



Danville Local Hazard Mitigation Plan

2023

CERTIFICATE OF LOCAL ADOPTION

Town of Danville, Vermont

A Resolution Adopting the Local Hazard Mitigation Plan

Note: Vermont Emergency Management has already reviewed and approved this plan.

WHEREAS, the Town of Danville has worked with its residents and stakeholders to identify its hazards and vulnerabilities, analyze past and potential future losses due to natural and human-caused hazards, and identify strategies for mitigating future losses; and ...

WHEREAS, the Danville Local Hazard Mitigation Plan contains recommendations, potential actions and future projects to mitigate damage from disasters in Danville; and

WHEREAS, the Town of Danville and the respective officials will pursue implementation of the strategy and follow the maintenance process described in this plan to assure that the plan stays up to date and compliant; and...

WHEREAS, a meeting was held by the Town of Danville Selectboard to formally approve and adopt the Danville Local Hazard Mitigation Plan.

NOW, THEREFORE BE IT RESOLVED that the Town of Danville Selectboard adopts this Local Hazard Mitigation Plan for the town.

Section 1. In accordance with (local rule for adopting resolutions), the (local governing body) adopts the (title and date of mitigation plan). While content related to (local government) may require revisions to meet the plan approval requirements, changes occurring after adoption will not require (local government) to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

November 2, 2023

Date

Jamie Ouellette
Alan J. L...
in E W...

DBJL

Selectboard members

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1. INTRODUCTION

A. Purpose

The purpose of this plan is to assist the Town of Danville in identifying hazards and implementing mitigation actions to begin reducing their risks while creating resilient measures for future generations. Through community-driven hazard identification and prioritization, assessment of community vulnerabilities, and analysis of risk towards those vulnerabilities, this plan will generate sustainable strategies to reduce or eliminate long-term risk to life and property from a hazard event. It is less costly to reduce vulnerability to disasters than to repeatedly repair damage. As climate change continues to produce more erratic and intense weather conditions, preparing for future hazards can reduce loss of life, property damage, community heritage, and the viable ecosystems we rely upon.

Hazard Mitigation: Any sustained action that reduces or eliminates long-term risk to people and property from natural hazards and their effects.

-- Vermont 2018 State Hazard Mitigation Plan

The Vermont State Hazard Mitigation Plan of 2018 defines *hazard mitigation* as

“...any sustained action that reduces or eliminates long-term risk to people and property from natural hazards and their effects.”

The goal of a Natural Hazard Mitigation Plan is to permanently reduce the risk and vulnerabilities by providing the community with the tools and awareness to increase education, collaboration, and cooperation when faced with natural hazards. By identifying and understanding the relationship between natural hazards, vulnerable systems, and existing capacity, Danville and its surrounding communities of support will be better equipped to identify and implement actions aimed at reducing the overall risk to natural hazards. Specific hazard mitigation projects can include:

- Flood-proofing structures
- Securing propane/fuel tanks in flood-prone areas
- Elevating furnaces and water heaters in flood-prone areas
- Identifying and modifying high traffic incident locations and routes
- Identifying and informing the public on primary and alternate evacuation routes
- Coordinating with local wildlife management programs
- Ensuring safe, clean, and adequate water supply
- Elevating structures or utilities above flood levels
- Identifying and upgrading undersized culverts
- Proactive land use planning for floodplains and other flood-prone areas
- Proper road maintenance and construction
- Ensuring critical facilities are safely located and provisioned
- Providing public information

With enhanced emphasis on community resilience, many state agencies and local organizations have an 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.

[The Code of Federal Regulations \(44 CFR Part 201\)](#), 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 must have an approved local hazard 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 and approved by FEMA, and several benefits in adopting a Local Hazard Mitigation Plan (LHMP):

- After November 1, 2004, [Flood Mitigation Assistance Grant Program \(FMAGP\)](#) funds will be available only to communities that have adopted a local plan;
- Communities without a plan are not eligible to receive funding from [FEMA's Hazard Mitigation Grant Program \(HMGP\)](#) to pay for hazard mitigation projects. (Communities, however, may apply for planning grants under the 7% of HMGP available for planning;
- Communities without a local plan are not eligible for funding from [FEMA's Pre-Disaster Mitigation \(PDM\)](#) program, and
- 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 Emergency Relief Assistance Fund (ERAF) requirements. See the attainable requirements [here](#).
- The National Flood Insurance Program (NFIP) is a voluntary program managed by FEMA and the Federal Insurance Agency (FIA), providing federally-backed insurances that are often at more affordable rates with greater coverage than private offerings through local community adoption of a *minimum* set of local regulations to keep future development from flood damage. To be eligible, communities must have a regularly updated hazard mitigation plan and describe their continued compliance with NFIP requirements. Learn more [here](#).
- Towns with an updated and approved LHMP are eligible for the Flood Resilient Communities Fund (FRCF) established by Vermont Legislature under Act 74, which can be read about [here](#).

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 were not in place;
- 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; and
- Connect hazard mitigation planning to community planning where possible.

Review Working Group

The committee responsible for overseeing the plan update process represents a cross section of local stakeholders whose expertise was essential to the development of the mitigation plan. Collectively, this

group possesses a first-hand knowledge of natural hazards and how they affect the community. Committee members were also able to develop, evaluate, and prioritize mitigation actions that will counteract the effects of these hazards.

- Kellie Merrill, Town of Danville *Selectboard (and Agency of Natural Resources)*
- Glenn Herrin, Town of Danville Planning Commission (and Department of Public Safety)
- Alison Low, Northeastern Vermont Development Association
- Bruce Melendy, Northeastern Vermont Development Association (also representing Local Emergency Planning Committee #9)

Steering committee members attended planning meetings but also made themselves available to provide information on request by the regional planning commission. They reviewed progressive drafts of plans and data. Additional individuals were consulted throughout the planning process. They include historical society members, highway department, road foreman, listers, public health officer, etc.

Regional Planning Commission

Multiple individuals from this organization were involved. A Senior Planner, a Regional Planner, and the Emergency Planner from Northeastern Vermont Development Association (NVDA) both directly with the review working group, attended meetings, and was responsible for plan drafts and research. They were assisted by NVDA's GIS Specialist, who compiled and mapped data as necessary.

Public Involvement

Prior to development of the updated plan, the steering committee developed a public survey to be distributed via Front Porch Forum. Paper copies of the survey were made available from the Town Offices as well. Relevant findings are cited throughout the plan, and a survey summary is appended to this plan. (Appendix B)

Neighboring Communities and Relevant Agencies

Prior to development of the updated plan, a public notice was emailed to the town clerks of following communities, notifying them of the first public hearing (and Zoom link):

- Peacham, Barnet, St. Johnsbury, Lyndon, Wheelock, Stannard, Walden, and Cabot

Following the release of the first draft, the plan was made available from the Town's website, and information was shared with the town clerks and planning commission chairs of neighboring communities. Drafts were also shared with the Vermont Department of Health and Vermont Agency of Natural Resources, Department of Environmental Conservation, and NVDA's Water Quality Planner.

Table 1A.1: Chronology of Planning Process

Date(s)	Description
February 24th, 2021	Hazard Mitigation working group members met with NVDA staff to review process, identify public survey, and review ranking methods for natural hazards. The group assigned probability scores to each risk identified in the 2018 Vermont Hazard Mitigation Plan and noted impacts in Danville. Individuals on the working group received a copy of the ranking system and assigned impact scores for discussion at their next meeting.
March 29th, 2021	Community survey went live on Zoho, and a URL was distributed to an email list compiled by the Town clerk. Links to the survey are on Front Porch Forum

June 16th, 2023	Working group met with Jesse Noone to review potential mitigation actions. The group reviewed a STAPLE+E process to evaluate and prioritize mitigation strategies. Individual members discussed viability of proposed strategies and devised new ones for the town to consider
June, 2023	After meeting with the committee members, another round of outreach to the road foreman, conservation commission, Open Door, and the fire district at their recommendation. Specific strategies and details of the town were asked based on their respective experiences.
July 2023	Final proposed strategies were sent to the LHMP Committee to complete the rankings. Final rankings were aggregated based on the consensus of the steering committee.
June-July, 2023	Final draft sections of the plan were given to members of the working group, who provided feedback and subsequently reviewed and discussed drafts with the Selectboard. Drafts were shared with the Agency of Natural Resources and the NVDA Basin Planner. Comments received from ANR and the Basin planner pertained to the pending release of revised FEMA data and the need for review of river corridor data. (Both are reflected in the mitigation strategies.) Technical correction from the selectboard was made to note a second solar panel at the Town Garage site and update to the Town's emergency dispatching arrangement.
July 2023	Full final drafts of the plan were made available from the Town web site. The plan was also shared with neighboring communities. No comments were received from neighboring towns or from the general public.

Information Sources Reviewed

- Centers for Disease Control
- Federal Emergency Management Agency, Open FEMA Datasets <https://www.fema.gov/about/openfema/datasets#public>
- National Weather Service, National Oceanic and Atmospheric Administration Storm Events Database, Caledonia County, VT <https://www.noaa.gov/>
- NOAA National Centers for Environmental information, Climate at a Glance Monitor: County Time Series, published March 2023, retrieved on March 27, 2023 from <https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series>
- NOAA/NWS NOWData Online Weather Data, St. Johnsbury, Vermont
- Danville Town Plan, adopted 2017
- Town of Danville Annual Reports, 2022 <https://danvillevt.gov/wp-content/uploads/2023/04/web-danville.pdf>
- Personal Interviews with Road Foreman, Fire District Chief Conservation Commission, and Open Door Owner
- Town of Danville Local Emergency Management Plan (LEMP), Adopted April, 2023
- U.S. Drought Monitor, National Drought Mitigation Center, University of Nebraska-Lincoln
- University of Vermont, Vermont Climate Assessment (2021) <https://www.uvm.edu/news/gund/vermont-getting-warmer-and-wetter-climate-change-study>
- University of Vermont, Vermont State Indicators Online <https://www.uvm.edu/crs/vermont-indicators-online>

This section of the plan satisfies requirement §201.6(b)(3): Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information?

- 2021 American Community Survey (ACS), 5-Year Estimates
- Vermont Agency of Natural Resources, BioFinder
<https://anrmaps.vermont.gov/websites/BioFinder/>
- Vermont Agency of Transportation, VTrans Town Highway Maps
<https://vtrans.vermont.gov/content/planning/maps/town-maps/highway-maps>
- Vermont Center for Geographic Information <https://vcgi.vermont.gov/>
- Vermont Climate Action Plan <https://climatechange.vermont.gov/about>
- Vermont Department of Health, Climate and Health Resources
<https://www.healthvermont.gov/environment/climate>
- Vermont Online Bridge and Culvert inventory (VOBCIT) <https://vtculverts.org/>
- Vermont State Hazard Mitigation Plan 2018 <https://vem.vermont.gov/plans/SHMP>
- Flood Ready Vermont <https://floodready.vermont.gov/>
- VT Parcelization Website <https://vtforesttrends.vnrc.org/home>
- Transportation Resilience Planning Tool (TRPT), VTRANS,
<https://vtrans.vermont.gov/planning/transportation-resilienceb>
- Green Mountain Power
- Data from The Forest Ecosystem Monitoring Cooperative (FEMC) <https://www.uvm.edu/femc/>
- The Vermont Association of Planning and Development Agencies (VADPA) Bridge and Culvert Inventory Status
<https://vapda.maps.arcgis.com/apps/dashboards/867c764a9a324fd2a1bba98d2edc7e18>
- Joe's Pond Association <https://www.joespondvermont.com/>
- New England and Northern New York Forest Ecosystem Vulnerability Assessment and Synthesis, United States Department of Agriculture (USDA)
- Town of Danville All-Hazard Mitigation Plan (2005)
- Natural Resources Conservation Service (NRCS)
- Brown, J. B., Conly, P. H., & Larrabee, D. A. (2021). *West Danville, Vermont: Then and now, 1781-2021*. Danville Historical Society.
- Danville Historical Society
- The North Star Monthly, September, 2003
- Lower Passumpsic River Tributaries River Corridor Plan May 1, 2014
- Passumpsic River Tactical Basin Plan, October 2019
- Emerald Ash Borer (EAB) Pest Preparedness Plan, Town of Danville, Adopted 2019
- Draft Enhanced Energy Plan, Town of Danville, 2023 <https://danvillevt.gov/wp-content/uploads/2023/05/DRAFT-Danville-Enhanced-Energy-Plan.pdf>
- Vermont Invasives <https://www.vtinvasives.org/>
- Keiser Pond Wildlife Management Area

B. Community Profile

Town Background

(All data was retrieved from Social Explorer's American Community Survey (ACS) 5-year Estimates, 2017-2021, Appendix F)

Danville, "the village in the hills", was first settled under the name of Hillsborough in 1765 and renamed in 1786. In 1796, with the addition of new counties within the state Vermont Danville was the initial choice of county seat for Caledonia County. In 1791 there were 574 citizens reported by the census. Over the years, decades, and centuries since, St. Johnsbury has taken over for county seat, seeing an influx in population while Danville has generally remained a modest village settlement. As of this report, American Community Survey data reports a population of 2,172 in the greater Danville area, with 416 people in the Danville Town Center. Like many residences in the Northeast Kingdom, there is a strong connection to open lands through forestry and agriculture.

The Town of Danville is generally compact and provides many cultural and daily amenities that aren't necessarily found in towns elsewhere in the region. The Town has been both proactive in its zoning bylaws and progressive in preserving its cultural heritage, no small feat considering the traffic and opportunities for growth being close to a regional center (St. Johnsbury) and having State Highway Route 2 dissect the Town Center.

Danville comprises 38,796 acres, or 60.62 square miles. The Agency of Natural Resources (ANR) has identified approximately 6,282 acres (9.81 square miles) of surface water through BioFinder. Its lakes include Joe's Pond (though much of the lake is in Cabot town boundaries), Joe's Brook, Morrill Brook along N. Danville Rd., Sleepers River, Water Andric, Whiteman Brook, Badger Brook, North Brook, Pope Brook, and the northern portion of Keiser Pond. All tributaries flow into the Passumpsic River. [BioFinder](#) lists approximately 20,794 acres of Priority Interior Forest Blocks, with a little over 12,000 acres being the highest priority. (Please see Appendix E for more details)

Prevailing Development Trends

Population growth has tapered over the past few decades in Danville. Despite this, housing production has increased. Though rural sprawl is a growing conversation for Danville, the town is still sparsely populated as represented by a population density of 35.8 people per square mile (slightly down from 2010). The Town Plan records 928 housing units from 2010 Census data. 2021 ACS data reports 1,287 housing units, a 27% increase in that timeframe. Of these, 981 households are occupied with 306 households (23% of active housing inventory) listed as vacant, likely as secondary or seasonal homes. Because of amenities such as a school and proximity to St. Johnsbury, there is a greater population of renters (227 households, or 23%) than most towns of this size. 85% of the total housing inventory in Danville are single-family homes.

60% of households in Danville are families, which provides a steady mix of youth and working families. Only 22% of the town's population is aged 65 and older, while almost 20% represent ages 17 and younger. Of the 981 full-time households, a third of them are inhabited by a single resident. The average household size is 2.2 people per household. Only 25% of households have 3 or more people living there. Comparisons based on data provided in the Town Plan suggest family households are on the decline while people aging alone are increasing.

This section of the plan satisfies requirement §201.6(d)(3): Was the plan revised to reflect changes in development?

The median household value in Danville is \$253,200, compared to the county median household value of \$176,200. The median household income in Danville is \$62,617, again higher than median household income for Caledonia County as \$55,159 (Though this data might be inflated by owners of secondary vacation homes in the area, ACS data generally does not account for vacant housing). 33% of the household population does not have wage or salary income.

As mentioned above, Danville has a higher proportion of renters than most rural communities in the Northeast Kingdom. Of the 227 renting households, 19% of households pay more than 30% of their household income on rent and are therefore considered cost-burdened, whereas 33% of homeowners in Danville are paying at least 30% of their income on selected monthly owner costs. Despite these numbers, Danville is fortunate to have a smaller number of residents below the poverty level. 8.6% of families have income below the poverty level, and of the 2,172 residents, 7% have an income to poverty ratio below 1.0.

Despite inflated median household income numbers, 35% of the 981 households make less than \$50,000 per year. Conversely, another 35% of households have income higher than \$100,000. 33% of the household population does not have wage or salary income while 41% of households have social security

income. This suggests that many Danville residents have retired and are aging in place, which is further supported by the 698 residents not in the labor force. However, unemployment is virtually non-existent, with ACS data showing 99.9% employment of people in the labor force. The highest levels of industry by occupation are education, health care, and social assistance (28%), manufacturing (13%), and administrative and waste management (9%). Almost half the workforce (48%) travel 20 minutes or more for work commutes.

The range of lifestyle and financial disparities display how different hazards can have far-reaching effects on the community based on their income, marital status, and cost of living.

