Adopted by the Town of Wheelock Selectboard on

2026 Wheelock, Vermont
Local Hazard Mitigation Plan Update

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Prepared by:

Town of Wheelock, Vermont

CERTIFICATE OF LOCAL ADOPTION
Town of Wheelock, Vermont
A Resolution of the Town of Wheelock Selectboard, Vermont Adopting
the 2026 Wheelock, Vermont Local Hazard Mitigation Plan Update

WHEREAS, Town of Wheelock recognizes the threat that natural hazards pose to people and property within Town of Wheelock; and
WHEREAS, Town of Wheelock has prepared a multi-hazard mitigation plan, hereby known as the 2026 Wheelock, Vermont Local Hazard Mitigation Plan Update 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, Town of Wheelock identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Town of Wheelock from the impacts of future hazards and disasters; and
WHEREAS, adoption by Town of Wheelock demonstrates its commitment to hazard mitigation and achieving the goals outlined in the 2026 Wheelock, Vermont Local Hazard Mitigation Plan Update.

NOW THEREFORE, BE IT RESOLVED BY THE TOWN OF WHEELOCK, VERMONT SELECTBOARD THAT:

In accordance with local rule for adopting resolutions, the Town of Wheelock Selectboard adopts the 2026 Wheelock, Vermont Local Hazard Mitigation Plan Update. While content related to Town of Wheelock may require revisions to meet the plan approval requirements, changes occurring after adoption will not require Town of Wheelock to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

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Date

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Selectboard Member

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Attested to by Town Clerk

Executive Summary

In May of 2026, the town began to develop this Local Hazard Mitigation Plan Update (LHMP) with the help of a contractor. The town's last approved plan was in 2021 and was part of a Multijurisdictional Plan with the towns of Burke, Sheffield and Sutton. Since that time, the town has seen the impact of extreme weather. July 2025 marked the third consecutive year that catastrophic flooding impacted the region. The increased frequency of destructive weather, especially rain, is an evident indication of a new level of challenge facing the state. What the town can do to mitigate the impact of increasingly severe weather and the destruction it brings to residential property, infrastructure, and the overall resilience of our community defines the call to meet this challenge like never before.

This update identifies the hazards, vulnerabilities, risk, and mitigation opportunities for the town for the next five years. As hazard mitigation is the sustained effort to permanently reduce or eliminate long-term risks to people and property from the effects of reasonably predictable hazards, the town has communicated its efforts related to developing this plan to its residents, businesses, and surrounding municipalities, providing a formal opportunity to give input and review relevant sections of the plan.

In realization that eligibility to receive federal hazard mitigation grants and optimize state-level reimburse or "match" dollars during a federally declared disaster is dependent on a federally approved plan, the town remains committed to sustaining its mitigation efforts and by developing this plan update, will have a guide for action that will foster enhanced emphasis on mitigation in the years to come. The town realizes the importance of mitigation inherent to its own resilience as well as means to establishing strong partnerships with regional support agencies, associations, state government and Federal Emergency Management Agency (FEMA).

The purpose of this plan update is to:

- Identify specific hazards that impact the town.
- Prioritize hazards for mitigation planning.
- Recommend town-level goals and strategies to reduce losses from those hazards.
- Establish a coordinated process to implement goals and their associated strategies by taking advantage of available resources and creating achievable action steps

This plan update is organized into five Sections:

Section 1: Introduction and Purpose explains the purpose, benefits, implications, and goals of this plan. This section also describes demographics and characteristics specific to the town and describes the planning process used to develop this plan.

Section 2: Hazard Identification expands on the hazard identification in the Town Plan with specific municipal-level details on selected hazards.

Section 3: Risk Assessment discusses identified hazard areas in the town and reviews previously declared disasters to identify what risks are likely in the future. This section presents a hazard risk assessment for the municipality, identifying the most significant and most likely hazards which merit mitigation activity. Building upon the identified hazards from 2021 and in line with the 2023 State Hazard Mitigation Plan, the updated profiled hazards are:

- Drought

- Extreme temperature (heat and cold)
- Hail
- Infectious Disease
- Invasive Species
- Snow/Ice Storm
- Flooding (Fluvial Erosion/Inundation/landslide combined)
- Wildfire
- Wind

Section 4: Vulnerability Assessment discusses buildings, critical facilities and infrastructure in designated hazard areas and estimates potential losses.

Section 5: Mitigation Strategies begins with an overview of goals and policies in the most recent Town Plan that supports hazard mitigation and then formulates a work plan around major infrastructure projects, community awareness and documentation. An analysis of existing municipal actions that support hazard mitigation, such as planning, emergency services and actions of the Public Works Department are also included. The following all-hazards mitigation goals are summarized below:

1) Reduce at a minimum, and prevent to the maximum extent possible, the loss of life and injury resulting from all hazards.
2) Mitigate financial losses and environmental degradation incurred by municipal, educational, residential, commercial, industrial, and agricultural establishments due to various hazards.
3) Maintain and increase awareness amongst the town's residents and businesses of the damage caused by previous and potential future hazard events as identified specifically in this Local All-Hazards Mitigation Plan.
4) Recognize the linkages between the relative frequency and severity of disaster events and the design, development, use and maintenance of infrastructure such as roads, utilities and storm water management and the planning and development of various land uses.
5) Maintain existing municipal plans, programs and ordinances that directly or indirectly support hazard mitigation.
6) Develop a mechanism for formal incorporation of this Local All-Hazards Mitigation Plan into the municipal comprehensive plan as described in 24 VSA, Section 4403(5). This mechanism will be developed by the Planning Commission, Selectboard and NVDA and integrate the strategies into the existing town plan as annexes until the next formal update occurs, where a section devoted to mitigation planning will be integrated into the plan.
7) Develop a mechanism for formal incorporation of this Local All-Hazards Mitigation Plan, particularly the recommended mitigation actions, into the municipal/town operating and capital plans & programs as they relate to public facilities and infrastructure within political and budgetary feasibility. The Planning Commission will review the updated LHMP and use language/actions from it to inform the integration and future update processes. Town Meeting Day will serve as the formal time that mitigation strategy budgetary considerations will be approved and incorporated into the town budget.

Section 5 also identifies and provides a detailed discussion on the following mitigation actions:

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Action #1: Reduce vulnerability to flooding.
Action #2: Improve resilience to severe winter/ice storms.
Action #3: Reduce risk and impact of major infectious disease events.
Action #4: Reduce risk and impact of fire hazards.
Action #5: Reduce impact of drought.
Action #6: Reduce impact of extreme heat and cold.
Action #7: Reduce risk and impact of invasive species.
Action #8: Reduce impact of high wind and hail events.

In conclusion, Section 5 provides an Implementation Matrix to aid the municipality in implementing the outlined mitigation actions with an annual evaluation process to be coordinated and administered by the Selectboard and associated Departments within Wheelock.

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SECTION 1: INTRODUCTION AND PURPOSE

1.1 Purpose and Scope of this Plan

The purpose of this Local All-Hazards Mitigation Plan Update is to assist this municipality in identifying all hazards facing their community and in identifying strategies to begin to reduce the impacts of those hazards. The plan update also seeks to better integrate and consolidate efforts of the municipality with those outlined in the Town Plan as well as efforts of NVDA, Vermont State agencies, FEMA, and the State Hazard Mitigation Plan. The town is aware that community planning can aid significantly in reducing the impact of expected, but unpredictable natural and human-caused events. This document constitutes an All-Hazards Mitigation Plan Update for the Town. Community planning can aid significantly in reducing the impact of expected, but unpredictable natural and human-caused events. The goal of this plan is to provide hazard mitigation strategies to aid in creating disaster resistant communities throughout Caledonia County.

1.2 Hazard Mitigation

The 2023 Vermont State All-Hazards Mitigation Plan states:

> *"The impact of anticipated yet unpredictable natural events can be reduced through community planning and implementation of cost effective, preventive mitigation efforts.*
>
> *The State of Vermont understands that it is not only less costly to reduce vulnerability to disasters than to repeatedly repair damage, but that we can also take proactive steps to protect our economy, environment, and most vulnerable citizens from inevitable natural hazard events. This Plan recognizes that communities have the opportunity to identify mitigation strategies during all phases of emergency management (preparedness, mitigation, response, and recovery) to more comprehensively address their vulnerability. Though hazards themselves cannot be eliminated, Vermonters can reduce our vulnerability to hazards by improving our understanding of both the natural hazards we face and their potential impacts.*
>
> *The 2023 Vermont State Hazard Mitigation Plan (SHMP) presents the hazard impacts most likely to affect Vermont and a mitigation strategy to reduce or eliminate our most significant vulnerabilities."*

Hazard mitigation strategies and measures can reduce or eliminate the frequency of a specific hazard, lessen the impact of a hazard, modify standards and structures to adapt to a hazard, or limit development in identified hazardous areas. This plan aligns and/or benefits from the State's 2023 Hazard Mitigation Plan and as part of the Emergency Relief Assistance Funding (ERAF) requirements. With enhanced emphasis on community resiliency, many state agencies and local organizations have increased awareness of the importance of mitigation planning and have produced plans and resources that towns can use to support their planning efforts. This plan will reference, when relevant, pertinent tools and resources that can be used to enhance mitigation strategies.

1.3 Hazard Mitigation Planning Required by the Disaster Mitigation Act of 2000

Hazard mitigation planning is the process that analyzes a community's risk from natural hazards, coordinates available resources, and implements actions to reduce risks. Per *44 CFR Part 201: Hazard Mitigation Planning,* this planning process establishes criteria for State and local hazard

mitigation planning authorized by Section 322 of the Stafford Act as amended by Section 104 of the *Disaster Mitigation Act of 2000*. Effective November 1, 2003, local governments now must have an approved local mitigation plan prior to the approval of a local mitigation project funded through federal Pre-Disaster Mitigation funds. Furthermore, the State of Vermont is required to adopt a State Pre-Disaster Mitigation Plan for Pre-Disaster Mitigation funds or grants to be released for either a state or local mitigation project after November 1, 2004.

There are several implications if the plan is not adopted:

- After November 1, 2004, Flood Mitigation Assistance Grant Program (FMAGP) funds will be available only to communities that have adopted a local plan.
- For disasters declared after November 1, 2004, a community without a plan is not eligible for HMGP project grants but may apply for planning grants under the 7% of HMGP available for planning.
- For the Pre-Disaster Mitigation (PDM) program, a community may apply for PDM funding but must have an approved plan to receive a PDM project grant.
- For disasters declared after October 14th, 2014, a community without a plan will be required to meet a greater state match when public assistance is awarded under the ERAF requirements (Emergency Relief Assistance Funding)

1.4 Benefits

Adoption and maintenance of this Hazard Mitigation Plan will:

- Make certain funding sources available to complete the identified mitigation initiatives that would not otherwise be available if the plan was not in place.
- Lessen the receipt of post-disaster state and federal funding because the list of mitigation initiatives is already identified.
- Support effective pre-and post-disaster decision making efforts.
- Lessen each local government's vulnerability to disasters by focusing limited financial resources to specifically identified initiatives whose importance have been ranked.
- Connect hazard mitigation planning to community planning where possible.

1.5 All-Hazards Mitigation Plan Goals

This All-Hazards Mitigation Plan establishes the following general goals for the town and its residents:

- Reduce at a minimum, and prevent to the maximum extent possible, the loss of life and injury resulting from all hazards.
- Mitigate financial losses and environmental degradation incurred by municipal, educational, residential, commercial, industrial, and agricultural establishments due to various hazards.
- Maintain and increase awareness amongst the town's residents and businesses of the damage caused by previous and potential future hazard events as identified specifically in this Local All-Hazards Mitigation Plan.

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- Recognize the linkages between the relative frequency and severity of disaster events and the design, development, use and maintenance of infrastructure such as roads, utilities and storm water management and the planning and development of various land uses.
- Maintain existing municipal plans, programs and ordinances that directly or indirectly support hazard mitigation.
- Develop a mechanism for formal incorporation of this Local All-Hazards Mitigation Plan into the municipal comprehensive plan as described in 24 VSA, Section 4403(5). This mechanism will be developed by the Planning Commission and NVDA and will integrate the strategies into the existing Town Plan as annexes until the next formal update occurs, when a section devoted to mitigation planning will be integrated into the plan.
- Maintain mechanism for formal incorporation of this Local All-Hazards Mitigation Plan, particularly the recommended mitigation actions, into the town operating and capital plans & programs as they relate to public facilities and infrastructure within political and budgetary feasibility. The Planning Commission will review the plan and use language/actions from it to inform the integration and update process. Town Meeting Day will serve as the formal time that mitigation strategy budgetary considerations will be approved and incorporated into the town budgets.
- Flood-related data and information originating in the Hazard Mitigation Plan will continue to be reviewed and assessed for relevant inclusion in the Town Plan Updates specific to flood resilience.

1.6 Community History and Background

The Town of Wheelock was chartered in 1785 and is a small community in Caledonia County, consisting of 25,478 acres divided by a north-south chain of intermittent mountains that are part of a larger chain extending from Sutton to Walden. Named for Eleazar Wheelock, the founder of Dartmouth College, the college offers free tuition to any person who is accepted into the college and a full-time resident of Wheelock. Though the small town was originally a farming and forestry community, it is now primarily a bedroom community for nearby cities. The municipality contains Mathewson State Forest, which is managed for timber and wildlife habitat and the Steam Mill Brook Wildlife Management Area. To the east of the mountains lie most of the primary agricultural lands and the better road network. This area is the most densely populated and comprises the most unforested land in the town. To the west of the mountains much of the land is managed for forestry, wildlife, and recreation. Three major water courses run through the town. The larger two are Miller's Run, adjacent to Route 122, which is about 1.6 miles long, and the Lamoille River along Route 16, which is about 1.4 miles long. The smallest of the three is the South Wheelock Branch, which runs for approximately 5 miles adjacent to the South Wheelock and Stannard Mountain roads.

The Town of Wheelock lies within four watershed areas; the Lamoille River Watershed, the Miller's Run Watershed, the Sleepers River Watershed, and the South Wheelock Branch Watershed. All, with the exception of the Lamoille River, lie within the larger Passumpsic River Watershed which is part of the larger Connecticut River Watershed. The Lamoille River Watershed lies within the larger Lake Champlain Watershed. A very small proportion in the extreme northern part of the town lies within the Calendar Brook

Watershed which is part of the larger Passumpsic River Watershed.

There are small flood zones along the South Wheelock Branch, although none of these appear on the FEMA flood zone map from 1974. The FEMA flood zone maps show that the courses of the Miller's Run and the Lamoille Rivers fall into the Zone A special flood hazard area (SFHA).

Wheelock is governed by a Selectboard who the voters elect. The Selectboard is responsible for preparing a budget, setting policy and administering finances. The town relies heavily on volunteers for governmental duties. Many of these volunteers are elected or appointed to Town boards or committees. They frequently represent their town on regional projects. The town has a Planning Commission which makes land use decisions.

Residents are served by individually owned septic systems and water supply is 100% groundwater, provided through private water wells/springs. Fire District 1-VT0005049 serves about 20 hookups in Wheelock village on Rte. 122. Electricity throughout the planning area is supplied by Lyndonville Electric Department, Vermont Electric Cooperative, Washington Electric, and the Central Vermont Public Service.. The town shares a volunteer fire department with Sheffield that was originally formed in 1950. There is no local police department. The closest hospital to the planning area is the Northeastern Vermont Regional Hospital in St. Johnsbury. Emergency medical services and transportation are provided by Lyndon Rescue and the Caledonia Essex Ambulance Service (CALEX). Helicopter transport via DART to Dartmouth Hitchcock Medical Center in Dartmouth, New Hampshire is also available.

National Flood Insurance Program

Wheelock does not participate in the National Flood Insurance Program. The town has tried twice to adopt the rules to enable application to NFIP was voted down each time. The flood map is 500204, effective on 11/15/1974.

1.7 Summary of Planning Process

NVDA contracted with OPH Consulting Services to lead the plan update in the spring of 2026. Ann Lawless, Selectboard Chair, served as the primary point of contact during the planning process. The following table presents the Planning Team members and their title:

Table 1-1: 2026 Wheelock Mitigation Planning Team Roster

2025 Hazard Mitigation Planning Team	Title
Carol Amos	Planning Commission Chair
Meaghan Rinehart	Planning Commission, Selectboard Minutes Clerk
Teresa Stimpson	Planning Commission, Delinquent Tax Collector
Kim Crady-Smith	Planning Commission, Board of Abatement Chair
Erin Swigart	Town Clerk & Treasurer

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Chuck Dill	Selectboard, volunteer Road Commissioner & Foreman
Mike Richardson	Selectboard Vice Chair
Shane Lanpher	Chief, Sheffield-Wheelock Volunteer Fire Dept., 911 Coordinator, Emergency Mgmt. Director
Mike Reddy	Resident/KURRVE POC
Ann Lawless	Selectboard Chair, LHMP POC

The last approved plan for the town was in 2021. May 14th, 2026 marked the kick-off correspondence with the planning team for the plan update. Planning requirements were presented with a list of next steps and information needs. The opportunity for all stakeholders to participate and provide feedback was announced on the town website and social media pages. This is seen as the most efficient way for stakeholders to provide input. The survey introduced the importance and informational needs of a LHMP and asked for specific concerns the resident and/or business owner had related to natural hazards in the town. The community survey is an anonymous feedback tool and any specificity to organizations and/or individuals who provided feedback via the survey is not available. Additional correspondence with planning team members and NVDA staff occurred throughout the update process. To support awareness of how natural hazards impact services people of need depend on for health and well-being, the following table provides a summary of service function and concerns during a hazard event.

Table 1-2: Summary of Regional Non-Profit and Vulnerable Population Service Providers

Organization	Function	Issues/Concerns
Rural Edge/SASH at home	The Support and Services at Home Program is offered throughout the State of Vermont, and it is designed to provide personalized coordinated care, through nursing services, programming, and service coordination, to help participants stay safe and live independently in their homes as long as possible, regardless of age or residential setting	Accessibility, notification, and assuring residents are safe rise to top of list during and immediately following a disaster.
Green Mountain United Way	To unite communities in the Northeast Kingdom and Central Vermont to address complex issues facing our region by focusing on Health, Education, Financial Stability, and Community Caring. We convene individuals, organizations, and leaders to make a difference in lives through collective impact	Increased demand, access to services, and a changing demographic all pose challenges and are difficult to address during a disaster largely because there is not capacity and/or limited resources.

	programs, Working Bridges, Tatum's Totes, and Volunteerism. info@gmunitedway.org https://www.gmunitedway.or	
NEKCA	Acute and essential needs of food, housing, climate, energy, racial and economic justice, and assistance to face disparity and oppression.	Increased demand for services during disaster events can place those relying on support to meet basic needs is a concern with the ability to access/coordinate support when transportation routes are flooded.
NEK Human Services	Case management, community and home support, residential care, psychiatry, medication management, individual therapy, group therapy, vocational supports, school-based counseling, emergency care and respite services for 3400+ clients annually. In addition, we offer outreach and consultation services to communities, schools, and businesses in our service area.	NKHS has an array of services to aid a person experiencing a crisis. Each service works along a continuum of care, which allows the person in crisis to determine, when appropriate, how much intervention and support they need. The continuum allows the person in crisis to move freely between different levels of service they require, both during and pre/post-crisis
Northeastern Vermont Regional Hospital	A full-service medical center and designated trauma center.	Access during disasters that disrupt transportation is the biggest concern. Facility damage to an extent that reduces function is also a concern.
Umbrella	A domestic violence agency.	The stress of disasters can exacerbate violent behavior in intimate relationships and when access to services is comprised, victims can have face increased hurdles in mitigating health and safety risk.

All neighboring towns were sent notification of the plan's development and were given an opportunity to provide input through email and/or phone call to the town clerk. These include Sheffield, Sutton, Lyndon, Danville, Stannard, and Greensboro. No responses were obtained from this solicitation.

Research and feedback on hazards, community capacities, community assets and potential mitigation projects was conducted in coordination with planning team members. Phone calls, emails and virtual meetings were conducted to support plan development and editing. Following

FEMA guidance in Local Mitigation Plan Review Tool Regulation Checklist, the plan was written using data sources that included:

- Surveys and formal solicitation of public comment
- 2019 Town Plan (provided current goals and regulations supporting mitigation, recent capital expenditures and infrastructure value helped to drive vulnerability assessment)
- 2023 Vermont State Hazard Mitigation Plan (provided key guidance language and definitions throughout the plan).
- FEMA FIRM (effective date 11/15/1974)
- Vermont Departments of Health (VDH) and Environmental Conservation (DEC) (provided information related with public health services that could be impacted during a disaster and state support functions designated to both VDH and DEC. DEC also provided river corridor data for mapping purposes.
- FEMA Open Source (data.gov) Data for Disaster History and PA funding (provided comprehensive declared disaster by year and type as well as project descriptions and cost per event).
- EPA's Incident Action Checklist for cold weather resilience of water systems (provides a guidance tool for public works to cross-reference actions on the system).

Based on the information obtained, input from town and state officials, the planning team, state and federal databases and local knowledge, the plan was created. While many small communities in Vermont face similar circumstances (e.g., flooding, winter storms and remote residents), each one has unique considerations and opportunities. There was a point made to capture the subtle characteristics of the town. From this, the updated risks, vulnerabilities, and mitigation strategies were developed. The following list provides a planning timeline synopsis

- *4/13/26: Project initiated with hired consultant through NVDA and signed contract.*
- *4/14/26:Initial meeting town officials to develop plan of action, planning team, and name a point of contact (POC) for correspondence and information.*
- *4/21/26: Wheelock Selectboard formally approved LHMP Update work to begin*
- *4/22/26: Community Survey launched, and Planning Team drafted. Public notified of update process and ability to provide feedback through town website and social media page.*
- *5/1/26: Planning Team formed*
- *5/7/26: Conversation with Road Supervisor related to infrastructure status, history, future needs and hurdles.*
- *5/14/26: Planning Team Kick-off meeting (virtual) to discuss planning process, updated hazard list draft and next steps.*
- *6/10/26: Collection of prior mitigation actions status via POC and town asset information*

- *6/18/26: Draft sections I and II sent to planning team for review and comment. POC returned draft with request for edits and corrections within the week.*
- *7/6/26: Draft sections III and IV sent to planning team for review and comment. POC returned with suggested edits within the week.*
- *7/23/26: Draft section V sent to planning team for review and comment. Discussions with fire chief, POC, and acting Road Supervisor to finalize key information also occurred. Comments and suggested edits returned within the week.*
- *7/30/26: Community notified that draft plan is available for review and comment via town website with a Google Forms link to collect community input. All adjacent towns were invited to request the draft as well.*
- *8/3/2026: Draft Plan Submitted to VEM.*

Draft sections of the update were presented to the planning team for review and comment with final draft available for review and comment by the public. The draft was then submitted to VEM for initial review. Minor edits were made to the plan following state recommendations and the final draft was resubmitted to VEM and then to FEMA for formal review and approval pending municipal adoption. A resolution of adoption was then approved by the selectboard.

SECTION 2: HAZARD IDENTIFICATION

For this update, the 2021 hazards profiled have been modified to meet the new FEMA review guidelines. The narrative methodology for the natural hazards profile combines the natural hazard categories outlined in the state mitigation plan and for each, considered prior history, current trends, and available data to estimate risk. These hazards provide the basis of future mitigation strategies. A profiled hazard can have high, moderate, or low risk. Those hazards omitted from full profiling do not pose enough risk to substantiate mitigation efforts at this time due to lack of occurrence frequency and/or vulnerability to assets as assessed in Section 3's Qualitative Risk Estimation Matrix (Table 3-2). Future conditions were considered in the hazard rankings and probability score. The frequency of hazards, storm data, and expenditures resulting from declared disasters were the tools used to estimate future risk. Flooding is the greatest threat to the town. For more information on these hazards please refer to the 2023 State Hazard Mitigation Plan.

While there are commonalties of natural hazard risk across most of the state and county, awareness of historic events coupled with the financial burden of recovery can help support trajectory for the future mitigation actions. As indicated in the 2023 SHMP, the hazards of most concern across the state are in-line with those in Wheelock. As it pertains to town-level assessments, the planning team reviewed the Natural Hazard and Risk Analysis Tool for changes and additions and feels that while the assessment methodology is distinct from the SHMP Hazard Assessment, there are comparative similarities in scoring relationships. The definitions of each hazard, along with historical occurrence and impact, are described below.

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Types of Natural Hazards: weather /climate hazards (drought, hurricane/tornado, high winds, severe winter storm, extreme temperatures, Severe weather, lightning, hail), flooding, geological hazards (landslide / erosion, earthquake, naturally occurring radiation), and fire hazards.

2021 Profiled Hazards:

- Drought
- Earthquake
- Extreme temperature (heat and cold)
- Hail
- Infectious Disease
- Invasive Species
- Snow/Ice Storm
- Flooding (Fluvial Erosion/Inundation combined)
- Wildfire
- Wind

2026 Updated Profiled Natural Hazards:

- Drought
- Extreme temperature (heat and cold)
- Hail
- Infectious Disease
- Invasive Species
- Snow/Ice Storm
- Flooding (Fluvial Erosion/Inundation/landslide combined)
- Wildfire
- Wind

2.1 Natural Hazards

100 events were reported by NOAA between 12/01/2020 and 05/01/2026 (1978 days). These included extreme heat, cold, wind, flooding, and winter storm events are listed for the county although each event may not have impacted Wheelock. While not included on the list, drought, and infectious disease are included and the data does not necessarily reflect the declared disaster damage totals. Winter Weather and Winter Storm were the most numerous types of events and Flash Flood and Flood events having the highest damage costs. Wheelock has a history of flooding and damage to public and private property has intensified since 2023.

Table 2-0: Wheelock Severe Weather Summary

Number of County/Zone areas affected:	2
Number of Days with Event:	84
Number of Days with Event and Death:	1
Number of Days with Event and Death or Injury:	1
Number of Days with Event and Property Damage:	26

Number of Days with Event and Crop Damage:	1
Number of Event Types reported:	11

Table 2-1: Summary of Vermont Emergency Declarations

Number	Year	Type
3595	2023	Flooding
3567	2021	Tropical Storm Henri
3437	2020	Pandemic (COVID-19) national 3/13/20
3338	2011	Hurricane Irene
3167	2001	Snowstorm
3053	1977	Drought

Source: FEMA

Table 2-2: Summary of Vermont Major Disaster Declarations since 1998 (Caledonia County in Bold with events that resulted in PA funding for the town with an "(*)")

Number	Year	Type
Denied	**2025**	**Severe Storm and Flooding**
***4810**	**2024**	**Severe Storm and Flooding, Landslides, Mudslides**
***4720**	**2023**	**Severe Storm and Flooding**
4695	**2023**	**Severe Storm and Flooding**
4621	2021	Severe Storm and Flooding
***4532**	**2020**	**COVID-19**
***4474**	**2020**	**Severe Storm and Flooding**
4356	**2018**	**Severe Storm and Flooding**
4380	**2018**	**Severe Storm and Flooding**
4330	**2017**	**Severe Storms and Flooding**
4207	2015	Severe Winter Storm
4232	2015	Severe Storms and Flooding
***4178**	**2014**	**Severe Storms and Flooding**
4163	**2014**	**Severe Winter Storm**
4140	**2013**	**Severe Storms and Flooding**
4120	2013	Severe Storms and Flooding
4066	2012	Severe Storms, Tornado and Flooding
4043	2011	Severe Storms and Flooding
***4022**	**2011**	**Tropical Storm Irene**
***4001**	**2011**	**Severe Storms and Flooding**
1995	2011	Severe Storms and Flooding
1951	2010	Severe Storm
1816	2009	Severe Winter Storm
***1790**	**2008**	**Severe Storms and Flooding**
1784	**2008**	**Severe Storms, Tornado and Flooding**
1778	2008	Severe Storms and Flooding
***1715**	**2007**	**Severe Storm, Tornado and Flooding**
1698	**2007**	**Severe Storms and Flooding**
***1559**	**2004**	**Severe Storms and Flooding**
1488	2003	Severe Storms and Flooding
1428	**2002**	**Severe Storms and Flooding**

1358	2001	Severe Winter Storm
1336	2000	Severe Storms and Flooding
1307	1999	Tropical Storm Floyd
1228	1999	Severe Storms and Flooding
1201	1998	Ice Storm

Source: FEMA

To support the selection of the updated profiled hazards, a qualitative assessment was completed. Through this methodology, in conjunction with disaster history and severe weather occurrences during the last planning period, the updated hazards were derived.

The analysis includes assessment of area impacted, scored from 0-4, and rates how much of the municipality's developed area would be impacted. Consequences: consists of the sum of estimated damages or severity for four items, each of which are scored on a scale of 0-3:

- Health and Safety Consequences
- Property Damage
- Environmental Damage
- Economic Disruption

Probability of Occurrence (scored 1-5) estimates an anticipated frequency of occurrence based on prior experience and current information. To arrive at the Overall Risk Value, the sum of the Area and Consequence ratings was multiplied by the Probability rating. The highest possible risk score is 80. According to the updated Hazard and Risk Estimation for Wheelock, the following natural hazards received the highest risk ratings out of a possible high score of 80:

- Severe Winter/Ice Storm (32/16)
- Flooding/Inundation (65)
- Extreme Cold (16)
- Fluvial Erosion (20)
- Landslide (20)
- Infectious Disease (20)
- Fire (20)
- Extreme heat (20)
- Drought (16)
- Hail (12)
- High Winds (14)
- Invasive Species (12)

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Table 2-3: Wheelock Hazard Risk Analysis

Wheelock Hazard & Risk Analysis: NATURAL HAZARDS	Drought	Flooding/Inundation	High Winds	Erosion	Landslide	Extreme Heat	Infectious Disease	Fire	Winter Storm	Ice Storm	Extreme Cold	Earthquake	Invasive Species	Hail
Area Impacted														
Key: 0 = No developed area impacted														
1 = Less than 25% of developed area impacted														
2 = Less than 50% of developed area impacted														
3 = Less than 75% of developed area impacted														
4 = Over 75% of developed area impacted	1	2	1	1	1	1	4	1	3	3	4	1	1	1
Consequences														
Health & Safety Consequences														
Key: 0 = No health and safety impact														
1 = Few injuries or illnesses														
2 = Few fatalities or illnesses														
3 = Numerous fatalities	1	1	1	1	1	1	2	1	1	1	1	1	1	1
Property Damage														
Key: 0 = No property damage														
1 = Few properties destroyed or damaged														
2 = Few destroyed but many damaged														
3 = Few damaged but many destroyed														
4 = Many properties destroyed and damaged	2	4	1	1	1	1	0	2	1	2	1	1	1	1
Environmental Damage														
Key: 0 = Little or no environmental damage														
1 = Resources damaged with short-term recovery														
2 = Resources damaged with long-term recovery														
3 = Resource damaged beyond recovery	2	3	2	0	1	1	1	2	1	2	1	1	2	1
Economic Disruption														
Key: 0 = No economic impact														
1 = Low direct and/or indirect costs														
2 = High direct and low indirect costs														
2 = Low direct and high indirect costs														
3 = High direct and high indirect costs	2	3	2	2	1	1	3	2	2	2	1	1	1	2
Sum of Area & Consequence Scores	8	13	7	5	5	5	10	8	8	7	8	5	6	6
Probability of Occurrence														
Key: 1 = Unknown but rare occurrence														
2 = Unknown but anticipate an occurrence														
3 = 100 years or less occurrence														
4 = 25 years or less occurrence														
5 = Once a year or more occurrence	2	5	2	4	4	4	2	2	4	2	2	1	2	2
TOTAL RISK RATING														
Total Risk Rating = Sum of Area & Consequence Scores x Probability of Occurrence	**16**	**65**	**14**	**20**	**20**	**20**	**20**	**16**	**32**	**16**	**16**	**5**	**12**	**12**

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The following discussion on natural hazards is based upon information from several sources. General descriptions are based upon the *2023 Vermont State Hazard Mitigation Plan.* Due to the rural nature of the Northeast Kingdom, there is little historical data available for presentation related to all hazards but when available, relevant data is included.

