

Town of Highgate, Vermont HAZARD MITIGATION PLAN 2026



VT78 in East Highgate during January 1998 Ice Storm.

Adopted by the Town of Highgate, Selectboard
_____, 2026

Formally Approved by State of Vermont and FEMA
_____, 2026

Table of Contents

Executive Summary.....	v
1. INTRODUCTION.....	1
2. PURPOSE.....	2
3. PLANNING PROCESS.....	2
Incorporation of Existing Plans, Studies, Reports and Technical Information	2
Documentation of the Planning Process, Public Input and Input from Neighboring Communities.....	4
Stakeholder Engagement and Public Outreach	5
Plan Development Process	6
4. COMMUNITY PROFILE.....	8
Demographics and Housing.....	8
Current Land Use	9
Energy	9
Emergency Services	10
Water Supply and Wastewater Disposal.....	10
Transportation	11
5. RISK ASSESSMENT.....	11
Identifying Hazards, Profiling Hazards, Estimating Losses and Assessing Vulnerability	11
Major Disaster Declarations in Vermont.....	15
2020 Pandemic	15
Climate Change.....	15
Hazard Profiles:.....	18
Flooding and Fluvial Erosion – <i>Moderate Risk</i>	18
Severe Winter Storms (Ice Storm) – <i>Moderate Risk</i>	25
Strong Winds (Windstorm, Thunderstorms, Tornado, Tropical Storm, Hurricane) – <i>Moderate Risk</i>	30
Landslide – <i>Moderate Risk</i>	37
Invasive Species – <i>Moderate Risk</i>	40
Extreme Cold – <i>Low Risk</i>	43
Extreme Heat – <i>Low Risk</i>	46

Infectious Disease Outbreak – *Low Risk* 48

Drought – *Low Risk* 50

Hail – *Low Risk* 52

Wildfire – *Low Risk*.....54

Dam Failure – *Low Risk* 56

Earthquake – *Low Risk* 57

6. COMMUNITY CAPABILITIES.....59

How This Plan Will Improve Existing Capabilities 59

Administrative and Technical 67

Municipal Funds.....67

Grand List.....67

National Flood Insurance Program (NFIP) 68

Staffing, Enforcement and Continued Compliance in the NFIP 68

River Corridor Bylaws.....68

Substantial Damage and Substantial Improvement 69

Repetitive Loss 69

Structures in the Special Flood Hazard Area.....69

Critical Facilities 69

Vermont’s Emergency Relief Fund (ERAF) 70

7. MITIGATION STRATEGY.....70

General Mitigation Goals 70

Identified Hazard Mitigation Actions, Programs and Activities 70

Prioritizing Mitigation Actions 71

Criteria for Analysis 71

Cost – Benefit Review 71

Mitigation Action Changes in Priorities 77

Integration Into Existing Plans and Procedures 78

8. PLAN MAINTENANCE 80

Annual Monitoring and Evaluation 80

Plan Updating 81

List of Figures

Figure 1: Location Map of Highgate, Vermont.....8

Figure 2: Highgate Flood Zone and River Corridors 19

Figure 3: Lakeshore flooding and Inundation Flooding History of Occurrences.....21

Figure 4: Lake Champlain Water Level Benchmarks	22
Figure 5: Minimum Snow Loads for Construction	26
Figure 6: Ice Storm Damage.....	27
Figure 7: Seasonal Record Snow Falls, Burlington, Vermont (NOAA, BTV)	28
Figure 8: Beaufort Wind Scale (NOAA)	33
Figure 9: Enhanced Fujita Scale (Source NOAA)	35
Figure 10: Saffir Simpson Hurricane Scale	35
Figure 11: Landslide Problem Areas	38
Figure 12 Emerald Ash Borer, (ANR)	41
Figure 13: Flowering Japanese knotweed.	41
Figure 14: Wind Chill Temperature Index	44
Figure 15: Tornado and Storm Research Organization Hailstorm Intensity Scale.....	52

List of Tables

Table 1: Reference Materials	2
Table 2: Hazard Mitigation Planning Team.....	4
Table 3: Hazard Assessment Ranking Criteria	11
Table 4: Hazard Assessment	12
Table 5: Hazard Risk Summary	13
Table 6: Future Effects of Climate Change by Hazard for Highgate, VT	15
Table 7: Top 10 Historic Crests of Lake Champlain (NOAA)	22
Table 8: Average Monthly Temperatures in Highgate (NOAA).....	43
Table 9: Planning and Regulatory Capabilities	59
Table 10: Grant List Summary for Highgate, VT (2026).....	67
Table 11: Cost - Benefit Review	72
Table 12: 2020 Mitigation Actions Update	72
Table 13: 2026 Mitigation Actions	73
Table 14: Mitigation Action Status	81

Appendices

Appendix A: Selectboard Plan Resolution	A.1
Appendix B: Mitigation Action Scoring Table.....	B.1
Appendix C: Major Disaster Declarations	C.1
Appendix D: Extremely Hazardous Sites (EHS) and Critical Facilities, Highgate, VT	D.1
Appendix E: Hazard History	E.1
• Winter Storm (Ice Storm).....	E.1
• Lake Shore Flooding and Inundation Flooding	E.10
• Lake Shore Erosion and Fluvial Erosion	E.13
• Strong Winds (windstorm, thunderstorms, tornado, tropical storms, hurricane)	E.15
• Extreme Cold	E.22
• Extreme Heat	E.27
• Hail	E.28
Appendix F: Maps	
• Facilities and Utilities.....	F.1
• Current Land Use	F.2
• Water Resources.....	F.3

Appendix G: Stakeholder and Public Outreach Plan.....	G.1
Appendix H: Community Survey & Results	H.1

Executive Summary

The purpose of hazard mitigation is to reduce or eliminate long-term risk to people and property from natural hazards and their effects. The Town of Highgate Hazard Mitigation Plan is a comprehensive strategy designed to reduce the risks posed by natural hazards and enhance the resilience of the community. Developed through a planning process involving a committee of key staff and stakeholders, the plan identifies natural hazards, assesses vulnerabilities, and outlines mitigation strategies to protect lives, property, and the environment in the town.

The legislative authority that provides the legal basis for mitigation is derived from the Stafford Act, as amended by the Disaster Mitigation Act of 2000. Section 322 of the Stafford Act specifically addresses mitigation planning. This establishes the requirement that state and local governments prepare hazard mitigation plans as a precondition for receiving FEMA mitigation project grants. More importantly, this plan and planning process lays out the strategy that will enable the town to become less vulnerable to future disaster losses. The process followed a methodology prescribed by FEMA.

The hazard identification and risk assessment process identified and examined a range of hazards with the potential to impact the community. It focuses on the specific hazards that were considered the greatest threat to the community including strong winds, flooding and fluvial erosion and severe winter storms (ice storms). It included the history of losses and analyzed future risks posed to the town. Analysis of historical data, modeling, and stakeholder input informed the identification of high-risk areas, critical infrastructure and vulnerable populations.

The plan identifies several mitigation strategies and actions that are based on the results of the risk assessment. They are aimed at reducing risk, enhancing preparedness, and promoting resilience across The Town of Highgate. The actions are summarized into four types: local planning and regulations, structural and infrastructure projects, natural system protections and education and awareness programs. The plan also includes a review of the town's current capabilities to reduce hazard impacts.

This plan (has been /will be) formally adopted by the Town of Highgate Selectboard. It is required to be updated at a minimum of every five years. Monitoring and evaluation mechanisms were established to track progress, assess effectiveness, and adapt strategies as needed to address changing conditions and emerging threats. By working together and implementing targeted mitigation measures, we can protect lives, property and the environment, and ensure a safer and more sustainable future for all residents of the community.

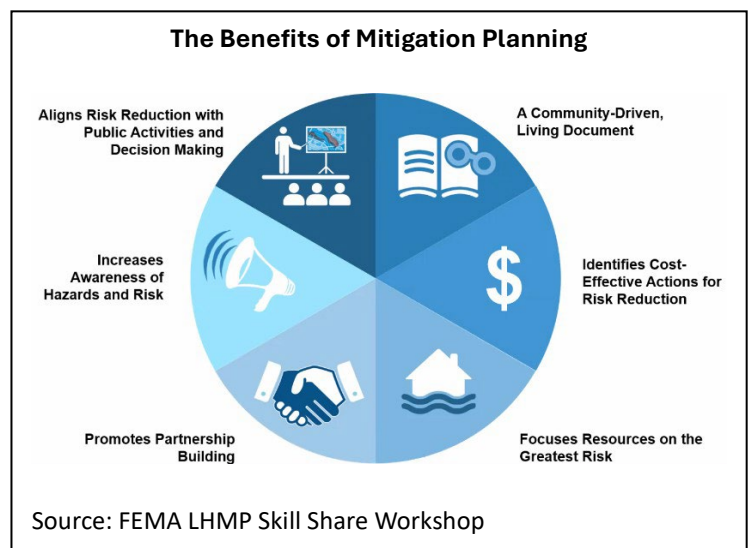
1. INTRODUCTION

The impact of expected, but unpredictable natural and human-caused events can be reduced through community planning. The goal of this plan is to provide an all-hazards local mitigation strategy that makes the Town of Highgate more disaster resistant.

Hazard mitigation is any sustained action that reduces or eliminates long-term risk to people and property from natural hazards and their effects. Based on the results of previous efforts, FEMA and state agencies have come to recognize that it is less expensive to prevent disasters than to repeatedly repair damage after a disaster has struck. This plan recognizes that communities have opportunities to identify mitigation strategies. 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 (but not limited to) projects such as:

- Flood-proofing structures
- Tying down propane/fuel tanks in flood-prone areas
- Elevating furnaces and water heaters
- 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 harm's way
- Establish & enforce appropriate building codes
- Public information and education.



2. PURPOSE

The purpose of this Hazard Mitigation Plan is to assist the Town of Highgate in identifying all hazards facing the county and their community and identify strategies to begin reducing risks from identified hazards. Once adopted, the local mitigation plan is not legally binding; instead, it outlines goals and actions to prevent future loss of life and property.

Highgate strives to be in accordance with the strategies, goals and objectives of the state of Vermont's Hazard Mitigation Plan.

Adopting and maintaining the Local Hazard Mitigation Plan will provide the following benefits:

3. PLANNING PROCESS

The Town of Highgate, Vermont Local Hazard Mitigation Plan 2026 is an update to the single jurisdictional Town of Highgate's Hazard Mitigation Plan 2020. The Town of Highgate and Northwest Regional Planning Commission conducted a thorough review of the 2020 Local Hazard Mitigation Plan at the beginning of the process and used it as a foundation to develop the 2026 Local Hazard Mitigation Plan.

Incorporation of Existing Plans, Studies, Reports and Technical Information

The Town of Highgate, VT Local Hazard Mitigation Plan 2026 development utilized plans, policies, studies, historical records, and data and technical information as a foundation. Such information provided a comprehensive understanding of existing hazards, vulnerabilities and community needs. The information ensured that the plan is effective and tailored to the specific context of the community.

A complete list may be found in Table 1.

Table 1: Reference Materials

Information Source	Review and Incorporation
American Community Survey Five Year Estimate 2023	Used to develop community profile section.
FEMA Disaster Declaration Website	Data from the site was used during the hazard profile and risk assessment sections.
FEMA Hazard Mitigation Assistance Program Policy Guide 2024	Used to ensure plan meets the Federal mitigation planning requirements including those address climate change.
FEMA Local Mitigation Planning Handbook 2023	The handbook was used to ensure plan meets the Federal mitigation planning requirements including those for addressing climate change. Referenced throughout the planning process.
FEMA NFIP Insurance Reports	Used to determine how many structures are insured, number of repetitive loss properties and describe NFIP compliance.

FEMA Risk Mapping, Assessment and Planning (Risk Map) Products	The data was referenced during the hazard profile and capabilities section of this plan.
National Oceanic and Atmospheric (NOAA) Climatic Data Center's Storm Events Database	Data was referenced and incorporated in the hazard identification and risk assessment section of this plan.
Northwest Regional Planning Commission Regional Plan 2023	The physical region section was referenced during the risk assessment as well as various data references on population and transportation.
Northwest Regional Planning Local Liaison Reports of Storm Damage	Referenced to develop the risk assessment section.
Town of Highgate Development Regulations 2025	The sections reviewed included zoning, subdivision regulations, and regulations for special flood hazard areas and regulations for river corridor areas.
Town of Highgate Municipal Plan 2023	Existing land use, population, transportation and future land use, public facilities, public services, flood resilience. The plan was referenced throughout the process.
Town of Highgate Road Erosion Inventory (Municipal Roads General Permit)	Referenced to develop the risk assessment section and mitigation actions section.
Town of Highgate, VT Flood Insurance Study 1983	The date was referenced for risk assessment section and used in capabilities section.
Town of Highgate, VT Flood Insurance Rate Maps 1983	The date was referenced for risk assessment section and used in capabilities section.
VELCO and Swanton Electric Outage Reports	Reference during Risk Assessment section of plan.
Vermont Agency of Transportation Bridges and Culverts On-Line Database	The data was referenced during the risk assessment and mitigation actions review.
Vermont Agency of Transportation Resilience Planning Tool	Referenced to develop the risk profile and mitigation actions.
Vermont ANR's Natural Resource Atlas	Tool was referenced throughout the process.
Vermont Bridge and Roads Standards – 2026	The document was referenced during the capabilities and mitigation projects meetings.
Vermont Climate Office Municipal Climate Change Vulnerability Index Tool	Tool used to understand municipal vulnerabilities to climate change across several social, economic, and environmental factors.
Vermont Dam Inventory	The tool was referenced during the risk assessment section and mitigation actions to address floods.
Vermont Department of Health website	Referenced during research of hazard identification and risk assessment section of plan.
Vermont Flood Ready Website	Data from the website was referenced throughout the planning process and used in various sections of the plan.

Vermont Functional Floodplain Initiative Web Tool	Referenced during research of hazard identification and risk assessment section of plan.
Vermont Hazard Mitigation Plan 2023	The entire plan was reviewed and referenced during the development of this plan.

Documentation of the Planning Process, Public Input and Input from Neighboring Communities

Northwest Regional Planning Commission was selected under contract with the Town of Highgate in November 2025. The Town of Highgate assembled a Hazard Mitigation Planning Team to participate in creating a Hazard Mitigation Plan. The Town actively invited various stakeholders in the planning process including residents, local businesses, local neighboring government agencies, regional emergency management committee, school, and non-profits that work directly with or provide support to people with disabilities and functional access needs.

Planning Team Member: A planning team member is a designated individual who actively participates in the planning process. They may be responsible for specific tasks such as data analysis, strategy development, and drafting the plan. Planning team members are usually part of the formal planning structure and may have specific roles based on their expertise or position within an organization.

Stakeholder: While stakeholders are also involved in the process, they may not have a formal role or responsibility within the planning team. Their participation is often more about providing input, feedback, and support rather than executing the planning tasks. Stakeholders can influence the planning process through their contributions but are not necessarily tasked with specific planning duties. Table 2 depicts the planning team.

Table 2: Hazard Mitigation Planning Team

Name	Organization	Role
AJ Johnson	Town Administrator (EM Coordinator)	Planning Team Lead (Selectboard Liaison)
Shaun Coleman	Northwest Regional Planning Commission	Planning Team Member
Merry Souza	Selectboard Chair	Planning Team Member
Luc Dupois	Planning Commission Chair	Planning Team Member
Wendi Dusablon	Town Clerk	Planning Team Member
Scott Bessette	Highgate Planning Commission Vice Chair Highgate Co-Road Commissioner	Planning Team Member
Jack Pelkey	Highgate Planning Commission Member	Planning Team Member
Ty Choiniere	Highgate Planning Commission Member	Planning Team Member
Thomas Conley	Highgate Planning Commission Member	Planning Team Member

Gary Greenough	Highgate Fire Chief	Planning Team Member (First Response)
William Sheets	Swanton Village Electric Swanton Village Manager	Stakeholder (Electric Utility)
Brian Savage	Swanton Town Administrator	Stakeholder (neighboring community)
Stephen Dodd	Sheldon Selectboard Chair	Stakeholder (neighboring community)
Dave Benion	Franklin Selectboard Chair	Stakeholder (neighboring community)
Erin Creeley	EP, Vermont Department of Health, St. Albans District	Stakeholder (Public Health)
Reginald Beliveau, Jr.	Franklin County Regional Emergency Management Committee	Stakeholder (REMC)
Jess Graff	Director, Champlain Valley Office of Economic Opportunity (CVOEO)	Stakeholder (People with Disabilities and Functional Access Needs)
Ashley Bartley	Visiting Nurses Association	Stakeholder (Senior Healthcare, Hospice and Community Support Services)
Dan Palmer	Missisquoi Valley Union High School	Stakeholder (Education)
Carl Watkins	Franklin County Regional Chamber of Commerce	Stakeholder (Local Businesses)
Tim Smith	Franklin County Industrial Development, Northern VT Economic Development District	Stakeholder (Economic Development)
Dennis Nolan	Historical Society	Stakeholder (Historical and Cultural Resources)
Lindsey Wight	Missisquoi River Basin Association	Stakeholder (Natural Resources)
Bridget Butler	Friends of Northern Lake Champlain ED	Stakeholder (Natural Resources)
Lauren Weston	Franklin County Natural Resources Conservation District	Stakeholder (Natural Resources)

Stakeholder Engagement and Public Outreach

The mitigation committee and NRPC developed a stakeholder and public outreach plan to ensure they were given opportunities to be involved in the plan's development process. Engagement and outreach are crucial for hazard mitigation planning for several reasons including fostering inclusive decision-making,

strengthening community resilience through active participation, raising risk awareness and preparedness through education, transparency, and promoting consensus building. The plan may be found in Appendix G.

Plan Development Process

Several planning meetings were held to discuss the development of the Hazard Mitigation Plan update. All meetings were open to the public. Public in attendance at the meetings were encouraged to participate. All meeting agendas were posted at 3 locations in the municipality in compliance with the requirements of Vermont Open Meeting Law. Hard copies of drafts discussed at meetings were available to the public in attendance at meetings and upon request.

January 21, 2026: The Town of Highgate's initial meeting with Town Administrator and NRPC staff member to discuss the mitigation planning process, assembly of planning team, stakeholder engagement and public outreach plan. This included a review of the Town's new Communication Plan & Policy.

February 3, 2026: Survey and flyer were finalized and released to the public by the Town Administrator. This was to solicit input from the whole community. The town proved notice of the survey by posting at several locations throughout the community including the library, Town Office, and Post Offices. The flyer with QR code was also posted on Town's official webpage, Facebook page and NRPC's Town of Highgate's Mitigation Plan project web page.

February 17, 2026 – Kickoff meeting at the Town Office with a virtual option to participate. The meeting was held during the Highgate Planning Commission meeting. The public meeting was warned following Vermont's Open Meeting Law requirements. Communication methods followed the stakeholder and public outreach plan to ensure the whole community had an opportunity to participate. NRPC staff facilitated the hybrid meeting. The meeting focused on past efforts, the FEMA mitigation planning process, plan update considerations, FEMA guidance, a review of the State Hazard Mitigation Plan, roles and timeline. The group also agreed to continue to utilize the NRPC website as the host for the project website for ease of administration.

February 20, 2026: NRPC staff compiled and distributed notes and related materials.

March 17, 2026: The committee held the hazard identification and risk assessment meeting with a virtual option at the Town Office. The public meeting was warned following Vermont's Open Meeting Law requirements. Communication methods followed the public stakeholder and public outreach plan to ensure the whole community had an opportunity to participate. NRPC staff reviewed the mitigation planning process, community outreach efforts, timeline, review of local hazards, state hazards identified in the state Hazard Mitigation Plan, review of hazard data, update of the risk assessment section based on participant feedback. The survey was reviewed to view any input from the public.

March 20, 2026: NRPC staff compiled and distributed notes and related materials.

April 21, 2026: The Policies, Plans and Capabilities Meeting at the Town Office was held with virtual option to participate. The meeting was held during the Highgate Planning Commission meeting. The

public meeting was warned following Vermont's Open Meeting Law requirements. Communications methods followed the stakeholder and public outreach plan to ensure the whole community had an opportunity to participate. The participants reviewed existing village resource capacity and capabilities, flood plain regulations, ordinances, stormwater infrastructure and inventories, local emergency management plan, and budget. The committee reviewed survey responses to date.

April 24, 2026: NRPC staff compiled and distributed notes from the previous meeting and reviewed town plans, policies, ordinance and budget as provided.

May 19, 2026: The Mitigation Actions, Strategies and Priorities meeting was held at the Town Office with virtual option to participate. The meeting was held during the Highgate Planning Commission meeting. The public meeting warned following Vermont's Open Meeting Law requirements. Communication methods followed the stakeholder and public outreach plan to ensure the whole community had an opportunity to participate. The meeting was centered on hazard mitigation strategies, confirmed mitigation goals and discussed past and future mitigation projects for the Town.

May 23, 2026: NRPC staff compiled and distributed meeting notes from the previous meeting.

June 26, 2025 - The Northern Vermont Economic Development District held a meeting on the Flood Recovery and Resiliency Plan. The meeting included updates on the hydrologic model, and outreach efforts to businesses that was being conducted by a consultant on behalf of the economic development business offices. Areas of concern that were previously identified during the mitigation committee meetings presented for incorporation into the model.

August 1 to September 1, 2026: Draft plan written.

September __, 2026: Public comment period opens. Plan made available on town website, NRPC website and social media. Hardcopies of the plan made available at town office and NRPC office. An email was sent to the Emergency Management Directors of Swanton Town, Franklin and Sheldon, Vermont, with a draft version of the plan as an attachment, soliciting comment on the draft via email. Postings included instructions to email comments to Shaun Coleman, Senior Planner at Northwest Regional Planning Commission. NRPC Senior Planner also directly emailed final drafts to neighboring towns and stakeholders to seek input.

October __, 2026: The public comment period will close. Final survey results and additional stakeholder input were incorporated into the final draft. The Town Administrator requested the draft plan and FEMA's Local Mitigation Plan Review tool to be filled out and submitted to VEM and FEMA for review and approval pending adoption.

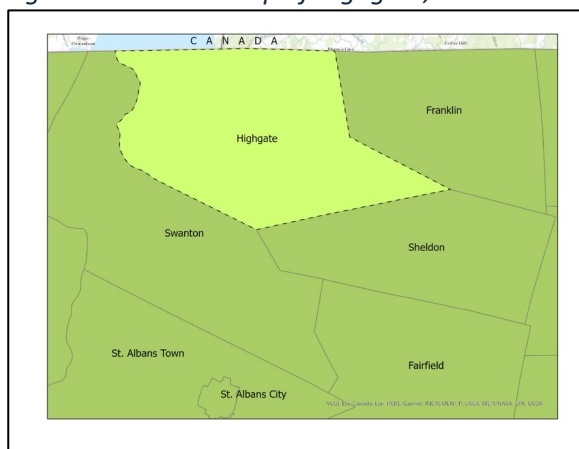
October __, 2026: The final draft LHMP and FEMA's Local Mitigation Plan Review Tool was submitted to VEM and FEMA for approval pending adoption.

4. COMMUNITY PROFILE

Highgate is located in the northwestern corner of the State of Vermont in Franklin County. Three towns, a lake, and a country border it. The Town of Franklin borders it to the east, the Town of Sheldon borders it to the southeast, and the Town of Swanton borders it to the southwest. Lake Champlain makes up Highgate's western border while Quebec, Canada makes up the northern border. The Town covers approximately 33,803 acres, which is 52.82 square miles.

Settlement in Town is typically spread out either along the existing roadways or along the shoreline. Commercial and industrial development is primarily located along VT 78 and within the village areas. Commercial “strip” forms of development have been occurring along State Road 78 west of Highgate Center, particularly near the Franklin County State Airport. The great majority of residential land use occurs within about two miles of Highgate Center, particularly east and west along State Route 78. Increased residential land use is also developing near U.S. Route 7 in the southwest quadrant and north of the State-owned airport.

Figure 1: Location Map of Highgate, Vermont



Highgate's topography is defined by two watersheds; the Rock River Watershed and the Missisquoi Watershed. Its dominant surface water resources are the Missisquoi River and Missisquoi Bay. The Missisquoi River serves as an important resource for hydroelectric energy to the region's development. However, such projects have greatly reduced the recreational benefits over the years. The Missisquoi River drains into Missisquoi Bay, a valuable recreational and water resource for the Town and region.

The Missisquoi National Wildlife Refuge consists of 6,642 acres of quiet waters and wetlands that attract large flocks of migratory birds. It is located on the eastern shore of Lake Champlain near the Canadian border. The 5,839-acre refuge includes most of the Missisquoi River Delta where it flows into Missisquoi Bay. The river delta, shared by the towns of Highgate and Swanton, consists of approximately 1,500 acres of freshwater marsh and swamp. Aside from its rich ecological wildlife value, the area has hydrological potential as a major source of potable ground water.

Demographics and Housing

The American Community Survey (ACS) estimated the population of Highgate was 3,528 in 2024 compared to 3,397 in 2000. The median age in Highgate is 44. Approximately 22.2% of the population is age 65 or older, while 15.8% is under 18 years of age. Additionally, 15.4% of the population under age 65 has a disability. While Highgate's population decreased between 2010 and 2020 by -1.78%, Franklin County as a whole continued to grow by 4.61% during the same period, suggesting Highgate's shift is a local trend, not regional.

The median household income is \$81,017 while 8.1% of the population are in poverty. According to the 2020 ACS, there were 1,662 housing units in Highgate. Of these, 1,164 were owner-occupied and 289 were renter-occupied year-round housing. The total number of housing units has increased by 21% since 2000. A minority of the housing units, 16.5%, were classified as vacant by the US Census, (excluding seasonal units).

The current 2026 municipal Grand List values of all structures is \$453,169,200. The median value of owner-occupied housing unit \$280,500 (ACS 2024).

Current Land Use

Land in Highgate is used primarily for agriculture or is considered forestland. The Town covers 59.8 square miles (38,279 acres), 11.5 square miles (7,291 acres or 19 percent) of which are covered by water. Of the 38,279 total acres, the number of acres in agricultural use is 16,057 acres, or 42 percent of the total. The number of acres of forested land is approximately 9,559 acres, or 18 percent of the total. Wetlands, shorelines and other non-buildable locations account for 14 percent of the land area in Highgate. The remaining 7 percent of the acreage in the Town is used for residential purposes, as either available for residential development, or for transportation purposes.

The Town of Highgate has four areas of State owned land covering a total of 668 acres. These areas include Highgate State Park (which is within the Highgate Cliffs Natural Area) covering 37 acres, the Rock River Access Area covering 7 acres, the Rock River Wildlife Management Area covering 296 acres and the Franklin County Airport covering 348 acres.

Development in Highgate is generally spread along roads (VT78, US Route 7, VT207) and shorelines of Lake Champlain. Commercial and industrial activity is concentrated along VT 78 and in Highgate Center, with additional businesses and home occupations scattered throughout town. Strip development west of Highgate Center, near the airport and Missisquoi Valley Union High School, has contributed to traffic conflicts.

Residential growth is the town's most significant development trend, driven largely by commuters to Franklin and Chittenden Counties. Homes cluster around Highgate Center and along VT 78, with smaller concentrations near U.S. Route 7, the airport, East Highgate, and Highgate Springs. The villages also contain many public services, while Highgate Springs sees seasonal resort activity. Sand and gravel extraction remains a major land use, though deposits are declining; changes in the industry may affect future land use and regional economic development.

Energy

Three utilities serve Highgate: Swanton Electric Department (majority), Vermont Electric Cooperative (rural edges), and Green Mountain Power (small southeastern area). Additionally, 12.5 MW of energy is generated from various ground and roof mounted facilities.

An estimate of current residential thermal energy demand in Highgate, based on data from the American Community Survey (ACS 2011-2015). The data shows that 58% of households in Highgate depend on fuel oil as their primary source for home heating. This is followed by propane (13.8%) and wood (16.8%). Wood includes both cord wood and wood pellets. Natural gas is used for heat by 10.9% of households.

Emergency Services

The town has no local police department. Vermont State Police, Franklin County Sheriffs' Department and St. Albans City Police Department (under contract) cover all areas of law enforcement from traffic violations to major crimes. The U.S. Border Patrol maintains a presence, increasing law enforcement support in the area.

The Town Fire Department is staffed by approximately 25 trained volunteers. The main funding of the operations comes from town appropriations, donations and fundraisers. The department responds to over 100 calls on average, mostly motor vehicle accidents. There are less than 5 structure fires per year on average. The US Coast Guard out of Burlington also offers some assistance during lake emergencies.

Missisquoi Valley Rescue Squad provides ambulance and rescue services for Highgate and Swanton. Services are funded through private donations, contracts, and fees. The squad has approximately 24 paid/volunteer staff made up of paramedics and EMTs.

Both fire and rescue are part of the are members of Franklin County Mutual Aid. Members provide assistance to one another during emergencies when needed. The agreement extends over the border to some neighboring communities in Quebec. The reimbursement rates for assistance follow the FEMA rates.

The nearest hospitals are Northwestern Medical Center in St. Albans and the University of Vermont Medical Center in Burlington.

Highgate adopted a Local Emergency Management Plan (LEMP) in 2025 to initiate response to serious crises. The LEMP is reviewed and updated as needed on an annual basis. The Town Selectboard has executed a National Incident Management System (NIMS) resolution and continually strives to remain current on NIMS compliance through training and reporting to Vermont Department of Public Safety.

Water Supply and Wastewater Disposal

Water is primarily supplied by individual wells and wastewater disposal is handled on an individual, on-site basis. There is no municipal water supply or wastewater treatment system in the Town. There are state regulations that must be met for proper waste disposal.

The Town received a Municipal Planning Grant and DEC Wastewater Planning Advance to examine wastewater and water supply solutions for the Highgate Village Core area. The goal of this effort was to identify a variety of alternative systems to provide water and wastewater services for Highgate Center with the goal of allowing growth in the village core. The Town is considering options for expanding wastewater and water services to the Franklin County Airport which owned by the State.

Transportation

U.S. Route 7 is a major State maintained arterial, which parallels I-89 to the west of the latter and terminates near the northernmost interchange of I-89. U.S. Port of Entry at Highgate Springs is located at the northern end of I-89 before continuing to Autoroute 35 in Canada.

VT 78 serves east-west travel in Highgate. The capacity of the roadway to handle peak traffic is impacted by the Missisquoi Valley Union High School, truck traffic off the Swanton I-89 interchange (exit 22), the various sand/gravel pit operations, the Highgate Transfer Station, and increased commercial/industrial activity associated with areas neighboring the State Airport. Agricultural vehicles are becoming a concern of the Town in terms of the weight and subsequent damage they can place on town roads. Planning Commissioners noted that as farming practices have changed, equipment is getting larger and having more of an impact and as farms consolidate, farmers are traveling farther between fields with their equipment. Highgate has three municipally owned bridges: Bridges #23 (St. Armand Rd), #24 (Tarte Rd) and #25 (Machia Rd). Bridges #23 & #24 need some minor repairs but are generally in good condition. Bridge #25 was replaced in 2019 and is in good condition with no need for repairs.

5. RISK ASSESSMENT

Identifying Hazards, Profiling Hazards, Estimating Losses and Assessing Vulnerability

The risk assessment process involves identifying potential hazards, analyzing their impacts and assessing the vulnerabilities and evaluating the potential impacts of those hazards on the community. This includes evaluating historical disaster data, mapping hazard prone areas and estimating potential damages to people, property, infrastructure and the economy. Changes in the community profile, potential impacts of climate change, historical data and social and economic challenges, the hazard ranking varies from the 2020 Hazard Mitigation Plan.

The Planning Team discussed how climate change, land use, and demographics may increase the town's vulnerability to certain hazards. Climate change is expected to worsen these vulnerabilities by intensifying the frequency and severity of weather events and altering weather patterns. Demographic shifts, such as an aging population, higher population density, socioeconomic disparities, cultural and linguistic diversity, urbanization, transient and migrant populations, and a growing number of individuals with disabilities or functional access needs, further amplify risks. The team reached its decisions through broad consensus.

Table 3: Hazard Assessment Ranking Criteria

Score	Frequency of Occurrence: Probability of a plausibly significant event impacting the community or regional scale based on previous occurrences and climate change projections.	Potential Impact: Severity and extent of damage and disruption to built and natural environments, people, and the economy
1	Unlikely:<1% probability of occurrence per year	<u>Negligible</u> : isolated occurrences of minor built or natural environmental damage, potential for minor injuries, health, or well-being impacts, or minimal economic disruption.

2	Occasionally: 1–10% probability of occurrence per year, or at least one chance in next 100 years	<u>Minor</u> : isolated occurrences of moderate to severe built or natural environmental damage, potential for injuries or health or well-being impacts, minor economic disruption.
3	Likely: >10% but <75% probability per year, at least 1 chance in next 10 years	<u>Moderate</u> : severe built or natural environmental damage on a community scale, injuries, fatalities or impacts to individual and community well-being, short-term economic impact.
4	Highly Likely: >75% probability in a year	<u>Major</u> : severe built or natural environmental damage on a community or regional scale, multiple injuries or fatalities or severe long-term impacts to individual and community well-being, significant long-term economic impact.

The Hazard Assessment for the Town derives a relative *Risk Score* which is the average of the sum of *Potential Impacts* multiplied by the *Probability* for each hazard. The relative risk score is categorized as:

- No Risk: 0
- Low Risk: 1 – 5
- Moderate Risk: 6 – 11
- High Risk: 12 – 16

All hazards identified in the state hazard mitigation plan were considered for incorporation into the Highgate Hazard Mitigation Plan. The hazards with the highest risk scores are winter storm (ice storm), invasive species, lake shore flooding and flood inundation and Lake Shore Erosion and Fluvial Erosion.

Table 4: Hazard Assessment

Hazard	Probability	Potential Impact				Average	Total Score*:
		Infrastructure	Life	Economy	Environment		
Flood Inundation and fluvial erosion	4	3	2	1	1	1.75	7
Severe Winter Storm (Ice Storm)	4	2	2	1	1	1.5	6
Wind (windstorm, thunderstorm, tornado, tropical storm, hurricane)	4	2	1	1	1	1.25	5
Invasive Species	4	1	1	1	2	1.25	5
Landslide	3	2	1	2	1	1.5	4.5
Cold	3	1	1	2	1	1.25	3.75
Heat	3	1	1	1	2	1.25	3.75
Infectious Disease Outbreak	1	1	3	4	1	2.25	2.25

Drought	1	1	1	2	1	1.25	1.25
Hail	1	1	1	1	1	1	1
Wildfire	1	1	1	1	1	1	1
Dam Failure	1	1	1	1	1	1	1
Earthquake	1	1	1	1	1	1	1

Table 5: Hazard Risk Summary

Hazard Type	Probability	Impact / Magnitude	Risk	Vulnerability
Flood Inundation & Fluvial Erosion	Highly Likely	Moderate to Major	High	Loss of road access, power loss, telecommunications loss. Roads, bridges, commercial and residential structures and properties, homes located in SFHA. People with disabilities and functional access needs.
Severe Winter Storm (Ice Storm)	Highly Likely	Negligible to Major	High	Loss of road access, power loss, telecommunications loss. Roads, bridges, commercial and residential structures, homes located in SFHA. People with disabilities and functional access needs.
Wind (windstorm, tornado, tropical storm, thunderstorm, hurricane)	Highly Likely	Negligible to Moderate	Moderate	Falling limbs and/or trees, power loss, telecommunications loss, structural damage to commercial and residential structures, roof damage, older mobile homes, barns, barn roofs. Business losses from telecom outages.
Invasive Species	Highly Likely	Negligible to Moderate	Moderate	Loss of road access, power loss, telecommunications loss. Roads, bridges, commercial and residential structures, homes located in SFHA. People with disabilities and functional access needs. Residences and seasonal homes along lakeshore, roadways, utilities.
Landslides	Likely	Moderate to Major	Moderate	Transportation infrastructure and residents along Missisquoi River south of Highgate Center and north of Highgate Falls Landfill and transfer station. People with vulnerabilities or functional access needs. Water quality.

Cold	Likely	Minor	Moderate	Power transformers, village water and sewer lines, residential and commercial structures, roads, culverts, Town Office, Fire and Rescue buildings, delivery services, livestock, pets, people with disabilities and functional access needs, HVAC workforce.
Heat	Likely	Minor	Moderate	Power transformers, village water and sewer lines, residential and commercial structures, roads, culverts, Town Office, Fire and Rescue buildings, delivery services, livestock, pets, people with disabilities and functional access needs, HVAC workforce.
Infectious Disease Outbreak	Unlikely	Moderate	Low	All sectors of the community, especially people with disabilities or functional access needs, health center, town operations, schools and businesses.
Drought	Unlikely	Minor	Low	Farms, livestock, residential gardens, forests, village water and sewer, residential and commercial wells structures, Town Office, Fire and Rescue buildings, pets, people with disabilities and functional access needs, HVAC workforce.
Hail	Unlikely	Negligible to Minor	Low	All public and private structures particularly roofs, vehicles, utilities telecommunications, crops and gardens.
Earthquake	Unlikely	Negligible to Major	Low	Infrastructure damage to transportation network. Structural damage to residences, commercial buildings, Town Office, Fire and Rescue buildings, Town Garage, Water and Waste Water Depts., and utilities. People with disabilities and functional access needs for evacuations or sheltering in place.
Wildfire	Unlikely	Minor	Low	Residential homes, commercial structures, utility poles and lines, road closures, fires in rural areas lacking fire breaks. People with disabilities and functional access needs for evacuations or air quality issues.
Dam Failure	Unlikely	Negligible to Minor	Low	Transportation infrastructure on VT78 and Monument Road.

Major Disaster Declarations in Vermont

There were approximately 25 Disaster Declaration in the Franklin County Vermont with damage totals of \$9.5M and FEMA obligations of \$7.9M. Refer to Appendix C for a list of disaster declarations.

2020 Pandemic

During the 2020 pandemic, the Town faced significant challenges such as limited local healthcare resources and economic disruptions, especially for small businesses. Social distancing measures led to the closure of local schools, restaurants, businesses, and shops, causing financial strain. The Town also saw shifts in community dynamics, with many residents relying more on neighbors and limited local services for support. The municipal offices adapted by finding ways to stay connected through continuity of operations planning that enabled staff to work remotely while still carrying out business operations, hold virtual governance committee meetings to conduct Town business, and implementing State protective guidelines for municipal departments to ensure all departments could continue to operate safely. The lessons learned from 2020 will serve the Town well should another pandemic occur.

Climate Change

Climate change is real. The impacts are witnessed today, with more frequent and intense extreme weather events like heavy downpours, shorter frost-free growing season and warmer nighttime temperatures. Although Highgate contributes minimally to global climate change, it must address the local consequences by building resilience and capacity. These impacts pose challenges in terms of economic or infrastructure vulnerabilities, and for native species and habitats. While some effects of climate change may be positive, the negative impacts—such as threats to agricultural production, increased flooding, and reduced snow cover affecting winter recreation—are of serious concern for their economic, social, and environmental consequences.¹ Table 6 summarizes the future effects of climate change for Highgate.

Table 6: Future Effects of Climate Change by Hazard for Highgate, VT

Hazard Event	Future Effects of Climate Change
Flooding & Fluvial Erosion	An increase in annual precipitation rates due to climate change could potentially exacerbate inundation flooding and fluvial erosion events in the future. Since the 1960s, the state of Vermont has seen a 6" increase in average annual precipitation, attributed to the warming of the atmosphere and subsequent increased evaporation rates ² . Such changes will impact road infrastructure and the storm water infrastructure and wastewater treatment. More residents could experience flooding on their properties where minor drainage issues now may exist. Buildings and home located near the river and tributaries may be a greater risk as frequency of flooding and fluvial erosion increase.
Lakeshore erosion	An increase in annual precipitation rates could exacerbate fluvial and lakeshore erosion. Since the 1960s, the state of Vermont has seen a 6" increase in average annual precipitation, attributed to the warming of the atmosphere and subsequent increased evaporation rates. Such changes will impact road infrastructure and the storm water drainage. More residents could experience erosion on their properties.