Table 1B.1: Town Statistics

Datum		Source
Population per square mile	35.8	American Community Survey (ACS) 5-year Estimates, 2017-2021
Total housing units	1,287	American Community Survey (ACS) 5-year Estimates, 2017-2021
Occupied	981	
Vacant (including seasonal)	306	
Median age	52.8	American Community Survey (ACS) 5-year Estimates, 2017-2021
Median home value	\$253,200	
Homestead tax rate (per \$100)	1.384	Department of Taxes, Agency of Administration FY 2023. https://tax.vermont.gov/property/education-property-tax-rates
Non-residential tax rate	1.453	

Parcelization

Parcelization is the subdivision of private land into smaller parcels of ownership. This can cause fragmentation of forested areas through rural residential development, thus disrupting wildlife habitat and threatened ecosystems. Both subdivisions of large tracts of land as well as fragmentation of natural habitats were highlighted as concerns in the most recent Town Plan. As a threat to natural heritage, the Town promotes development within their village center designation.

The Vermont Natural Resources Council (VNRC) runs the [VT Parcelization](#) website which has tracked parcelization rates in Vermont between 2004 and 2020 on multiple scales. In that span, Danville lost about 1,500 acres of farmland, yet gained roughly 600 acres in woodland. Residential acreage has increased by about 2,600 acres. Overall, Danville has yet to see a dramatic change in parcel size changes yet has the fourth largest amount of acreage of 100-200 acre parcels as well as the fourth largest number of parcels over 50 acres of any town in Vermont.

Land Use

Citizens overwhelmingly want Danville to maintain its current small-scale rural character and way of life well into the future. As a town with a village center designation, Danville possesses a vibrant cross street with a village green and businesses. It seeks to attract service-oriented commercial businesses that fit its small-scale mold along with maintaining residential capacity to keep housing affordable for the town. Danville possesses multiple municipal buildings in town as well as public lands, including the recently completed Lamoille Valley Rail Trail.

Job creation relies heavily on regional, state and federal initiatives or the entrepreneurial spirit and investments of individuals with little or no local support. An economic plan and regulatory framework are necessary to make Danville an attractive location for businesses. Today, the major employers in town are the school, the Town, small retail and service companies - many focused on hospitality and tourism -

and many small entrepreneurial and home based businesses. There is a local need to promote the benefits of Danville as a place to locate or expand business and provide quality jobs for its residents.

Current zoning bylaws (adopted 2009) outline eight districts within the town: Village Core, Historical Neighborhoods, Village Residential, Route 2, Medium Density Residential (MDR) I, MDR II, Low Density Residential, and Conservation. Permitted uses, conditional uses, and area and dimensional requirements, parking requirements, loading and service areas are specifically defined for each district. The bylaws stipulate that no land development may commence without a zoning permit issued by the Administrative Officer.

Danville received designation as a “Village Center”. Vermont law defines a village center as “the core of a traditional settlement, typically composed of a cohesive mix of residential, civic, religious, commercial, and mixed-use buildings, arranged along a main street and intersecting streets that are within walking distance for residents who live within and surrounding the core.” Village Center designation supports local revitalization and comes with several opportunities for tax credits and priority status for grants. The designation is intended to promote a vibrant mix of uses in the heart of Danville Village(s).

It is the intention of the Town to preserve prime agricultural lands development. Local land use regulations intend to contribute to the viability and sustainability of agriculture as a worthwhile economic endeavor in the effort to enhance food quality and security.

Joe’s Pond

Joe’s Pond is a vital source of cultural identity and economic vitality for Danville. Named after a Native American of the Micmac tribe, the lake encompasses approximately 405 acres at an elevation of 1,551 feet with about 78 feet of maximum depth. It flows southeast into the Passumpsic River, which then traverses to the Connecticut River. Its watershed reaches northerly and covers over 18,000 acres.

Joe’s Pond Association is a community-driven organization that manages many of the lake’s social organizations and natural resources, including managing water quality and showcasing the pond’s rich history. The association exists for the purpose of improving the surroundings of the lake and promoting general welfare. Their work has included cyanobacteria studies, invasive species protection, shoreline stabilization, and water-quality testing.

The [Vermont Inland Lake Scorecard](#) for [Joe’s Pond](#) has issued mixed results for water quality, with water quality standards marked as “stressed” and the overall watershed “moderately disturbed”. The lake’s trend and shoreland condition both received a “poor” scoring. According to the scorecard, there are no known invasive species. However, in a recent Annual Aquatic Vegetation Survey Report in 2022, the common reed was found to be the first existing invasive species. In 2019, the first algae bloom was observed on Joe’s Pond (*West Danville, Vermont: Then & Now*). Both watershed and shoreland Best Management Practices should be the focus of initiatives protecting water quality in Joe’s Pond.

Natural Resources and Wildlife Species

Danville is the home of [Keiser Pond Wildlife Management Area](#) (WMA), land owned and managed by the Vermont Fish & Wildlife Department. The WMA is 69.2 acres surrounding the pond, with the pond itself expanding 33 acres. The management goals of this property are to preserve and enhance the existing aquatic and terrestrial habitats. Northern white cedar, balsam, red spruce, and white pine predominate the shoreline, with an abundance of wildlife thriving in the ecosystem as well. In particular, Keiser Pond is known as a birding hot-spot with blue herons, waterfowl, mallards, green-winged teal, loons, and an array of ducks and geese inhabiting the wetland and shorelines.

Danville has procured two public Town Forests within town limits, each with their own goals of management and strategies of habitat maintenance. [Rodgers Lot](#), is a 120-acre parcel intended to maintain the contiguous forest landscape for the priority of conserving Priority Bird Block habitats among other important species. The [Pumpkin Hill Lot](#) is approximately 100 acres with numerous small wetland ecosystems. It is home to numerous rare or uncommon plant species. Both were made by the Conservation Commission in Danville.

The Conservation Commission was formed in 2006. They meet on the first Monday of every month at the Town Hall and hold seats for nine members. Some informational items on their [website](#) include Emerald Ash Borer preparedness, tree ordinances, and town forest management plans.

Facilities and Utilities

For a small town, Danville has a wealth of long-standing municipal buildings, including a host of designated historical sights. Additionally, the town is home to seven designated Century Farms as listed in the Town Plan. The town has a K-12 school of about 315 students (2022 Annual Town Report), two Town Garages, a Town Farm, two fire stations, a sewer plant, and Town Hall. Additionally, the Town is fortunate to have local health services, a town library, a grocery store, and commercial businesses in the village center. The Primary Emergency Operations Center (EOC) as listed in the Local Emergency Management Plan (LEMP) is located in the Town Office.

Electric Utilities

Most of Danville is served by Green Mountain Power, with the exception of West Danville which is served by Washington Electric Co-op. Telecommunication companies that have reliable services in the area include Spectrum, Verizon, and AT&T, yet survey respondents voiced concerns about reliable dependence from both electric and telecommunication utility services.

Green Mountain Power was able to provide outage data for Danville from 2018-2022 (Appendix C). Within that time frame, there have been seven multi-day outage events of power being lost and restored from storms. The most significant outage event occurred between 10/31/2019-11/04/2019, where a windstorm (detailed in Table 2B.3.2) swept through the area causing 41 separate outages with customers being without power for up to and over 40 hours at a time. Extended power outages are a vulnerability and are very common in the Northeast Kingdom. 75% of the survey respondents reported being without power for a day or longer.

Water and Sewer

The Town of Danville possesses a municipal water and sewer system, with the ability to direct and absorb planned development of growth. Water hydrant lines were expanded and improved along Route 2, providing the Village Center with resilient facilities in times of hazard or in periods of growth for the town. Homeowners beyond supply limits rely on spring water sources and lichfields for quality.

Danville Village developed a sewer treatment facility in 1982, a double-aerated lagoon next to the Water Andric. While improvements have been made over the years to retain a high effluent of the discharge, the capacity of the Water Andric watersheds limits the ability to significantly expand the facility. The 2005 All Hazard Mitigation Plan states that a generator is needed for the pumping stations because there is currently a small generator that can only operate on an 8-hour capacity if there were to be a sustained power outage.

Solid Waste

In 1991, Danville joined the [Northeast Kingdom Solid Waste District](#) that serves its member towns by providing the planning, hazardous waste collection, education, state compliance reporting, facility

certification application, grant application, recycling material possessing, and other activities which would otherwise have to be carried out by each individual town.

The Town of Danville, for its part, operates a recycling center (now a paid position) in the town garage, and operates at least two bulky and categorical waste days each year. During summer months the Town operates a stump dump for yard waste limited to Danville residents in Rodgers Lot town Forest. Danville School and one business also participate in the community recycling effort and food waste composting effort.

Medical Facilities & Emergency Response

Emergency services are made up of 3 parts: Law, Fire, and Rescue. The Vermont State Police in St. Johnsbury serve as law enforcement for all residents in Danville. The town contracts for limited traffic enforcement with the Caledonia County Sheriff's Department (CCSD). Danville is served by a volunteer fire department that has been in place for more than 100 years.

The fire department is located at 296 Peacham Road and has a total of 4 fire trucks, one stationed in North Danville, one rescue vehicle, and one UTV Remote Rescue Vehicle. Danville Rescue Squad, Inc. is a nonprofit rescue organization that had its first year of service in 1968. It is a volunteer organization. Danville Rescue has its own building located at 379 Brainerd Street and has 4 rescue vehicles in its fleet including an amphibious unit. Danville Rescue is associated with the CALEX Ambulance Service, based in St. Johnsbury. The Danville Health Center is a local community health center that has been in service since 1977 and acts as a robust asset for the community. Regionally, the following health service provider are listed:

- Northeastern Vermont Regional Hospital: Critical Access Hospital (about 7 miles away; St. Johnsbury, VT)
- St. Johnsbury, VT Health and Rehab (Nursing Home, about 7 miles away; St. Johnsbury, VT)
- FMC OF ST. Johnsbury Dialysis (about 7 miles away; St. Johnsbury, VT)
- Caledonia Home Health Care (about 7 miles away; St. Johnsbury, VT)
- Pines Rehab and Health Center (Nursing Home, about 11 miles away; Lyndonville, VT)
- North Country Home Health and Hospice Agency (Home Health Center, about 11 miles away; Littleton, NH)
- Lafayette Center, Genesis Healthcare (Nursing Home, about 14 miles away; Franconia, NH)

Infrastructure

Roads

The VTrans [Town Highway Maps](#) has about 111 recorded Class 1-3 road miles in Danville, with another 22 miles of Class 4 roads (displayed in Table 1B.2.). The town originally developed roads to lead to the village center, and therefore the town has many access points and routes towards the Danville town center. Despite being bisected by Highway Route 2, Danville does not often experience heavy or unsafe traffic and has numerous traffic calming strategies through the town center. As Route 2 is northern Vermont's main East-West thoroughfare, congestion is likely in an event of evacuation.

Though many roads are Class 4 and therefore unmaintained by the town or state, there are multiple road access opportunities for residents within Danville to reach service areas in Hardwick and St. Johnsbury. Additionally, the recently-completed [Lamoille Valley Rail Trail](#) (LVRT) runs through town and extends to West Danville onto Hardwick in the west, and St. Johnsbury in the east. Lastly, Vermont Association of Snow Trails (VAST) runs and maintains a large network of [snowmobile trails](#) throughout the region, including the Danville S-Ski-Mos trails.

Table 1B.2 Danville Road Mileage

Class	Description	Mileage
US Highways		9.06
Class 1	State highways that run typically run through downtowns and village centers and are maintained by the municipality.	3.75
Class 2	Major connectors between high activity centers in a town. Town is required by statute to keep in “good and sufficient repair” all year.	14.74
Class 3	All other town highways that remain negotiable by a car throughout the year. Town is required by statute to keep in “good and sufficient repair” all year.	84.00
Class 4	Roads that the Selectboard may apply some discretion for maintenance. The Town has an adopted policy on Class 4 roads.	22.25
Total	Traveled Highways (excludes Class 4 mileage)	111.55

Source: VTrans Town Highway February, 2021 (most current)

The 2022 Annual Town Report contains a Road Foreman Report that lists road improvement projects that are informed by the projects listed in the Lower Passumpsic River Tributaries River Corridor Plan (LPRTRCP). Their Treasurer's Report dissects revenue and expenses between class roads, trucks and equipment, payroll, and town garage. 2022 expenses slightly outpaced revenue by -\$781.36.

[Vermont's Agency of Natural Resources' Clean Water Project Explorer](#) features highlights and a handful of projects executed within the Town funded by multiple sources, including the VTrans Better Roads Program, the Municipal Roads Grant Program, and the Clean Water Initiative Program. These projects underscore the relationship and importance between road maintenance and water quality.

Another recent tool developed by VTRANS and a multi-disciplinary consultant team is the [Transportation Resilience Planning Tool](#) (TRPT), which combines river science, hydraulics and transportation planning methods and is applied at a watershed scale to identify bridges, culverts, and road embankments that are vulnerable to damage from floods. It estimates risk based on the vulnerability, and criticality of roadway segments, and identifies potential mitigation measures based on the factors driving the vulnerability. This tool can be used for planners, commission and selectboard members, road foremen or highway departments, and emergency management coordinators to highlight road segments' vulnerability along with possible mitigation strategies. Most high-risk segments within town limits are on Highway 2 and North Danville Road.

Culverts, Dams, and Bridges

The Vermont Association of Planning and Development Agencies (VAPDA) houses the [Vermont Bridges and Culvert](#) inventory, which stores a database of located culverts statewide and their recorded conditions. Though improvements can be made in outreach to smaller towns' inventory, reporting, and conditions, the database provides a wealth of information and inventory of culvert and bridge statuses accessible to the public. The last inventory date recorded in Danville was 2009, where 931 culverts were recorded.¹ Of those, 764 (82%) are considered in excellent condition, 24 are considered to be in poor condition, 3 urgent, and 9 critical. 88 of them are privately owned and managed, with the vast majority of them being run by the Town Highway. Most of the culvert systems run along arterial roads. The severe flooding events of 2011 caused damage to road infrastructure in Danville. Past problem areas include, but are not limited to, sections of North Danville Road, Cormier Road and Bruce Badger Road.

¹ <https://vapda.maps.arcgis.com/apps/dashboards/867c764a9a324fd2a1bba98d2edc7e18>

The 2014 Lower Passumpsic River Tributaries River Corridor Plan assessed bridges and culverts for geomorphic compatibility. This assessment indicated that a majority of the bridges and culverts in Danville have a high degree of vulnerability to flooding and erosion. These structures are identified in Tables 11 and 12, and site specific projects designed to reduce fluvial erosion risks are identified and prioritized on Table 13 (link to this report is found at <https://anrweb.vt.gov/DEC/SGA/finalReports.aspx>).

Multiple culvert and bridge restoration projects are listed within the Danville Town Plan. Culvert replacement and channel restoration/stabilization along a segment of Whiteman Brook where an undersized stone culvert poses a major channel constriction and risk of major damage to VAST trail.

There are 18 bridges within Danville town limits recorded within the database - six along Joe's Brook, three across Houghton Brook, two across Roy Brook, two across Sleepers River, two above the river on North Brook, and one across Morrill Brook. It is likely that many bridges have not been recorded in the culvert database.

Within the [ANR Atlas Database](#), there is an inventory of spatial, structural, historic, and regulatory information on most dams in Vermont. Within this database, there are 10 dams in Danville - six in service, three removed, and one breached.

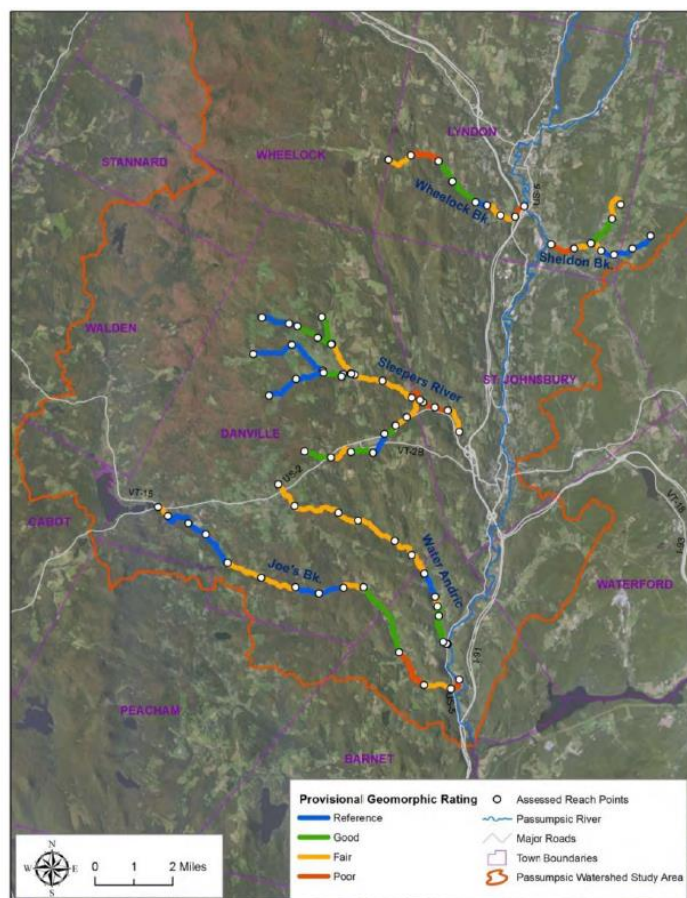


Figure 3: Provisional geomorphic ratings for the Lower Passumpsic River Tributaries.