2.1.1. *An Introduction to Severe Weather*

The town is acutely aware of the potential of natural hazards. New challenges exist for the town including more intense storms, frequent heavy precipitation, heat waves and cold spells, extreme/repetitive flooding, drought conditions, and more unstable weather patterns. These events pose risks to both public and private property and the health and well-being of residents. In 2025, a disaster declaration request was denied following an appeal and so marks another concern that Federal assistance following a major natural hazard event resulting in damage may not be available to an extent the state is accustomed to. Engaging the community in developing mitigation strategies that reduce the town's vulnerability to the impacts of natural hazards and furthering the town's commitment to building a resilient community are important functions of this plan. The 2023 SHMP relays the following:

"Over the past several decades, there has been a marked increase in the frequency and severity of weather-related disasters, both globally and nationally. Most notably, the Earth has experienced a 1°F rise in temperature, which has far-reaching impacts on weather patterns and ecosystems. This statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer), is known as Severe weather. The Intergovernmental Panel on Severe weather (IPCC) forecasts a temperature rise of 2.5°F to 10°F over the next century, which will affect different regions in various ways over time. Impacts will also directly relate to the ability of different societal and environmental systems to mitigate or adapt to change. Increasing temperatures are forecasted to have significant impacts on weather-related disasters, which will also increase risk to life, economy and quality of life, critical infrastructure, and natural ecosystems. The IPCC notes that the range of published evidence indicates that the costs associated with net damages of Severe weather are likely to be significant and will increase over time. It is therefore imperative that recognition of a changing climate be incorporated into all planning processes when preparing for and responding to weather-related emergencies and disasters. Most of the natural hazards identified in this plan are likely to be exacerbated by changes in climate, either directly or indirectly. The National Aeronautics & Space Administration (NASA) reports that global Severe weather has already had observable effects on the environment: glaciers are shrinking, sea ice is disappearing, sea level rise is accelerating, heat waves are occurring more frequently and intensely, river and lake ice is breaking up earlier, plant and animal ranges have shifted, and trees are flowering sooner. Though Severe weather is expected to have global reach, the impacts differ by region. While the southwestern United States is expected to experience increased heat, wildfire, drought and insect outbreaks, the northeastern region is predicted to experience increases in heat waves, downpours, and flooding. Accordingly, consideration of Severe weather was identified as a key guiding principle of the 2023 SHMP, addressed in each of the pertinent hazard profiles and incorporated into all relevant mitigation actions." 2023 SHMP

From 1973 to 2006 (33 years), there were 13 Major Disaster Declarations in Vermont. From 2007-2026 (19 years), there were 31. In essence, over double the disasters in just over half the time. It is commonly accepted that weather extremes are becoming more commonplace in Vermont. Record setting weather events have been experienced in the state over the last decade. There is a general prediction that Vermont will have warmer temperatures year-round, with wetter winters and drier summers. An increase in the size and frequency of storms is also predicted. Thus, warmer temperatures in the next century will likely increase the chance of

weather-related hazards occurring. An increase in precipitation may also result in increased flooding and fluvial erosion. Drier summers may increase the chance of drought and wildfire. A warmer climate may also result in an influx of diseases and pests that cold winters previously prevented. The 2022 NOAA National Centers of Environmental Information State Climate Summary concludes:

1. *Temperatures have risen about 3 degrees Fahrenheit since the beginning of the 20th Century in Vermont. 2010-2020 was the warmest 11-year period on record. As warming trends continue, the intensity extreme winter cold is projected to decrease.*
2. *Average annual precipitation has increased almost 6 inches since 1960.*
3. *Extreme weather events (e.g., floods and severe storms) are having a stronger impact on Vermont and extreme rainfall is projected to become more frequent and intense while long-term droughts continue to pose challenges to water-dependent sectors.*

The Vermont Climate Assessment has established state-level information with implications for local surface waters. Vermont's average annual temperature has increased by almost 2°F (1.11°C) since 1900 with warming occurring twice as fast in winter. The assessment highlights five key messages for water resources in Vermont:

• Due to extreme variation in precipitation with our changing climate, periods of prolonged dry-spells and drought, coupled with higher water usage in snowmaking and agriculture could exacerbate low water availability.

• Increases in overall precipitation, and extreme precipitation, have caused stream flows to rise since 1960. Severe weather will further this pattern, although the overall increase in streamflow comes with disruptions in seasonal flows cycles.

• Increases in heavy precipitation jeopardize water quality in Vermont. Storms produce large runoff events that contribute to erosion and nutrient loading. Combined with warm temperatures, this creates favorable conditions for cyanobacteria blooms.

• Increased occurrence of high stream flows increase the risk of flooding that causes damage to many roads and crossing structures. Risk reduction requires addressing outdated and unfit structures.

• Nature-based solutions are an effective, low-cost approach to Severe weather adaptation. River corridors, floodplain, and wetland protection dampen flood impacts and improve water quality along with green infrastructure.

2.1.2 Profiled Hazards

Severe Winter Storm

NOAA reports 49 events ("winter storm" and "winter weather") in the county during the last planning period. Winter storm frequency and distribution varies from year to year depending on

the climatological patterns. Because such storms are expected during a Vermont winter, the town is well-equipped to deal with snow removal and traffic incidents. The most damaging types of snowstorms are ice-storms caused by heavy wet snow or rain followed by freezing temperatures. This leads to widespread and numerous power and telephone outages as lines either collapse due to the ice weight or are brought down by falling trees and branches. Winter storms impact the entire planning area and can include snowstorms, cold, blizzard and ice. According to the *2023 Vermont State All-Hazards Mitigation Plan*:

> *"Severe winter storms bring the threat of heavy accumulations of snow, cold/wind chills, strong winds, and power outages that result in high rates of damage and even higher rates of expenditures. A heavy accumulation of snow, especially when accompanied by high winds, causes drifting snow and very low visibility. Sidewalks, streets, and highways can become extremely hazardous to pedestrians and motorists. Severe winter storms develop through the combination of multiple meteorological factors. In Vermont and the northeastern United States, these factors include the moisture content of the air, direction of airflow, collision of warm air masses coming up from the Gulf Coast, and cold air moving southward from the Arctic. Significant accumulations of ice can cause hazardous conditions for travel, weigh down trees and power lines, and cause power outages. Freezing rain can also be combined with snowfall, hiding ice accumulation, and further hindering travel, or with mixed precipitation and potentially ice jams or flooding."*

The winters of 1969-72 produced record snowfalls for nearby Wheelock, and greater than normal precipitation was recorded in 8 of the 11 years during 1969-79. According to the available history specific to the region, the max 24-hour snowfall occurred February 24-25, 1969, at 34'' with an additional 2.12'' of rain during the period. The winter of 2010-2011 was the third snowiest on record with a total of 124.3 inches for the county. The record for the county was 145.4 inches set in 1970-1971. The potential for a major snowstorm that exceeds the capabilities of the town exists every year but with the recent increase in snow fall totals and cold temperature duration, the town realizes that further consideration is required. NOAA's National Centers for Environmental Information is now producing the Regional Snowfall Index (RSI) for significant snowstorms that impact the eastern two thirds of the U.S. The RSI ranks snowstorm impacts on a scale from 1 to 5, similar to the Fujita scale for tornadoes or the Saffir-Simpson scale for hurricanes. NCEI has analyzed and assigned RSI values to over 500 storms going as far back as 1900. New storms are added operationally. As such, RSI puts the regional impacts of snowstorms into a century-scale historical perspective. The index is useful for the media, emergency managers, the public and others who wish to compare regional impacts between different snowstorms. The RSI and Societal Impacts Section allows one to see the regional RSI values for particular storms as well as the area and population of snowfall for those storms. The area and population are cumulative values above regional specific thresholds. For example, the thresholds for the Southeast are 2", 5", 10", and 15" of snowfall while the thresholds for the Northeast are 4", 10", 20", and 30" of snowfall. 2010, 2012 and 2015 have some of the highest rankings for notable storms. These rankings are based, in part, on the severity of the storm using the following system. Since 2000, there has only been one event that reached a category 4 in the Northeast, five reached Category 3, eight were "significant" and all others were notable. Despite having considerably more snow than the U.S. average, Wheelock has had no major PA funding related to damage from snow events.

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Table 2-4: Major Northeast Snowstorms 2018-present

Event Date	Category	Description
January 3–5, 2018	1	Notable
March 1–3, 2018	1	Notable
March 5–8, 2018	2	Significant
March 11–15, 2018	2	Significant
March 20–22, 2018	1	Notable
December 14–18, 2020	2	Significant
January 30–February 3, 2021	3	Major
January 1-3, 2022	1	Notable

Table 2-5: NOAA's Regional Snowfall Index (RSI)

CATEGORY	RSI VALUE	DESCRIPTION
1	1–3	Notable
2	3–6	Significant
3	6–10	Major
4	10–18	Crippling
5	18.0+	Extreme

Specific snow totals for Wheelock were unavailable but county-based data provides an accurate portrait of the magnitude that the town can expect to experience in the future. The potential for even a robust highway department becoming overwhelmed to manage a major snowstorm without outside assistance exists every winter. In January of 2015, the area received 28'' of snow compared to only 11.3'' in 2014. The county experienced historic January snowfall totals in 1987 (47.5''), 1978 and 1979 (46.5'', 45.8''). Total average snowfall in December is 26.2'', January is 22.6'', February averages are slightly less at 16.9'' and March is 18.3''. February 14th-15th, 2007 saw the greatest 24-hour max snowfall total at 23.5''. The snowfall totals are annual averages based on weather data collected from 1981 to 2010 for the NOAA National Climatic Data Center. Because such storms are expected during a Vermont winter, the town is well-equipped to deal with snow removal and traffic incidents. The most damaging types of snowstorms are ice-storms caused by heavy wet snow or rain followed by freezing temperatures. This leads to widespread and numerous power and telephone outages as lines either collapse due to the ice weight or are brought down by falling trees and branches. The 2023 SHMP has the following information related to severe winter storms:

> *"There are no standard loss estimation models or methodologies for the winter storm hazards. Potential losses from winter storms are, in most cases, indirect and therefore difficult to quantify. According to the 2014 National Climate Assessment, there is an observable increase in severity of winter storm frequency and intensity since 1950. While the frequency of heavy snowstorms has increased over the past century, there has been an observed decline since 2000 and an overall decline in total seasonal snowfall."*

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Ice Storm
NOAA reports no ice storms during the last planning period. Major Ice Storms occurred in January,1998 and again in December of 2013 and 2014. The North American Ice Storm of 1998 was produced by a series of surface low pressure systems between January 5 and January 10, 1998. For more than 80 hours, steady freezing rain and drizzle fell over an area of several thousand square miles of the Northeast, causing ice accumulation upwards of 2'' in some areas. Wheelock received .5 to 1 inch of ice. While there is evidence that supports an increase in weather and precipitation severity, the incidence of ice storms remains fairly spaced out prior to 2013. The town expects to have another ice storm but unlike rain and snow events, the occurrence of a major ice storm is not expected every year. In the records available to the town regarding power outage, the longest duration outage was in December of 2014 at 72 hours and affecting 90% of Wheelock residents.
Ice maps can be found at: www.wrh.noaa.gov/map/?wfo=sto

Extreme Cold
Extreme cold may be generally defined as prolonged periods of time with freezing temperatures, often made worse by the impact of wind chill factors (the combined elements of air temperature and wind on exposed skin). At certain levels, the human body may suffer from frostbite or hypothermia, making extreme cold a potential severe and life-threatening hazard to people left unprotected from the elements. Freezing temperatures may also cause severe damage to croplands and other vegetation, resulting in economic losses for commercial and agricultural businesses, and pipes may freeze and burst in structures that are poorly insulated or without heat. Long cold spells may cause rivers and lakes to freeze and lead to ice jams that can act as a dam, resulting in severe flooding.

NOAA reports eight extreme cold events in the county during the last planning period. Recent extremes in cold temperatures are a concern. 2015 tied the coldest winter (January to March) on record (1923) for Vermont according to the NOAA's National Climatic Data Center whose dataset dates to 1895. Cold temperatures are expected in the Northeast, but they can pose a serious threat to health and safety, especially as the severity and duration increases in conjunction with other technological (e.g., power outage, fuel oil delivery disruption) and societal (ability to purchase heating fuel) factors. Maintaining a safe living environment for livestock during extreme temperatures, especially cold extremes, is a real concern for Wheelock and the rest of the state. Wheelock's winter of 2015 was the coldest anyone could remember with a mean temperature of 7.8 degrees Fahrenheit and a max-low of -26 degrees Fahrenheit in February. However, January of 1970 had a mean temperature of 6.6 degrees Fahrenheit which is the coldest mean temperature for the county and January is the statistically coldest month in all of Vermont. Since 1900, January produced temperatures in the negative 20's and 30's consistently for Caledonia County with record cold temperatures occurring in 1914 (-38). Cold temperatures are expected in the Northeast, but they can pose a serious threat to health and safety, especially as the severity and duration increases in conjunction with other technological (e.g., power outage, fuel oil delivery disruption) and societal (ability to purchase heating fuel) factors. Maintaining a safe living environment for livestock during extreme temperatures, especially cold extremes, is a real concern for farmers in Wheelock and the rest of the state and while the temperatures for the town remain within averages seen in the last 85 years, the town

expects dangerously cold temperatures every winter. The impact of extreme cold is summarized in the 2023 State Hazard Mitigation Plan:

> *"Extreme cold temperatures can have significant effects on human health and commercial and agricultural businesses, as well as primary and secondary effects on infrastructure (e.g., burst pipes from ice expansion and power failure). What constitutes "extreme cold" can vary across different areas of the country based on what the population is accustomed to in their respective climates. Exposure to cold temperatures can cause frostbite or hypothermia and even lead to heart attacks during physically demanding outdoor activities like snow shoveling or winter hiking. When temperatures dip below freezing, incidents of icy conditions increase, which can lead to dangerous driving conditions and pedestrian-related slipping hazards. A large area of low pressure and cold air surrounding the poles, known as a polar vortex, is strengthened in the winter. When these polar vortex winds are distorted, due to cyclical strengthening and weakening or interaction with high-amplitude jet stream patterns, they have the potential to split into two or more patterns, allowing artic air to flow southward along a jet stream. As this arctic air is able to access more southerly regions, extreme cold conditions can be observed in Vermont, which also have the potential to remain over the region for extended periods"*

Recent extremes in cold temperatures are a concern and impact the entire planning area and region. 2015 tied the coldest winter (January to March) on record (1923) for Vermont according to the NOAA's National Climatic Data Center whose dataset dates to 1895. While the temperatures for the town remain within averages seen in the last 85 years, dangerously cold temperatures are expected every winter. The NOAA Wind Chill Chart identifies those temperatures and associated wind speeds that may cause frostbite if skin is exposed to the air over a certain period of time:

Table 2-6: NOAA Wind Chill Chart

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

Frostbite Times: 30 minutes; 10 minutes; 5 minutes

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

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

In anticipation of extreme cold temperatures, the National Weather Service may issue the following watches, warnings, or advisories, which are aimed at informing the general public as well as the agricultural industry**:**

- 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

Many of the impacts from these hazards can be reduced by using common sense and practicing preparedness measures such as staying off the snow and ice covered roads until they are cleared, having vehicles equipped with proper winter gear and snow tires, using moderation and resting when removing snow and cleaning up from a storm, keeping heating pipes cleared and well ventilated, keeping roofs clean of heavy snow/ice loads, checking on and helping the elderly and disabled residents of the community, and listening to the local weather forecast for storm updates.

Based on past occurrences, the worst anticipated winter weather Wheelock could experience would be 2 to 3 feet of snowfall in a 24-hour period with more totals at higher elevations and several days of power outages. Using the wind chill scale and historical information, the estimate for extreme cold is negative 60 degrees Fahrenheit. Caledonia County has also had unseasonably cold weather in the spring, which led to crop loss. The most recent time this occurred was 2023.

Flooding

NOAA reports 19 flash flood events in the county during the last planning period. There are three main types of flooding that occur in Vermont: flooding from rain or snow melt, flash flooding and urban flooding. Rainstorms are the cause of most flooding in town. Flooding has also been known to occur because of ice jams in rivers adjoining developed towns and cities. While ice jam risk for the town is considered low, these events may result in widespread damage in major river floodplains or localized flash flooding caused by unusually large rainstorms over a small area.

The effects of all types of events can be worsened by ice or debris dams and the failure of infrastructure (especially culverts), and dams. Winter and spring thaws, occasionally exacerbated by ice jams, are another significant source of flooding, especially when coupled with high rain levels. Much of this flooding is flash flooding, occurring within hours of a rainstorm or other event. Flash flooding, as opposed to flooding with a gradual onset, causes the largest amount of damage to property and infrastructure. Floods cause two major types of damage: water damage from inundation and erosion damage to property and infrastructure. The 2023 Vermont State All-Hazards Mitigation Plan discusses flooding extensively:

"Flooding is the most common recurring hazard event in Vermont. In recent years, flood intensity and severity appear to be increasing. Flood damages are associated with inundation flooding and fluvial erosion. Data indicates that greater than 75% of flood damages in Vermont,

measured in dollars, are associated with fluvial erosion, not inundation. These events may result in widespread damage in major rivers' floodplains or localized flash flooding caused by unusually large rainstorms over a small area. The effects of both inundation flooding and fluvial erosion can be exacerbated by ice or debris dams, the failure of infrastructure (often as a result of undersized culverts), the failure of dams, continued encroachments in floodplains and river corridors, and the stream channelization required to protect those encroachments."

Vermont experienced major floods long before Federal disaster assistance became available. But in November of 1927, Vermont experienced catastrophic flooding. In the month before the flood, rains more than 150% of normal precipitation fell after the ground had frozen. The flood itself was precipitated by 10 inches of rain falling over the course of a few days. The flood inundated parts of many towns and damaged or destroyed numerous bridges in the county. As the history of the flooding cited above bears out, the geography and topography are right for a significant localized storm with extreme damage at almost any location in Vermont. Numerous floods have resulted in Presidentially declared disasters and an influx of federal disaster assistance.

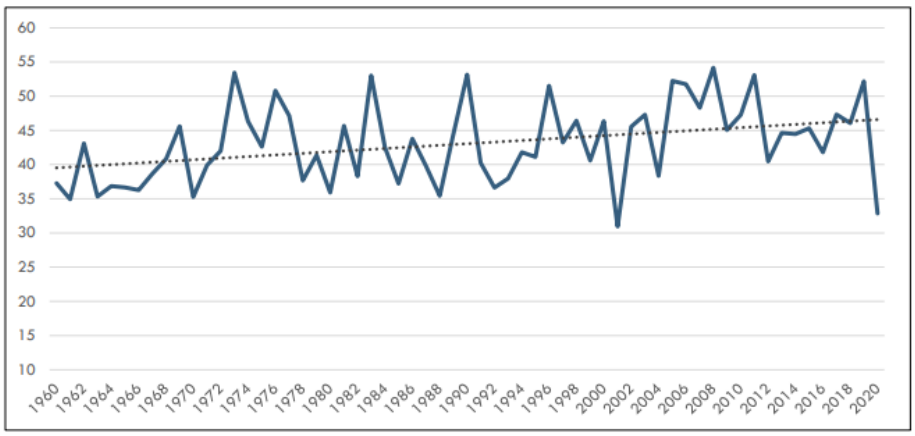
The town is susceptible to both flash flooding in higher elevation areas and overbank flooding in some lower lying areas. These events are frequently caused by excessive rainfall over an extended period, heavy spring snow runoff, and ice jams. The damage from a river flood can be widespread as overflow affects rivers and streams downstream and can cause dams and dikes to break, inundating lower lying areas. Fluvial erosion of riverbanks, which often accompanies flood events due to the narrow stream valleys and steeply sloped topography, can severely threaten mountain communities. This is because most of rural town development lies in valley areas along rivers and streams. Infrastructure and structures within the narrow stream valleys receive drainage from the higher elevations and are often the most vulnerable to damage from flash flooding.

On 10 July 2025, multiple rounds of slow-moving thunderstorms produced localized flash flooding across Vermont. Considerable flash flooding occurred in the towns of Sutton, West Burke, and East Haven, Vermont where swift water rescues were performed and significant washouts occurred. The event pales in comparison to the flooding on the same day in 2023 and 2024, but damage in Wheelock was significant. The Fall Brook Road Bridge was damaged in 2024 and due to planning timelines, the bridge was vulnerable when the July 11th, 2025 flooding hit. The bridge was so seriously damaged the state required the bridge to be closed. Loads of gravel were placed at each entrance to keep vehicles from using it. With a $60,000 CDBG grant request to do hydrology and engineering studies on several bridges and 2 culverts, there is hope this bridge can return to function through replacement as it can no longer be repaired to pre-2024 flood condition. In 2024, portions of Sutton Road washed into the Town Hall parking lot resulting in about 2.5' of erosion in front of the door.

The 2024 flood event resulted in catastrophic damage and destruction, prompting Vermont officials to call for FEMA reform. During the overnight hours of July 29th into July 30th, 2024, slow-moving thunderstorms brought torrential rainfall to portions of Orleans, Caledonia, and Essex counties. Rainfall totals across these areas ranged from 4 to 8 inches, with intensities exceeding 2 inches per hour over an extended period. This intense rainfall resulted in rapid and severe flash flooding.

The increases in total rainfall and severity are to be expected along the lines seen with the records set across the state recently. There are three sources of historical precipitation data for Vermont. The data are reported at the county level: 1) recurrence time intervals for 24-hour rainfall storm depth, 2) annualized daily frequency of rainfall, and 3) rainfall-intensity frequencies. The first source of data is the recurrence time intervals for 24-hour rainfall storm depth. The recurrence depth data describes the expected intensity of major rainfall events with respect to both rainfall depth and frequency of occurrence.

Table 2-7: Caledonia County Precipitation Totals from 1960-2020



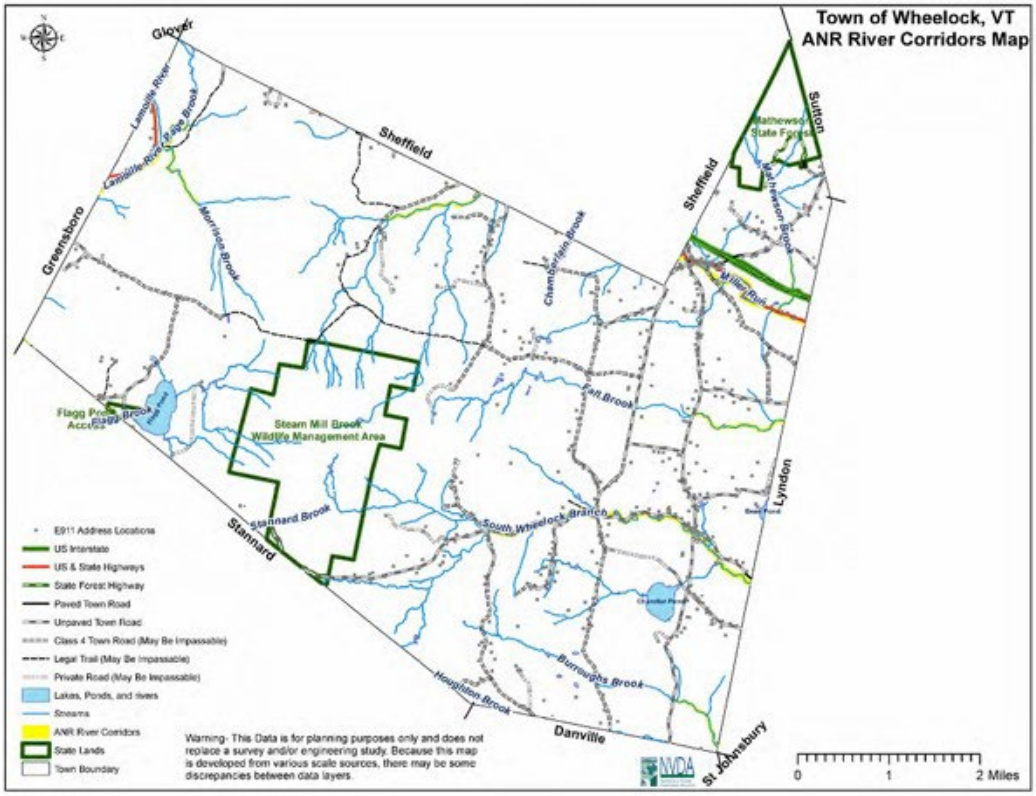
The second source of data is the annualized daily frequencies of rainfall, which were obtained from the National Climatic Data Center (NCDC), Climate Normals program. The data provides the average number of days per year with measurable precipitation (greater than 0.01 inches) on a county-by-county basis. This data allows for the conversion of the annual probabilities derived from the recurrence time intervals to daily probabilities. The annualized estimated daily frequency of measurable rainfall for Caledonia County is 174 days (highest in the state) with 119 days of rain and 55 days of snow. The final source of data is rainfall-intensity frequencies. Hourly precipitation totals throughout the state of Vermont were obtained from the NCDC's Cooperative Observer Program (COOP).

Inundation and Floodplains

Inundation-related flood loss is a significant component of flood disasters; the more common mode of damage is associated with the dynamic, and oftentimes catastrophic, physical adjustment of stream channel dimensions and location during storm events. These adjustments are often due to bed and bank erosion, debris and ice jams, or structural failure of or flow diversion by man-made structures. A greater threat is erosional damage. The state of Vermont has been conducting geomorphic assessment to identify areas vulnerable to erosional damage.

Of all types of natural hazards experienced in Vermont, flash flooding has historically resulted in the greatest magnitude of damage suffered by private property and public infrastructure. Most communities have undertaken significant mitigation measures in recent years. However, flash floods can strike at any time in areas that are not identified as typical flood hazard areas, and thus they continue to cause public and private damage.

Map 2-1: Wheelock River Corridor Map



High Risk Areas

The Miller's Run and the Lamoille River are the only water courses in the town that have a FEMA Flood Insurance Rate Map (FIRM) and that show a Special Flood Hazard Area (SFHA). These maps were created in 1974 and were not part of any flood study. Therefore, they are general at best. There is no clear way to determine what structures are in or out of the flood zone based on the map alone because of the general nature and the scale of the mapping. Further, no FIRM was ever created for areas along the South Branch in the southern part of the town. There are known areas that flood along that water course. It is difficult to determine the flooding hazards without further mapping of these areas. Best estimates currently show 11 properties in the mapped flood area. Six of these are single family dwellings, one is a mobile home, one is government, and three are commercial.

Regarding flood inundation issues, the *2023 Vermont State All-Hazards Mitigation Plan* states:

> *"Recent studies have shown that most flooding in Vermont occurs in upland streams and road. drainage systems that fail to handle the amount of water they receive. Due to steep gradients, flooding may inundate these areas severely, but only briefly. Flooding in these areas generally has enough force to cause erosion capable of destroying roads and collapsing buildings. These areas are often not mapped as being flood prone and property owners in these areas typically do*

not have flood insurance (DHCA, 1998). Furthermore, precipitation trend analysis suggests that intense local storms are occurring more frequently. Additionally, irresponsible land use and development will exacerbate the preexisting vulnerability. Urban flooding usually occurs when drainage systems are overwhelmed and damages homes and businesses. This flooding happens in all urban areas, but specifically in Burlington where the area is located at the bottom of a gradient, which adds to the intensity of this localized flooding…

…Over the past two decades, flood damage costs have risen dramatically in Vermont due to increasing occurrences of flooding and increases in vulnerability associated with unwise land use development in flood plains or within stream corridors. The geography and topography are right for a significant localized storm with extreme damage at almost any location in Vermont. Heavy rains with previous ground saturation, which causes runoff, are a significant part of the flooding formula in Vermont. Steep topography and narrow, inhabited, stream and river valleys further increase the dangerous nature of this hazard. Furthermore, precipitation trend analysis suggests that intense, localized storms that can cause flash flooding are occurring with greater frequency. While flooding will continue, planning and other mitigation measures can help minimize damages.

All of Vermont's major rivers have inhabited floodplains. While residents in mountain valleys are at risk, they may not be aware of the danger or may choose to ignore it. There are many reasons property owners are reluctant to relocate to less flood prone ground, not the least of which is the lack of personal experience of flooding. In addition, many communities originated beside rivers and streams, some of the most attractive property is located in vulnerable areas. Lakeshore property in Vermont is vulnerable to flooding from high water levels, either by surface water erosion or flooding. Occasionally, water-saturated ground and high-water tables cause flooding to basements and other low-lying areas. Lakeshore property is highly desirable and valuable, making the development of lakeshore areas very likely, even with the high potential for flooding. Restrictions on lakeshore property development have significant negative economic and tax revenue impacts that must be carefully weighed against the gains in personal safety and protection of property."