¹ Vermont Climate Assessment, (2021) University of Vermont, Gund Institute for Environment.

² <https://climatechange.vermont.gov/vermont-today>

	Buildings and home located near streams may be a greater risk as frequency of erosion increase.
Severe Winter Storm (Ice Storm)	Winter in Vermont has been reported to be warming 2.5 times faster than the global average annual temperatures since 1960, affecting the snow conditions for many sectors of the local economy. Severe winter storms may bring more rain than snow, high winds, and flooding conditions due to decreased ground frost. Warming winters will have a significant effect on maple sugar production that relies on temperatures at or below 0°C / 32°F at night and above freezing during the day for sap to run. For the tourism sector, reduced snow packs will impact winter recreation on the lake with less snow mobile users, Nordic skiers, and could impact ice fishing and those traveling through the Town and frequenting local businesses. Climate change is projected to alter ice storms by increasing their potential intensity according to NOAA. Regions that traditionally experience heavy winter snowfall will more frequently hover near the freezing mark, transforming snow into freezing rain. Because a warmer atmosphere holds more moisture, future ice storms are expected to pack higher precipitation volumes. This increases the risk of heavier ice accumulations that can severely damage forest ecosystems, orchards, forests, and utility infrastructure like power, cable and fiber optic lines.
Wind (windstorm, tornado, tropical storm, thunderstorm, hurricane)	According to the NOAA, as the world warms, the jet stream is expected to get faster, with the fastest winds increasing by about 2% for every degree Celsius (1.8° Fahrenheit) of warming. This could lead to greater increase of high wind events and include record-breaking winds that could cause increased damages notably to rural roads in forested areas, electric utility infrastructure, tree damage, residential roof and siding damage particularly mobile homes, and flying debris.
Invasive Species	Rising average annual temperatures will have potential impacts on forests and the ag sector of the local economy. Stress will occur on native species as the climate becomes more favorable for southern species. Local impacts will be on the forest products, agriculture, and tourism industry. Particularly concerning are pests like the Asian longhorned beetle (not yet found in Vermont), emerald ash borer, and hemlock woolly adelgid, which have already killed millions of trees across North America.
Landslides	Increased rainfall, particularly intense or prolonged storms, can saturate soil and destabilize slopes, while rapid snowmelt and ground frost thaw further contribute to ground instability. Additionally, clear cut practices that strip large areas of vegetation from hillsides, reducing soil cohesion and increasing landslide risk during subsequent rains. These changes may lead to more frequent, widespread, and severe landslides, posing growing threats to infrastructure, ecosystems, and human safety, especially in mountainous areas.
Cold	With the climate change trend being towards warmer temperatures, future extreme cold periods beyond the norm are unlikely.
Heat	Extreme, prolonged heat will impact the public health sector by placing those with functional access needs at risk; it will impact first response services and local health offices during long spells of heat. The Town will have to continue to monitor local capacities for their predefined cooling sites and first responder resources. Extreme heat can stress the electrical grid as more air conditioners will

	be put into use. Climate change may intensify mud season by causing earlier snowmelt and increased spring rainfall, leading to softer, more waterlogged soils that can severely damage unpaved roads and make them difficult and at times impassable to navigate for residents.
Infectious Disease Outbreak	The Vermont Department of Health defines an infectious disease as one that is caused by micro-organisms, such as bacteria, viruses, or parasites. A vector-borne disease is an infectious disease that is transmitted to humans by blood-feeding arthropods, including ticks, mosquitoes, and fleas, or in some cases by mammals (e.g. rabies). Rising temperatures will enable more diseases and their carriers to spread further north, where harsh winter conditions previously limited their expansion. All sectors and populations of the community including essential services, ambulance service and local health offices. public health sector, people with disabilities and functional access needs including elderly.
Drought	Warmer temperatures over prolonged periods without precipitation will lead to drought conditions. Warmer winters that lead to reduced snowpack would mean water sources are not getting recharged. This will impact those who rely on wells and impact the Town's water supply and distribution system. Drought conditions could also lead to increased wildfire risks which will impact the fire department resources and put private and public properties at risk.
Hail	Greater increase in hailstorm activity would increase damages to public infrastructure such as the public works vehicles, public building roofs, and private property.
Earthquake	No known impacts from climate change.
Dam Failure	Climate change may increase the potential impacts of a dam failure by contributing to more frequent and intense precipitation events, increased runoff, and flooding that can place additional stress on dam structures and downstream infrastructure. Changes in precipitation patterns, extreme weather, and more frequent freeze-thaw cycles may accelerate erosion, structural deterioration, and maintenance challenges. A dam failure during a future extreme weather event could result in greater downstream flooding, property damage, infrastructure impacts, environmental degradation, and increased risks to public safety.
Wildfire	Warming temperatures coupled with drought and greater frequency of wind could create a greater frequency of wildfires occurring. While much of the Town areas are developed, the likelihood of wildfire affecting them is very low. However, as has occurred in some suburban settings in Colorado in recent years, wildfire fueled by high winds could cause damage to residential areas in the Town areas. This would impact the fire department and Vermont Electric Co-op infrastructure. The tourist economy could be impacted due to wildfire smoke. Segments of the population that have functional access needs, particularly those with respiratory issues, would be impacted creating increased demands on ambulatory and health care services.

Readers looking for additional information on ice jams should review the State Hazard Mitigation Plan.

Hazard Profiles:

Flooding and Fluvial Erosion – Moderate Risk

Description: Flooding is the most widespread and destructive hazard in the United States. Flooding has also been the most common and costly hazard to affect Highgate. Flooding can occur anytime of the year because of heavy rains, thunderstorms, rapid snowmelt, tropical storms from hurricanes or Nor'easters. It can result from the overflow of major rivers and their smaller tributaries or inadequate local drainage. Historically, floods have been a factor in over 80% of all federally declared disasters. People living near bodies of water such as rivers, lakes, and streams are at greater risk from flooding than those not living in the floodplain.

The types of flooding that occur in Highgate include:

- **Inundation/Surface Water Flooding:** Occurs when heavy rain saturates the ground, causing water to pool in low-lying areas, especially in urban centers like Montpelier.
- **Flash Flooding:** Rapid, dangerous flooding that occurs within six hours of heavy rain, often transforming small, dry streams into torrents.
- **Stream (Fluvial) Flooding:** Occurs when streams overflow their banks, common during spring melt or following intense, widespread rainfall. There are no rivers in Highgate.
- **Lake Shore Flooding:** Lakeshore flooding refers to the inundation of coastal areas along lakes. In Highgate, it occurs when Lake Champlain water level exceeds the minor flood stage of 99.5 feet spilling over onto the low-lying land, roads, and shoreline properties due to a number of factors including heavy rainfall, snowmelt, high winds, and changes in lake levels high seasonal water levels and strong wind-driven waves.

Fluvial erosion is the wearing away and collapse of riverbanks and stream banks caused by the natural movement and adjustment of rivers and streams. It typically occurs when a stream becomes unstable and has more energy than is needed to carry its sediment load, often due to channel alterations or runoff events that increase water velocity. Factors contributing to lake shore and fluvial erosion risk in Highgate include intense rainfall events, saturated soils, snowmelt, and channel constrictions at bridges or culverts, land use practices, agricultural activities, and loss of riparian vegetation can further reduce bank stability.

Lakeshore erosion is the gradual or rapid deterioration and recession of shoreline soils and sediments by wave action, fluctuating water levels, ice movement, wind, and storm events. This natural process can be accelerated by flooding and freezing and thawing of lake ice.

Location: The Missisquoi River, Rock River, Hungerford Brook, Kelly Brook, Saxe Brook, Carmen Brook and Youngman Brook flow within the town of Highgate. Flood plains in Highgate follow along the brooks and creeks of undeveloped areas of forest lands and marshes and land that is in agricultural use Flooding along the Missisquoi River, within the boundaries of the Missisquoi National Wildlife Refuge, is controlled by the floodwaters of Lake Champlain. Since the Refuge is primarily wetland, the water levels do not rise rapidly but disperse into a wide flood plain.

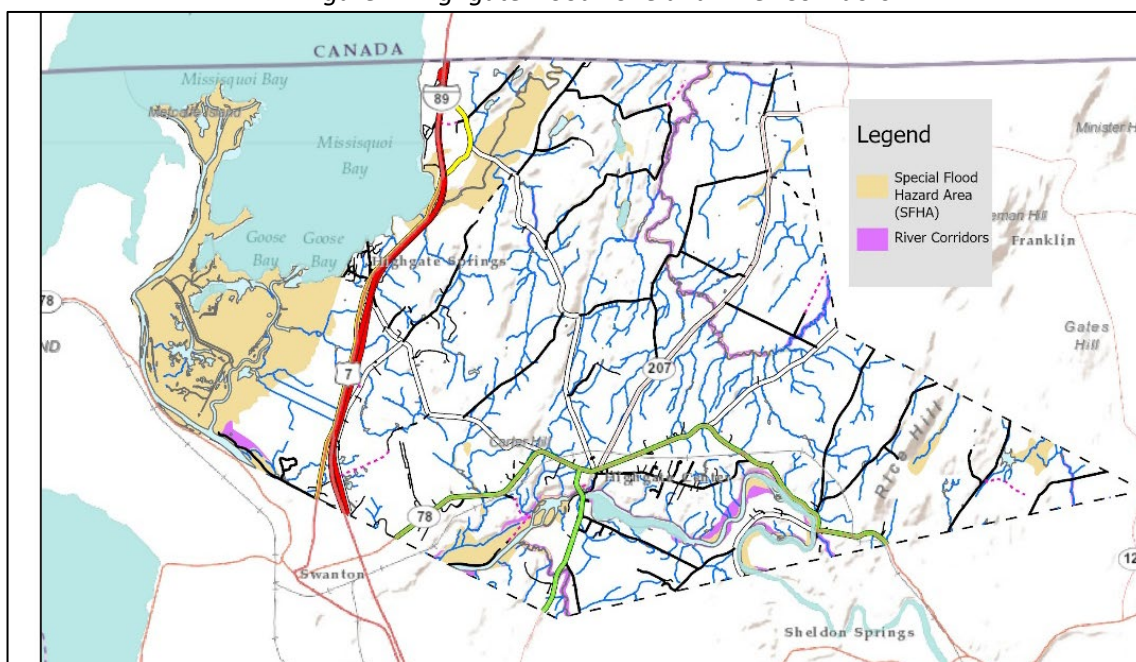
There are approximately 3.5 miles of developed Lake Champlain shoreline in Missisquoi Bay in northern Highgate. Much of the lakeshore is densely developed with a mix of year-round and seasonable

residences. There are notable undeveloped sections at Highgate Cliffs Natural Area, the Missisquoi River Delta, and the Rock River outlet. There is a mix of year-round and seasonal residences in the Highgate Springs area. Several of the properties are at risk of spring inundation flooding from Lake Champlain. Since the record-breaking Lake Flood event in 2011, many property owners have taken steps to flood proof their properties.

Ice jams typically happen during the late winter or early spring, but in recent years they have formed during early winter months. Ice jam related flooding on the Missisquoi River typically occurs upstream from the Swanton Village Hydroelectric Facility to East Highgate where the River almost forms and oxbow along Machia Road, Route 78 and Lamkin Street. Ice tends to build up in the bends of the river in this area. Route 78 is sometimes reduced to one lane from ice jams and water backing up and inundating the road. The section of Route 78 is monitored by VAOT when conditions warrant. Traffic is detoured from Route 78 to Machia Road (TH4) across Bridge 25. No other structures along VT78 are at risk from the flooding. Since the highway is owned and operated by the state, the Town is not responsible for mitigation.

Figure 7 depicts Flood Zones and River Corridors for Highgate. The data includes the special flood hazard areas and flood zones from FEMA's Flood Insurance Rate Maps (FIRM). The map was created using data from the Northwest Regional Planning Commission, Vermont Center for Geographic Information, Vermont Agency of Natural Resources and FEMA FIRMs.

Figure 2: Highgate Flood Zone and River Corridors



Probability: The committee categorized flooding and fluvial erosion as *highly likely*. Inundation flooding can occur rapidly during heavy rainfall, snowmelt, lake ice melt, or more slowly in cases of prolonged rainfall. Floods in Highgate have occurred in every season of the year. Flooding in the spring is common and is caused by rainfall combined with snowmelt. Floods in late summer and fall are usually the result of above normal precipitation. Winter floods result from occasional thaws, particularly in years of heavy

snow cover. Lakeshore flooding typically occurs in springtime during “ice out” conditions when Lake Champlain thaws during warmer months of March and April. Fluvial erosion of stream and river channels occurs during flood events.

The committee classified the probability of fluvial erosion and lake shore erosion as *highly likely* occurrence. Highgate has several high-gradient streams and rivers coupled with soils that are prone to erosion.

Extent: According to the National Climate Assessment, the average annual precipitation in the United States has increased by approximately 4%. The average annual precipitation in the Northeast has increased about 10% since 1901, and the amount of precipitation falling in the heaviest storms has increased by about 60% since the 1950s, the largest increase of any region in the United States. Committee members agreed based on their observations that this trend was evident.

There is a stream gauge on the Missisquoi River east of Town in Berkshire. This is the closest gauge to Highgate. The highest recorded measurement was 23.10 feet which occurred on November 3, 1927. Average height for this reach is about 12.59 feet.

Flooding disrupts transportation systems which affect day-to-day life for many residents who must travel outside of town for employment or for health care visits. Flash floods are likely to occur in Highgate in a limited area and have the potential for damaging Monument Road, VT78 and Route 7.

Figure 1: Missisquoi River Gauge at East Berkshire

Recent Crests	Historic Crests
1. 13.60 ft on 12-19-2023	1. 23.10 ft on 11-04-1927
2. 15.14 ft on 07-11-2023	2. 18.92 ft on 03-15-1946
3. 16.49 ft on 11-09-2019	3. 17.50 ft on 04-01-1918
4. 15.64 ft on 04-16-2014	4. 17.45 ft on 04-18-1982
5. 14.13 ft on 08-29-2011	5. 17.42 ft of 02-28-2000

Flooding along the Missisquoi River near Monument Road in Highgate typically results in minor impacts such as flooded lawns, water in basements, and sections of the road being overtopped. While no properties have experienced total losses, several homes sustained significant damage during the 2018 ice jam event, including damaged electrical appliances, sheetrock, and structural components. The town has since made substantial investments to flood-proof properties and improve road infrastructure.

Agriculture is a vital and expanding sector of the local economy, but it is highly vulnerable to flooding disasters. Even the loss of a small number of farms could produce significant economic consequences. Extreme weather can destroy crops, delay planting, or prevent harvest. USDA data indicates that crop insurance claims related to flooding have increased in recent years for farm businesses in Franklin County. Recent USDA Risk Management Agency data indicate that crop insurance indemnities in 2024 totaled approximately \$1,643,125 across Franklin and Grand Isle Counties (\$1,496,809 in Franklin County and \$146,316 in Grand Isle County). These payments represent insured agricultural losses from weather and other hazards, though the actual economic impact is likely higher because many crops, livestock, and stored agricultural products are not covered by federal crop insurance programs.

In many cases, fluvial erosion causes more damage than traditional flood inundation because unstable channels can rapidly erode banks, undermine infrastructure, and shift during major storm events. Roads

are particularly vulnerable, as fast-moving floodwaters can erode embankments, wash away supporting materials, and damage drainage systems, ultimately leading to road collapse or washouts. Ongoing mitigation efforts in the town and watershed include riparian buffer plantings, stormwater and road drainage improvements under Vermont's Municipal Roads General Permit, and watershed projects aimed at reducing runoff and stabilizing tributaries flowing into the Missisquoi River.

The extent of fluvial erosion in Highgate's drainage ditches and streams is generally limited to localized areas, but it can become moderate during periods of heavy rainfall, rapid snowmelt, or intense storm event. Fluvial erosion causes severe damage to critical public infrastructure—such as roads, bridges, culverts, and stream-crossings—as well as homes, businesses, and community buildings located near rivers. Eroded material (sediment and debris) washes downstream to lower-gradient reaches, clogging channels and forcing rivers outside their banks, triggering additional flooding.

Lakeshore erosion affects shoreline properties and downstream areas where eroded sediment settles. Winter and spring ice action can exert massive physical force against shorelines, gouging banks and eroding shorelines and beaches. High water levels combined with severe windstorms concentrate heavy wave energy against shorelines, dramatically increasing instantaneous soil loss. Once topsoil and shoreline land detach and wash away, the land loss is often permanent unless major structural or nature-based engineering solutions are implemented. Natural ecosystem recovery and vegetation re-establishment can take years to decades.

Figure 3: Lakeshore flooding and Inundation Flooding History of Occurrences

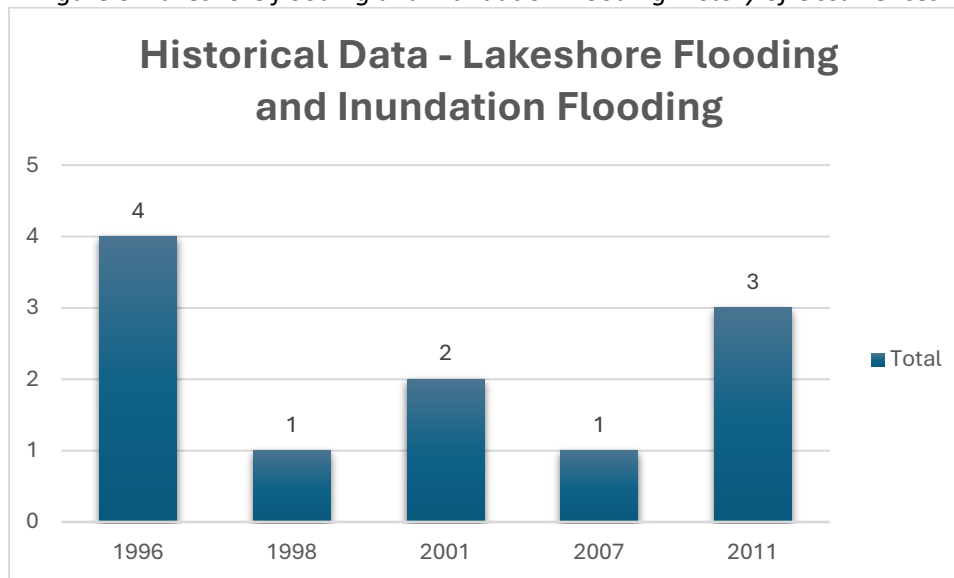


Figure 4: Lake Champlain Water Level Benchmarks

CATEGORY	STAGE
Major Flooding	101 ft
<i>Extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations.</i>	
Moderate Flooding	100.5 ft
<i>Some inundation of structures and roads near stream.</i>	
Minor Flooding	99.5 ft
<i>Minimal or no property damage, but possibly some public threat.</i>	
Action	99 ft
<i>The level which, when reached by a rising stream, represents the level where the NWS or a customer/partner needs to take some type of mitigation action in preparation for possible significant hydrologic activity.</i>	

There are no lake gauges in Highgate. The closest gauge at Rouses Point, New York and the highest recorded measurement was 103.27 feet, which was measured on May 6, 2011. The average height of the Lake is 95.5 feet.

Table 7: Top 10 Historic Crests of Lake Champlain (NOAA)

Rank	Water Level (Ft.)	Date of Crest
1.	102.67	May 6, 2011
2.	101.26 ft.	April 27, 1993
3.	100.43 ft.	May 15, 2000
4.	100.39 ft.	April 29, 2019
5.	101.23 ft.	April 24, 2008
6.	99.93	April 21, 2014
7.	99.54 ft.	May 4, 2018
8.	99.08 ft.	July 7, 2013
9.	98.94 ft	April 24, 2022
10.	98.64 ft.	May 5, 2023

Ice jam flooding in Highgate is typically short-duration but can occur with little warning and may cause road closures, damage to infrastructure, and flooding of structures located near the river. Risk is influenced by temperature fluctuations, rain-on-snow events, channel constrictions, and the presence of bridges or other structures that may trap moving ice.

A GIS based overlay analysis was conducted using FIRM data with the Vermont E-911 data of structure locations. The results found that there are fifty-one (51) structures within the 100-year flood plain and none in the 500-year floodplain in Highgate. Seven (7) are mobile homes, one (1) classified as a commercial farm, thirty (30) as single-family residential units, one (1) as industrial, nine (9) as seasonal camps, one (1) as gated with no building and one (1) as “other”. This represents 3% of E-911 surveyed structures within the community.

Impact:

NOAA Flood Impacts of flooding at Missisquoi River near East Berkshire:

- 23' - Devastating flooding occurs, with water levels similar to the record crest during the Great Flood of 1927. Bridges on, and large sections of Routes 118, 108, and 105 will be covered in water, and may be destroyed. Many local roads will flood and water will inundate some homes along the river in East Berkshire and Enosburg Falls.
- 17' - Severe flooding will occur from Richford downstream to Sheldon along the Missisquoi. Water will flood yards and approach a few homes in East Berkshire. Water will also flood Route 118 in East Berkshire and several locations along Route 105 between Richford and Enosburg Falls. Missisquoi Street in Enosburg Falls will flood. Water levels will be similar to those observed during the Halloween Storm of 2019.
- 16' - There will be widespread flooding along the Missisquoi from Richford to Sheldon. Water will flood Route 105 near the Enosburg and Berkshire town line and will approach Route 118 in East Berkshire. Kane Road in Sheldon will flood. There will be extensive field flooding.
- 14' - Widespread flooding of low-lying fields and roadways will occur from Richford to Enosburg Falls. Marvin Road in Berkshire and Boston Post Road in Enosburg will flood. Water will approach Route 118 in East Berkshire and Kane Road in Sheldon and will begin to cross Route 105 near the Enosburg and Berkshire town line. Yards will flood at some homes along the river in East Berkshire.
- 13' - Widespread flooding of low-lying fields will occur along the Missisquoi from Richford to Enosburg Falls. Water will enter the yards of a few homes in East Berkshire and the recreation fields at Richford Park will flood. Marvin Road will flood near the Richford town line. Water will approach Boston Post Road in Enosburg.

NOAA Flood Impacts of flooding along Lake Champlain Shore:

- 101.5' - Severe flooding occurs, with moderate to widespread inundation of lake side properties and closure of some low-lying roads.
- 100.5' - Flooding becomes serious, and wave erosion on windward shores becomes a problem. If lake ice is present, structural damage may occur.
- 99.5' - Minor flooding is expected with water beginning to enter some lake front properties. Water also begins to threaten low lying roads, piers, and docks. Wave action can compound flooding on windward facing shorelines.
- 99.0' - Minor shoreline flooding may occur under windy conditions where the action of waves may cause splash over on some low-lying lakeside properties.

The area's most vulnerable to lake shore flooding include the shore line properties (year-round and seasonal) in the Missisquoi Bay at Highgate Springs including portions of Shipyard Dock Road, Old Dock Road, Duck Point Road, Country Club Road and U.S. Route 7. Flooding from the Missisquoi River typically impacts some residential properties on Monument Road, Tanglewood Drive and Jedware Circle near the Swanton town line. Brouseau Road and Machia Road properties and infrastructure are also impacted by flooding from Missisquoi River. U.S. Route 78 which parallels the Missisquoi River is of particular concern because it is a major transportation route across town.

Ice jams impacts typically occur in East Highgate where the Missisquoi River is attempting to straighten itself. At times, ice will pile up along State Route 78 any free flowing water will back up over the road. This also occurs along the river behind the Orman Croft hydro dam that is operated by Swanton Village

Electric. It should be noted that the dam, which is actually a rubber bladder, is no longer installed.

The potential impact of lakeshore erosion and fluvial erosion was classified as *moderate* by the Committee. The Town's shoreline along Lake Champlain is regularly exposed to wave action, ice movement, and wind-driven storms. The west-facing shoreline at Highgate Springs have experienced documented erosion and shoreline undercutting. There are multiple private shoreline properties that are impacted by erosion.

Fluvial erosion hazard mapping by the VT Agency of Natural Resources (ANR) classifies risk of fluvial erosion from *Low, Moderate, High* to *Very High*. Most of the Rock River is classified as *Moderate* while Saxe Brook near St. Armand Road and Ballard Road intersection is classified as *Very High*. The remainder of Saxe Brook is classified as *Moderate* to *Low*. Roads within these areas include Machia Road, Monument Road, Saint Armand Road (south of Parent Road), and Waugh Farm Road among others. In East Highgate, Machia Road and VT78 are subject to degradation from fluvial erosion as the Missisquoi River is in process of trying to form an oxbow lake to straighten itself.

Town Vulnerability:

People: Residents in low-lying areas near the Lake Shore in Highgate Springs and Missisquoi River, Rock Rick and related tributary streams are vulnerable to property damage, displacement, transportation disruptions, and potential safety risks during major flood events. flooding events can cause injuries or fatalities to people who do not evacuate in time. Delayed evacuation can be caused by flash flood events, or by individuals who are hesitant to leave their houses. The elderly, the homeless, residents with special needs and those without proper transportation may potentially be impacted more than other residents.

Built Environment: Flooding can cause damage to town and private property, including roads in close proximity to Lake Shore in Highgate Springs including Route 7, associated culverts, driveways, bridges, private wells, water and wastewater infrastructure, private septic systems, and buildings. These impacts could cause disruption of the transportation along US Route 7 and State Route 78 to and from the community.

For fluvial erosion, areas on either side of the Missisquoi River are prone to erosion as the soil is made up of sand on top of clay. Steep river banks tend to cause the top layer of soils to slide off the clay. Areas of particular concern are along Saxe Brook near St. Armand Road and Ballard Road intersection. Other roads that are vulnerable to fluvial erosion include Machia Road, Monument Road, Saint Armand Road (south of Parent Road), and Waugh Farm Road. In East Highgate, Machia Road and VT78 are subject to degradation from fluvial erosion.

Natural Environment: Flooding and fluvial erosion can significantly impact the natural environment by destabilizing streambanks and shorelines, accelerating erosion, and increasing sediment transport that degrades aquatic habitats. Floodwaters can carry excess phosphorus, nutrients, pollutants, and invasive species into waterways, reducing water quality throughout the northern Lake Champlain watershed and increasing the likelihood of harmful algal blooms that threaten aquatic ecosystems, wildlife, domestic animals, and public health. These impacts can also damage wetlands within the Missisquoi River Wildlife Area..

Economy: Flooding and fluvial erosion can cause major economic impacts to the town such as disruption or closure of impacted businesses loss of tourist dollars, homelessness due to damages to residential structures, and recovery costs, including employee overtime, time and equipment spent on the costly repairs.

Potential Future Impacts:

Climate Change: Climate change is causing stronger, more persistent storms with more rainfall, which makes steeper terrain and saturated soil more prone to flooding. The 2019 Halloween storm caused over \$6 million in damage to infrastructure after producing 3–5 inches of rain in a single day in northwestern Vermont. Damage due to stronger storms will cause impacts to road infrastructure, wastewater systems, storm water infrastructure. Private properties located near the river and streams could become susceptible to flooding for the first time which may lead to more property buyouts. Ag. based businesses will be impacted due to saturated soils.

Changes in Land Use/Development: The establishment of the Flood Hazard District within Highgate's Subdivision and Zoning Bylaws enabled the Town to qualify for participation in FEMA's National Flood Insurance Program (NFIP). This program allows property owners within the designated Flood Hazard District to purchase flood insurance. The district is intended to prevent increased flooding risks resulting from development in flood-prone areas, minimize future public and private losses due to flooding, and promote the health, safety, and general welfare of the community. Highgate remains committed to enforcing its floodplain regulations and ordinances to maintain eligibility in the NFIP and to protect both residents and property by limiting development in areas vulnerable to flooding. As a result, changes in land use and development are not expected to increase the risk of inundation flooding for current or future assets.

Changes in Demographics: Highgate's demographics are expected to remain stable over the next five years. An aging population may increase demand for emergency assistance, medical services, and accessible transportation during floods. Population growth could strain infrastructure and emergency response resources. More residents with disabilities or mobility needs could also complicate flood preparedness, response, and recovery.

History: See Appendix E for history of Inundation flooding and lakeshore flooding.

Severe Winter Storms (Ice Storm) – Moderate Risk

Description: Severe winter storms with snow, ice and freezing temperatures in various combinations are fairly common in Highgate. Such storms are accompanied by strong winds creating blizzard conditions with blinding wind-driven snow, severe drifting, and dangerous wind chill. Strong winds with these intense storms and cold fronts can knock down trees, utility poles, and power lines. Winter storms can cause roofs to collapse and limit access to areas and buildings around Town. Extreme cold often accompanies a severe winter storm or is left in its' wake. Prolonged exposure to the cold can cause frostbite or hypothermia and become life-threatening.

A **Nor'easter** is a large coastal storm that forms along the Atlantic coast and produces strong northeasterly winds, heavy precipitation, and prolonged impacts such as snow accumulation, ice storms, high winds, and flooding. In Vermont, Nor'easters are a major source of winter weather hazards and can affect entire communities through power outages, hazardous travel conditions, and damage to infrastructure.

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 (at least 3 hours).

An **ice storm** is a winter weather hazard characterized by the accumulation of freezing rain that forms a layer of ice on surfaces.

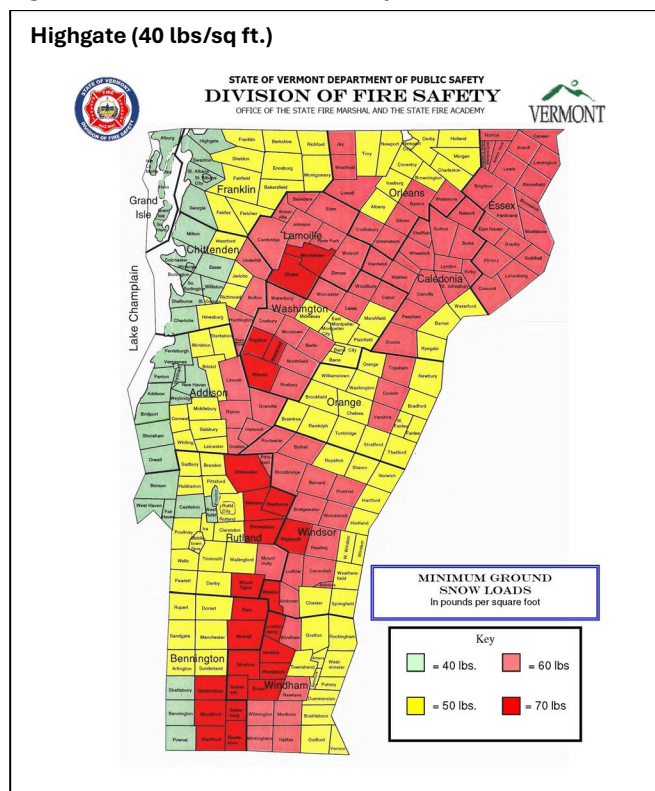
Construction standards for snow load (see map) indicate that structures in Highgate should be built to withstand loads of 40 pounds per square foot. This would indicate an average depth of snow of 40 inches or 10 inches of ice on a square foot of roof surface. At that point, design standards would be 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.

Location: A severe winter storm (ice storm) has the potential to affect all areas of Highgate, making it a town-wide hazard rather than one confined to a specific location. Heavy snow, ice accumulation, freezing rain, strong winds, and extreme cold can impact residential neighborhoods, village areas, roads, agricultural lands, public facilities, and utilities throughout the community. Higher-elevation and more remote areas may experience greater snow accumulations and more difficult travel conditions especially in eastern areas of Town. Widespread power outages can occur from downed trees and utility lines. Because winter storms affect the entire town simultaneously, all residents, businesses, and critical facilities in Highgate are considered exposed to this hazard.

Probability

The probability of severe winter storm (ice storm) is considered *highly likely* by the committee. Winter Storms occur annually in Highgate between late October to late April. More typically in the form of a Nor'easter. Nor'easters are more common and 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, and sometimes last for several days. Blizzards occur less frequently and can cause hazardous travel conditions, road closures, power outages, damage to infrastructure, and disruptions to emergency services, affecting entire communities. Even less common but potentially more damaging are ice storms which can negatively affect the entire community by creating dangerous travel conditions, damaging trees and utility infrastructure, disrupting essential services, and causing prolonged power outages during cold weather.

Figure 5: Minimum Snow Loads for Construction



Extent: Some of the worst historical winter storms in Highgate 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). The ice storm of January 4 – 8, 1998, was the worst recorded ice event in the Town's history as well as all of the northeast included Quebec Canada. Roads were impassable due to ice accumulations. Power poles and lines were downed. Electricity was out for the several days following the event. Waterlines froze. Emergency shelters were opened. The National Guard was activated to assist in recovery efforts.

Figure 6: Ice Storm Damage.



Highgate's recent history, since the 1998 ice storm, has not recorded any loss of life or structural damage to public assets due to severe winter storms (ice storms). These random events are difficult to set a cost to repair or replace any of the structures or utilities affected.

The Town highway department is equipped to handle most winter emergencies, including maintaining road accessibility through various snow and debris removal equipment. The Town has access to private machinery, including bulldozers, plows, ATVs and snowmobiles, should they be needed in the event of an emergency. Heavy wet snows occurring during early fall and late spring and ice storms in the winter months are the cause of most power failures. There are emergency generators available to provide power to the town office, school and fire station.

Figure 7: Seasonal Record Snow Falls, Burlington, Vermont (NOAA, BTV)

Top 10 Fall Snowfall Totals					
Fall (September – 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
Winter (December – February)					
1	103.4:	2007-08	1	18.4"	1912-13
2	97.9"	2010-11	2	20.6"	1979-1980
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	26.7"	2011-12
9	78.6"	1946-47	9	27.4"	1960-61
10	75.1"	1969-70	10	27.5"	1988-89
Spring (March – May)					
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

Impact: The impact of severe winter storm (ice storm) is considered *negligible to major* by the committee based on history. The primary impacts of a storm typically include the disruption of transportation networks, school closings and occasionally telecommunications and power outages. Vulnerable

populations such as the elderly, those dependent on medical equipment and specialized health or physical care are at risk to winter storms. Also at risk are farms and associated structures and livestock. Barns can collapse due to heavy snow loads. Dairy cattle are susceptible to mastitis if they are unable to be milked. The town is able to keep the roads open and treated for most storms and any loss of power is usually limited to hours, except during the Ice Storm of 1998 when most of the town was without power for three to four days.

Impact

Strong winds, accumulations of ice and heavy snow can knock down trees, utility poles, communication towers and power lines. Communications and power can be disrupted for days while utility companies work to repair the extensive damage. People have been trapped at home for up to two weeks, without utilities or other services.

The primary impacts of a storm typically include the disruption to transportation networks, school closings and occasionally telecommunications and power outages. Vulnerable populations such as the elderly, those dependent on medical equipment and specialized health or physical care are at risk to winter storms.

Also at risk are agricultural based businesses such as dairy farms and the maple sugar industry. Barns can collapse due to heavy snow loads and ice accumulations. Dairy cattle are susceptible to mastitis if they are unable to be milked. Sugar maple trees and sap lines used for the production of maple syrup can be greatly damaged by ice accumulation.

Town Vulnerability

People: Severe winter storms (ice storms) can cause injuries or fatalities to people who cannot or choose not to shelter-in-place, or who do not have adequate shelter. Delayed sheltering-in-place can be caused by no notice events, or by individuals who do not heed the warning.

The elderly, the unhoused, residents with special needs and those without proper transportation may potentially be impacted more than other residents. Some residents in Hoyt Point have asked the town to help plow their driveways during some severe winter events as they were unable to due to the amount and type of snow.

Built environment: Severe winter storms (ice storms) can cause damage to town and private property, including buildings (roof collapse), blocked egress routes, blocked evacuation routes, frozen pipes, downed powerlines, and road infrastructure including State Route 78, US Route 7 and Interstate 89. Drifting snow can be problematic in some areas of town along the lake shore, St. Armand Road and Gore Road. Impacts from severe winter storms could cause disruption of the transportation system to and from the community and county. Cable, fiber and power lines

Figure 5.2: Top 10 Winter Snowfalls Mar-May

Burlington, Vermont Top 10 Spring Snowfall Totals Mar-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					

could be damaged by disrupting businesses, telehealth and tele education opportunities for residents.

Natural environment: Severe winter weather and ice storms events can cause damage to the environment with downed trees. Areas in town that may be more vulnerable are those areas where the utility company hasn't removed vegetation along the utility corridor.

Economy: Severe winter weather and ice storms events can cause economic impacts to the town. Impacts include disruption or closure of impacted businesses, and recovery costs, including employee overtime, time and equipment spent on the repairs. Commuters may be unable to get to and from work. Schools and businesses may be closed. Delivery of fuels and goods to and from town may be interrupted. Power could be disrupted causing disruptions in financial transactions for stores and restaurants.

Potential Future Impacts:

Climate Change: Winter in Vermont has been reported to be warming 2.5 times faster than the global average annual temperatures since 1960³. Typical winter weather conditions will be impacted including river ice reduction and shifting agricultural production times. Warmer winters will also mean that ground freezing will likely be impacted, and rain precipitation could saturate soils causing more flooding. Warmer winters will affect crucial Vermont industries like maple sugaring. Maple sugaring relies on a specific temperature range for sap to flow, typically occurring when nighttime temperatures drop below freezing (0°C / 32°F) and daytime temperatures rise above freezing. Warming winters will also impact the tourist industry for those traveling through town to for winter recreation opportunities such as snowmobiling and ice fishing.

Changes in Land Use/Development: As Highgate continues to grow there will be an increase in the number of people, structures, and critical facilities exposed to severe winter weather. New development may place additional demands on transportation networks, utility systems, and emergency services. Conversely, resilient development practices, redundant energy systems, scheduled equipment maintenance, capital planning and land-use planning can reduce Highgate's vulnerability by improving access, minimizing power disruptions, and enhancing the community's ability to withstand and recover from winter storm impacts.

Changes in Demographics: Highgate's demographics are not expected to change significantly in the next five years. Although Highgate's demographics are not expected to change significantly in the next five years

History: See Appendix F for history of severe winter storm (ice storms).

Strong Winds (Windstorm, Thunderstorms, Tornado, Tropical Storm, Hurricane) – Moderate Risk

Description: FEMA's National Risk Index defines severe winds as damaging winds that exceed 58 mph. Locally, wind-caused damages have occurred with sustained winds greater than 30 mph with gusts greater than 40 mph. Strong winds pose a threat to lives, property, and vital utilities primarily because of flying debris or downed trees and power lines.

Strong wind can be the result of the following:

- **Wind Storm:** high wind event without precipitation.

³ Vermont Climate Assessment (2021), University of Vermont, Gund Institute for Environment.

- **Thunderstorm:** high wind event with the potential for compounding impacts due to precipitation (i.e. flood inundation, fluvial erosion, lightning, and/or hail).
- **Tornado:** a violent rotating column of air extending from a thunderstorm, not common in Vermont.
- **Hurricane/Tropical Storm:** the most significant impacts from hurricanes/tropical storms in Vermont are inundation flooding and fluvial erosion. Wind implications of hurricanes/tropical storms are addressed below.

Wind Storm: 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 from 46 to 57 mph. The NWS will issue a High Wind Warning for wind speeds that are 58 mph or higher. Additionally, the NWS also has classifications for Tropical Storm Wind Warning and Hurricane.