Water Quality

Danville is located in the Basin 15 - Passumpsic watershed. The landscape of the town is essentially an eastern sloped watershed with multiple source points that go into the Passumpsic River that then feeds directly into the Connecticut River. As a part of the lower Passumpsic River tributaries, four tributaries (Joe's Brook, Water Andric, Sleepers River, and Wheelock Brook) and five sub-tributaries (Whiteman Brook, Badger Brook, Morrill Brook, North Brook, and Pope Brook) enter the Passumpsic from the west and drain in the towns of Barnet, Cabot, Danville, Lyndon, Peacham, Stannard, St. Johnsbury, Walden, and Wheelock.

Figure 1B.1: Geomorphic ratings for the Lower Passumpsic River Tributaries.

Source: Lower Passumpsic River Tributaries River Corridor Plan, 2014.

Flooding and erosion hazards are a top concern for citizens within the Lower Passumpsic tributary watersheds following major flooding in spring of 2011 (and again to a lesser degree during Tropical Storm Irene in the summer of 2011). These recent flood events caused major damage to

roads, properties, and homes in several areas throughout the tributary watersheds.

The Vermont ANR completed a joint [Passumpsic and upper Connecticut River Tactical Basin Plan](#) in June 2014, which covers both basins 15 and 16. The total area of the basin is 989 square miles with the goal to provide objectives and actions to protect surface waters and address high-priority stressors. The Passumpsic River drains 507 miles whereas the upper Connecticut spans 482 miles.

The [Basin 15 Passumpsic Tactical Basin Plan](#) (TBP) was approved in October of 2019. It outlines numerous strategies to protect the region's watershed, riparian areas, wetlands, upland forest, and more from development and climate change effects. The plan provides specific focus area studies and priority strategies that can be implemented on a community scale for the Town of Danville.

Figure 1B.2: Recommended and existing high-quality water of the Passumpsic River Basin.

Source: Passumpsic River Tactical Basin Plan

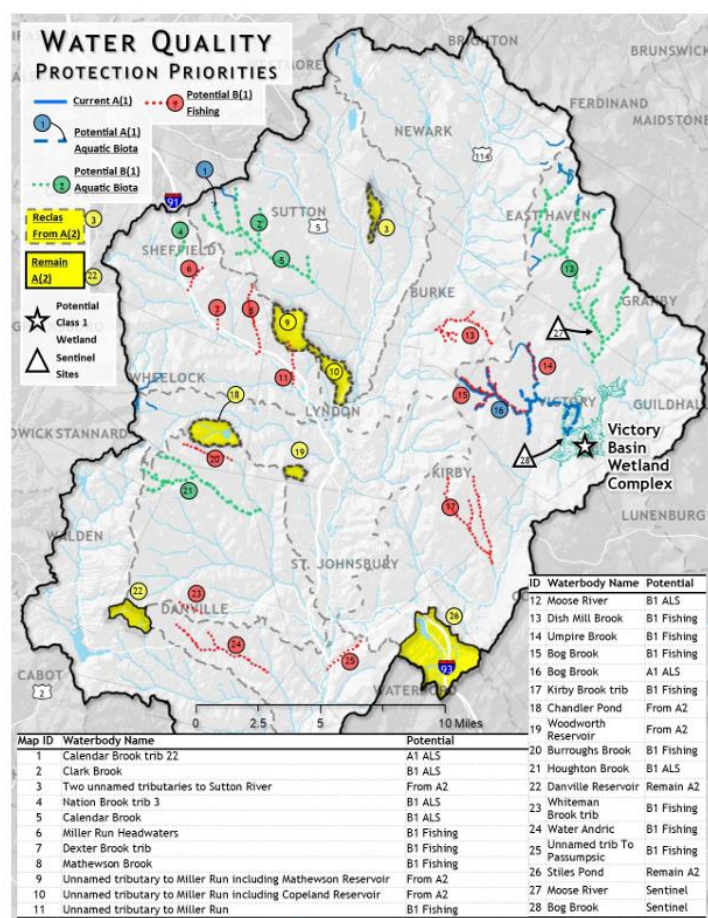


Figure 9. Recommended and existing high-quality waters of the Passumpsic River Basin

Both documents highlight the importance of each watershed, as well as the issues that threaten water quality of subwatersheds in Danville. While there are no impaired lakes or ponds, Sleepers River is impaired from high E. Coli levels that occur from St Johnsbury wastewater overflows. Water Andric is stressed from nutrient loading. Joe's Pond and Keiser Pond both score favorable conditions, however both are recorded as fair conditions for mercury levels on their lake scorecard. Joe's Pond's shoreline is very developed and received poor conditions for such.

As a result of dealing with severe, repeat flood and erosion damage throughout Vermont over the last two decades, Vermont's river scientists and engineers now understand that hazard mitigation and river restoration projects are most successful when carried out within a context of how reach and watershed scale stressors influence flood and erosion hazards. Flood resilience

strategies include replacing undersized culverts, developing Fluvial Erosion Hazard (FEH) zones, and high priority river corridor projects.

The 2019 Tactical Basin Plan's recommended actions for surface waters in Danville include supporting farmers in developing Nutrient Management Plans (NMP's), supporting brownfields restoration efforts that mitigate surface water pollution, identifying stormwater treatment practices, and developing shoreline and erosion projects.

Sediment from roads and driveways can be addressed with improved drainage ditch networks, limiting future driveway lengths in sensitive areas, and other approaches. The Vermont Better Back Roads

program provides assistance for towns seeking ways to reduce rural stormwater problems. Since many of the upgrades to culverts and bridges would also correct problems with aquatic organism passage (AOP), additional grant funds may be available for this work.

The Town of Danville puts out a federally mandated water quality report each year. They recorded zero violations for 2021 of their municipal water system, testing for microbes, inorganics, pesticides, radioactive, and organic materials.

Town Governance and Town Properties

Danville has a full municipal government, with elected Town Officers that include a five-member Selectboard, and seven-member Planning Commission, a Town Clerk, a Town Treasurer, a board of Listers, a Constable, an Emergency Management Coordinator, a Fire Chief & Warden, a Highway Department, a Health Officer, a Road Commissioner, a Town Moderator, a Town Auditor, a Town Services Officer, and more. Selectboard meetings are held on the first and third Thursday and each month, with the Planning Commission meeting on the fourth Thursday of each month.

Danville has a variety and wealth of municipal buildings and lands listed in their Town Plan. Management depends on a variety of public, volunteer, and private services. Danville has an organized Chamber of Commerce that hosts events and organizes with local businesses, as well as a conservation commission that dedicates time to community trail building and the overall management of public outdoor resources. The 2022 Annual Report identified \$215,803.06 of total taxes collected.

Critical Facilities

FEMA defines a critical facility as buildings or structures that provide services and functions essential to a community, especially during and after a disaster. Examples include – but are certainly not limited to – fire stations; emergency shelters; medical facilities; schools; nursing homes, day cares, and other facilities serving vulnerable populations; public utility infrastructure; drinking water supplies; and structures or facilities that store hazardous materials.

Table 1B.3 Critical Facilities in Danville

Critical Facility	Public Service, Use, Location
Danville Fire Department,	Emergency first responders. Ambulance, EMS
Caledonia County Sheriff; Vermont State Police	Law Enforcement
Danville Medical Center, Danville Dental Group	On-care patient healthcare
Northeast Kingdom Waste Management District, Danville Recycling Center	Waste management
Danville Rescue, CALEX	Local and regional EMS
Danville School District	Based in St. Johnsbury. Caledonia Central Supervisory Union
Town Office Danville School North Danville Community Center	Large-capacity building centers. Community board posts. Primary and Alternate Emergency Operations Center (EOC)
VT Route 2	Provides critical East-West and thoroughfare access
Marty's First Stop	Grocery Stores, supplies, community Board Posts

Hasting's Store	
Northern Counties Health Care	Regional medical center
Green Mountain Power Washington Electric Co-op	Service, electrical transmission lines, and infrastructure within Danville
Danville Town Garage	Storage of town road equipment and vehicles
Joe's Pond Association	Neighborhood association committed to the care and health of Joe's Pond
Caledonia County Airport	Lyndon, VT. Closest airport strip
Danville Animal Hospital	Veterinarian
Consolidated Communications Spectrum	Providers of telecommunications in the region

Climate Change and Severe Weather Patterns

It is commonly accepted that weather extremes are becoming more commonplace in Vermont. From 1964 to 1985 there were eight major disaster declarations in Vermont. Subsequent decades have seen a steady increase: From 1996 through 1986, there were six, from 1997-2007 there were 11, and from 2008 to 2018, 19. In just the past three years, there have already been five. Since 2011, record-setting snow, rain and cold have been experienced in the state. Of these disaster declarations, 26 have occurred in Orleans County. (See Table 1C.4)

Table 1B.4: FEMA Disaster Declarations in Caledonia County, FY1964-present

Declaration Number	Declaration Date	Incident Description
DR-160-VT	11.02.1963	Drought and impending freeze (this was a statewide declaration)
DR-164-VT	03.17.1964	Flooding (this was a statewide declaration)
DR-397-VT	07.06.1973	Severe storms, flooding and landslides
DR-518-VT	08.05.1976	Severe storms, high wind, and flooding
DR-712-VT	06.18.1984	Severe storms and flooding
DR-840-VT	09.11.1989	Severe storms and flooding
DR-875-VT	07.25.1990	Severe storms and flooding
DR-938-VT	03.18.1992	Heavy rains, ice jams and flooding
DR-1063-VT	08.16.1995	Excessive rainfall, flooding
DR-1184-VT	07.25.1997	Excessive rainfall, high winds, and flooding
DR-1228-VT	06.30.1998	Severe storms and flooding
DR-1307-VT	11.10.1999	Tropical Storm Floyd
DR-1428-VT	07.12.2002	Severe storms and flooding
DR-1559-VT	09.23.2004	Severe storms and flooding

DR-1698-VT	05.04.2007	Severe storms and flooding
DR-1715-VT	08.03.2007	Severe storms and flooding
DR-1784-VT	08.15.2008	Severe storms, a tornado, and flooding
DR-1790-VT	09.12.2008	Severe storms and flooding
DR-4001-VT	07.08.2011	Severe storms and flooding
DR-4022-VT	09.01.2011	Tropical Storm Irene
DR-4140-VT	08.02.2013	Severe storms and flooding
DR-4163-VT	01.29.214	Severe winter storms
DR-4178-VT	06.11.2014	Severe storms and flooding
DR-4330-VT	07.30.2018	Severe storm and flooding
DR-4532-VT	04.08.2020	Biological – COVID 19 Pandemic
EM-3567-VT	08.22.2021	Hurricane – Tropical Storm Henri

Bolded text denotes public assistance FEMA funding for damage to public infrastructure in Danville. Note: Open FEMA only has public assistance records going back to 1999. Pre-1999 public assistance data comes from the 2005 Danville All-Hazards Mitigation Plan developed by NVDA but never adopted.

An increase in the size and frequency of storms is also predicted. Thus, climate change in the next century will likely increase the chance of weather-related hazards. An increase in precipitation may also result in increased flooding and fluvial erosion. Drier summers will likely increase the chance of drought and wildfire, which can further exacerbate groundwater retention during heavy rain events. A warmer climate may also result in the influx of diseases and pests that cold winters previously prevented. The Intergovernmental Panel on Climate Change (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. Increasing temperatures are expected to significantly exacerbate the impacts of natural hazards and net economic damages will continue to rise.²

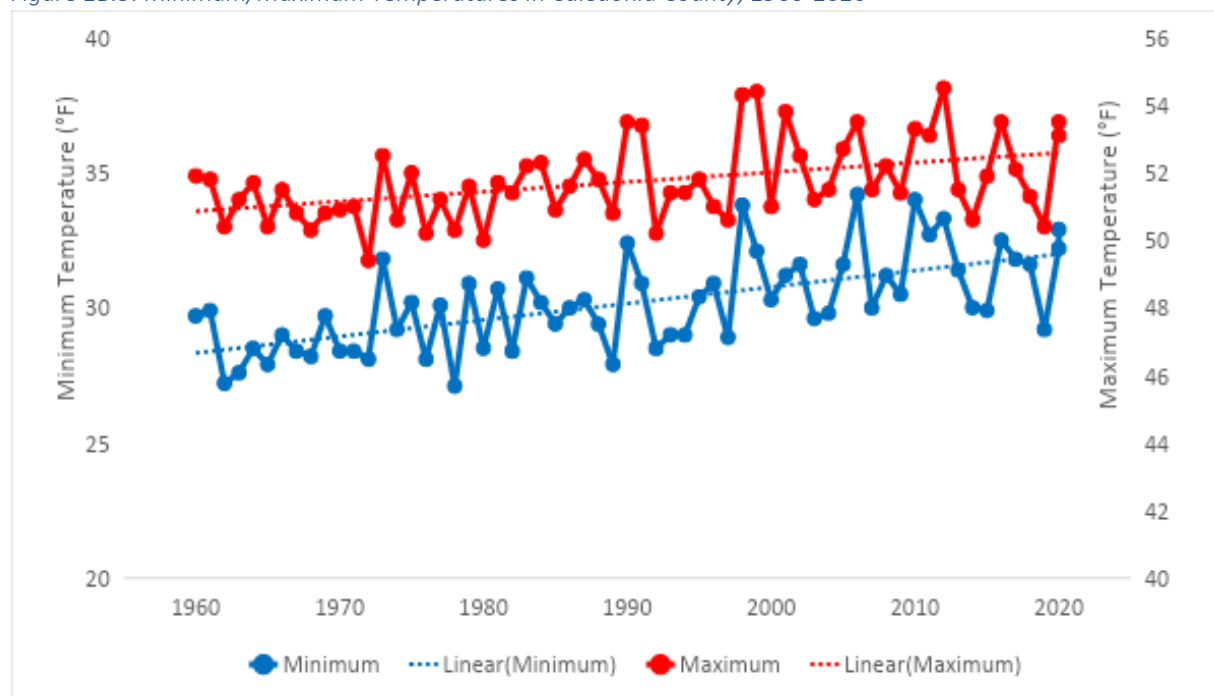
These changes will continue in the future to a greater or lesser extent, depending on how quickly countries transition to a new low-carbon economy. The State of Vermont’s multi-focused strategy for mitigation climate effects includes: 1) Promoting better buildings through efficiency and weatherization measures; 2) promoting cleaner energy from non-fossil fuel burning sources; 3) reducing emissions through low-carbon travel (e.g. electric vehicles, more transportation options to reduce vehicle miles traveled); 4) pursuing nature-based solutions (such as upland forests, floodplains and wetlands to attenuate flood flows); 5) reducing waste through composting and recycling; and 6) preparing for a new climate. The latter includes enhancing disaster preparation, reducing vulnerabilities (such as buildings and infrastructure subject to damage), and tackling health risks stemming from climate change. More information is available at <https://climatechange.vermont.gov/our-climate-solutions>

In recent years, it has become evident that human activities, mostly associated with the combustion of fossil fuel, have added to the natural concentration of greenhouse gasses in the atmosphere and are

² World Economic Forum: Climate Change is Making Disasters More Expensive.
<https://www.weforum.org/agenda/2018/10/climate-disasters-cause-global-economic-losses-un/>

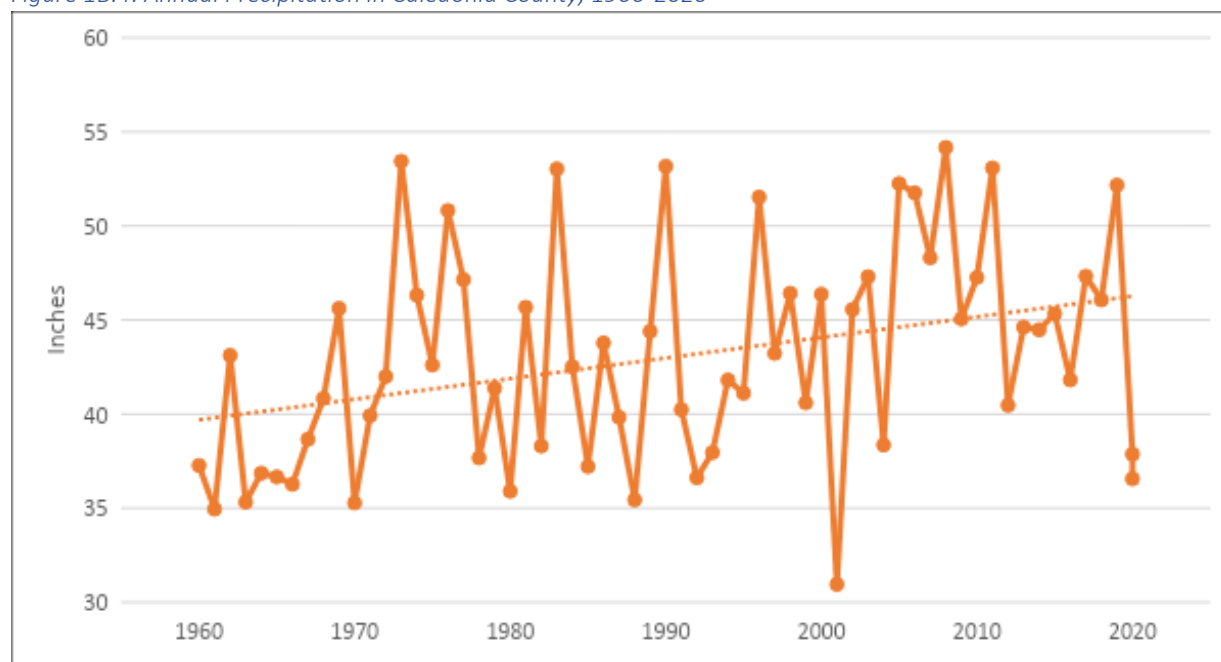
contributing to rapid climate change on a global scale. An analysis of annual minimum and maximum temperatures in Caledonia County shows that minimum temperatures are generally rising faster (.6°F per decade) than maximum temperatures, (.4°F per decade). (See Figure 1C.2)

Figure 1B.3: Minimum/Maximum Temperatures in Caledonia County, 1960-2020



Annual precipitation is rising at a rate of about 1.09" per decade (See Figure 1C.3). While projections of the effects of climate change vary, it is generally predicted that the region can expect to have warmer temperatures year-round, with warmer, wetter winters, and increasingly erratic patterns of precipitation.