Fluvial Erosion and Landslides

Erosion occurs on a consistent, but small-scale, basis within the riparian corridor of the town's streams and rivers. This is a part of normal natural processes and as such is necessary for the proper functioning of the ecosystem of these waterways. However, fluvial erosion on a large scale can damage stream banks and undercut infrastructure such as roads, bridges, and culverts as well as agricultural land and structures, causing severe damage. Fluvial erosion on a large scale can cause stream bank collapses, which are generally classified as landslides. Most flood damage is associated with fluvial erosion rather than inundation. The *2023 Vermont State All-Hazards Mitigation Plan* contains the following discussion of fluvial erosion:

"In Vermont, most flood-related damage is due to fluvial erosion. Erosion occurs when the power of the flood (i.e., the depth and slope of the flow) exceeds the natural resistance of the river's bed and banks. Rivers that have been overly straightened or deepened may become highly erosive during floods, especially when the banks lack woody vegetation, or when the coarser river bed sediments have been removed. In areas where rivers are confined due to human activity and development, they have become steeper, straighter, and disconnected from their floodplains. The more trapped the river is, the greater power it will gain, which eventually

results in a greater degree of damage to critical public infrastructure such as roads and stream crossings, as well as homes, businesses, community buildings and other man-made structures built near rivers. Fluvial erosion is also increased downstream when all the eroded materials (i.e., sediment and debris) come to rest in a lower gradient reach, clog the channel, and cause the river to flow outside its banks. When severe enough, fluvial erosion can also be the cause of Landslides (see Landslides). The land area that a river accesses to meander and overtop its banks to release flood energy without excessive erosion is known as the River Corridor. A river corridor includes the meander belt of a stream or river and a buffer of 50'. The River Corridor, as defined in Vermont statute, is: the land area adjacent to a river that is required to accommodate the dimensions, slope, planform, and buffer of the naturally stable channel and that is necessary for the natural maintenance or natural restoration of a dynamic equilibrium condition, as that term is defined in section 1422 of this title, and for minimization of fluvial erosion hazards, as delineated by the Agency of Natural Resources in accordance with river corridor protection procedures.

Vermont's River Corridor maps delineate river corridors for larger streams and rivers, and standard setbacks for smaller, upland streams. The setbacks were determined by factoring in the same stable stream slope requirements used when delineating a river corridor using a meander centerline setback. These maps are located on the Vermont FloodReady and Vermont Natural Resources Atlas websites."

The Vermont Agency of Transportation (VTrans) applies the term "scour critical" to stream crossing structures especially vulnerable to streambed scour—the undermining of bridge supports by water action and erosion. A spreadsheet database is maintained by VTrans and continually updated by the Bridge Inspection Program. Structures inspected are only those of 20 ft. or longer owned by a municipality or the state. The scour critical rating is based on the structure itself, and does not consider debris jams, outflanking, channel change, or other issues commonly associated with fluvial erosion. Water supply sources and distribution systems are also endangered by fluvial erosion. Many water distribution systems involve buried pipes that cross streams, which are vulnerable to fluvial erosion. In December 2014, the Vermont Department of Environmental Conservation (DEC) released the "Flood Hazard Area and River Corridor Protection Procedures" guide, outlining specific actions and considerations. While fluvial erosion potential has not been addressed yet, new data is constantly becoming available, such as the recently released River Corridors Base Map by the Agency of Natural Resources. While exposure is limited by the length and character of the rivers within the town, the potential for significant property damage under unique circumstances is a concern. Most of the "new FIRMs" will digitize existing data over orthophotos using 1 ft contours. There will be a new study of the CT River. These will serve to support regulations to minimize or eliminate the impact of fluvial erosion. Extent data related to the fluvial erosion hazard for the town is unavailable.

Landslides and Slope Failures

The term "landslide" describes a wide variety of processes that result in the downward and outward movement of slope-forming materials including rock, soil, artificial fill, or a combination of these. The materials may move by falling, toppling, sliding, spreading, or

flowing. Landslides are common on clay to sandy lacustrine deposits throughout Vermont. In many cases, the displaced material has been at least partially eroded away by stream flow.

Landslides can be triggered by one or a combination of factors, including fluvial erosion, soil saturation, natural geologic weathering processes such as the freezing and thawing of soils, human modification of the bank, increases in loading on top of the slope, surface or near surface drainage patterns, and loss of vegetation. Fluvial erosion, causing bed and bank erosion are associated with water flowing along the toe of the slope, removes bank material to over-steepen and potentially under-cut the slope.

Landslides were included in recent disaster declarations and with high frequency events, the threat of landslides increase with erosion channels on slopes channeling water more efficiently which can increase sediment displacement to areas below. When these areas are roads or structures, the risk of damage increases. While many of these slope failures occurred along riverbanks, others were initiated by strong stormwater flows that found a path of least resistance from impervious surfaces. Historical data specific to Landslides is minimal as these events typically occur during high rain and erosion events and are incorporated in and associated with these federal disaster declarations.

Significant specific landslides have occurred in Vermont with mitigation costs totaling, approximately, $4 million since 1999. This was the result of increased slope instability due to ground saturation from thick snowpack melt and heavy spring rains followed by Tropical Storm Irene in late August. Following Tropical Storm Irene, nine "cliff hanger" properties were purchased state-wide using FEMA HMGP grants for a total of, approximately $1,500,000 due to continued risk from previous landslides. Property damage from seven significant landslides in the State outside of Tropical Storm Irene total, approximately, $4.3M since 1983.

Slope failure hazards have, and continue to, exist in town. The town is vulnerable to landslides triggered by high stormwater flows during heavy rain events and minimal stormwater infrastructure. Stormwater runoff from extreme rainfall has caused erosion at sites that continue to deteriorate with each rain event. These channels cause run-off to travel faster to the area below and with destabilization of the slope, can cause soil and debris to slide down into roads.

Ice Jams

Ice jams, which can cause rapid and catastrophic flooding, are considered increasingly hazardous in parts of Vermont. In addition to the inundation damage they cause, ice jams can block infrastructure such as roads and culverts. Ice jams are not as much of a concern in Wheelock as elsewhere in Vermont.

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Table 2-8: History of Occurrences from National Climactic Data Center Website and FEMA

Date and Disaster Declaration Number if applicable	Event (By FEMA classification)	Location	Extent and impacts
8/20/2024 DR4810	Severe Storm and Flooding	Countywide	The remnants of Hurricane Beryl brought floodwaters to central Vermont that caused frantic evacuations, knocked down bridges and washed away an apartment building. The deluge dropped more than 6 inches of rain on parts of Vermont. Significant damage in central Vermont and counties east and west. Many rivers at flood stage.
7/14/2023 DR 4720	Severe Storm and Flooding	Countywide	A storm system dropped between 6 to 9 inches of rain in many areas throughout the state. Two major rivers, the Winooski and the Lamoille, surpassed water level records set during 2011's Hurricane Irene. The storm initially struck New York before moving to New England and resulted in severe flooding that shut down major roads and highways and prompted hundreds of evacuations. The flooding caused 14 Vermont rivers to be in flood stage.
12/22/2022 DR 4695	Severe Storm and Flooding	Countywide	Starting in the afternoon hours of December 23,2022, more than two inches of precipitation fell in portions of the impacted counties. This rainfall, combined with more than an inch of melted water equivalent from the pre-existing snowpack, caused mountain watersheds and streams to exceed bank-full capacity and flood some roads.
8/26/2011 – 9/2/2011 DR 4022-VT	Tropical Storm causing mass, severe flooding and flash flooding, and fluvial erosion.	Statewide	Montpelier Flood gauge at 19.05 feet (flood stage is at 15 feet); Statewide rainfall of 3-5 inches with 5-7+ inches in Central VT. Flooding, flash flooding, fluvial erosion across the region. Fluvial erosion extent data is unavailable.
5/27/2011 DR 1995-VT DR 4001-VT	Flood/Flash Flood Severe Storm	Countywide	Montpelier flood gauge at 17.59 feet, 3-5" plus of rainfall & severe flash flooding & resultant river flooding as well.
11/02/1927-11/04/1927 (Flood of 1927)	Flood	Statewide	One of VT's worst disasters. Heavy rain, 4-9 inches statewide, fell on frozen ground. Damage and loss of life occurred with 84 deaths, over 1,000 bridges taken out, over 600 farms and businesses destroyed, and miles of roads and railways claimed. No specific data for Town of Wheelock.

Extreme Heat

Extreme heat and prolonged periods of hot weather have direct and indirect effects on other hazards such as drought, wildfire, invasive species, and infectious disease. Vermont has a climate where extreme heat is less likely than other regions in the country. However, heat-related events do occur and are beginning to occur with much greater frequency. Extreme maximum temperatures are often observed during drought years, and in many cases, the records that are broken were long-standing and set during previous droughts. It should be noted that a heat wave could be either a boon or a bane depending upon the time of year and the antecedent conditions. For example, the hot conditions of August 1996 followed a cool, wet summer, thereby providing an extra boost for plants. The 2023 Vermont State Hazard Mitigation Plan states the following:

> *"Extreme hot temperatures can have significant effects on human health and commercial and agricultural businesses, as well as primary and secondary effects on infrastructure (e.g., damage to asphalt roadways from softening). What constitutes "extreme heat" can vary across different areas of the world based on what the population is accustomed to in their respective climates. An example of this difference in acclimatization can be understood when comparing analyses of excess mortality due to heat: in New York City, the data show that the heat index threshold needs to reach at least 95°F to measure a significant rise in heat-related mortality, whereas the threshold in Montreal, Canada, only 400 miles north, is 91°F and did not need to factor in heat index. Similar epidemiological analyses completed by the Vermont Department of Health suggest that the heat threshold in which hospitals in the State see a rise in heat-related emergency room visits is 87°F . Temperature fluctuations are a result of several meteorological processes . Due to the tilt of Earth's axis, regions of the globe receive varying levels of solar radiation. The delta between these levels produces circulation patterns at the global level, which drive air and storm system movement via air masses. Air masses, as defined by NOAA, are thousands of feet thick and extend across large areas of the earth. Air masses that form over tropical ocean regions will become exceptionally hot and humid, while those masses above high latitude continents will become cool and dry. When these air masses meet, a front is created; fronts can either be cold or warm. In addition to these air mass and front-related impacts humans feel at ground level, movement of narrow bands of strong wind high in the atmosphere, known as jet streams, maneuver weather systems below and transfer heat and moisture across the globe. The speed and intensity of the jet stream will affect the duration and temperature associated with a cold or warm front. Extremely high temperatures can occur when a high-pressure system (under which air is descending toward the Earth's surface) develops and intensifies. Under such conditions, the potential for a heat wave exists. A heat wave is a period of three or more consecutive days during which the maximum temperature meets or exceeds 90°F."*

In anticipation of extreme heat events, the National Weather Service (NWS) may issue the following advisories:

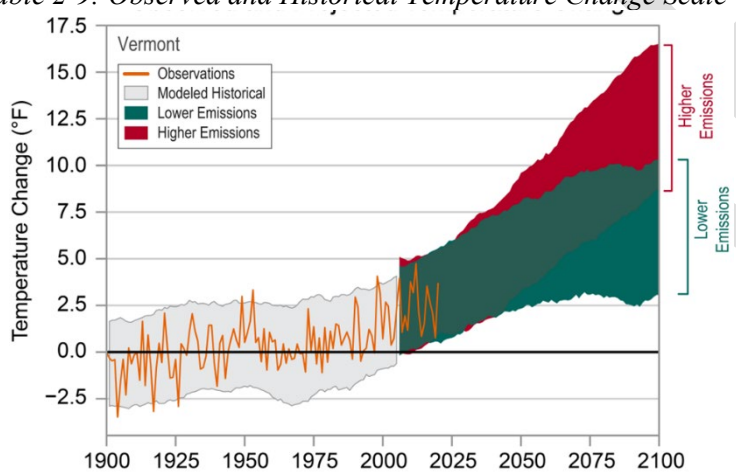
- *Excessive Heat Outlook: A period of excessive heat is possible within the next 3 to 5 days.*
- *Heat Advisory – Take Action: A period of excessive heat is expected. The combination of hot temperatures and high humidity will create a situation in which heat related*

illnesses are possible. Heat Advisories are issued when heat indices are expected to reach at least 95°F.

- *Excessive Heat Watch: A prolonged period of dangerous excessive heat is possible within about 48 hours.*
- *Excessive Heat Warning – Take Action: A prolonged period of dangerous excessive heat is expected within about 24 hours. The combination of hot temperatures and high humidity will create a situation in which heat related illnesses are possible. Excessive Heat Warnings are issued when heat indices are expected to reach at least 105°F.*

The National Centers for Climate Information show that temperatures in Vermont have risen about 3°F since the beginning of the 20th century. While there are no data trends on the number of hot days (days with temperatures of 87°F or greater, the past 11 years (2010-2020) was the warmest period in history. Under a higher emissions pathway as shown below, we can expect unprecedented warming to continue through this century, while the intensity of extreme winter cold will drop as well.[1]

Table 2-9: Observed and Historical Temperature Change Scale



Source: NOAA National Centers for Environmental Information, State Climate Summaries 2022. https://statesummaries.ncics.org/chapter/vt

Unseasonal Heat

Higher spring and fall temperatures are leading to longer freeze-free seasons, as well as "backward" or "false" springs, where warming temperatures in the late winter or spring are followed by snow or freezing rain. These events are happening more frequently, and rapid thawing and refreezing are likely to damage roads. Early spikes in temperatures can also curtail maple production and disrupt the region's outdoor recreation sector.

March 8-9, 2000, is the only excessive heat event for Vermont on NOAA's records, impacting Windham and Bennington Counties. Temperatures climbed through the 60s to near 70°F on both afternoons. At Albany International Airport, the high of 66°F on March 8 established a new

[1] Runkle, J., K.E. Kunkel, S.M. Champion, L.-A. Dupigny-Giroux, and J. Spaccio, 2022: Vermont State Climate Summary 2022. NOAA Technical Report NESDIS 150-VT. NOAA/NESDIS, Silver Spring, MD, 4 pp.

record high, eclipsing the old record of 64°F set in 1942. On March 9, the temperature reached 68°F, replacing the old daily record high of 66°F set in 1977. March of 2012 set new records: 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 snowpack across the region to be largely below normal or even non-existent by mid-March. In Vermont, temperatures climbed into the 70s March 18 and low-80s.

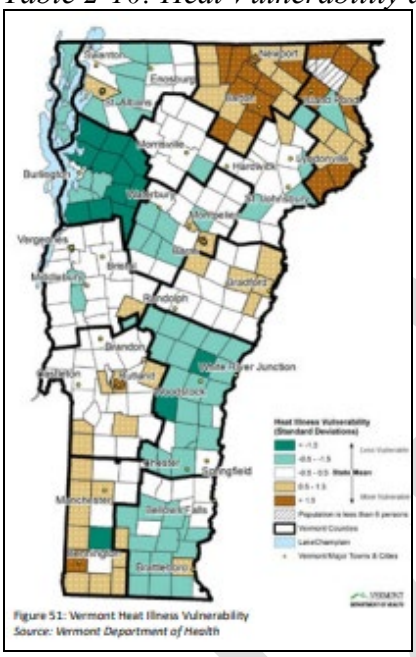
March 19-22, 2012: Record heat was recorded across all of Vermont with maximum temperatures 30-40°F above normal and some daily records being broken by 10°F or more. This event caused an estimated reduction of 30% of maple sugar production, resulting in an estimated impact of nearly $10 million. In addition, there was a significant loss of ski industry revenue due to a 25-50% reduction in snow loading.

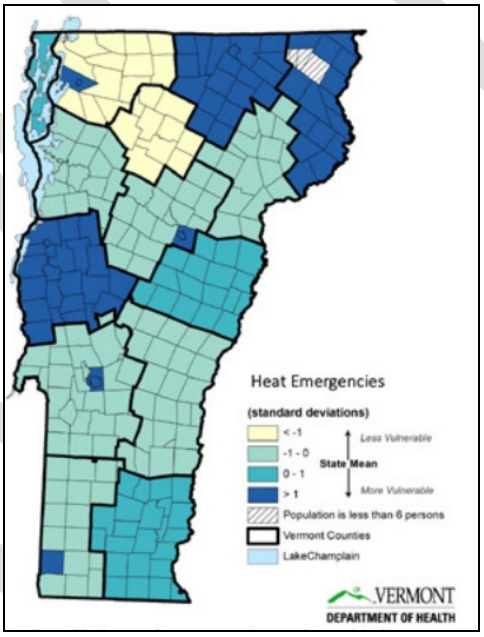
Dangerously High Summer Heat
Heat is most likely to pose the greatest risk to human health in July, which is typically the hottest month of the year. In July of 1911, there was a 12-day average of 90.75°F. The summer of 1949 was also very hot, with 25 days above 90°F. It is important to note here, however, that hot weather can have health impacts at even lower temperatures, with health risks increasing considerably when temperatures reach the mid-to-upper 80s. Between 2000 and 2017, the number of recorded days per year with a daily temperature high greater than or equal to 85°F peaked during the 2016 summer at 45 days, closely followed by the summer of 2015 at 41 days in Burlington. The maximum temperature reached 89°F on July 21st and July 24. Notable, if not record setting heat events include:

- *June 23rd-24th, 2025: 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. Temperature values were pushed to the extreme as adiabatic warming due to downslope winds caused Plattsburgh, New York to tie an all-time record high and break the monthly high temperature for June of 101 °F. Burlington, Vermont also observed a temperature reading of 99 °F, which had not been observed since 2001. Subsident warming underneath the ridge was most significant across the Champlain Valley, but significant heat was observed over much of Vermont and northern New York.*
- *June 18th-20th, 2024: Heat advisories were issued on June 18th with temperatures reaching 100 degrees and remained in the 90's through the weekend with high humidity.*
- *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.*
- *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.*

The Heat Vulnerability in Vermont report suggests that Vermonters are at a greater risk for serious, heat-related illness – potentially even death, when the statewide average temperature reaches or exceeds 87°F. The Health Department's Climate & Health Program has reviewed six heat vulnerability themes (population demographics of a town or city, socioeconomic status, health status of residents, environmental characteristics, the ability of town residents to acclimate to hot temperatures and emergency room visits for heat illness) and determined a thematic vulnerability for each. In general, those at higher risk during hot weather include older adults and children, people with chronic medical conditions, people active outdoors, people without air conditioning, and people living in more urbanized parts of Vermont. The hot-weather vulnerability maps by theme, and more information regarding the health impacts of increasing temperatures and prolonged periods of hot weather are available at the Department of Health's Climate & Health website: www. healthvermont.gov/environment/climate. The northeast portion of Vermont has the highest concentrated heat illness vulnerability and heat emergency ratings as seen in the maps below.

Table 2-10: Heat Vulnerability and Emergency Mapping





Source: https://www.healthvermont.gov/sites/default/files/documents/pdf/ENV-CH-hot-weather-planning-guidance.pdf

Vermont data indicate that Vermont residents experience heat-related illnesses at temperatures lower than in many other parts of the country. This is likely related to how infrequently hot weather occurs in Vermont, which has several impacts:

- We do not experience enough hot weather for people's bodies to adapt to hotter conditions.
- Many homes in Vermont are not adequately weatherized and do not have air conditioning.
- At a state and community level, we have not developed plans and policies needed to be prepared for hot weather.

- At an individual level, it can be hard to adapt behaviors to stay safe during hot weather, and Vermont has a large population of older adults, who are at more risk for heat-related illnesses.

The primary impact of extreme heat or prolonged periods of hot weather is to human life. Hot conditions, especially when combined with sun and high humidity, can limit the body's ability to thermoregulate properly. Prolonged exposure to hot conditions can lead to heat cramps, heat exhaustion, heat stroke, or exacerbate other pre-existing medical conditions. Some of these impacts require medical attention and can be fatal if left untreated. Heat kills more people in the US each year than any other type of weather event.
A new guidance report released by the Vermont Department of Health highlights the health risks from extreme heat. The report is informed by the 2021 heat wave in the Northwestern US and Western Canada, an area with a similar summer climate to Vermont. More than 1,400 people died during that event. Between 2009 and 2019, the Vermont Department of Health reports that there was an average of 104 heat-related emergency department (ED) visits per year and 12 total heat-related deaths across the state. Heat-related ED visits have trended up over that period by more than 2 additional ED visits each year. 2018 was the deadliest year in recent record, with 173 heat-related ED visits and 5 heat-related deaths in total, including 90 ED visits and 4 deaths during a 6-day heat wave in early July. These numbers only include ED visits and deaths specifically attributed to heat in a hospital or death record. (Data at the County level is not available.). Heat-related illnesses mainly occur between May and September. It takes time for our bodies to adjust to warmer weather, so unseasonably hot days early in the year can be particularly harmful.

Table 2-11: Heat Index with ED Visits

	May	June	July	August	September
Average daily high heat index* (°F), Burlington Airport	68°	75°	83°	81°	72°
Heat-related ED visits, statewide total, per month (2009-2019)	14	19	47	17	7

The risk for heat-related illnesses and deaths increases substantially when the heat index reaches 90°F or above in Burlington – which is equivalent to about 85°F in cooler places like Wheelock. All ED visits and deaths (related to any cause) increase as the heat index rises, as many chronic physical and mental health conditions are worsened by heat exposure.

Table 2-12: Heat Index Magnitude and Frequency with ED Visits and Deaths

Max heat index (°F), Burlington Airport	Days per year*	Heat-related ED visits, per day*	Heat-related deaths, total*	All ED visits, per day*	All deaths, per day*
Less than 80°	97	0.2	2	742	12.9
80° - 89°	46	1	2	778	13.3
90° - 94°	6	3	2	789	14.1
95° or hotter	3	7	6	795	14.2

* Heat-related data are reported for May-September, 2009-2019. ED visits and deaths are statewide totals.

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Vulnerable Populations
Although all Vermonters can be affected by hot weather, there are specific factors that can increase an individual's risk for experiencing heat-related health impacts. The risk for heat illnesses tends to be greater for the following groups of people:

People Living in Urban Areas:
Only about one-third of Vermonters live in urban areas as defined by the US Census, but a disproportionate number of heat-related deaths from 2009-2019 (10 of 12) occurred in municipalities that are at least partially urban. Urban heat risk data collected by Health Department volunteers in 2020 were used to estimate that on a hot day, the heat index can be as much as 15°F hotter in the most urban locations in Vermont compared to largely undeveloped and wooded locations.

People Who are Unusually Sensitive to Heat Exposure:
This category can include anyone not acclimated to hot weather, especially older adults and young children, pregnant women, people that are overweight or have a chronic medical condition, people using drugs, alcohol or some prescription medications, and people who experienced a prior heat illness. The most severe heat-related impacts in Vermont have been experienced by older adults. Ten of the 12 people that died in Vermont from a heat-related cause between 2009 and 2019 were over the age of 50.

Additional vulnerabilities related to extreme heat

Vector-born disease
Data suggests that health impacts are also associated with prolonged hot weather and increasing average temperatures. For example, increases in the incidence of vector-borne diseases (e.g., Lyme, West Nile, and Eastern equine encephalitis) in Vermont and New England at-large have been observed and are attributed to warming conditions. The increase in average annual temperatures and shortened winters have allowed mosquitos and ticks to become more active earlier in the spring and remain active later in the fall. Because the incidence of Lyme disease in Vermont is higher than the national average at present, lengthening vector seasons is of great concern to the health community in Vermont. People working in the outdoors – loggers and farmers, for example – are most vulnerable to vector-borne illness.
Cyanobacteria blooms: Hot weather can increase thermal stratification in water bodies, where shallow water layers are much warmer and do not readily mix with cooler, deeper water layers. Stratified water layers are most common in late summer and early fall, providing more favorable conditions for development of cyanobacteria blooms in Vermont's lakes and ponds. Some types of cyanobacteria can release natural toxins or poisons (called cyanotoxins) into the water, especially when they die and break down. Swimming or wading in water with cyanobacteria may cause minor skin rashes, sore throats, diarrhea, stomach problems, or occasionally more serious health problems. Children and pets are at higher risk of exposure because they are more likely to play near the shoreline and drink water while swimming. The rise in average annual temperature and increased occurrence of prolonged hot weather events will also have impacts on infrastructure, the environment, and the economy in Vermont.

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Drought & Wildfire
As temperatures continue to rise, considerations for the water supply follow. Higher temperatures will lead to increased evapotranspiration, soil drying rate and the frequency of short-term droughts, limiting water availability for tree growth. With a changing forest complexion and greater levels of evapotranspiration, extreme heat and prolonged hot weather could also lead to an increase in the occurrence of wildfires in Vermont.

Planning Considerations:
Community cooling sites can be an essential resource for community members that do not have access to air-conditioning and need extra assistance to stay safe during hot weather. To be most effective, cooling site **locations** should be identified and advertised before hot weather occurs. The Vermont Department of Health maintains a map of known cooling sites at healthvermont.gov/climate/heat. Here are the characteristics of an optimal cooling site:

Table 2-13: Cooling Site Options

Minimum recommendations	Encouraged amenities
Air-conditioned	Public transit or personal transportation assistance
Free entry	Activities available for guests
Convenient for community to access	Separate room for families and children
American Disabilities Act compliant	Access to wi-fi and power for personal devices
Access to restrooms	Food/snacks provided
Access to water	Provisions for pets
Electricity for medical equipment	Back-up generator available
Refrigeration for medications	Extended hours as needed
Seating available for all guests	On-site health and social services
Widely advertised throughout community	Law enforcement or other site safety officer

People are reluctant to leave their homes in a heat emergency. Experience has shown that individuals can be reluctant to leave their homes, even in the event of an emergency. Successful messaging about cooling sites in the event of an extended heat advisory will depend largely on communication with property managers of rental properties, visiting nurses, and other home service providers for at-risk populations.

Drought
Drought is defined as a water shortage with reference to a specified need for water in a conceptual supply and demand relationship. It is a complex phenomenon that is difficult to monitor and assess because it develops slowly and covers extensive areas, as opposed to other disasters that have rapid onsets and obvious destruction. Also, unlike most disasters, the effects of drought can linger long after the drought has ended. Drought is an inherent, cyclical component of natural climatic variability and can occur at any place at any time. It is difficult to determine the onset, duration, intensity, and severity of a drought, all of which affect the consequences and corresponding mitigation techniques. High winds, low humidity, and extreme temperatures can all amplify the severity of the drought. While severe droughts are rare in Vermont, there have been regional disruptions in spring-sourced home water supplies as recent

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as 2018 (and another in 2001). Summer is potentially a dry period, but local thunderstorms and moisture from tropical air masses generally prevent serious drought. During the summer of 2021, wells were running dry in other areas of the state. A severe drought during 1930-36 affected the entire State. The drought of 1960-69 affected the entire State and was the most severe for regions of the state. The recurrence interval of this drought was greater than 50 years and was regional in scope, encompassing most of the northeastern United States. Precipitation in the State was less than normal every year during 1960-68, which was the longest continuous spell of deficient precipitation since 1895. Streamflow deficiency was greatest during 1965. In 1969, the drought ended abruptly. Water was trucked in to provide relief to drought-stricken dairy herds. Spring can also bring abnormally dry conditions as was evident in early 2015. Drought periods have historically remained as brief periods of abnormally dry conditions in the spring and occasionally, summer months.

The summer of 2025 ends as second driest since 1894. Rainfall is seven inches below normal. The town is concerned about the potential impact of drought on water availability, crop health, livestock health, people with well systems, and overall well-being. No two states have the same experience during a drought and while data specific to Wheelock was not, county data is available here. The National Integrated Drought Information System (NIDIS) uses the Palmer Drought Severity Index (PDSI) which updates every 5 days. The PDSI is a standardized index based on a simplified soil water balance and estimates relative soil moisture conditions. The magnitude of PDSI indicates the severity of the departure from normal conditions. A PDSI value >4 represents very wet conditions, while a PDSI <-4 represents an extreme drought. Additionally, the U.S. Drought Monitor assigns drought numbers (D0-D4). D4 is the most severe drought, with the worst conditions on record. It would only be expected to occur once or twice within a 100-year period. Extreme drought, D3, occupies positions 3 through 5. These conditions are still among the worst on record and would be expected to occur once every 20 to 50 years. Severe drought, D2 would be expected to occur once every 10 to 20 years. Moderate drought, D1 would be expected to occur about once every 5 to 10 years. Abnormally Dry conditions, D0, would be expected once every 3 to 5 years.

The severity of a drought depends on the duration, intensity, and geographic extent of the water shortage, as well as the demands on the area's water supply. The US Department of Agriculture (USDA) rates droughts from D0–D4, depending on the severity of the drought, the amount of time it will take for vegetation to return to normal levels, and the possible effects of the drought on vegetation and water supply .Below are examples of some of the impacts experienced in Vermont in the past per the D0-D4 categories.[2]

Table 2-14: Drought Category by Observed Impact

Category	Examples of historically observed impacts
D0	Crop growth is stunted; planting is delayed Fire danger is elevated; spring fire season starts early Lawns brown early; gardens begin to wilt

[2] The process for developing this example impact table is described in "Linking drought impacts to drought severity at the state level Bulletin of the American Meteorological Society", 101(8), pp.E1312-E1321. doi: 10.1175/BAMS-D-19-0067.1

Category	Examples of historically observed impacts
	Surface water levels decline
D1	Honey production declines
	Irrigation use increases; hay and grain yields are lower than normal
	Trees and landscaping are stressed; fish are stressed
	Voluntary water conservation is requested; reservoir and lake levels are below normal capacity
	Wildfires and ground fires increase
D2	Fish kills occur; wildlife move to farms for food
	Golf courses conserve water
	Producers begin feeding cattle; hay prices are high
	Specialty crops are impacted in both yield and fruit size
	Trees are brittle and susceptible to insects
	Warnings are issued on outdoor burns; air quality is poor
	Water quality is poor; groundwater is declining; irrigation ponds are dry; outdoor water restrictions are implemented
D3	Crop loss is widespread; Christmas tree farms are stressed; dairy farmers are struggling financially
	Extremely reduced flow to ceased flow of water is observed; river temperatures are warm; wells are running dry; people are digging more and deeper wells
	Water recreation and hunting are modified; wildlife disease outbreak is observed
	Well drillers and bulk water haulers see increased business

Source: https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?VT

To view a more complete record, and to filter impacts by drought severity, sector and season, check out the interactive State Impacts Tool.