Thunderstorm: Thunderstorms vary in size and type, each posing unique hazards. They can produce powerful downburst winds known as microbursts and macrobursts, which radiate outward from the base of a storm and can exceed 80 mph, with microbursts being particularly dangerous to aircraft due to their concentrated impact area. Ordinary cell thunderstorms consist of a single updraft and downdraft, bringing strong winds, rain, lightning, and hail. In contrast, multicell cluster thunderstorms contain multiple ordinary cells and are especially prone to flash flooding. Squall line thunderstorms form long, narrow bands—sometimes over 100 miles—with their strongest winds and rains concentrated at the leading edge. The most intense and destructive type is the supercell thunderstorm, which can last the longest and is responsible for nearly all tornado formation, along with producing lightning, hail, and flash flooding. (see: Hail and Lakeshore and Inundation Flooding & Lakeshore and Fluvial Erosion).

In Highgate, high winds typically occur alongside severe thunderstorms, with straight-line winds often causing the majority of thunderstorm-related wind damage. These winds can be mistaken for tornadoes due to the comparable wind speeds and damage patterns, but unlike tornadoes, they do not involve rotating air. While thunderstorms and their associated hazards can happen at any time of year, they are most common during the spring and summer months.

Tornado: A tornado is a rapidly rotating column of air that extends from a thunderstorm to the ground, capable of causing extreme destruction. The most intense tornadoes can produce wind speeds exceeding 250 mph, leaving damaged paths that may span over a mile in width and stretch up to 50 miles in length. Tornado intensity is measured using the Enhanced Fujita Scale, which rates wind speeds on a scale from EF0 to EF5.

Hurricane/Tropical Storm: A hurricane is a tropical cyclone with sustained winds that have reached speeds of 74 mph or higher. A storm reaches hurricane status only after strengthening over a period of days or even weeks. A tropical storm has a maximum sustained wind speed of 39 to 73 mph and typically forms over warm ocean waters. As a hurricane moves to coastal areas, wind speeds decrease, and the hurricane may be downgraded to a tropical storm. This is the case in many of the tropical storms that have reached Vermont. The Atlantic Ocean hurricane season occurs approximately from June 1 through November 30, with most of the hurricane activity occurring between mid-August through October.

Hurricanes and tropical storms are hazard events that often result in high winds, inundation flooding, and lakeshore and fluvial erosion impacts. The topography and landscape in Highgate contributes to the risk associated with these three hazard impacts (refer to Flooding and Fluvial Erosion hazard profile).

Location: Strong wind (windstorm and thunderstorms) is common in Highgate and can occur anytime during the year. The entire town can be affected as pressure gradients move through the area. Southerly and westerly winds tend to be stronger as they move through the Champlain Valley or across Lake Champlain. The town has experienced a variety of high wind events from storm systems that track from eastern New York and Ontario, and across Lake Champlain as well as Quebec from the north. There are no confirmed tornado events or hurricanes in Highgate. The town is far inland from the Atlantic Ocean and is unlikely to receive a direct hit from a hurricane, however the remnants of tropical storms with accompanying thunderstorms, winds, rain and less often, hail as an accompanying hazard have occurred. Windward shore lines of prevailing westerly and southerly winds take the brunt of wind force.

Probability: The probability of a strong wind (windstorm, thunderstorm, tornado, tropical storm) event in Highgate is considered *high likely* based on history. National Climatic Data Center records indicate that Franklin County has experienced 141 high wind, strong wind or thunderstorm wind events over the past 58 years resulting in over \$4,700,000 in cumulative property damage. Of those, 77 are classified as severe thunderstorms with wind speeds of 50 kts or greater. Participants estimate that strong wind events occur at least once per month, in the form of thunderstorms and windstorms typically between May and September and less common as Tropical Storms between mid-August and October and as severe winter storms (Nor'Easter and blizzard) from November 1 through March 30th.

Those hail events that do occur tend to be highly localized and limited to a small area. Hail is profiled later in this section.

Tornadoes can occur under the right conditions but in Vermont they occur typically between March and August. In Highgate, there are no NOAA confirmed tornado events.

Tropical Storms and Hurricanes typically occur during the official Atlantic Hurricane Season from June 1 through November 30. Activity typically peaks between mid-August and late October,

The Town has experienced five tropical storms and their remnant since 2004, with varying degrees of impact with the worst being in 2017 where multiple broken poles and downed lines that caused power disruptions for several days.

Extent: NOAA storm event reporting defines wind categories as follows:

High Wind: Sustained non-convective winds of 40 mph (35 knots) or greater lasting for 1 hour or more, or wind gusts of 58 mph (50 knots) or greater. These winds are not directly associated with thunderstorms.

Strong Wind: Non-convective winds below High Wind criteria but still capable of causing damage or disruption. Typically includes sustained winds or gusts between 40 and 57 mph that result in impacts.

Thunderstorm Wind: Convective wind produced by a thunderstorm with measured or estimated gusts of 50 knots (58 mph) or greater, or winds causing damage consistent with those speeds. Thunderstorm Wind is one of NOAA's primary severe weather event categories.

Figure 8: Beaufort Wind Scale (NOAA)

Force	Wind (Knots)	WMO Classification	On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, Smoke rises vertically.
1	1-3	Light air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes begin to move
3	7-10	Gentle breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh breeze	Moderate waves 4-8 ft taking longer form, may whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong breeze	Larger waves 8-13 ft, whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-19 ft, white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (18-25 ft) waves of greater length, edges of crests beginning to break into spindrift, foam blown in streaks	Twigs breaking off trees, generally impedes progress
9	41-47	Strong Gale	High waves (23-32 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs.
10	48-55	Storm	Very high waves (29-41 ft) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high (37-52 ft) waves, foam patches cover sea, visibility reduced	Widespread structural damage.
12	64+	Hurricane	Air filled with foam, waves over 45 ft, sea completely	Widespread structural damage.

			white with driving spray, visibility greatly reduced	
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Strong winds (windstorm, thunderstorm, tornado, tropical storm) can and have occurred throughout the town. Weather systems generally come in from the west as systems build in the Great Lakes region and Ontario and travel through the Adirondacks in New York and across Lake Champlain. Systems occasionally arrive from the south from the mid-Atlantic region or rarely from the east.

According to NOAA, strong winds can damage roofs, windows, and siding, and can cause structural damage to roofs at 55–63 mph. Homes with siding are particularly vulnerable to wind damage, and stucco can also be damaged by water. For mobile homes winds can cause serious damage to anchored mobile homes at speeds over 80 mph and can destroy poorly constructed or unsecured mobile homes at speeds of 60 – 73mph.

Strong wind events often accompany thunderstorms. Lightning strikes in Franklin County average between 4-6 strikes per square mile each year based on data collected by NASA 's Earth information System. Within Highgate, the low estimate for lightning strikes on land is 200 strikes per year, and the high estimate is 300 strikes per year on land.

There have been 141 thunderstorm events in the region (Grand Isle, Franklin and Chittenden Counties) 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. Participants estimate that thunderstorms with accompanying high winds occur at least once per year, typically between May and August.

Tornadoes can occur any time of the year under the right conditions but occur typically between March and August. According to the State Hazard Mitigation Plan, Vermont has experienced 49 tornadoes, 14 of which were magnitude F2 (significant) and 19 magnitude F1 (moderate) on the Enhanced Fujita Scale. F2 tornadoes have maximum wind speeds of 111 to 135 mph, while F1 tornadoes range from 86 to 110 mph. In 2026, 3 tornados were confirmed by the NWS in other areas of the state.

Figure 9: Enhanced Fujita Scale (Source NOAA)

Scale	Wind Speed		Types of Damages Due to Hurricane Winds
	mph	km/h	
EF0	65-85	105-137	<i>Minor or no damage.</i> Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF0.
EF1	86-110	138-177	<i>Moderate damage.</i> Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135	178-217	<i>Considerable damage.</i> Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165	218-266	<i>Severe damage.</i> Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations are badly damaged.
EF4	166-200	267-322	<i>Devastating damage.</i> Well-constructed and whole frame houses completely leveled; cars and other large objects thrown and small missiles generated.
EF5	>200	>322	<i>Extreme damage.</i> Strong-framed, well-built houses leveled off foundations are swept away; steel-reinforced concrete structures are critically damaged; tall buildings collapse or have severe structural deformations; some cars, trucks, and train cars can be thrown approximately 1 mile (1.6 km).

Hurricanes have never occurred in Vermont due to the state's location far from the Atlantic coastline. In general, severe hurricanes are not considered likely, nor do they pose a recurring threat for Highgate.

The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 rating based only on a hurricane's maximum sustained wind speed. *This scale does not take into account other potentially deadly hazards such as flooding, and tornadoes.*

Figure 10: Saffir Simpson Hurricane Scale

Tropical Depression: ≤ 38 mph, ≤ 33 knots, ≤ 62 km/h		Tropical Storm: 39-73 mph, 34-63 knots, 63-118 km/h
Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph 64-82 kt 119-153 km/h	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph 83-95 kt 154-177 km/h	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (Major)	111-129 mph 96-112 kt 178-208 km/h	Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to

		weeks after the storm passes.
4 (major)	130-156 mph 113-136 kt 209-251 km/h	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157 mph or higher 137 kt or higher 252 km/h or higher	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: (NOAA)

Hail typically accompanies thunderstorms and is profiled separately.

Impact: The impact of strong winds in Highgate is considered *negligible to moderate* by the committee depending on wind type, strength, duration and local conditions. Typical damages include down trees and branches that disrupt electrical and telecommunication services and traffic flow. Roads are sometimes closed or reduced to one lane traffic as highway and fire department crews work to clear the roadways. Structural damage to homes and businesses typically comes in the form of damaged roofs (blow of tiles), broken windows from flying debris and personal property damages from upturned trees. Residences along the shore line experience increased wave action that can erode shorelines, set docks and moored boats adrift. In the winter, strong winds can freeze roads, create snow drifts on roads, and cause white outs. Wind chill causes temperatures to drop to dangerously cold levels.

There is power surge equipment and emergency backup generators installed for electronic equipment at the Fire Station, Public Works Department, Town Office, and Middel and High School buildings. The Public Works and Fire Departments are equipped with associated debris removal equipment.

Swanton Village Electric and Vermont Electric Cooperative utility lines and infrastructure are in process of being reinforced due to damaging winds and are vulnerable to toppling trees. A right-of-way vegetation management plan is in place for the utility corridors to help mitigate damages. Strong wind events with associated power outages can have a short-term impact on the local economy due to business closures.

Town Vulnerability:

People: Strong Wind events can cause injuries or fatalities to people who do not shelter-in-place in time, or who do not have adequate shelter. Delayed sheltering-in-place can be caused by no-notice events, or by individuals who do not heed the warning. The elderly, the homeless, residents with special needs and those without proper transportation may potentially be impacted more than others. Communication systems are vulnerable, as the loss of phone service poses challenges for residents—particularly vulnerable populations. With landline networks now relying on fiber lines that share poles with electrical service, phone access depends on short-lived battery backups

during outages. Cell service is commonly used but often unreliable in certain areas, complicating efforts to reach emergency services.

Built environment: The primary threat to critical infrastructure, residential structures, and public safety across the town. Key vulnerabilities include public facilities—such as the Town Office, Fire Station, Library, Middle and High School, and Public Works Building—as well as commercial structures, seasonal homes, barns, and livestock. Lake shore properties that have docks and moored boats are at risk of having docks topple or boats drift away. Typical wind damage includes torn roofing, compromised siding, and broken windows. Above-ground utilities—including poles, transformers, and power lines—are highly susceptible, with widespread outages disrupting local businesses and public operations. High winds combined with wave action present severe erosion and tree-hazard risks along Missisquoi Bay. Additionally, lightning strikes—most prevalent along exposed lakeshore properties—risk causing structural fires, wildland fires, and major electrical equipment destruction.

Natural environment: Wind events can cause damage to the environment with downed trees, and uprooted trees and plants. Wind driven waves can accelerate deterioration of lakeshore beaches and properties.

Economy: Structural damage and power outages force business closures and prevent local stores and restaurants from processing electronic transactions. Emergency road cleanup, damage repairs, employee overtime, and heavy equipment operation draw heavily on town resources. Severe home damage (damaged/destroyed roofs, broken windows in winter and siding) may temporarily displace residents and create short-term housing needs. Severe winds can destroy crops, orchards, vineyards impacting local farm-and agricultural based businesses, and revenues. Several farms

Potential Future Impacts:

- **Climate Change:** Future impacts of wind events (windstorms, thunderstorms, tornado, tropical storms and hurricanes) are varied. According to NOAA, warming temperatures will cause a predicted increase in wind speeds through warmer atmospheric conditions that fuel stronger severe thunderstorms in the Champlain Valley. Higher overall temperatures and increased atmospheric moisture will heighten instability during summer and early fall, leading to localized microbursts, extreme straight-line winds, and elevated risks of severe convective storms.
- **Change in Land Use/Development:** Although the town lacks high-risk structures like mobile home parks, the conversion of seasonal lakeshore properties into year-round homes and ongoing rural residential infill steadily increase structural exposure to extreme winds and wave-driven shoreline erosion. Future commercial and residential development within designated Village Core boundaries would help reduce the extension of vulnerable utility lines.
- **Change in Demographics:** Highgate's demographics are not expected to change significantly in the next five years, though an increase in the average age of the population may increase vulnerabilities of the population.

History: See Appendix E for history of strong winds (windstorms, thunderstorms, tornados, tropical storms and hurricanes).

Landslide – Moderate Risk

Description: Landslides are the sudden downslope movement of soil, rock, or debris under the influence of gravity. They are often triggered by heavy rainfall, rapid snowmelt, riverbank erosion, steep slopes, or

Landslide activity has occurred during periods of prolonged saturated ground and high water tables, particularly following major rain and flood events. The Highgate transfer station area between the Missisquoi River and Highgate Center is prone to landslides and slumping slopes due to the geologic makeup of the soils. In May 2011, three landslides were documented on steep slopes adjacent to Transfer Station Road, near the power line corridor along Route 207, and along Brosseau Road; these slides were large enough to require stabilization and drainage work to reduce future risk.

Additionally, an August 2011 landslide near the town landfill associated with flooding from Tropical Storm Irene deposited significant sediment into a local stream and required reconstruction of the slope with stone and grading. Flooding in July 2023 caused a new slide to occur at the landfill.

Impact: The impacts of landslides is significant to town by disrupting the transportation network, threatening solid waste management at the county landfill, causing damages to the environment including water quality and economic impacts to both public and private entities related to repair and maintenance of failing slopes. There have been no fatalities from landslides. Financial impacts on individuals and families can be significant. For example, in 2015, two property owners took part in a home buyout when their homes were threatened by the sudden onset of a landslide far above and set back from the Missisquoi River.

Town Vulnerability:

People: Landslides can threaten public safety by causing injuries, fatalities, property damage, and isolation when roads or access routes are blocked. Individuals living, working, or traveling near slopes are particularly vulnerable during periods of intense rainfall or rapid snowmelt. Repairs can be costly. A residence on Brosseau Road is vulnerable to landslides and the town is considering a property buyout at the site.

Built Environment: Landslides can damage or destroy roads, bridges, utilities, buildings, and other infrastructure through slope failure, soil movement, and debris deposition. Transportation corridors and infrastructure located on or below unstable slopes are especially susceptible to disruption and costly repairs. Brosseau Road, Carter Hill Road, Gore Road, Machia Road, Monument Road, Park Street, River View Road, Transfer Station Road and the capped landfill have experienced landslides and bank slumping which has been and will be costly to stabilize and/or repair.

Natural Environment: Landslides can alter landscapes, remove vegetation, increase sediment delivery waterways in the Lamoille River watershed, and degrade water quality and aquatic habitats. While landslides are a natural geomorphic process, large or frequent events can significantly affect ecosystem stability and watershed function. The Missisquoi River and Rock River watersheds contain several slide areas.

Economy: Landslides can result in substantial costs related to emergency response, infrastructure repair, slope stabilization, and property damage. Economic impacts may also include transportation disruptions, reduced access to businesses and services, commuting workers, and long-term maintenance expenses for affected areas such as the Transfer Station.

Potential Future Impacts

Climate Change: Climate change is expected to increase the risk of landslides in Highgate as more frequent and intense precipitation events lead to saturated soils and reduced slope stability. Heavy

rainfall, flooding, and rain-on-snow events may trigger localized slope failures, particularly along streambanks of the Missisquoi River, Rock River and Hungerford Brook, road embankments, and steep slopes in East Highgate. These conditions could result in damage to roads and infrastructure, increased sediment in waterways, and potential impacts to nearby homes and agricultural land.

Changes in Land Use/Development: Altering natural drainage patterns and reducing vegetation that helps stabilize soils may lead to more landslides. Activities such as road construction, excavation, and development, especially along the Missisquoi River or near steep slopes in East Highgate can disturb soils and increase the likelihood of slope failures, particularly during periods of heavy rainfall. As development expands into previously undeveloped areas, infrastructure and property may face greater exposure to landslide hazards particularly in areas where the soils are sand on top of clay.

Changes in Demographics: Highgate's demographics are not expected to change significantly in the next five years. An aging population may increase the town's vulnerability to landslides, as older residents may face greater challenges in preparing for, responding to, and recovering from such an event.

History: See Appendix E for Landslide

Invasive Species – Moderate Risk

Description: Invasive species are non-native plants, animals, or pathogens that spread rapidly in an ecosystem, causing harm to the environment, local economies, or public health. These species can outcompete native species, disrupt ecosystems, and cause significant ecological and economic damage. Invasive species can be plants, animals, fungi, or microorganisms. They often have high reproductive rates, few natural predators in their new environment, and the ability to thrive in a wide range of conditions.

Common invasive plants found in Franklin County and Highgate include common buckthorn, glossy buckthorn, honeysuckle, Japanese knotweed, purple loosestrife, wild parsnip and garlic mustard.

Highgate's agricultural lands are susceptible to invasive insects such as Brown marmorated stink bug, and the spotted wing drosophila.

Forest and terrestrial invasive species include emerald ash borer (widespread, hemlock woolly adelgid, and beech leaf disease (expected expansion into northern Vermont).

Aquatic Invasive Species include water chestnut, Eurasian watermilfoil, zebra mussels, and the spiny water flea.

While not an invasive species, the Missisquoi Bay in Highgate experiences recurring cyanobacteria (blue-green algae) blooms along portions of its Lake Champlain Shoreline particularly during warm summer months when nutrient runoff and calm weather promote bloom development.

Location: All ecosystems in Highgate are susceptible to invasive species from the Missisquoi River to the Missisquoi Bay to Highgate Center, to neighborhood backyards that contain residential vegetable and flower gardens and properties, to farms and fields.

Probability: The probability of new invasive species introduction and spread in Highgate is considered highly likely by the committee. The Town contains active agricultural lands, forests, and waterways thus increasing the likelihood of exposure to new invasives. Climate change and increased human movement (e.g., transportation, trade, and recreation) further elevate the risk by creating more favorable conditions for species to establish and spread. Several invasive species are already present in the region, indicating a continued and persistent threat.

Extent: This emerald ash borer is a severe ecological threat. Ash trees are common in Highgate. Infestations were first detected in 2021 and have decimated the local ash population according to committee members.

Figure 12 Emerald Ash Borer, (ANR)



Wild parsnip is a toxic plant grows widely throughout town, taking over disturbed soils and posing a skin-contact hazard to people and animals due to its photosensitive sap.

The Missisquoi Bay is heavily impacted by aquatic invasive species.

- Eurasian Watermilfoil: An aggressive aquatic plant that forms dense underwater mats, crowding out native species and interfering with boating and swimming.
- Zebra Mussels: Tiny, destructive mollusks that blanket shorelines, clog water pipes, and alter the aquatic food web.
- Water Chestnut: A floating plant that creates nearly impenetrable mats on the water's surface, severely restricting light and oxygen in shallow bays.

Infestations of Eurasian watermilfoil and zebra mussels interfere with boating, fishing, swimming, and shoreline infrastructure, increase maintenance costs for docks and water intake systems, and require ongoing management, monitoring, and public education to limit their spread.

The Missisquoi River Basin Association noted that Japanese knotweed is an incredibly pervasive invasive plant that flourishes along the Missisquoi River corridor. Knotweed can eventually suffocate native species. It has shallow roots which can lead to river bank destabilization because of the lack of support from native vegetation and trees that were once there. During large rain events, the weakened river banks often break down and fall into the river causing sediment to flow downstream into Lake Champlain. Knotweed is

Figure 13: Flowering Japanese knotweed.



incredibly resilient and eradication requires multiple years of treatment to remove, even when treated with herbicide.

The extent of an invasive species can range from localized infestations (e.g., roadside patches of wild parsnip) to widespread ecological disruption (e.g., emerald ash borer infestation across forested areas). The severity of impact depends on the species involved, the size of the infestation, and how quickly it is detected and managed.

Invasives can affect forest health, agricultural production, recreational access to the Lake and trails, and even public safety in the case of toxic plants. Invasive species may cause overgrowth or damage to various built environments, such as powerlines and culverts. The damage can be minor to catastrophic. Over time, the cumulative effects can lead to long-term ecological changes and economic losses.

Impact: The impact was ranked as *moderate* in Highgate according to the committee due to the type and locations of damage that occurred. According to Vermont Fish and Wildlife, garlic mustard, Japanese knotweed, buckthorn, barberry, honeysuckle, and others are common along woodland edges, trails, fence rows, and roadsides. The emerald ash borer quickly became widespread throughout the town and county.

Town Vulnerability:

People: Health and safety risks from toxic or harmful plants such as wild parsnip include severe skin burns or rashes when touched, particularly during outdoor activities like mowing, hiking, or farming. Invasive insects, such as ticks, can increase the risk of vector-borne diseases like Lyme disease.

Built Environment: The emerald ash borer threatens ash trees near roads, utility lines, and buildings. Dead or weakened trees pose a risk of falling and damaging power lines, homes, or roads, increasing maintenance and emergency response costs. Invasive roots, such as those from Japanese knotweed, can damage foundations, pavement, and drainage systems. Invasives growing in stormwater systems such as tile drains or ditches can clog drainage pipes and culverts or block flow, worsening local flooding or erosion.

Natural Environment: Invasive plants like Japanese knotweed, honeysuckle, or wild parsnip can outcompete native vegetation, leading to the decline of native plants that local wildlife depends on for food and habitat. Forests are particularly at risk from pests like the emerald ash borer, which can cause widespread tree mortality, reduce forest canopy cover, and disrupt wildlife corridors. The Town's Forest Reserve District (3,879 acres) is vulnerable to terrestrial invasive infestations such as the emerald ash borer. The Highgate Cliffs Natural Area (37 acres) is home to several significant and natural communities, including several uncommon and rare plant communities that are vulnerable to invasives. Phosphorus has been identified as a high priority threat to water quality in the Missisquoi Bay, there are also concerns regarding the health of fish and wildlife, the invasion of nuisance aquatic plants, rising mercury levels and other watershed-related issues.

Economy: Timber and forestry impacts from species like emerald ash borer can reduce income from woodlots and lead to costly tree removal near homes, roads and utility corridor. Landowners and farmers may face rising costs related to invasive species control, lost productivity, or degraded soil and pasture conditions. Long-term impacts may include reduced timber value, increased infrastructure maintenance costs, and diminished recreational and tourism opportunities.

Potential Future Impacts:

Climate Change: According to the Department of Health, deep cold spells can play a crucial role in controlling insect pests by limiting overwinter survival, reducing the number of generations, and slowing the spread of invasive species and insect-borne plant diseases. A decline in extreme cold due to climate change may lead to increased pest resistance, greater risks to agriculture and forests, and a wider spread of harmful species like ticks with Lyme disease, which are typically limited by colder climates. As northern and high-elevation areas of Vermont warm, they may become more suitable habitats for ticks and their hosts, such as mice. Reduced snowpack from warming winters could still expose these hosts to freezing during sudden cold snaps.

Warmer spring and fall temperatures prolong the growing season. Invasive plants like Eurasian watermilfoil and water chestnut can start growing earlier in the spring, allowing them to shade out and outcompete native plants before they have a chance to establish. Heavy rain events wash high concentrations of sediment and nutrients (such as phosphorus) from the landscape into the lake. This surge in nutrients, combined with warmer waters, creates ideal "super-charged" conditions for dense, invasive weed mats and harmful cyanobacteria (blue-green algae) blooms.

Change in Land Use/Development: Increased urbanization, agriculture, or deforestation can disturb native ecosystems, making them more vulnerable to invasive species. Development often creates fragmented landscapes and edge habitats that favor fast-growing, opportunistic invaders over native species. Additionally, increased human activity and infrastructure (e.g., roads, landscaping, water management) can unintentionally introduce and spread invasive species into new areas. Increased development along the lake shore could create erosion of shorelines that lead to silt and phosphorous runoff that could lead to "mud flats" where millfoil aggressively outcompetes native plants.

Change in Demographics: Highgate's demographics are not expected to change significantly however as new people move to town, land clearing for housing and infrastructure can disturb native habitats, making it easier for invasive plants like Japanese knotweed or wild parsnip to establish. Landscaping with non-native ornamental plants may inadvertently introduce invasive species that spread into natural areas.

History: Refer to Appendix E for invasive species history.

Extreme Cold – Low Risk

Description: In Highgate the summers are comfortable, wet, and mostly sunny and the winters are freezing, snowy, and mostly cloudy. Over the course of the year, the temperature typically varies from 7°F to 76°F and is rarely below -11°F or above 83°F.

Extreme cold events commonly occur during the winter months and may be intensified by wind chill, which increases the rate of heat loss from the human body and can lead to frostbite or hypothermia within minutes.

Table 8: Average Monthly Temperatures in Highgate (NOAA)

Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
High	29°F	32°F	41°F	55°F	69°F	78°F	82°F	81°F	73°F	59°F	46°F	35°F

Low	7°F	12°F	21°F	37°F	50°F	60°F	70°F	68°F	55°F	43°F	29°F	15°F
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Location: All areas in Highgate are susceptible to cold events.

Probability: The committee determined the probability of an extremely cold event to be *highly likely* but duration varies from less than 12 hours to several days.

Extent: The National Weather Service typically defines extreme cold conditions through wind chill advisories and warnings. In the context of hazard mitigation, extreme cold is considered a recurring natural hazard with the potential for widespread impacts.

- **Wind Chill Warning:** Dangerously cold wind chill values are expected or occurring.
- **Wind Chill Watch:** Dangerously cold wind chill values are possible.
- **Wind Chill Advisory:** Seasonably cold wind chill values but not extremely cold values are expected or occurring.
- **Hard Freeze Warning:** Temperatures are expected to drop below 28°F for an extended period of time, killing most types of commercial crops and residential plants.
- **Freeze Warning:** Temperatures are forecasted to go below 32°F for a long period of time, killing some types of commercial crops and residential plants.
- **Freeze Watch:** Potential for significant, widespread freezing temperatures within the next 24-36 hours.

The extent of extreme cold in can be severe, with temperatures often dropping well below freezing and

Figure 14: Wind Chill Temperature Index

Wind (mph)	Temperature (°F)																	
	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-58	-63
10	34	27	21	15	11	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-38	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-83	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-52	-60	-67	-74	-81	-88	-95
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98
Frostbite times	None		>2 hours					≤30 minutes		≤10 minutes		≤5 minutes						

sometimes reaching as low as -20°F to -30°F during winter months. This extreme cold, coupled with wind chills that can plunge even lower, poses significant risks to public health and infrastructure. The frigid temperatures can cause hypothermia and frostbite within minutes for exposed individuals, particularly affecting vulnerable populations such as the elderly, low-income residents, and those

without proper heating or shelter.

Prolonged periods of extreme cold can impact public health and safety, transportation infrastructure, public utilities, water infrastructure, power and heating systems, agriculture, and the local economy. Extended periods of extreme cold increase the risk of hypothermia, frostbite, and other cold-related illnesses, particularly among vulnerable populations such as older adults, young children, and those without adequate heating. Cold weather can also cause water pipes to freeze and burst, fire hydrants to freeze impairing a response to structure fires. It can strain heating and electrical systems and increase the likelihood of power outages. Transportation may be disrupted by icy roads and vehicle failures. There are also higher costs for heating and maintenance. These impacts can affect the entire community and become more severe when extreme cold occurs for an extended period or coincides with other winter weather events.

Impact: The impacts of extreme cold in Highgate were determined by the committee to be *minor to major*. Highgate is in a northern location and inland setting making it prone to Arctic air masses, which regularly bring extreme cold. According to NOAA, extreme cold temperatures are a recurring winter hazard in northern Vermont. The region typically experiences multiple periods of subzero temperatures each winter.

Extreme cold temperatures in Highgate typically cause frozen water lines for both public and private water lines affecting residences, businesses and public buildings. Vehicles with older batteries and engines may have difficulty starting which would affect people's ability to drive to work, school or attend health care appointments. On occasion, extremely cold temperatures cause power disruptions in Highgate due to increased electrical load from space heater. Heat pumps often fail during extremely cold weather spells due to their design. Occasionally, schools will close.

Town Vulnerability:

People: Extreme cold can cause hypothermia, frostbite, and other cold-related illnesses, particularly among people with disabilities and functional access needs such as older adults, young children, the unhoused and those without adequate heating.

Built Environment: Prolonged cold temperatures can damage buildings, freeze water and sewer lines, increase energy demand, and strain utility infrastructure. It also complicates construction and infrastructure projects, as frozen ground makes it difficult to dig or lay foundations, repair utilities, or manage drainage systems. Frozen soil can lead to frost heaves, where the expansion and contraction of frozen ground causes damage to road infrastructure, driveways, and foundations. It can lead to frozen water mains, and frozen water lines. Water and heating systems are vulnerable to freezing during subzero events, especially in older homes or uninsulated areas. The cold also puts a strain on the local energy grid due to the increased demand for heating.

Natural Environment: Extreme cold can stress wildlife, alter ecosystem processes, and affect the health and survival of sensitive plant and animal species.

Economy: Extreme cold can increase heating and maintenance costs, disrupt transportation and outdoor work, reduce productivity, and create financial burdens for households, businesses, and municipal services.

Potential Future Impacts:

Climate Change: Although extreme cold events may occur less frequently and with shorter duration, they are likely to become more unpredictable due to changes in the jet stream influenced by Arctic warming. As winters warm, more frequent freeze-thaw cycles are expected, with temperatures regularly rising above and falling below freezing. These cycles can significantly impact transportation infrastructure, causing potholes, frost heaves, and damage to roads, bridges, and building foundations. Additionally, extreme temperature fluctuations during winter months can create unstable river ice conditions causing ice jams and localized flooding. Warming temperatures and reduced extreme cold may increase pest survival and expand habitats for disease-carrying species like ticks, posing greater risks to agriculture, forests, and public health.

Change in Land Use/Development: As extreme cold events become less frequent, future land use and development may shift to accommodate longer growing seasons and reduced heating demands. However, sudden cold snaps could still pose risks to infrastructure, agriculture, and natural systems unaccustomed to variable winter conditions. Development plans may need to account for these fluctuations by incorporating resilient building designs and land management practices.

Changes in Demographics: Highgate's demographics are expected to remain stable over the next five years. However, population growth and development could increase pressure on heating systems, utilities, emergency services, and shelters during extreme cold. More infrastructure and residents may be exposed to frozen pipes, power outages, and transportation disruptions. Older adults, young children, and lower-income households may need additional support.

History: Please refer to Appendix E for history of extreme cold temperatures.

Extreme Heat – *Low Risk*

Description: Extreme heat refers to prolonged periods of excessively hot weather, often accompanied by high humidity which can pose serious health, safety and infrastructure risk. In Highgate, extreme heat typically occurs during the summer months when daytime temperatures rise well above average—often exceeding 90°F (32°C)—and nighttime temperatures remain elevated, preventing cooling.

Location: All areas of Highgate are susceptible to extreme heat events.

Probability: The probability of extreme heat in Highgate is considered *likely* by the committee. While historically rare in northern Vermont, climate change is contributing to more frequent and intense heat waves in the region. The number of days with temperatures exceeding 90°F (32°C) is projected to rise over the coming decades. These events are becoming more common during the summer months, particularly in July and August, and may also begin occurring earlier and later in the season.

Extent: The severity of these events can vary based on humidity levels, wind conditions, and the persistence of high-pressure systems. During more intense heat waves, the heat index—a measure that combines temperature and humidity—can reach dangerous levels, significantly increasing health risks, stressing energy and public health systems.

Agricultural impacts may include crop damage, heat stress in livestock and reduced productivity. Additionally, local events and outdoor activities may be canceled or scaled back, and economic losses may occur in sectors like farming, recreation, and tourism.

Heat advisories, watches, and warnings are issued by the National Weather Service and local authorities to alert residents to the risks of impending heatwaves. Places with limited tree cover and ventilation may experience more intense local effects, known as the urban heat island effect, though this is less pronounced in rural communities like Highgate.

The Vermont Department of Health's Heat Vulnerability Index (HVI) references Highgate. The Town's Heat Illness Vulnerability is below the state's mean level (-0.5 to -1.5) roughly averaging 3 to 6 days per year days per year with maximum temperatures of at least 87°F.

Impact: The impact of extreme heat in Highgate was determined by the committee to be *minor*. Extreme heat in Highgate typically lasts for one to several days and up to a week, with daytime temperatures exceeding 90°F and limited overnight cooling. Because Highgate is bordered to the west by Lake Champlain, cool summer water buffers summer temperatures along the shoreline.

Prolonged high temperatures lead to heat-related illnesses such as heat exhaustion and heat stroke, especially among at-risk populations. First response agencies may see increased demand, and public safety services may be strained. Extreme heat can also cause infrastructure stress, including power outages (brown outs) due to high energy demand for cooling systems.

Town Vulnerability:

People: Heat events can cause injuries or fatalities to people who do not heed heat advisories. People with disabilities or functional access needs may be more susceptible to heat related illnesses or injuries such as heat stroke. Older adults have a reduced physiological ability to regulate body temperature, while infants and children rely entirely on caregivers and dehydrate faster. First response services (fire, rescue, law enforcement) could be impacted with larger crowds being drawn to the town beaches and marinas and increased recreational boaters, cyclists and tourists.

Built Environment: Heat events can cause a strain on the town's electrical system, leading to brown or blackout events. Extreme heat can also cause thermal expansion of concrete and steel and swelling on transportation infrastructure.

Natural Environment: Heat events can increase the occurrences of droughts and wildfires. Droughts can cause minor to catastrophic issues for the natural environment. Local wild plants and crops may be lost during a prolonged drought event. Additionally, a drought can lead to streams and groundwater being depleted, which impacts wild and domesticated animals.

Economy: Heat events can cause economic impacts to the towns' operations. Impacts include disruption or closure of municipal departments as well as private businesses from staff with heat related illnesses or power disruptions. For farms, heat stress combined with lower water and nutrient intake directly translates to reduced live animal weights and lower milk yields from dairy cows.

Potential Future Impacts:

Climate Change: Climate change has the potential to increase extreme heat occurrences in Highgate and New England. Older adults are physiologically more sensitive to heat stress, cardiovascular strain, and dehydration. Many older homes on the island lack central air conditioning. High heat days drive up local electricity demand for cooling, putting strain on regional rural power grids. Highgate's economy relies on commercial agriculture orchards, farms, and dairy. Outdoor farm workers face severe heat stress during critical summer harvest and maintenance months. Agricultural crops, vineyards and orchards productivity could be impacted by warmer winters and hotter summers. There is increased likelihood of future drought events, both in frequency and magnitude.

Change in Land Use/Development: No changes to asset impacts due to extreme heat and drought events because of development or land use changes could be identified.

Change in Demographics: Highgate's demographics are not expected to change significantly in the next five years, although a rising average age may increase residents' vulnerability to extreme heat and the need for cooling, hydration, and wellness support.

History: Refer to Appendix E for history of extreme heat events in Highgate.

Infectious Disease Outbreak – Low Risk

Description: An infectious disease outbreak is the occurrence of cases of a disease caused by bacteria, viruses, parasites, or fungi that exceed normal expectations within a specific area or population. These outbreaks can spread quickly and unpredictably, posing significant threats to public health, healthcare systems, and local economies

Location: An infectious disease outbreak can affect the entire town of Highgate, including residential neighborhoods, Missisquoi Valley Union Middle and High School, first responders, town offices, departmental staff, and workplaces.

Probability: The probability of future infectious disease outbreaks in Highgate was rated as *occasional* by the committee.

Extent: Outbreaks may persist from a few days to several years, depending on factors such as the type of pathogen, the effectiveness of the public health response, and the level of immunity within the population. Certain diseases also follow seasonal trends, such as influenza peaking in winter and vector-borne illnesses becoming more prevalent in warmer months. Rarely a larger scale virus outbreak, such as the global Covid-19 in 2020, can gradually spread and overwhelm health care institutions, facilities, systems, resources, and supply chains at the local, state, federal and international levels.

Seasonal illnesses like influenza and tick-borne diseases such as Lyme disease are regularly reported according to Vermont Department of Health. The risk of larger outbreaks—such as COVID-19 or other emerging infectious diseases—remains elevated due to factors like proximity to Canada, travel, climate change, and population movement. Public health trends and past events suggest that the community will continue to face infectious disease threats in the foreseeable future.

Outbreaks may persist from a few days to several years, depending on factors such as the type of pathogen, the effectiveness of the public health response, and the level of immunity within the population. Certain

diseases also follow seasonal trends, such as influenza peaking in winter and vector-borne illnesses becoming more prevalent in warmer months.

People with disabilities and those with access and functional needs may be especially vulnerable during a disease outbreak, although anyone can be affected. Outbreaks can strain local healthcare facilities, sometimes requiring temporary modifications to public spaces, such as converting schools into triage centers. The natural environment may also play a role in the origin or spread of disease, necessitating measures like water treatment to prevent further transmission. Economically, outbreaks can disrupt or shut down businesses and lead to additional costs for public health responses, such as running immunization clinics.

Impact: The committee categorized the impact as *negligible to moderate*. Typical outbreaks are limited to individual or family cases or within group settings such as Missisquoi Valley Union Middle and High School or commercial offices. A larger outbreak has the potential to be widespread and disruptive. Public health may be significantly affected as occurred during the Covid-19 outbreak, especially among vulnerable populations like seniors, children, and individuals with preexisting conditions.

Local and regional healthcare facilities and services may become overwhelmed, and essential services such as education, first response, medical operations and municipal operations may be interrupted. Prolonged outbreaks or pandemics can result in business closures, economic losses, mental health challenges, and long-term community strain. Quarantine measures, supply chain disruptions, and public health mandates may further impact daily life.

Town Vulnerability:

People: Infectious disease outbreaks can result in illness, hospitalization, and death, particularly among people with disabilities and functional access needs such as older adults, young children, and individuals with underlying health conditions. Widespread outbreaks can also affect mental health and disrupt daily activities, education, and access to essential services. The town operations may be impacted due to loss of even one staff member.

Built Environment: Infectious diseases can disrupt the operation of schools, municipal facilities (town office, public works department), and town road network by reducing workforce availability and increasing demands on public services. Public buildings (town offices, school, library, post office) may require enhanced sanitation measures, temporary closures, or operational modifications to reduce disease transmission.

Natural Environment: Infectious diseases generally have limited direct impacts on the natural environment, but increased use of medical supplies, disinfectants, and waste disposal can create localized environmental pressures. Some diseases may also affect wildlife populations.

Economy: Disease outbreaks can lead to workforce shortages, reduced business activity, increased healthcare costs, and disruptions to local commerce and tourism. Long-term economic impacts may include lost productivity, increased public expenditures, and financial strain on households, businesses, and the local government.

Potential Future Impacts:

Climate Change: Climate change has the potential to increase the frequency and intensity of disease outbreak events through various mechanisms. Temperature changes may increase vector-

borne disease and pathogen survival. Extreme weather events (e.g., tropical storms, flooding, winds) can disrupt infrastructure, leading to breakdowns in sanitation, clean water supply, and healthcare services. Climate-induced displacement and migration can lead to overcrowded living conditions, which can facilitate the spread of infectious diseases.