Figure 1B.4: Annual Precipitation in Caledonia County, 1960-2020



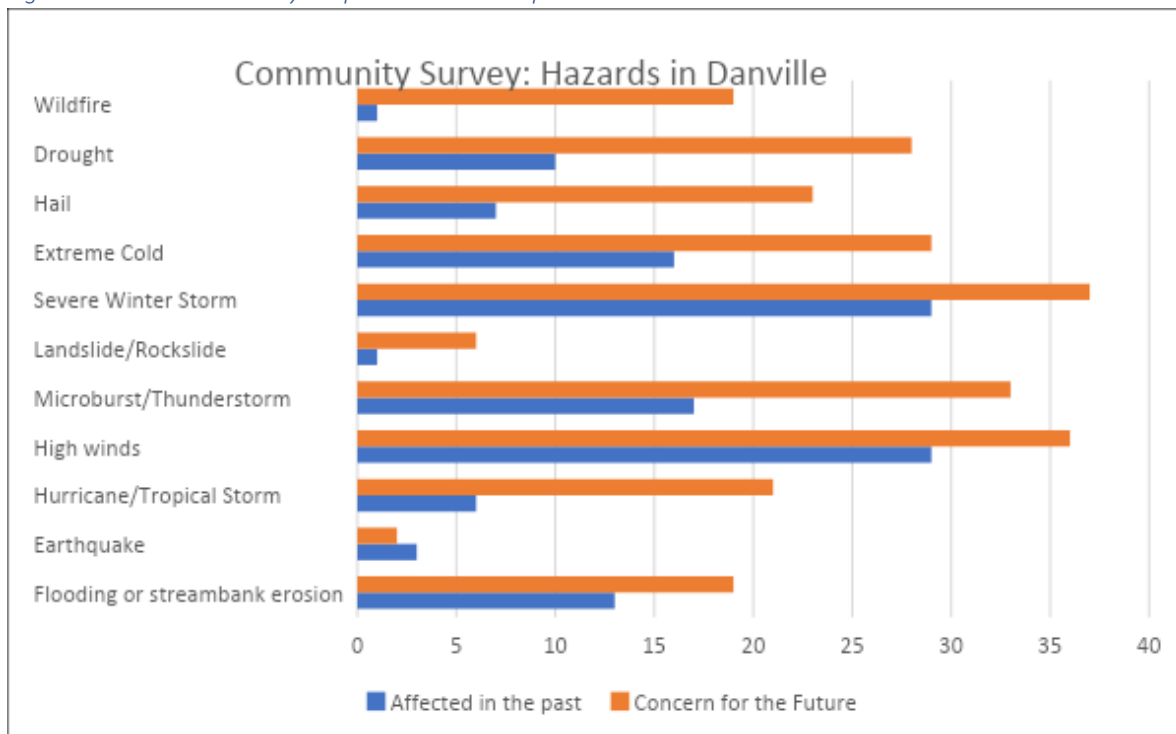
Sources: NOAA Climate at a Glance

USDA's recent drought disaster declaration in Caledonia County (and all other counties in Vermont) is not an aberration from the warming trend: According to the University of 2021 Vermont Climate Assessment, increasing variability of rain patterns and water tables makes both flooding and drought likely possibilities. We are moving to extremes: either too much rain or not enough. An increase in precipitation may result in increased flooding and fluvial erosion. Drier summers may increase the chance of drought and wildfire. A warmer climate may also result in the influx of diseases and pests that cold winters previously prevented.

The National Oceanic & Atmospheric Administration (NOAA) holds a storm event database, dating from January 1950 that records episode narratives of the events down to a municipal scale.

The increasing unpredictability of weather was on the minds of respondents to the Danville Hazard Mitigation Survey. Respondents indicated they were primarily negatively impacted by severe winter storms and high winds. By contrast, respondents indicated they were either mildly or very concerned about a much wider array of hazards in the future. (Figure 1C.4) "With global warming, these disasters will get worse," one respondent noted.

Figure 1B.5: Danville Survey Respondents: Past Experiences vs. Future Concerns Date: 2021



2. DANVILLE HAZARDS AND POTENTIAL IMPACTS

A. Hazard Identification Process

Effective mitigation efforts must be based on a rational evaluation method that answers three basic questions:

1. What bad things can happen, given the town's vulnerabilities and loss history?
2. How likely are these hazards to occur?

3. How bad could they be?

The tables below represent Danville's inventory of known hazards, a determination of the likelihood of future occurrences, and assessment of the community's vulnerability. By performing this analysis, we can then prioritize actions to mitigate the impacts of each of these hazards and make Danville a safer place.

To answer the above questions, we assembled data and insight on past events. Disasters that have occurred in the Town, the larger region, and the State of Vermont can give us good information about what types of disasters we can expect in the future and what kinds of damage they might cause. However, while historical data shapes our perspective, past losses are by no means a crystal ball for predicting future events. Climate change is already changing our weather patterns, which means we can expect a proliferation in storm events with severe impacts as well as new challenges, like drought in summer and long winters characterized by heavy ice accumulation. Armed with historical data and a healthy respect for climate change and the unknown, the plan represents the town's best attempt to identify hazards and prepare for the future.

This is Danville's first Local Hazard Mitigation Plan. In 2005, a local adjunct to a regional All-Hazard Mitigation Plan was developed, but it was never adopted. While the unadopted plan contains some useful information, the hazard profiling process began with the evaluation of the natural hazards profiled in Vermont's 2018 State Hazard Mitigation Plan. The working group used the same methodology that was used in the statewide plan:

$$\text{Probability} \times \text{Average impact score} = \text{Overall Score}$$

Table 2A.1: Probability and Impact Scoring

Score	Probability	Score	Impact
1	Unlikely: <1% probability in any year	1	Negligible: isolated occurrences of minor property and environmental damage, potential for minor injuries, no to minimal economic disruption
2	Occasionally: 1-10% of occurrence in any year; at least 1 chance in 100 years	2	Minor: isolated occurrences of moderate to severe property and environmental damage, potential for injuries, minor economic disruption
3	Likely: >10% but < 75% in any year; at least one chance in next 10 years	3	Moderate: severe property and environmental damage on a community scale, injuries or fatalities, short-term economic impact
4	Highly likely: >75% in any given year	4	Major: severe property and environmental damage on a community or regional scale, multiple injuries or fatalities, significant economic impact

Table 2A.2 All Hazards Assessed

Hazard Impact	Probability	Potential Impact					
		Infrastructure	Life	Economy	Environment	Avg.	Score
Fluvial Erosion	4	3	2	2	4	2.75	11
Invasive Species	4	3	1	3	3	2.5	10
Ice	3	3	3	3	2	2.75	8.25
Wind	4	3	2	2	1	2	8
Snow	4	1	3	2	1	1.75	7
Inundation Flooding	3	2	2	3	2	2.25	6.75
Cold	3	1	3	2	1	2	6
Heat	3	1	3	2	2	2	6
Drought	3	1	2	2	3	2	6
Landslides	3	3	2	1	2	2.75	5.5
Wildfire	2	3	3	3	2	2.75	5.5
Earthquake	2	3	3	3	2	2.75	5.5
Infectious Disease/Outbreak	2	1	3	3	1	2	4
Hail	3	1	1	1	1	1	3

The highest risks to the town (risks to be profiled) were those with an overall score of four or higher. Each of the “priority” hazards will be profiled to identify the following factors in accordance with FEMA requirements. Hail has a likely probability, but its potential for damage is extremely limited and was therefore not profiled.

- **Location:** General areas in the community that may be vulnerable to the hazard.
- **Vulnerability:** Community structures, systems, populations, or other assets as defined by the community that are susceptible to damage and loss from hazard events.
- **Extent:** The strength or magnitude and details of the most notable event(s).
- **Observed impact:** Financial impact from an event, and/or the number of structures that are impacted.
- **Likelihood/Probability:** Occasionally: 1-10% of occurrence in any year; at least 1 chance in 100 years; Likely: >10% but < 75% in any year; at least one chance in next 10 years; Highly likely: >75% in any given year

B. Risk Assessment - Assets and Vulnerabilities

A risk assessment is the process of identifying hazards, important community assets, and vulnerabilities. Understanding this process will give us tools to quickly identify how a natural hazard can affect the community’s vulnerable systems, and which assets are available to resources in a given scenario. This section will briefly highlight Danville’s available assets and existing vulnerabilities.

Assets

Population Assets

Despite Danville being modest in size and population, the Town has prepared and organized a robust municipal capacity that includes a highway department, a water and fire district (respectively), a development review board, an energy committee, and a conservation commission. Built capacity for specific issues offers preparation for road closures, snow and ice buildup, and other issues that the town can face short and long-term. Town contracts with local service providers also help to sustain capacity.

Economic Assets

The Village Center is home to commercial businesses that can support capacity in a time of need, including a food bank and population shelters for heating and cooling. In addition, Danville possesses close access to groceries stores, gas, health centers, and hardware stores. The Danville School also serves as an integral community station for education, events, and gathering.

Environmental Assets

The town has established two town forests and is home to a vast watershed. The high elevation and sloped foothills can prevent some flooding from happening, and the watershed has a high capacity for absorption. Joe's Pond feeds much of the region's watershed, and is vital to local habitat, water quality, and wildlife. It is also home to many social and recreational opportunities. The town has also established both a conservation commission and an energy committee, which can help establish capacity for these assets.

Built Infrastructure Assets

Danville has multiple access points to and from the town center, creating resilience in time of road closures or evacuations. Highway 2 is the only established east-west route in Vermont. Danville's strategic location to St. Johnsbury and Interstate 91 for goods and services is an added benefit to outsourcing needs of the community.

Vulnerabilities

Social vulnerabilities can show up in a variety of ways for any community, large or small. The State of Vermont measures each census tract with a Social Vulnerability Index (SVI) that is currently based 2016-2020 American Community Survey (ACS) data.³ It is a specifically designed planning tool to evaluate and identify populations that may need more assistance during an emergency.

Census Tract 9576 in Caledonia County, a population of 2,231. Roughly 23% of the population is 65 and older, roughly 7% are living in poverty, and about 25% of the population are single parents. The town's vulnerabilities were highlighted as being crowded and having no vehicle, according to the index.

The following will utilize ACS data in a more detailed scope to highlight the vulnerabilities of Danville through its population, economy, environment, and built infrastructure. Observations through the Town Plan and floodplain information will also inform this section.

Population Vulnerabilities

As is the case with much of Vermont, Danville's population is aging, though at a more moderate rate. 22% of the town's population are aged 65 and older. While advanced age by itself does not create vulnerability, it is proven that both health problems can become more common and exposure to environmental hazards, such as excessive heat, can be more problematic. Although there are established plans for heating and cooling centers in the Local Emergency Management Plan (LEMP), the proposed

³ [Vermont Social Vulnerability Index.](#)

centers do not have climate-controlling capabilities and there are no overnight shelters. There is however, Northeast Kingdom Community Action (NEKCA) in St. Johnsbury, which offers multiple social support services.

Though less than 1% of the population is unemployed, roughly 39% identify as not being in the labor workforce and 27% of households report having no earnings. 8.6% of families have income below the poverty line in Danville, and 7% of the population has an income to poverty ratio below 1.0. Lastly, roughly one-third of the town lives alone, which can isolate them from information, assistance, and resources. These demographics can become unstable if access to essential services are hindered for a prolonged period.

Economic Vulnerabilities

Danville has numerous commercial businesses in their small, but vibrant village center. Any hazard lasting longer than a few days would have long-lasting impacts on the viability of these businesses, as evidenced by the COVID-19 pandemic.

Environmental Vulnerabilities

Though the large watershed does have a high tolerance and absorption, it does mean that numerous water flows will direct itself to and through Danville. The responsibility of water quality and floodplain management falls on the shoulders of Danville. And while Danville may be less susceptible to flooding, it is more susceptible to high winds, heavy snow, and ice-out events from its high elevation.

The threats of fragmentation of forested lands through the parcelization of privately owned lands is an environmental vulnerability. Native ecosystems, animal habitat, agricultural lands, contiguous forests, old-growth, and endangered and threatened species are all compromised by this trend. The development on lake shorelines can also increase the potential for declined water quality, in particular algae blooms.

Annex A to Town of Danville Local Emergency Management Plan (LEMP)
15 July 2019

Danville Map

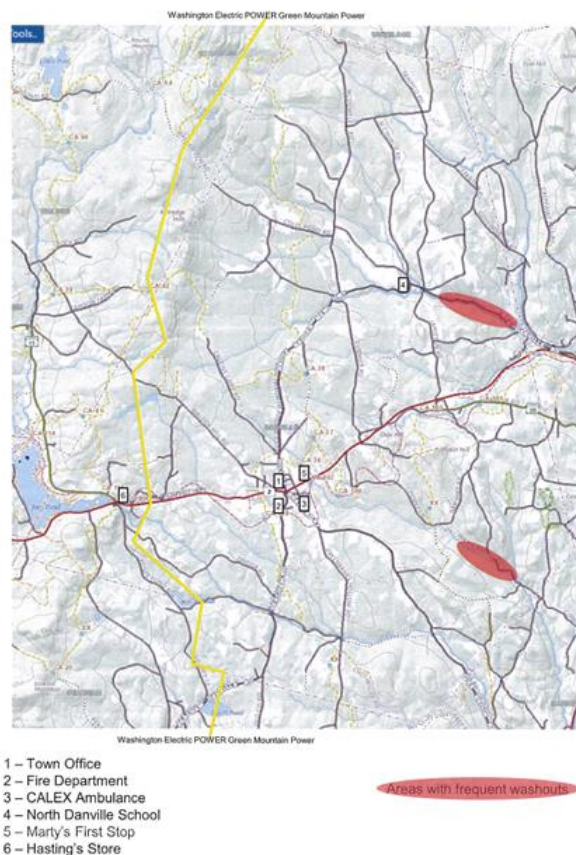


Figure 2B.1: Danville Map

Source: Danville Local Emergency Management Plan (LEMP) Annex A

Though Danville roads possess good overall connectivity, the quality of their class III & IV roads in relation to the uses can pose a vulnerability during wetter seasons and/or severe weather events due to poor quality. Many respondents specified having their roadways either washed out or blocked. 55% of survey responses reported being unable to travel due to impassable roads in severe weather conditions. Virtually all main roads were mentioned. The Town Plan, the LEMP, and the Emergency Management Coordinator all have identified areas of frequent road washouts that include sections of Bruce Badger Memorial Highway, North Danville Road, Water Andric Road, and Cormier Road (Figure 2B.1) Additionally, 37% of respondents specified that they are “very concerned” about potential damage to infrastructure during natural hazards events.

Danville has limited resiliency concerning heating and power. Additionally, a lack of

telecommunication facilities has been highlighted as an issue in the Town Plan. 21% of the population in Census Tract 9576 in Caledonia are without internet connectivity.⁴

C. Hazard-Specific Information for Profiled Risks

1. Flooding (Inundation and Fluvial Erosion)

Floods can damage or destroy public and private property, disable utilities, make roads and bridges impassable, destroy crops and agricultural lands, cause disruption to emergency services, and result in fatalities. People may be stranded in their homes for a time without power or heat, or they may be unable to reach their homes. Long-term collateral dangers include the outbreak of disease, loss of livestock, wash out of septic systems causing

This section of the Plan satisfies the requirements of 44 CFR §201.6(c)(2)(i) and 44 CFR §201.6(c)(2)(ii): Hazard Identification and Risk Assessment for Flooding (Inundation and Fluvial Erosion)

⁴ Internet Connectivity Across the US, ACS 2018 (5-year Estimates). <https://www.socialexplorer.com/755178c094/view>

water supply pollution, downed power lines, loss of fuel storage tanks, fires and release of hazardous materials.

FEMA describes natural hazards as environmental phenomena that have the potential to impact societies and the human environment. A “large-scale disaster” is one that exceeds the response capability of the local jurisdiction and requires State, and potentially Federal, involvement.