Current and future assets that may be vulnerable to drought include people, structures, infrastructure, natural and historic resources, and valued activities. Droughts can have significant impacts on community assets. Examples for the town include:

Water Supply and Quality:

- Droughts can lead to reduced water availability, affecting drinking water supplies, irrigation for agriculture, and industrial processes.
- Lower water levels in lakes, rivers, and reservoirs can impact water quality and availability.
- Agriculture:
- Droughts directly affect crop yields by reducing soil moisture, leading to crop failure or lower productivity.
- Livestock may suffer due to poor forage availability and insufficient water.

- Economy:
- Agricultural losses impact local economies, affecting farmers, businesses, and employment.
- Reduced water availability can disrupt industries that rely on water, such as manufacturing and energy production.

Natural Environment:

- Dry conditions can lead to wildfires, damaging forests, grasslands, and wildlife habitats.
- Ecosystems may suffer due to reduced water availability, affecting plant and animal species.
- Public Infrastructure:
- Land subsidence (sinking) can occur during prolonged droughts, damaging roads, bridges, and buildings.
- Seawater intrusion into coastal aquifers can impact water supply infrastructure.

Health and Social Impacts:

- Drought-related stress can affect mental health in communities.
- Migration away from drought-affected areas can strain social services and resources.

Community Assets:

- Well-maintained infrastructure (such as water storage facilities, irrigation systems, and wells) can help communities cope with water scarcity.
- Collective efforts, like community-based water management and conservation practices, contribute to resilience during droughts.
- Availability of contractors to dig wells during drought.

Changes in population, changes in land use, and development can impact vulnerability to all hazards, including drought. As seen with the COVID-19-related influx of people moving to Vermont, an increased demand for water and water-related resources specific to point-of-use increases on all water supply systems can increase vulnerability during drought conditions. This cascade of demand could impact farm and livestock as well, further exacerbating the risk of increased demand with supply is compromised. While populations have remained relatively stable, as other areas of the country experience the prolonged impacts of Severe weather and natural disasters, Vermont could see additional increases in population and this increase can tax community assets, especially during a disaster.

Invasive Species

The National Invasive Species Council defines an invasive species as one that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Invasive species can overwhelm native species and their habitats, forcing the native species out. They are considered to pose the second greatest threat to biodiversity globally. Invasive plants in Vermont, such as Japanese knotweed, common reed (Phragmites), and purple loosestrife, can change soil composition, change water tables, and disrupt insect cycles. They often lack food value upon which wildlife depends. Some invasive

animals prey heavily upon native species while others, such as the alewife and zebra mussel, out-compete native species for food and nutrients with significant impacts reverberating up and down food chains.

Harmful, non-native species can be found in all ecosystems across the United States. These species can cause costly economic and ecological damage each year including crop decimation, clogging of water facilities and waterways, wildlife and human disease transmission, threats to fisheries, increased fire vulnerability, and adverse effects for ranchers and farmers. The spread of invasive species is endemic in Vermont. Aquatic Invasive Species (AIS) are a serious threat to water quality because they can change the surrounding ecosystem and out-compete native species for food and habitat. Once established, they are nearly impossible to eradicate. Some invasives, such as Eurasian milfoil are easy to detect, while others, such as larval zebra mussels and the spiny water flea, are too small to see.

People can unwittingly transport invasives from other waterbodies on boats and equipment that have not been properly drained, cleaned, or dried. Significant flood events, including dam breaches, could increase risk of AIS. There are some invasives that will kill certain tree species (e.g., Emerald Ash Borer) and having a greater concentration of dead trees contributes to the potential for more severe wildfires. This has been a contributing factor to the severity of wildfires out west.

Aquatic invasive plant species can add to the biomass of a waterbody, which can create hypoxic conditions and increase nutrient loading, both of which produce prime habitat for cyanobacteria blooms. Japanese Knotweed is present along many river corridors in VT. Because of the open root structure, it can reduce the ability of the riparian zone and stream to hold water, which can lead to flash floods during heavy runoff.

Studies have shown that when AIS are present in a waterbody, the value of the homes are decreased up to 16%. Vermont is ranked worst in the U.S. for lakeshore disturbance. Stormwater is a major contributor to disturbance. The Vermont ANR has a Lake Wise Award to support and recognize lake-friendly shoreline property.

Because plant and animal life are so abundant throughout the region, the entire planning area is considered to be uniformly exposed to the invasive species hazard. Areas with high amounts of plant or animal life may be at higher risk of exposure to invasive species than less vegetated areas; however, invasive species can disrupt ecosystems of all kinds.

The Vermont Invasives website maintains a crowd-sourced invasive species map that allows users to upload locations and photos of invasive species, which acts as an aid in determining spread rate and control measures across the State. According to this source the wild parsnip and Japanese knotweed have been located along local roadways within the planning area (three recorded observations in Burke). Severity/Extent Invasive species are a widespread problem in Vermont and throughout the country. The geographic extent of invasive species varies greatly depending on the species in question and other factors, including habitat and the range of the species. Some (such as the gypsy moth) are nearly controlled, whereas others, such as the zebra mussel, remain consistent threats to impact aquatic ecosystems throughout the state. The

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presence and severity/extent of Invasive species is routinely measured through monitoring and recording observances. In Vermont, this includes but is not limited to the following:

- Vermont's Agency of Agricultural, Food and Markets (VAAFM) maintains a list of invasive plants and regulates their importation, movement, sale, possession, cultivation, and distribution.
- Vermont's Department of Forests, Parks and Recreation (FPR) is responsible for the survey, detection, and management of forest pests in Vermont.
- The Department of Environmental Conservation (DEC) has a Vermont Aquatic Invasive Species Program that coordinates management activities associated with both aquatic invasive and nuisance species.
- The State also maintains a watch list, updated regularly, of non-native plants that have the potential to become invasive in Vermont based on their behavior in northeastern states.

One-third of the plant species found in Vermont are not native to the State, but only about 8% have the potential to create environmental and economic harm due to their ability to grow rapidly, profusely, and widely. These are the plant species monitored on the watch list, which acts as a resource for public information and as a means to enlist volunteers to monitor potentially harmful plants in Vermont, although it has no regulatory force.

Wildfires

A wildfire is an unwanted, uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Other names such as brush fire or forest fire may be used to describe the same phenomenon depending on the type of vegetation being burned. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase the frequency and severity of wildfire for people and property located within wildfire hazard areas, and particularly for those in rural areas with limited capabilities for rapid fire suppression. When not quickly detected and contained, wildfires have the potential to cause extensive damage to property and threaten human life. Wildfires are part of the natural management of many forest ecosystems, but most are caused by human ignition factors. Nationally, over 80 percent of wildfires are started by negligent human behavior during dry conditions such as improperly discarding cigarettes, burning debris, or not extinguishing campfires in wooded areas. The second most common cause of wildfires is lightning strikes that occur during dry thunderstorms. Wildfires can also be the result of other natural hazard influences such as drought and extreme heat.

As seen with the Canadian wildfires in 2023, the impact on air quality is a real concern. Vermonters experienced the effects of smoke from this event. Understanding the relationship between wildfires, Severe weather, and air quality is a relatively new mitigation challenge for Vermont. The risk of wildfire is town-wide but remains low in comparison to other areas in the U.S., 87% lower. There is enhanced risk in rural pockets through-out town which poses more threat to private residences in comparison to town-owned infrastructure. With this, town assets are relatively insulated from the impact of wildfire but any loss of residential property due to fire would reduce the grand list. While most wildland fires are less than 1-acre, larger events can occur. A 2024 wildfire in Barnard, VT burned 50 to 60 acres in a single event.

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Carbon monoxide as well as polycyclic aromatic hydrocarbons (PAHs), and particles called PM10 and PM2.5 are all found in wildfire smoke and can be hazardous to human health when inhaled. Most dangerous are the PM2.5 particles that are smaller than 2.5 microns. These biproducts of combustion can get deep into the lungs and bloodstream. The U.S. Air Quality Index is a tool used by the Environmental Protection Agency to describe air quality. It's one way to understand how healthy or unhealthy the air is — and what actions should be taken to minimize exposure. The index runs from 0 to 500; higher numbers are worse. The EPA uses AQI to give warnings about pollutants.

Table 2-15: US Air Quality Index with Health Recommendations

US AQI Level			PM2.5 (µg/m³)	Health Recommendation (for 24hr exposure)
	Good	0-50	0-12.0	Air quality is satisfactory and poses little or no risk.
	Moderate	51-100	12.1-35.4	Sensitive individuals should avoid outdoor activity as they may experience respiratory symptoms.
	Unhealthy for Sensitive Groups	101-150	35.5-55.4	General public and sensitive individuals in particular are at risk to experience irritation and respiratory problems.
	Unhealthy	151-200	55.5-150.4	Increased likelihood of adverse effects and aggravation to the heart and lungs among general public.
	Very Unhealthy	201-300	150.5-250.4	General public will be noticeably affected. Sensitive groups should restrict outdoor activities.
	Hazardous	301+	250.5+	General public is at high risk to experience strong irritations and adverse health effects. Everyone should avoid outdoor activities.

Wildfire includes forest, brush, crop, or grassland fires, are not common events in Vermont, particularly large forest wildfire events. The 2023 SHMP defines a wildfire as *'An uncontrolled burning of woodlands, brush or grasslands."* These fires have the potential to damage structures and utilities as well as forest and croplands. There were no recorded events in the NOAA database during the last planning period in the state.

"Wildfire conditions in Vermont are typically at their worst either in spring when dead grass and fallen leaves from the previous year are dry and new leaves and grass have not come out yet, or in late summer and early fall when that year's growth is dry." -2023 SHMP

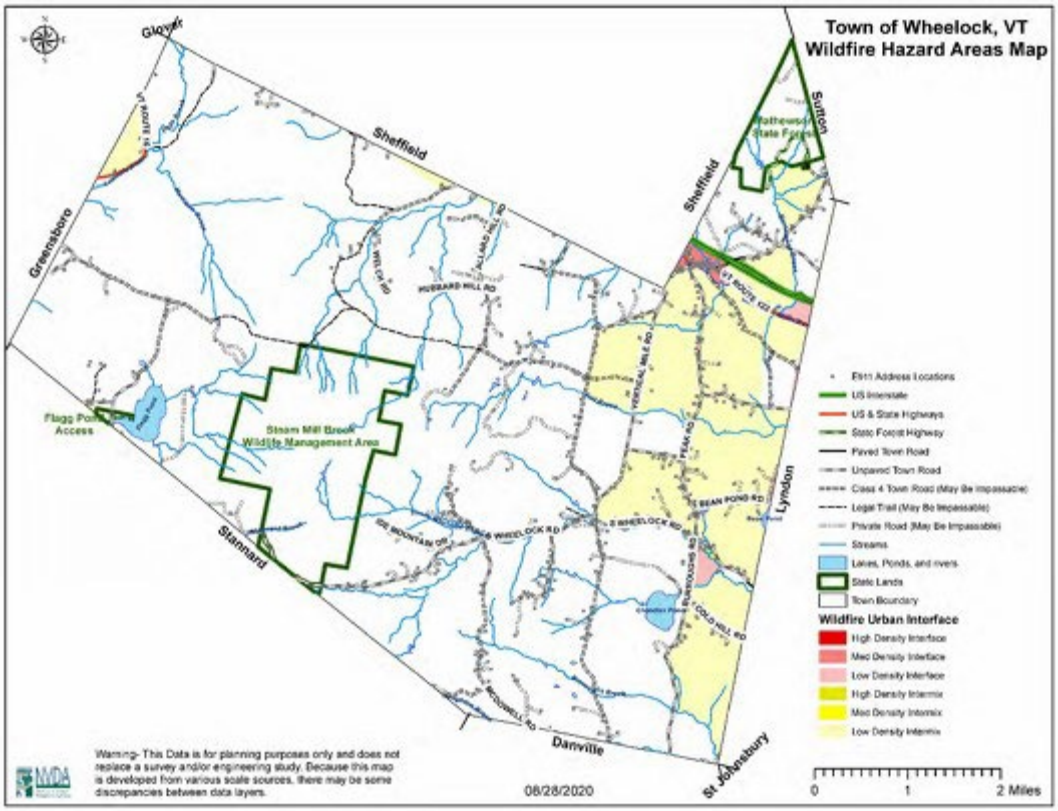
In addition to lack of precipitation, a particular town's vulnerability to large wildfires is directly related to the proportion and continuity of acreage that is forested, pasture and cropland. Although large wildfires are always a threat, particularly for rural communities with large tracts of forested and vegetative land, the Town's vulnerability is mostly dependent upon weather

conditions, Severe weather, and continued efforts on outreach to provide information on steps to prevent wildland fires and enforcement of 'red flag' warnings to restrict controlled burning during dry season. Vermont's prime seasonal conditions for wildland fires are in the spring and fall.

According to the State of Vermont Hazard Mitigation Plan, there has not been a major wildfire in Vermont in the last 50 years. Vermont has a reliable system of local fire suppression infrastructure coordinated at the state-level. Vermont's climate, vegetation type, and landscape discourage major wildfire. However, brush fires or burning debris are the major causes for wildland fires according to the Vermont Department of Forests, Parks, and Recreation.

Forest fires remain a big threat and accessibility into large surrounding forest areas is a concern. Multiple mutual aid departments and lightweight water packs have improved response time. Wheelock has five dry hydrants and has obtained permission from many private pond owners to use water sources if needed.

Map 2-2: Wheelock Wildfire Hazard Map



Infectious Disease

Public health risks, such as those presented by infectious diseases and vector-borne illnesses, are present within every community. The Vermont Department of Health defines an infectious disease as one that is caused by micro-organisms, such as bacteria, viruses, and parasites. A vector-borne illness 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). Most infectious diseases are caused by pathogens that can be spread, directly or indirectly, from person to person. Such diseases may be seasonal (seasonal influenza) or, in the case of new diseases, result in a global pandemic. According to the Vermont Department of Health, infectious disease dynamics depend on a range of factors, including land use, human behavior, climate, efficacy of healthcare services, population dynamics of vectors, population dynamics of intermediate hosts and the evolution of the pathogens themselves. Many of these diseases require continuous monitoring, as they present seasonal threats to the general population. An epidemic emerges when an infectious disease occurs suddenly in numbers that are in excess of normal expectancy. Infectious disease outbreaks put a strain on the healthcare system and may cause continuity issues for local businesses. These outbreak incidents are a danger to emergency responders, healthcare providers, schools, and the public. This can include influenza (e.g., H1N1), pertussis, West Nile virus, and many other diseases. A pandemic is an epidemic that has spread over a large area, that is, it is prevalent throughout an entire country, continent, or the whole world.

Severe weather, global travel, and population density can all influence infectious disease incidence and prevalence. Small communities do have some level of protection from some infectious diseases but others, like Lyme Disease can affect any community. The 2023 State Hazard Mitigation Plan states:

The Vermont Department of Health defines an infectious disease as one that is caused by micro-organisms, such as bacteria, viruses, and 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).

Infectious Disease Trends & Vulnerability According to the Centers for Disease Control (CDC), the number of reported cases of vector-borne infectious disease has more than tripled between 2004 and 2016 . Those infectious diseases that fall into the first threat classification category identified in Table 38 (i.e., currently present in Vermont and which may be exacerbated by Severe weather) are already exhibiting increased prevalence in New England. For example, with both temperature (see: Extreme Heat) and precipitation (see: Inundation Flooding & Fluvial Erosion) expected to increase in Vermont, West Nile Virus mosquito vector activity will likely increase, as well as the vector's period of activity. Similarly, between 1964 and 2010, counts of Eastern Equine Encephalitis (EEE) have continued to rise in New England, though they remain constant in the southeastern states. Perhaps the most significant trend in infectious disease vulnerability in Vermont is that of Lyme disease, where Vermont ranks second in highest rate of disease incidence in the nation. The Vermont Department of Health reports that the number of reported cases of Lyme disease have increased dramatically over the last decade, and with shrinking winters, the potential for infection through tick bite continues to grow. Additionally,

Vermont's increase in forest cover could provide a more suitable habitat for ticks and their hosts, which may lead to further spread of Lyme disease in the State. Outdoor laborers and recreationalists are especially vulnerable to Lyme disease, as exposure to ticks is greater. The southern and western halves of the State are more vulnerable to Lyme disease, as the warmer climate contributes to longer period of vector activity. Vermont is typically not vulnerable to diseases such as HIV/AIDS, SARS, cholera, malaria, and resistant tuberculosis, though they are considered to be major disasters in some parts of the world. However, an incident that caused water supplies to become contaminated or resulted in people eating spoiled food could have significant health implications. An animal infected with the rabies virus would be a localized threat. The potential for large-scale infection of Vermont's commercial animal population with foot and mouth disease, bovine spongiform encephalopathy (i.e., Mad Cow Disease), or any number of poultry viruses, while unlikely, could cause widespread economic problems. A health threat might also result from an act of bioterrorism.

The Vermont Department of Health lists all reportable infectious diseases and that table can be found here. Pandemic planning in Vermont appears to ebb and flow. Following the H1N1 Virus Outbreak in 2009-2010, increased emphasis on pandemic planning was seen across the state. From 2010 to 2019 however, without another major U.S. event, emphasis on pandemic planning diminished. While Vermont, due to its rural nature, has some level of protection from national infection rates during a pandemic, the financial implications experienced during the COVID-19 pandemic in 2020 hit the state extremely hard.

COVID-19 is a new disease, caused by a virus not previously seen in humans. COVID-19 is highly contagious and people with COVID-19 who do not have any symptoms can spread the virus to other people. On March 13, 2020, President Trump declared a nationwide emergency pursuant to Sec. 501(b) of Stafford Act to avoid governors needing to request individual emergency declarations. All 50 states, the District of Columbia, and 4 territories have been approved for major disaster declarations to assist with additional needs identified under the nationwide emergency declaration for COVID-19. Additionally, 32 tribes are working directly with FEMA under the emergency declaration. FEMA announced that federal emergency aid has been made available for the state of Vermont to supplement the state and local recovery efforts in the areas affected by the Coronavirus Disease 2019 (COVID-19) pandemic beginning on January 20, 2020, and continuing. Public Assistance federal funding was made available to the state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency protective measures (Category B), including direct federal assistance under Public Assistance, for all areas in the state of Vermont affected by COVID-19 at a federal cost share of 75 percent.

In early 2020, there was a quick return to the tenets of effective pandemic planning. Preparing for hospital surge, high death rates and the medical equipment necessary for both patients and health care workers are examples of the state's early focus. Public information and guidance on safety, isolation, travel, and quarantine also became extremely important while mitigating the pervasive economic consequences of reducing work forces, sending students home, and closing businesses. Additionally, Vermont had to consider the implication of, and work to control, the immigration of people from other states. Both infection risk and taxing of local resources were the main concerns associated with this real consequence of the pandemic.

While the Northeast Kingdom remained insulated from infection rates (and subsequent deaths) seen elsewhere in the state (e.g., Burlington), issues of border closure, implementing safety protocol and procedures and economic resilience were experienced in every community, including Wheelock. Despite having relatively low illness and death, the economic and operational consequences of pandemic are of concern to the town. Having the capacity to navigate the funding opportunities as result of the pandemic for the town and residents is a concern in addition to providing resources to residents to mitigate spread (e.g., testing and vaccination services) and assure continuity of operations for government and community-based organizations. *(https://www.healthvermont.gov/response/coronavirus-covid-19/current-activity-vermont#town*

While major disease outbreaks are uncommon, public health emergencies can become stand-alone disasters that compound the threat of other natural hazards and exceed local and state capacity. There is precedent for federal assistance due to public health emergencies including West Nile Virus (2000), a mosquito-borne disease, for which a Federal emergency declaration was made in New York and New Jersey, and the COVID-19 pandemic, which resulted in a major disaster declaration in all states, territories, and the District of Columbia.

High Winds

High winds can occur during a range of hazard events, including those weather systems described below, or can simply be the result of differences in air pressures and flow down a mountain. When winds are sustained at 40-50 miles per hour, isolated wind damage is possible. Widespread significant wind damage can occur with higher wind speeds, including but not limited to downed trees and power lines, flying debris, transportation disruptions (road closures or roads made impassible in remote areas), damage to buildings and vehicles, and threats to human life and safety. A high wind warning is issued by the National Weather Service when sustained winds of 40 miles per hour or greater or gusts to 58 miles per hour or greater are expected.

Since 2021, there have been 20 high wind events county-wide. High winds often occur in conjunction with a thunderstorm and can gust up to 50 mph, causing property damage and disruption in electric and telecommunication utilities, transportation and commercial businesses. Although difficult to predict, these storms also pose a high risk of injuries and loss of life. The downward draft from these storms can produce microbursts which are not uncommon in Vermont. These events can come with wind speeds in excess of 80 mph and pose an additional threat to low flying aircraft making it difficult for them to maintain altitude. Although less common in Vermont, super cell thunderstorms are the largest, longest lasting and most devastating thunderstorms which can produce tornadoes and widespread destruction of crops and property. Tropical storms, hurricanes, nor'easters, and winter storms can also cause high wind damage throughout the state.

The Beaufort Wind Scale shown below can be used to predict damage based upon wind speeds. The National Weather Service issues wind advisories when sustained winds of 31-39 miles per hour are reached for at least one hour or gust between 46-57 miles per hour and High Wind Warming for winds of 58 mph or higher. Thunderstorm winds tend to affect areas of Vermont

with significant tree stands as well as areas with exposed property and infrastructure and aboveground utilities.

Table 2-16: Beaufort Wind Scale

Beaufort Wind Scale		
Classification #	**Wind Speed**	**Land Conditions**
6	25 to 31 mph	**Large branches in motion; whistling in telephone wires**
7	32 to 38 mph	**Whole trees in motion; inconvenience felt walking against wind**
8 to 9	39 to 54 mph	**Twigs break off trees; wind generally impedes progress**
10 to 11	55 to 73 mph	**Damage to chimneys and TV antennas; pushes over shallow rooted trees**
12 to 13	74 to 112 mph	**Peels surfaces off roofs; windows broken; mobile homes overturned; moving cars pushed off road**
14 to 15	113 to 157 mph	**Roofs torn off homes; cars lifted off ground**

Table 2-17: Wheelock Building Exposure to Flood and Wildfire Hazards

Total Buildings	Buildings in SFHA/%	Buildings in wildfire hazard area/%
546	**109/4%**	**1766/65%**

Hail

Hail is a form of precipitation composed of spherical lumps of ice. Known as hailstones, these ice balls typically range from 5-50 millimeters 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 by which it is produced. No matter the size, hail can damage property, young and tender plants, and cause bodily harm to those people caught outside without shelter. Hailstorms usually occur in Vermont during the summer months and generally accompany passing thunderstorms. While local in nature, these storms can be significant to area farmers, who can lose entire fields of crops in a single hailstorm. Large hail is also capable of property damage, to include both structures and vehicles. Hailstone size can range from the size of a pea to the size of a melon. The severity of hailstorms can be determined by the TORRO Hailstorm Intensity Scale. The scale extends from H0 to H10 with its increments of intensity or damage potential related to hail size (distribution and maximum), texture, numbers, fall speed, speed of storm translation, and strength of the accompanying wind.

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Table 2-18: The TORRO Hailstorm Intensity Scale (H0 to H10)

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, crops, vegetation
H3	Severe	20-**30**	>300	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
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**		(Severest recorded in the British Isles) 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

Table 2-19: TORRO Hailstorm Intensity Scale

Size code	Maximum diameter (mm)	Description
0	5-9	Pea
1	10-15	Mothball
2	16-20	Marble, grape
3	21-30	Walnut
4	31-40	Pigeon's egg > squash ball
5	41-50	Golf ball > Pullet's egg
6	51-60	Hen's egg
7	61-75	Tennis ball > cricket ball
8	76-90	Large orange > soft ball
9	91-100	Grapefruit
10	>100	Melon

Hail events are an occasional occurrence in the planning area, and those events that do occur tend to be highly localized and limited to a relatively small area. NOAA historical records indicate 62 reported events in Caledonia County since 1950, causing $87,000 in property damage but no recorded human casualties. Hail will continue to be a likely occurrence in the planning area, given the frequency with which Caledonia County has experienced some form of hail event. NOAA reports two hail events during the last planning period but both were specific to other towns within the county.

Profiled Natural Hazard Summary

The natural hazards impacting Vermont communities are, for the most part, homogenous. Each town and city in the Green Mountain State are called to assess their capabilities in mitigating the ongoing relationship we all share with mother nature when that relationship becomes a difficult one. The data and information presented above, combined with the knowledge of living, and experiencing life in our town, serves as the foundation of that assessment which is required to define achievable and viable mitigation strategies that can serve to protect both the safety and financial investments of the town and its residents.

SECTION 3: RISK ASSESSMENT

3.1 Designated Hazard Areas

3.1.1. Flood Hazard Areas

A special flood hazard area is defined in terms of likelihood of damage in a one hundred (100) year period. A floodway is the pathway and watercourse that must be reserved to carry flood water away during the 100-year incident. There are 26 buildings in the SFHA (estimated from e911 sites) and this number equates to 4% of all buildings in the town. One of these is the town garage. The town does not participate in the NFIP and does not have zoning.

The Miller's Run and the Lamoille River are the only water courses in the town that have a FEMA Flood Insurance Rate Map (FIRM) and that show a Special Flood Hazard Area (SFHA). These maps were created in 1974 and were not part of any flood study. Therefore, they are general at best. There is no clear way to determine what structures are in or out of the flood zone based on the map alone because of the general nature and the scale of the mapping. Further, no FIRM was ever created for areas along the South Branch in the southern part of the town. There are known areas that flood along that water course. It is difficult to determine the flooding hazards without further mapping of these areas.The table below summarizes structures in the SFHA and associated flood insurance policies.

Table 3.0: Wheelock Community Report Summary

26	Buildings in the Special Flood Hazard Area (SFHA) (estimated from e911 sites).
Hazard Maps For Manufactured Home Communities	None
0	Flood Insurance Policies in SFHA (Zone A, AE, AO, A 1- 30)
?	Percent of buildings in the SFHA with flood insurance in force.
1	Critical or public structures in SFHA or 0.2% flood hazard area (est. from e911 sites.)
4%	Percent of buildings in the SFHA.

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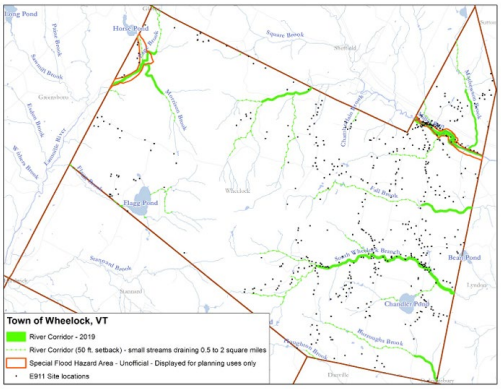
3.2 Fluvial Erosion Hazard Areas

About two-thirds of Vermont's flood-related losses occur outside of mapped floodplains, and this reveals the fundamental limitations of the FEMA FIRMs. A mapped floodplain makes the assumption that the river channel is static but river channels are constantly undergoing some physical adjustment process. This might be gradual, resulting in gradual stream bank erosion or sediment deposit – or it might be sudden and dramatic, resulting in a stream bank collapse. The losses experienced during historic flood events are most often related to the latter. This type of flood-related damage occurs frequently in Vermont, due in part to the state's mountainous terrain. Land near stream banks are particularly vulnerable to erosion damage by flash flooding, bank collapse, and stream channel dynamics. The Vermont Department of Environmental Conservation, Agency of Natural Resources, has identified river corridors, which consist of the minimum area adjacent to a river that is required to accommodate the dimensions, slope, planform, and buffer of the naturally stable channel and that is necessary for the natural maintenance or natural restoration of a dynamic equilibrium condition. In other words, the river corridor provides "wiggle room" for a stream as its channel changes over time. Keeping development out of the river corridors therefore reduces vulnerability to erosion.

3.3 River Corridors

The State River Corridors were mapped to assist municipalities throughout Vermont identify areas that will likely be subject to fluvial erosion. The mapping is based on what is known of stream dynamics, and a variety of physical features, including drainage area of the streams. Detailed Phase 2 Stream Geomorphic data is available and can be used to further refine the mapped River Corridors. Although the State does not regulate uses within the River Corridor except for certain uses that are exempt from local zoning (like agricultural uses), the general recommendation is that new development in such areas should not significantly exacerbate flooding and fluvial erosion. GIS river corridor maps are now available online from the VT Agency of Natural Resources, which are more extensive than the NFIP hazard areas. Maps can be found at tinyurl.com/floodreadyatlas.

Map 3-1: Wheelock River Corridor Map



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3.4 Repetitive Loss Properties

Structures in Wheelock have suffered damage due to flooding. Wheelock residents have had to turn to other FEMA programs for financial assistance following severe storms. There is one current residential property in cue for a FEMA buy-out due to repetitive damage but there are no prior examples of property acquisition projects.

3.5 Previous FEMA-Declared Natural Disasters and Non-Declared Disasters

While the Town of Wheelock has had a history of flooding, losses to public infrastructure have intensified in recent years. The previous planning period included three major flood events that caused significant damage throughout the town. The 2024 flood event was the worst in town history.

Table 3-1: Flood Disaster Summary

Disaster Number	Declaration Date	Incident Type	Number of Projects	Federal Share Obligated
1428	07/12/2002	Severe Storm(s)	3	$32,865.69
1559	09/23/2004	Severe Storm(s)	3	$6,109.80
1698	05/04/2007	Severe Storm(s)	2	$6,701.09
1790	09/12/2008	Severe Storm(s)	2	$9,905.74
4001	07/08/2011	Severe Storm(s)	26	$469,139.67
4022	09/01/2011	Hurricane	3	$30,741.07
4140	08/02/2013	Flood	1	$46,828.01
4178	06/11/2014	Flood	1	$10,357.80
4720	07/10/2023	Severe Storms	3	$118,870
4810	7/9/2024	Severe Storm, Flooding, Landslides, and Mudslides	12 funded, 2 in process, not including 2 for which Scope Change will be requested	$625,445

Non-declared disasters have resulted in severe damage as well. Specifically, the 2025 flood event where the request for a federal disaster declaration was denied.