Changes in Land Use/Development: A widespread infectious disease outbreak could cause disruption in available trades people, construction workers and laborers available to work on housing, transportation and utility infrastructure projects. No large-scale projects are anticipated in Highgate in the near future.

Changes in Demographics: Highgate's demographics are not expected to change significantly in the next 5 years but any increase in growth may increase opportunities for disease transmission through greater interaction in schools, workplaces, public facilities, and community events. An aging population may be more susceptible to severe illness and may place greater demands on healthcare and support services during an outbreak. Additionally, vulnerable populations, including individuals with underlying health conditions, limited access to healthcare, or economic constraints, may face greater challenges in preventing infection and recovering from illness, potentially increasing the overall impact on the community.

History: According to the Vermont State Hazard Mitigation Plan:

- 1918, 1957, 1968: Pandemic Influenza.
- 2009: H1N1 strain.
- 2015: Sika virus.
- 2020 - 2021: COVID-19.

Drought – Low Risk

Description: Drought is a prolonged period of abnormally dry weather characterized by a deficiency in precipitation, resulting in water scarcity and environmental stress. Droughts can have significant impacts on agriculture, water resources, ecosystems, and socio-economic systems. Droughts manifest gradually and can vary in duration, intensity, and spatial extent. They may be triggered by natural climate variability, such as atmospheric circulation patterns, or exacerbated by human activities, such as land use changes and water management practices.

Location: All areas of Highgate are susceptible to drought.

Probability: The probability of extreme drought in Highgate is considered *likely* by the committee.

Extent: Droughts can affect large geographic regions, including urban and rural areas, agricultural lands, forests, and waterways. Drought severity is often categorized based on indicators such as precipitation deficits, soil moisture levels, streamflow, and water storage reservoir levels. Severe droughts can lead to significant water shortages, ecological disturbances, and socio-economic impacts. Severe droughts can result in reduced water availability for drinking, bathing, irrigation, and commercial uses, leading to economic losses, environmental degradation to streams habitats, wetlands, and forests and social disruption.

Impact: Dairy farming, maple sugaring, commercial orchards, and produce farming are the primary agricultural activities still being practiced in the Town. The agriculture community has high summer water requirements. Without sufficient rainfall or dedicated irrigation ponds, these soils dry rapidly during peak summer transpiration, threatening fruit yield and tree survival.

Additionally, lack of moisture slows pasture grass growth to a crawl. This leaves dairy cows, beef cattle, horses, sheep, and goats with insufficient fresh forage to graze. Livestock farms rely on local hay, alfalfa, and field corn for winter feed. Severe droughts frequently decimate second and third hay cuttings, creating widespread regional shortages.

Residents and commercial properties that rely on wells and spring fed systems would be impacted by drought.

The Lake Champlain shoreline is vulnerable to the *secondary* impacts of hydrological drought. Low precipitation paired with warm temperatures drops water levels and slows water circulation, triggering intense cyanobacteria (blue-green algae) blooms that restrict water recreation and affect shorefront water intake lines.

Additionally, local events and outdoor activities may be canceled or scaled back, and economic losses may occur in sectors like agriculture, recreation, and tourism.

Town Vulnerability:

People: Much of Highgate relies on private wells or springs. Extended dry periods lower groundwater tables, leading to reduced well yields, loss of water pressure, or wells running completely dry. Highgate has a higher percentage of elderly residents than the state average, who are more susceptible to heat stress and water supply disruptions during drought conditions.

Built Environment: Droughts are not likely to cause any significant impacts to the built environment; however, dried wells may cause the need to dig a new well or replace well parts which is costly. Private wells may need to be drilled deeper as water tables drop which is costly.

Natural Environment: Low precipitation combined lowers stream flows into Lake Champlain. Stagnant, warmer water in shallow bays can exacerbate seasonal cyanobacteria (blue-green algae) blooms, restricting recreational water use and private shorefront pumping. Local wild plants and crops may be lost during a prolonged drought event. Additionally, a drought can lead to streams and groundwater being depleted, which impacts wild and domesticated animals

Economy: Highgate is home to prominent commercial orchards, farms, and livestock pastures. Drought during critical growing months (June–August) severely impacts crop yields, fruit size, forage growth, and requires increased irrigation or hauling water. Dairy production could lessen if cows are not getting sufficient water.

Potential Future Impacts:

Climate Change: Drought is projected to become longer, more frequent and more severe. Much of Highgate relies on private wells. Prolonged dry spells lower groundwater tables causing water pressure to drop, sediment in drinking water or wells simply running dry. This creates a financial burden on residents who would need to dig new wells. Climate change threatens the agriculture economy and adds financial strains on farm families. Prolonged drought also increases wildfire risk which would place added burden on Highgate’s volunteer fire department’s ability to respond to multiple incidents.

Change in Land Use/Development: No changes to asset impacts due to drought events as a result of development or land use changes could be identified.

Change in Demographics: Highgate’s demographics are not expected to change significantly in the next five years. An aging population may have greater health risks during periods of water shortages, while seasonal residents and summer visitors can significantly increase water demand

during the driest months of the year. Given there are no large developments planned in town in the near future, the impacts of drought on Highgate's future demographics are expected to be minimal.

History: Per the Vermont State Hazard Mitigation Plan:

"The droughts in the mid-1960s were the most severe in Vermont. Every county in the State experienced Exceptional Drought (D4) conditions in May of 1965. Since the 1960s Vermont has experienced several less severe periods of drought. There were two declared statewide droughts in June and July 1995. The drought persisted through the summer of 1995, and a third, more severe drought affected Southern Vermont in August of that year. In 2001-2002, Vermont was affected by a Severe Drought (D2), which peaked at over 14% of the State at the D2 level between November and December of 2001 and nearly 100% of the State in at least Moderate Drought (D1). Portions of Vermont were in Severe Drought (D2) from October 2016 through April 2017, peaking at 29.15% of Vermont in October and November 2016 and 80% of the State was in at least Moderate Drought (D1) (Figure 50). Moderate Drought conditions returned in October of 2017 and again in June 2018. From September to November of 2018 the State experienced another Severe Drought. Then from June 2020 to October 2021 much of the State was under Moderate Drought to Abnormally Dry conditions. From September to October of 2020 29.4% of the State was under Severe Drought conditions."

Hail – Low Risk

Description: Hail is a form of precipitation composed of spherical lumps of ice. Known as hailstones, these ice balls typically range from 50 mm in diameter on average, with much larger hailstones forming in severe thunderstorms. The size of hailstones is a direct function of the severity and size of the thunderstorm that produces it.

Location: Hailstorms are random in nature and can impact any area or structure within the town.

Probability: The committee classified the probability of hail event as *unlikely*. Hailstorms typically accompany thunderstorms between June and September. There are no major hail events that have occurred in Highgate.

Extent: Hailstorms typically accompany thunderstorms between June and September. They are relatively infrequent, brief in duration, highly localized, and typically cause limited damage due to the generally small hail size—less than 1 inch in most cases. However, when larger hail does occur, it can result in significant damage to crops, property, and structures. One hailstorm in July 2007 caused widespread damages to apple orchards and crops in Highgate. The extent of damage is difficult to predict and quantify, as hailstorms are random in nature and can impact any area or structure within the town.

For TORRO Scale (hailstorm intensity), please refer to the State Hazard Mitigation Plan.

Figure 15: Tornado and Storm Research Organization Hailstorm Intensity Scale

TORRO Scale	Intensity Category	Typical Hail Diameter (mm.)	Probable Kinetic Energy, J-m ²	Typical Damage Impacts
H0	Hard Hail	5	0-20	No damage
H1	Potentially Damaging	5-15	>20	Slight general damage to plants, crops
H2	Significant	10-20	>100	Significant damage to fruit and crops, damage to glass and plastic structures, pain and wood scored

H3	Severe	20-30	>300	Widespread glass damage, vehicle bodywork damage
H4	Severe	25-40	>500	Widespread glass damage, vehicle bodywork damage
H5	Destructive	30-50	>800	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40-60	-	Bodywork of grounded aircraft dented; brick walls pitted
H7	Destructive	50-75	-	Severe roof damage, risk of serious injuries
H8	Destructive	60-90	-	Severe damage to aircraft bodywork
H9	Super Hailstorms	75-100	-	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>100	-	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Impact: The committee rated the impact of hail as *negligible*. Hailstones can damage crops, orchards, vineyards, vehicles, roofs, and siding. Typically, hail is small and rarely damages crops such as corn and hay to the level of causing financial losses for farmers. There are no reports of injuries from hail.

Town Vulnerability:

People: Hailstorms can cause injuries from falling ice, particularly to individuals outdoors, and may create hazardous travel conditions that increase the risk of vehicle accidents. Severe hail events can also disrupt daily activities and emergency response operations.

Built Environment: Hail can damage roofs, siding, windows, vehicles, agricultural structures, and other exposed infrastructure, resulting in costly repairs and maintenance. Critical facilities and utility systems may also experience localized damage during severe storms.

Natural Environment: Hail can damage crops, gardens, forests, and other vegetation by stripping leaves, breaking branches, and reducing plant productivity. Repeated or severe hail events can negatively affect agricultural yields and ecosystem health.

Economy: Hailstorms can lead to substantial economic losses through property damage, vehicle repairs, crop losses, insurance claims, and business interruptions. Recovery and repair costs can place financial burdens on property owners, agricultural producers, and local governments.

Potential Future Impacts:

Climate Change: Climate change can influence hailstorms in complex ways. Warmer temperatures increase atmospheric moisture and energy, which can lead to more intense thunderstorms—potentially making hailstorms more severe. However, higher temperatures near the surface may also melt smaller hailstones before they reach the ground, possibly reducing the frequency of smaller hail events.

Changes in Land Use/Development: Increased residential development in rural areas and farmland conversion could heighten vulnerability to hail-related damages.

Changes in Demographics: Highgate's demographics are not expected to change significantly in the next 5 years. Impacts are likely to remain the same.

History: Refer to Appendix E for history of hail events in Highgate.

Wildfire – *Low Risk*

Description: Wildfire is an uncontrolled fire that burns in forests, grasslands, brush, or other natural areas, often fueled by dry vegetation, wind, and weather conditions. Wildfires can spread rapidly and pose serious threats to public safety, property, infrastructure, and natural resources. According to the US Forest Service wildfires can be caused by a variety of natural and human-related factors:

1. Lightning Strikes – One of the most common natural causes, especially during dry conditions, lightning can ignite trees or brush and lead to rapidly spreading fires.
2. Campfires and Outdoor Burning – Unattended or improperly extinguished campfires, burn piles, or fire pits can easily ignite nearby vegetation.
3. Discarded Cigarettes – Lit cigarettes thrown from vehicles or dropped on dry ground can start fires, especially during hot, windy weather.
4. Equipment Use and Malfunctions – Sparks from chainsaws, lawnmowers, or power lines can ignite fires in dry conditions.
5. Arson – Intentionally set fires remain a leading cause of wildfires in some regions and are particularly dangerous due to their unpredictability.
6. Agricultural and Debris Burning – Improperly managed burns on farmland or residential properties can escape control and ignite wildfires.
7. Drought and Climate Conditions – While not direct ignition sources, prolonged drought and warmer temperatures create extremely dry vegetation, increasing the likelihood and severity of wildfires when ignition does occur.

Location: In Highgate, wildfire risk is generally concentrated in forests, fields, and undeveloped land outside of Highgate Center where residential properties border wooded or brush-filled zones. Although Highgate Center is at a lower risk, wildfires can still threaten structures, utilities, and transportation routes, especially where development meets natural vegetation—commonly referred to as the wildland-urban interface (WUI).

Probability: The committee rated the probability as *unlikely*, however the fuel potential for large fires exists.

Extent: The town remains vulnerable during dry periods, particularly in spring and late summer when vegetation is highly flammable. The fire chief noted wildfires generally come in the form of grass fires of less than 5 acres in size. The potential extent of damage could be significant due to the large areas of forested land and limited wildfire protection from the on-call Fire Department. Major wildfire events have not occurred in Highgate and data on past damages is limited.

Wildfires pose a risk of injury or death to individuals who are unable to evacuate promptly. Delays in evacuation may result from sudden onset fires or from individuals who ignore warnings. Vulnerable populations—such as the elderly, people experiencing homelessness, residents with disabilities and functional access needs, are likely to face greater risk. Also, there is public health risk from smoke that reduces air quality, especially for people of all ages with respiratory issues such as asthma.

Impact: The committee rated the impact of wildfire as *negligible* to *minor*. There have been no large wildfires in Highgate, but if a wildfire were to occur, it could pose significant risks to public safety, property, and the environment especially in the wooded areas. Impacts may include the destruction of homes, barns, and other

structures; loss of livestock or crops; interruption of utilities and services; and damage to critical infrastructure such as power lines or roads. Smoke from wildfires can also pose health risks, especially for individuals with respiratory conditions. In more severe cases, wildfires can lead to evacuations, economic losses, environmental degradation, and long-term recovery challenges. The psychological and social impacts on residents, especially those who lose property or face evacuation, can also be substantial.

Town Vulnerability

People: Wildfires can threaten lives through direct exposure to flames, smoke inhalation, and rapidly changing fire conditions that can force evacuations with little warning. They also impact public health over a broader area by degrading air quality and increasing respiratory and cardiovascular risks. People with disabilities or functional access needs (i.e. the elderly, those without housing, those without proper transportation) may potentially be impacted more than other residents.

Built Environment: Wildfires can destroy or severely damage homes, businesses, utilities, transportation corridors (i.e., US Route 7, Interstate 89, VT207 and Route 78) and critical infrastructure (public works garage, fire station, town office, power infrastructure), especially in wildland–urban interface areas. Post-fire conditions can also increase risks to structures from debris flows and reduced slope stability.

Natural Environment: Wildfires can lead to significant environmental damage by destroying vegetation, altering wildlife habitats, and contributing to soil erosion. They also release large amounts of pollutants and greenhouse gases into the atmosphere, reducing air quality and impacting overall ecosystem health. While fire is a natural ecological process, high-intensity or frequent fires can degrade forests and reduce biodiversity.

Economy: Wildfires can result in significant economic losses through property damage, firefighting and emergency response costs, business interruptions, and impacts on tourism, forestry, and agriculture. Long-term recovery may also require substantial investments in rebuilding, landscape restoration, and can lead to higher insurance costs and reduced property values.

Potential Future Impacts:

Climate Change: Climate change has the potential to increase the frequency and intensity of wildfires due to rising temperatures and changing precipitation patterns.

Change in Land Use/Development: Increased residential development in rural areas, particularly through subdivisions and large lot estates, increases wildfire risks due to land clearing and proximity to forested areas. Increased development leads to greater human activity and infrastructure needs that could increase risk.

Change in Demographics: Highgate’s demographics are not expected to change significantly in the next five years and could increase the risk and impact of wildfires as more development encroaches on forested areas, creating a larger wildland-urban interface. This expansion may strain emergency services, increase the number of people and properties at risk, and elevate the potential for human-caused ignitions. Additionally, greater demand for land and resources could lead to increased fuel loads and reduced natural buffers.

History: The fire department does not keep detailed records for wildfires, so no details of past wildfires are available other than what was recorded in the State Fire Marshal’s Report.

June 5 – 8, 2023: An air quality alert was issued for the entire state due to wildfires in Canada.

July 5 – 7, 2002: Smoke, from many forest fires across the Nemiscau region of northern Quebec, carried into Vermont from the evening hours of July 5 to the late evening of July 7. Advisories were issued warning people with respiratory problems to remain indoors and all individuals to curb outside activity. No major problems were reported to the National Weather Service because of this smoke.

Dam Failure – Low Risk

Description: Dam failure can take several forms, including structural collapse or a breach. Dam failure can take several forms, including a collapse or breach in the structure. While most dams have storage volumes small enough that failures have few or no repercussions, dams storing large amounts can cause significant flooding downstream.

Location: There is one dam in Town on the Missisquoi River that is owned and operated by Swanton Village Electric Department. The dam is actually a rubber bladder that is controlled by dam operators. It is one of only a handful of bladder dams left in the country. The dam is currently not in operation as the bladder needs replacement and a replacement is unavailable. The future of the bladder replacement is unknown at the time of this writing. Swanton Village Electric has been unsuccessful in finding a replacement. There are no manufacturers in the United States.

Probability: The committee classified the probability of dam failure as *unlikely* because there is no longer a dam that is operating in town. There was low probability of failure prior to bladder being removed. The dam could be inflated and deflated by dam operators to adjust for the fluctuations in river flows.

Extent: Extent of damages is non-existent. However, when the dam was in place, there are no properties in town that would be impacted by a dam failure. State and federal engineers found that during the January 2018 Missisquoi River Flood event from ice jams, the dam did not play a role in downstream flooding. The bladder was actually not in place at the time of the flood.

Impact: There are no impacts from a dam failure as the bladder that formed the dam was removed.

Similar run-of-river and smaller hydroelectric structures have little to no storage capacity to absorb upstream flood surges. In extreme events, water passes straight over or through the facility. The Missisquoi River floodplain in Highgate consists heavily of farm fields, pastures, and marshland. A sudden breach or flood surge can cause crop damage, loss of livestock, and heavy erosion/topsoil scouring downstream in the Waugh Farm Road area and possible flooding along state Route 78, Route 207 and Monument Road.

Town Vulnerability:

People: None. However, when the dam was in place, residents living downstream of the dam along Route 78, Route 207, Waugh Farm Road, Tanglewood Drive, Jedware Circle, Monument Road and Baker Road were at risk. There are approximately 30 residences that may be impacted by dam failure if the dam were in place. People with disabilities and or functional access needs may need assistance evacuating on short notice. This puts strain on local response organizations that rely on volunteers and limited paid staff.

Built Environment: Currently none. While Highgate does not house massive reservoir-retaining flood-control dams on the scale of central Vermont's major state dams (like Waterbury or Wrightsville), local vulnerability was a concern when the dam was in place. The following roads would be impacted: State Routes 78, 207, Route 78, Route 207, Waugh Farm Road, Tanglewood Drive, Jedware Circle,

Monument Road and Baker Road. There are 26 single family residences, 2 mobile homes, 1 substation and 1 industrial site that would be impacted by a dam failure if the dam were in place.

Natural Environment: Currently none. However, when the dam was in place, a failure could significantly impact the natural environment by destabilizing the Missisquoi River, accelerating erosion, and increasing sediment transport that degrades aquatic habitats. Floodwaters can carry excess phosphorus, nutrients, pollutants, and invasive species into waterways, reducing water quality throughout the northern Lake Champlain watershed and increasing the likelihood of harmful algal blooms that threaten aquatic ecosystems, wildlife, domestic animals, and public health. These impacts can also damage wetlands within the Missisquoi River Wildlife Area.

Economy: None. However, then the dam was in place, a failure could have resulted in high costs for response and recovery efforts, road repairs, home maintenance and repairs, and increases to electric rates for those who are serviced by Swanton Village Electric.

Potential Future Impacts:

Climate Change: Strong temperature fluctuations, similar to what occurred in January 2018, could change ice conditions within a 24 – 48-hour period. Warmer, unseasonable temperatures, could cause Missisquoi River ice to melt, causing ice jams. Ice jam can act as secondary dams backing up water unpredictably into properties along the river and along roads. Such jam could suddenly release water flooding down stream areas around Waugh Farm Road, VT Route 78 and VT Route 207.

Change in Land Use/Development: Should a replacement bladder be installed, key transportation corridors, such as state Route 207 and Route 78 would be vulnerable to washouts or overtopping. A sudden flood wave can easily sever travel along these major routes between Highgate Center, East Highgate, and neighboring communities like Swanton Town and Village.

Change in Demographics: Highgate's demographics are not expected to change significantly in the next five years. However, an aging population may increase the demand for emergency assistance, medical services, and accessible transportation during a dam failure and flood event. This can place additional pressure on infrastructure and emergency response resources. Increases in populations with disabilities and functional access needs, such as individuals with limited mobility, may also increase the challenges associated with dam failure response and recovery.

History: None.

Earthquake – Low Risk

Description: An earthquake is the shaking of the surface of the Earth resulting from a sudden release of energy in the Earth's lithosphere that creates seismic waves.

Location: While earthquakes occur on fault lines, the entire town of Highgate is susceptible to an earthquake.

Probability: The committee considered Earthquakes as an *unlikely* event for the town and region based on history.

Extent: An earthquake is measured by magnitude, energy released by an earthquake, and intensity, effect and damage caused by the earthquake. The most commonly used scale is the Richter Scale. Although difficult to predict, given the State's historical earthquake data, Highgate may anticipate an earthquake measuring very low on the Richter Scale.

All of Vermont is classified as an area with a low to moderate seismic activity. This can be compared to the west coast of the U.S., which is classified as "very high" and the north-central states classified as "very low." Earthquakes have been felt in Highgate and remain a geologic possibility.

Impact: The committee rated the impact of an earthquake as *negligible* to *major*. Earthquakes can vary in size and intensity, and they may cause ground shaking, surface rupture, and secondary effects like landslides, tsunamis, or structural damage. Historically, earth quakes cause very slight almost undiscernible ground tremors.

Town Vulnerability: Earthquakes in Vermont are typically small tremors so the possibility of a threat to the following is low.

People: Earthquakes can cause injuries or fatalities from collapsing structures, falling objects, and secondary hazards, while also disrupting access to emergency services, healthcare, and essential resources.

Built Environment: Ground shaking can damage buildings, roads (US Route 2 and causeway), bridges, utilities, and critical facilities, resulting in structural failures, service interruptions, and costly repairs.

Natural Environment: Earthquakes can trigger secondary hazards such as altered stream channels, increased erosion, and cause bank failures. In Highgate, this could impact lakeshore properties that are located well above the mean water level. Additionally, groundwater systems could be affected, leading to changes in private and public water supplies.

Economy: Earthquakes can generate significant economic losses through property damage, infrastructure repairs, business disruptions, emergency response costs, and long-term recovery efforts.

Potential Future Impacts:

Climate Change: Climate change primarily affects atmospheric and oceanic processes, but there is emerging evidence suggesting that it can indirectly influence seismic activity, including earthquakes⁴. It is not currently possible to predict when or where an earthquake may occur.

Changes in Land Use/Development: No large residential or commercial developments are expected to occur in next 5 years. Any increase in the number of residential homes, residential and commercial developments and infrastructure would cause greater potential for property damage, service disruptions, and economic losses if an earthquake were to occur.

Changes in Demographics: Highgate's demographics are not expected change significantly in the next five years. Although population growth or shifts in vulnerable groups could affect the number of residents needing assistance during an earthquake and the resources required for evacuation, shelter, and recovery.

History: According to the VT Geologic Survey, the two strongest recorded quakes measured in Vermont were of a magnitude 4.1 on the Richter scale. One was centered in Swanton and occurred in 1943, and the second occurred in 1962 at Middlebury. The Swanton quake caused little damage, but the Middlebury quake did result in broken windows, cracked masonry and falling objects around the Middlebury area.

Earthquakes centered outside of the state have also affected Vermont. Two quakes of magnitude 5.5 occurred in New Hampshire in 1940. In 1988, an earthquake with a magnitude 6.2 was centered in Saguenay, Quebec

⁴ DeLoss, J. (2024, December 18). *CSU study links climate change and earthquake frequency*. CSU SOURCE. <https://warnercnr.source.colostate.edu/climate-change-earthquake-frequency/>

and caused shaking in the northern two thirds of Vermont. On June 23, 2010, a magnitude 5.2 earthquake in Ottawa was felt in the area. No damage was reported.

6. COMMUNITY CAPABILITIES

A hazard mitigation capabilities assessment evaluates a community's ability to reduce and manage risks associated with natural hazards. This assessment involves analyzing existing policies, programs, and resources to identify strengths and areas for improvement in mitigating hazards. The four key types of mitigation capabilities include planning and regulatory, administrative, and technical, financial and education and outreach. Below are the definitions of each key type:

- **Planning and regulatory:** Planning and regulatory capabilities are the codes, ordinances, policies, laws, plans and programs that guide growth and development.
- **Administrative and Technical:** Administrative and technical capabilities are the participant's staff, skills, and tools. These capabilities can be used for mitigation planning and to conduct specific mitigation actions.
- **Financial:** Financial capabilities are the resources to fund mitigation actions.
- **Education and Outreach:** Education and outreach capabilities are programs and methods that can communicate about and encourage risk reduction.

How This Plan Will Improve Existing Capabilities

Highgate's mitigation capabilities that reduce hazard impacts or that could be used to implement hazard mitigation activities. As Highgate goes through the update process for the planning mechanisms outlined in Table 10, the Town will look to the Hazard Mitigation Plan to help guide land use district decisions, and guide goals and policies for those districts.

Updates to each of the planning mechanisms outlined in Table 8 are handled by the identified responsible party. There is no timeframe for updating the referenced plans and regulations to better incorporate hazard mitigation, however, as each document is updated, the Hazard Mitigation Plan will be reviewed for incorporation. For example, The Local Emergency Management Plan is updated after Town Meeting each year, including updates to vulnerable geographic locations, as well as locations of residents and businesses who may be in harm's way. This information will be used to update the Local Hazard Mitigation Plan.

The goals of this Hazard Mitigation Plan will be incorporated in the upcoming Municipal Plan update to ensure that emergency preparedness and mitigation planning efforts are included, with particular attention to the identified mitigation actions. Additionally, the Hazard Mitigation Plan will be used to help prioritize high risk areas and target priority projects through Vermont's Municipal Roads General Permit Program and related funding. This will ensure this plan is utilized and project follow-through occurs.

Table 9: Planning and Regulatory Capabilities

Existing Protection	Description / Responsible Party	Effectiveness / Enforcement / Hazard Addressed	Gaps in Existing Protection / Improvement Needed
Planning and Regulatory Category			

Highgate Town Plan 2023-2031	Policies and vision for future land use. Adopted 2023 Planning Committee Chair	Policies that provide protection and limited development in wellhead protection areas, wetlands, steep slopes, and shallow soils. Flooding, fluvial erosion, lakeshore erosion, severe thunderstorms, severe winter weather (ice storm), hazardous materials.	Incorporate hazard mitigation projects into the All Hazards Resiliency Chapter.
Development Regulations (2025)	Municipal laws that dictate how specific parcels of land can be developed and utilized. They govern factors such as property usage (residential, commercial, or agricultural), building height, lot size, setback distances from property lines, and environmental protections like flood zone restrictions. Their primary purpose is to promote orderly growth, protect natural resources, preserve property values, and ensure community safety. Zoning Administrator Development Review Board (DRB) Chair	Restrictions on development in potentially hazardous areas such as steep slopes, floodplains, lakeshore and water resource areas. Flood hazard rules are embedded directly within Highgate's combined Zoning, Flood Hazard, and Subdivision Regulations. Lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, hazardous materials.	Will need updating to address new FEMA flood mapping estimated to be released in 2027.
Local Emergency Management Plan	Summary of emergency response and emergency notification procedures. Adopted 2025. EMD	Updated annually. Severe winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, major fire - wildland.	Conduct annual training on plan. Does not include continuity of operations annex.

Building Code	Regulations governing the design, construction, alteration, and structural integrity of physical buildings. They dictate how a structure must be built—setting minimum technical standards for foundations, framing, electrical systems, plumbing, mechanical work, and energy efficiency. Their primary goal is to ensure long-term structural safety and occupant welfare. Fire Chief	Severe winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, major fire - wildland.	Town does not currently have a building code and does not currently plan to adopt one, however new construction is expected to meet state energy requirement. The town may consider adopting building codes in the future.
Local Emergency Management Plan (LEMP)	Summary of emergency response and emergency notification procedures. Summary of emergency response and emergency notification procedures. Adopted 2025. EMD	Updated annually. Severe winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, major fire – wildland.	Conduct annual training on plan. Does not include continuity of operations annex.
Capital Improvement Program and Budget	The Town engages in capital planning, primarily managed through its annual municipal planning processes, dedicated capital reserve funds, and the Town Plan. Selectboard Chair	Highgate uses dedicated funds voted on by residents (such as Highway/Equipment reserves and building improvement funds) to plan for and finance major equipment, vehicle replacements, and municipal infrastructure. Severe winter storm (ice storm), lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm,	Budget for long-term hazard mitigation projects

		tornado, tropical storm, hurricane).	
Road Erosion Inventory	Identifying location and severity of road erosion on road segment that are within 1,000 feet of surface waters. Survey completed in 2018 with annual updates. Town wide survey anticipated for 2027. Road Foreman	Road Erosion Inventory completed in 2018. Town applies for state funding annually to address road erosion issues. Highly effective in addressing Severe winter storm (ice storm), lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane).	Does not include private roads.
Traffic Ordinance 2024	Establishes local traffic, speed, designates intersections, regulates parking, and public safety and road maintenance Selectboard Chair	Establishes special traffic regulations on public highways within the town. Ensures safety, order, and compliance with traffic laws by regulating speed limits, traffic control devices, parking, loaded vehicles, driveways, mobile vendors, and structures on public rights-of-way. Also provides enforcement mechanisms and penalties for violations.	The ordinance designates violations as civil offenses under 24 V.S.A. Chapters 1974a and 1977, but fails to outline actual fine schedules, escalating penalties for repeat offenses, or explicit authority for issuing tickets..
Administrative and Technical Capabilities			
Local Official Roles	Responsibilities	Staffing	Improvements Needed
Town Selectboard	Locally elected governing body responsible for decision making.	5 members	Volunteer position. Paid small annual stipend. Filling multiple roles. Dedicated time on hazard mitigation may be limited.
Town Administrator	Professional administrator hired by the Selectboard to assist with the daily operations of municipal government, implement policies, assist staff and budgets, and coordinate the delivery of local services in accordance with Vermont law and	1 Town Administrator	Filling multiple roles. Dedicated time on hazard mitigation may be limited.

	local ordinances.		
Zoning Administrator	Enforces development regulations and supports land use planning.	1 part-time	Limited hours. Dedicated time on hazard mitigation may be limited. Increase coordination with emergency management and attend substantial damage determination training.
Public Works Department	Manages day-to-day operations, crew management, and physical maintenance for the Highgate Highway Department.	1 full time Public Works Director position with 2 full-time crew members.	Consider training staff to assist with FEMA preliminary damage assessments and documentation coordination
Fire Chief	Lead and manage the fire department, directing emergency response operations, overseeing fire prevention and public safety programs, and coordinating preparedness, response, and recovery efforts for hazards and disasters within the community.	1 volunteer.	Challenges related to limited daytime response availability for volunteer department, volunteer recruitment and retention, training capacity, maintenance and administrative workload.
Town Clerk & Public Meetings Clerk	The Town Clerk is Presiding Officer responsible for the administration and conduct of all town and general elections.	1 full-time Town Clerk & Public Meetings Clerk	Challenges related to competing municipal priorities. Limited time for hazard mitigation.
Town Treasurer	The Treasurer oversees the collection of taxes and processes payments. Assists with annual capital budget.	1 full-time Town Treasurer,	Challenges related to competing municipal priorities. Limited time for hazard mitigation.
Director of Recreation	Oversees local youth sports, plans family and community events, and manages the operations and scheduling of town recreational facilities, including the Highgate Sports Arena.	1 full time Director of Recreation.	The Recreation Director maintains active community reach through the town's recreation portal, social media channels, and email distribution lists. Integrating emergency broadcasts (such as VT-ALERT registration pushes or storm shelter

			updates) into these existing platforms ensures broader community outreach during disasters.
Financial Capabilities			
Existing Protection	Description / Responsible Party	Effectiveness / Enforcement / Hazard That is Addressed	Gaps in Existing Protections / Improvements Needed
Annual Town Budget	Highgate uses dedicated capital reserve funds voted on by residents (such as Highway / Equipment reserves and building improvement funds) to plan for and finance major equipment, vehicle replacements, and municipal infrastructure. Selectboard Chair	Capital goals, municipal facility needs, and infrastructure priorities (such as community wastewater projects and highway asset management) are outlined in the Highgate Town Plan. Severe winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, and major fire – wildland.	Federal and state hazard mitigation grants (such as FEMA's BRIC program or VTrans emergency relief funds) require a local cost-share match (typically 10%–25%). Establishing a dedicated "Hazard Mitigation Grant Match Reserve" ensures the town has immediate matching funds available to capture state and federal grants quickly after a major event or funding cycle open.
In Kind Services	Donations and volunteer support from residents	Volunteers can assist with everything from event planning, municipal governance and emergency response support. Volunteers leverage local skills, labor and resources without adding financial strain. Severe winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane),	Need system for tracking donations and volunteer time for in-kind match. Identify volunteer coordinator for community.

		hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, and major fire – wildland.	
Emergency Relief and Assistance Fund (ERAF)	The Emergency Relief Assistance Fund (ERAF) provides state funding to match Federal Public Assistance after federally declared disasters. Selectboard Chair	Ensures communities have planned for emergencies and incentivizes additional resiliency measures (stream corridor protections) for additional match reduction. Severe winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, and major fire – wildland.	Ensure highest possible protection. Missing FEMA approved mitigation plan. Ensure 2026 Vermont State Road and Bridge Standards were adopted.
Education and Outreach			
Existing Protection	Description / Responsible Party	Effectiveness / Enforcement / Hazard That is Addressed	Gaps in Existing Protections / Improvements Needed
Town Website and Social Media Sites	Municipal communications (such as warnings for Town Meeting, public hearings, and Selectboard meetings) follow standard Vermont statutory open meeting and public warning requirements (1 V.S.A. § 312).	The Town relies heavily on traditional, static web infrastructure and regional third-party sites rather than active, direct emergency alert tools managed locally through its municipal website or dedicated social media. The website and town's social media lacks an automated home-page banner system or real-time breaking news feed, making it slow and inefficient for urgent, rapidly changing conditions. Severe winter storm (ice	The official town website functions primarily as an administrative document hub. During an emergency, it lacks an automated home-page banner system or real-time breaking news feed, making it slow and inefficient for urgent, rapidly changing conditions.

		storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, and major fire – wildland.	
Annual Town Report	The town publishes a comprehensive annual Town Report distributed to residents prior to Town Meeting Day to outline budget proposals, department activities and public board updates. Selectboard Chair	The report serves as a primary tool for municipal transparency. It provides detailed accounting of town finances, departmental expenditures, property tax rates, and board reports, giving residents a clear view of how tax dollars are spent.	It could include a one-page "Disaster Readiness Guide" at the front or back of the report detailing local shelter locations, VT-ALERT registration links, emergency contact numbers, and flood safety reminders.
Social Media Emergency Preparedness Messaging	Provides residents with timely information about hazards, preparedness actions and available resources before, during, and after emergencies. Town Administrator	Aids dissemination of official municipal updates quickly, reduces misinformation, and improves public awareness and community resilience. Severe winter storm (ice storm), invasive species, lake shore flooding and flood inundation, lake shore erosion and fluvial erosion, strong wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), hazardous materials, cold, infectious disease outbreak, extreme heat, drought, hail, earthquake, and major fire – wildland.	Can be limited by inconsistent staffing, outdated contact information, and the inability to reach residents who do not use social media or lack internet access. Research and consider purchasing an emergency / mass notification system or dedicating a municipal VT Alert administrator. Actively promoting public sign-ups for VT-Alert on municipal channels to ensure residents receive direct emergency broadcasts.

Administrative and Technical

The Town is governed by a volunteer Selectboard. Paid staff includes a Town Administrator, a Town Clerk, a Town Treasurer, one part-time Zoning Administrator, on full time Director of Recreation , one full-time Public Works Director and 2 full-time public works crew members.

The Town has a Planning Committee and Development Review Board comprised of volunteers and supported by one part-time Zoning Administrator. The Zoning Administrator is response for the floodplain management program and continued compliance. Landuse development projects that require permits are reviewed for compliance with the Town's Land Use Regulations which include a Flood Hazard district with support from the State Agency of Natural Resources, and they include site visits and permitting as applicable. Any permits for conditional uses within the Flood District, such as substantial improvement to existing structures, new construction, recreation or open-air markets, etc. are allowed only by approval from the Town's Development Review Board.

The Public Works Department has one one full-time Director and a two-person crew who are responsible for maintaining miles of highway. The department is constantly maintaining roads during the winter months limiting their availability for other projects.

The Director of Recreation manages both overall town programming (sports leagues, seasonal events) and oversees year-round operations at the Highgate Sports Arena. The position receives capacity support by various volunteer sports organizations and committees but there is little time available for supporting emergency management type activities.

The Fire Department is comprised of volunteer members consisting of one Fire Chief and an average of 15 - 25 volunteers. The department can meet the needs of the communities and can activate mutual aid with neighboring departments if circumstances warrant.

Municipal Funds

The Town's capital budget is prepared and voted on every year during Town Meeting. Specific-use monies are then available to be drawn down throughout the year but only for a specific purpose such as paying for a reappraisal, capital equipment fund, and fire department and highway department trucks and equipment, etc. The Selectboard, Town Clerk, Town Treasurer and department heads annually prepare budgets for general government expenses and highway expenses including payrolls.

Grand List

The Listers and Tax Collector manages the municipal Grand List (property assessments), forming the foundation for property tax revenue that funds the majority of the town budget. The Fire Department, the Cemetery Commission, Library, Recreation Commission, ent each prepare an operating budget for their needs. At Town Meeting in March, these budgets are each presented to the taxpayers who vote to approve the allocation, with or without voter amendments. In early July, once the town has received both the updated Municipal Grand List from the Town Listers and the School Tax rate for the school district, the selectboard sets the Town tax rate for the coming year.

Table 10: Grant List Summary for Highgate, VT (2026)

Type	Number	Value Including Land
Residential I Homes (R1)	819	167,499,600

Residential II Homes (R2)	217	64,221,600
Seasonal I Home	101	14,087,700
Seasonal II Home	4	1,122,300
Mobile Homes - Unlanded	63	2,245,800
Mobile Homes - Landed	239	38,268,600
Farms	52	31,746,300
Commercial	69	26,931,800
Commercial Apts	4	1,151,200
Utilities	7	82,632,900
Other	47	2,270,000
Telecom	8	2,816,300
Misc.	146	16,415,900
Total Listed	1,777	453,169,200

National Flood Insurance Program (NFIP)

The National Flood Insurance Program (NFIP) is a federal program in the United States aimed at providing insurance coverage for properties at risk of flooding. The NFIP was established in 1968 with the passage of the National Flood Insurance Act to address the lack of affordable flood insurance in high-risk areas and to reduce the financial burden on taxpayers for flood disaster relief. At the time of this writing, Highgate has been enrolled in the NFIP since April 4, 1983, and is currently in compliance. The adopted 2025 Development Regulations regulate development in the NFIP floodplain per the 1981 Flood Insurance Rate Maps. 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 Highgate by restricting development in flood prone areas.

FEMA is in process of updating the FIRMs for the County which are due to be released in 2027.

Staffing, Enforcement and Continued Compliance in the NFIP

The Zoning Administrator enforces existing flood plain regulations and reviews future development proposals. If the Zoning Administrator is unavailable, the Selectboard may designate an alternate official to perform these duties to ensure regulatory continuity. Appeals of decisions made by the Zoning Administrator are handled by the Development Review Board (DRB), the community's designated Appropriate Municipal Panel under 24 V.S.A. § 4461. The Town works with the elected officials, the Northwest Regional Commission, VT Agency of Natural Resources and FEMA to correct and prevent any compliance issues.

River Corridor Bylaws

Highgate does not have a River Corridor Bylaw which aims to protect areas along rivers and streams that are prone to erosion and flooding. However, the town's Development Regulations contain stream buffer and corridor protection rules. The regulations establish a mandatory vegetated buffer strip measured horizontally from the top of the bank of all streams, rivers, and designated watercourses. The buffer width

varies depending on the type of waterway. The Zoning Administrator is responsible for monitoring compliance.