In Vermont, climate change is causing increases in storm intensity and total precipitation. These increases will likely lead to a rise in flooding, water quality and ecosystem impairments, and reduced water-based recreational availability to Vermonters.⁵

It is commonly accepted that weather extremes are becoming more commonplace in Vermont. From 1964 to 1985 there were eight Major Disaster Declarations in Vermont. Subsequent decades have seen a steady increase: From 1996 through 1986, there were six, from 1997-2007 there were 11, and from 2008 to 2018, 19. In just the past two years, there have already been four. Since 2011, record-setting snow, rain and cold have been experienced in the state. Of these disaster declarations, 24 have occurred in Caledonia County (See Table 1C.4). As storms become more frequent, erratic, and intense, infrastructure liabilities such as road quality, culvert quality, and streambank stability have and will continue to exacerbate the impact of these extreme, yet increasingly common weather events.⁶

Danville is within the Passumpsic River tactical basin planning area (Basin 15). (A “basin” is an area of land drained by a river and its tributaries): The Passumpsic River Basin drains 507 square miles, a major portion of Caledonia County and minor portions of Essex, Orleans and Washington counties. The East Branch of the Passumpsic River originates in the town of Brighton and joins the West Branch just northeast of Lyndonville. The Passumpsic River then joins Millers Run which drains the towns of Sheffield and Wheelock and flows over 20 miles to the south until it reaches the Connecticut River in East Barnet passing over a series of seven hydroelectric dams along the way. The basin also includes the Moose River watershed with headwaters in East Haven and includes Victory Bog wetlands complex, along with the Sleepers River and Joe's Brooks and several smaller tributaries.

Surface waters in Danville include the southeasterly portion of Joe's Pond, the northern portion of Keiser Pond, and several smaller ponds. Tributaries and sub-tributaries of the Passumpsic River in Danville include Joes Brook, Sleepers River, Water Andric, Whiteman Brook, Badger Brook, Morrill Brook, North Brook, and Pope Brook.

The Passumpsic River Tactical Basin Plan was last updated in October of 2019, and provides direction on actions to take to improve water quality and flood resilience.

Inundation Flooding

Inundation flooding is when flooding occurs when heavy precipitation and ice jams cause streams to spill over into adjoining low-lying lands called floodplains. This risk is associated with moderate to severe community scale impact to life, economy and environment due to damage to personal property, businesses, and business disruption. Major community-scale environmental impacts may be due to sedimentation deposit, loss of crops and loss of water quality. There is also potential for moderate to

⁵ [Basin 16 - Upper Connecticut River Tactical Basin Plan](#)

⁶ [Vermont Climate Assessment, 2021](#)

severe isolated damage to infrastructure, particularly roads. Inundation may also leave roads impassable due to standing water.

Figure 2C.1.1: Land cover and major subwatersheds in the Passumpsic River Basin.

Source: Passumpsic River Tactical Basin Plan



Figure 2. Land cover and major subwatersheds in the Passumpsic River Basin

Danville has adopted floodplain regulations which reference the FEMA Flood Insurance Rate Map (FIRM), which was made effective in January 1975. FIRM map depicts inundation flooding risk. Inundation flooding, which is characterized as the rise of riverine and lake water levels, occurs during significant levels of precipitation from rainstorms, thunderstorms, hurricanes or tropical storms. It can also occur due to rapid snow and ice melting during rapidly rising temperatures in the late winter or spring.

Danville's FIRM is a paper map (i.e. not georeferenced) and is organized on five separate panels, only one of which depicts a flood hazard area. Data is not available for the other parts of town. FEMA did not conduct a Flood Insurance Study, so the map lacks critical detail such as base flood elevations (how high the water might be expected to rise in a significant flood event) or delineation of floodways (portions of the stream channel where flood waters run the deepest and

fastest during a flood). The one area depicted as a special flood hazard area on panel 3 appears as an "approximate Zone A" and includes areas adjacent to Roy Brook and Whiteman Brook in the eastern part of the town. Based on E911 records, no structures have been identified within the mapped special flood hazard area.

Danville has been a member of the National Flood Insurance Program (NFIP) since June 7, 2004. Development in the Zone A areas on the FIRM require a permit and conditional use approval by the Development Review Board. Details of the town's flood hazard area requirements can be found in Section 412 of their zoning bylaws. The Town Plan states that Danville is in the "Emergency Phase" of the NFIP because FEMA has yet to issue FIRM maps. Danville has no NFIP-insured properties within their town limits that have experienced repetitive loss due to flooding.

The Zoning Administrator must issue a permit for all development in areas of special flood hazard. Conditional use approval by the Development Review Board is required for construction of new buildings, the substantial improvement of existing buildings, or floodway development.

If the application is not prohibited by other sections of the town's bylaw, the Zoning Administrator shall, prior to issuing a permit, submit a copy of the application to the Vermont Agency of Natural Resources, Flood Plain Management Section in accordance with 24 V.S.A. §§ 4409 and 4412.

Dam failure is another potential source of inundation flooding. According to the Vermont Dam Inventory, Danville has six dams: the Danville-1 dam (VT Dam Inventory ID 58.01) located on a tributary north of Joe's Pond; the Danville Reservoir Dam on Brown Brook owned by the Danville Fire District (VT Dam Inventory ID 58.03); the privately owned Frye Pond dam (VT Dam Inventory ID 58.11) and Frye Pond Upper (VT Dam Inventory ID 58.12), both on Brown Brook; the Kaiser Pond Dam (VT Dam Inventory ID 58.04) owned by the State of VT, Division of Fish and Wildlife; and the West Danville No. 15 Dam (VT Dam Inventory ID 58.02), a hydroelectric dam on Joe's Brook owned by Green Mountain Power. The West Danville No. 15 Dam is the only one identified as having a Hazard Potential Classification of "Significant." This dam is regulated by the VT Public Utilities Commission. The other dams are considered "Low" or "Minimal" hazard, which means that no direct loss of life can be expected from dam failure, although there may be isolated incidents of loss of agricultural lands, equipment, or non-residential buildings. Low hazard dams are inspected every 10 years.

One tool to address flash floods locally is by using the Vermont Association of Planning & Development Agencies (VAPDA) [VT Culverts](#) GIS database. Assessing culverts in conjunction with community experience can pinpoint local inundation points during a flash flood, icing conditions, or other hydrologic events.

The floods of July 2023 caused some of the greatest damage to road infrastructure and property in recent memory, commonly already being referred to as the worst flood in Vermont's history. Montpelier airport recorded 5.28 inches of precipitation on July 10th. Calais recorded 9.20 inches of precipitation over a 48-period. More locally, St. Johnsbury recorded 1.79 inches on July 10, followed by another .98 inches on the 11th.

This event topped what was widely considered the worst storm prior to this even Tropical Storm Irene in 2011. St. Johnsbury, however, received 4.05 inches of rain on the 28th of August that year.

Fluvial Erosion

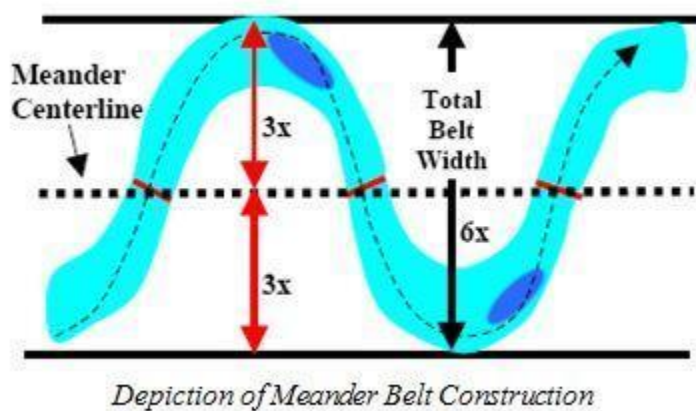
Fluvial erosion is the natural process of the wearing away of soil, vegetation, sediment, and rock from the river channel bed and banks by the action of water. When river channels are altered by humans or nature, the river must readjust to reach its former balance. The rate of erosion is affected by local soil type, slope, precipitation, and volume and velocity of river discharge. Other natural or human activities accelerate the natural rate of erosion, such as large storm events, removal or alteration of riparian vegetation, modification of runoff flow patterns, and physical alteration of land within the floodplain and the active river area (i.e. logging, agriculture, dairy farming).

The Vermont Agency of Natural Resources estimates that inundation areas have only been mapped for about 20% of Vermont's stream miles. The more common mode of damage is associated with the dynamic, and often 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. Fluvial erosion can lead to moderate to severe community-scale damage to infrastructure, which includes washed out roadways. There also can be major community-scale impacts to the environment, which includes collapse of streambanks, and severe disruption of riverine habitat. Increased sedimentation loads can damage water quality. There are moderate-to-severe threats to personal safety, private property, and businesses from structural damage, but these are likely to occur on an isolated scale.

The Vermont Rivers Program of the Agency of Natural Resources (ANR) has released statewide data on areas subject to fluvial erosion for all streams and rivers. These risk areas are defined by Vermont Statute as “River Corridors,” 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. Mapped river corridors can be viewed [here](#).

Mapped river corridors along streams with a drainage area of two miles or more consist of two components: a *meander belt* and a *riparian buffer*. The meander belt is an area calculated to accommodate the amplitude of stream meanders that have or will form in response to the laws of physics which dictate that channel depth and slope evolve toward a state of minimal work (i.e., equilibrium or least erosive form). The width of the meander belt will vary depending on the amount of land draining to a given point on a stream, so the River Corridor width varies in part based on stream size. (See Figure 2B.2.1)

Figure 2C.1.2: River Corridor Meander Belt



Source: Vermont Agency of Natural Resources, <https://floodready.vermont.gov/>

The riparian buffer is an extension of the meander belt to provide additional protection. A naturally vegetated buffer helps to protect streambank stability if the meander moves to the edge of the meander belt. If this extension were not included and structures were planned at the very edge of the meander belt, a

prospective home or business owner would need to armor the riverbank to protect the structure.

For streams with a drainage of less than two square miles, a riparian buffer of 50 feet on either side of the top of the streambank is deemed sufficient to accommodate lateral movement of the stream channel.

Analysis of ANR River Corridor Maps indicates there may be 41 properties in the river corridor, none of which are located in the FEMA Special Flood Hazard Area. Most of these structures are residential properties (single-family homes and mobile homes). As with the FEMA Firms, this data requires additional vetting and site investigation.

ANR’s River Corridor Maps do not indicate any required action on the part of municipalities. They are developed to facilitate ANR’s responsibilities in Act 250 to protect public safety from fluvial erosion hazards and to regulate activities exempt from zoning and local land use regulations under the Flood Hazard Area and River Corridor Rules. Municipalities are strongly encouraged – but are not required – to regulate development in the river corridor as part of their flood hazard regulation.

Flash floods occur when severe storms drop high amounts of rainfall in short periods of time. Precipitation falls so quickly that the soil is unable to absorb the water, which results in surface runoff that collects in small, upstream tributaries that then moves quickly downstream at a high velocity. Stream alteration from fluvial erosion will exacerbate the effects of flash flooding. Extent data for fluvial erosion is unavailable due to a lack of a central repository for this information to be collected after flood and fluvial erosion events. However, the Town Plan makes specific mention that Danville’s history of flood damage is a result of fluvial erosion rather than inundation.

The one major flood event in Vermont's history by which all other events are judged is the Flood of 1927. Severe loss of life and property was experienced. Statewide, more than 50% of bridges and roads were damaged in the flood that occurred on November 27th of that year. Most of the flooding damage in Danville has been to roads and bridges. Ten respondents to the Hazard Mitigation Survey indicated they had been adversely impacted by flooding or streambank erosion in the past.

As shown on Table 1B.4, from 1997 to 2011 Danville received assistance from FEMA from seven federal flooding disaster declarations. The federal share of the cost of damages from the five events occurring from 2004 to 2011 was \$933,532.68. The damage was primarily to roads and bridges. According to the NOAA Storm Event database, there were 43 flood and flash flood events reported in Caledonia County between 01/01/1997 and 12/31/2022. Below are narratives that appear in the NOAA database regarding selected events during this period.

A stream [geomorphic assessment](#) and river corridor plan was conducted along tributaries in the Lower Passumpsic River in 2014 in the wake of the 2011 flooding events in Danville and Lyndon. In particular, Joe's Brook, Water Andric, Sleepers River, Sheldon Brook, and Wheelock Brook were studied. It identified that most are highly erosive during flood events due to ongoing adjustments to their corridors, particularly from deforestation, settlement, channel straightening, dredging, and other forms of encroachment. The assessment's conclusion was that ongoing vertical and lateral channel migration is likely in the future for many river reaches in Danville and Lyndon. Fluvial Erosion Hazard (FEH) zones should be considered by Danville and Lyndon to better map flood and erosion risks for both the safety and protection of their citizens, and the infrastructure controlled by the municipality.

While fluvial erosion events are rarely charted amongst their own category, such erosion is often the byproduct of flash and inundation flooding, and many of the locations identified in the Tactical Basin Plan and River Corridor Plan are areas of high risk.

The Department of Environmental Conservation (DEC) [Road Erosion Inventory](#) reporter map is an interactive town highway segment map that shows the standard of roads that meet the Municipal Roads Grant Program (MGRP) standards.

Another recent tool developed by VTRANS and a multi-disciplinary consultant team is the [Transportation Resilience Planning Tool](#) (TRPT), which combines river science, hydraulics and transportation planning methods and is applied at a watershed scale to identify bridges, culverts, and road embankments that are vulnerable to damage from floods.

In the [Landslide Inventory of Caledonia County, Vermont](#) (2021), a case study was conducted in Hardwick in 2003 of a landslide above Route 15. The area sliding was about 400 feet long, 105 feet high, with an overall slope of approximately 28 degrees. Overall, the report concluded and identified over 300 unstable slope features within the county.

The USGS has a GIS-based [Landslide Inventory](#). Within Danville, there are numerous points of data along the Sleepers River and Water Andric. While dates are not available, data for erosion along the Sleepers River includes the largest extent of landslides of up to 400 meters in length, 22 meters in height, with the largest aspect of 356 and a slide angle of 48 degrees.

In the Lower Passumpsic River Tributaries River Corridor Plan (2014), multiple sections of brooks and tributaries within Danville recorded poor geomorphic ratings. Episodic flooding in 2011 showed signs of degradation, scouring, and widening within the Water Andric, Wheelock Brook, Badger Brook, Sleepers River, Sheldon Brook, and Whiteman Brook.

The floodwaters from the July 2023 floods washed out numerous roads in Caledonia, and erosion of the Lamoille River near Hardwick destroyed an entire hotel off the banks of the river.

Finding specific fluvial erosion extent data information was not attainable in terms of how many acres were lost or streambank' surface area altered.

Table 2C.1.1 Significant Flood Events in Danville

Date	Description and Impacts	Damage
7/15/1997	A cold front stalled across northern Vermont during the morning hours of July 15, 1997. Road washouts resulted with rapid rises on area rivers.	\$500,000 in property damage reported
7/11/2007	On the afternoon of July 11th...a warm and very moist airmass was draped across Vermont. In addition, a slow moving cold front entered Vermont from west to east during the afternoon. This front promoted the development of numerous tropical-like showers and thunderstorms, that repeatedly generated and moved over the same areas of central and eastern Vermont. Localized heavy rainfall exceeded 3 inches within a two hour time frame with some localized storm totals approaching 6 inches across a very hilly or mountainous terrain, which resulted in flash flooding of several communities...A Presidential Federal Flood Disaster was declared in Washington, Windsor, Orange, Orleans and Caledonia counties with an estimated storm damage total in excess of 3 million dollars.	The federally obligated cost share of damage in Danville for DR- 1715 was \$51,040.80
8/6/2008	A strong trough of low pressure moved across central New York into Vermont during the morning and early afternoon of August 6th. A very moist air mass and favorable steering winds accounted for training showers and thunderstorms with very heavy rain across portions of the southern Green Mountains as well as northeast Vermont during the morning into early afternoon hours... Flash flooding occurred in Brandon (Rutland county) as well as in the northeast Vermont communities of Barnet, Danville and St. Johnsbury (Caledonia county). Flash flooding closed roads in Barnet and Danville.	The federally obligated cost share of damage in Danville for DR- 1790, which was declared the following month, was \$216,860.25
5/30/2011	Thunderstorms developed along a nearly stationary cold front across central and northeast Vermont. Heavy rainfall from the storms produced localized flash flooding. Heavy rains from thunderstorms washed out multiple local roads in Danville	\$75,000 in property damage reported
8/28/2011	Tropical Storm Irene moved across southeast New York and southwest New England during the morning hours of August 28th and then proceeded to track north along the Connecticut River Valley in Vermont during the afternoon and evening...Approximately 100,000 customers were without power during the storm. ...Flooding from Tropical Storm Irene was widespread across Caledonia County.	The federally obligated cost share of damage in Danville for DR- 4022 was \$60,788.33

Table 2C.1.2: Flood Hazard Summary Table

Location	Vulnerabilities	Extent	Observed Impact	Probability
Land adjacent to streams and ponds, river corridors. Inundation areas around ponds, dams, roadways and areas downstream of undersized culverts and bridges	<p>Poor and critical culverts. Poor road quality infrastructure</p> <p>Developed shoreline on Joe's Pond</p> <p>Stranded residents</p> <p>Washout points and dam failures</p> <p>Septic overflow from Danville or St. Johnsbury</p>	<p>Inundation points along Joe's Pond, Bruce Badger Memorial Highway, North Danville Rd, Water Andric Road, and Cormier Road.</p> <p>Common fluvial erosion along Sleepers River.</p> <p>Flood hazards along Route 2 pose a significant threat to access and services. Damage and debris to roads and bridges; flooding to residential properties; stream bank collapse. Lakeside erosion.</p> <p>4.05 inches of rain in St. Johnsbury on August 28th, 2011. 2.77 inches over a 48-hour period on July 10-11th, 2023.</p>	<p>Major: \$328,689.38 in severe storm and flood damage in FEMA-declared assistance for Danville</p> <p>\$10,732,000 in county-wide property damage and \$1M in crop damage recorded by NOAA. Property damage reported by survey respondents</p>	<p>Highly likely: >75% in any given year</p>

2. Invasive Species

Invasive species are defined as plants, insects, and other organisms that were either accidentally or intentionally introduced from other places and that can negatively impact agriculture, recreation, forestry, human health, the environment, and the economy. Invasive plants, which are categorized as either terrestrial or aquatic, can cause environmental devastation by changing soil composition, changing water tables, and disrupting insect cycles. They often lack food value upon which wildlife depends.