As with any municipality, maintaining transportation routes through road, bridge and culvert repair and replacement is ongoing and requires fiscal, environmental, communication and engineering planning to be successful. The work accomplished in Wheelock since 2021 that was not directly related to a declared disaster has supplemented the work accomplished in direct response to disaster-related damage to town roads and bridges. The cumulative effect of this work has served to enhance overall resilience to future events while assuring to the best degree possible, consistent use of transportation infrastructure in the face of severe weather.

3.6 Future Events

The town expects severe weather, especially flooding, to impact the planning area with damage. The frequency of flood events and other, less common types of severe weather (e.g., extreme heat, drought) during the last planning period supports this expectation.

3.7 Hazard Summary

Flooding remains the most likely event to incur the most cost for the town based on historical analysis and disaster declaration-related funding since 2011. All have been a result of severe rainstorms. Given the magnitude of damage during DR4810, the realization that a major flooding event can result in major expense is evident and likely to have a significant impact over a smaller area while a severe winter storm tends to affect the entire town. As with most Vermont towns, there is almost an inherent resilience to winter weather events because they are expected. However, as severity increases and consequences mount (e.g., power outage, road closures, etc.), the risk for health and safety also increases. Drought poses risk to the health and longevity of aquatic species, terrestrial livestock, and people while increasing the risk of wildfire. Extreme temperatures can be tied to other hazards and create problems for people and infrastructure independent of other hazards. Vermont has become an unexpected hotspot for tornadoes in New England in 2026, with all three confirmed tornadoes in the region occurring in the state. While this does not necessarily indicate a long-term increase, it highlights the variability and potential for severe weather even in typically low-risk areas.

SECTION 4: VULNERABILITY ASSESSMENT

Vulnerability refers to the potential impact of a specific loss related to an identified risk. While the loss of any one facility would cause a disruption in town services and operations, the overall vulnerability is moderate. There are roads, bridges, and culverts vulnerable to flooding and those are identified below. Loss of equipment function for the PW department is a vulnerability for the town but the risk is not due or predicted to be a result of a disaster, merely, the required maintenance expected of highway-related machinery. 200 structures are in the town's mapped Flood Hazard Area, but none are critical infrastructure. However, the town is vulnerable to loss during a disaster. The table below summarizes major town structural assets from current grand list:

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Table 4-0: Town Structure and Land Asset Summary

Property Description	Real Value
Hearse House	LAND: See garage BUILDING: $9300 TOTAL: $9300
Sheffield/Wheelock Fire Department Sub-Station	LAND: $12000 BUILDING: $264200 TOTAL: $276200
Sheffield/Wheelock Transfer Station	LAND: See Town Hall BUILDING: $30300 TOTAL: $30300
Town Hall	LAND: $63000 BUILDING: $156100 TOTAL: $219100
Town Garage	LAND: $20700 BUILDING: $107300 TOTAL: $128000
Sutton Rd Garage (storage only)	LAND: See town hall BUILDING: $46200 TOTAL: $46200
Loader Shed	LAND: See town hall BUILDING: $8900 TOTAL: $8900

Of the profiled hazards, the following vulnerability rating (high, moderate, low) is given below. The vulnerability rating is based on the disaster case history for the town and when the greatest financial impact was seen due to the disaster. A "high" vulnerability reflects substantial case history (≥2 in last five years) of events with an economic impact requiring action. A "moderate" vulnerability reflects limited case history (< 2 in last five years) of an event with and economic impact requiring action. A "low" vulnerability reflects little to no case history in the last five years. The specific vulnerability to the population as a whole or any specific sub-population (e.g., older adults) is subjective because there is no historical data to rank vulnerability to health and safety of Wheelock residents, workers, or travelers.

4.1 Vulnerability Narrative for Profiled Hazards:

Severe winter/ice storm: Moderate

Summary: While snow and ice events are distinct hazards, the likelihood of these two hazards occurring at a level of concern is considered equal. While a major ice event can have catastrophic consequences for the entire planning area, these events are rare. While all structures are vulnerable to major snow loads, there is little evidence to support concern over structure failure due to snow loads on roofs, ice on gutters, etc. Town snow removal equipment is vulnerable to damage with greater use, especially during emergency situations as well as road damage from plowing. Populations caught outdoors, commuting, or working outside during a severe winter storm are more vulnerable to cold-related injury and/or snow related accidents, but winter comes every year and residents, and the town are accustomed to making intelligent decisions regarding safety and protection of infrastructure. Special populations (e.g., aging, disabled, etc.) are more vulnerable in terms of mitigating structure loads, hazardous travel and relocating to safety.

Extreme Heat and Cold: Moderate
Summary: Recent evidence shows that greater extremes in temperature and overall weather fluctuation are occurring with increased frequency. A long-duration cold snap can cause significant damage to structures due to bursting pipes and the residential health and safety considerations include factors related to financial resources, fuel supply, sheltering, provisions and employment. Because most homes in Wheelock have very limited air conditioning, extreme heat is a risk for the town because of the health and environmental variables associated with this growing threat.

Infectious Disease: Moderate
Summary: Not only is the COVID-19 current during the drafting of this plan but it will likely remain active for some time to come. While Vermont has remained relatively insulated from the worst-case scenarios already seen in other states in regard to infection rates and deaths, there have been significant financial impacts for the region and state. There are several important considerations for the town and villages to take on. Issues such as tax revenue reductions from failure to pay on a large scale to how a major storm event could compromise pandemic response (e.g., sheltering operations and resource allocation).

Flooding (including fluvial erosion/landslide/inundation): High
Flooding is the most common recurring hazard in the state of Vermont. There are three main types of flooding that occur in Vermont: flooding from rain or snow melt, flash flooding and urban flooding. Flooding has also been known to occur as a result of ice jams in rivers adjoining developed towns and cities. These events may result in widespread damage in major river floodplains or localized flash flooding caused by unusually large rainstorms over a small area. The effects of all types of events can be worsened by ice or debris dams and the failure of infrastructure (especially culverts). Rainstorms are the cause of most flooding in Wheelock. Winter and spring thaws, occasionally exacerbated by ice jams, are another significant source of flooding, especially when coupled with high rain levels. Much of this flooding is flash flooding, occurring within hours of a rainstorm or other event. Flash flooding, as opposed to flooding with a gradual onset, causes the largest amount of damage to property and infrastructure. Floods cause two major types of damage: water damage from inundation and erosion damage to property and infrastructure.

Previous experiences have proven to the town that flooding is the greatest risk and another flood event is probable. With this conviction, the need to complete viable mitigation actions to town infrastructure becomes incredibly important and the town remains aware of this. The estimated Capacity-Disruption Levels Given a Measured Rainfall Event can be interpreted as the conditional probability that a particular roadway capacity disruption occurs, given that a rainfall event occurs.

Drought: Moderate
Summary: While relatively rare, the potential for extreme weather patterns, including heat, are on the rise. A drought scenario has both direct and indirect costs and consequences that can often be difficult to respond and recover from. During drought situations, wells will often need to be dug deeper and when there is such a drastic increase in demand for contractors, the wait times to

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get water flowing again can be long. As with any disaster, the capacity to adequately respond is surpassed and in a major drought, this holds true. With recent rains and flooding, a drought scenario seems almost implausible, but history has shown that they do occur and like flooding, the consequences could be severe and long-lasting.

Wildfire: Moderate
Summary: An assessment of town structures vulnerable to structural fire would be based on age and proximate location to other high-risk structures. Community assets are not particularly vulnerable to wildfires as they are typically located in town centers and away from large tracts of forested and vegetative land. However, with expectations of more frequent drought conditions and increased wildfire risk, the town will plan to use available resources, like Firewise outreach programs, to educate community on how to minimize the risk of brush and wildfires and to issue dry weather alerts when the risk wildfire is high. Higher death rates from fire statistically correlate to population factors including elderly population, adult smokers, poverty rates, and education. The most significant common factor in fire fatalities in Vermont continues to be the absence of a functioning smoke detector in the sleeping area of residential structures. In Vermont, structure fires can be caused by improperly disposing of ashes with live coals from wood stoves, lit cigarettes, failure to clean creosote from solid-fuel heating equipment chimneys, or faulty electrical wiring.

Although structural and wildfire incidents in Wheelock have been minimal in recent years, the probability of occurrence remains high with the projection of more extreme temperatures and continued periods of drought due to severe weather. Wheelock residents remain particularly vulnerable to structural fires, which are more likely to cause physical harm and damage to homes, because many of the residents heat their homes using wood or pellet burning stoves and other riskier means.

Hail: Moderate
Communities with high concentrations of unprotected assets—such as older buildings with fragile roofing, unshielded vehicles, or crops in peak growth stages—are particularly sensitive. Vulnerability is amplified in areas where buildings do not have hail-resistant materials, insurance coverage is limited, or early-warning systems are underdeveloped.

Invasive Species: Moderate
Assessing the vulnerability of species to Severe weather is a key step in anticipating climate impacts on species. Vulnerability assessments characterize species' future conservation needs and can guide current planning and management actions to support species persistence in the face of Severe weather. Changing climate conditions have bearing on every aspect of biological invasions, in some cases worsening existing problems. Severe weather is creating new pathways for invasive species to be introduced, such as shipping routes that open up as sea ice retreats. Warmer temperatures can allow existing invasive species to expand their range into habitat that is currently too cool. Similarly, impacts to native species and people may change if new conditions affect invasive species abundance. Severe weather may make existing invasive species control tools less effective, such as aquatic barriers that require minimum water flows (USGS).

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High Wind: Moderate
Given that high wind events often occur in conjunction with rain events, there is potential for a duel threat that could impede response efforts to major flood event (e.g., downed limbs or power lines blocking access, loss of power, etc.). High wind events are to be expected and normally pass without major incident. But given increases in weather severity and frequency, the town is vulnerable, especially during colder months when the loss of power could cause a health and safety issue.

4.1 Infrastructure

Flooding is the highest risk profiled hazard and town infrastructure has high vulnerability to damage during major flood events. The information presented below summarizes town infrastructure and high vulnerability areas.

4.2.1 Town Roads and Highways

Vermont's local roads are classified according to their importance and general use. This classification system applies to all town highways and is used to determine the amount of state highway assistance provided to each community. Interstate 91, which runs through the north end of Wheelock, is a major connecting highway for cities in the northeastern United States and Quebec, Canada. Exit 23 provides access to South Wheelock and to the South Wheelock Road. Exit 24 provides access to Route 122 to the east of the village. State Highway 16, running north-south, passes through northwest Wheelock. State Highway 122, running east-west, passes through the Village of Wheelock, connecting State Highway 5 north of Lyndonville with State Highway 16 in Glover.

The Town of Wheelock maintains approximately 40 miles of public highways. The most recent Wheelock Mileage Map can be found here. The only Class II highway in Wheelock is the South Wheelock/Stannard Mountain Road. It is an east-west road connecting State Highway 5 in Lyndon and State Highway 16 in Greensboro Bend. Traffic on this road has increased significantly over the years. The road is traveled seven days a week, 24 hours a day. The road is now a popular connector route between Hardwick and Lyndonville. Residents report concerns about speeding. There are 22.02 miles of Class III road in Wheelock. Roads that are part of the school bus route receive priority scheduling for plowing and maintenance. Several Class III roads are steeply sloped. There are about 19 miles of Class IV road in Wheelock. The town is responsible for the maintenance of the bridges and culverts on Class IV roads and the property owners are responsible for plowing and road maintenance. Town policy related to this is included below:

> *"The Town may not provide any summer maintenance of class 4 highways except for the maintenance of bridges and culverts and to control erosion of highways or runoff to adjacent property, and removal of obstructions as required by necessity, and for the public good and convenience of the inhabitants of the town."*

Property owners have expressed concerns about the conditions of Class IV roads and requests for the highway department to do more work on Class IV roads are increasing. There is a lot of room for interpretation in "*As required by necessity and for the public good*." However.

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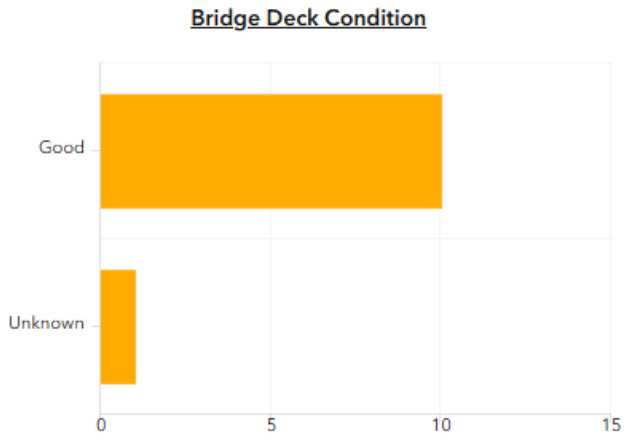
Most of the seasonal camps in Wheelock are located on Class IV roads and a few year-round residences. Class IV roads are used for hiking, skiing, hunting, biking, ATV's, and snowmobiles. All town roads are open to and used by loggers to reach their work sites. Concerns have been expressed about damage to Class IV roads caused by heavy logging equipment.

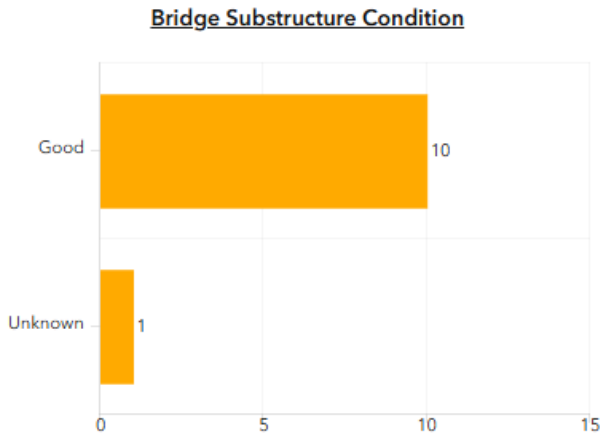
4.2.2 Bridges, Culverts, and Dams

Wheelock's Town Highway Department, aided by NVDA, has done a thorough job of maintaining an inventory of the town's road infrastructure on Vermont's online bridge and culvert inventory tool (www.vtculverts.org). Due to the increased frequency and severity of rain/flood events in Wheelock, the town highway department is in the process of seriously reassessing all culverts and bridges with proposed replacement and rehabilitation. Major culvert and bridge replacement or rehabilitation projects are may be funded through competitive Roadway and Structures grants offered by VTrans, but there is not enough funding to cover all projects. Due to the funding structure, in order to obtain funding from the bridge and culvert program, municipalities must participate in the regional Transportation Advisory Committee (TAC) to be placed on the priority list, which is reviewed yearly. Stormwater-related improvements are required on town roads to comply with Municipal Roads General Permit requirements, which took effect in 2018 with at least 15% of non-compliant segments upgraded to meet standards by 2021-22 and full compliance by 2036. Wheelock is active with the MRGP Grants-in-Aid program as well as the Better Roads grant program; all sections of road eligible in this program must be hydrologically connected for funding consideration.

Bridges

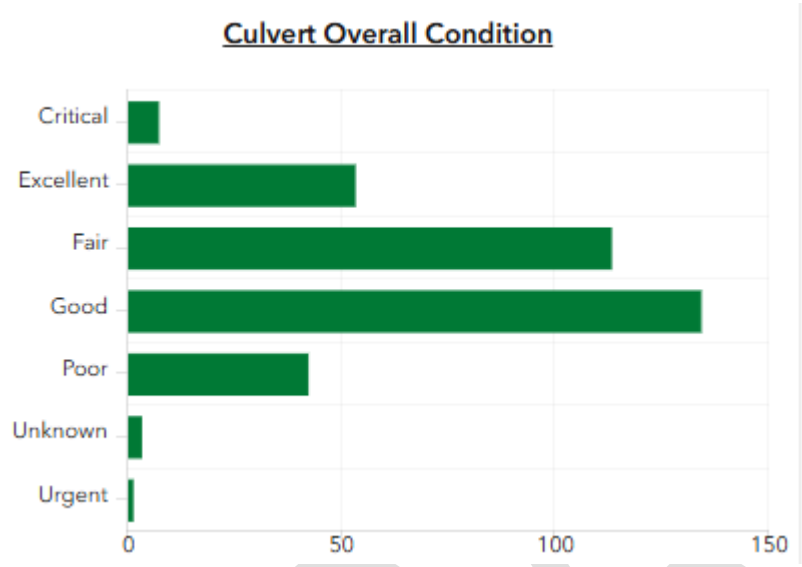
Briges are extremely critical and costly structures. Repair and replacement costs frequently enter into the millions. Regionally, the vulnerability of bridges to flood damage became evident from the damage seen to Vermont bridges in the 2011 storms and again in 2023 and 2024. Successfully mitigating scour-related problems associated with bridges depends on the ability to reliably estimate scour potential, design effective scour prevention and countermeasures, design safe and economical foundation elements accounting for scour potential, and design reliable and economically feasible monitoring systems. There are 11 bridges in town. Below is the most recent data from VTCulverts.org:





Culverts

The combination of roads, steep slopes, and running water not only constitute areas of higher road erosion risk, it also often marks areas where the Town of Wheelock has installed and maintains culverts and bridges. VTCulverts.org shows that Wheelock has 353 culverts and this resource rates importance and status of these culverts. Below is the most recent report from VtCulverts.org:



Dams

The 2023 Vermont State All-Hazards Mitigation Plan states the following:

"While a rare occurrence, dam failure and resulting flooding can be devastating and threaten life and property downstream of dams. Dam failure can occur not only during large storms and high flows, but also during normal, sunny day conditions. While the depths and extents of flooding caused by dam failure are most severe during storms when reservoir elevations and rivers are at their highest, the public is generally conscious of flooding under these conditions. For this reason, it is often the sunny day failure scenario, that occurs with no warning, that is most dangerous. Dam failure is caused by the overtopping or structural failure of a dam resulting in a significant, rapid release of water, which can lead to flooding. Structural failure can be caused by many factors, such as internal soil erosion in earth embankment dams, sliding or overturning of concrete dams, gate failure, or caused by other means, such as deliberate sabotage. Dams are classified according to their potential for causing loss of life and property damage in the area downstream of the dam if it were to fail using the general classification system: High Hazard, Significant Hazard, and Low hazard. It is important to note that the hazard class is independent of the condition of a dam. Depending on the entity that regulates the dam, these definitions have minor but notable differences. In Vermont, dams are regulated by four distinct entities depending on the purpose and owner of the dam:

• Dams that are part of the production of power (i.e. hydropower) constructed before 1935 (with a few exceptions) are regulated by the State of Vermont Public Utility Commission (PUC). The PUC regulates approximately 25 dams, six of which are considered HIGH hazard and five of which are considered SIGNIFICANT hazard.
• Hydropower Dams constructed after 1935 (with a few exceptions) are regulated by the Federal Energy Regulatory Commission (FERC). FERC regulates approximately 80 dams, 18 of which are considered HIGH hazard and seven of which are considered SIGNFICANT hazard.
• Dams owned by the Federal Government (i.e. United States Army Corps of Engineers, USACE) are essentially self-regulated by that agency. Federal entities regulate approximately 5 HIGH hazard dams and one SIGNIFICANT Hazard dam.
• Non-federal, non-power dams are regulated by the Department of Environmental Conservation, (DEC). The DEC regulates approximately 41 HIGH Hazard Dams and 110 SIGNIFICANT hazard dams.

In 2018, the Vermont State Legislature passed a law updating the existing regulation of dams, Statute 10 V.S.A. Chapter 43 which applies to the DEC and PUC. The purpose of the law is to serve to protect public safety and provide for the public good through the inventory, inspection, and evaluation of dams in the State. The law aims to provide a definition for a dam, update and modernize the State's dam inventory and give the DEC rulemaking authority for items such as exemptions, registration, hazard classifications, EAPs, inspections and design standards. These rules will be developed over the next several years."

Following DR4720 in 2023, state inspectors fanned out to examine the conditions of more than 350 dams in Vermont. Inspectors found defects in at least 60 dams. Five of those dams were classified as "high" hazard, which means a "probable or certain" loss of life downstream in case of failure. Twenty-two were "significant" hazards — like the Chandler Pond Dam — meaning failure could cause "major or extensive" property loss. However, none of those 27 dams are "at risk of imminent failure" and Chandler Pond is rated as "fair".

The National Inventory of Dam (NID), as part of the US Army Corp of Engineers, maintains a database of nearly 93,000 dams. Of these, 76% are "high hazard with an Emergency Action Plan (EAP)".

The primary purpose of Chandler Pond is water supply. The dam stores water for municipal, industrial, or agricultural use, helping ensure a reliable supply for the surrounding area. The dam is owned by Village of Lyndonville. It impounds the South Wheelock Branch-TR near Wheelock and is considered a vital resource for the community.

The dam stands 21 feet tall and stretches 470 feet across, creates a reservoir covering 65 acres, has a maximum storage capacity of 1,075 acre-feet, and collects water from a drainage area of 1 square miles. Completed in 1890, the structure is over a century old. Dam failure in Wheelock is possible, but unlikely and does not pose risk to human life.

4.2.3 Water and Wastewater

Wastewater in Wheelock is served by individually owned septic systems. Water supply is 100% groundwater, provided through private water wells/springs, including the Wheelock Fire District 1, 0005049, that is fed by a spring and serves 20 hookups in Wheelock village. The District is

run by its members, not by the Town. The Town Hall is one of the hookups served by the District.

Critical Facilities

The Center for Disaster Management and Humanitarian Assistance defines critical facilities as: "Those structures critical to the operation of a community and the key installations of the economic sector." As mentioned in the summaries above, some critical facilities have increased vulnerability during specific hazard events. The Town Garage is in the Special Flood Hazard Area (SFHA) and potential relocation is an action for the town to consider.

4.3 Estimating Potential Losses in Designated Hazard Areas

The FEMA flood maps are old and usually very hard to read. FEMA is developing new maps that will have more detail with orthophotos to help identify landmarks. There are two phases of map release: the release of the work (draft) maps, followed by the release of the preliminary maps. Some draft maps have already been released for Caledonia County towns in the Lamoille watershed. The data is being developed through base level engineering (BLE) and is based on the concept that flooding occurs along streams and rivers. BLE uses LIDAR (Light Detection and Ranging) to determine the contours of land. This technology puts rain discharge on the landscape then tees it up to match downstream fluvial flooding. Essentially, it helps to determine a more realistic picture of how much water can be stored in areas along streams, rivers, and ponds – and how high the water can get in significant flood events.

There are 26 structures in the SFHA. Damage to infrastructure and/or residential housing can exceed 1%. Bridges pose the greatest financial strain to repair. Specific asset vulnerability is included in the table below with considerations for severe weather, new development, and changing demographics. Specific to infectious disease, extreme cold and heat, new development is not considered a significant factor in changing vulnerability. Changing demographics, especially an aging and more vulnerable population, however, poses enhanced vulnerabilities.

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Table 4-1: Town of Wheelock Hazard Risk and Vulnerability Summary

Hazard (probability)	Vulnerability	Extent (Storm Data from most severe event)	Impact (economic/health and safety consequence)	Climate, population, land use, and development change impact
Flood (high)	Culverts, bridges, road infrastructure. There are 26 structures within the 100-year Flood Hazard Area.	In July of 2023, a foot of rain fell in nearby Montpelier and Rutland. This is the most rain in any month on record. event. The greatest 24-hour rainfall record for the immediate region occurred in late August 2011 at 4.01''. The greatest level of precipitation in any month occurred in August 2011 at 11.12'' No detailed data was available for fluvial erosion damage in town in terms of numbers of acres lost during each event.	DR4810 will likely result in the greatest financial cost to the town. Federal share for recovery costs were over $625,000 with two projects not yet completed as of 7/9/202. Prior to 2024, DR 4022 (2011) resulted in the greatest financial impact and damage to roads and bridges with nearly $100,000 in FEMA funding. There is a significant bridge issue in the town. The Fall Brook Bridge was ordered closed by the state and 7 families were cut off because of the closure. The town spent 30 days and $140k to make a .5mile section of class 4 road passable.	Severe weather can bring more severe rain events, increasing frequency. Mitigation actions may not occur fast enough to reduce repetitive damage to an area. Land use changes that decrease natural protection systems (tree cutting for lumber) increase vulnerability while repetitive damage properties can be acquired to reduce vulnerability. Population growth can increase development in higher risk areas. Population changes that decrease individual capacity to respond, recover from flooding increases overall vulnerability.
Fluvial erosion, inundation, and landslides (high)	In most areas where roads cross waterways, including bridges and culverts. Areas of steep slopes.	Road scouring results from drainage issues. Erosion occurs at shoreline but poses little risk.	People can be negatively impacted by fluvial erosion through disruption in property integrity and in severe cases, dangerous acute scenarios during where erosion poses immediate safety risks during travel or inside a home. Further inundation flooding brings risk of drowning, property damage and subsequent health and safety concerns (e.g., structural integrity following flood damage, contaminated water supplies, septic failure, and mold). Landslides	Land use changes that decrease natural protection systems (tree cutting for lumber) increase vulnerability.

			could pose safety risk to people located withing the landslide zone and/or during travel where acute landslide could down trees that could land on vehicles or bury them in debris	
Extreme Cold/ Snow/Ice Storm (high)	Elderly & handicapped populations, remote structures, old/under insulated structures, public infrastructure and utilities, telecommunications, trees, school system.	Snowfall has varied, from a few inches to over a foot or more. Heavy snow and wind may down trees and power lines. Snow/ice contributes to hazardous driving conditions. The winter of 2010-2011 was the third snowiest on record with a total of 124.3 inches for the county. The record for the county was 145.4 inches set in 1970-1971.	For roof collapse: monetary damages will depend on each structure but, collapse of barn roof is often a total loss. This does not include the loss of livestock. The collapse of a house roof may be at a 50% loss. For car crashes due to poor driving conditions: minimal damage to vehicle to totaled vehicle and operator injury. Health impacts could vary significantly. Loss of energy or communication capabilities may occur and impede recovery.	Older adults and other vulnerable populations have increased vulnerability due to reduced resilience to extreme temperatures in addition to the ability to mitigate (e.g., shovel snow, stay warm, and meet activities of daily living (ADLs). Severe weather can produce more extremes in temperature and winter precipitation. There is no anticipated development that would increase the town's vulnerability to extreme cold, ice, and snow. However, in the future, Wheelock is expected to see more heavy, wet, snow events that would increase impacts to power lines, and could increase impacts on critical assets.

Infectious Disease (moderate)	The entire planning area is vulnerable in both health and financial stability. While the main vulnerability is people and financial stability, any material asset requiring consistent maintenance is at risk if continuity of operations is impacted.	COVID-19 has far-exceeded severity of 2009-2010 HINI Pandemic.	2020 COVID-19 has resulted in the greatest infectious disease-related financial consequence for the planning area in history.	Severe weather can potentially create weather patterns conducive to increased transmission and/or creation of an infectious disease. Any change in development or land use creating increases in population density increase vulnerability as does any population change defined by reduced immunity and ability to mitigate risk of infection (e.g., elderly, communal housing residents).
Extreme heat/drought (moderate)	The entire planning area is vulnerable. Specific assets include older populations, children, people who work outdoors, and transportation infrastructure. Extreme heat often results in the highest annual number of deaths among all weather-related disasters. Any material asset requiring consistent maintenance is at risk if continuity of operations is impacted.	The northeast portion of Vermont has the highest concentrated heat illness vulnerability and heat emergency ratings.	2023 was the hottest year on record globally and in Vermont. Between 2000 and 2017, the number of recorded days per year with a daily temperature high greater than or equal to 85°F peaked during the 2016 summer at 45 days, closely followed by the summer of 2015 at 41 days in Burlington. A heat wave across Vermont in late June of 2024 resulted in temperatures into the mid-90's. The drought of 1960-69 affected the entire state and was the most severe for regions of the state. The recurrence interval of this drought was greater than 50 years and was regional in scope, encompassing most of the northeastern United States. Precipitation in the state was less than normal every year during 1960-	Changes in development or land use that increase demand on total water supply (public and private) increase vulnerability to drought. Any change in development or land use that decreases natural protection systems to extreme heat (e.g., tree clearing, paving) increase vulnerability to health impact of extreme hear. Any population change resulting in reduced ability to mitigate impact of extreme heat (e.g., stay cool) can increase individual vulnerability.

			68, which was the longest continuous spell of deficient precipitation since 1895. Streamflow deficiency was greatest during 1965. In 1969, the drought ended abruptly.	
High Winds	The entire planning area is vulnerable to high winds. Power lines, trees, and structures are most vulnerable and pose greatest risk to safety	In 2024, a strong low pressure moved northeast across the Great Lakes on February 28th and 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 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	Extended power and telecommunication loss in colder months increases risk to many vulnerable populations. Damage to infrastructure through downed lines and trees falling on buildings or vehicles is also a concern.	Severe weather can increase risk of severe wind locally and in other areas. Land use changes in adjunct to increased residential housing increases the potential impact of damaging winds. Vulnerable populations (e.g., elderly with diminished health and those without transportation) could be disproportionately impacted.

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		15,000-20,000.		
Invasive Species (moderate)	Bodies of water, natural ecosystems, and recreational opportunities.	Assessing the vulnerability of species to climate change is a key step in anticipating climate impacts on species. Vulnerability assessments characterize species' future conservation needs and can guide current planning and management actions to support species persistence in the face of climate change. A full assessment of climate vulnerability involves characterizing three essential components: sensitivity, adaptive capacity, and exposure. Assessing sensitivity and adaptive capacity, as well as determining which aspects of exposure to assess all require detailed knowledge of species-specific traits and ecology. Such a detailed understanding is hard to come by,	Severe weather conditions have bearing on every aspect of biological invasions, in some cases worsening existing problems. Severe weather is creating new pathways for invasive species to be introduced, such as shipping routes that open up as sea ice retreats. Warmer temperatures can allow existing invasive species to expand their range into habitat that is currently too cool. Similarly, impacts to native species and people may change if new conditions affect invasive species abundance. Severe weather may make existing invasive species control tools less effective, such as aquatic barriers that require minimum water flows.	With increased human interaction with the natural world, the risk of introducing invasive species increases. This relationship is in conflict with the advantages associated with having water-based recreational opportunities and an appealing natural landscape. Stewardship is important to maintain ecosystems when threatened by human activity.

		even for well-studied species, thus, developing vulnerability assessments for lesser-studied species can be extremely challenging.		