Substantial Damage and Substantial Improvement

A permit and conditional use approval by the appropriate municipal panel is required for substantial improvement of existing buildings. Prior to issuing a permit, a copy of the application and supporting documentation shall be submitted by the administrative officer to the State National Floodplain Insurance Program Coordinator at the Vermont Agency of Natural Resources, Department of Environmental Conservation, River Management Section. Substantial improvement includes any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50% of the market value of the structure before the start of the construction of the improvement. This term includes structures which have incurred substantial damage. Substantial damage includes damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged conditions would equal or exceed 50% of the market value of the structure before the damage occurred.

Repetitive Loss

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.

According to FEMA repetitive losses / BCX claims, there are 3 active NFIP policies in Highgate. There have been 4 claims since 1978 totaling \$34,198. There are no repetitive loss properties in Highgate.

Structures in the Special Flood Hazard Area

There are approximately 47 structures within the SFHA in Highgate: 1 Boat ramp/dock, 7 camps, 1 commercial farm, 1 gated w/o building, 1 Industrial site, 6 mobile homes, commercial building, 28 single family dwellings, and 1 "other". Of these, 6% of structures carry flood insurance. This represents 2% of E-911 surveyed structures within the community. Most of these homes are located along the Lake Champlain shore or Missisquoi River.

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. A list of critical facilities may be found in Appendix D.

Vermont's Emergency Relief Fund (ERAF)

ERAF provides state funding to match FEMA Public Assistance after federally declared disasters. Eligible public costs are generally reimbursed by FEMA at 75% with a 7.5% State match. The state will increase its match to 12.5% or 17.5% if communities take steps to reduce flood risk as described below. To receive the 12.5% state match rate, communities must have the following:

- 1) NFIP Participation
- 2) Municipal Road and Bridge Standards
- 3) Local Emergency Management Plan
- 4) FEMA approved Local Hazard Mitigation Plan

To receive the 17.5% state match rate, communities participate in FEMA's Community Rating System or adopt fluvial erosion hazard or adopt river corridor protection bylaw that meets or exceeds the Vermont Agency of Natural Resources regulations.

Highgate's ERAF rate currently is 7.5%. Upon adoption of the 2026 Highgate Hazard Mitigation Plan, the ERAF rate will increase to 17.5%.

7. MITIGATION STRATEGY

The following Mitigation Goals were developed by the Committee.

General Mitigation Goals

- 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 Planning process and Local Emergency Operations Plan.
- Increase hazard mitigation public education and outreach
- Ensure the general public is part of the hazard mitigation planning process.

Identified Hazard Mitigation Actions, Programs and Activities

A mitigation action is a measure, project, plan or activity proposed to reduce or eliminate current and future vulnerabilities described in the risk assessment. Mitigation actions help achieve the plan's mission and goals. The actions to reduce vulnerability to threats and hazards form the core of the plan and are a key outcome of the planning process. FEMA's mitigation action handbook identified actions within the following four categories that need to be considered:

Local Planning and Regulations: These actions include government authorities, policies or codes that influence the way land and buildings are developed and built.

Structure and Infrastructure Projects: These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure.

Natural Systems Protections: This type of action can include green infrastructure and low impact development, nature-based solutions, and bioengineering to incorporate natural features or processes into the built environment.

Education and Awareness Programs: These types of actions keep residents informed about potential natural disasters. Educational outreach can help minimize these risks. Many of these types of actions are eligible for funding through the FEMA HMA program.

Prioritizing Mitigation Actions

Mitigation actions are listed in terms of mitigating threat or risk to public health and safety, reduction of hazard to community assets, adherence to the 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. On-going action items occur at least once per year. Mitigation actions and their associated scores are listed in priority order, below.

Criteria for Analysis

The following criteria were used establishing an order of project priorities. 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 in Appendix B.

- 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 municipal 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?

Projects are classified as either short – term, medium–term or long - term activities.

- Short –term action items are activities which the municipality may be capable of implementing within six months to one year.
- Medium-term action items may be capable of being implemented in one to five years.
- Long-term action items may require 5 to 10 years, new or additional resources, funding, or authorities.

Cost – Benefit Review

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 performed using criteria in Table 10 with results listed in the Mitigation Actions Table 13.

Table 11: Cost - Benefit Review

Cost Estimate	
High	More than \$100,000
Medium	Equals \$50,000 - \$100,000
Low	Less than \$50,000
Benefit Estimates	
High	Public Safety
Medium	Infrastructure / Functionality
Low	Aesthetics / General Maintenance

Note: At the time of applying for FEMA's mitigation grant programs, each action listed in Table 13 will undergo the full benefit-cost analysis methodology (BCA version 4.8 and higher) to maximize savings.

Mitigation Actions

Table 12: 2020 Mitigation Actions Update

Hazard Mitigation Action	Hazard Addressed	Responsible Party	Priority	Status
Transfer Station property and road stabilization	Flooding, Fluvial Erosion, Landslide	Selectboard Chair and Public Works Director	High	Completed in 2024.
Machia Road Bank Stabilization	Flooding, Fluvial Erosion, Landslide	Selectboard Chair and Public Works Director	High	Carryover / On-going. Other infrastructure priorities took precedent.
Property Buyouts for Monument Road Residences	Flooding, Fluvial Erosion, Landslide	Selectboard Chair and Public Works Director	Medium	Completed in 2024.
Monument Road Flood Proofing (road elevation, bank stabilization, draining improvements)	Flooding, Fluvial Erosion, Landslide, Severe Winter Storm	Selectboard Chair and Public Works Director	High	Completed in 2021.
St. Armand Road Culvert upgrade	Flooding, Fluvial Erosion, Landslide, Severe Winter Storm (Ice Storm)	Selectboard Chair and Public Works Director	Medium	Completed in 2024.

Pine Plains Road Erosion Control	Flooding, Fluvial Erosion, Landslide	Selectboard Chair and Public Works Director	Medium	Completed in 2024.
Rollo Road drainage improvements (1.5 miles east of the intersection with Ballard Road)	Flooding / Fluvial Erosion	Selectboard Chair and Public Works Director	Medium	Completed in 2024.
Procure and install generator for water system building at the Highgate elementary school.	All-Hazards	Selectboard Chair and School Board	High	Removed as mitigation action. Town does not own the school and the building is no longer in use.
Support Power Utility Efforts to Protect Utility Corridors (tree / branch removal.	Severe Winter Storm (Ice Storm), Severe Thunderstorm (High Winds, Hail, Lightning)	Selectboard Chair and Public Works Director	High	On-going.

Table 13: 2026 Mitigation Actions

Hazard Mitigation Action	Hazard Addressed	Hazard Mitigation Action Category	Responsible Party (bolded text = primary POC)	Estimated Timeline for Completion	Funding Source	Action Prioritization and Cost / Benefit
Transfer Station Bank Stabilization	Flooding, Fluvial Erosion, Landslide, Earthquake	Structure and Infrastructure Projects	Selectboard Chair PW Director	April. 2027 to Sept. 2031	VTRANS Structures Grant, Town Operating Budget	36 High / High
Machia Road Bank Stabilization	Flooding, Fluvial Erosion, Landslide Severe Winter Storm (Ice Storm), Landslide, Earthquake	Structure and Infrastructure Projects	Selectboard Chair PW Director	May 2026 – Oct. 2029	HMGP, VTRANS Structures Grant, Town Operating Budget	36 High / High

Hazard Mitigation Action	Hazard Addressed	Hazard Mitigation Action Category	Responsible Party (bolded text = primary POC)	Estimated Timeline for Completion	Funding Source	Action Prioritization and Cost / Benefit
Property Buyout at 225 Brousseau Road	Flooding, Fluvial Erosion, Strong Winds (windstorm, thunderstorm, tornado), Severe Winter Storm (Ice Storm), Landslide	Structure and Infrastructure Projects	Selectboard Chair Public Works Director	May 2027 – Sept. 2030	HMGP, FMA, BRICK, Town Operating Budget	35 Low / High
St. Armand Road to River Road drainage improvements	Flooding, Fluvial Erosion, Landslide	Structure and Infrastructure Projects	Selectboard Chair Public Works Director	May 2027 – Sept. 2030	Town Operating Budget	35 Low / High
Remove Problematic Beaver Dams	Flooding, Fluvial Erosion, Strong Winds (windstorm, thunderstorm, tornado), Severe Winter Storm (Ice Storm), Landslide	Structure and Infrastructure Projects	Selectboard Chair Public Works Director	May 2027 – Sept. 2030	Town Operating Budget	35 Low / High
Enhance Public Awareness of home fire risks (smoke alarms, carbon monoxide, fire extinguishers)	Flooding and Fluvial Erosion, Severe Winter Storm (Ice Storm), Wind (windstorm, thunderstorm, tornado, tropical storm, hurricane), Extreme Cold, Extreme Heat, Structure Fire, Wildfire	Education and Awareness Programs	Fire Chief EMD	Annually (Beginning Fall 2026).	Town Operating Budget	36 Low / High

Hazard Mitigation Action	Hazard Addressed	Hazard Mitigation Action Category	Responsible Party (bolded text = primary POC)	Estimated Timeline for Completion	Funding Source	Action Prioritization and Cost / Benefit
Update Flood Bylaws to reflect changes in FEMA FIRMS	Flooding and Fluvial Erosion	Local Planning and Regulations	Zoning Administrator Development Review Board.	Short term (Begin May 2027 end Sept. 2027)	Operating Budget	36 Low / High
Enhance Public Awareness of the Dangers of Severe Winter Weather	Strong Winds (windstorm, thunderstorm, tornado, tropical storm, hurricane), Severe Winter Storm (Ice Storm), Extreme Cold.	Education and Awareness Programs	Fire Chief EMD	Annually (Beginning Fall 2026).	Town Operating Budget	35 Low / High
Shipyard Road Boat Launch Shoreline Protection	Flooding and Fluvial Erosion, Strong Winds (windstorm, thunderstorm, tornado, tropical storm, hurricane), Severe Winter Storm (Ice Storm)	Natural Systems Protection	Director, Friends of Northern Lake Champlain	Medium Term (Began in June 2023 end October 2026)	VT Clean Water Fund	35 Low / High
Saxe Brook Riparian Buffer Expansion Planting, St. Armand Road	Flooding and Fluvial Erosion, Strong Winds, (windstorm, thunderstorm, tornado, tropical storm, hurricane)	Natural Systems Protection	Director, Franklin County NRCD	Medium Term (June 2027 begin, July 2027 end)	Conservation Reserve Enhancement Program (CREP) USDA VT ANR	35 Low / High
Hot and Cold Weather Shelter Planning	Drought and Extreme Heat, Extreme Cold, Drought	Education and Awareness Programs	EMD Health Officer	Annually (Beginning Fall 2026).	Town Operating Budget	35 Low / High

Hazard Mitigation Action	Hazard Addressed	Hazard Mitigation Action Category	Responsible Party (bolded text = primary POC)	Estimated Timeline for Completion	Funding Source	Action Prioritization and Cost / Benefit
Disease Vector Control Training	Infectious Disease Outbreak	Education and Awareness Programs	Health Officer EMD	Annually (Beginning Fall 2026 to September 2031)	Town Operating Budget	35 Low / High
Support Power Utility Efforts to Protect Utility Corridors from Ice	Severe Winter Storm (Ice Storm), Strong Winds, (windstorm, thunderstorm, tornado, tropical storm, hurricane) Extreme Cold, Wildfire, Hail	Local Planning & Regulations	Selectboard Chair PW Director	Annually. (Beginning Fall 2026 to Fall 2031)	Town Operating Budget	34 Low / High
Work with Vermont Woodlands Association to provide educational tools, webinars, and field guides to help identify invasive species threats	Invasive Species	Education and Awareness Programs	Town Administrator Recreation Director	January 2027 – December 2030	Town General Fund	High Low/High
Public Messaging and Training on Infectious Disease and/or Invasive Species Awareness	Infectious Disease Outbreak, Invasive Species	Education and Awareness Programs	EMD Health Officer	Annually (Beginning Fall 2026 through Fall 2031).	Town Operating Budget	34 Low / High

Mitigation Action Changes in Priorities

Mitigation actions changed priorities for several reasons, reflecting the evolving nature of risks, community needs and resource availability. Key factors that drove changes in mitigation actions and priorities may include:

- **Evolving Risk Landscape:**
 - Climate Change: As the impacts of climate change become more pronounced, priorities may shift towards addressing related risks like sea-level rise, increased frequency of extreme weather events, and changing precipitation patterns
- **Updated Hazard Data:**
 - Improved Understanding: Advances in science and technology provide better data and modeling, leading to new insights about hazard risks and vulnerabilities.
 - Recent Disasters: Experiences from recent disasters can highlight previously underestimated risks and lead to a re-evaluation of priorities.
- **Community and Stakeholder Input:**
 - Public Concerns: Community feedback and concerns can bring attention to specific vulnerabilities or areas in need of mitigation.
 - Stakeholder Engagement: Involvement of local businesses, non-profits, and other stakeholders can influence which mitigation actions are prioritized based on their expertise and needs.
- **Changes in Resources:**
 - Funding Availability: New funding opportunities or changes in budget allocations can shift which projects are feasible and prioritized.
 - Technological Advances: New technologies can provide more effective or cost-efficient mitigation solutions, altering priority actions.
- **Policy and Regulatory Changes:**
 - New Legislation: Changes in local, state, or federal regulations can necessitate updates to mitigation priorities to ensure compliance.
 - Policy Shifts: Shifts in government policy focus, such as increased emphasis on sustainability or climate resilience, can change priorities.
- **Demographic and Economic Changes:**
 - Population Growth: Increased population density in certain areas can raise the priority of mitigating risks in those regions.
 - Economic Development: As areas develop economically, there may be a higher priority placed on protecting new infrastructure and investments.
- **Critical Infrastructure Needs:**
 - Infrastructure Vulnerabilities: Identification of weaknesses in critical infrastructure (e.g., utilities, transportation networks) can lead to a prioritization of actions to fortify these systems.
 - Lifeline Services: Ensuring the resilience of essential services like water, power, and healthcare can become a higher priority in mitigation planning.
- **Previous Hazard Mitigation Projects:**
 - Project Completion: The completion of previous hazard mitigation projects may have resolved a hazard in a particular area that was of previous concern.

Integration Into Existing Plans and Procedures

For Highgate to succeed in reducing long-term risk, information from this Plan should be integrated throughout town operations. Integration actions include:

- The mitigation goals and risk assessment information can be incorporated into the next Town Plan update and into future flood hazard area regulations and river corridor bylaws
- Funding mitigation actions can be prioritized in the annual budget process
- Funding mitigation actions can be prioritized in grant research
- The risk assessment information can be incorporated into future training plans and budgets
- The hazard mitigation risk assessment and actions can be embedded into the LEMP

The following hazard mitigation information was captured in the 2023 Town Plan and should be captured in the Town Plan rewrite:

Land Use:

- To provide adequate, safe and affordable housing for all segments of the population.
- To provide for a diversified economy by the development and expansion of appropriate industries and commercial and recreational businesses.
- To protect and encourage the continuation of agriculture and production of value added goods.
- To enhance environmental quality, preserve the rural, agrarian character of Highgate, and protect its natural assets.
- To ensure that development occurs at a pace consistent with the Town's ability to provide services.
- Prohibit development in areas that threaten potable water supplies, such as wellhead protection areas.
- Regulate shore lands to ensure land use development and other activities do not degrade water quality in the Bay.
- Ensure new development does not have a detrimental effect on air quality

Facilities, Utilities & Services:

- Continue to provide first-rate volunteer fire protection.
- Start a recruitment program that can further enhance the fire department.
- Adopt new bylaws to enhance fire department objectives training and implementation of Standard Operating Guidelines (SOGs)
- Reduce the environmental impact from stormwater runoff and wastewater disposal systems, especially those systems in densely settled and environmentally sensitive areas.
- Prohibit and prevent the improper storage and disposal of hazardous wastes.
- Identify and promote the development of recreational and tourist activities, services and facilities placing emphasis on the use of natural and existing man-made resources and on development which does not contribute to pollution of the lake.
- Maintain library and operations as efficiently and economically as possible.
- Provide library services that meet the needs of the community.

All Hazards Resiliency

- Encourage and foster an all-hazards disaster resilient community.
- Prevent the loss of life and injury that result from flooding and other natural disasters.

- Reduce damages to public infrastructure resulting from all hazards events through hazard mitigation planning and project implementation.
- Encourage the protection and restoration of floodplains and upland forested areas that attenuate and moderate flooding and fluvial erosion.
- Implement resiliency measures that are compatible with natural features (including floodplains, river corridors, wetlands, and upland forests), historic resources, character of neighborhoods, and the capacity of the community to implement them.
- Incorporate mitigation measures when developing improvements or expansion to municipal infrastructure.
- Continue participation in the National Flood Insurance Program.
- Continue to implement high-priority projects identified in the Local Hazard Mitigation Plan.
- Adopt annually the Local Emergency Operations Plan.
- Participate in the Franklin County Mutual Aid Agreement.
- Adopt the most recent VTrans Town Road and Bridge Standards.
- Work with State and local Emergency Management, and the town highway department, to plan improved emergency response capacity (operations, training, equipment) during natural disasters.
- Evaluate the flood hazard regulations for opportunities to incorporate measures to increase public safety and reduce future damages.
- Adopt and implement river corridors and buffers to prohibit future development in high-risk areas for flooding or erosion hazards and enable the town to seek additional state matching funds from the Vermont Emergency Relief and Assistance Fund (ERAF).
- Consider adopting a setback standard to reduce landslide hazards.

Infrastructure: Transportation and Energy

- To provide an efficient cost-effective transportation network to meet the various needs of the residents of the Town.
- Maintain a road system that guides the development goals of the Town.
- Increase opportunities for residents and visitors to safely walk and bike within the community
- Maintain Town Garage and equipment inventories to keep pace with Town growth.
- Prevent erosion on Machia Road. This issue should be addressed at a regional level.
- Support the implementation of low impact development and green infrastructure to manage stormwater on public and private properties.
- Promote energy conservation and efficiency in recreational facilities
- Plan for increased electric demand with the support of Efficiency Vermont and local electric utilities.

Education and Awareness

- To provide educational opportunities commensurate with the needs of the population
- Coordinate new partnerships with various groups and organizations including, but not limited to, Highgate Historical Society, the Franklin County Chamber of Commerce, Friends of Missisquoi National Wildlife Refuge, the Missisquoi Bay Working Group, local churches, the youth service group Highgate Cares, and the Maquam Bay of Missisquoi to provide community activities and educational opportunities for young and old

8. PLAN MAINTENANCE

This Plan is dynamic. To ensure it remains current and relevant, it will be evaluated, monitored and updated every five years in accordance with FEMA guidelines in effect at the time.

Annual Monitoring and Evaluation

Within 12 months of FEMA Final Approval, the Plan will be annually evaluated and monitored as follows:

1. Three months prior to the anniversary of the FEMA Final Approval date, the Selectboard Chair and Planning Committee will evaluate the effectiveness of the Plan in meeting the stated goals. Items to be considered during this evaluation:
 - What disasters have the town or region experienced?
 - Should the list of highest risk natural hazard impacts be modified?
 - Are new data sources, maps, plans, or reports available? If so, what have they revealed, and should the information be incorporated into the plan?
 - Has development in the town or region occurred and could it create or reduce risk?
 - Has the town adopted new policies or regulations that could be incorporated into this plan?
 - Have elements of the plan been incorporated into new plans, reports, policies or regulations?
 - Are there different or additional community capabilities available for mitigation implementation?
2. Next, the Selectboard Chair and Selectboard will monitor mitigation action progress. Items to consider:
 - Is the mitigation strategy being implemented or anticipated?
 - Were the cost and timeline estimate accurate?
 - Should new mitigation actions be added?
 - Should proposed actions be revised or removed?
 - Are there new funding sources to consider?

The status (e.g. in progress, complete) of each action should be recorded in Table 8.1. If the status is “in progress” note whether the action is on schedule. If not, describe any problems, delays, or adverse conditions that will impair the ability to complete the action.
3. The public will have an opportunity to review the plan and provide updates a month prior to the Selectboard meeting during the month of the annual anniversary date of FEMA Final Approval. The Selectboard Chair will post hard copies at the Town office and post materials on the Town website and Facebook page for the public. Items to consider for public engagement:
 - Are there any new stakeholders to include?
 - Were there changes in population patterns (migration, density or makeup of socially vulnerable populations)?
 - Were there any changes in land use and development?
 - What public outreach activities have occurred? At minimum, the town will publicly post notice of meeting when the plan is being evaluated.
 - How can the public involvement be improved?

4. Based on input received, the mitigation strategy and/or actions will be modified, if needed. The plan status and public input will be reviewed at Trustees meeting during the month of the annual anniversary date of FEMA Final Approval. A report (or public record in the form of meeting minutes) of the annual evaluation and monitoring will be made available to the public on the Town website and captured in the plan.

Table 14: Mitigation Action Status

Mitigation Action Status					
Mitigation Action	2026	2027	2028	2029	2030
Local Plans & Regulations					
Update Flood Bylaws to reflect changes in FEMA FIRMS					
Structure & Infrastructure Projects					
Transfer Station Bank Stabilization to address 2023 landslide					
Machia Road Bank Stabilization					
Property Buyout at 225 Brousseau Road					
St. Armand Road to River Road drainage improvements					
Natural Systems Protection					
Shipyard Road Boat Launch Shoreline Protection					
Saxe Brook Riparian Buffer Expansion Planting, St. Armand Road					
Outreach & Education Programs					
Enhance Public Awareness of home fire risks (smoke alarms, carbon monoxide, fire extinguishers)					
Enhance Public Awareness of the Dangers of Severe Winter Weather					
Hot and Cold Weather Shelter Planning for Local Officials and Volunteers					
Disease Vector Control Training for Municipal Officials					
Support Power Utility Efforts to Protect Utility Corridors from Ice					
Infectious Disease and/or Invasive Species Education and Awareness for Public					

Plan Updating

This plan will be updated at a minimum every five (5) years as follows:

1. Initiate Plan Update – The Selectboard Chair should contact Vermont Emergency Management (VEM) to apply for funding approximately 2 years prior to the plan expiration date. It is assumed that the Selectboard Chair will serve as the primary point of contact for the Plan update.

Once funding is secured and the grant agreement between the Town and State is in place, the Selectboard Chair can issue a request for proposals (RFP) to procure planning services in accordance with the grant agreement. The RFP should be issued approximately 14 months before the plan expires.

Once a consultant is procured, the Plan update process can begin with a kick-off meeting including the consultant and local hazard mitigation planning team. The kick-off meeting should be scheduled approximately 12 months before the plan expires. The Town should allot approximately 8 months for the plan update process.

2. The Stakeholder Public Outreach Plan for LHMP should be reviewed and updated. Opportunities for whole community involvement throughout the Plan update process must be factored into the schedule. Whole community involvement must include the effects of climate change, changes in population patterns (migration, density, or the makeup of socially vulnerable populations), and changes in land use and development. These opportunities may include a community survey, planning workshop, and public meetings at critical milestones agreed to at the project kick-off meeting.
3. Once the local hazard mitigation planning team has prepared a final draft following a public comment period, they can seek authorization from the Trustees to submit the Plan for VEM/FEMA approval. Plan approval is accomplished in two steps. The first step is receiving “Approval Pending Adoption” from the VEM/FEMA review. The Town should submit for “Approval Pending Adoption” approximately 4 months before the plan expires to allow for time to respond to any review comments received by VEM/FEMA. The second step is adopting the plan. Once the Town receives “Approval Pending Adoption”, the Town Selectboard should adopt the plan by signing the resolution as soon as their next regular meeting.
4. Once adopted, the Town can submit the Plan and the signed resolution to VEM/FEMA. FEMA will issue the Town a letter with the date of “Final Approval”. That date starts the clock on the 5-year cycle.

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Appendix A: Plan Resolution

RESOLUTION

A RESOLUTION OF THE TOWN OF HIGHGATE SELECTBOARD ADOPTING THE 2026 TOWN OF HIGHGATE HAZARD MITIGATION PLAN.

WHEREAS the Town of Highgate recognizes the threat that natural hazards pose to people and property within The Town of Highgate; and

WHEREAS The Town of Highgate has prepared a multi-hazard plan, hereby known as the 2026 Town of Highgate Hazard Mitigation Plan in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS the 2026 Town of Highgate Hazard Mitigation Plan identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in The Town of Highgate from the impacts of future hazards and disasters; and

WHEREAS adoption by The Town of Highgate Selectboard demonstrates its commitment to hazard mitigation and achieving the goals outlined in the 2026 Town of Highgate Hazard Mitigation Plan.

NOW THEREFORE, BE IT RESOLVED BY THE TOWN OF HIGHGATE SELECTBOARD, IN THE STATE OF VERMONT, THAT:

Section 1. In accordance with 24 VSA §872, The Town of Highgate Selectboard adopts the 2026 Town of Highgate Hazard Mitigation Plan. While content related to The Town of Highgate may require revisions to meet the plan approval requirements, changes occurring after adoption will not require The Town of Highgate Selectboard to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

ADOPTED by a vote of ____ in favor and ____ against, and ____ abstaining, this ____ day of _____, 2026.

By: _____ (Signature)

_____ (print name)

APPENDIX B

Appendix B: Mitigation Action Scoring Table

Mitigation Action	Criteria												Total Score
	1	2	3	4	5	6	7	8	9	10	11	12	
Transfer Station Bank Stabilization to address new landslide	3	3	3	3	3	3	3	3	3	3	3	3	36
Machia Road Bank Stabilization	3	3	3	3	3	3	3	3	3	3	3	3	36
Property Buyout at 225 Brousseau Road	3	3	3	3	3	3	3	3	3	3	3	3	36
Enhance Public Awareness of home fire risks (smoke alarms, carbon monoxide, fire extinguishers)	3	3	3	3	3	3	3	3	3	3	3	3	36
St. Armand Road to River Road drainage improvements	3	3	2	3	2	3	3	3	3	3	3	3	35
Remove problematic beaver dams	3	3	2	3	2	3	3	3	3	3	3	3	35
Update Flood Bylaws to reflect changes in FEMA FIRMS	3	3	3	3	3	3	3	3	3	3	3	3	36
Enhance Public Awareness of the Dangers of Severe Winter Weather	3	3	2	3	2	3	3	3	3	3	3	3	35
Shipyard Road Boat Launch Shoreline Protection	3	3	2	3	2	3	3	3	3	3	3	3	35
Saxe Brook Riparian Buffer Expansion Planting, St. Armand Road	3	3	2	3	2	3	3	3	3	3	3	3	35
Hot and Cold Weather Shelter Planning	3	3	2	3	3	3	3	3	3	3	3	3	35
Disease Vector Control Training	3	3	2	3	3	3	3	3	3	3	3	3	35
Support Power Utility Efforts to Protect Utility Corridors from Ice	3	3	2	2	3	3	3	3	3	3	3	3	34
Flood Buyout for Residences Along Black Falls Brook	3	3	3	3	2	3	3	3	3	3	3	3	35
Amidon Road Culvert Upgrade	3	3	3	3	2	3	3	3	3	3	3	3	35
Replace Temporary Bridge on Cote Drive	3	3	3	3	2	3	3	3	3	3	3	3	35
Upgrade damaged culvert on Brady Road	3	3	3	3	2	3	3	3	3	3	3	3	35
Update Flood Bylaws to reflect changes in FEMA FIRMS	3	3	3	3	2	3	3	3	3	3	3	3	35
Enhance Public Awareness of the Dangers of Severe Winter Weather	3	3	2	3	3	3	3	3	3	3	3	3	35
Hot and Cold Weather Shelter Planning for Local Officials and Volunteers	3	3	2	3	3	3	3	3	3	3	3	3	35

APPENDIX B

Disease Vector Control Training for Municipal Officials (ticks, mosquitos, fleas that transmit pathogens like West Nile Virus and Lime Disease)	3	3	2	3	3	3	3	3	3	3	3	3	35
Support Power Utility Efforts to Protect Utility Corridors	3	3	2	2	3	3	3	3	3	3	3	3	34
Infectious Disease and/or Invasive Species Education and Awareness for Public	3	3	2	2	3	3	3	3	3	3	3	3	34

Appendix C: Major Disaster Declarations

(Source: FEMA.gov)

Note: Total Cost is the estimated total cost of the Public Assistance grant project in dollars without administrative costs. FEMA Obligated is the federal share of the Public Assistance grant eligible project amount in dollars, plus grantee (State) and sub-grantee (applicant) administrative costs.

Disaster Date(s)	Declaration Date	Hazard (Disaster Declaration) Total Cost and FEMA Obligated Public Assistance	Franklin County Declaration? (Yes/No)
Aug 11 – 24, 2024	September 11, 2024	Severe Storms and Flooding (DR-4816)	No
Jul 29-31, 2024	September 26, 2024	Severe Storms, Flooding, Landslides and Mudslides (DR-4826)	No
July 9 – 11, 2024	August 20, 2025	Severe Storms, Flooding, Landslides, Mudslides (DR-3609, DR-4810)	No
Jan 9 – 13, 2024	April 19, 2024	Severe Winter Storm (DR-4770) Total Cost \$62, 305.65: FEMA obligated \$46,872.27	Yes
Dec 18 - 19, 2023	March 2, 2024	Severe Storms and Flooding (DR-4762)	No
Aug 3 – 5, 2023	October 6, 2023	Severe Storms and Flooding (DR-4744)	No
July 10 - 14, 2023	July 14, 2023	Severe Storms, Flooding Landslides, and Mudslides (4720)	Yes
July 10 - 14, 2023	July 10, 2023	Severe Storm and Flooding (DR-3595)	Yes
Dec 22-24, 2022	March 20, 2023	Severe Storms (Wind) and Flooding (DR-4695) Total Cost \$182, 310.57 FEMA obligated \$138,589.71	Yes
Jul 29-30, 2021	September 29, 2021	Severe Storm and Flooding (DR-4621)	No
January 20 – May 11, 2023	April 8, 2020	COVID-19 (DR-4532) Total Cost \$182, 310.57: FEMA obligated \$138,589.71	Yes
October 31 – November 1, 2019	January 17, 2020	Severe Storm (Wind) and Flooding (DR- 4474) Total Cost \$422,403.22 FEMA obligated \$422,403.22	Yes
April 15, 2019	April 15, 2019	Severe Storms and Flooding (DR-4445)	No
May 4 – 5, 2018	July 30, 2018	Severe Storm and Flooding (DR-4380)	Yes
October 29 - 30, 2017	January 2, 2018	Severe Storm and Flooding (DR-4356) Total Cost \$198,418.51 FEMA obligated \$149,230.33	Yes
June 29 – July 1, 2017	August 16, 2017	Severe Storms and Flooding (DR-4330)	No
June 9, 2015	July 29, 2015	Severe Storm and Flooding (DR-4232)	No
December 9 – 12, 2014	February 3, 2015	Severe Winter Storm (DR-4207) Total Cost \$0 FEMA obligated \$0	No
April 15 - 18, 2014	June 11, 2014	Severe Storm and Flooding (DR-4178) Total Cost \$150,969.64 FEMA obligated \$113,227.23	Yes

APPENDIX C

December 20 - 26, 2013	January 29, 2014	Severe Winter Storm (DR-4163) Total Cost \$1,141,226.96 FEMA obligated \$855,920.22	Yes
June 25 – July 11, 2013	August 2, 2013	Severe Storms and Flooding (DR-4140)	No
May 22 – 26, 2013	June 13, 2013	Severe Storms and Flooding (DR-4120)	No
May 29, 2012	June 22, 2012	Severe Storm, Tornado, and Flooding (DR-4066)	No
August 27, 2011	August 29, 2011	Tropical Storm Irene (DR-4022) Total Cost \$334,304.64 FEMA obligated \$300,847.19	Yes
May 20, 2011	November 8, 2011	Severe Storms and Flooding (DR-4043) Total Cost \$600,020.21 FEMA obligated \$800,026.93	Yes
April 23, 2011	June 15, 2011	Severe Storms and Flooding (DR-1995) Total Cost \$387,816.36 FEMA obligated \$290,862.31	Yes
December 1, 2010	December 22, 2010	Severe Storms (Wind) (DR-1951) Total Cost: \$183,349.20 FEMA Obligated: \$137,511.92	Yes
December 11 – 18, 2008	January 14, 2009	Severe Winter Storm (DR-1816)	No
July 21 – August 12, 2008	September 12, 2008	Severe Storms and Flooding (DR-1790)	No
July 18, 2008	August 15, 2008	Severe Storms, a Tornado and Flooding (DR-1784)	Yes
June 14 - 17, 2008	June 14, 2008	Severe Storms and Flooding (DR-1778) Total Cost: \$326,737.87 FEMA Obligated: \$245,053.41	Yes
August 12 – September 12, 2004	September 3, 2004	Severe Storms and Flooding (DR-1559) Total Cost: \$667,018.87 FEMA Obligated: \$500,264.23	Yes
June 5 - 13, 2002	June 15, 2002	Severe Storms and Flooding, Severe Wind (DR-1428) Total Cost: \$368,720.47 FEMA Obligated: \$276,540.43	Yes
June 17 – August 17, 1998	June 30, 1998	Severe Storms and Flooding, Rainfall (DR-1228) Total Cost: \$n/a FEMA Obligated: \$n/a	Yes
January 6 - 16, 1998	January 15, 1998	Ice Storms (DR-1201) Total Cost: \$n/a FEMA Obligated: \$n/a	Yes
July 14 - 17, 1997	July 25, 1997	Excessive Rainfall, High Winds and Flooding (DR-1184) Total Cost: \$n/a FEMA Obligated: \$n/a	Yes
June 12 – 14, 1996	June 27, 1996	Flooding (DR-1124)	No
January 19 – February 2, 1996	February 13, 1996	Storms and Flooding (DR-1101) Total Cost: \$n/a FEMA Obligated: \$n/a	Yes
August 4 – 6, 1995	August 16, 1995	Heavy Rain, Flooding (DR-1063)	No

APPENDIX C

April 24 - May 26, 1993	May 12, 1993	Heavy Rain, Snowmelt & Flooding (DR-990) Total Cost: \$n/a FEMA Obligated: \$n/a	Yes
March 11, 1992	March 18, 1992	Flooding, Heavy Rain, Ice Jams (DR-938)	No
July 4 – 23, 1990	July 25, 1990	Flooding, Severe Storm (DR-875) Total Cost: \$n/a FEMA Obligated: \$n/a	Yes
August 4 – 5, 1989	September 11, 1989	Severe Storms, Flooding (DR-840)	No
June 6 – 8, 1984	June 18, 1984	Severe Storms, Flooding (DR-712) Total Cost: \$n/a FEMA Obligated: \$n/a	Yes
August 5, 1976	August 5, 1976	Severe Storms, High Winds & Flooding (DR-518) Total Cost: \$n/a FEMA Obligated: \$n/a	Yes
June 28 - 30, 1973	July 6, 1973	Severe Storm, Flooding, & Landslides (DR-397) Total Cost: \$n/a FEMA Obligated: \$n/a	Yes

APPENDIX D

Appendix D: Extremely Hazardous Sites (EHS) and Critical Facilities, Highgate, VT

<i>Hazardous Sites: Facilities required to report to federal, state, and local governments under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 for chemical emergencies. Sites listed are those that store, and/or use hazardous substances.</i> <i>Critical Facilities: A facility that provides services and functions essential to a community, especially during and after a disaster.</i>	
Hazardous Materials Tier II Site	Stanislas Pit (formerly A.G. Anderson Sand Pit) 1635 Frontage Road
Hazardous Materials Tier II Site	Town of Highgate Sand Pit – formerly Carroll Concrete 1745 Frontage Road
Hazardous Materials Tier II Site	Chevalier’s Drilling Inc. Highgate Springs
Hazardous Materials Tier II Site	G. Boucher Fertilizer 2343 Gore Road
Critical Facility Hazardous Materials Tier II Site	Franklin County Airport 629 Airport Road
Critical Facility Hazardous Materials Tier II Site	Highgate Converter Station Vermont TRANSCO, Inc. 2694 VT Route 78
Critical Facility Hazardous Materials Tier II Site Government Site	USCBP Highgate Spring Port of Entry 482 Welcome Center Road, Highgate Springs
Critical Facility Hazardous Materials Tier II Site	Highgate Jolley 80 Gore Road/VT 207
Critical Facility Warming Shelter	Highgate Library Mill Hill Road
Critical Facility Hazardous Materials Tier II Site Energy	Highgate Substation Vermont TRANSCO 2759 VT Route 78
Critical Facility Town Highway Dept Emergency Services	Highgate Public Works and Fire Department 2996 VT Route 78
Critical Facility	Highgate Sports Arena / Rec Center Gore Road
Hazardous Materials Tier II Site	Highgate Transfer Station (Casella) 2 Transfer Station Road
Hazardous Materials Tier II Site	Highgate Village Market Irving Gas Station 3108 VT Route 78
Critical Facility Shelter	Missisquoi Valley Union Middle and High School 100 Thunderbird Drive

APPENDIX D

Critical Facility Hazardous Materials Tier II Site Telecom	SBA Communications Cell Tower 241 Gore Road (Arena)
Hazardous Materials Tier II Site	Jolly Convenience Store 60 Gore Road
Hazardous Materials Tier II Site Energy	Level 2 Communications Highgate Vermont TRANSCO
Hazardous Materials Tier II Site	Martin's General Store 2934 US Route 7 Highgate Springs
Hazardous Materials Tier II Site	McCuin and Sons 3337 VT Route 78
Hazardous Materials Tier II Site Energy	Orman Croft Generating Facility Swanton Village Electric Power 126 Baker Road
Hazardous Materials Tier II Site	St. Louis Parish 2934 US Route 7
Critical Facility Government Site	US Post Office – Highgate Center 38 St. Arman Road
Critical Facility Government Site	US Post Office – Highgate Springs 2934 US Route 7
Critical Facility Hazardous Materials Tier II Site Natural Gas	Vermont Gas Systems, Inc. Highgate Springs Port of Entry Vermont Brick (VT 78 Leduc Industrial Park

Appendix E: Hazard History for Highgate

Flooding and Fluvial Erosion History

Dates	Description and Extent
July 29 – 31, 2024	(DR-4826) The event was caused by slow-moving nocturnal thunderstorms that brought torrential rainfall, with totals ranging from 4 to 8 inches and intensities exceeding 2 inches per hour in some areas. The extreme precipitation was driven by an unseasonably strong high precipitation low pressure system across New England, overnight. This resulted in rapid and severe flash flooding, particularly in Morgan, Lyndon, and St. Johnsbury, where 42 homes and 16 bridges were destroyed, and St. Johnsbury's 8.08 inches of rain shattered a 1913 record. The Town of Highgate was spared from damages.
July 9 - 11, 2024	(DR-4810) Vermont experienced significant flooding and storms, notably two major events in the first and last weeks of the month. The first resulted from the remnants of tropical cyclone Beryl impacting portions of Central and Northeastern Vermont and northern New York. The heaviest rainfall—ranging from 3 to 5 inches with localized amounts exceeding 7 inches in places like Walden—led to widespread flash flooding, river flooding, and nearly 700 damage reports in Vermont. In addition to the flooding, the event included severe thunderstorms that produced damaging winds and large hail up to 1.5 inches in diameter due to favorable atmospheric conditions supporting supercells. This event caused only minor flooding in Highgate.
July 10 – 11, 2023	(DR-4720) The event known as the “Great Vermont Flood of July 10-11, 2023,” caused catastrophic flash and river flooding across much of the state, with rainfall totals reaching 9.20 inches in Calais and Montpelier setting a calendar-day record of 5.28 inches. This event exceeded Tropical Storm Irene's 2011 record. Crucial preparation, including a “High-risk” Weather Prediction Center outlook and a State of Emergency declaration, facilitated the mobilization of swift water teams and saved lives despite two fatalities and widespread destruction that rivaled or exceeded the impact of Tropical Storm Irene in 2011. Highgate landfill was damaged during this event as a portion of the slope started to separate. A few basements in Highgate Springs had water in them and some minor impacts occurred along local roads. Several segments on the Missisquoi River experienced some bank failures near Pine Plains, Morey Road and Machia Road.
Oct. 31 - Nov. 1, 2019	(DR-4474) This event is locally referred to as the “Halloween Storm.” Steady rain developed during the mid to late evening of October 31 and became heavy at times through the early morning hours. Rainfall amounts from 2.5 to 4 inches fell across northwest and north central Vermont. Numerous rivers including the Missisquoi River and Rock River and area streams flooded. Several roads were full or partially washed in the northern areas. In Highgate, there were many basements that were flooded, several culverts were washed out. The Missisquoi River rose to the bridge trusses of the new East Highgate bridge.
May 4 - 5, 2018	(DR-4380) While Highgate did not experience the most severe damages reported statewide, the event caused some localized flooding and fluvial