Invasive animals can threaten biodiversity by preying upon native species or out-competing for food and nutrients.

Human activity is most likely to contribute to the spread of invasive species. Non-native insects, for example, can inadvertently get transported into the region via wooden shipping crates or firewood. Aquatic invasives can be introduced on boats, either in the ballast water or on the hull. Landscaping and cultivating can spread invasives as well, as is the case with garlic mustard and Japanese knotweed, and these plants can readily establish a monoculture. Climate change also contributes to the spread of invasives. Warmer temperatures, for example, weakens native species such as maple, yellow birch, and American Beech, while allowing for forest pests such as the hemlock woolly adelgid to overwinter and reproduce.

Many long-term effects can be brought on by the presence of invasive species. Causal relationships to other hazards, such as flooding, ice storms, and wildfire that can open forest canopy can increase the

This section of the Plan satisfies the requirements of 44 CFR §201.6(c)(2)(i) and 44 CFR §201.6(c)(2)(ii): Hazard Identification and Risk Assessment for Invasive Species

prevalence and introduction to both invasive plants and insects. They can completely alter sensitive ecosystems by acting as a major driver of forest change.⁷ Through this increased competition native tree species are projected to have reductions in suitable habitat because of this incursion.

Vermont Invasives (www.vermontinvasives.org) is an educational resource created by the State of Vermont and the University of Vermont Extension. The site encourages users to learn to identify and report sightings of invasives. According to Vermont Invasives:

“Non-native, invasive terrestrial plants are one of the greatest threats to the health of Northeastern forests. They negatively impact forest regeneration, forest structure, ecosystem function, recreation and wildlife habitat, are costly to manage, and can be harmful to human health.”

This site also identifies three non-native insects which currently threaten Vermont: the emerald ash borer (EAB), Asian long-horned beetle (ALB) and hemlock wooly adelgid (HWA). These three pests threaten more than 14 different species of trees in Vermont, including maple, elm, horse chestnut, willow, ash, poplar, European mountain ash, hackberry, and hemlock.

A forest pest that is native but nonetheless destructive is the forest tent caterpillar (FTC), an insect that feeds on hardwoods. The Department of Forests, Parks and Recreation (VT FPR) monitors forest tent caterpillars and the Vermont Natural Resources Atlas maps the extent of infestations of this insect. An aerial survey in 2016 mapped at least 24,500 acres of FTC defoliation. Heaviest defoliation occurred in Essex, Lamoille, Orleans and Caledonia counties. The nearest mapped damage sites are in Cabot and Peacham, showing 50% to 75% leaf defoliation. Forest tent caterpillars are especially of concern to maple syrup producers. Technical advice for land managers, sugar bush owners, arborists and homeowners is available from VT FPR through the Orleans County Forester or VT FPR’s Forest Biology Lab at 802-879-5687.

Japanese knotweed is usually found in wet habitats, along river and stream banks, and in disturbed areas such as roadsides and old fields. In Vermont, knotweed covers miles of shoreline on every major river in the state. Japanese Knotweed has already taken over along the Wells River, covering vast riparian areas. While the roots of varied native vegetation help to stabilize riverbanks, Japanese Knotweed can contribute to erosion. Japanese Knotweed grows quickly – as much as three to four inches a day -- spreading quickly to crowd out other native species to create a monoculture. Knotweed has a very shallow root system and does not support the stability of riverbanks. Removal of the plant takes years, because its thick rhizomes can overwinter and grow as long as 60 feet. Herbicides, such as glyphosate, can be effective in eliminating knotweed, but their use poses ecological hazards as well. Japanese Knotweed can be unwittingly spread by dredging, excavating, and improperly disposing of yard trimmings.

The Emerald Ash Borer (EAB) is already in Danville, since it has already been spotted in neighboring Groton. (First discovered in 2017 to be in Caledonia). The EAB burrows through the ash tree’s inner bark, depriving the tree of water and nutrients. A healthy tree infested by EAB can die within one to four years. Ash trees account for about 5% of the state’s forest composition, and most are expected to die, resulting in

⁷ [New England and Northern New York Forest Ecosystem Vulnerability Assessment and Synthesis: A Report from the New England Climate Change Response Framework Project](#)

safety hazards from falling trees, loss of tree cover (and loss of capacity to sequester carbon), and riverine debris in high water and flooding events.

Danville depends mainly on the actions of concerned citizens to slow the spread of invasives. The Conservation Commission maintains an Emerald Ash Borer Preparedness Plan. Dated November 2018, the plan is considered a living document. The plan addresses ash trees that are located:

- along village streets within the Danville village(s) limits
- in the right-of way on rural roads;
- in town parks; and
- trees that pose hazards along certain trails in Danville's Town Forests that if killed will constitute a hazard to people and property.

"The threat of invasive species is not going away. It's a long-term stewardship issue that must become a daily part of how we look at and care for the woods that provide us with beauty, recreation, forest products and our heritage." www.vtinvasives.org

Based on a 2017 survey conducted by the Conservation Commission, there is an estimate of about 1,200 ash trees 12" or larger in our rural ROWs, and about 34 within the village and in public areas. Ash trees along the rail trail or along Town Forest trails were not included. As it is much safer and cheaper to remove ash trees while they are still living, it may make sense to preemptively remove potential hazard trees from ROWs before they become infested. Trees that may affect power lines are the responsibility of Green Mountain Power Co. The EAB Plan recommends a tree ordinance, which was passed by the town in 2019.

Table 2C.2.1: Invasive Species Identified in the Northeast Kingdom

Species	Description
Japanese knotweed	Found in wet habitats, along river and stream banks, and in disturbed areas, such as roadsides. In VT, knotweed covers miles of shoreline on every major river in the state. Mechanical control methods include repeated cuttings, as well as wire fencing laid horizontally on the ground over a patch.
Eurasian Milfoil	Displaces and reduces the diversity of native aquatic plants, providing less value as food source for water fowl. Once established, it's impossible to eradicate. To manage the spread, avoid boating through infestation areas and check and wash down watercraft after hauling out.
Buckthorn, common and glossy	Invades forests and can form dense thickets crowding out native shrubs and understory plants. Increases nitrogen level in soil, which changes conditions for other plants. Invades wet habitats as well, which can destabilize streambanks. Smaller plants can be pulled by hand. Larger plants require cutting and possibly a weed wrench. Hang from a branch to prevent re-rooting.
Asiatic bittersweet	Fast-growing vines encircle trees, slowly killing them. Can be managed through careful hand pulling and entire removal of plant. Plants should be bagged before disposing.
Wild chervil & Wild Parsnip	Found along roads but will spread into fields and their shaded fringes. Seeds are spread by mowers and wind over great distances. The plant's sap can burn skin. Can be

	managed by carefully timed mowing, before the seed can reduce their spread. Pulling requires protective layers, such as gloves and long sleeves.
Asian Lady Beetle	Very similar to ladybugs with different shapes and coloration. Likely have played a major role in the disappearance of many native Lake Beetle species.
Curly-leaf Pondweed	Submersed plants with a distinct, wavy appearance. Only pondweed with toothed edges; can grow 4-5 feet tall. Thrives in polluted and eutrophic waters and can be an indicator of declining water quality. Grows in dense strands that can restrict the growth of native plants and deplete nutrients. High impacts to water recreation.

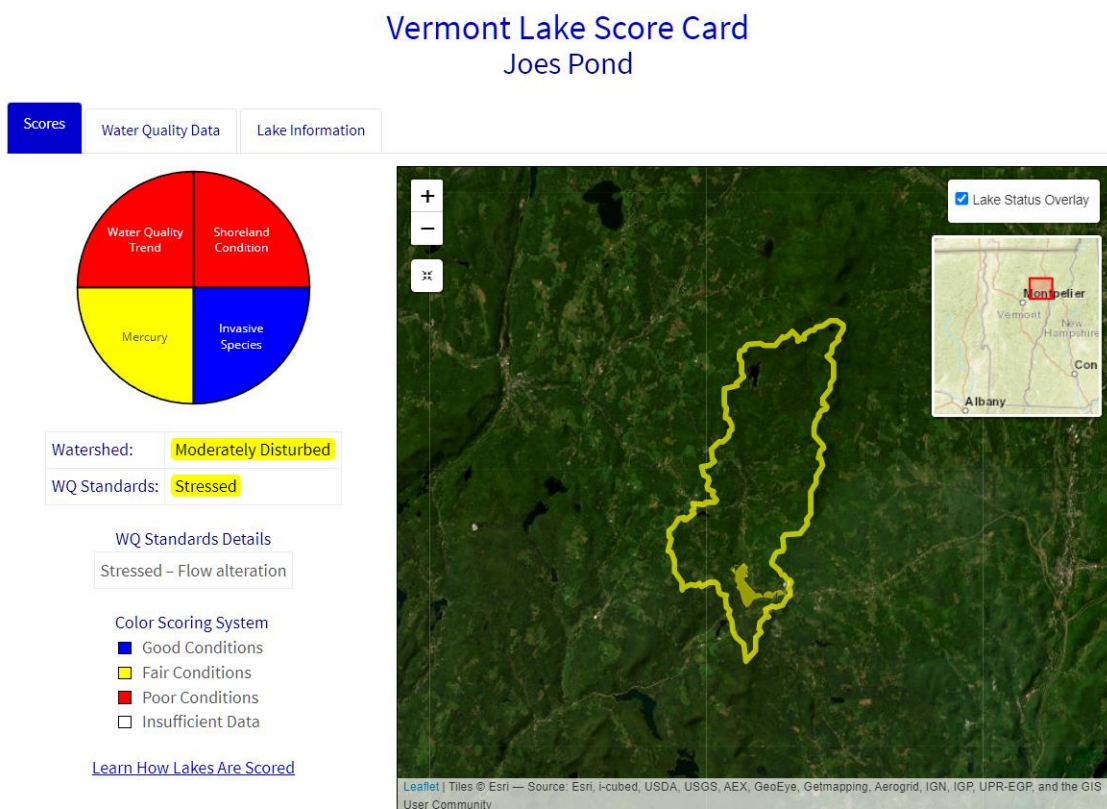
For the purposes of culture, history, recreation, housing, and economy, Joe's Pond and its surrounding forests' health are vital to the community's identity and wellbeing. Though still regarded as one of the cleaner lakes in Vermont, nutrient loading has become an issue through increased phosphorus. Nutrient loading provides more food for various algae blooms. Algae blooms diminish available dissolved oxygen, creating water quality issues, affecting recreational opportunities as well as a large portion of the economic tax base, and present a significant health threat to both fish species and humans. There is currently no known presence of invasive species in Joe's Pond, and the Association regularly monitors the lake through lakeshore reporting, state grant funding, funding support from neighboring communities, and biannual biological surveys. However, in a recent Annual Aquatic Vegetation Survey Report in 2022, the common reed was found to be the first existing invasive species.

The Department of Environmental Conservation (DEC) Watershed Management Division has assessed water quality through a Lay Monitoring Program since 1979. The image above (Figure 2C.4.1) was taken from the DEC scorecard website, indicating stressed water quality standards from flow alteration derived from dam manipulation. Spring phosphorus rates have been significantly increasing with summer rates significantly decreasing. While Joe's Pond remains one of the cleaner lakes, increased wastewater discharge, and can have the potential to reduce lake diversity.⁸

26% of respondents reported being "very concerned" about potential environmental damage to trees and contamination of surface waters from natural hazard events.

⁸Addy, Green, and Herron. pH and Alkalinity, University of Rhode Island, July 2004. <http://cels.uri.edu/docslink/ww/water-quality-factsheets/pH&alkalinity.pdf>

Figure 2C.2.1. Joe's Pond Lake Scorecard



Sources: Department of Environmental Conservation (DEC) Watershed Management Division.

Table 2C.2.2: Invasive Species Hazard Summary Table

Location	Vulnerability	Extent	Potential Impact	Probability
Town wide, with habitats specific to individual species, such as roadways, wetlands, forests.	Boreal forests, hardwoods, agriculture, waterways, native species; economic vulnerability to tax base of Joe's Pond.	Emerald Ash Borer located in Caledonia County	Major: Decreased water quality and available oxygen in lakes	Highly Likely: > 75% in any given year. High likelihood of future impact.
Joe's Pond, Keiser Pond, and associated brooks		Currently no known invasives in or around Joe's Pond.	Weakened native species. Compromised natural habitat, including streambanks and forests. Compromised soil stability along waterways.	
		Japanese knotweed and emerald ash borer likely imminent.		

3. Wind

Typically rare, Vermont has begun to see the effects of increased thunderstorm winds as evidenced during Tropical Storm Irene in 2011 and the Halloween flood of 2019. Excessive windstorms can affect the region year-round, and are often accompanied by other storm factors.

Most recently, the Halloween storm of 2019 produced both significant floods and high winds, resulting in washed out roads and culverts, with over 120,000 people affected by power outages.⁹ Dangerous combinations of power outages and access roads cut off can lead to pronounced isolation and severely limited emergency response in rural regions such as Danville.

This section of the Plan satisfies the requirements of 44 CFR §201.6(c)(2)(i) and 44 CFR §201.6(c)(2)(ii): Hazard Identification and Risk Assessment for Wind

High windstorms present a severe threat to loss of life, property, and crop damage. Forest and sensitive habitat can be upheaved in structure and composition. Infrastructure is commonly affected through downed trees that result in prolonged power outages and road closures. Additionally, the random nature and various accompanying impacts windstorms possess present a difficult challenge to respond from.

The Beaufort Wind Scale, one of the first scales to estimate wind speeds, was created by Britain's Admiral Sir Francis Beaufort in 1805 to help sailors estimate the winds via visual observations. The scale starts with 0 and goes to a force of 12. The Beaufort scale is still used today to estimate wind strengths. The table below, which focuses on specifications for land, provides perspective on the wind strengths that can be expected in Danville.

Table 2C.3.1: Beaufort Wind Scale

Speed				
Force	MPH	Knots (KTS)	Description	Specifications for Land
0	0-1	0-1	Calm	Calm; smoke rises vertically.
1	1-3	1-3	Light air	Direction of wind shown by smoke drift, but not by wind vanes.
2	4-7	4-6	Light Breeze	Wind felt on face; leaves rustle; ordinary vanes moved by wind.
3	8-12	7-10	Gentle Breeze	Leaves and small twigs in constant motion; wind extends light flag.
4	13-18	11-16	Moderate Breeze	Raises dust and loose paper; small branches are moved.
5	19-24	17-21	Fresh Breeze	Small trees in leaf begin to sway; crested wavelets form on inland waters.
6	25-31	22-27	Strong Breeze	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty.
7	32-38	28-33	Near Gale	Whole trees in motion; inconvenience felt when walking against the wind.
8	39-46	34-40	Gale	Breaks twigs off trees; generally impedes progress.
9	47-54	41-47	Severe Gale	Slight structural damage occurs (chimney-pots and slates removed)
10	55-63	48-55	Storm	Seldom experienced inland; trees uprooted; considerable structural damage occurs.

⁹ [The Halloween 2019 Significant Flooding and High Wind Event](#)

11	64-72	56-63	Violent Storm	Very rarely experienced; accompanied by wide-spread damage.
12	72-83	64-71	Hurricane	This is approaching a Category One Hurricane, according to the Saffir-Simpson Wind Scale: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.

Source: NOAA

Though increasing, hurricanes are rare in Vermont, as are tornadoes. There have been 49 tornadoes recorded in Vermont since 1951, the closest to Danville being an EF0 in 1988 near Lyndonville. Tornado wind speeds are recorded using the Enhanced Fujita Scale (EF) which are marked by the following speeds:

Table 2C.2.6: Enhanced Fujita Wind Scale

EF Rating	3 - Second Gust (mph)
0	65-85
1	86-110
2	111-135
3	136-165
4	166-200
5	Over 200

The National Oceanic and Atmospheric Administration (NOAA) lists three types of wind events that have affected Danville from 1/1/1990 to 6/30/2022. There was also one tornado reported in neighboring Peacham.