4.4 Proposed Land Use and Development Trends Related to Mitigation

Wheelock is exposed to flood and erosion risks that have become more extreme in recent years. Future land use and development decisions need to respond appropriately to these hazards to minimize future damage and loss and the town has formalized its commitment to reducing risk in the 2019 Town Plan. Flood resilience needs to be considered in the upland areas as well to ensure that land development does not contribute to downstream flooding. Maintaining or establishing riparian buffers along streams for their flood attenuation, stream bank stabilization, water quality and wildlife habitat benefits are goals of the Town Plan with the concept of using land within the floodplain and river corridor. Land use regulations (otherwise known as Zoning and Subdivision Regulations) are considered to be a regulatory tool to aid in the effective implementation of the town plan. The town does not have zoning or subdivisions regulations.

4.4.1 Future Development and Housing

Future development will support any resulting costs created by the need for an increase in services. Wheelock will maintain its rural character and any future growth will not alter the character of the town or strain the capabilities of local transportation, safety, and health systems. The town will continue enrollment in the Village Center Designation Program.

4.5 Vulnerability Summary

The town, like most in Vermont, is vulnerable to all hazards profiled in this plan update but flood vulnerability remains the most significant when viewed through the lens of the July 2024 flooding events and how they impacted Wheelock. Geography, road location and composition, consequences of the natural world, resources, and the time-precipitation volume ratio are all factors in the expression of vulnerability and with increased frequency of flood events, this vulnerability increases. Power outages that can and do occur at any time of year, but especially in winter, are also of significant concern. As mentioned at the start of this update, the impact of severe weather is posing challenges to the town rarely seen, if ever. This update attempts to reflect this challenge and what the town can do in the next planning cycle to meet the challenge.

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SECTION 5: MITIGATION STRATEGIES

The greatest advancement in mitigation planning the town has achieved is from direct experiences in responding to, and recovering from, the major disasters that have impacted the town since the last approved plan. The greatest challenge the town has seen is also a result of these disasters, especially those of 2023 and 2024. These disasters have redefined how the entire state views and approaches mitigation. This plan update allows for a continuation of the systematic documentation of mitigation efforts into the next planning cycle. The implementation matrix captures specific progress in certain areas but more importantly, gives the town a guide from which all future action and updates can be based on and built from.

The town recognizes the difficulty in turning planning into action due to the reactionary nature of meeting the ever-changing demands of day-to-day operations both in and out of disasters. These reactionary actions can fall into the category of mitigation but so often, they fall into disaster response and recovery with a scramble to keep up with general maintenance. An important intention of this update is for the town to have a working document, a series of actions, questions, and discussion topics that may spring forth planning and actions that protect the town from being caught in the revolving door of response and recovery. Planning tends to capture the ideal, the perfect world scenario given ample time and resources, but reality can immediately challenge the implementation of the best plans. Consensus can also challenge courses of action. To address the impact of severe weather, a balance must be found, and the town is committed to this imperative.

5.1 Town Goals and Policies that support Hazard Mitigation

As the town nears completion of its updated Town Plan, the commitment to articulate a vision to maintain, evolve, and transform the expanse of town policies and operations to the best of its ability in order to enhance overall community resilience is implied. The town does not participate in the NFIP and does not, nor plan to, have zoning regulations.

5.2 Existing Town of Wheelock Actions that Support Hazard Mitigation

The town has done its best at monitoring and addressing transportation issues and addresses needs. The ability to expand and improve the identified capabilities to achieve ideal levels of hazard mitigation are challenging for small, rural communities. These challenges include lack of authority and/or ability to expand and improve current capabilities. For example, the town does not possess unlimited resources and must operate within the confines of allotted budgets and personnel, even when grant funding is available. Additionally, the town's level of authority in taking actions that directly impact the health and safety of residents (e.g., evacuations, avoiding travel, etc.) are at a level of recommendation only. The town has pursued and received both state and Federal funding to support efforts to enhance its resilience and mitigate risk. The town has addressed its current and future needs and by and large, infrastructure projects remain the primary focus for the town. Relocating the town garage and maintaining transportation infrastructure remain as areas of focus. The town does not, nor does it plan to, have building codes, subdivision regulations, or zoning in the near future.

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The town has also adopted municipal road and bridge standards that meet or exceed the current standards and has an approved and adopted Local Emergency Management Plan and Town Plan.

Table 5-0: Existing municipal capabiliites that support hazard mitigation

Type of Existing Protection	Description /Details/Comments	Key Points
Emergency Response		
Police Services	State Police, and the County Sheriff serve the town with law enforcement.	Adequate recruiting is a challenge
Fire and EMS Services	Sheffield-Wheelock volunteer fire department. EMS provided by Lyndon Rescue via contracted service agreement.	Backed up by mutual aid from surrounding towns.
Other Municipal Services		
Highway Services	Road Supervisor and two crew	Challenged to address magnitude of damage from flood disasters in addition to keeping up with general maintenance
Planning Commission and Selectboard	Yes	Achieving consensus on decisions impacting the town can be a challenge.
Emergency Plans		
Local Emergency Management Plan (LEMP)	2026	None at this time
Shelter, Primary	Wheelock Town Hall	Not ADA compliant with no accessible washrooms
Replacement Power, backup generator	Yes	Tested weekly but needs a better roofing structure to project it.
Shelter, Secondary	Lyndonville Fire Station	
Replacement Power, backup generator	Yes	
Municipal Plans		
Town / Municipal Comprehensive Plan	2019	Flood resilience goals and policies included
Hazard Specific Zoning (slope, wetland, conservation, industrial, etc.)	No	
Participation in National Flood Insurance Program (NFIP) and Floodplain/Flood Hazard Area Ordinance	No	
Culvert and bridge Inventory	2024	Town will explore best options in keeping this updated during next planning period.

5.3 Town of Wheelock All-Hazards Mitigation Goals

- Reduce at a minimum, and prevent to the maximum extent possible, the loss of life and injury resulting from all hazards.
- Mitigate financial losses and environmental degradation incurred by municipal, educational, residential, commercial, industrial, and agricultural establishments due to various hazards.

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- Maintain and increase awareness amongst the town's residents and businesses of the damage caused by previous and potential future hazard events as identified specifically in this Local All-Hazards Mitigation Plan.
- Recognize the linkages between the relative frequency and severity of disaster events and the design, development, use and maintenance of infrastructure such as roads, utilities and storm water management and the planning and development of various land uses.
- Maintain existing municipal plans, programs and ordinances that directly or indirectly support hazard mitigation.
- Maintain mechanism for formal incorporation of this Local All-Hazards Mitigation Plan into the municipal comprehensive plan as described in 24 VSA, Section 4403(5). This mechanism will be developed by the Planning Commission, Selectboard and NVDA and integrate the strategies into the existing town plan as annexes until the next formal update occurs, where a section devoted to mitigation planning will be integrated into the plan.
- Maintain mechanism for formal incorporation of this Local All-Hazards Mitigation Plan, particularly the recommended mitigation actions, into the town operating and capital plans & programs as they relate to public facilities and infrastructure within political and budgetary feasibility. The Planning Commission will review the plan and use language/actions from it to inform the integration and update process. Town Meeting Day will serve as the formal time that mitigation strategy budgetary considerations will be approved and incorporated into the town budgets.

5.4 Mitigation Actions

While the town has seen minor changes in demographics and population, the community impact and subsequent needs resulting from recent flood events create new challenges and insights. The better a community can merge long-term cost-savings through mitigation actions while addressing the health and safety of its residents, the greater the resilience of that community. In the next 5-year planning cycle, the town will have an increased focus on mitigating the consequences of severe weather. The following defines town mitigation planning for the next five years.

5.4.1. Current Capabilities, and Need for Mitigation Actions

The Town Plan's goals and policies that support hazard mitigation and the existing mitigation actions demonstrate the variety of policies and actions forming the foundation of this Hazard Mitigation Plan Update. The town has considered future needs, and the financial considerations required to meet these needs. The town remains challenged in both the staffing and budgetary requirements necessary to purchase new equipment and complete road, bridge, and culvert maintenance. This challenge is increased during the response and recovery periods of a disaster.

As with most towns in the state, mitigating flood-prone areas is a continuous effort that sees increased attention following a major event. The town remains aware and diligent in keeping up with mitigation actions for all municipal systems. But in doing so, resources can be strained to

meet the other requirements for a safe and resilient community. A collaborative spirit is crucial to meet and enhance the necessary communication, planning, and efficiency of action required to best serve the town and its residents.

The impact of recent disasters has supported the need for viable mitigation actions, largely in response to the effects of severe weather and especially flooding. The severity and frequency of recent events have been overwhelming for many communities and Wheelock has been challenged in recovering from these events. Major infrastructure has seen repeated damage, and the road department has, to this point, worked to directly repair and restore Wheelock's roads. While much has occurred behind the scenes (e.g., collaboration with state agencies and FEMA), this work has also been challenging at times. Many lessons can be learned from these recent experiences and can help define town strategy and actions moving forward. Development in town has not significantly changed hazard vulnerability.

Progress in Mitigation Efforts

If an action from 2021 has not been completed and is still a required mitigation action for the next planning cycle, that action will be included in this update's mitigation action table. Actions from the previous plan not addressed below have been determined to be low priorities for the town. A low priority action from 2021 is defined by one or more of the following attributes:

- *An action that is no longer considered a necessary strategy to mitigate risk by respective experts at the city, state, and or regional level.*
- *An action that is not feasible or required to maintain daily operations and/or protection systems.*
- *An action that is not associated with reducing risk to a natural hazard with an acceptable cost-benefit ratio.*

The actions listed in the last approved plan continue to have some merit as the town moves in the next planning period. The status of the mitigation actions listed in the 2021 plan are included below.

Table 5-1: Status Summary of 2021 Mitigation Actions

Action	Status
Install a generator at the fire station in South Wheelock.	Not complete. Fire dept. distinct from town operations.
Collaborate with the Town of Sheffield to develop an agreement with the American Red Cross for opening a shelter during a disaster.	Not complete. Red Cross Program no longer operational.
Re-apply for designation when it comes due in 2025. Bringing public Village Center buildings up to code includes the fire code, accessibility, and other measures that provide sustainability and tax credits to the Town.	Complete: Town has a "Legacy Designation" that will still be useful for the same purposes
Protect the Historic District from natural hazards by establishing a long-term repair and maintenance plan for	Partially complete: There are some projects

Town facilities including Town Hall and Garage to decrease vulnerability to high winds, snow loads, heavy rains, power outages, flooding, and other natural hazards.	underway and some that were put out to bid but no bids came in.
Upgrade the Town Hall to meet emergency shelter requirements.	Not Complete: Lack of ADA is the biggest problem. This action will continue into next planning period.
Identify best new location for Town Garage out of the floodplain and move the Garage campus to that location. Complete a feasibility study for the new location and tear down the old facility.	Not complete: this action will continue into next planning period. The Town got a planning grant to hire an architect and outreach firm to develop 2 plans for the Town Hall and also to position a potential new town garage on the same parcel with the Town Hall and to develop the traffic ways to serve both. This was during the recent pandemic and townspeople had to vote by Australian ballot on each plan separately. They voted both down.
Adopt the State's River Corridor bylaws as a way to address local flooding and fluvial erosion.	Not complete. This action will continue into next planning period.
Maintain quality and adequacy of potable water at each of the significant sites on the 5049 Wheelock Fire District 1 Water System. (Significant sites includes Wheelock Village Store (food and gas), Town Hall and Town Garage).	Partially complete. This action will continue into next planning period.
Develop and maintain long-range plan for capital improvement projects.	Partially complete: Town clerk/treasurer Erin Swigart is in a VLCT training program for treasurers and they are just now working on capital planning. SB's plan is to do it this year. In 2025, town worked with a VLCT staff member on budgeting, and she will help with cap. budgeting if needed.
Support regional hazard mitigation education campaign and	Partially complete. This

expand the Town's capacity for hazard mitigation with local resources such as websites, listservs, and newsletters.	action will continue into next planning period.
Form an Energy Committee.	Not complete and will not be pursued due to staff and time constraints. In May 2025 with a lot of help from Wheelock Community Initiative and the MERP mini-grant of $4000, the town put on an energy fair.
Fix bridge on Stannard Mountain Road near Blakely Road.	Complete: This bridge was fixed with a VTrans Structures grant.
Fix Twin Bridges, built in 1927, over Miller's Run Brook on Peak Rd. near Rte. 122.	Not Complete: hese 2 bridges, while operational, will be part of the Hydrology & Resilience Study supported by a $60,000 CDBG planning grant that has been awarded. The project is to be completed in 2026. The study will include hydrology and scenarios for repairs with budget estimates. The study will also include Fall Brook Bridge, damaged in 2025 flooding to the extent that the state mandated closure, and Minister Hill Bridge (damaged but operational) as well as two large culverts. The final part of the grant project is a public meeting to share these options and help decide how to proceed. The engineering and project management/administration consultants have been selected and will be engaged as soon as the CDBG Grant agreement is

	in place - expected August 2026.
Fix Minister Hill Bridge, built in 1928, over S. Branch Brook, Minister Hill Rd. corner S. Wheelock Rd.	In progress: Hydrology will be completed as part of the CDBG Planning grant in 2026. Application for a Vtrans Structures grant was not awarded.
Develop and implement a 5-year plan for repair and replacement of culverts, bridges, roads.	In progress: 2026 CDBG Planning Grant will include hydrology and alternate scenarios with cost estimates for 5 bridges and 2 culverts.
Annually update the Town's transportation infrastructure information in the Vermont Online Bridge and Culvert Inventory Tool and the Online Road Erosion Inventory (REI) regarding Municipal Roads General Permit program (MRGP).	Partially complete: This needs to get done and the system for doing it has changed. We have attended some training.
Expand current efforts to install a Reverse 911 system.	Partially complete. Fire chief is 911 designee.
Prioritize the use of renewable energy.	Partially complete: Town applied for a relatively small MERP Implementation Grant ($61K) for town hall. Restoring its historic windows to make them operable and building new storm windows is under contract to be done this summer. We did some door and window sealing. St. Johnsbury Academy electrical instructor and students will make sure the wiring is safe and install efficient lighting fixtures in the fall 2026 semester. A contractor has been hired to take down the basement ceiling starting July 23, 2026.
Maintain healthy water courses and water bodies. Protect Chandler Pond, Flagg Pond and Bean Pond, as well as the Miller's Run and other streams, from the adverse effects of	Not complete. Although we did upgrade our driveway policy and we are using it

commercial development. Further residential development adjacent to these natural attributes should be minimal.	to manage new driveway permits and also go after problem driveways that are damaging roadways, causing erosion, etc. Finding other means to prevent development that could get damaged by flooding is needed. River Corridors may be the answer. We were able to get the town's first ever backhoe through a FEMA alternate project.
Add a generator to the Town Hall to establish it as a shelter.	Complete.
Develop a program to plant new trees and shrubs in areas prone to fluvial erosion.	Not complete and will not be pursued. We are focusing on failed bridges and culverts.
Emerald Ash Borer: Conduct a survey of ash trees in town rights of way to identify trees susceptible to death and toppling over from damage caused by the invasive species, Emerald Ash Borer. Develop an action plan.	Not complete and low priority.
Collaborate with the Town of Sheffield to purchase a fire fighting vehicle that can access highly wooded areas.	Not complete and no longer being pursued. Sheffield has built a brand new fire station.
Emerald Ash Borer: Public information campaign.	Not complete and low priority.
Continue representation from Wheelock on the Communications Union District Board of NEKBroadband.org.	Complete. The purpose of this was to bring high speed, affordable internet to all Wheelock locations
Conduct land evaluations and site analysis to prioritize conservation easements and erosion prevention measures.	Partially complete: Partially complete: Waiting for FEMA approval to fix failed embankments at Boulay Rd and S Wheelock Rd. Engineering is done, permits are in hand, contractors have been procured. Waiting for FEMA approval and financial support before starting.

5.4.2. Specific Mitigation Actions

The following actions define the mitigation measures to be taken by the town in the next five years:

Action #1: Reduce vulnerability to flooding
Action #2: Improve resilience to severe winter/ice storms.
Action #3: Reduce impact of extreme temperature
Action #4: Reduce risk and impact of major infectious disease events.
Action #5: Reduce risk and impact of wildfire
Action #6: Reduce impact of drought
Action #7: Reduce risk and impact of invasive species
Action #8: Reduce impact of high winds
Action #9: Reduce impact of hail

5.4.3. Prioritization of Mitigation Strategies

Because of the difficulties in quantifying benefits and costs, it was necessary to utilize a simple "*Action Evaluation and Prioritization Matrix*" in order to affect a simple prioritization of the mitigation actions identified by the town. This method is in line with FEMA's STAPLEE method. The following list identifies the questions (criteria) considered in the matrix so as to establish an order of priority. Each of the following criteria was rated according to a numeric score of "1" (indicating poor), "2" (indicating below average or unknown), "3" (indicating good), "4" (indicating above average), or "5" (excellent).

- Does the action respond to a significant (i.e., likely, or high risk) hazard (including severe weather)?
- What is the likelihood of securing funding for the action?
- Does the action protect threatened infrastructure?
- Can the action be implemented quickly?
- Is the action socially and politically acceptable?
- Is the action technically feasible?
- Is the action administratively realistic given capabilities of responsible parties?
- Does the action offer reasonable benefit compared to its cost of implementation?
- Is the action environmentally sound and/or improve ecological functions?

Scoring: 1=Poor 2=Below Average or unknown 3=Average 4=Above Average 5=Excellent

The ranking of these criteria is largely based on best available information and best judgment of project leads. For example, all road improvement projects were initially identified by the acting Road Supervisor and approved for inclusion in this plan by the planning team. It is anticipated that, as the town begins to implement the goals and actions of their Mitigation Strategies, they

will undertake their own analysis in order to determine whether or not the benefits justify the cost of the project. Along these lines and as mentioned in a previous section, several action categories have fallen off from priority for the town and are no longer seen as viable methods, due to capacity and/or efficacy, to mitigate risk of natural hazards for the town.

Table 5-2: Wheelock Action Evaluation and Prioritization Matrix

Rank	Action	Responds to High Hazard	Funding Potential	Protection Value	Time to Implement	Social and Political Acceptance	Technical Feasibility	Admin Feasibility	Benefit to Cost	Environmental Advantage	Total
1	Reduce vulnerability to flooding	5	4	5	2	5	3	3	4	4	35
3	Protect infrastructure and population from extreme temperatures	3	2	3	2	3	2	3	3	2	23
2	Improve resilience to severe winter/ice storms	4	3	3	2	4	3	4	3	3	29
7	Reduce vulnerability to drought	1	1	2	1	3	3	1	2	4	18
8	Reduce impact of infectious disease event	1	1	2	2	3	2	2	3	1	17
6	Reduce vulnerability to wildfire	1	2	2	3	3	2	3	2	2	20
9	Reduce impact of hail	1	1	1	1	3	1	1	2	2	13
4	Reduce impact of high winds	1	1	2	3	3	4	4	2	2	22
5	Reduce risk and impact of invasive species	1	1	2	2	4	2	2	3	4	21

5.4.3. Specific Mitigation Actions

Mitigation Action Groups:

(P) Prevention: Government administrative or regulatory actions or processes that influence the way land and buildings are developed and built. These actions also include public activities to reduce hazard losses. Examples include planning and zoning, building codes, capital improvement programs, open space preservation, and storm water management regulations.

(PP) Property Protection: Actions that involve the modification of existing buildings or infrastructure to protect them from a hazard, or removal from the hazard area. Examples include acquisition, elevation, relocation, structural retrofits, flood proofing, storm shutters, and shatter-resistant glass.

(PEA) Public Education & Awareness: Actions to inform and educate citizens, elected officials, and property owners about potential risks from hazards and potential ways to mitigate them. Such actions include outreach projects, real estate disclosure, hazard information centers, and school-age and adult education programs.

(NRP) Natural Resource Protection: Actions that, in addition to minimizing hazard losses also preserve or restore the functions of natural systems. These actions include sediment and erosion control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration and preservation.

(SP) Structural Projects: Actions that involve the construction of structures to reduce the impact of a hazard. Such structures include storm water controls (e.g., culverts), floodwalls, seawalls, retaining walls, and safe rooms.

With emphasis on nature-based solutions (i.e., "green-engineering), several specific actions described below fall into the nature-based solution category. These sustainable planning, design, environmental management, and engineering practices integrate natural features or processes into the built environment to promote adaptation and resilience. When an action is a nature-based solution, "NBS" will be included to denote the association.

Action #1: Reduce vulnerability to flooding

Group: SP, NRP, PP
Lead Responsible Entity: Wheelock Selectboard
Potential Partner Entities: Vermont Agency of Natural Resources; State Geologist; Vermont Agency of Transportation; NVDA, VEM, FEMA and the ACCD
Timeframe: See Implementation Matrix
Funding Requirements and Sources: FEMA or other hazard mitigation grants; FHWA grants; VAOT grants; SHIP; CDBG; and municipal operating and capital budgets.
Progress: The town has worked hard to respond and recover from the flood events of 2023 and 2024. Formal planning, grant funding, equipment, and subject matter experts have all been utilized during the last planning cycle. The town appropriates funds to manage needs and has a proactive selectboard and planning commission.

Specific Identified Tasks:

1. Funding and staff resources permitting, assess the vulnerability and operational capability of municipal-owned roads, culverts, and other storm water management infrastructure to predicted storm water and snowmelt in areas with a documented history of recurring problems. Use the included Mitigation Action Agenda Items Short List included in this plan. The infrastructure will be evaluated regularly prior to replacement or upsizing of the existing infrastructure. Assessment of increased risk in specific areas with increased

frequency of flood events should be considered (e.g., scoured/eroded slopes, stressed infrastructure, fluvial erosion). Addressing general maintenance needs when repetitive flood damage work competes with time normally allotted for general maintenance, whereby increased risk of damage during next flood event.

- Use, and amend as needed, the 2026-2031 Mitigation Actions Short List: Suggested Agenda Items found in Appendix of this update.
- Continue to explore relocating the town garage out of the floodplain.
- Inventory drainage areas and identify natural flood water storage areas to mitigate damage from flash floods.
- Adopt the State's River Corridor bylaws as a way to address local flooding and fluvial erosion.
- Engage in analysis and discussion on general maintenance projects that, if not completed due to competing demands, may increase the risk of flood-related damage during the next event.
- Engage in analysis and discussion on large projects that, if damaged, would not receive substantive support from the FEMA DR program. The challenge is keeping up with deferred maintenance. FEMA responds to damage repair requests by studying any condition reports available. VTrans engineers produce an extensive report on each town bridge every two years. If the documented condition is poor, FEMA will not support improvements, only restoration to pre-disaster conditions. In some cases in 2024, this made no sense given the amount of time and work it takes to administer a FEMA award. The Town did not accept the FEMA offer for Minister Hill Bridge because it did not address the cause of the flooding, only the repair of the result.
- Working with the state on a viable path forward for deferred maintenance is an important and necessary action for the next planning period.
- Develop strategies that aim to reduce competing demands for road crew when they are working to recover from a disaster and still need to perform general maintenance duties. These strategies can include:
    - Budgeting for staffing and contractors
    - Establishing efficiencies in issuing RFPs and establishing contracts
    - Understanding the timeline of all grant-funded work and the consequences of not being able to complete a project due to competing demands.
    - Improve capacity to manage disaster events: Explore hiring a paid project manager as soon as a federal disaster is declared, rather

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than have volunteer Selectboard members volunteer to work with FEMA.

- Find suitable methodology to keep bridge and culvert inventory up to date.

2. Property Acquisition through FEMA (and other) Buy-out Program:

- The town should assess repetitive and significantly damaged property for eligibility in Buy-out programs to assist in mitigating future damages if and when required.
- The town should convey the opportunity to owners of repetitive loss properties and/or those potentially eligible for acquisition in addition to educating property owners on best practices for mitigating future risk of property loss.
- Utilize best practices for acquired property use and function in-line with town goals.

3. Street reconstruction and street resurfacing (NBS) is considered a viable mitigation action and is the most visible part of the capital program for this planning cycle. The rationale for street resurfacing/reconstruction as mitigation is explained and summarized by the belief that through the consistent attention to areas in need, the town is reducing vulnerability to flood/snow-damaged transportation routes by reducing permeability to moisture invasion. The street construction cost shown in the summary by fund does not include any cost for water and sewer infrastructure. Considering road engineering practices (e.g., permeable road surfaces) that enhance green engineering practices will allow the town to mitigate hazard risk while benefiting the environment. Within political and financial restraints, re-engineer certain sections of roads to lower overall maintenance costs, improving snow plowing speeds and improve overall capability of roads to handle current and projected traffic volumes. Specific projects will be identified and prioritized during the planning period through municipal coordination situational awareness.

4. Develop understanding of best practices related to NBS and implement when feasible:

- Protecting and enhancing landforms that serve as natural mitigation features (i.e., riverbanks, wetlands, dunes, etc.).
- Using vegetative management, such as vegetative buffers, around streams and water sources.
- Protecting and preserving wetlands to help prevent flooding in other areas.
- Establishing and managing riparian buffers along rivers and streams.
- Retaining natural vegetative beds in stormwater channels.
- Retaining thick vegetative cover on public lands flanking rivers.
- Preserving natural areas and vegetation benefits natural resources while also mitigating potential flood losses. Techniques include:
    - Developing an open space acquisition, reuse, and preservation plan targeting hazard areas.

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- Developing a land banking program for the preservation of the natural and beneficial functions of flood hazard areas.
- Utilize and incorporate best practice guides for the creation and implementation of enhanced planning and response initiatives (e.g., Toolkit | Agency of Commerce and Community Development (vermont.gov); https://community.fema.gov/ProtectiveActions/s/article/Landslide-Mitigation-Property.
- Reassess need for fluvial erosion hazard mapping.

5. DR 4810 Recovery: While response and recovery phases are active during this update's development, full recovery will likely stretch through the next planning cycle. The town is and will continue to:

1. Assess conditions of infrastructure damage/destruction for triage action.
2. Assess and develop strategies to reduce the risk of landslides in the future, independent of soil saturation when possible.
3. Maintain adequate records and grant management to maximize FEMA Public Assistance for eligible infrastructure projects.
4. Assist recovery paradigms for individuals and businesses (e.g., FEMA IA and SBA Loans).
5. Collect lessons learned and develop innovative measures to reduce the impact of high rain events.
6. Create and/or improve debris management response planning.
7. Utilize Category Z Staffing reimbursement strategy for key recovery administrators.
8. Utilize and incorporate best practice guides for the creation and implementation of enhanced planning and response initiatives (e.g., Toolkit | Agency of Commerce and Community Development (vermont.gov); https://community.fema.gov/ProtectiveActions/s/article/Landslide-Mitigation-Property

6. Landslide Mitigation Actions using NBS:

- Preventing erosion with proper bank stabilization, sloping or grading techniques, planting vegetation on slopes, terracing hillsides, or installing riprap boulders or geotextile fabric.
- Stabilizing cliffs with terracing or plantings of grasses or other plants to hold soil together.
- Prohibiting removal of natural vegetation from slopes.
- Using a hybrid of hard/soft engineering techniques (i.e., combine low-profile rock, rubble, or wood structures with vegetative planting or other soft stabilization techniques).
- Using a rock splash pad to direct runoff and minimize the potential for erosion.

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- Using bioengineered bank stabilization techniques.

7. Specific Infrastructure Projects
    - Fall Brook Bridge Repair/rebuild
    - Vertical Mile Rd. stone arch culvert replaced with box culvert
    - Morgan Rd. East culvert needs culvert redesigned and installed
    - Both Twin Bridge need renovation work on Peak Rd (near rt 122)
    - Minister Hill Bridge abutments need renovation (state grant pursued but decline)
    - Guard rail replacement on Peak, Sutton, and Burrows Rd. Ditching on Burroughs and Cold Hill Rds. (SHIP grant received)
    - Non-funded guard rails need replacement on Stannard Mtn Rd and another area of Burrows Rd.

Rationale / Cost-Benefit Review: Conducting vulnerability assessments facilitates a targeted and effective approach to road and storm water management infrastructure. This will prove useful in the development and implementation of municipal capital and operating plans as well as the development and implementation of grant-funded mitigation projects. Some areas suffer low-level but consistent damage during heavy rain and snowmelt. Mitigating against these problems would reduce short- and long-term maintenance costs and improve the flow of traffic for personal and commercial purposes during flooding events.

Action #2: Maintain and improve resilience to severe winter storms.

Group: SP, PP, PEA
Primary Responsible Entities: Wheelock Selectboard
Potential Partner Entities: Wheelock Road Crew
Timeframe: See Implementation Matrix
Funding Requirements and Sources: VTrans, VEM or FEMA hazard mitigation funding; existing programs, contingent on available resources and funding.
Progress: Roads are monitored and altered, when necessary, so that plowing can occur without damage to trucks and/or roads. The designated shelter has back-up power. Snow clearing equipment is regularly serviced, and the town maintains an adequate supply of salt.

Specific Identified Tasks:

1. Maintain Existing Shelter Capability: Maintain and improve capabilities of existing shelters. Notification procedures and shelter staffing are a priority for the town and it intends to move forward on planning and public involvement. Upgrade the Town Hall to meet emergency shelter ADA requirements.
2. Reduce risk of power failure due to ice storms: Enhance collaboration between town road crew and electric company related to down-limbed induced power failure. Maintain function

of generators. Assess and plan for required budgeting and labor for tree removal, dead/diseased limb removal and visual assessments.

3. Notification: Develop a notification/communication plan that conveys essential sheltering information using school phone system and back-up methodology (email, text, etc.). The town is investigating the use of TextMyGov as means to communicate with population. VT Alerts is an additional option.
4. Residential Programs (NBS): Provide guidance and communication to residents on the structural and mechanical actions that can occur to reduce risk to severe winter storms (e.g., weatherproofing, anchoring, alternative heating sources, tree trimming, financial programs, etc.)
    - Ask property owners to report ice jams and adverse changes in the river conditions.
    - Provide information to owners on how to report sightings and conditions to town officials. This will include the development of a process to receive and disseminate the information to the designated town officials.
5. Continue to monitor roads for safe and effective plowing: Efficient snow removal is the foundation to winter storm (snow) events, assuring roads are plowable before winter remains an important facet of highway department functions. The town will review its current road equipment plans to ensure adequate road and debris clearing capabilities.
6. Increase awareness of ICS structure and recommended practices: The town can mitigate the effects of a severe winter by understanding how a large-scale storm is managed when the State EOC is operational. Additional awareness of local-level roles and responsibilities during statewide events is a mitigation action.