APPENDIX E

	erosion from overwhelmed culverts and road washouts typically associated with intense rainfall events.
January 13, 2018	Record high temperatures followed by precipitation caused rapid snow and ice melt. The conditions were perfect for localized flooding along the Missisquoi River and its tributaries. Flooding occurred along Monument Road, Tanglewood Drive and Jedware Circle, Waugh Farm Road, and VT78 in East Highgate. Many private residences were flooded and roads were closed.
April 15 - 18, 2014	(DR 4178): Severe storms and flooding affected Caledonia, Essex, Franklin, Lamoille, Orange, Orleans, and Washington Counties in Vermont. A federal declaration was made. In Highgate, some flooding occurred along local roads with an estimated \$10,000 in damages.
September 8, 2012	A rapidly intensifying area of low pressure moved from the eastern Great Lakes across Quebec province Canada during the afternoon and evening hours of September 8th. A tight pressure gradient created strong southerly surface winds of 20 to 30 mph with frequent gusts more than 40 mph across the region. In addition, these strong winds delivered an abnormally warm and unstable air mass ahead of the surface low and cold front. As the cold front moved across New York during the afternoon, 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 or small trees prior to any thunderstorms. Wind damage associated with thunderstorms was more widespread and significant.
August 30, 2011	(DR-4022) Flooding caused by Tropical Storm Irene in Southern and Central Vermont was catastrophic, destroying property and taking lives, and again eliciting a disaster declaration (DR-4022). The details and impacts of Tropical Storm Irene are provided in the Hurricanes/Tropical Storms section of this risk assessment. However, it is important to underscore that the majority of damages in the state resulting from Tropical Storm Irene were due to flooding and fluvial erosion. The town of Highgate's landfill site and Transfer Station Road experienced a lot of erosion that contributed to a bank failure at the site.
June 1 – 18, 2011	Record Flooding and related fluvial erosion occurred along the shores of Lake Champlain from mid-April to mid-June. NWS Flood Stages for the United States Geological Survey (USGS) gages on Lake Champlain at the ECHO Center in Burlington, VT and Rouses Point, NY are 100.0 feet and were surpassed on April 13th and finally receded below flood stage on June 18th. Major flooding occurs with lake levels at or above 101.5 feet, which were surpassed from April 27th to June 8th as the lake level exceeded its flood stage of 100 feet from April 13th to June 18th. Further, the lake level exceeded its previous flood of record of 102.1 feet on April 28th and crested at 103.26 feet on May 6th, before eventually receding below the previous record on June 5 th . In addition, strong south to southeast winds of 25 to 35 mph (greater at times) caused extensive damage due to 3 to 5 foot wave action as well as 0.5-1 foot seiches on windward facing shores (New York and Vermont). These episodes occurred on April 23rd, May 2nd, May 22-23rd and June 1st. North to northwest winds of 20 to 30 mph caused extensive damage due to 2 to 4 foot waves and seiches around an half foot on windward shorelines (Vermont) on May 9-10th and June 1st-2nd. These record lake levels were attributed to a combination of a 125-

APPENDIX E

	150 percent of normal winter snowfall, subsequent melting of that snow pack and an abnormally wet meteorological spring (March, April and May). Normal precipitation for meteorological spring within the Lake Champlain basin is 8.5-10 inches, yet observed precipitation was 16 to 26 inches (> 200 percent). Serious and extensive flooding to dozens of lake shore roads, 500-1000 houses and dozens of businesses. In addition, the periodic closing of the Lake Champlain ferry from Grand Isle, Vermont to Plattsburgh, New York, and the delayed opening of two additional ferry crossings. Damage estimates will be incorporated into the May storm data, representing the crest of the flood waters, thus the time of the most significant impact and damage.
May 1 – 31, 2011 April 13 – 30, 2011	Record Flooding occurred along the shores of Lake Champlain from mid-April to mid-June. NWS Flood Stages for the United States Geological Survey (USGS) gages on Lake Champlain at the ECHO Center in Burlington, VT and Rouses Point, NY are 100.0 feet and were surpassed on April 13th and finally receded below flood stage on June 18th. Major flooding occurs with lake levels at or above 101.5 feet, which were surpassed from April 27th to June 8th as the lake level exceeded its flood stage of 100 feet from April 13th to June 18th. Further, the lake level exceeded its previous flood of record of 102.1 feet on April 28th and crested at 103.26 feet on May 6th, before eventually receding below the previous record on June 5th. In addition, strong south to southeast winds of 25 to 35 mph (greater at times) caused extensive damage due to 3 to 5 foot wave action as well as 0.5-1 foot seiches on windward facing shores (New York and Vermont). These episodes occurred on April 23rd, May 2nd, May 22-23rd and June 1st. North to northwest winds of 20 to 30 mph caused extensive damage due to 2-to-4-foot waves and seiches around an half foot on windward shorelines (Vermont) on May 9-10th and June 1st-2nd. These record lake levels were attributed to a combination of a 125-150 percent of normal winter snowfall, subsequent melting of that snow pack and an abnormally wet meteorological spring (March, April and May). Normal precipitation for meteorological spring within the Lake Champlain basin is 8.5-10 inches, yet observed precipitation was 16 to 26 inches (> 200 %). Serious and extensive flooding to dozens of lake shore roads, 500-1000 houses and dozens of businesses. In addition, the periodic closing of the Lake Champlain ferry from Grand Isle, Vermont to Plattsburgh, New York and the delayed opening of two additional ferry crossings. Properties (mainly seasonal) along the lake shore in Highgate were significantly impacted with some destroyed.
June 14 - 17, 2008	(DR 1778) A series of storms affected the entire state. 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 17 strong thunderstorms produced pea sized hail and heavy rain in the Lamoille River basin in northwest Vermont. Flash flooding occurred in the eastern parts of Franklin County.
August 24, 2007	(FEMA-1715-DR): Franklin County was on the edge of a strong frontal system that brought heavy rain which damaged road infrastructure.
June 4, 2007	(FEMA-1698-DR) Franklin County was on the edge of a strong frontal system that brought heavy rain which damaged road infrastructure.
April 20 – 30, 2007	The melting of snow from an above normal snow pack established in February, March and early April, as well as several rain events during the latter half of

APPENDIX E

	April, contributed to a significant run-off into streams and rivers of the Lake Champlain basin, which eventually deposited into Lake Champlain. Lake Champlain had been rising steadily since mid month, and at 7:15 pm LST on April 20th, finally exceeded its flood stage of 100.0 feet. Primarily...only minor shoreline flooding but was occasionally exasperated due to strong winds and wave action along the Vermont shoreline. Several summer camps, cottages experienced flooding as well as a few docks damaged as well. The lake would remain above flood stage through the end of April. There was \$20,000 in damages reported between Grand Isle, Addison and Chittenden Counties.
10/25/2004	A strong storm system produced heavy rain in northern Vermont. Many roads were flooded resulting in approximately \$5,000 in damages.
08/29 – 30, 2004	Heavy rain fell across the region as a cold front moved through the area. Several roads were closed due to wash outs and bridges were damaged throughout Town. There was approximately \$40,000 in damages county-wide
May 1 - 9, 2001	Snow melt and associated runoff due to the spring melt continued to result in flooding along the shores of Lake Champlain into May 2001. Lake levels remained above flood stage through May 9th, with generally minor flooding reported. There was approximately \$21,000 in damages County-wide in April and approximately \$17,000 in damages in May between the Grand Isle, Chittenden, Franklin, Addison and Rutland Counties.
April 23 – 30, 2001	Snowmelt and associated runoff due to the spring melt resulted in flooding along the shores of Lake Champlain. Lake levels reached the 100.99 ft. level (flood stage was 100 ft). Lakeshore flooding continued into the month of May.
Feb. 28, 2000	Mild winter weather combined with a cold front creating flood conditions throughout Highgate and neighboring communities. Steady rain added to the snowmelt runoff. Several roads in Highgate were flooded.
Sept. 11, 1998	Flooding occurred during a storm that resulted in several small road washouts.
April 1 – 13, 1998	Spring runoff and flood waters resulted in Lake Champlain rising to equal or exceeding 101 ft. during this period. The maximum level reached for the year was 101.82 ft. on April 5. Lakeshore flooding was widespread with water closing some roads and flooding some private properties. Due to the high lake level, water back flowed in some streams that flow into the lake. Some residents were forced to sandbag their properties for protection. There was an estimated \$40,000 in property damages across the Grand Isle, Addison, Franklin and Chittenden Counties.
November 9, 1996	A strong cold front moved slowly across New York State Friday and Friday night and across Vermont Saturday. Periods of heavy rain occurred late Friday night into Saturday. Culvert and field flooding was reported in Grand Isle County Saturday morning. South Hero a storm total rainfall of 4.46 inches. County wide damages were approximately \$50,000.
May 12 – 24, 1996	Continued runoff into Lake Champlain resulted in the lake level rising above the 100 foot mark with minor lake shore flooding. The highest level recorded during this period in May of 1996 was 100.90 feet on May 16, 1996.
May 2 – May 8, `1996	Runoff from melting snow and rainfall resulted in the Lake Champlain Lake level reaching or exceeding 100 feet. There was some minor flooding along the lake shore during this period.
January 19 -20. 1996	A strong storm system moved into the Great Lakes on Thursday and then

APPENDIX E

	moved into Canada on Saturday. The circulation associated with this storm resulted in above normal temperatures, strong winds and flooding due to snow melt and rainfall. Two deaths in the state were attributed to the flooding. Numerous roads were washed out due to the flooding statewide. Strong winds buffeted the state during Friday and Friday evening. Numerous power outages were reported. The flooding damaged many roads throughout South Hero. Damage estimates were \$2,800,000 for the area affected.
April 16, 1994	A flood event caused approximately \$500,000 in property damages county-wide.
May 1, 1993	A low-pressure system settled over the region producing heavy rains. Several local roads in Grand Isle County were inundated with flood waters due to blocked culverts. There was an estimated \$500,000 in damages countywide

Severe Winer Storm (Ice Storm) History

Dates	Description and Extent
January 25 – 26, 2026	An area of low pressure from the southern Mississippi River Valley to the Carolina coast with strong arctic high pressure north accounted for relatively rare accumulations of snow and ice from New Mexico to the Tennessee river valley on January 24th and 25th. Snow overspread the region during the afternoon with the heaviest into the early morning hours of January 26th with a temporary lull until mid to late morning. Snowfall totals were 8 to 10 inches along the international border with Canada with 10 to 18 inches elsewhere across the region with some localized amounts around 20 inches. There were no power outages, but there were numerous vehicle accidents. Snowfall totals across the county were 10 to 12 inches.
March 28 – 29, 2025	A weak wave of low pressure developed and traveled along a stationary front draped across northern NY and VT during the evening of March 28th and continuing into the 29th. Snowfall amounts ranged from a dusting to a few inches across southern VT to a half foot or more in the northern sections. Meanwhile across the southern tier there was mixed winter precipitation, including freezing rain and icing that accumulated up to a half inch in some locations. Power outages across northern VT, mainly central and southern VT were around 20,000.
February 15 – 16, 2025	Snow overspread the region late Saturday afternoon, snowing heavily during Sunday before ending Sunday night. Some sleet mixed in at times Sunday across northern and central area with a complete changeover to sleet and freezing rain with some ice accumulations in southern areas before changing back to snow during the afternoon and evening. Scattered power outages were reported on February 17th due to strong winds more than 50 mph in northeast VT and in southern VT where it combined with some lightly ice laden trees. Combination of strong winds in excess of 40 mph and deep snow led to a 100-foot barn collapse in the town of Williamstown. The result was the barn was a total loss and at least 6 cows had died. Snowfall totals across Grand Isle County were 10 to 12 inches with brisk winds developing in the evening hours to begin blowing and drifting snow that caused some driving hazards of poor visibility and snow covered roads through February 17th.
April 3 – 5, 2024	A major storm across the Great Lakes remained nearly stationary during the

APPENDIX E

	afternoon of April 3rd as a coastal low developed off the NJ-DE that eventually moved to near Cape Cod, MA by midday April 4th. In addition, a strong area of high pressure was in Hudson Bay but was cresting toward northern New England and NY. Windy conditions developed across VT during the afternoon hours of April 3rd and continued into the early morning hours of April 4th. The stronger winds were located across southern VT where some wind gusts exceeded 50-60 mph with approximately 13,000+ outages due to wind. Mixed rain, sleet and snow developed in the afternoon and evening hours of April 3rd and then transitioned to heavy wet snow overnight through midday on April 4th. Snowfall totals ranged from 2 to 6 inches along the immediate lakeshore with 6 to 10 inches within 3-5 miles in the Champlain valley. Other snowfall totals were 8 to 12 inches within the immediate Connecticut River Valley with 12 to 20+ inches elsewhere across the state. Impacts were significant across the region with hundreds of motor vehicle accidents, numerous school closing and more than 35,000 power outages at its peak due to snow weighted trees on powerlines. Heavy, wet snowfall totals of 5 to 8 inches were common with nearly a trace along the immediate lakeshore.
March 23, 2024	An area of low pressure moved from the southeast United States on March 22nd up the eastern seaboard to the NJ/DE coast by midday on March 24th and offshore by Cape Cod late at night on March 24th. Snow overspread Vermont, south to north, during the early morning hours of March 23rd and then exiting from west to east during the evening hours of March 23rd. The higher snowfall accumulations were across south central and southern VT, except along the MA/VT border where some mixed precipitation types occurred. Snowfall totals ranged from 3 to 6 inches in northwest VT, 6 to 12 inches across the rest of the Champlain Valley and northern VT, 12 to 18 inches in central VT with 18 to 24+ inches across south central VT with these higher totals mainly across Windsor and eastern Rutland counties. Impacts were largely travel related.
March 9 – 11, 2024	(DR-4770) Low pressure across the Carolinas during the afternoon of March 9th moved slowly northeast along the coast across southeast Massachusetts during the morning of March 10th and lingered along the Maine/Nova Scotia border through the early morning hours of March 11th. The impactful weather occurred in two phases. The first phase occurred during the evening and overnight hours of March 9th with valley rain and elevated mountain wet and heavy snowfall, especially in the central and southern Green Mountain communities. The heavy wet snow greatly impacted the higher terrain and resulted in numerous tree damage, power outages (>30,000 outages) and travel disruptions. Snowfall was less prevalent in the valleys. The second phase occurred during the evening on March 10th through early afternoon on March 11th with northwest upslope enhanced snowfall across the northwest slopes of the central and northern Green Mountains as well as some interior valleys. This, combined with wind gusts in excess of 30 mph led to numerous travel disruptions. During the afternoon hours as the snow waned, northwest winds increased with frequent gusts in excess of 40 mph which led to delays in power restoration. Storm total snowfall from the evening of March 9th through the afternoon hours of March 11th ranged from 2 to 5 inches across the valley floors of the Champlain and the mid to lower Connecticut River valleys, 4 to 8 inches in elevations above 1000 feet and 10 to 18+ inches in the higher

APPENDIX E

	elevations (1500-2000+ feet), especially the northwest slopes.
January 24 – 25, 2024	A stationary surface boundary draped across northern NY/VT, during the evening and overnight hours of January 24th, was the focusing mechanism for moisture that entrained along the boundary and across the area. Temperatures were below freezing across much of central and eastern VT that allowed for several hours of light freezing rain during the evening and overnight hours. Flat ice accumulations were generally 0.1 to 0.2 inches with isolated amounts around 0.25 inches. The main impacts were icy, hazardous travel.
January 16, 2024	A weak coastal storm moved past southern New England on January 16th. Light snow overspread Vermont during the morning and ended during the evening. Snowfall totals ranged from 3 to 7 inches across the region with higher totals in the higher terrain of central VT. The main impacts were numerous traffic accidents, despite the dryness of the snow
January 6 – 7, 2024	Low pressure developed across the northern Gulf of Mexico coast during the evening hours of January 5th and traveled along the east coast moving off the southeast coast of New England by the afternoon of January 7th. Snow moved into Vermont during the evening hours of January 6th and exited by midafternoon of January 7th. Snowfall amounts across VT were generally 4 to 12+ inches with the lighter amounts in the northern Champlain Valley and Essex County with the higher snowfall totals (8-12+ inches) across the eastern slope communities of the southern and central Green Mountains. The main impacts from this storm were hazardous road conditions.
March 3 – 4, 2023	A double-barreled low-pressure system moved across southern New England on March 4th. Snow and rain mixed developed late at night on the 3rd and continued through the morning hours of the 4th. Snowfall totals were generally 7 to 12 inches across Vermont with 3 to 6 inches across the central and northern Champlain Valley.
February 23, 2023	A weak area of low pressure tracked west to east along a stationary boundary, south of New England during the overnight of February 22nd into February 23rd. The storm was a quick mover with about 6-8 hours of snowfall that accumulated 3 to 8 inches across the region, the heaviest in the southern and central Green Mountains.
January 25 - 26, 2023	Low pressure moved from the Ohio River Valley on Wednesday 1/25 to upstate New York and northern New England on Thursday 1/26. Meanwhile an area of low pressure developed along the associated boundary with the parent low across the tri-state region and moved across eastern New England. Snow overspread Vermont during the afternoon and evening hours of January 25th, heaviest during the evening hours before a lull in the steadiest precipitation as well as a change to mixed sleet and rain occurred during the nighttime hours. Light snow and snow showers redeveloped and moved across Vermont Friday before ending by evening. Snowfall amounts across Vermont ranged from 1 to 3 inches in southern VT, 3 to 6 inches in central VT with 6 to 12 inches in northern VT, especially in the higher elevation
January 19 - 20, 2023	Low pressure moved from the mid-Mississippi Valley on January 19th into New York by January 20th. In the meantime, an area of low pressure was developing across southeast Massachusetts and moving offshore. Snow and sleet overspread Vermont during the evening of January 19th, but then drier air

APPENDIX E

	allowed a lull in precipitation for much of the overnight hours before more snow and snow showers redeveloped and fell through the afternoon hours of the 20th. Widespread snowfall totals of 4 to 7 inches were observed, the higher totals across the higher elevations of the Green Mountains.
January 12 -13, 2023	Low pressure moved from the Ohio River Valley on January 12th across central/northern New England on January 13th. Snow overspread northwest Vermont during the evening of January 12th and continued overnight before exiting around midday on the 13th. Snowfall totals across the region were generally 2 to 4 inches and restricted to northwest and northern Vermont due to milder temperatures and rain/snow mixed elsewhere across the state.
March 12, 2022	A series of weak low-pressure areas traversed along a cold front that moved across VT during the day of March 12th. Rain/snow mixed developed in the early morning hours changing to snow around sunrise and continuing until early to midafternoon. Snowfall amounts ranged from several inches in the lower Connecticut River Valley with 4 to 7 inches in the Champlain Valley with 6 to 12 inches elsewhere with the higher amounts mainly in northern sections. The initial wet nature of the snow led to numerous slick and icy roads accounting for numerous vehicle accidents.
February 18, 2022	An arctic front slowly moved from northwest to southeast across VT during the morning hours of February 18th, bringing much colder air. Meanwhile, a weak surface wave was traveling northeast along this boundary. The combination allowed light rain to change to freezing rain and eventually sleet and snow through the midday hours of February 18th. Ice accumulations were generally around a tenth (0.10) of an inch with sleet/snowfall totals of 1 to 2 inches that created hazardous travel.
January 17, 2022	A long tracked and powerful winter storm, with a history from the Mississippi River valley through the southeast and north along the Appalachians into the northeast, impacted VT on January 17th. Snow moved into VT around midnight of January 17th with snowfall rates of 1-2 inches per hour at times during the morning, eventually ending by early afternoon with residual snow showers during the evening and night. General snowfall accumulations in VT was 4 to 8 inches with the complexity of the storm due to its strength and strong low-level jet accounted for mesoscale features of snowfall distribution with east-side upslope regions witnessing higher totals and west-side downwind communities witnessing less snowfall. In addition, these strong low-level easterly winds did cause some downslope wind gusts (in excess of 50 mph) in the foothills of the western slopes of the Green Mountains and in the higher terrain in northeast VT which resulted in scattered power outages
December 25 – 26, 2021	Low pressure across the Great Lakes on Christmas Eve (December 24th) slowly traveled and transferred energy to a new coastal low near Cape Cod during the night of December 25th. This delivered a wintry mix of mainly light freezing rain and freezing drizzle beginning the morning of December 25th and ending as freezing drizzle and light snow on the morning of December 26th. Snow accumulations were an inch or two across the northern mountains and NE VT with ice accumulations generally a tenth of an inch or less, except locally up to 1/4 inch in the lower Connecticut River Valley with little activity along the Canadian border. Significant travel issues across VT during Christmas morning, especially in central and eastern VT with numerous vehicle accidents and the

APPENDIX E

	closure of portions of Interstate 89/91 and other roads at times.
December 18, 2021	A weak area of low pressure moved from the Ohio River Valley to southeast of New England on Saturday, December 11th. Snow moved into VT during the early afternoon and exited around midnight. Snow fell moderate at times, especially across central and southern VT. A widespread 4 to 6 inches fell across the northern third of the state with 5 to 8 inches in the central and south-central VT with lesser amounts in extreme southern VT due to mixed precipitation. There were no major impacts.
November 26 – 17, 2021	Weak low pressure moved along a cold front that moved across NY/VT during November 26th. Rain and rain showers transitioned into wet snow beginning at higher elevations around noon and eventually into the Champlain Valley by early evening. Snowfall ranged from a few wet inches in the Champlain Valley with 4 to 8 inches in the some of the higher elevations in the Green Mountains. The wet nature of the snow led to scattered power outages in the foothills.
April 21, 2021	Surface low pressure developed along a frontal boundary and moved northeast across SE New York, western southern New England and central New England on the 21st. Precipitation developed in the morning and mostly in the form of snow or mixed snow and rain, then as the intensity of the precipitation increased during the afternoon and evening hours, fell primarily as wet snow. Snowfall across Vermont ranged from 2 to 6 inches with a few localized amounts around 8 inches. In Rutland and Windsor counties south, it was primarily a rain event. Roads remained primarily wet, thus limited impacts.
February 16, 2021	A cross-country storm system, responsible for heavy snows in Seattle, snow, ice and report cold in the southern Plains and the Tennessee valley moved into New England during the overnight hours of February 15-16th. Snow overspread Vermont around midnight on the 16th, mixing with sleet and freezing rain before sunrise and ending by mid-morning. Combined snow and sleet accumulations were generally 3 to 6 inches with minimal icing from freezing rain. However, many roads were treacherous due to the wintry mix and many schools cancelled classes.
January 2, 2021	A weak to moderate upper level and surface storm system moved across the northeast, including New England late on New Year's into January 2nd. Snowfall was a general 4 to 8 inches across northern VT with the higher amounts across the counties bordering with Canada.
January 23 – 24, 2020	A late season weak area of low pressure moved across the Ohio River valley and developed a secondary area of low pressure south of New England during the afternoon and evening hours of March 23rd. Snow moved into northern NY by early afternoon and across Vermont by mid-afternoon. Initially surface/ground temperatures were above freezing but fell below freezing with accumulating snow as the snowfall rates approached up to 3 inches per hour. Total snowfall ranged from 2 to 4 inches in northwest VT to 4 to 7 inches across much of the state with pockets of 7 to 10 inches in eastern VT.
January 18 – 19, 2020	A quick moving area of low pressure, that originated in the Pacific northwest on January 15-16, moved across the central CONUS and eventually across New England on January 19th. Snow moved into northern NY during the afternoon of the 18th and exited by daybreak of the 19th. A widespread 2 to 4 inches fell across the central and southern Champlain Valley of VT, 4 to 7 inches across

APPENDIX E

	the rest of central and southern VT and 6 to 10 inches across portions of northern VT.
January 16, 2020	A clipper-like system quickly moved from the lower Great Lakes on the evening of January 15th, across central NY during the early morning hours of January 16th into the Gulf of Maine by midday. A west to east band of moderate to occasionally heavy snow moved across the southern Adirondacks and central VT during the overnight and morning hours of January 16th, where 4 to 8 inches of snow was observed. Lesser snowfall totals were measured across northern NY, northern VT and southern VT.
January 12, 2020	A moisture laden storm system tracked along a old cold front from the Gulf of Mexico up across NY and VT. On Saturday, January 11th, the front was positioned across southern Canada with temperatures in the 50s/60s across VT. As the front slowly progressed south into northwest VT during the late evening and overnight hours, moderate to heavy rain fell across the region. During the early morning hours of January 12th, the cold front slipped south into the southern portions of the Champlain Valley. Widespread 1/4 to 1/2 inches of ice accretion with locally up to 3/4 inch was observed along the international border, resulting in hazardous travel and scattered power outages.
December 29 – 30, 2019	A large, complex winter storm moved across the Great Lakes on December 29th and eventually stalled on December 30th and 31st. Meanwhile, secondary low pressure developed near Pennsylvania on December 30th and moved across southern New England on the 31st. A wintry mix of freezing rain, sleet and some snow moved into Vermont by the evening of December 29th and continued steadily until midday on December 30th before tapering to showers of mixed precipitation and snow on the afternoon of the 30th. Predominantly freezing rain and sleet fell across southern VT with sleet, freezing rain and some snow in central VT with snow and sleet in northern VT. Freezing rain accumulated 1/3 inch or less across Vermont's southern four counties with a sloppy 1-3 inches of snow, sleet and freezing rain in the Champlain Valley and 3 to 7 inches across north-central and northeast Vermont. Main impacts were hazardous road conditions Sunday night (29th) and Monday morning (30th). Strong wind gusts in excess of 40 mph occurred at times along the immediate western slope communities. Approximately 5000 customers were without power for the event, a combination of ice and wind effects.
March 22 – 23, 2019	Low pressure moved from the mid-Atlantic coast on March 21st and intensified rapidly as it moved to just off the Maine-New Hampshire coast on the 22nd. Precipitation started as rain the valleys and wet snow in higher elevations during the overnight of the 21st/22nd and changed to a wet snow for much of the 22nd before ending around daybreak Saturday (23rd) in the mountains. Snowfall totals ranged from 3 to 6 inches in the valleys below 500 feet, 6 to 12 inches around 1000 feet and 12 to 20+ inches in elevations above 1500 feet, especially in northern sections of the state. These wet snow conditions and eventual brisk winds of 15 to 25 mph with higher gusts later Friday and Friday night combined with the snow weighted trees and power lines to cause thousands of power outages to approximately 10,000-15,000 customers.
January 29-30, 2019	A storm system across the Great Lakes on the morning of January 29th traversed across NY and Northern New England during the afternoon and nighttime hours. A widespread 3 to 6 inches were observed across much of

APPENDIX E

	northern VT with 5 to 10 inches across central and southern VT.
January 8 – 9, 2019	A weak surface low across the Great Lakes on January 8th received upper atmospheric support during the night of the 8th and developed a significant winter storm off the NH/ME coast by the morning of January 9th as it slowly moved into Newfoundland by January 10th. Precipitation started as light rain, freezing rain and snow across Vermont during the evening of January 8th, changing to accumulating snow after midnight of January 9th. Snowfall was largely confined to mountain communities by midday of January 9th and continued until ending by late evening of January 10th. Snowfall amounts varied greatly (3-18+ inches) with the highest amounts along the west-northwest facing higher elevation communities of the Green Mountains in northern VT, due to a prolonged and climatological wrap-around/northwest up slope event. The heavy wet nature of the initial snowfall, as well as mixed with freezing rain, accounted for hundreds of school closings for the morning of January 9th. Some scattered power outages were observed with the heavy, wet snow as well.
November 27-28, 2018	A storm that brought blizzard conditions to parts of the Midwest on Sunday, November 25th moved into the Ohio River Valley - Southern Great Lakes on 11/26. The storm slowed considerably in the eastern Great Lakes, thus allowing a secondary low pressure system to develop near the Delmarva Peninsula during the evening of 11/26 and proceeded to move to near Boston by the morning of November 27th. Precipitation moved into the North Country by 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 change over to snow. Highest snowfall totals at elevations above 1500 feet, where more than 12-15 inches fell. The heavy wet snow accounted for more than 40,000 outages, affecting 100,000 customers without power due to snow loading on power lines.
March 13-15, 2018	A Nor'easter swept across eastern New England on March 13th and remained nearly stationary across eastern Quebec/Nova Scotia on the 14th-15th. This allowed a long duration snowfall event across Vermont with snow beginning during the morning of March 13th but the heaviest occurring during the night of March 13th through March 14th. The greatest snowfall occurred across the higher elevations of central and eastern VT with 1 to 2 feet or more being reported. Elsewhere snowfall totals were 8 to 18 inches. Limited impact as accumulating snowfall on roadways was limited to nighttime hours.
March 7 -9, 2018	An upper-level low across New England. snow began by midday and lingered with mountain snow showers on the 9th. Impacts were mainly travel related. Northwest Vermont snow totals ranged from 5 to 8 inches. Some power outages were reported.
December 25, 2017	A clipper storm system moved from the northern Great Lakes on December 24th to New England on Christmas Day with a secondary development off the New England coast. A widespread 4 to 8 inches of snow fell across Vermont.
December 22, 2017	A quick moving storm system moved from the Ohio River Valley across southern New England and brought snow to Vermont during the morning commute and ending shortly after the evening commute. A widespread 5 to 10 inches of snow fell across central VT. The timing and intensity of the snowfall

APPENDIX E

	lead to hundreds of vehicle accidents and blocked highways for several hours.
December 13, 2017	On December 12, an energetic winter storm brought widespread snowfall of 4–8 inches across Vermont, with 8–12 inches common in eastern areas and localized totals exceeding 12 inches. Snowfall during both the morning and evening commutes, combined with brisk winds and blowing snow, created hazardous travel conditions across the state.
April 1, 2017	A storm system moved from the Ohio River Valley on March 31st to south of New England and then out to sea on April 1st. Wet snow, occasionally mixed with rain, began across Vermont by midday. Snowfall totals were generally 3 to 6 inches in the Champlain Valley and along the Canadian border with 6 to 12 inches elsewhere. The snow load of the heavy, wet snow did allow for some scattered power outages and numerous vehicle mishaps as well.
March 31, 2017	Wet snow, occasionally mixed with rain began across Vermont by midday on the 31st, but accumulations were limited due to above freezing temperatures and March solar radiation. An increase in snow intensity and lack of solar radiation, along with temperatures near freezing allowed for significant snowfall accumulations above 1000-1200 feet, especially in eastern and central parts of Vermont. Snowfall totals were generally 3 to 6 inches in the Champlain Valley and along the Canadian border with 6 to 12 inches elsewhere. The snow load of the heavy, wet snow did allow for some scattered power outages and numerous vehicle mishaps as well.
April 6 – 7, 2016	A slow-moving storm in the Great Lakes region delivered mild, moist air into a unseasonably cold, dry airmass across Vermont during the afternoon and evening of April 6th. Snow developed during the afternoon hours and remained nearly stationary across the Canadian border through the evening and night hours. Snowfall ranged from less than an inch across the southern Champlain Valley and southern Vermont to 4 to 6 inches along the Canadian border.
February 15 -16, 2016	A coastal low across the Carolinas on the morning of February 16th raced northward across the Champlain Valley of VT/NY during the day. This allowed for a wintry mix of snow, sleet, freezing rain and rain across the region and a strong east-southeast wind across portions of Vermont. Snowfall averaged 2 to 4 inches across much of Vermont with only 1 to 2 inches in the immediate Champlain Valley. Ice accretion was mainly a tenth of an inch or less. Main impacts were slick, sloppy roads but some isolated power outages due to wind gusts more than 40 mph along the western slopes of the Green mountains.
January 30, 2015	The remnants of a powerful winter storm that brought blizzard conditions to New Mexico and Texas, tornadoes in Texas and record flooding rains to portions of the Mississippi River Valley moved into the Great Lakes on December 29th bringing the first winter storm of the 2015-16 season to northern New York. Snow overspread Vermont around midnight and changed to sleet and freezing rain before ending in the afternoon. Snowfall across the area was 3 to 7 inches with limited icing. Routine impacts of vehicle accidents across the County occurred
January 27, 2015	A powerful nor'easter brought blizzard conditions to much of southern and eastern New England on January 26-27th. However in Vermont, snowfall was moderate across the region with snowfall totals ranging from a few inches in much of western and northern Vermont to 6 to 10 inches in southeast

APPENDIX E

	Vermont.
January 3 – 4, 2015	A winter storm on January 3–4 brought a mix of snow, sleet, freezing rain, and rain to Vermont, with most areas receiving 2–4 inches of snow and up to 0.1 inch of ice, while northeastern Vermont saw 3–7 inches of snow and up to 0.25 inch of ice. The combination of snow and ice created hazardous travel conditions and increased the risk of vehicle accidents and scattered power outages.
December 20 - 22, 2013	Two rounds of freezing rain accumulated around an inch across Grand Isle causing numerous vehicle accidents as well as damage to trees and utility lines. There were brief power outages during this time. There was an estimate of \$250,000 of property damages from the event.
December 14 – 15, 2013	On December 15, 2013, a coastal storm brought the first widespread snowfall of the 2013–2014 winter season, producing 10–15 inches of snow across southeastern Vermont and 3–6 inches in northwestern Vermont. The storm primarily caused hazardous travel conditions and numerous vehicle accidents, particularly because it was the season's first significant snowfall
March 1, 2012	A powerful winter storm that brought blizzard conditions to portions of Wisconsin and Minnesota and severe weather to portions of the Tennessee River Valley on February 29th weakened as it moved across the Northeast on March 1st. There were two rounds of snowfall that moved across the North Country, the first during the evening and overnight of February 29th and the second during the daylight hours of March 1st. The first round delivered widespread 1-3 inches across much of Vermont with 6 to 10 inches along the east slopes of the central and southern Green Mountains. The second round delivered another 1-3 inches with some areas that witnessed 3 to 5 inches additional accumulation.
February 25, 2010	Heavy wet snow fell across the State that resulted in snowfall accumulations of 6 to 30 inches. The weight of the heavy snow accounted for widespread power outages across the region that resulted in upwards of 50,000 customers state-wide without power.
January 2-3, 2010	Near record snow fell across the county from a powerful Atlantic storm system. Northwest winds of 15 to 25 mph with higher gusts caused considerable blowing and drifting snow with 4-to-5-foot snow drifts reported. A record 33.1 inches of snow fell at Burlington International Airport in South Burlington.
February 19-21, 2009	A prolonged flow of cool, moist and unstable air created persistent snow showers across the northern Counties during the afternoon of February 20th and continued until the early morning hours of February 21st. There were significant snowfall amounts (more than 12 inches) observed at various ski resorts. From 3 to 8 inches of snowfall accumulated within Grand Isle County and across the Champlain Valley.
January 29, 2009	Snow overspread the State early in the morning and continued into the evening hours. Snowfall accumulations with this storm were generally 8 to 14 inches in the County. There were no reported damages.

APPENDIX E

February 14, 2007	Known regionally as the “Valentine’s Day Storm”. 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.
October 20, 2006	A low-pressure system brought cold air to the northern portion of the state. Heavy, wet snow accumulation of 3-6 inches occurred damaging many trees and causing power disruptions.
February 13, 2000	A storm system over the Ohio Valley tracked across central New England during Monday, February 14th. Heavy snow fell across the area with accumulations generally between 7 and 14 inches.
January 6, 1998	DR 1201. This storm is referred to as the Ice Storm of 1998. Snow turned to freezing rain. Ice accumulations were generally between 1 and 2 inches with locally greater accumulations over portions of Grand Isle County. The impact on the region was dramatic. Trees and power lines snapped due to the weight of the ice. Power outages lasted for several days. Damage to the utility companies ran in the millions. With no electricity, the agricultural community was unable to milk cows with loss of income and damage to cows. Travel was dramatically impacted and many roads and bridges closed due to ice and fallen trees. The National Guard assisted with cleanup operations after the storm. Falling tree limbs and other debris were a significant hazard during and following the storm. It is not known what the financial losses were to the Town because of the storm. There was \$1,500,000 in damages in Grand Isle County. Public Assistance funding was \$5,899,183.
April 10, 1996	A classic Nor’easter, this system spread snow across the region for nearly two days. The snow tapered off to flurries by late evening on the second day. The heaviest snow fell over and east of the Green Mountains with 7 to 14 inches. In the Champlain Valley 2 to 5 inches fell with heaviest amounts above the 700-foot level. The wet snow resulted in some power outages and minor automobile accidents across the state.
February 28, 1995	A low-pressure system which developed in the Ohio Valley resulted in a mixture of snow, sleet, and freezing rain across Vermont. Snow accumulations ranged from four to eight inches across much of Grand Isle County.
March 13-14, 1993	One of the worst storms of the century. Known as the "Blizzard of 93", it was one of the most powerful storms (Nor’easters) on record. The system moved up the Eastern Seaboard on the 13th and 14th coming close to breaking pressure and snowfall records in many locations. Snowfall amounts ranged from 10 to 28 inches across the state. Due to the weight of the snow that accumulated over March, there were numerous damage reports of barns and building roofs being damaged or at risk of collapsing
January 3, 1993	A combination of a cold surface and warm moist air aloft created freezing rain and freezing drizzle across the state. Road surfaces in Grand Isle County were covered in “black ice”. “Black ice” is a thin transparent form of ice allowing the black asphalt surface of a road to be seen through the ice. “Black ice” conditions typically result in numerous traffic accidents as motorists are

APPENDIX E

	unaware that the road surface is covered in ice.
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Strong Winds (windstorm, thunderstorm, tornado, tropical storm, hurricane) History

Dates	Description and Extent
6/19/2026	A Tornado Watch was issued by the National Weather Service for all of Vermont. There were no confirmed tornados in Fairfax. However, a confirmed EF1 tornado occurred in Woodstock and another was confirmed in Lincoln.
3/17/2026	strong low-pressure system tracked from the Great Lakes into northern Quebec, pushing a sharp cold front across the region. Southerly winds ahead of the front generated 40–50 mph gusts across Vermont on March 16 with minimal impact, followed by western gusts exceeding 40–50 mph as the front passed during the early morning hours of March 17. The severe winds knocked tree limbs and trees onto utility lines, leaving approximately 15,000 customers without power, primarily along and east of the spine of the Green Mountains.
12/19/2025	A cold front moved across NY and VT during the morning hours with strong, gusty and damaging southwest-west winds in excess of 60 mph in several locations resulting in damaged trees, utility lines and scattered power outages of up to 25,000 customers.
6/19/2025	A cold front moved across an unstable airmass during the afternoon of June 19th. Scattered thunderstorms developed across VT with only one storm intensifying enough to produce isolated severe weather. Trees toppled onto power lines along Carroll Hill Road in Fairfax.
2/15 – 2/17, 2025	A low-pressure system moving from the lower Mississippi River Valley to the Gulf of Maine brought heavy snow, sleet, freezing rain, and severe winds across Vermont. Strong northwest winds exceeding 40–50 mph caused scattered power outages, significant blowing and drifting snow, and hazardous driving conditions with poor visibility.
8/09/2024	The remnants of Hurricane Debby moved across northern New York and northwest Vermont, bringing 1 to 3 inches of rain to Vermont. Strong south-southeast wind gusts reaching 40 to 60 mph impacted the central and northern Champlain Valleys eastward to the western slopes of the Green Mountains. Because trees were in full leaf, these severe wind gusts brought down numerous tree branches and trees onto utility lines, structures, and vehicles, resulting in over 50,000 power outages across the region.
3/04 – 3/05, 2024	A late winter storm brought windy conditions across VT during the afternoon hours of April 3rd and continued into the early morning hours of April 4th. In some places in southern Vermont, wind speeds were between 50-60 mph. Impacts were significant across the state with hundreds of motor vehicle accidents, numerous school closing and more than 35,000 power outages at its peak due to snow weighted trees on powerlines.
2/28/2024	Strong low pressure moved northeast across the Great Lakes on February 28th, but created a strong pressure gradient between this storm and high pressure across the Canadian Maritimes. This allowed strong south-southeast winds ahead of a cold

APPENDIX E

	front associated with the strong area of low pressure and southwest winds behind the frontal boundary. The strongest winds occurred along and behind the cold front during the evening and early night hours of February 28th. Numerous reports of wind gusts in excess of 45 mph with several gusts in excess of 55 mph occurred along with downed tree limbs, branches and subsequent power outages. Power outages across VT were between 15,000-20,000. Several reports of wind gusts in the 40-50 mph range along with varying types of tree damage that impacted power.
1/09 – 1/13, 2024	(DR-4770): A powerful winter storm tracked from the Pacific Northwest to the Great Lakes, intensifying as it moved. A sharp pressure difference between the Great Lakes and eastern Canada created extremely strong winds across New York and Vermont. These winds caused widespread damage, including downed trees, power outages affecting 80,000 people, and over \$1 million in losses. In Franklin County, there were several reports of 50-55 mph winds and NWS estimated wind gusts in excess of 60 mph. Numerous power outages occurred as well. Several inches of wet snow accompanied the storm, with higher elevations seeing more accumulation. There was an estimated \$200,000 in property damages in western Franklin County.
1/09/2024	Strong storm moved across the Great Lakes less than 72 hours from a slightly more impactful, stronger storm that moved across a similar path on January 10th. This storm produced slightly lighter winds and less precipitation than the last event but still accounted for scattered to numerous power outages across the region (25,000). Mesonet and public reports of wind gusts of 40-50 mph were reported as well as isolated to scattered tree and utility line damage.
9/11/2023	A weak area of low pressure traveling along a stationary front, draped across NY and VT, embedded in an unseasonably warm and unstable air mass resulted in a series of thunderstorms that moved across Vermont during the late afternoon and evening. Some of these thunderstorms produced damaging winds of downed trees and utility lines
12/22 – 12/24, 2022	(DR 4695): A powerful winter storm centered in the eastern Great Lakes and Ontario slammed Vermont with strong winds. Southeast winds reached speeds of 25-35 mph, with frequent gusts exceeding 50 mph and even reaching 60 mph or higher in some areas. These high winds caused widespread damage, knocking down trees and power lines, and leaving over 100,000 people without power at the peak. Later in the day, a powerful arctic front associated with the storm swept across the state. Temperatures plummeted from the 40s and 50s down to the 20s, accompanied by strong west winds of 20-35 mph. As temperatures dropped rapidly, a widespread snowfall of 2-5 inches occurred. Combined with the sub-freezing air, this snowfall created a flash freeze, making travel extremely dangerous. While wind gusts of 45-55 mph were recorded including one station at Burton Island on Lake Champlain where gusts reached 60-65 mph. Total FEMA Public Assistance grants dollars obligated for this declaration for the affected Counties was \$1,495,613.14.
2/01/2022	Strong winds battered the Champlain Valley due to a pressure difference between New England and the Great Lakes. Measured wind gusts of 45 to 55 mph were common across Franklin County. Several branches and small, weak trees downed by winds were the main impacts as well as isolated power outages.