- **Thunderstorm Wind:** Winds arising from convection (occurring within 30 minutes of lightning being observed or detected), with speeds of at least 50 knots (58 mph), or winds of any speed (non-severe thunderstorm winds below 50 knots) producing a fatality, injury, or damage. There are 148 thunderstorm wind events recorded in the NOAA database for Caledonia County, and 11 events with impacts reported in Danville.
- **Strong Wind:** Non-convective winds (i.e. not associated with a thunderstorm) gusting less than 50 knots (58 mph), or sustained winds less than 35 knots (40 mph). There are 24 events reported in the NOAA Storm Event Database from 1/1/ to 6/30/2022 in Caledonia County. There is only one event with reported impacts in Danville, but one strong wind event was the notorious Halloween storm of 2019, which led to sustained power outages.
- **High Wind:** sustained non-convective winds of 35 knots or greater lasting for 1 hour or longer, or winds (sustained or gusts) of 50 knots for any duration, on a widespread or localized basis. There are 15 high wind events in the NOAA database for Caledonia County, and one event with reported impacts in Danville.

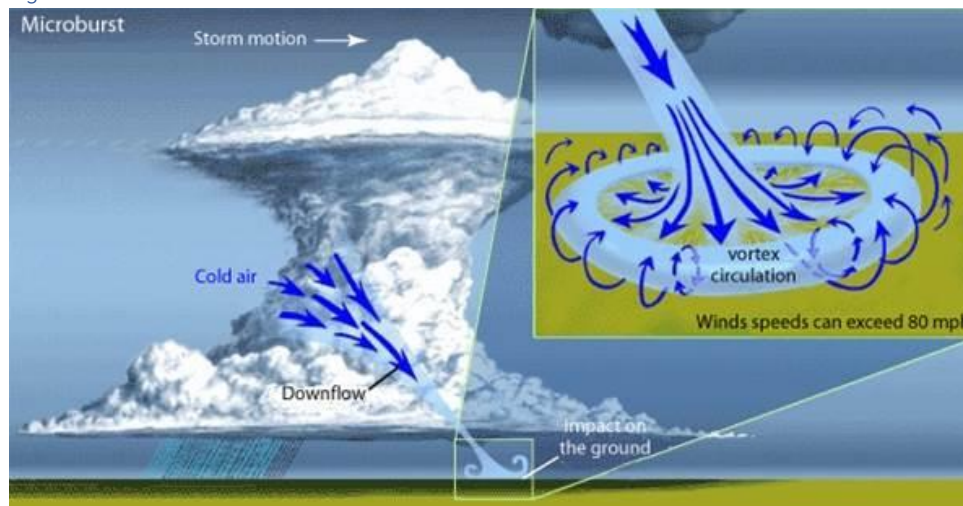
Danville residents frequently experience downed trees and power outages from wind, and they occasionally experience structural damage. Twenty-five survey respondents indicated they had

experienced power outages for longer than a day. Some respondents reported road closures from downed trees after high wind events. One respondent specified having their residence access blocked for several days from downed trees. Since most residents are on private wells, they also lose their water when the power goes out. 51% of respondents reported being without running water for a day or longer.

The most damaging winds that Danville experiences are “straight line” winds, especially thunderstorm winds that are not rotational like a tornado. Of particular concern are thunderstorm winds associated with a microburst, which can rapidly approach 11 or 12 of the Beaufort Scale.

The National Weather Service defines a microburst as a localized column of sinking air (downdraft) within a thunderstorm that is usually less than or equal to 2.5 miles in diameter. (Figure 2B.3.1)

Figure 2C.3.1: Microburst



Source: NOAA

Ideal conditions for microbursts occur in hot humid conditions and can be exacerbated by instability, high levels of precipitative water, and converging air in the middle of a thunderstorm. It occurs when large amounts of water or hail are suspended in the updraft. Evaporation, cooling, and sinking air weaken the updraft to the point where it can no longer hold up the large core of rain or hail. Subsequently, the core plummets to the ground, spreading out in all directions. The location where the microburst first hits the ground incurs the greatest damage, which includes high winds. The phenomenon usually lasts just a few minutes, but the damage can be intense.

Forecasting for microbursts is near to short term (6-12 hours) and is based on the atmospheric conditions likely to lead to a microburst. However, microbursts can also occur without any warning at all because they can form quickly between radar scans.

Non-convective winds have on occasion reached similar magnitudes and inflicted property damage in Danville.

Table 2C.3.2: Significant Wind Events in Danville, 1990 to present

Date	Type	Magnitude	Description and Impacts	Damage
10/16/2005	High Wind	40 kts	An ocean storm system moved north to the east of New England during Saturday, October 15th and into New Brunswick during Sunday, October 16th. A tight pressure gradient on the backside of this intensifying storm resulted in strong winds across the area on October 16th during the late morning and early afternoon especially. Countywide tree damage was reported, with the following specific reports: both Sutton and Danville (Caledonia county) reported trees down on power lines, while in the town of Orange (Orange county) trees were blown down on power lines. Power outages were reported across these areas.	\$5,000
6/27/2007	Thunderstorm wind	55 kts	A mid-level atmospheric disturbance and accompanying surface trough moved into a very warm and unstable airmass across Vermont during the late afternoon hours of the 27th. Thunderstorms developed along this boundary in the Champlain Valley of New York and intensified as they moved across Vermont. There were numerous reports of wind damage in the form of downed trees and power lines across the state, which resulted in thousands without power. Numerous trees blown down near State Routes 2, 15 and other local roads.	\$10,000
11/28/2009	Strong Wind	39 kts	A strong area of low pressure moved from Cape Cod into the Gulf of Maine on November 27th and 28th. Meanwhile, a cold upper atmospheric low moved across New England which delivered cold air aloft to the region. The combination accounted for a substantial elevated terrain snow event across Vermont as well as strong gusty winds with the arrival of colder air. Snowfall across elevations mainly above 1000-1500 feet along and east of the spine of the Green Mountains in Vermont on the night of the 27th into the morning of the 28th ranged from 3 to 7 inches with localized higher amounts in elevations above 2000 feet. Some specific snowfall totals include; 8 inches in Jay (Orleans county) and Walden (Caledonia county), 6	\$2,000

			<p>inches in Canaan (Essex county) and Barton (Orleans county), 4 inches in Mendon (Rutland county), Weston (Windsor county), Danville and Sutton (Caledonia county). In addition, brisk to strong wind gusts in excess of 40 mph ushered in colder air during the early morning hours of the 28th and caused scattered power outages that affected nearly 8000 people. Some observed wind gusts included; 52 mph in Stowe (Lamoille county), 48 mph in Waltham (Addison county) and South Burlington (Chittenden county), 45 mph in Mount Holly (Rutland county) and Springfield (Windsor county).</p>	
7/4/2012	Thunderstorm wind	60 kts	<p>A moderately strong upper level disturbance ahead of a surface cold front moved across southern Quebec during the afternoon and evening hours of July 4th. These disturbances moved into a warm and unstable air mass and developed thunderstorms in southern Quebec, which moved across northeast Vermont during the afternoon hours and the Champlain Valley during the evening. Both episodes contained widespread wind damage and frequent lightning. In the afternoon, the communities of Walden, Cabot, West Danville and Danville were most affected. Despite the holiday festivities, no serious injuries were reported. Dozens of trees down, including on vehicles, camps and power lines. Several light boats flipped over on Joe's Pond. Damage was widespread on the north and east shores with lighter damage elsewhere.</p>	\$50,000
06/02/2013	Thunderstorm Wind	55 kts	<p>A very warm and humid air mass was located across Vermont during the afternoon of June 2nd. A strong mid-atmospheric disturbance, ahead of a cold front, moved across portions of Vermont and triggered widespread thunderstorms with pockets of damaging winds and large hail. Some of the damage occurred in the Rutland vicinity as well as the Route 2 corridor between Montpelier and Lunenburg. At the peak of the event, roughly 20,000 customers had lost power. Several trees down with damage to houses and vehicles.</p>	\$20,000
11/01/2019	Strong Wind	46 kts	<p>A developing area of low pressure moved from the Gulf of Mexico on during the night of the 30th and</p>	\$50,000

			<p>moved north into the eastern Great Lakes as it intensified during the evening of October 31st. As the surface low moved across Ontario during the night of October 31st, its associated cold front slowly edged across Vermont during the early morning hours of November 1st...strong southwest to west winds, gusting to 40 to 50 mph and locally higher, developed around sunrise and continued through mid-afternoon before quickly diminishing by evening. These persistent strong winds combined with over-saturated soils, led to numerous downed trees, structural damage and escalated power outages to their peak of more than 100,000 outages.</p>	
05/26/2021	Thunderstorm Wind	55 kts	<p>An upper level disturbance ahead of a strong cold front moved into a marginally unstable airmass to trigger scattered thunderstorms across eastern NY that continued to move east into VT and intensify. One particular cluster of thunderstorms moved from Addison county across central and eastern VT with a path of damaging winds that knocked down numerous trees and utility lines. Power outages affected nearly 35,000 total customers with a peak outage of 20,000 customers. Trees and utility lines downed by thunderstorm winds.</p>	\$15,000

Missing from the NOAA database is an event on March 8, 2022, when a gust removed major portions of a metal roof from a large historic structure in West Danville. According to WCAX news, the weather station at the Fairbanks Museum in St. Johnsbury reported a front moving through the area overnight, resulting in strong gusts. A weather station in North Danville had recorded a gust of 39 mph, whereas *West Danville, Vermont: Then & Now* says that gusts of 85 mph swept through in July of 2012.

FEMA does not categorize declared disasters by wind alone.

A wind storm from a hurricane on September 21, 1938 swept through northern Vermont with speeds of 75 mph (North Monthly Star). 700 people reportedly died from that event in the state, with approximately 2.6 billion board feet of trees blown down.

Table 2C.3.3. Wind Hazard Summary Table

Location	Vulnerability	Extent	Observed Impact	Probability
Town-wide High-elevation points	Downed trees, downed power lines, extended power outages; potential for injuries from falling debris or power lines; disruption to services and businesses; road blockages and limited emergency response	Gusts of 40 mph and winds approaching 60 kts. Power outages in the tens of thousands.	Major: Trees lost, roads blocked, power outages, structural damage to houses and farm structures, and automobiles. NOAA Storm Event Database reports \$100,000 in damages to Danville and \$3.079M in property damages county-wide.	Highly Likely: > 75% in any given year

4. Severe Winter Conditions (Cold, Snow, and Ice)

Winter weather often results in temporary road closures, school and business delays, and even power outages. Given the high amount of snowfall this region experiences, the town and residents are generally well prepared to deal with normal winter weather conditions. Severe winter storms, however, have been shown to affect the entire region resulting in:

This section of the Plan satisfies the requirements of 44 CFR §201.6(c)(2)(i) and 44 CFR §201.6(c)(2)(ii): Hazard Identification and Risk Assessment for Cold, Snow, and Ice

- Extensive damage to above-ground power and utility lines and extended power outages (as what happened in the ice storm of 1998);
- Road shutdowns, making general travel, transport, and emergency vehicle access difficult;
- Shutdown of schools, businesses, and local government services, limiting access to goods and services;
- Structural failure from excessive snow loading, especially barns (as in the storm of 2007);
- Injuries and fatalities from poor driving conditions, frostbite, hypothermia, heart attacks from overexertion, and carbon monoxide poisoning from blocked vents.

The National Weather Service (NWS) has a new prediction tool called the Winter Storm Severity Index (WSSI). The purpose of this tool is to provide National Weather Service (NWS) partners and the public with an indication of the level of winter precipitation (snow and ice) severity and its potential related societal impacts. The WSSI does not depict official warnings and should always be used in context with official NWS forecasts and warnings. Utilizing this tool can be helpful in winter weather severity predictability.

Any given storm will have different levels of impact from these individual components:

Potential Winter Storm Impacts	
	No Impacts Impacts not expected.
	Limited Impacts Rarely a direct threat to life and property. Typically results in little inconveniences.
	Minor Impacts Rarely a direct threat to life and property. Typically results in an inconvenience to daily life.
	Moderate Impacts Often threatening to life and property, some damage unavoidable. Typically results in disruptions to daily life.
	Major Impacts Extensive property damage likely, life saving actions needed. Will likely result in major disruptions to daily life.
	Extreme Impacts Extensive and widespread severe property damage, life saving actions will be needed. Results in extreme disruptions to daily life.

- Snow Amount
- Snow Load
- Ice Accumulation
- Blowing Snow Index
- Ground Blizzard
- Flash Freeze

Figure 2C.4.1. NWS Winter Storm Severity Index Impacts.

Source: National Weather Service

Based on Vermont Climate Assessment (VCA), which provides a framework for understanding climate change impacts in Vermont, average winter temperatures are warming at a rate over twice as fast as summer and fall temperatures (+3.3°F). The state's days with maximum temperatures < 0°F have decreased by over 10 days since 1960. Lastly, Northeastern Vermont has experienced the most accelerated change in the length of freeze-free period since 1991 at 9.6 days/decade.¹⁰

This has brought a decline in snowfall during the same time period, yet an increase in total precipitation as a greater portion of winter precipitation is falling as rain rather than snow. These warming winter temperatures followed by arctic air masses have the propensity to create mass freeze-overs on a town-wide scale, intensifying ice damage and strain on infrastructure, trees, and property, as evidenced in both survey respondents and power outage data from Green Mountain Power (Appendix B and C).

Caledonia County is no stranger to cold, icy winter conditions. NOAA's storm database has recorded 281 days with Winter Weather & Winter Storm events since 1996 in Caledonia County, accumulating a total of \$2,550,000 in property damages.

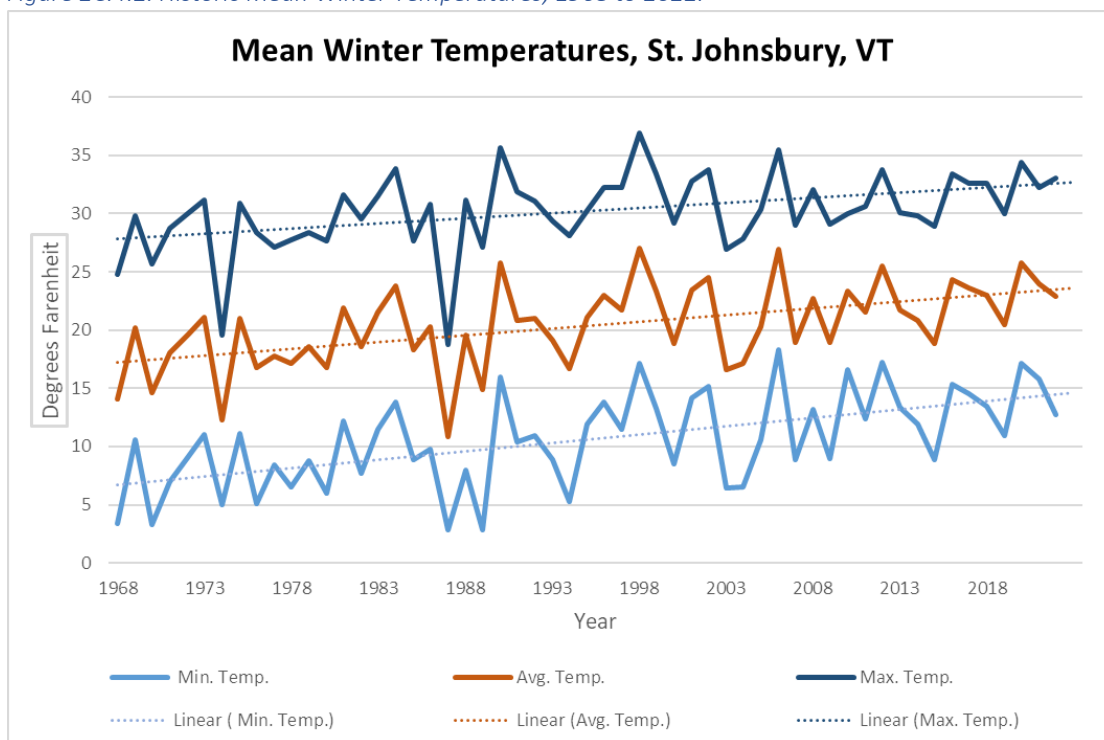
NOAA defines a *winter storm* as an event that has one significant winter weather hazard (i.e., heavy snow and blowing snow; snow and ice; snow and sleet; sleet and ice; or snow, sleet and ice) and meets or exceeds locally/regionally defined 12 and/or 24-hour warning criteria for at least one of the precipitation elements.

Cold

Figure 2C.2.2 depicts historic winter temperatures in nearby St. Johnsbury (the closest available data to Danville). Averaging the mean temperatures of the minimum, average, and maximum temperature of winter months (December-February) confirms that all mean winter temperatures are rising, with minimum temperatures rising at a slightly quicker rate than maximum and average temperature.