Rationale / Cost-Benefit Review:

This mitigation action serves to reduce the economic impact and risk to both human and animal (livestock and pet) health and safety during severe winter storm events by reducing risk and enhancing the mechanisms of winter storm mitigation in the long term. More formalized policy formation in both staffing and notification procedures, especially pertaining to vulnerable populations where transportation and special needs are a concern could potentially significantly reduce the physical, psychological, and social impacts of a disaster.

Action #3: Protect infrastructure and population from extreme temperatures.

Primary Responsible Entities: Wheelock Planning Commission, emergency planning services
Potential Partner Entities: VDH, NVDA
Timeframe: See Implementation Matrix
Funding Requirements and Sources: State funding can include structures grants and ACCD/VAAFM. Federal sources can include FEMA, LIHEAP and WAP programs help pay for heating, cooling, and home weatherization.

Specific Identified Tasks:

1. Economic Resilience:

- Assess, if feasible, the economic consequences of both extreme cold and heat (with drought) and develop actions steps to best support the community and protect infrastructure/the environment.

2. Review Considerations:

- Enhance and expand availability of publicly available cooling sites. Wheelock's cooling options will need to serve a range of needs for a diverse population. Some sites will need to be located indoors and operate for extended hours.
- Specific mitigation actions to consider:
    - Execute an operating agreement with one facility to function as a dedicated cooling site that meets all of the minimum requirements, and at least two of the encouraged amenities.
    - Promote use of the Vermont Department of Health Cooling Sites map and review the map every time the Local Emergency Management Plan is updated.
    - Establish procedures for ensuring that potable water is available for outdoor cooling sites during heat emergencies.
    - Work with local housing providers, social service agencies, and the regional planning commission to ensure that cooling options are considered when planning for warming shelters for unhoused populations.
    - Improve cooling and ventilation of existing housing stock. Current statewide and regional efforts to weatherize and fuel switch provide an excellent opportunity to address cooling and ventilation as well. Organizations such as HEAT Squad and Northeast Employment Training Organization provide low- and no-cost services to Wheelock's energy-burdened households.

3. Notification and Education – Investigate and develop a notification/communication plan that conveys essential sheltering information. Educating citizens regarding the dangers of extreme cold and the steps they can take to protect themselves when extreme temperatures occur by sustaining a process that serves to disseminate educational resources for homeowners and builders on how to protect pipes, including locating water pipes on the inside of building insulation or keeping them out of attics, crawl spaces, and vulnerable outside walls. Inform homeowners that letting a faucet drip during extreme cold weather can prevent the buildup of excessive pressure in the pipeline and avoid bursting through a yearly public service campaign.

- Expand on "neighbor-to-neighbor" networks. Many Vermont residents are famously independent and self-reliant, and many individuals will not ask for help, even in more dire situations. The neighbor-to-neighbor efforts that were mobilized during the pandemic response, however, establish a valuable precedent for future emergency responses, including heat emergencies. The Wheelock Community Initiative (WCI) has an email list of 150 active addresses. WCI sends email blasts and facebook posts in addition to its monthly 2-page newsletter that is distributed in print and via email

- One statewide system that can be used in any community is the Citizens Assistance Registry for Emergencies. Anyone can register in CARE, and it is the responsibility of the local Emergency Management Director to request the CARE database for their municipality as needed. Registration in CARE is typically low but promoting the use of it annually (such as Town Meeting Day) may help. The town is looking into the use of TextMyGov as means to communicate with population.

4. Specific mitigation actions:

- Ensure that rental housing management staff, social service agencies, and visiting nurses have relevant and timely information on heat emergencies, including availability of cooling sites.
- Encourage enrollment in CARE.

Rationale / Cost-Benefit Review: With an increase in extreme weather, there is a need to protect property, the environment, and the population. Costs associated with this mitigation action can be excessive and sometimes difficult to utilize prior to an event. Planning and education costs are the most effective way, during the next planning period, to address the hazards so closely associated with Severe weather. Given the magnitude of population dependence on social services, indicating economic and other social vulnerabilities, effective outreach, education, and collaboration with resources supports this mitigation action category. Given the high risk for heat-related illness in the town, coordination with VDH and planning for such events is important.

Action #4: Reduce risk and impact of infectious disease event

Group: PEA, PP, SP

Lead Responsible Entities: Wheelock Selectboard

Potential Partner Entities: ACCD, VDH, VEM

Timeframe: See Implementation Matrix

Funding Requirements and Sources: Pandemic planning funding is secondary to financial stability funding in response to potential economic consequences not known to be a serious consequence of infection mitigation efforts. State funding includes; ACCD and VDH and Federal sources include FEMA, CDBG, and SBA.

Specific Identified Tasks:

1. Work with facility leads to understanding risk factors and what can be done to mitigate and enhance training and skills for response, misinformation, and support.
2. Enhance awareness and planning for health-related mandates, communication, isolation and quarantine logistics for residents, municipal operations and maintaining economic stability.
3. Develop and maintain continuity of operations plans for critical government and community services.

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4. Disseminate public information on infectious disease risk and prevention measures when appropriate.

Rationale / Cost-Benefit Review: With an increase in extreme weather, there is a need to protect property, the environment, and the population. Given the magnitude of population dependence on social services, indicating economic and other social vulnerabilities, effective outreach, education, and collaboration with resources supports this mitigation action category. Given the high risk for heat related illness in the town, coordination with VDH and planning for such events is important.

Action #5: Reduce risk and impact of wildfire.

Group: SP, NRP, PP
Lead Responsible Entities: Wheelock Selectboard, Fire Chief
Potential Partner Entities: Vermont Agency of Natural Resources, VT Fire Academy
Timeframe: See Implementation Matrix
Funding Requirements and Sources: FEMA Fire Assistance Grants, Municipal Operating and Capital budgets.
Progress: The Fire Department annually conducts fire preparedness programs and school, and family programs related to hazard awareness and disaster preparedness, including providing information on Town Meeting Day. The VFA offers training on a host of topics related to emergency preparedness and raises awareness in the community about what organizations are doing around emergency response planning and chemical safety. Enhanced emphasis on Severe weather at state level.

Specific Identified Tasks:

1. Continue programs to raise public awareness of fire hazards, safety, preparedness, and prevention.
2. Continue use of burn bans for reducing wildfires during high-risk conditions
3. Enhance public education of the risk of wildfires and collaborate with state agencies (e.g., tourism, agriculture) on mixed-media sources to reach the largest audience most efficiently.
4. Explore opportunities through FEMA for Fire Assistance Grants and Post-fire assistance if needed.
5. Maintain quality and adequacy of potable water at each of the significant sites on the 5049 Wheelock Fire District 1 Water System. (Significant sites includes Wheelock Village Store (food and gas), Town Hall and Town Garage).

Rationale/Cost-Benefit Review: With increasing occurrence of remote, largescale wildfires, the issue of air quality impacting health and safety is a growing concern. While difficult to mitigate air quality when it poses risk, there are actions that can be taken to potentially reduce impact. This mitigation action serves to reduce the impact and risk to both human safety and the environment during wildfire events by reducing risk and enhancing protection measures and

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awareness of risk. Costs associated with this action are relatively low as it will focus on public information. More formalized policy formation in both staffing and notification procedures, especially pertaining to vulnerable populations where evacuation and special needs are a concern and important considerations for the town. Local wildfire suppression and mitigation measures are also included in this action.

Action #6: Reduce risk and impact of drought.

Group: SP, NRP, PP
Lead Responsible Entity: Wheelock Selectboard
Potential Partner Entities: Vermont Agency of Natural Resources, VEM, VAAFM
Timeframe: See Implementation Matrix
Progress: Public information mechanisms are established but little work has been accomplished specific to drought
Funding Requirements and Sources: FEMA, USDA, HMGP, BRIC, and PDM grants.

Specific Identified Tasks:

- Drought Planning: The town should explore what, if any, actions should be taken based on best practices related to drought mitigation, state guidance, and risk (NBS). Examples include encouraging drought-tolerant landscape design through measures such as:
    - Investigate solutions to well-service contractor-demand during drought events.
    - Use spring stewardship programs to help maintain supplies.
    - Educate the public on best practices and recommendations for wells to improve resilience and reduce impact of drought through conservation actions.

Rationale / Cost-Benefit Review: Improved public awareness could potentially reduce the impact and severity of drought periods. Improved awareness could also build understanding and public support for municipal mitigation actions. Drought emergency planning via contractor pool and potential MOU's in conjunction with educational outreach is a resilience builder.

Action #7: Reduce vulnerability to high wind events.

Group: SP, NRP, PP
Lead Responsible Entity: Wheelock selectboard, road crew
Potential Partner Entities: Vermont Agency of Natural Resources, VT Fire Academy

Timeframe: See Implementation Matrix
Progress: Much has been done to protect mobile homes and mobile home parks at the state level from hazards. Tree trimming to protect electrical infrastructure is completed annually.
Funding Requirements and Sources: While structure upgrades/retrofitting to improve resilience to wind damage are a recommended best strategy, costs can be significant and a barrier to achieving ultimate structural resilience. HMGP, BRIC, and PDM grants.

Specific Identified Tasks:

1. Understanding Best Practices:

- Build knowledge of (FEMA P-804 (2023), Wind Retrofit Guide for Residential Buildings in Hurricane-Prone Regions for applicable and feasible strategies.
- Consider public outreach and town procedure to verify that asphalt shingle packages are labeled to indicate compliance with ASTM D7158. Asphalt shingles should have a classification that corresponds to the required basic wind speed.
- Consider public and town procedures on high wind mitigation strategies

2. Enhance Electrical System Resilience through coordination with electrical suppliers:

- Assess high risk areas for power system damage during high winds through formal and informal means (e.g., in the course of routine operations) and address feasible actions, including communication with electric supply companies.

Rationale / Cost-Benefit Review: Improved public awareness could potentially significantly reduce the loss of life and property damage through ongoing, formal, ongoing, public information campaigns that address property protection actions (flood proofing, elevation, anchoring mobile homes/propane tanks, electric and water system elevation, electric grounding, etc.) Improved awareness would also build understanding and public support for municipal mitigation actions to reduce potential infrastructure and liability costs.

Action #8: Reduce risk and impact of invasive species

Group: SP, NRP, PP
Primary Responsible Entity: Wheelock selectboard
Potential Partner Entities: ANR, NVDA
Timeframe: See Implementation Matrix
Progress: No progress at this point.

Funding Requirements and Sources: Education and enforcement measures are specific considerations before an invasive species is established. At this time, funding would be the town's responsibility. Federal Invasive Species Rapid Response Fund is designated to support mitigation as well.

Specific Identified Tasks:

- FEMA has several initiatives and resources aimed at mitigating the impact of invasive species. One key approach is through the National Flood Insurance Program (NFIP), which integrates floodplain management with wildlife conservation. This helps protect habitats essential for threatened and endangered species while reducing flood risks.
- Additionally, the Federal Invasive Species Rapid Response Fund plays a crucial role in quickly containing or eradicating newly detected invasive species. This fund, supported by the U.S. Fish and Wildlife Service, provides financial resources to address invasive species before they become widespread and costly to manage.

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- Education on prevention and enforcement of expected precautions, when applicable and feasible through understanding of risk and environmental/climate-related precursors to invasive likelihood.

Rationale / Cost-Benefit Review: Severe weather is bringing many challenges to communities in Vermont and the risk of invasive species is increasing with more accommodating climate patterns. Protecting bodies of water and forests from invasive species requires coordination and compliance from individuals.

Action #8: Reduce impact of hail

Group: SP, NRP, PP
Primary Responsible Entity: Wheelock selectboard
Potential Partner Entities: ANR
Timeframe: See Implementation Matrix
Progress: No progress to report

Funding Requirements and Sources: FEMA, ANR, town budgets.

Specific Identified Tasks:

1. Infrastructure Protection: Implement measures to protect critical infrastructure, such as floodproofing buildings and installing debris management systems.

2. Public Outreach: Conduct awareness campaigns to educate communities about the risks associated with hail and how to prepare for potential impacts.

3. Insurance and Risk Assessment: Evaluate the potential financial impact of hailstorms and consider insurance options to mitigate losses.

4. Data-Driven Insights: Utilize data analytics to understand the frequency and severity of hail events, allowing for proactive planning and response.

Rationale / Cost-Benefit Review: Severe weather is bringing many challenges to communities in Vermont and the risk of severe hail may coincide with changing weather patterns.

5.5 Implementation and Monitoring of Mitigation Strategies

5.5.1. Public Involvement Following Plan Approval

After adoption, the town will continue to maintain the web-presence of the mitigation plan with an opportunity for community input offered. This web presence can also be accomplished through NVDA's website. Additionally, the town will hold an annual public meeting after performing the annual progress report for the mitigation plan to discuss achievements and the following year's implementation plan. At town meeting, the town will present mitigation information and provide the public an opportunity to increase understanding and involvement with planning efforts. The town will also notify its neighboring municipalities of the availability of information for review and any significant risks and/or mitigation actions that have an impact on surrounding towns.

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5.5.2. Project Lead and Monitoring Process

The Selectboard Chair (or their designee) is the project lead and will work in conjunction with the Selectboard, town clerk, and NVDA/hired consultant to complete, at minimum, a review and revision of the plan once every five years. The town will create a mitigation action collection system that will be used as the source of future updates following the annual evaluation that will occur in conjunction with the progress report using the Plan Implementation Matrix provided below. While mitigation actions are, by default, often addressed at monthly Selectboard meetings, the town will schedule one meeting annually to formally assess the plan and adopt updates following the annual progress report and community meeting regarding the LHMP. Once the plan is approved by FEMA, the calendar will begin for annual review. The town will take the following implementation matrix and add actions to it each year, modifying tasks and/or needs as required so that the next LHMP update will be populated with the specific actions related to each mitigation strategy by year.

5.5.3 Plan Evaluation and Update Process

Formal integration into other community planning mechanisms since the last plan update have included the Town Plan related to flood resilience measures, achieving optimal ERAF rates, and the importance and rationale of mitigation planning efforts. This integration across the town plan, when appropriate, will continue in the future. Many of the action items from the 2021 plan have been accomplished due to situational awareness of town officials to pre-existing momentum during the plan development. The selectboard chair will lead the plan evaluation process as part of the annual progress report. Prior to town meeting and in preparation for the annual town report, a mitigation section will be included that provides an executive summary for the public that addresses the following topics:

- Status of recommended mitigation actions for the five-year planning period
- Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk.
- Identification of a lead person to take ownership and champion the Plan if different from Selectboard Chair.
- An approach to evaluating future conditions (i.e., socio-economic, environmental, demographic, change in built environment etc.)
- Discussion of how changing conditions and opportunities could impact community. resilience in the long term
- Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience

By engaging in the annual evaluation, the town will have a viable method for capturing the facets of efficacy and areas needing revision and improvement in its mitigation plan. The town is committed to "institutionalizing" mitigation into its normal operating procedures and with approval of this plan, embarks on the formal incorporation of mitigation actions and discussion, maintaining an awareness that involves not only the Selectboard, Town Clerk and acting Road Supervisor but also the community at large. Along these lines, the town will maintain a contact list of the current planning team and make revisions as required, including the team on the evaluation process each year. Through this consistent attention resulting from the evaluation process, progress reports and communication in the annual town report, the town will achieve the

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consistency required to enhance resilience through planning, assessment and actions devoted to mitigation.

5.5.4. Plan Update Process

Although the plan will be reviewed, pending ongoing financial resources, in its entirety every five years the town may review and update its programs, initiatives and projects more often based on the above procedure as changing needs and priorities arise.

The Plan update will be led by the project lead. Depending on funding availability, the town may elect to acquire the assistance of NVDA and/or a consultant to update the plan following a declared disaster and/or the next five-year planning cycle. To assure that the Plan does not expire, the town will begin the update process within no less than 18 months of the current Plan's expiration date. Following a disaster and during the recovery phase, the town will use the experience to assess the current Plan's ability to address the impact of the most recent disaster and edit the plan accordingly. Using the annual progress reports and evaluation narratives as a guide, along with perceived changes in risk or vulnerabilities supported by data and/or observation, strategies will be captured in accordance with FEMA guidelines, which includes reconvening the planning team during the update process. The town will establish a "Mitigation File" that documents all evaluations and progress reports, along with actions, especially related to infrastructure improvement projects. While the progress reports are designed to capture the specific actions the town has accomplished related to implementation, keeping a narrative list with dates on all actions relatable to mitigation (e.g. school drills, LEMP updates, Fire Safety Awareness, meetings, etc.), will provide the town the bulk of information required in the update process.

5.5.5. Implementation Matrix for Annual Review of Progress

The following table is intended to aid municipal officials in implementing the mitigation actions for Wheelock and to facilitate the annual monitoring and progress reporting. Progress has been included as a guide to future updates. Each year, the town will reserve a Selectboard meeting to review and update the Implementation Matrix as a means to establishing an accurate evaluation of the plan's efficacy and the information required for the succeeding update to the plan. The matrix includes each mitigation action for the project period, the timeline for accomplishment and the task leads. The town will update the matrix each year related to the full mitigation action items for each action category as they relate to progress status (completion or deletion from planning cycle initiatives) and rationale (new information, social, political and/or budgetary restrictions).

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Table 5-3: Hazard Mitigation Action Implementation Tracking

Action	Responsible Entity (Primary in **Bold**)	Timeline	Specific Identified Tasks	Annual Progress
Reduce vulnerability to flooding	**Selectboard**, Acting Road Supervisor (RS)	Current and ongoing	Specific Identified Tasks: Funding and staff resources permitting, assess the vulnerability and operational capability of municipal-owned roads, culverts, and other storm water management infrastructure to predicted storm water and snowmelt in areas with a documented history of recurring problems. Use the included Mitigation Action Agenda Items Short List included in this plan. The infrastructure will be evaluated regularly prior to replacement or upsizing of the existing infrastructure. Assessment of increased risk in specific areas with increased frequency of flood events should be considered (e.g., scoured/eroded slopes, stressed infrastructure, fluvial erosion). Addressing general maintenance needs when repetitive flood damage work competes with time normally allotted for general maintenance, whereby increased risk of damage during next flood event. Use, and amend as needed, the 2026-2031 Mitigation Actions Short List: Suggested Agenda Items found in	

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			Appendix of this update. Continue to explore relocating the town garage out of the floodplain. Inventory drainage areas and identify natural flood water storage areas to mitigate damage from flash floods. Adopt the State's River Corridor bylaws as a way to address local flooding and fluvial erosion. Engage in analysis and discussion on general maintenance projects that, if not completed due to competing demands, may increase the risk of flood-related damage during the next event. Engage in analysis and discussion on large projects that, if damaged, would not receive substantive support from the FEMA DR program. The challenge is keeping up with deferred maintenance. FEMA responds to damage repair requests by studying any condition reports available. VTrans engineers produce an extensive report on each town bridge every two years. If the documented condition is poor, FEMA will not support improvements, only restoration to pre-disaster conditions. In some cases in 2024, this made no sense given the amount of time and work it takes to administer a	

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			FEMA award. The Town did not accept the FEMA offer for Minister Hill Bridge because it did not address the cause of the flooding, only the repair of the result. Working with the state on a viable path forward for deferred maintenance is an important and necessary action for the next planning period. Develop strategies that aim to reduce competing demands for road crew when they are working to recover from a disaster and still need to perform general maintenance duties. These strategies can include: Budgeting for staffing and contractors Establishing efficiencies in issuing RFPs and establishing contracts Understanding the timeline of all grant-funded work and the consequences of not being able to complete a project due to competing demands. Improve capacity to manage disaster events: Explore hiring a paid project manager as soon as a federal disaster is declared, rather than have volunteer Selectboard members volunteer to work with FEMA. Find suitable methodology to keep bridge and culvert inventory up to date.	

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			Specific Infrastructure Projects Fall Brook Bridge Repair/rebuild Vertical Mile Rd. stone arch culvert replaced with box culvert Morgan Rd. East culvert needs culvert redesigned and installed Both Twin Bridge need renovation work on Peak Rd (near rt 122) Minister Hill Bridge abutments need renovation (state grant pursued but decline) Guard rail replacement on Peak, Sutton, and Burrows Rd. Ditching on Burroughs and Cold Hill Rds. (SHIP grant received) Non-funded guard rails need replacement on Stannard Mtn Rd and another area of Burrows Rd.	
	Selectboard	Spring 2027 and as needed	Property Acquisition through FEMA (and other) Buy-out Program	
	RS	Spring 2027 and as needed	Develop understanding of best practices related to NBS and implement when feasible: Street reconstruction and street resurfacing	
	RS, Selectboard	Current and until recovery completed	DR-4810 Recovery and continued monitoring of vulnerable infrastructure	
Action	Responsible	Timeline	Specific Identified Tasks	Annual Progress

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	Entity			
Maintain and improve resilience to severe winter storms	Emergency Management Director (EMD)	Winter 2026-2027 and each subsequent fall	Improve primary shelter to meet ADA requirements	
	Selectboard	Winter 2026-2027 and each subsequent fall	Reduce risk of power failure due to ice storms	
	EMD, **Selectboar**d	Winter 2026-2027 and ongoing as required	Notification	
	EMD, **Selectboard**	Winter 2026-2027 to initiate.	Residential Programs a. Ask property owners to report ice jams and adverse changes in the river conditions. b. Provide information to owners for how to report sightings and conditions to town officials. This will include the development of a process to receive and disseminate the information to the designated town officials.	
	RS	Winter 2026-2027 and each subsequent Fall in planning period	Monitor roads for safe and effective plowing	
	EMD, Fire Chief	Winter 2026-Winter 2031	Increase awareness of ICS structure and recommended practices	
Action	Responsible Entity	Timeline	Specific Identified Tasks	Annual Progress
Reduce impact of extreme temperature	Selectboard	Fall 2026-Spring 2027 (as-required)	Assess, if feasible, the economic consequences of both extreme cold and heat (with drought) and develop actions steps to best support the community	

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			and protect infrastructure/the environment.	
	Selectboard	Winter 2026-Spring 2027 (as-required)	• Enhance and expand availability of publicly available cooling sites. Wheelock's cooling options will need to serve a range of needs for a diverse population. Some sites will need to be located indoors and operate for extended hours. Specific mitigation actions to consider: 1. Execute an operating agreement with one facility to function as a dedicated cooling site that meets all of the minimum requirements, and at least two of the encouraged amenities. 2. Promote use of the Vermont Department of Health Cooling Sites map and review the map every time the Local Emergency Management Plan is updated. 3. Establish procedures for ensuring that potable water is available for outdoor cooling sites during heat emergencies. 4. Work with local housing providers, social service agencies, and the regional planning commission to ensure that cooling options are considered when planning for warming shelters for unhoused populations. 5. Improve cooling and ventilation of existing housing stock. Current statewide and regional efforts to weatherize and fuel switch provide an excellent opportunity to address cooling and ventilation as well.	

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			6. Organizations such as HEAT Squad and Northeast Employment Training Organization provide low- and no-cost services to Wheelock's energy-burdened households. 7. Ensure that rental housing management staff, social service agencies, and visiting nurses have relevant and timely information on heat emergencies, including availability of cooling sites. 8. Encourage enrollment in CARE.	
Action	**Responsible Entity**	**Timeline**	**Specific Identified Tasks**	Annual Progress
Reduce risk and impact of infectious disease event	Selectboard	Winter 2027 and annually thereafter as needed	1. Work with facility leads to understanding risk factors and what can be done to mitigate and enhance training and skills for response, misinformation, and support. 2. Enhance awareness and planning for health-related mandates, communication, isolation and quarantine logistics for residents, municipal operations and maintaining economic stability. 3. Develop and maintain continuity of operations plans for critical government and community services. 4. Disseminate public information on infectious disease risk and prevention measures when appropriate.	
Action	**Responsible Entity**	**Timeline**	**Specific Identified Tasks**	Annual Progress
Reduce risk and impact of drought	Selectboard	Summer 2027 and annually	Drought Planning: The town should	

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		each spring	determine what, if any, actions should be taken based on best practices related to drought mitigation, state guidance, and risk (NBS). Examples include encouraging drought-tolerant landscape design through measures such as: Investigate solutions to well-service contractor-demand during drought events. Use spring stewardship programs to help maintain supplies. Educate the public on best practices and recommendations for wells to improve resilience and reduce impact of drought through conservation actions	
Action	**Responsible Entity**	**Timeline**	**Specific Identified Tasks**	Annual Progress
Reduce risk and impact of wildfire	**Fire Chief,** Selectboard	Spring 2027 and as needed	Fire Prevention Programs: Continue National Fire Prevention Week and other programs to raise public awareness of fire hazards, safety, preparedness and prevention. 1. Continue use of burn bans for reducing wildfires during high-risk conditions 2. Enhance public education of the risk of wildfires and collaborate with state agencies (e.g., tourism, agriculture) on mixed-media sources to reach the	

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			largest audience most efficiently. 3. Review policy and procedure to reduce risk. Control tree cover over new structures to reduce spread in the event of a structure fire. 4. Explore opportunities through FEMA for Fire Assistance Grants and Post-fire assistance if needed.	
Action	**Responsible Entity**	**Timeline**	**Specific Identified Tasks**	Annual Progress
Reduce impact of high winds	**Selectboard**	Fall 2026 and ongoing as-needed	1. Build knowledge of (FEMA P-804 (2023), Wind Retrofit Guide for Residential Buildings in Hurricane-Prone Regions for applicable and feasible strategies. 2. Consider public outreach and town procedure to verify that asphalt shingle packages are labeled to indicate compliance with ASTM D7158. Asphalt shingles should have a classification that corresponds to the required basic wind speed. 3. Consider public and town procedures on high wind mitigation strategies 4. Enhance Electrical System Resilience through coordination with electrical suppliers:	

			5. Assess high risk areas for power system damage during high winds through formal and informal means (e.g., in the course of routine operations) and address feasible actions, including communication with electric supply companies	
Action	**Responsible Entity**	**Timeline**	**Specific Identified Tasks**	Annual Progress
Reduce risk and impact of invasive species	**Selectboard**	Spring 2027 as threats emerge	1. FEMA has several initiatives and resources aimed at mitigating the impact of invasive species. One key approach is through the National Flood Insurance Program (NFIP), which integrates floodplain management with wildlife conservation. This helps protect habitats essential for threatened and endangered species while reducing flood risks. 2. Additionally, the Federal Invasive Species Rapid Response Fund plays a crucial role in quickly containing or eradicating newly detected invasive species. This fund, supported by the U.S. Fish and Wildlife Service, provides financial resources to address invasive species before they become widespread and costly to manage. 3. Education on prevention and enforcement of expected precautions, when applicable and feasible through understanding of risk and environmental/climate-related precursors to invasive likelihood.	
Action	**Responsible Entity**	**Timeline**	**Specific Identified Tasks**	Annual Progress

Reduce impact of hail	**Selectboard**	Spring 2027 and as-needed	1. Infrastructure Protection: Implement measures to protect critical infrastructure, such as floodproofing buildings and installing debris management systems. 2. Public Outreach: Conduct awareness campaigns to educate communities about the risks associated with hail and how to prepare for potential impacts. 3. Insurance and Risk Assessment: Evaluate the potential financial impact of hailstorms and consider insurance options to mitigate losses. 4. Data-Driven Insights: Utilize data analytics to understand the frequency and severity of hail events, allowing for proactive planning and response.	

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APPENDICES

Appendix A: Mitigation Action Short-List: Suggested Agenda Items

2026-2031 Mitigation Actions Short List:

Suggested Agenda Items

Introduction: The following actions are suggested discussion and planning topics to best serve town mitigation planning during the next five years.

1. Budgeting for disaster-related infrastructure repairs:

   Background: FEMA reimbursement can take a year or more following a disaster declaration (which can take a month or more following an event). With the increased frequency, severity, and cost of flood repairs recently, municipal budgets can be strained with one significant flood event. Even without history of this challenge for a town, the potential for repetitive damage events in a short time frame to the tune of several hundreds of thousands in repair costs is a real and present concern.

   Suggested Topics of Inquiry:
   a. What level of repair costs can the town feasibly incur from a flood event?
   b. How can the town better manage grant processes at the state and Federal levels?
   c. If a flood event exceeded this level, what are the options for the town.
      - What are the short and long-term actions to support increased revenue and/or decreased loss? Has there been a recent reappraisal cue from the state to create more equitable taxation? How can next FY budgeting help?
      - Are general maintenance grants at-risk of being lost due to time commitment/labor requirement for damage repair?
      - What other options are available to the town to support major flood repair costs before pursuing a bank loan?

2. Strategy for keeping up with general road maintenance during disaster recovery period(s) and keeping up with deferred maintenance before the next disaster.

   Background: Major flood damage can take months to years to fully recover from. During this time, town resources may be strained to keep up with both general maintenance and flood recovery work. This phenomenon has the potential to increase flood vulnerability to

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infrastructure requiring general maintenance that without, have less resilience to withstand flooding.

Suggested Topics of Inquiry:

a. How is the town's general contracting process functioning and is there room for improvement (e.g., from scope of work, RFP, bid review, contracting and project management)?
b. At what point does the town seek contractors for work and how has this changed during a flood event and subsequent recovery periods?
c. Is the threat of losing grant funding due to time restraints an issue and if so, what can be done to reduce the risk of losing these funds?
d. Has an MOU been considered/pursued with neighboring towns and/or local contractors for emergency measures, response, and/or recovery work?

3. Utilizing After Action Review to enhance operations and resilience to severe weather

Background: Arguably, a town's experience with disaster events and recovery can provide important information on what worked and what needs to be improved and the questions above can be guided by these experiences. However, there may be other areas that will help support the town for future events.

Suggested Topics:

a. Has the town formally (or informally) engaged in After Action Reviews related to a disaster response and/or recovery event? If not, would this be helpful in gaining insight on how best to prepare for the next event?
b. If there has been recent turnover of road foreman and/or other leadership at the town level, how best can the town ensure that lessons learned, and overall institutional awareness are utilized to the best degree possible during the next disaster event?
c. Are there communication hurdles existing that prohibit an adequate exchange of information to support town resilience? If so, how can this be mitigated?