APPENDIX E

12/11 – 12/12, 2021	A very powerful cold front with winds more than 100 knots at 5,000 feet moved into Vermont from the west. The front produced strong surface winds in excess of 40-50 mph around mid-evening and gradually decreased into the 30-40 mph range during the early morning hours of the 12th. There were approximately 15,000 customer power outages statewide. In Fairfax, scattered tree limbs and small trees downed by strong winds, measured in the mid-upper 40s but some local estimates were more than 50 mph.
11/12/2021	A powerful fall storm tracked from Great Lakes to New York and Vermont. Numerous surface wind gusts in excess of 40 mph were observed with several wind gusts approaching or exceeding 50 mph in the higher terrain of the Green Mountains that led to more than 10,000 power outages. In Franklin County, several wind gusts were recorded by spot forecaster at 40-45 mph, including 52 mph in East Berkshire. This led to scattered power outages due to downed trees on powerlines.
07/20/2021	A healthy upper level trough and frontal boundary moved from Ontario into VT during the overnight hours of July 20th. Ahead of this system, a vigorous squall line of thunderstorms that developed in Ontario during the early afternoon hours moved across northern NY from mid-afternoon into the evening hours and evening hours across VT with numerous reports of damaging winds.
8/22/2021	(3567 EM): Tropical Storm Henri brought some rain and gusty winds to the region but there were no local impacts in Highgate.
3/01/2021	An arctic front moved across Vermont during the evening of March 1st delivering arctic air on strong winds during the overnight of March 1st-2nd. Persistent northwest winds of 15 to 30 mph with gusts in excess of 40-50 mph began around 9 pm March 1st and continued until daybreak March 2nd. These strong winds combined with ambient temperatures of 5 below to 5 above zero created wind chills in the 15 to 30 below zero range. Nearly 10,000 customers lost power during the event.
8/4/2020	A brief period of gusty winds associated with the approach and passage of weakening Tropical Storm Isaias brought measured and estimated wind gusts of 40 to 50 mph that caused some scattered tree damage that resulted in scattered power outages.
7/08/2020	A mid-level shortwave (disturbance) moved from southern Quebec into a unstable air mass across Vermont during the afternoon of July 8th. This lead to several rounds of thunderstorms, some with damaging winds, large hail and torrential rains of 2 to 3+ inches.
10/16 – 10/17, 2019	A powerful Nor'easter intensified rapidly across New England, bringing 1 to 4 inches of rain to Vermont along with localized lowland and drainage flooding. Strong winds gusting up to 50–55 mph combined with heavily saturated soils to knock down trees and branches across the Champlain Valley and the western slopes of the Green Mountains, resulting in over 20,000 power outages across the region.
7/30/2019	A weak upper-level disturbance moving through a very warm, humid, and unstable air mass lead to scattered thunderstorms, including several severe storms in the Champlain Valley of Vermont. Severe storms caused damaging winds in the form of downed tree limbs, trees, and utility lines.
6/30/2018	(DR 4380): An atmospheric heat ridge with accompanying thunderstorm clusters moved into northern Vermont and southern Quebec during the late evening. The high winds generated by the thunderstorms downed many trees and caused some

APPENDIX E

	power disruptions. The total FEMA Public Assistance grants dollars obligated for this declaration for the affected Counties was \$3,246,787.21.
5/04/2018	Winds up to 60-80 mph occurred across the five affected counties. Strong winds and microbursts created power outages throughout the state. Several trees were knocked down in eastern Franklin County. Hail showers were also reported among several counties. \$44,096.31 was distributed to communities after the storm for damage.
10/29 – 10/31, 2017	(DR-4022): A strong thunderstorm fueled by an ex-tropical storm brought damaging winds to Vermont, causing power outages and knocking trees down throughout the state. Winds reached over 70 mph at times and rain caused flooding. Electric companies had multiple broken poles and many primary and service lines down. All power was restored to customers in two days. The total FEMA Public Assistance grants dollars obligated for this declaration for the affected Counties was \$5,296,752.57.
1/10/2017	A strong pressure gradient between high pressure east of New England and an intensifying low pressure system over the northern Great Lakes produced powerful southerly winds across the northern Champlain Valley. Sustained winds of 25 to 35 mph with gusts reaching up to 60 mph—particularly 45 to 50 mph near the shores of Lake Champlain—brought down tree limbs and small trees onto utility lines. These downed lines resulted in isolated to scattered power outages, leaving thousands of local residents without electricity.
12/26/2016	The combination of strong high pressure departing Maine and Nova Scotia and a strong low-pressure system moving across the northern Great Lakes created a strong southerly jet streak across the Champlain Valley during the afternoon and evening. numerous mesonet observations of 45-50 mph gusts, largely between 2 pm and 10 pm. Several branches downed by winds and resultant power outages.
9/11/2016	A cold front moved across New York during the early morning hours and Vermont during the morning hours of September 11th. Preceding this cold front was a solid line of showers and thunderstorms that stretched from the Canadian border south to the Massachusetts border that moved across VT in the pre-dawn hours. Scattered severe thunderstorms knocked down numerous trees and caused subsequent power outages.
7/22 – 7/23, 2016	A disturbance moved across the Canadian border during the overnight of July 22-23rd and developed some strong to severe thunderstorms with a few producing locally damaging winds. Significant and widespread damage occurred with more than 20,000 utility outages.
5/29/2016	Widespread gust downed tree limbs and damaged power lines across communities in northern Vermont. While most outages were brief, they disrupted electrical and telecommunication services for many residents and businesses. Emergency crews and utility workers responded quickly to clear debris and restore power.
2/29 – 3/01, 2016	Two low-pressure areas merged over Quebec and strengthened a cold front moving across New York and Vermont. The system brought strong west-to-northwest winds with gusts of 40 to 45 mph across the region, occasionally approaching 50 mph. These severe winds knocked down tree limbs and power lines, causing isolated damage locally and scattered to widespread power outages across Vermont, including nearly 20,000 outages concentrated in the Connecticut River Valley.
6/25/2013	A warm moist airmass provided the fuel for severe storms and flash flooding on June

APPENDIX E

	25, 2013.
1/20/2013	Strong low pressure moved across Quebec, while its associated vigorous cold front moved across Vermont during the late morning to early afternoon hours of January 20th. Strong west winds measured more than 50 mph caused numerous reports of scattered tree branch, tree or power line failures in Vermont. An estimated 10,000 customers lost power during this event. Scattered reports of tree limbs, tree branches down and power outages across the region. A measured wind gust of 54 mph was recorded by a trained spotter along with several other reports in excess of 45 mph.
10/29 – 10/30, 2012	Hurricane Sandy made landfall near Ocean City, New Jersey. In Vermont, a predominant east-northeast wind blew across the region with the strongest winds in northeast Vermont and along some Green Mountain western slope communities including Fairfax. Much of the state witnessed wind gusts of 35 to 45 mph with those western slope communities in the 50-60 mph range. Tree and power line damage was scattered but still left a total of 35,000 residents throughout the state without power at some point during the storm.
9/08/2012	A rapidly intensifying area of low pressure moved from the eastern Great Lakes across Quebec province Canada during the afternoon and evening hours of September 8th. A tight pressure gradient created strong surface southerly winds of 20 to 30 mph with frequent gusts more than 40 mph across the region. In addition, these strong winds delivered an abnormally warm and unstable air mass ahead of the surface low and cold front. As the cold front moved across New York during the afternoon, 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 or small trees prior to any thunderstorms. Wind damage associated with thunderstorms was more widespread and significant.
7/23/2012	A quick moving disturbance across Ontario and Quebec provinces in Canada pushed a warm front across the region during the morning and early afternoon of the 23rd, followed by a cold front during the night. Numerous thunderstorms developed ahead of the cold front in northern New York and intensified as they moved into Vermont during the late afternoon and evening hours. There were numerous reports of damaging winds and large hail.
1/18/2012	Strong south to southwest winds with frequent gusts in excess of 40 mph and a few gusts to 50 mph knocked down some tree limbs and caused some scattered power outages.
8/28/2011	(DR-4022: Tropical Storm Irene devastated parts of Southern and Central Vermont, however the northern part of the state was largely spared. Heavy rain fell in Fairfax throughout the day and evening. Some local roads experienced flooding from culverts being overtopped but damages were minor compared to other areas of the state.
7/06/2011	A cold front and upper atmospheric disturbance moved across a warm, moist unstable air mass across northern New York and Vermont during the afternoon of July 6th. Thunderstorms developed across Franklin County New York and became more organized as they moved across the Champlain Valley of New York into Vermont. In Vermont, 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.

APPENDIX E

5/26/2011	A surface low as well as upper atmospheric energy traveled along a quasi-stationary boundary across northern New York and Vermont during the afternoon and evening of May 26th. The air mass ahead of this boundary was moderately to largely unstable and the combination led to numerous reports of damaging winds. Some 25,000+ customers lost power during these storms across the state.
12/01/2010	A strong pressure gradient between a massive low-pressure system moving over Canada and a high-pressure system over New Brunswick generated powerful south-to-southeast winds across Vermont. Downslope winds exceeding hurricane force hit communities along the western slopes of the Green Mountains, while gusts approaching 55 mph spread across the Champlain Valley. The persistent, damaging winds blew off roofs, collapsed barns, downed utility lines, and left over 35,000 customers across the state without power.
10/15/2010	A low-pressure system off the Delmarva Peninsula rapidly intensified into a strong Nor'easter as it tracked toward the Gulf of Maine, bringing heavy rainfall, mountain snow, and severe winds to Vermont. Prolonged north winds of 20–35 mph with frequent gusts of 50–55 mph battered the Champlain Valley and higher terrain, knocking down large branches and shallow-rooted trees in saturated soils, leading to scattered power outages.
5/31/2009	An unseasonably cold storm system traversed across Ontario and Quebec provinces. This translated into a strong mid-level disturbance and low-level jet stream that supported a sharp, strong cold front that moved across Vermont resulting in strong winds with gusts of 40 to 55 mph along with a 20-degree temperature plunge. There were numerous reports of fallen trees, scattered power outages across the state as well as property damages from fallen trees.
5/14/2009	Strong south to southwest winds of 25 to 35 mph with frequent gusts in excess of 50 mph was witnessed across much of northern Vermont during the morning and early afternoon. These winds resulted in numerous reports of scattered downed trees and powerlines, as the spring season accounted for foliage on the trees.
3/11/2009	A powerful storm moved from the Mississippi River Valley on December 24th across the Great Lakes and into eastern Quebec by the morning of December 25th. A strong cold front associated with this storm moved across northern New York during the late evening. South to southwest winds of 20 to 30 mph with gusts to 40 mph ahead of the cold front shifted to the west-northwest at 25 to 35 mph with gusts to 50 mph during early Christmas morning. Scattered reports of tree limbs, power outages and torn roof shingles were reported across Vermont.
12/24/2008	A powerful storm moved from the Mississippi River Valley on December 24th across the Great Lakes and into eastern Quebec by the morning of December 25th. A strong cold front associated with this storm moved across northern New York during the late evening. South to southwest winds of 20 to 30 mph with gusts to 40 mph ahead of the cold front shifted to the west-northwest at 25 to 35 mph with gusts to 50 mph during early Christmas morning. Scattered reports of tree limbs, power outages and torn roof shingles were reported across Vermont.
7/26/2008	A mid-atmospheric disturbance moved across northern New York and the northern Champlain Valley of Vermont during the afternoon of July 6th. Scattered thunderstorms developed in the Adirondacks and moved across the northern Champlain Valley of Vermont. There were some isolated reports of wind damage in Grand Isle, Chittenden, and Franklin counties in Vermont.

APPENDIX E

7/18/2008	Several mid-atmospheric impulses traveled along a stationary boundary across northern Vermont during the early afternoon and evening hours of July 18th. This stationary boundary separated warm, humid air across much of Vermont from cooler, drier air across the international border with Canada. 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. This squall line interacted with an individual thunderstorm near Fletcher, that eventually produced an extensive damage path around 7 miles in length between North Cambridge and Waterville (Lamoille County), caused by straight-line winds of 60 to 80 mph. However, within this greater damage field was a tornadic storm with two very brief touchdowns with EF0 and EF1 damage. Another area of thunderstorms moved across central Vermont with pockets of significant damage across Addison, Washington, and Orange counties.
6/3/2008	The National Weather Service issued a Tornado Watch for Franklin County. A powerful cold front with strong winds tracked across Lake Champlain and into Vermont during the afternoon and early evening. Power outages were scattered throughout Town as many trees and branches toppled power lines. Power was restored within 12 hours.
4/01/2008	During the evening of April 1st into the early morning hours of April 2nd, strong winds of 25 to 35 mph with gusts to 50 mph blew across Vermont, especially the higher terrain. This was a result of a combination of strong high pressure off the Atlantic coast along with a strong and deepening area of low pressure that moved across the Great Lakes and southeast Canada. These strong winds knocked down a few tree limbs and caused scattered power outages.
1/09/2008	A strong and rapidly intensifying low-pressure system moved into the state from the Great Lakes across Ontario and western Quebec during the morning. Strong winds translated down to the surface and caused scattered wind damage in the form of downed trees and scattered power outages throughout Vermont.
8/16/2007	Scattered thunderstorms developed in a moderately unstable airmass across the Champlain Valley of New York during the afternoon of the 16th. One thunderstorm developed in a favorable, highly sheared wind environment which eventually intensified into a supercell thunderstorm in Clinton County, NY. This supercell then proceeded to travel into Vermont affecting numerous communities between Highgate (Franklin County) and Concord (Essex County). Significant straight-line wind damage (estimated between 60 and 80 mph) in the form of snapped, uprooted and downed trees, downed power lines and some structural damage occurred in Grand Isle, Georgia (Franklin county), Westford (Chittenden county) and Hardwick (Caledonia county). Also, there were several thunderstorms, including a supercell that developed in the northern Hudson Valley of New York and moved across Rutland and Windsor counties in southern Vermont. Significant straight-line wind damage (estimated between 60 and 80 mph) in the form of snapped, uprooted, and downed trees, downed power lines and some structural damage occurred as well in Rutland (Rutland County) and surrounding communities.
8/07/2006	A relatively strong westerly low-level flow interacted with a moderately unstable airmass across northern New York and northern Vermont in the afternoon.

APPENDIX E

	Scattered thunderstorms moved across the region, including a supercell structure that originated in Clinton county New York, moved into Grand Isle County, before it knocked a few trees and powerlines in St. Albans.
2/17/2006	On the morning of Friday, February 17, 2006, an arctic front pushed across the Champlain Valley of Vermont, bringing sustained winds of 30 to 40 mph and damaging gusts exceeding 60 mph. These severe winds knocked down trees and power lines, causing structural damage to homes and tearing shingles off roofs in towns like Williston, St. Albans, and Enosburg. The storm resulted in widespread disruption across the region, leaving an estimated 50,000 customers statewide without power.
10/16/2005	An ocean storm system moved north to the east of New England and resulted in strong winds across the region. There were downed trees and power outages in the county and across the State. Damage estimates in the county were approximately \$10,000.
9/29/2005	A strong cold front moved across western Vermont during the morning. Large scale damaging winds preceded and followed the front. Trees and power lines were downed across both Franklin and Addison counties, with numerous power outages. There were damages estimates of \$10,000 between both counties.
8/30 – 8/31, 2005	Tropical moisture and high winds from Katrina reached Fairfax on August 30 th . The rain was initially steady then became heavy on the 31 st . Winds were steady but non-threatening. Rainfall totals across Franklin County were between 2.5 and 4 inches. A few local roads had minor flooding. The Town was largely spared.
7/8/2005	Tropical Storm Cindy produced heavy rain and high winds across much of the state including Hihgte. Rain amounts were estimated between 1 and 3 inches with no reported damage.
7/05/2005	Thunderstorms resulted in strong winds which blew down trees in nearby Swanton and Sheldon.
1/02/2005	A cold front moving southeast from Canada triggered severe thunderstorms across Franklin County, Vermont, accompanied by 1 to 2 inches of rain and pea-sized hail. Estimated wind gusts of 58 to 72 mph knocked down dozens of trees, damaged cars, and caused structural damage to mobile homes, chimneys, and a barn in Franklin, Richford, and Berkshire, resulting in power outages throughout the county.
8/12/2004	(FEMA-1715-DR): Tropical Storm Francis generated high winds and heavy rain throughout most of the state. Several culverts and ditches in the Town were damaged due to flooding.
6/26/2004	A cold trough in the upper levels of the atmosphere resulted in micro burst type winds. People reported hearing only one clap of thunder with no lightning. Wind gusts were estimated at 40 to 50 mph. In Chittenden and Franklin Counties, tree limbs were blown down with some power outages. In Barre (Washington County), a tree was blown down onto a car. A boat was over turned on Lake Champlain.
6/09/2004	A low-pressure system moved across southern Quebec during Wednesday along with an associated cold front that tracked slowly across northern New York and Vermont. This front was preceded and accompanied by thunderstorms with damaging winds. In Fairfax, trees and power lines were blown down.
9/19/2003	The remnants of Hurricane Isabelle brought strong winds. Trees and power lines were blown down across the area with most reports from Enosburg, Fairfield and

APPENDIX E

	Fairfax. Damage estimates between the 3 municipalities were approximately \$10,000.
9/14 – 9/15, 2002	Remnants of Tropical Storms Hannah produced high winds and heavy rain throughout Franklin County. There was minor damage reported from falling trees and limbs.
7/03/2002	A cold front along the Canadian-United States border triggered locally severe thunderstorms Wednesday night.
6/23/2002	A cold front moved southeast from Canada, and triggered thunderstorms during the evening hours. A few storms reached severe criteria. Thunderstorms in North Hero, VT resulted in wind gust to 60 mph (52 kts) while thunderstorm winds blew down trees in the town of Grand Isle, VT.
8/10/2001	Early morning thunderstorms resulted in a lightning strike which set fire to and destroyed a garage attached to a house.
7/10/2001	Thunderstorms developed in an unstable airmass ahead of a surface trough during the afternoon and evening hours. Large hail was reported with locally gusty winds.
7/09/2001	A moist unstable air mass was in place across Vermont, as an area of weak low pressure moved across southern New England and triggered late afternoon and evening thunderstorms. A thunderstorm produced nickel size hail in the town of Alburg.
6/16/2001	A cold front moved from west to east across Vermont Saturday evening. Thunderstorms preceded and accompanied the front with heavy rain and gusty winds across the county. In North Hero, the wind gusted to 28 mph (24 knots) between 6 and 630 PM EDT (5 and 530 PM EST).
7/05/1999	A mesoscale convective system consisting of a cluster of thunderstorms moved across northern NY and northern Vermont during the early morning hours of Monday, July 5th. There were numerous reports of trees and power lines blown down. For example, in Grand Isle County of Vermont, trees and large branches were blown down in Alburg Springs.
9/06/1998	A cold front moved southeast from Canada across Vermont during the night of Sunday, September 6th, and triggered thunderstorms. Locally strong winds and hail accompanied a few of the storms. Specifically, near Alburg (Grand Isle County), strong winds blew down power lines
6/15/1996	A cold front moved across Vermont during the late morning and afternoon hours of Wednesday, June 5, 1996. Scattered thunderstorms were accompanied by small hail at several locations including. Sutton, Vermont (Caledonia County) pea size hail at 1030 am Est, North Hero, Vermont (Grand Isle County) 1/4-inch hail at 1055 am Est with gusty winds. Burlington, Vermont (Chittenden County) pea size hail at 11 am.
8/22/1997	An unstable atmosphere across the region associated with an upper level low over the Great Lakes resulted in numerous thunderstorms with reports of some hail.
6/22/1998	A cold front moved across Vermont during the afternoon hours. Heavy rain and locally large hail accompanied a few of the thunderstorms with this front. The Grand Isle ferry reported wind gust to 43 knots and nickel size hail in the Vermont waters of Lake Champlain, approximately 2 miles Southwest of Grand Isle Station, Vt. Lightning struck and damaged a barn in South Hero, Vermont (Grand Isle County)

APPENDIX E

6/23/2002	A cold front moved into northern Vermont from Canada and triggered thunderstorms in the region during the evening hours. Thunderstorms with accompanying winds blew down trees in Highgate
3/10/2002	A strong cold front moved across the area from Canada. Strong winds were associated with this low-pressure system and strong cold front during the early morning in the town of Swanton that measured at 62 mph (54 knots). In addition, trees were reported blown down in the St Albans area.
8/10/2001	Early morning thunderstorms resulted in a lightning strike which set fire to and destroyed a garage attached to a house.
2/10/2001	A strong storm system moved across the Canadian Province of Quebec Friday night, February 9th and Saturday, February 10th. The associated cold front was accompanied and followed by very windy conditions. In the town of Sheldon Springs, winds were measured at 74 mph (64 knots) around 605 AM Saturday.
3/8/2000	A storm system moved into Vermont from New York. This system resulted in strong east and southeast winds primarily along the west slopes of the Green Mountains. Saturated ground conditions combined with the winds resulting in downed trees. Scattered power outages were reported throughout Franklin County due to wind damage.
11/2/1999	In northern Vermont, a significant windstorm caused widespread damage and power outages. The storm's strong east to southeast winds, combined with heavy wet snow from earlier in the day, downed numerous trees and power lines, particularly along the western foothills of the Green Mountains.
9/17/1999	Impacts of Hurricane Floyd, which had weakened to a tropical storm by the time it reached the state. Despite its diminished strength, Floyd produced high winds and heavy rain across Vermont, including Fairfax, leading to widespread downed trees and power lines. Wind gusts reached up to 60 mph, and rainfall totals of 3 to 6 inches were common, with some areas reporting higher amounts. The heavy rainfall contributed to localized flooding, and the downed trees caused structural damage, blocked roadways, and affected hiking trails.
7/5/1999	A mesoscale convective system consisting of a cluster of thunderstorms moved across northern NY and northern Vermont during the early morning hours of Monday, July 5th. There were numerous reports of trees and power lines blown down. For example, in Grand Isle County of Vermont, trees and large branches were blown down in Alburg Springs.
9/27/1998	A cold front moved southeast from Canada across Vermont during the late afternoon and night of Sunday and triggered thunderstorms. Locally strong winds and small hail accompanied a few of the storms. In St. Albans where thunderstorm winds gusted to 58 mph (50 knots) along with pea size hail.
9/06/1998	A cold front moved southeast from Canada across Vermont during the night of Sunday, September 6th, and triggered thunderstorms. Locally strong winds and hail accompanied a few of the storms. Specifically, near Alburg (Grand Isle County), strong winds blew down power lines.
6/29/1998	A cold front moved into Vermont during the late afternoon and evening. Thunderstorms developed along and ahead of this front with locally strong winds and large hail.

APPENDIX E

1/27/1996	A storm system tracking from the Mississippi Valley through the Great Lakes into Canada brought snow transitioning to rain across Vermont, accompanied by strong wind gusts of 30 to 50 mph and localized gusts up to 83 knots. The damaging winds blew down numerous large trees, caused extensive power outages, tore off roofs, and caused a leg injury in Franklin County when part of a building collapsed onto a person. Additionally, rainfall and snowmelt caused minor field flooding along local rivers.
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Land Slide History

Date	Description and Extent
7/09 – 07/11/2023	Tropical cyclone Beryl impacting portions of Central and Northeastern Vermont and northern New York. The heaviest rainfall—ranging from 3 to 5 inches with localized amounts exceeding 7 inches in places like Walden—led to widespread flash flooding, river flooding, A new slide occurred at the Transfer Station.
2020	Large slide in due to major precipitation in spring; took out power lines; bedrock at base of slope just west of Hill Top Lane.
Spring 2015	Two active landslides occurred on River View Lane in Highgate that threatened two residences. The sites were high above and relatively far from the Missisquoi River. The Town performed property buyouts in partnership with the property owners.
8/28/2011	Tropical Storm Irene brought steady heavy rain throughout the day which triggered a slope on the capped landfill at the Transfer Station to slump. Stabilization and repairs were made in subsequent years via FEMA mitigation funding. Additionally, a slope near Highgate Falls slumped as well and emergency repairs were made to stabilize the slope.

Lake Shore Erosion and Fluvial Erosion

Begin Date	End Date	Description and Extent
05/04/2018	05/04/2018	An energetic storm system moved from the Great Lakes across the St. Lawrence Valley into Ontario/Quebec during the afternoon and evening hours of May 4th. Instability was marginal for thunderstorm development during the evening hours with thunderstorms ahead of a cold front. However, winds were unseasonably strong in the atmosphere, accounting for some thunderstorms to produce damaging winds and there was some localized damage in non-thunderstorm winds accompanying the arrival of colder air. Very brief heavy rainfall of up to 2 inches in less than an hour accounted for localized flash flooding and a mudslide. Strong winds and a lake level at/above flood stage caused for 4-to-6-foot waves to batter a causeway between Colchester and Grand Isle on Lake Champlain, resulting in numerous washouts and a closure of the causeway.
09/08/2012	09/08/2012	A rapidly intensifying area of low pressure moved from the eastern Great Lakes across Quebec province Canada during the afternoon and evening hours of September 8th. A tight pressure gradient created strong southerly surface winds of 20 to 30 mph with frequent gusts more than 40 mph across the region. In addition, these strong winds delivered an abnormally warm and unstable air mass ahead of the

APPENDIX E

		surface low and cold front. As the cold front moved across New York during the afternoon, 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 or small trees prior to any thunderstorms. Wind damage associated with thunderstorms was more widespread and significant.
06/01/2011	06/18/2011	Record Flooding occurred along the shores of Lake Champlain from mid-April to mid-June. NWS Flood Stages for the United States Geological Survey (USGS) gages on Lake Champlain at the ECHO Center in Burlington, VT and Rouses Point, NY are 100.0 feet and were surpassed on April 13th and finally receded below flood stage on June 18th. Major flooding occurs with lake levels at or above 101.5 feet, which were surpassed from April 27th to June 8th as the lake level exceeded its flood stage of 100 feet from April 13th to June 18th. Further, the lake level exceeded its previous flood of record of 102.1 feet on April 28th and crested at 103.26 feet on May 6th, before eventually receding below the previous record on June 5th. In addition, strong south to southeast winds of 25 to 35 mph (greater at times) caused extensive damage due to 3 to 5 foot wave action as well as 0.5-1 foot seiches on windward facing shores (New York and Vermont). These episodes occurred on April 23rd, May 2nd, May 22-23rd and June 1st. North to northwest winds of 20 to 30 mph caused extensive damage due to 2 to 4 foot waves and seiches around an half foot on windward shorelines (Vermont) on May 9-10th and June 1st-2nd. These record lake levels were attributed to a combination of a 125-150 percent of normal winter snowfall, subsequent melting of that snow pack and an abnormally wet meteorological spring (March, April and May). Normal precipitation for meteorological spring within the Lake Champlain basin is 8.5-10 inches, yet observed precipitation was 16 to 26 inches (> 200 percent). Serious and extensive flooding to dozens of lake shore roads, 500-1000 houses and dozens of businesses. In addition, the periodic closing of the Lake Champlain ferry from Grand Isle, Vermont to Plattsburgh, New York, and the delayed opening of two additional ferry crossings. Damage estimates will be incorporated into the May storm data, representing the crest of the flood waters, thus the time of the most significant impact and damage.
5/01/2001 4/13/2011	5/31/2011 4/30/2011	Record Flooding occurred along the shores of Lake Champlain from mid-April to mid-June. NWS Flood Stages for the United States Geological Survey (USGS) gages on Lake Champlain at the ECHO Center in Burlington, VT and Rouses Point, NY are 100.0 feet and were surpassed on April 13th and finally receded below flood stage on June 18th. Major flooding occurs with lake levels at or above 101.5 feet, which were surpassed from April 27th to June 8th as the lake level exceeded its flood stage of 100 feet from April 13th to June 18th. Further, the lake level exceeded it's previous flood of record of 102.1 feet on April 28th and crested at 103.26 feet on May 6th, before eventually receding below the previous record on June 5th. In

APPENDIX E

		addition, strong south to southeast winds of 25 to 35 mph (greater at times) caused extensive damage due to 3 to 5 foot wave action as well as 0.5-1 foot seiches on windward facing shores (New York and Vermont). These episodes occurred on April 23rd, May 2nd, May 22-23rd and June 1st. North to northwest winds of 20 to 30 mph caused extensive damage due to 2-to-4-foot waves and seiches around an half foot on windward shorelines (Vermont) on May 9-10th and June 1st-2nd. These record lake levels were attributed to a combination of a 125-150 percent of normal winter snowfall, subsequent melting of that snow pack and an abnormally wet meteorological spring (March, April and May). Normal precipitation for meteorological spring within the Lake Champlain basin is 8.5-10 inches, yet observed precipitation was 16 to 26 inches (> 200 %). Serious and extensive flooding to dozens of lake shore roads, 500-1000 houses and dozens of businesses. In addition, the periodic closing of the Lake Champlain ferry from Grand Isle, Vermont to Plattsburgh, New York and the delayed opening of two additional ferry crossings.
4/20/2007	4/30/2007	The melting of snow from an above normal snow pack established in February, March and early April, as well as several rain events during the latter half of April, contributed to a significant run-off into streams and rivers of the Lake Champlain basin, which eventually deposited into Lake Champlain. Lake Champlain had been rising steadily since mid month, and at 7:15 pm LST on April 20th, finally exceeded its flood stage of 100.0 feet. Primarily...only minor shoreline flooding but was occasionally exasperated due to strong winds and wave action along the Vermont shoreline. Several summer camps, cottages experienced flooding as well as a few docks damaged as well. The lake would remain above flood stage through the end of April. There was \$20,000 in damages reported between Grand Isle, Addison and Chittenden Counties.
06/23/2002	06/23/2002	A cold front moved southeast from Canada, and triggered thunderstorms during the evening hours. A few storms reached severe criteria. Thunderstorms in North Hero, VT resulted in wind gust to 60 mph (52 kts) while thunderstorm winds blew down trees in the town of Grand Isle and waves battered the lake shore. .
09/06/1998	09/06/1998	A cold front moved southeast from Canada across Vermont during the night of Sunday, September 6th, and triggered thunderstorms. Locally strong winds and hail accompanied a few of the storms. In Grand Isle County strong winds blew down power lines and 4 to 5 waves occurred on Lake Champlain.

Invasive Species History

Eurasian watermilfoil has been documented in portions of Lake Champlain since the 1960s and is established around the Champlain Islands. Dense growth interferes with boating, swimming, and native aquatic habitat.
Zebra mussels were established in Lake Champlain in the early 1990s and are widespread in the Missisquoi Bay. They clog water intake systems, alter aquatic ecosystems, and damage boats and

APPENDIX E

docks.
Spiny water flea was first detected in Lake Champlain in 2014. This invasive zooplankton competes with native species and can affect the lake's food web and sport fisheries.
The Missisquoi Bay has experienced recurring cyanobacteria (blue-green algae) blooms over 20 years along portions of the shoreline, particularly during warm summer months when nutrient runoff and calm weather promote bloom development.
Japanese knotweed was originally introduced to the United States from eastern Asia in the 19th century and has since spread to cover miles of riverfront property throughout the Missisquoi River Basin. The first mapping survey for its spread was conducted by the Missisquoi River Basin Association in 2020.
Emerald ash borer (EAB) was first detected in Vermont in 2018 and Highgate in 2021. It has since spread throughout much of the state. Ash trees in South Hero are at risk of widespread mortality, increasing hazards from falling trees along roads, trails, and utility corridors.
Hemlock woolly adelgid has expanded northward in Vermont in recent years. While not yet widespread in South Hero, continued warming temperatures increase the likelihood of establishment and impacts to eastern hemlock stands.
Beech leaf disease has been identified in Vermont and poses a growing threat to American beech forests, with expected expansion into northern Vermont.