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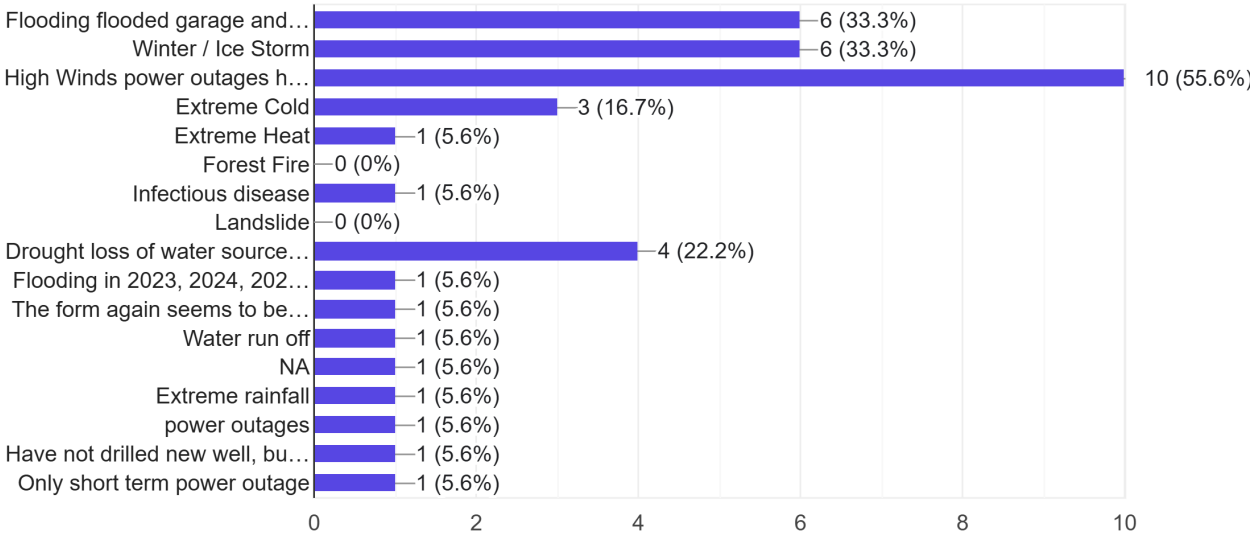
Appendix B: Community Outreach Survey Results

Have you ever been impacted physically, financially, or psychologically by a natural disaster?

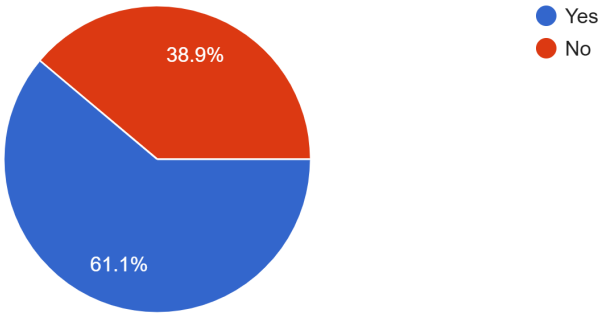
18 responses

Which Hazard(s) was the cause of the disaster you experienced?

18 responses



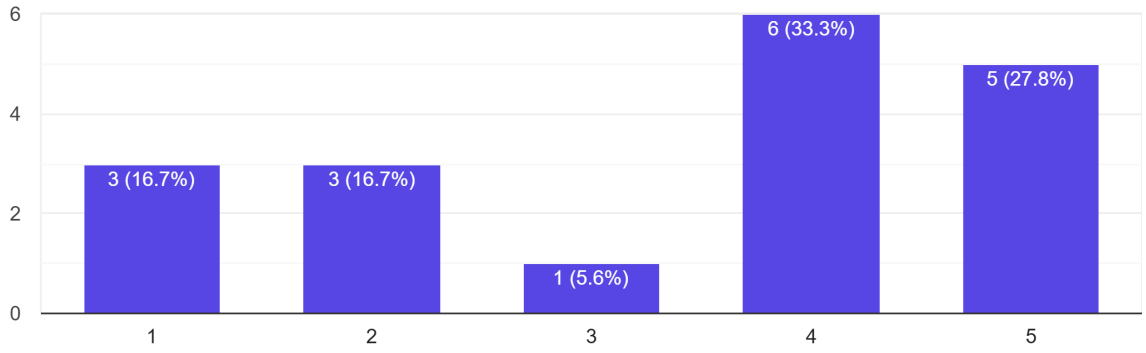
Has a road washout and/or flooding impacted your daily travels?
18 responses



If you answered yes to the above question, please name the section of road and how long you were impacted?11 responses

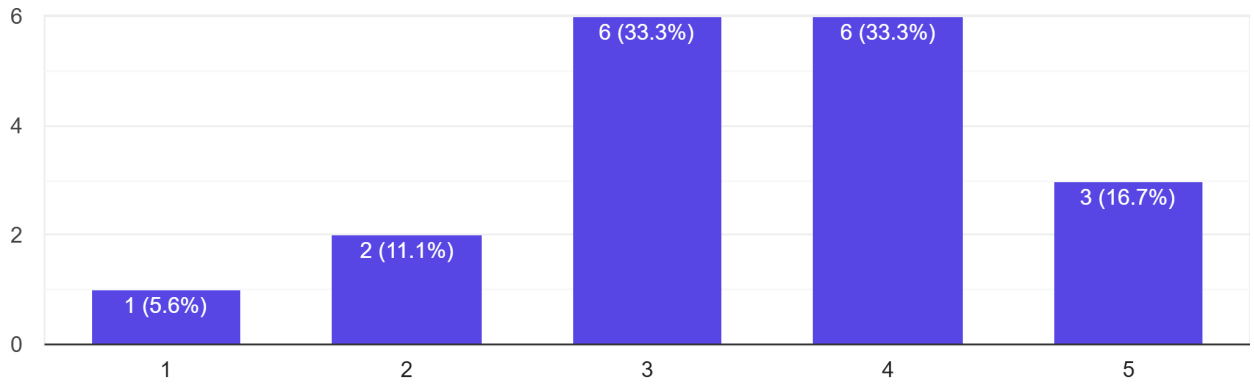
South Wheelock Road, 1-2 months
Many roads were affected in 2023, 2024, 2025. I was not personally impacted but a lot of people were for weeks.
Gonyaw Road (<1 week), Old Schoolhouse Hill Rd (<1 week - Greensboro Bend), Stannard Mountain Road (<1 week), Orton Rd bridge (1+ year), E. Main St Bridge (Greensboro Bend - bridge is still out following 2024 flood)
Buchler road and Fall Brook road
Burroughs Road, Stannard Mt Road
S. Wheelock Rd
Burroughs Road - hill near South Wheelock 4 corners.
Burroughs and Cold Hill - several days

How concerned are you about flooding?
18 responses



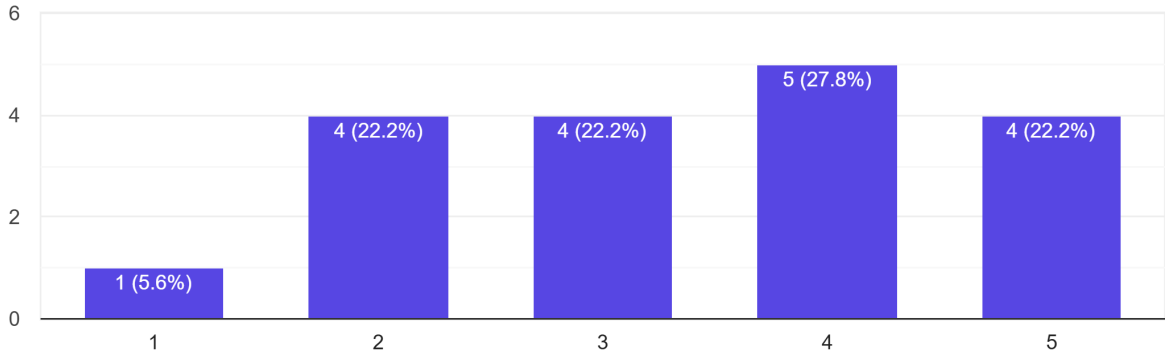
How concerned are you about winter / ice storms?

18 responses



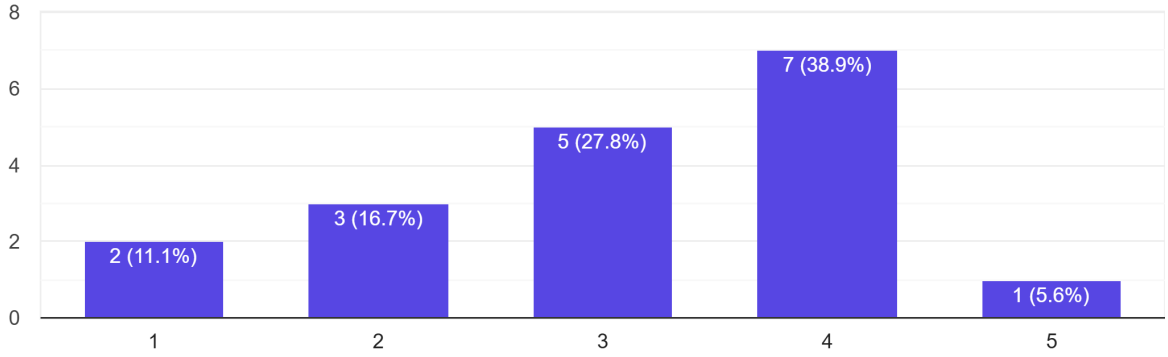
How concerned are you about high winds?

18 responses



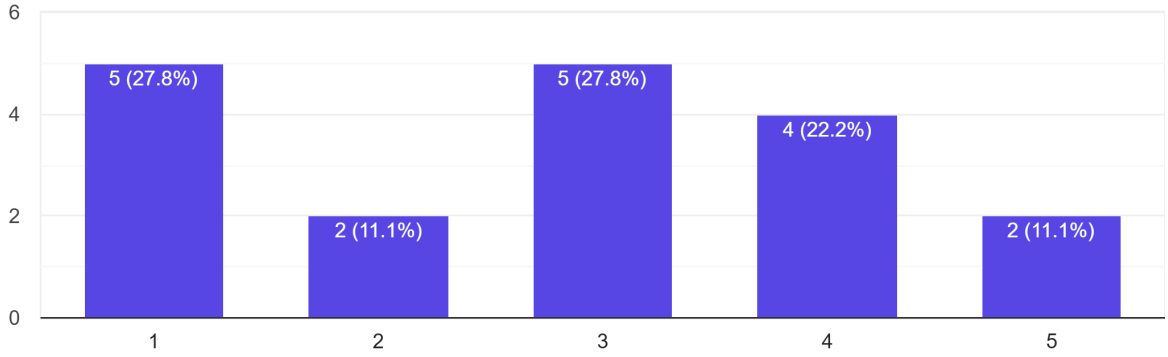
How concerned are you about extreme cold or heat?

18 responses



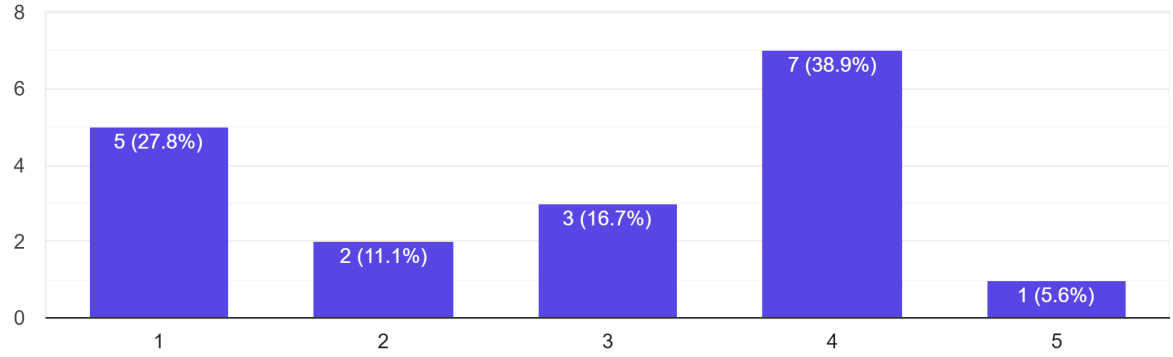
How concerned are you about wildfires?

18 responses



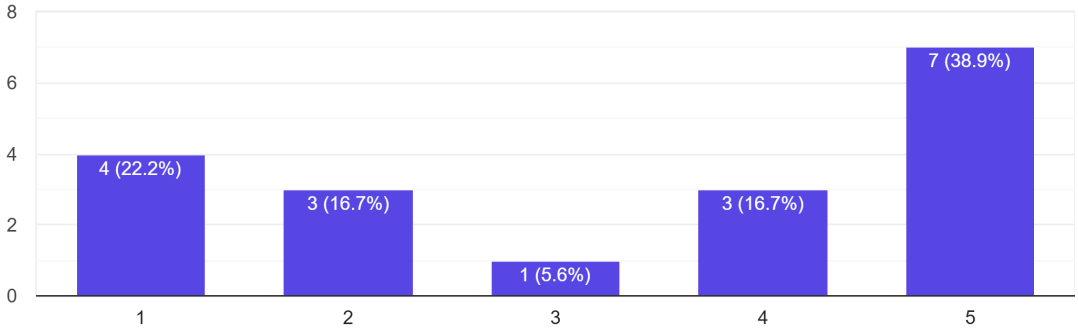
How concerned are you about another pandemic and/or infectious disease event?

18 responses



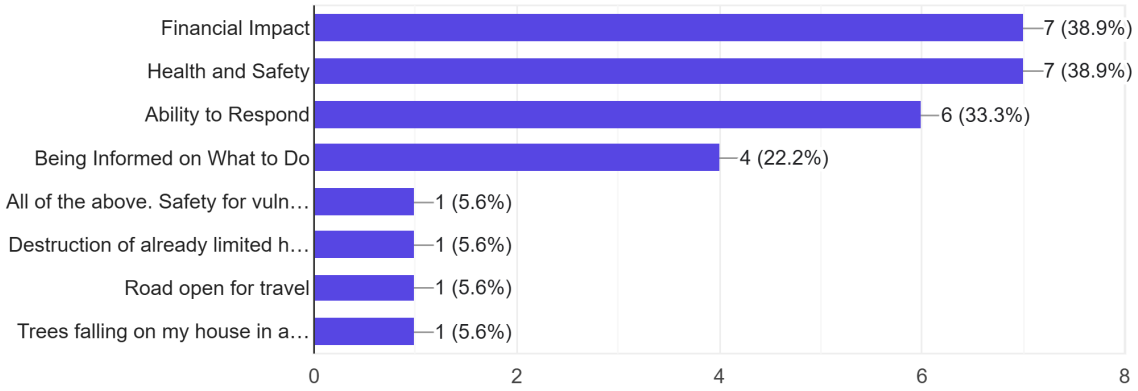
How concerned are you about climate change?

18 responses



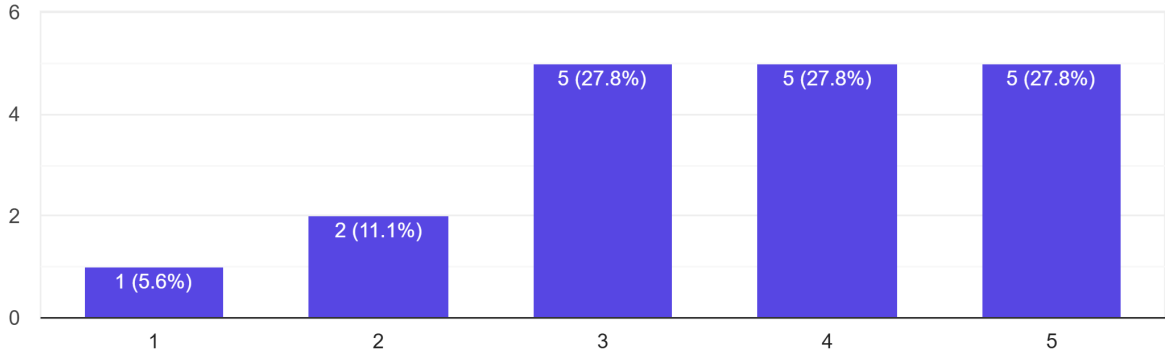
What concerns you the most about natural disasters?

18 responses



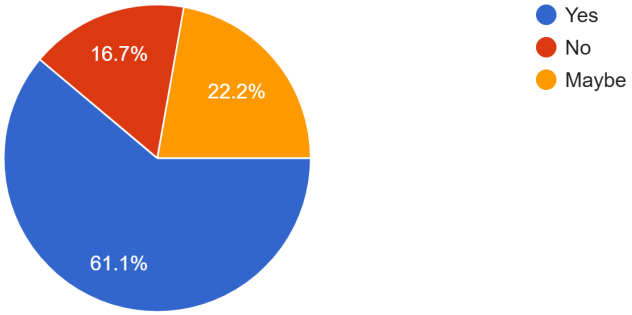
How concerned are you about road access during mud season?

18 responses



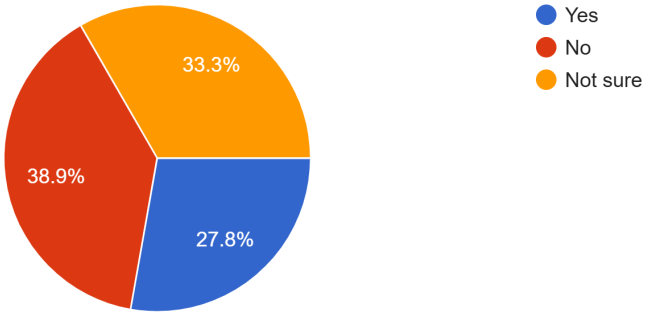
Do you feel that the town is negatively impacted by the current level of cellular and wi-fi service in regard to vulnerability to natural disasters?

18 responses



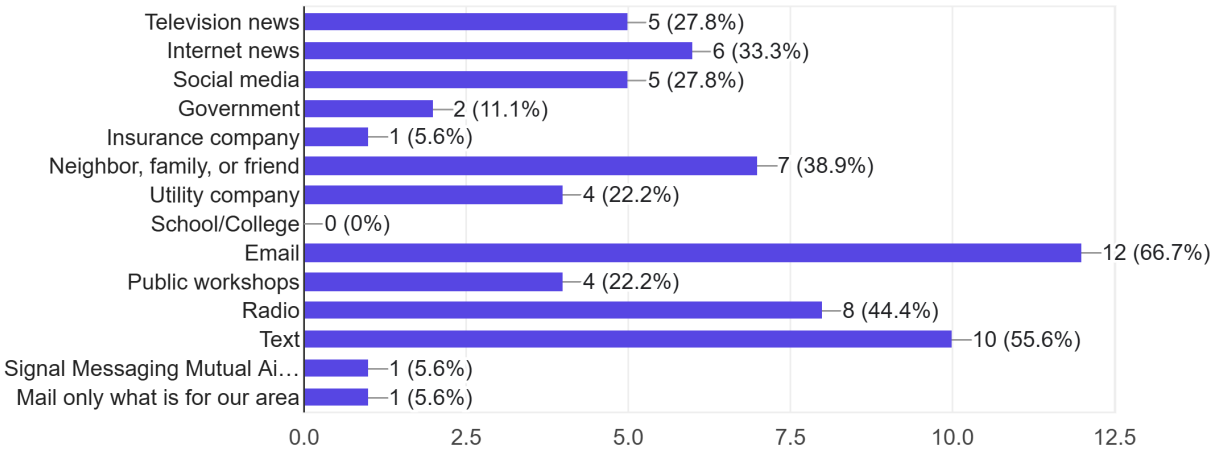
Have you ever received information about how to protect your property from disasters?

18 responses



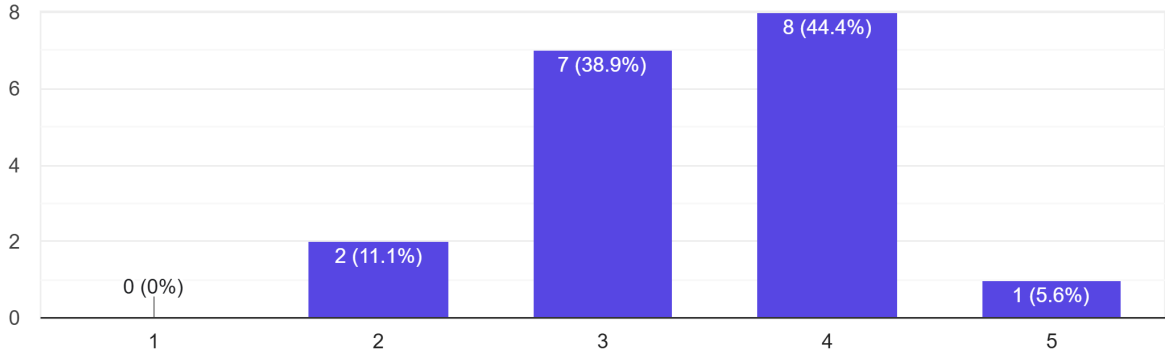
What is the best way for you to receive information about natural disasters?

18 responses



When thinking about the common problems associated with natural disasters (e.g., power outages, closed roads, access to essential services, and com...vel of preparedness for the next natural disaster?

18 responses



If there is anything you would like to say or ask related to natural disasters, please include below. Please do not include your name, address, or telephone number.8 responses

I get anxious when we get scary deplorable weather.

How can we increase our resiliency and ability to respond to the next disaster during "blue sky" times between disaster? How can we support those with limited financial resources to prepare/develop resiliency/mitigate risks to their homes. How can we connect neighbors in

advance, as we have often seen that neighbors are those with the most on the ground knowledge of needs/resources and are the first to respond in crisis.
Elect dept doesn’t maintain branch/tree removal we call all the time
Glad this plan is being updated, especially after three summers in a row with catastrophic rain.
In the 70's when the state of Vermont started to prohibit the dredging of rivers, that put into motion the increased potential for flooding. If studies were completed, they would most likely indicate that the damage from heavy rains caused less flooding along the river corridors prior to the that time then present day. After the recent floods, all you have to do is look at the rivers still filled with downed trees and then when it rains, the time it takes for the water to crest at the river banks is so minimal to what it was previously. The state requires you to update the plan, so maybe the first place to start would be to get the state to allow the towns the permission to clear the rivers of debris so you are not wasting your efforts to implement a plan to deter flooding when one of the big factors of flooding along the rivers cannot be eliminated. You can try to protect your property from natural disasters all you want, but don't forget that no one has any control over the climate, winds, ice, snow or mud. How could you possibly control mud? It is a given for where we live; dirt and water equal mud. Unless you want to pave all dirt roads, mud will always exist on the dirt roads in the spring. You can try to protect your property all you want from the risk of natural disasters, but Mother Nature is unpredictable and cannot be controlled. Identifying risk are certainly beneficial to everyone but changes have to be followed through for those risk to be decreased. Any strategy to prevent loss is always worth the effort.
Answers above pertain mainly to me at my residence in StJ, not to my woodlot&camp in Wheelock. However, I reside only 3.5 road miles from the Wheelock town line.
Power outages are always bothersome.

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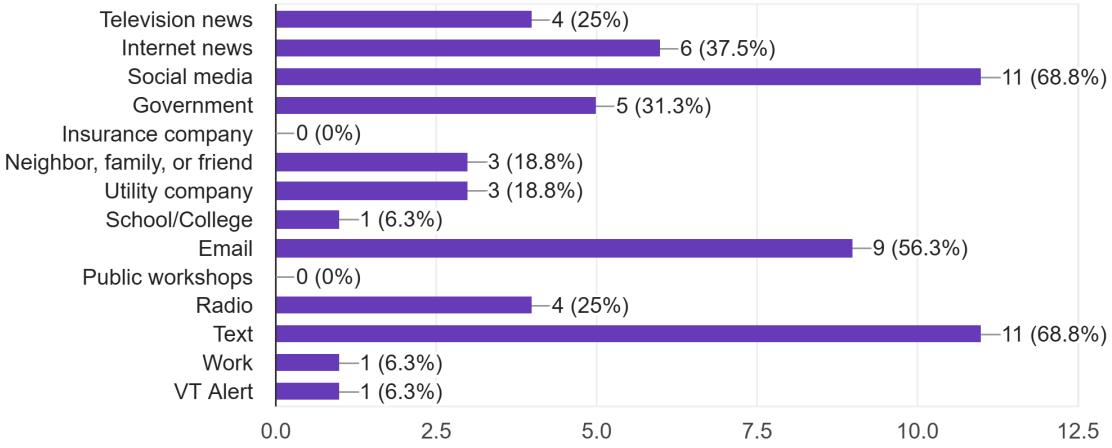
What is the best way for you to receive information about natural disasters?

16 responses



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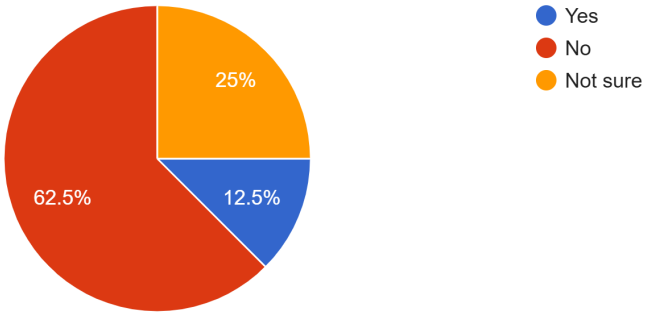

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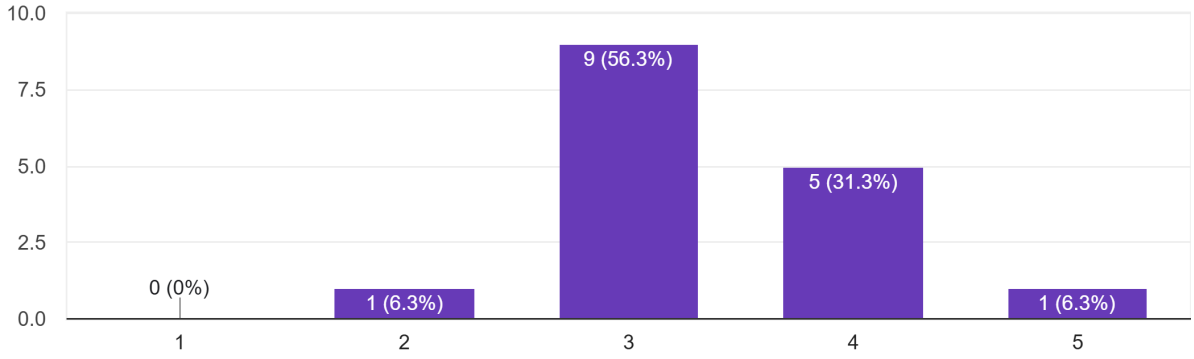
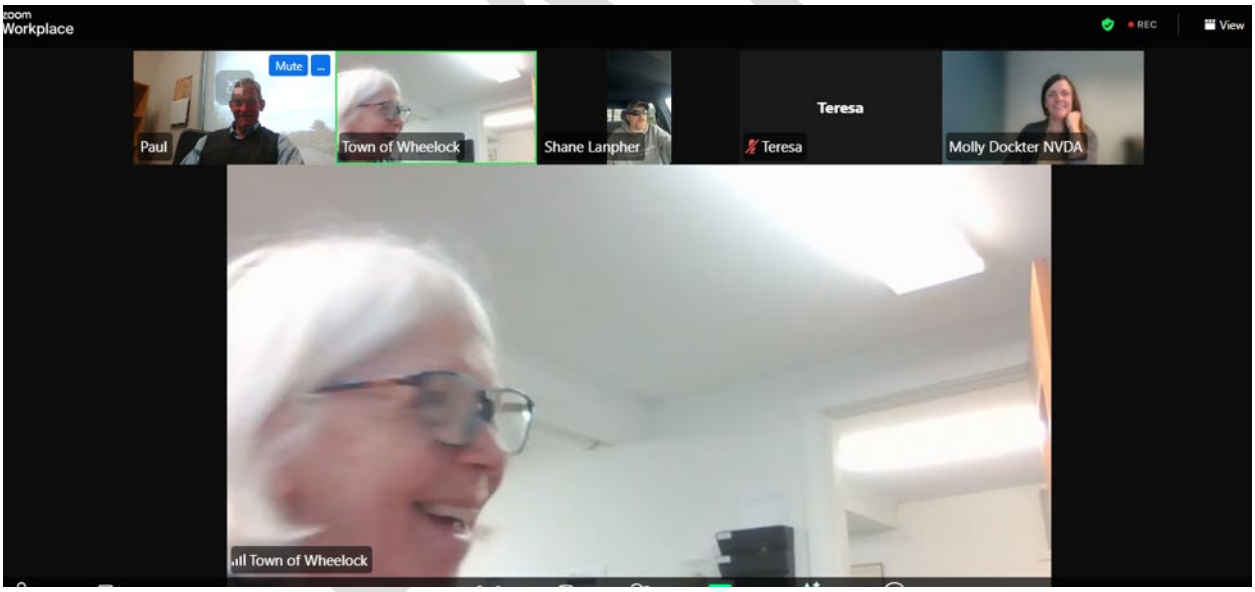
16 responses



Appendix C: Meetings and Public Communication

May 14th, 2026 Kick-off:



Home Government Contacts & Community Community & Resources

Hazard Mitigation Planning

Our current Local Hazard Mitigation Plan (LHMP) will expire August 10, 2026. A current LHMP is critical for disaster planning, for securing grants, and for keeping the town's Emergency Relief Assistance Fund (ERAF) score as low as possible in the event of a federally declared disaster. In a federally declared disaster, FEMA pays 75% of eligible costs, and the remaining 25% is split between the town and state. Currently Wheelock's share is 17.5%, and the town would like to lower it as much as possible.

NVDA has provided us a consultant, Paul Luciano, at no cost to the town. Paul will help us complete a new draft LHMP and have it submitted for initial review before expiration. The first step is a survey:

Understanding the community's experience with natural disasters is an important part of the planning process and a short survey has been made. Please take a few moments to fill out, it is anonymous. As the draft plan takes form, you will be invited to review and provide comment. Survey Link Here" Paper copies of the survey will be made available at the town office and village store.

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