Extreme Cold History

Begin Date	End Date	Event Description and Extent
2/03/2023	2/04/2023	An arctic airmass entered Vermont during the morning hours of February 3rd (Friday) and continued through the evening hours of February 4th (Saturday). Daytime actual temperature readings fell during Friday to zero to 15 below zero and still falling by mid-afternoon with brisk west winds creating wind chills of 20 to 40 below zero. Overnight lows Friday night were 15 to 30 below zero with minimum wind chill values of 30 to 45 below zero and it wasn't until Saturday afternoon when actual air temperatures surpassed zero in spots but developing south winds still produced sub-zero wind chills. The last occurrence of something this widespread and intense, although brief was in January 26-27, 1994. Numerous schools and businesses closed as well as outdoor events, including ski resorts.
1/27/2022	1/29/2022	An arctic air mass from Ontario brought Bitterly cold wind chills ranging from -20°F to -30 °F occurred late Wednesday night into midday Saturday. Actual temperatures dropped to -15°F to -25°F on the morning of the 27th and -5°F to -10°F below on the morning of the 29th.
1/20/2022	1/22/2022	Minimum temperatures Friday morning (1/21) were 5 to 10 below zero and 10 to 20 below zero on Saturday (1/22). Coldest wind chills early Friday morning were 5 to 10 degrees colder.
1/11/2022	1/15/2022	An arctic cold front moved across the state with a strong area of high pressure across south-central Canada. Sub-zero temperatures ran from Friday night through Sunday morning. Simultaneously, a powerful ocean storm was moving into Newfoundland Canada brought brisk north-northwest winds of 15 to 25 mph with higher

APPENDIX E

		gusts that combined with the arctic airmass created dangerously cold wind chills of -25 to -40 °F.
1/11/2022	1/15/2022	Minimum temperatures on the morning of the 11th (Tuesday) were 0 to -10 °F with winds creating wind chills in the -15 to -25°F range. Daytime highs only reached the single numbers above zero with still sub-zero wind chills. Lows on Tuesday night fell below zero early then rose overnight but combined with south winds of 10 to 20 mph still created wind chills in the -10 to -20°F. Arctic high pressure moving from central Canada across the Great Lakes into the northeast on January 11th. Brisk northwest winds of 10 to 20 mph delivered sub-zero air temperatures, that combined created apparent temperatures (wind chill) in the -20 to -35°F range across north-central and northeast VT and higher elevations with -15 to -25°F elsewhere by daybreak on January 11th. High temperatures on the 11th ranged from single numbers above and below zero with wind chills still in the teens to below zero. Low temperatures during the early night of the 11th were sub-zero and began to rise overnight due to a south wind. However, brisk south winds of 15 to 25 mph created wind chills in the -10 to -20°F range. Numerous school districts closed school and after school activities due to the cold and COVID related complications according to local media.
1/05/2018	1/07/2018	A surge of cold Arctic air brought an extended stretch of extreme cold. The most severe wind chills occurred on the mornings of January 6 and 7, when frigid temperatures combined with westerly wind gusts of 30 to 40 mph, producing widespread wind chills between -20°F and -40°F. In response to the dangerous cold, numerous warming shelters were opened throughout Vermont.
2/01/2015	02/28/2015	From late January to early March, a persistent deep cold trough dominated the Northeast, resulting in the coldest February on record for much of Vermont and nearby areas. Temperatures averaged 13–17°F below normal. Many locations stayed below freezing for 25–45 straight days. February saw 15–20+ days with temperatures below 0°F, and wind chills reaching -30°F or lower on several occasions. According to the National Weather Service, it was the coldest month since December 1989 or January 1994. Several communities set record cold temperatures.
1/7/2015	1/8/2015	An arctic cold front pushed across Vermont during the afternoon hours of January 7th with plummeting temperatures and brisk, strong winds (15 to 30+ mph) causing dangerously cold wind chills of 25 to 40 degrees below zero during the evening of January 7th into the morning hours of January 8th. These dangerously cold wind chills lead to delayed school openings of 2 hours or cancelled classes on the morning of January 8th. Actual minimum ambient temperatures on the morning of January 8th were 15 to 30 below zero across northern

APPENDIX E

		New York. Observed wind chills in the mountains ranged from 40 to 70 below zero
1/14/2009	1/18/2009	An arctic cold front moved across Vermont during the early morning hours of January 14th which delivered some of the coldest temperatures across the region in several years. As the arctic front passed across northern Vermont, temperatures dropped over 20 degrees within several hours. Temperatures averaged 20 to 25 degrees below normal values, which were already at climatological winter minimums. Daytime maximum temperatures ranged from single digits above and below zero during this stretch while nighttime minimums were -10 to -30 °F with isolated readings colder than -40°F at times. Some observed minimum temperatures for January 15th included: -32°F at Island Pond (Essex), -31°F in Canaan (Essex), -24°F at North Troy (Orleans), Granby and Gallup Mills (Essex) with -22°F at Plainfield and Marshfield (Washington), -21°F at Morrisville (Lamoille) and -20°F at Lyndonville (Caledonia), Newport (Orleans) and Waltham (Addison). Some observed minimum temperatures for January 16th included: -42°F in Island Pond (Essex), -37°F in Sutton (Caledonia), -34°F in Walden (Caledonia), -32°F in Gallup Mills (Essex), -31°F East Berkshire (Franklin), -30 °F in Granby (Essex), Enosburg Falls (Franklin), and St. Johnsbury (Caledonia) and -29°F at Plainfield and Waitsfield (Washington) and Bethel (Windsor). Record cold daily temperatures were set on January 16th for the following sites; Morrisville-Stowe Airport with -32°F St. Johnsbury Fairbanks Museum with -30°F, Montpelier-Barre Airport at -26°F and Burlington International Airport at -21°F. Extremely cold temperatures led to numerous cold weather-related problems including numerous dead vehicle batteries and broken home/business water pipes
12/08/2008	12/08/2008	An Arctic front swept across northern NY and New England, bringing the season's first Arctic air mass. By the morning of Dec. 8, temps ranged from 5°F above to -10°F, with NW winds at 10–20 mph and higher gusts. Wind chills reached -15°F to -25°F across northern Vermont during the early to mid-morning hours.
3/09/2007	3/09/2007	Arctic high pressure settled across New England during the night of the 8th and morning of the 9th with more frigid temperatures, like a few days earlier across Vermont. Morning lows on the 9th were 10 to 34 degrees below zero, which included record lows at the following three sites: Burlington, Montpelier, and St. Johnsbury. Some morning lows on the 9th included: -34 degrees at Island Pond (Essex), -31 degrees at Sutton (Caledonia), -30 degrees at East Haven (Essex), -28 degrees at Gallup Mills (Essex), -26 degrees in Morrisville (Lamoille), -23 degrees in St. Johnsbury (Caledonia) and Bethel (Windsor), -22 degrees in Newport (Orleans) and Montpelier (Washington), -21 degrees in Enosburg Falls (Franklin), -20 degrees in Plainfield and Waitsfield (Washington), -19 degrees in Hanksville (Chittenden) and Northfield (Washington), -18 degrees in East Albany (Orleans), -17 degrees in Woodstock (Windsor), -16 degrees in New Haven (Addison) and Alburgh (Grand Isle), -15 degrees in Cornwall (Addison),

APPENDIX E

		Rutland (Rutland) and at the NWS office in South Burlington (Chittenden).
3/06/2007	3/06/2007	An arctic cold front swept across Vermont during the afternoon and evening of the 5th and delivered frigid temperatures along with blustery winds. Temperatures plummeted to below zero just after midnight on the 6th and were 5 to 20 degrees below zero by dawn. These frigid temperatures, accompanied by winds of 15 to 30 mph created dangerously cold wind chills of 20 to 40 degrees below zero. Brisk winds with temperatures around zero continued through the daylight hours of the 6th with wind chill readings in the 20s to around 30 degrees below zero. The winds subsided after sunset on the 6th, but it remained extremely cold through the morning of the 7th with overnight minimum temperatures of 10 to 30 degrees below zero. Some morning lows on the 6th included: -20 degrees at East Albany (Orleans), -15 degrees at Sutton (Caledonia) and Eden (Lamoille), -12 degrees at Island Pond (Essex), Chelsea (Orange), Newport (Orleans) and Waitsfield (Washington) with -11 degrees at South Lincoln (Addison), Hanksville and Westford (Chittenden), -10 degrees at St. Albans (Franklin), Alburg (Grand Isle) and Danby (Rutland) and -8 degrees in Rochester (Windsor). Some morning lows on the 7th included: -35 degrees in East Haven and Island Pond (Essex), -32 degrees in Gallup Mills (Essex), -30 degrees in Canaan (Essex), -27 degrees in Morrisville (Lamoille), -25 degrees in Waitsfield (Washington) and Bethel (Windsor), -24 degrees in St. Johnsbury (Caledonia) and Plainfield (Washington), -21 degrees in Sutton (Caledonia), Hanksville (Chittenden), Union Village (Orange), Newport (Orleans), Northfield (Washington) and Rochester (Windsor), -20 degrees in Cornwall and South Lincoln (Addison), Essex Junction (Chittenden), East Albany (Orleans) and Woodstock (Windsor), -19 degrees in Alburg (Grand Isle), Rutland (Rutland) and -18 degrees at the NWS office in South Burlington (Chittenden).
1/25/2007	1/26/2007	An arctic cold front moved across Vermont on the 24th and delivered very cold temperatures of zero to 25 degrees below zero by the morning of the 25th. However, on the night of the 25th into the morning of the 26th, a secondary cold front combined with a strengthening area of low pressure near New Brunswick, accounted for the combination of brisk northwest winds of 10 to 15 mph and temperatures 5 to 20 degrees below zero for wind chill readings of 25 to 40 degrees below zero. Some morning lows on the 25th included: -29 degrees in Island Pond (Essex), -21 degrees in Sutton (Caledonia) and Morrisville (Lamoille), -19 degrees in East Haven (Essex), Canaan (Essex) and Enosburg Falls (Franklin), -15 degrees in Greensboro (Orleans), -14 degrees in Montpelier (Washington), East Albany and Newport (Orleans), -10 degrees in Bethel (Windsor), Westford (Chittenden) and Alburgh (Grand Isle). Some morning lows on the

APPENDIX E

		26th included: -20 degrees in Island Pond, East Haven, Canaan (Essex) and Sutton (Caledonia), -16 degrees in East Albany (Orleans), -15 degrees in Montpelier (Washington), -14 degrees in St. Johnsbury (Caledonia) and Eden (Lamoille) with -11 degrees in South Lincoln (Addison), Woodstock (Windsor), Rutland (Rutland) and the NWS office in South Burlington (Chittenden). Northwest winds of 10 to 15 mph created wind chill values of 25 to 40 degrees below zero. The cold wave diminished slightly on the 27th-29th, due to a slight airmass modification and clouds across the region, but it remained some 10 to 20 degrees below normal. However, another arctic front pushed across the area on the 29th with a replenishment of arctic air that brought early morning low temperatures on the 30th of 10 to 30 degrees below zero. Some morning low temperatures on the 30th included -32 degrees at Island Pond (Essex), -27 degrees in Sutton (Caledonia), -25 degrees in East Haven (Essex), -24 degrees in Enosburg Falls (Franklin), -22 degrees in Morrisville (Lamoille) and -18 degrees in Hanksville (Chittenden) and Newport (Orleans).
2/27/2006	2/27/2006	During the early morning hours of the 27th, an Arctic air mass settled over Vermont. A strong pressure gradient between high pressure in central Canada and low pressure over Labrador generated brisk winds. These winds, combined with frigid temperatures, resulted in wind chills ranging from -15°F to -30°F.
2/18/2006	2/19/2006	An arctic airmass moved into Vermont during the night of the 17th and delivered colder air through the 18th. Meanwhile, a strong pressure gradient between the arctic high across the Great Lakes and the departing storm in Newfoundland was creating brisk winds of 10 to 20 mph with higher gusts. The combination resulted in wind chills of 10 to 20 below zero in the Champlain Valley and south central portions of Vermont.
1/15/2006	1/15/2006	An arctic cold front moved across northern Vermont during the early morning of 15th. Record warm temperatures in the 50s on Saturday the 14th, were replaced with temperatures 5 to 15 above on Sunday. Blustery northwest winds 20 to 30 mph with gusts to 40 mph created wind chills of 10 to 25 degrees below zero and an apparent temperature change from Saturday (14th) of 50 to 70 degrees colder.
1/23/2005	1/23/2005	A storm system east of New England combined with high pressure over the Midwestern US resulted in a flow of very cold air and gusty winds.
1/13/2004	1/16/2004	An arctic front moved through the area Tuesday, January 13th. Wind chills during Tuesday night, Jan 13th through noon on Wednesday, January 14th were generally -25°F and -45°F. Arctic high pressure then settled across the area on the 14 th .
12/30/1998	12/31/1998	Low pressure moved into the Canadian maritimes Wednesday (December 30th) and the associated arctic front moved across the area early Wednesday (December 30th). Very cold air was ushered in on strong winds. Snow squalls occurred across the area with between 3 and 5 inches falling in the mountains. Mount Mansfield reported 5

APPENDIX E

		inches. In Rutland County several mountain roads were blocked for a short period of time Wednesday (December 30th).
1/19/1997	1/19/1997	An arctic airmass centered over the Northeast resulted in bitterly cold early morning low temperatures on Sunday, January 19, 1997. A few of the coldest locations were Canaan (Essex County) minus 38, Morrisville (Lamoille County) minus 36, Westford (Chittenden County) minus 29,
1/17/1997	1/17/1997	An outbreak of arctic air resulted in extreme wind chills across much of Vermont. These wind chills frequently ranged from between 30 and 60 below zero.

Heat History

Per the State Hazard Mitigation Plan, the following extreme heat events occurred:

Date	Event Description & Extent
June 23 – 24, 2025	A short period of extreme heat developed across Vermont and northern New York as an upper level high built across the eastern half of the United States. Dry air aloft suppressed thunderstorm activity, especially on June 23rd, which provided an opportunity for very efficient heating while high dewpoints produced heat indices over 110 °F.
June 17 - 19, 2024.	Areas of Vermont and other states in New England experienced a heatwave with temperatures in the 90s for three days.
July 7 - 10, 2020	Excessive heat in the Champlain Valley on what has already been a very warm early summer. High temperatures surpassed the upper 80s from July 7-10th with a daily high of 95 degrees on July 9th and 10th. These temperatures combined with high dewpoints in the upper 60s to lower 70s created heat index values in the mid-90s to around 100 degrees on July 9th and 10th. High temperatures in the upper 80s to lower 90s with dew points in the 60s to lower 70s created heat index values in the mid-90s to around 100 degrees.
June 18, 2020	Areas of Vermont and New York experienced the 2nd longest heatwave duration with temperatures in the 90s for six days straight in northwestern Vermont. Burlington recorded the highest temperature in its history on June 22nd and 23rd with a reading of 96°F. Eight of fourteen of Vermont's counties recorded high temperatures during this period. One death in Orleans County was associated with this heat wave.
July 1, 2018	High temperatures affected all fourteen counties in Vermont through Independence Day. Temperatures reached the mid-90s, and heat indices were recorded within the range of 95 -110°F. The heat wave continued for 6 consecutive days, and Burlington, VT saw the warmest 5 day stretch since 1892. It is important to note that the all-time minimum temperature also broke a previous record of 78 degrees Fahrenheit, on July 2nd, 2018. Four deaths were attributed to this event, one recorded in Washington County and three in Chittenden County, all related to excessive indoor residential temperatures. Nearly 100 heat-related emergency department visits occurred state-wide during this heat wave, and more than 10 percent of Emergency Medical Service calls on July 1st were heat related.
March 17, 2012	Winter of 2011-12 had temperatures that averaged 4-5°F above normal and snowfall 40-60% of normal. This combination accounted for snow pack across the region to be

APPENDIX E

	largely below normal or even non-existent by mid-March. In Vermont, temperatures climbed to the 70s March 18 and low-80s March 19-22. Record heat was recorded across all of Vermont with maximum temperatures 30-40°F above normal and some daily records being broken by 10°F or more. This event caused an estimated reduction of 30% of maple sugar production, resulting in an estimated impact of nearly \$10 million. In addition, there was significant loss of ski industry revenue due to a 25-50% reduction in snow loading.
July 21, 2011	Temperatures across much of southern Vermont warmed into 90s with dew points in the 70s, combined with the hot temperatures and resulted in heat indices of 100°F to 104°F. This was the 2nd day of a 3 to 4-day heat wave across a large portion of Vermont with heat index values of 100°F to 108°F across the Champlain and Connecticut valleys as well as some interior valleys. One death is attributed to this event in Windsor County.
August 1-2, 2006	A heat ridge moved into Vermont during the early morning of August 1. Temperatures soared into the 90s but significantly more important were dewpoints that reached the middle to upper 70s to produce excessive heat index values of 100°F to 105°F, some of the highest values in nearly a decade.

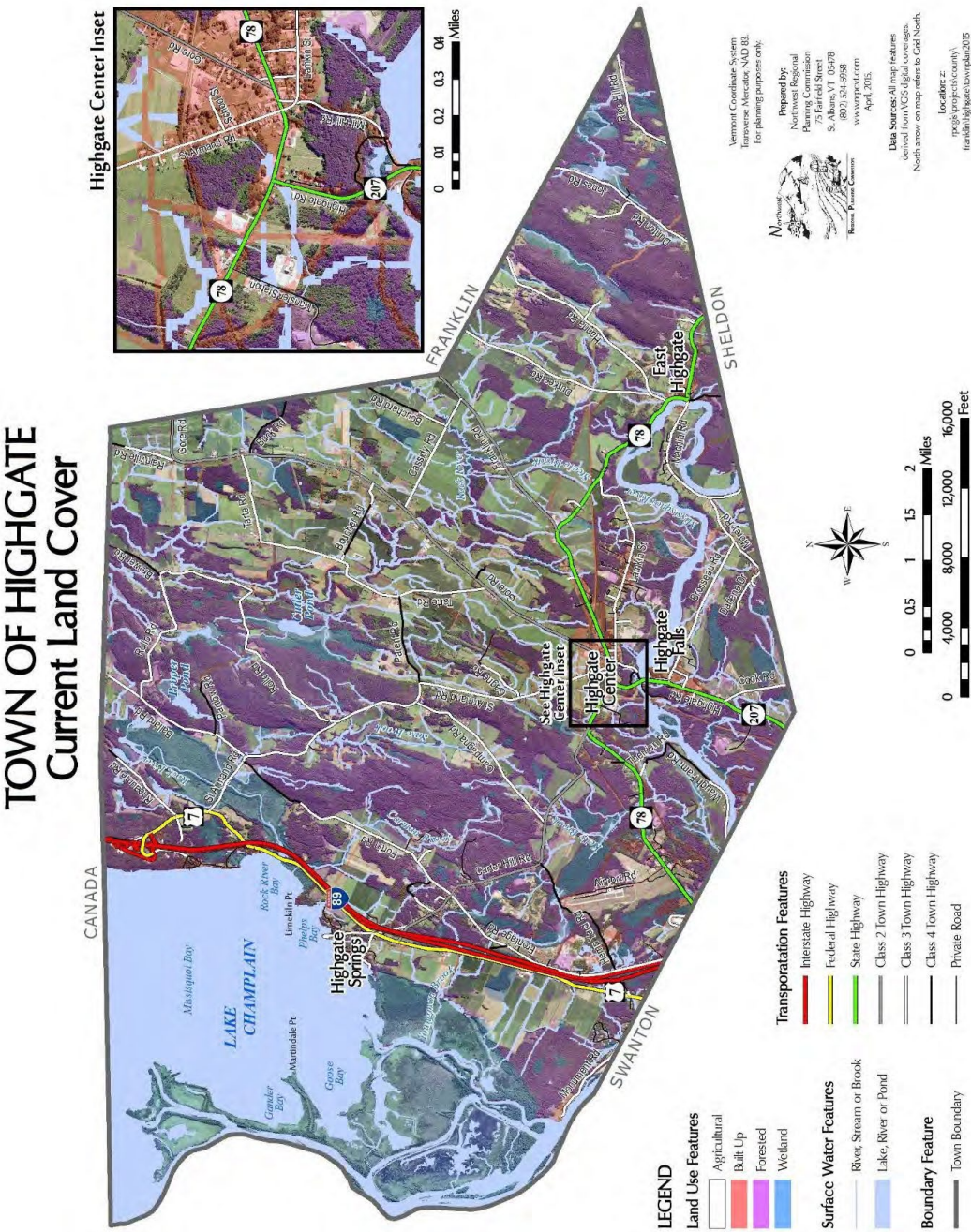
Hail History

Begin Date	Event Description and Extent
5/21/2022	A mid level disturbance moved into a moderately unstable airmass across Vermont during the late afternoon/early evening of May 21st. Scattered thunderstorms developed in NY and southern Quebec and intensified as they moved east into VT. Several reports of damaging winds and a few observations of hail greater than one inch in diameter were reported in Highgate.
10/31/2017	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.
6/28/2016	A cold front moves across a marginally unstable air mass during the afternoon of June 28th developing thunderstorms in the Adirondacks of New York that eventually moved into the Champlain Valley and elsewhere in Vermont. A few isolated thunderstorms did deliver strong gusty winds and hail just under an inch in diameter. Some slow moving and training storms did deliver localized 2 to 4 inches of rain in north-central and northeast Vermont for some minor flash flooding. Penny size hail was reported in Highgate Springs.
5/22/2013	On the evening of May 22nd, a stationary boundary remained draped across northern New York and Vermont. There was enough low-level instability, as well as disturbances along this boundary to produce scattered and training thunderstorms during the evening hours in the Champlain Valley that produced some hail and localized urban flooding in poor drainage locations. Dime size hail was reported in Highgate.
6/26/2009	On the afternoon of June 26th, an unseasonably cold and strong upper level low pressure system was located across eastern Canada. Mid-level shortwave energy rotated around this upper low into a moderately unstable air mass across northern New York and Vermont. This resulted in widespread thunderstorm activity, some of which produced large hail and brief strong winds across portions of Vermont. Nickely size hail was reported in Highgate.

APPENDIX E

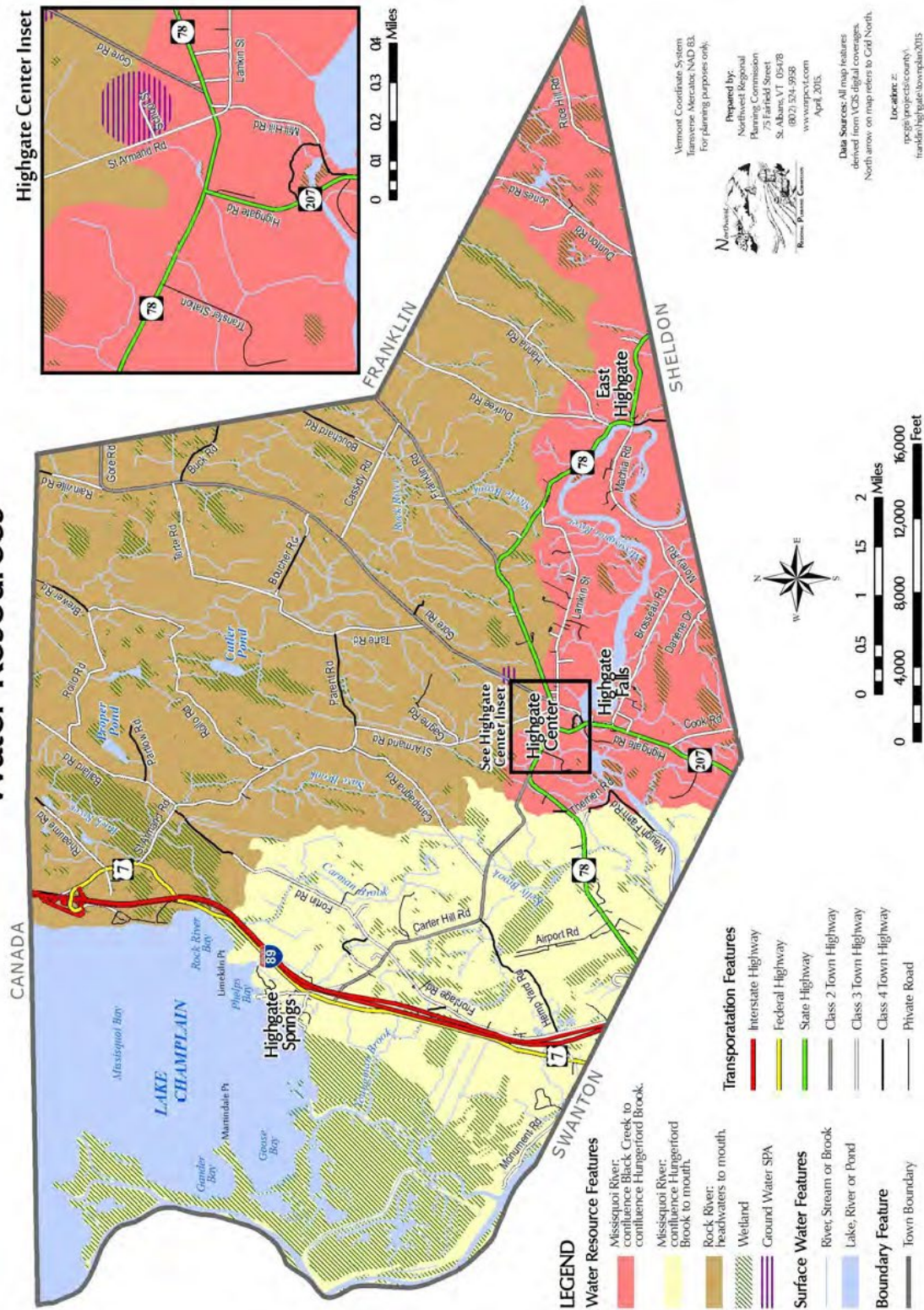
8/3/2007	A cold front and mid-level disturbance moved into a hot and unstable airmass, with temperatures in the 90s and dewpoints in the mid to upper 60s, across Vermont during the afternoon of the 3rd. This resulted in scattered thunderstorms, some of which produced large hail. Large hail reports included; Golf ball size (1.75 inches diameter) in Richford, and quarter size (1.00 inch diameter) in Highgate Springs.
7/1/2004	A low pressure system near James Bay, Canada on the morning of July 1 moved east across Quebec. The associated cold front in the central Great Lakes Thursday morning, July 1st, moved into northern New York during the afternoon. The cold front continued east into northern Vermont during the evening of the 1st of July. Thunderstorms preceded and accompanied the front. Some of the storms were severe with large hail and/or strong winds. In Highgate, penny size hail was reported.
7/03/2002	A cold front along the Canadian-United States border triggered locally severe thunderstorms Wednesday night, July 3rd.

Current Land Use



Water Resource

TOWN OF HIGHGATE Water Resources



Appendix G: Stakeholder and Public Outreach Plan

TOWN OF HIGHGATE, VT LOCAL HAZARD MITIGATION PLAN – STAKEHOLDER AND PUBLIC OUTREACH PLAN

To meet FEMA requirements and to ensure public, neighboring community, local and regional agency input opportunities, the following communication methods are recommended.

Goals:

1. Inclusive Participation and collaboration – Ensure all relevant stakeholders and the public have opportunities to contribute including people with disabilities, access and functional needs. Foster collaboration among all stakeholders.
2. Informed Decision-Making – Provide necessary education and information regarding hazards and risks.
3. Community Buy-In – Foster community support and ownership by involving stakeholders and public from the start.
4. Transparency - Build trust through clear, transparent and consistent communication throughout the planning process
5. Effective Implementation = Gather input that is practical, sustainable and responsive to the needs of the community.
6. Compliance –Ensure federal, state and local requirements for public involvement in hazard mitigation planning are met.

Identifying Planning Team and Stakeholders

- Local Government Officials – Selectboard Chair, Selectboard members, public works director, first response agencies, health officer, finance, zoning administrator, planning, and regional planning commission, Health Department
- School representatives
- Local and regional entities that support people with disabilities, access, and functional needs (PDAFN) or vulnerable populations (vulnerability specific to hazard mitigation)
 - Hospital / medical care (Northwest Medical Center, Northern Tier Center for Community Health (NOTCH))
 - Visiting Nurses Association Hospice of the Southwest Region (Bennington, Franklin and Rutland Counties)
 - Champlain Valley Office of Economic Opportunity
 - Age Well (Meals on Wheels)
 - Mobile home properties
 - People living in flood zones
 - Turning Point of Franklin County
- Franklin County Natural Resource Conservation District
- Friends of Northern Lake Champlain
- Missisquoi River Basin Association
- Neighboring communities (Franklin, Sheldon, Swanton Town and Swanton Village)
 - Public Safety Answering Point (PSAP) Dispatch Center (St. Albans City)

- Franklin County Mutual Aid
- EMS Services (Missiquoi Valley Rescue, Inc.)
- Neighboring EMDs
- Town Clerks
- Businesses that support hazard mitigation / emergency response
 - Swanton Village Electric
 - Vermont Electric Co-operative
 - Northern Vermont Economic Development District
 - Franklin County Industrial Development
 - Franklin County Chamber of Commerce
 - Northwest FiberWorx (community broadband)
- Non-Profit organizations – Including community-based organizations that work directly with or provide support to people with disabilities or functional accesses needs or front-line communities – housing, health care, etc.
 - Food Shelf, Healthy Roots Collaborative, Champlain Valley Office of Economic Opportunity, Northern Tier Center for Health, Meals on Wheels)

Communication Methods and Implementation:

- Post meeting information (agenda, slides, zoom link, etc.) on municipal website
- Post meeting information (agenda, slides, zoom link, etc.) on municipal social media sites
- Post Online surveys / questionnaires on Montgomery Mitigation Project website
- Send email notifications (e.g., meeting dates, agenda, slides, etc.) to the entities listed below
- Post hard copies of meeting information (agenda, slides, etc.) in municipal buildings (village office, library, public safety building, general store)
- Post hard copy of meeting information (agenda, slides, etc.) including non-municipal buildings (e.g., post office, NOTCH, etc.)

Processing Feedback

Feedback opportunities included public meetings, public comment period, requests. online feedback via email link, phone, regular updates and follow-ups. Comments and feedback received were incorporated during the plan update.

Planning Team and Stakeholders		
Name	Organization	Role
AJ Johnson	Town Administrator (EM Coordinator)	Planning Team Lead (Selectboard Liaison)
Shaun Coleman	Northwest Regional Planning Commission	Planning Team Member
Merry Souza	Selectboard Chair	Planning Team Member
Luc Dupois	Planning Commission Chair	Planning Team Member
Wendi Dusablon	Town Clerk	Planning Team Member
Scott Bessette	Highgate Planning Commission Vice Chair Highgate Co-Road Commissioner	Planning Team Member
Jack Pelkey	Highgate Planning Commission Member	Planning Team Member

APPENDIX G

Ty Choiniere	Highgate Planning Commission Member	Planning Team Member
Thomas Conley	Highgate Planning Commission Member	Planning Team Member
Gary Greenough	Highgate Fire Chief	Planning Team Member (First Response)
William Sheets	Swanton Village Electric Swanton Village Manager	Stakeholder (Electric Utility)
Brian Savage	Swanton Town Administrator	Stakeholder (neighboring community)
Stephen Dodd	Sheldon Selectboard Chair	Stakeholder (neighboring community)
Dave Benion	Franklin Selectboard Chair	Stakeholder (neighboring community)
Erin Creeley	EP, Vermont Department of Health, St. Albans District	Stakeholder (Public Health)
Reginald Beliveau, Jr.	Franklin County Regional Emergency Management Committee	Stakeholder (REMC)
Jess Graff	Director, Champlain Valley Office of Economic Opportunity (CVOEO)	Stakeholder (People with Disabilities and Functional Access Needs)
Ashley Bartley	Visiting Nurses Association (formerly Franklin County Home Health Agency)	Stakeholder (Senior Healthcare, Hospice and Community Support Services)
Dan Palmer	Missisquoi Valley Union High School	Stakeholder (Education)
Carl Watkins	Franklin County Regional Chamber of Commerce	Stakeholder (Local Businesses)
Tim Smith	Franklin County Industrial Development, Northern VT Economic Development District	Stakeholder (Economic Development)
Dennis Nolan	Historical Society	Stakeholder (Historical and Cultural Resources)
Lindsey Wight	Missisquoi River Basin Association	Stakeholder (Natural Resources)
Bridget Butler	Friends of Northern Lake Champlain ED	Stakeholder (Natural Resources)
Lauren Weston	Franklin County Natural Resources Conservation District	Stakeholder (Natural Resources)

APPENDIX G

Outreach Contacts	
Apartment Complex	None
Senior Living	None
Airport – State	VT Agency Of Transportation Franklin County Airport Border Air Ltd. 629 Airport Road Highgate, VT 05488
Businesses	Franklin County Regional Chamber of Commerce Manager Carl Watkins 2 N Main St.#101 St. Albans, VT 05478
Community Action	Champlain Valley Office of Economic Opportunity (CVOEO) Director Jess Graff 5 Lemnah Dr., Suite 5 St. Albans, VT 05478
Conservation District	Franklin County Natural Resources Conservation District USDA – NRCS Field Office Lauren Weston, District Manager 50 South Main St. Ste B-20 St. Albans, VT 05478
Environment	Friends of Northern Lake Champlain Bridget Butler, Executive Director PO Box 1145 St. Albans, VT 05478
Daycare	MVSD Highgate Preschool 219 Gore Road Highgate Center, VT 05459
Economic Development and Industry	Franklin County Industrial Development Corp. Northern VT Economic Development District Tim Smith, Director, Board member 2 N Main Street St. Albans City, VT 05478
Food Shelf	Highgate Methodist Church Community Center 3060 Rte. 78 Highgate, VT 05459
Library and Community Center	Highgate Library and Community Center 17 Mill Hill Road Highgate Center, VT 05459
Government Office Fire Station Public Works	Highgate Municipal Complex 2996 VT-78 Highgate Center, VT 05459
Government Office (neighboring)	Swanton Village Municipal Complex 120 First Street Swanton VT 05488

APPENDIX G

Government Office (neighboring)	Swanton Town Office 1 Academy Lane Swanton, VT 05488
Government Office (neighboring)	Sheldon Town Office 1640 Main Street Sheldon, VT 05483
Government Office (neighboring)	Franklin Town Office 5167 Main St. Franklin, VT 05457
Historical	Highgate Historical Society 3181 VT Route 78
Hospital	Northwest Medical Center Emergency Manager 133 Fairfield St. St. Albans, VT 05478
Mobile Home Park	All Rental Mobile Home Park N&A Pine Haven Inc. Route 78 Highgate Center, VT 05459
Mobile Home Park	ANDCO Mobile Home Park First Choice Property Mgmt Frontage Road Highgate Center, VT 05459
Mobile Home Park	Descorcie's Mobile Home Park Paul's Court Highgate, VT 05459
Mobil Home Park	LynnLout Mobile Home Park Route 78 Highgate, VT 05459
Municipal Public Works Fire Department	Highgate Municipal Complex 2996 VT-78 Highgate Center, VT 05459
Highgate Dam (Operator Swanton Village Electric)	Swanton Village Electric 120 First Street Swanton VT 05488
Religious Facility	St. John's Episcopal Church 161 Park Street Highgate, Center, VT 05459
Religious Facility	St. Louis Parish Church 222 Lamkin Street Highgate, VT 05488
Residential Home Care	None
School	Highgate Elementary School 219 School Street Highgate Center, VT 05489
School	Missisquoi Valley Union Middle and High School

APPENDIX G

	100 Thunderbird Drive Highgate, VT 05489
US Customs and Border Patrol	GSA Highgate Springs Port of Entry 482 Welcome Center Road, Highgate Springs, VT 05489
US Postal Service	US Post Office - Highgate 38 St. Armand Rd Highgate Center, VT 05459
US Postal Service	US Post Office – Highgate Springs 2934 VT Route 7 Highgate Springs, VT 05489
Utility	Highgate Converter Station Vermont Transco, Inc. 2694 Vt Route 78 Highgate, VT 05489
Utility	Highgate Substation Vermont Transco 2759 Vt Route 78 Highgate, VT 05489
Utility	Vermont Gas Systems Inc. 85 Swift Street South Burlington, VT 0540
Utility and Hydro Dam	Swanton Village Electric 120 First St, Swanton, VT 05488

Appendix H: Community Survey Flyer, Survey and Results



The flyer features a background image of a cloudy sky over a body of water with a wooden pier. The text is centered and uses a mix of yellow, black, and purple colors for emphasis.

Highgate is updating the Town's Hazard Mitigation Plan and needs your input!!

Hazard Mitigation is sustained action taken to reduce or eliminate long-term risk to people and property due to natural or man-made disasters. Local Hazard Mitigation Plans are updated every 5 years.

A Hazard Mitigation Plan helps our community to:

- Identify cost-effective actions for risk reduction
- Focus resources on the greatest risks and vulnerabilities
- Build partnerships between residents, organizations, and businesses
- Increase education and awareness of hazards and risk
- Communicate our priorities to state and federal officials
- Align risk reduction with other community objectives

Participate Today!
SURVEY LINK:
<https://tinyurl.com/369pkhzz>



Benefits of having an approved Hazard Mitigation Plan:

- Provide the Town with a roadmap for becoming more disaster resilient.
- Municipalities can receive federal funds from:
 - Hazard Mitigation Grant Program (HMGP)
 - Flood Mitigation Assistance Program (FMA)
 - Flood Resilient Communities Fund (FRCF)
- The Town will receive a higher level of post-disaster reimbursement through the Emergency Relief and Assistance Fund (ERAF).
- Town Officials and First Responders are better prepared!

For more information scan the QR Code or visit the project web page <https://tinyurl.com/2ifes7ke>



Community Stakeholder Survey *

Town of Highgate, Vermont

Local Hazard Mitigation Plan

***Results in Red:** The Town of Highgate utilized a survey to solicit public input on 1) potential natural hazard impacts and 2) mitigation strategies to reduce these impacts in the future. The survey was made available online as well as hard copy over the course of the planning process. The Town received 26 responses and a summary of the input received is provided below in red.

Hazard mitigation is an action that reduces the long-term impacts of Natural Hazards (e.g. ice, snow, wind, heat, cold, drought, flood inundation, fluvial erosion, earthquake, wildfire, invasive species, infectious disease outbreaks, and hail) on that community including people, buildings, environmental systems, and other infrastructure.

Your Name (optional):

Email address (if you would like to be contacted for follow-up information):

Town, Village or City of residence?:

Highgate: 100%

Other: 0%

Have you ever experienced a natural disaster? If so, what type and where?

Yes: 31% (Various locations and dates, including ice storms, floods, wind damage)

No: 69%

No answer: 0%

Is your home or business property located in a FEMA designated floodplain?

If yes, do you have insurance through the National Flood Insurance Program (NFIP)?

Yes: 3.4%

No: 69%

Do not know: 27.6%

How concerned are you about the following events?

Rank	Hazard
1	Flooding and Fluvial Erosion
2	Severe Wind (Windstorm, Thunderstorm, Tornado, Tropical Storm, Hurricane)
3	Severe Snow Storm (Ice Storm)
4	Infectious Disease Outbreak
5	Landslide
6	Extreme Heat
7	Wildfire
8	Drought
9	Extreme Cold
10	Invasive Species

APPENDIX H

11	Hail
12	Earthquake

Is there another hazard not listed above that you think is a wide-scale threat to the community? If yes, please explain.

- Water quality of Lake Champlain. Blue green algae in Missisquoi Bay.

Describe any specific hazard(s) issue/problems that you would like the planning committee to consider.

- Rock River fishing access area was eroding from lake waves and area used to flood not sure about recent years.
- flooding on monument road and along Rock river.
- Machia Road issues that the town knows. Lake Champlain water quality can get pretty bad in August with algae blooms.
- Some areas along Missisquoi looks like small landslide occurred following the 2023 and 2024 rains.
- Machia Road has had problems with shoulder failing. Monument Road floods. Runoff on VT78 sometimes causes it to close during rain. Lake shore line floods every spring.
- Need more law enforcement in town. There is not enough law enforcement coverage.

Based on the hazards you listed, what actions can the town implement to reduce the risk for each hazard either to you and/or the community?

- the lake problems are a state issue likely. The town selectboard knows about machia road and monument road issues.
- The town should keep on addressing erosion issues along the missisquoi river including areas south of highgate center.
- Town should move Machia road or close it where the should is failing. It would be a shore detour if they closed it. Raise monument road to prevent any future flooding if possible and if it makes cent\$.
- Conduct emergency exercises before the disasters happen to test our response.
- Has the town looked into hiring its own police department?

Are there specific roads, neighborhoods, or areas in Highgate that you believe are particularly vulnerable to hazards? (Examples include areas prone to frequent flooding, persistent ice, or repeated power outages)

- The Transfer Station seems which the town owns had had issues with slopes slumping and hills side washing away. The town has to repair it every 10 odd years it seems.
- It used to flood a lot on Monument Road and St Armand Road but I think the town fixed those issues. Route 7 used to flood but that is state to fix.
- Machia and Monument
- Snow/ice issues
- Machia Road slope failing. Is it possible to close the road? it would be very expensive for the town to fix. Is it worth it?

What types of mitigation project do you believe local, state and federal government agencies should focus on to reduce disruptions of services and to strengthen the community?

100% responded. Summary of residents recommended actions for the town:

Retrofit and strengthen essential facilities such as the public works, electric department, public safety, municipal office, schools, etc. - 86.2% -

Replace inadequate or vulnerable bridges and culverts – 100%

Retrofit infrastructure by, for example, elevating roadways and improving drainage systems – 89.7%

Work on improving the damage resistance of utilities (electricity, communications, water/wastewater facilities, etc.) – 86.2%

Install or improve protective structures, such as floodwalls, levees or overflow facilities – 69%

Buyout flood prone properties and maintain as open space – 31%

Strengthen codes, ordinances and plans to require higher hazard risk management standards – 3.4%

Inform property owners of ways they can mitigate damage to their property(s) – 10.3%

Improve local emergency shelter facilities – 24.1%

How would you rate the importance of the following actions to protect yourself and your community:
(1= High Priority 2= Medium Priority 3= Low Priority)

Rank	Actions	High Priority	Medium Priority	Low Priority
High	Preventing loss of life and injuries	100%	0%	0%
	Protecting transportation infrastructure (roads/bridges)	97%	3%	0%
	Protecting private property	86%	14%	0%
	Strengthening emergency services (police, fire, ambulance)	76%	24%	0%
Medium	Protecting and reducing damage to utility infrastructure (power/water/wastewater)	62%	34%	3%
	Promoting cooperation among public agencies, citizens, non-profits, and businesses	42%	27%	0%
	Preventing business closure and loss	41%	45%	14%
	Protecting the natural environment	38%	38%	24%
	Protecting historical/cultural landmarks	38%	34%	0%
Low	None in the low range			

How prepared are you for a hazard event impacting your town?

- Very prepared – 10.3%
- Somewhat prepared – 62.1%
- Somewhat unprepared – 27.6%
- Very unprepared – 0%

What actions have you taken to reduce the risk to your residence and family from potential natural disasters?

(Circle all that apply)

- Developed a family plan: 11.1%
- Have a 3-day supply kit: 14.8%
- Have a car emergency kit: 51.9%
- Certified in First Aid and/or CPR: 25.9%
- Installed smoke detectors: 85.2%
- Installed carbon monoxide detectors: 81.5%
- Installed a generator and know the utility shutoff procedure: 29.6%
- Purchased fire extinguishers: 40.7%
- Installed Floodproofing: 11.1%
- Purchased flood insurance: 7.4%
- Purchase homeowners/renter's insurance: 96.3%
- Other: 0%

Where do you turn for information during an emergency? (circle all that apply)

- Cell phone: (79.3%)
- Front Porch Forum: (17.2%)
- Land Line Phone: (10.3%)
- Newspaper: (31%)
- Radio Station: (96.6%)
- Social Media (Instagram, Facebook/Meta, X (Twitter), other) (89.7%)
- Television (79.3%)
- VT Alert (10.5%)
- Weather Radio (5.3%)

Thank You for your Input!

If you have questions or would like additional information, please contact **Shaun Coleman, Northwest Regional Planning Commission** at scoleman@nrpcvt.com or (802) 524-5958.