¹⁰ [Vermont Climate Assessment, 2021](#)

Figure 2C.4.2. Historic Mean Winter Temperatures, 1968 to 2022.



Source: NowData (National Weather Service)

“Cold” and “extreme cold” have relative meanings for different parts of the country, but sub-zero temperatures are considered extremely cold in northern Vermont. According to National Weather Service data from the past 30 years, sub-zero temperatures in the area usually occur between December and March. Table 2C.2.1 suggests that sub-zero temperatures begin later into winter and end earlier, whereas maximum temperatures over 32 degrees are ending sooner in the season.

Table 2C.4.1. First and Last Temperatures in St. Johnsbury, VT, 1968-2023

Minimum Temperature Under 0			Maximum Temperature Over 32		
	Last Day of Year	First Day of Year		Last Day of Year	First Day of Year
Minimum	Feb-06 (2010)	Nov-17 (2019)	Minimum	Jan-01 (2022)	Dec-04 (1970)
Mean	Mar-8	Dec-15	Mean	Jan-6	Dec-28
Maximum	Mar-29 (1974)	Feb-01 (2023)	Maximum	Feb-11 (1977)	Dec-31 (2020)

Source: NowData (National Weather Service)

Extreme cold is likely to impact everyone town-wide, causing moderate-to-severe impacts to infrastructure, life, and economy. Water pipes can freeze or burst, and car batteries can die. Extreme cold can disrupt outdoor recreation. Unseasonably cold temperatures can damage agricultural crops. Extreme cold temperatures can further cause heavy strain on sole-source heating systems.

Neither the NOAA Storm Events Database nor the FEMA Declaration Summaries database covered damages or instances of extreme cold weather specific to Danville. However, NOAA has recorded 24 instances of “cold/wind chill” or “extreme cold/wind chill” in Caledonia County, including reports of cold wind chills 25 to 40 below zero. There was a record cold in February for much of Vermont in 2015 and a recording of -31 degrees in nearby Sutton and Sheffield. In these instances, damage to

infrastructure, frozen water mains, and dead vehicle batteries. 40% of survey respondents reported being affected by extreme cold weather.

Danville has made progressive advances preparing for extreme cold days by implementing a heating/cooling center strategy within their Local Emergency Management Plan (LEMP), updated on April 20th, 2023. It guides as a checklist to open, operate and close warming or cooling centers as needed, with the intention of an Incident Commander (IC) used to make proactive decisions to aid the community. While the Town does not have plans or resources to operate a shelter, the LEMP identifies the Emergency Operations Centers (EOC) - the Town Office, the North Danville Community Center, and the CALEX building - as the most likely places for such centers. While their centers have been established, retrofitting for climate control and defining capacity limits for each center are still needed.

Those who are especially vulnerable to the impacts of extreme cold are residents in older structures and energy-burdened households. According to the most recent American Community Survey 5-year estimates (2021), 41% of Danville housing units were built before 1970 and 33% built prior to 1940. Older structures are likely to be “leaky” and poorly insulated, which can nearly double average heating energy use. Heating challenges are further exacerbated by energy burden, which is measured as energy spending as a percentage of income. Energy burden, according to a 2019 study by Efficiency Vermont, is high in the rural Northeast Kingdom. While the average energy burden statewide is about 10%, Danville’s overall energy burden is considered “moderate” at 9%.¹¹

Danville’s Energy Committee has released a draft [Enhanced Energy Plan](#) for the town, with the purpose of analyzing uses and needs in concert of promoting efficient use and renewable energy. It is a detailed and comprehensive document that provides Danville with an energy envelope to make informed future decisions to be more energy efficient and resilient.

Snow

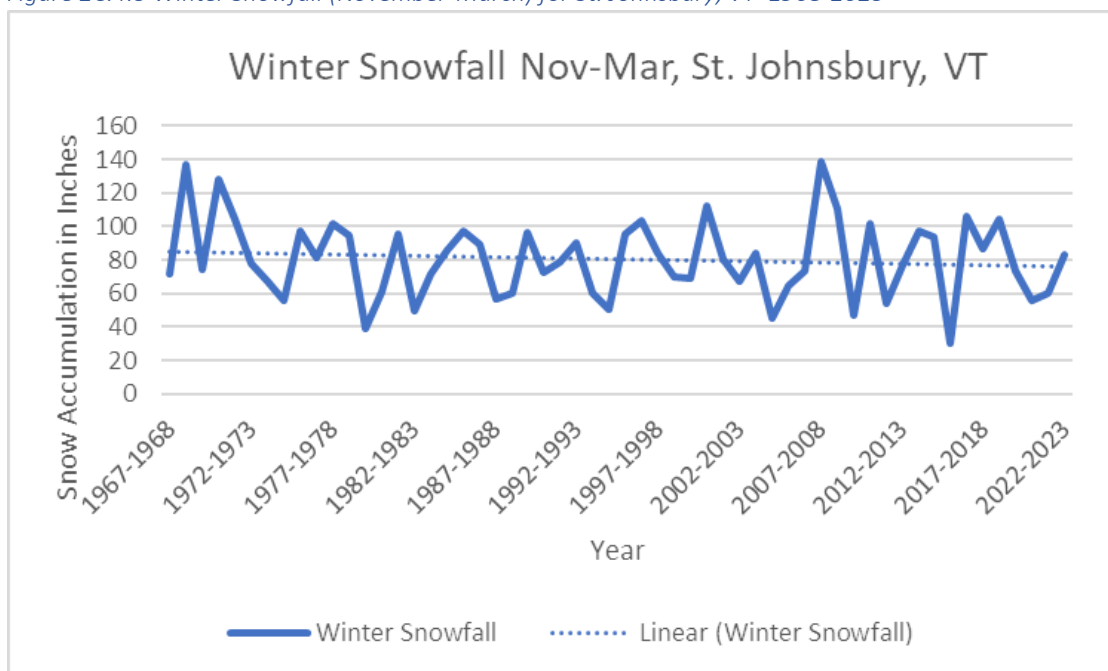
In general Danville residents are accustomed to snow and businesses are unlikely to shut down because of heavy snowfall. The likeliest moderate-to-severe impacts to infrastructure would be short term because roadways are not passable during a storm. Heavy snow accumulations have caused restrictions in road and driveway access in the past according to survey responses.

Bucking the state trend of declining snow, the Northeast Kingdom and its surrounding areas have received relatively little change to their accumulation of snowfall. In fact, as precipitation has increased, northeastern Vermont has experienced average annual snowfall 24 inches higher in the 2010’s than in the 1930’s (Vermont Climate Assessment, 2021).

St. Johnsbury, however, is trending at a slightly decreased annual rate since 1968 (see Figure 2C.2.3). This information might be misleading for Danville, as the town’s elevation is approximately 900 feet higher than St. Johnsbury and likely receives a greater accumulation of snowfall.

¹¹ [Efficiency Vermont: 2019 Energy Burden Report](#)

Figure 2C.4.3 Winter Snowfall (November-March) for St. Johnsbury, VT 1968-2023



Source: NOWData, NOAA

Caledonia County's snow season can extend from October through May, with the heaviest monthly snow accumulations in December. However, the largest snowstorms can still occur in February/early March. The mean annual snowfall for the entire season in St. Johnsbury is 88.5" (NOWData).

The nearest, most complete data on snowfall and accumulation is in St. Johnsbury. The mean number of days per year with 1" or more of snow depth is 110 days. The maximum number of days with snow cover was in 2019 at 148 days, and the minimum was in 2016 with 52 days. The mean number of days per year with over 1" of snowfall is 26 days per year (NOWData - NOAA Online Weather Data).

"West Danville, Vermont: Then and Now, 1781-2021", makes mention of a storm that released 18-20 inches of snow in June, 1816. In 1894, the first snow of the year was recorded on October 2nd. Finally in 1993, the snow depth reached 58 inches in West Danville

Though NWS data is often with gaps, existing data suggests a downward trend in the annual snow cover. This trend is consistent with statewide data and loss of snow cover, which can be attributed to rising temperatures. Reductions in snow fall may leave exposed ground more vulnerable to freezing during extreme cold events, which can cause significant impacts to building infrastructure.

Since 1997, there have been eight instances of Heavy Snow storm events recorded in Caledonia County within the NOAA database, resulting in \$261,000 in property damages. "Heavy Snow," according to the National Weather Service, is snowfall accumulating to 4 inches or more in depth in 12 hours or less; or snowfall accumulating to 6 inches or more in 24 hours or less.

Monthly Climate Normals (1991–2020) – SAINT JOHNSBURY, VT

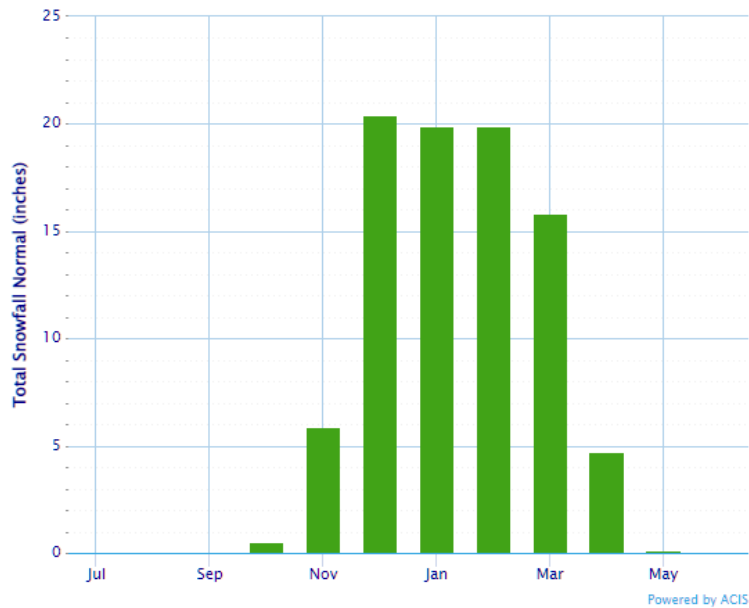


Figure 2C.4.4. Total Snowfall by Month, St. Johnsbury, VT, 1991-2020
Source: NowData, National Weather Service

Table 2C.4.2: Heavy Snow Events in Caledonia County. Storm Events Database, NOAA

Date	Episode Narrative	Total Property Damage
12/01/1997	<p>An area of low pressure off the Middle Atlantic coast Sunday night (11/30/97) moved to near Cape Cod early Monday (12/01/97) and continued to move northeast thereafter. Snow and freezing rain developed during late Sunday night (11/30/97) and continued in the form of periods of snow Monday (12/01/97) into early Tuesday (12/02/97). Several traffic accidents were reported.</p> <p>Sutton (Caledonia county).....10.0 inches</p>	\$10,000
12/25/1997	<p>A storm system in the Great Lakes region early Thursday (12/25/97) moved northeast into Canada during the day. Another storm developed off the New Jersey coast early Thursday (12/25/97) and moved northeast to coastal Maine Thursday night (12/25/97). The precipitation began as mixed snow, sleet and freezing rain but changed quickly to snow with the heaviest snow in northeast Vermont. West Burke (Caledonia county) reported 7.0 inches and Victory (Caledonia county) reported 8 inches. A few traffic accidents resulted. Also, a few power outages were reported in Caledonia county the night of 12/25/97.</p>	\$15,000
3/14/1998	<p>An area of low pressure moved across northern New York and northern New England during Saturday (March 14) and then into the Canadian maritimes Sunday (March 15). A complex pattern of snow accumulations resulted across Vermont, with the heaviest snowfall in and east of the</p>	\$5,000

	<p>Green Mountains. A number of traffic accidents were reported. Some of the heavier accumulations were:</p> <p>Sutton (Caledonia county).....9.0 inches.</p>	
3/21/1998	<p>A storm system along the Virginia coast on Saturday (March 21) moved slowly northeast into the Gulf of Maine late Sunday and Sunday night (March 22) . Snow was heavy Saturday night into Sunday morning with a number of traffic accidents reported and brief power outages. The snow tapered off to snow showers Sunday night. Snow accumulations were generally 15 to 20 inches across northwest and north central Vermont with around a foot elsewhere across the area. The heaviest report was 25 inches at Jay Peak near the border of the Vermont counties of Franklin and Caledonia.</p> <p>Sutton (Caledonia county).....12.0 inches.</p>	\$5,000
2/27/2002	<p>A cold front moved across the area accompanied by and followed by snow squalls. In addition, an ocean storm spread moisture into the region. Generally between 3 and 6 inches of snow fell in the hilly terrain, with a few locally higher amounts. This included the western slopes of the Green Mountains in the Eastern portions of both Addison and Chittenden counties and northwest Windsor county. A few reports were: Canaan with 7 inches, South Lincoln reported 6.2 inches, Eden with 6 inches, East Albany with 5.5 inches and Hanksville with 5.2 inches. A few of the mountain peaks received higher amounts.</p>	\$1,000
2/14/2007	<p>Low pressure developed across the lower Mississippi river valley on the morning of the 13th and moved into the central Appalachians by the early morning hours of the 14th. During the early morning hours of the 14th, a coastal low quickly developed near the Delmarva peninsula and rapidly intensified, as it moved northeast across southeast Massachusetts and into the Gulf of Maine by the evening of the 14th. Snow moved into southern Vermont around midnight on the 14th, then overspread the rest of Vermont during the early morning hours. Snow fell heavy at times from late morning through early afternoon in southern Vermont and early afternoon through early evening elsewhere, before dissipating during the night. Snowfall rates of 2 to 4 inches per hour and brisk winds of 15 to 25 mph caused near whiteout conditions at times, along with considerable blowing and drifting of the snow, making roads nearly impassable. Further, temperatures in the single numbers above zero combined with these brisk winds created wind chill values of 10 degrees below zero or colder. Snowfall totals ranged from 15 to 25 inches in the Connecticut river valley to 20 to 35 inches elsewhere across Vermont. The National Weather Service office in South Burlington set an all-time record 24 hour snowfall of 25.3 inches, breaking the old mark of 23.1 inches set on January 14, 1934. In addition, the storm total of 25.7 inches was the 2nd heaviest storm total snowfall on record, behind the 29.8 inches received on December 25th through 28th, 1969. 20 inches recorded in Lyndon.</p>	\$200,000

	The deep snowfall (18-30 inches) and deeper snow drifts (4-6+ feet) caused numerous problems, including the blocking of numerous heat vents that resulted in the build-up of carbon monoxide and sent dozens of people seeking treatment at area hospitals. There were additional indirect injuries resulting from this storm, including vehicle accidents and cardiac arrests due to overexertion during snow removal. Snow removal operations took several days and up to a week in some urban communities. In addition, the weight of the heavy snowfall on some weaker roofs, resulted in the partial or total collapse of 20 or more barn roofs and the deaths of more than 100 cattle.	
2/05/2014	The combination of low pressure from the Gulf of Mexico, that moved into the Ohio River valley on the night of February 4th and a developing coastal low that moved south of New England on February 5th delivered widespread snowfall to Vermont on February 5th. A widespread 5 to 12 inches of snow fell across Vermont with the higher totals in the central and southern Green Mountain communities. Snowfall was at its peak during both the morning and afternoon/evening commutes causing hazardous travel. Six to ten inches of snow fell across Caledonia county.	\$10,000
02/13/2014	<p>A Winter storm, responsible for record ice and snow across the southeast United States on February 12th, moved and redeveloped off the southeast United States coastline on February 13th. This storm intensified as it hugged the eastern seaboard on February 13th, moved across southeast Massachusetts and into the Gulf of Maine by February 14th.</p> <p>Snow began to overspread southern Vermont during the mid-morning hours of February 13th, not reaching the Canadian border until the evening commute. There were two bands of heavy snowfall, snowfall rates of 1-2+ inches an hour, that moved across the region. The first band moved across southern and eastern Vermont during the afternoon hours of February 13th and again during the early morning hours of February 14th.</p> <p>Snowfall across Caledonia county was 10 to 15 inches with 14 inches in Walden and Sheffield, 13 inches in St. Johnsbury, 12 inches in Lyndonville, 12 to 14 inches in Sutton and 10 inches in West Barnet.</p>	\$15,000

Ice

Ice accumulation is becoming a regular concern for winter weather, especially with rapidly fluctuating temperatures in winter months coupled with rising temperatures. Ice accumulation can lead to moderate to severe community-scale damage to infrastructure and economy, which includes downed trees and power lines, dangerous roadways, and extensive power outages that lead to closure of schools, services, and businesses. Numerous survey respondents reported property damage, power outage from downed limbs or trees, and frozen culverts as damage received from ice.

The Vermont State Hazard Mitigation Plan considers ice to have greater impacts than hazards associated with snow. Our warming winters can lead to prolonged patterns of melting and refreezing, not to mention wintry mix of freezing precipitation. Pre-storm road temperatures and surface conditions affect

the potential for ice accumulation on roads and walkways. Roads and walkways washed clear of salt and sand by rain, for example, are more likely to form ice. Subsequent snow accumulation can hide the snow, hiding the icy layer beneath. NOAA winter storm records show one ice storm in Caledonia County, in Table 2C.2.3, causing \$80,000 in property damage. FEMA has recorded one “severe ice storm” in Caledonia County, on January 29, 2014.

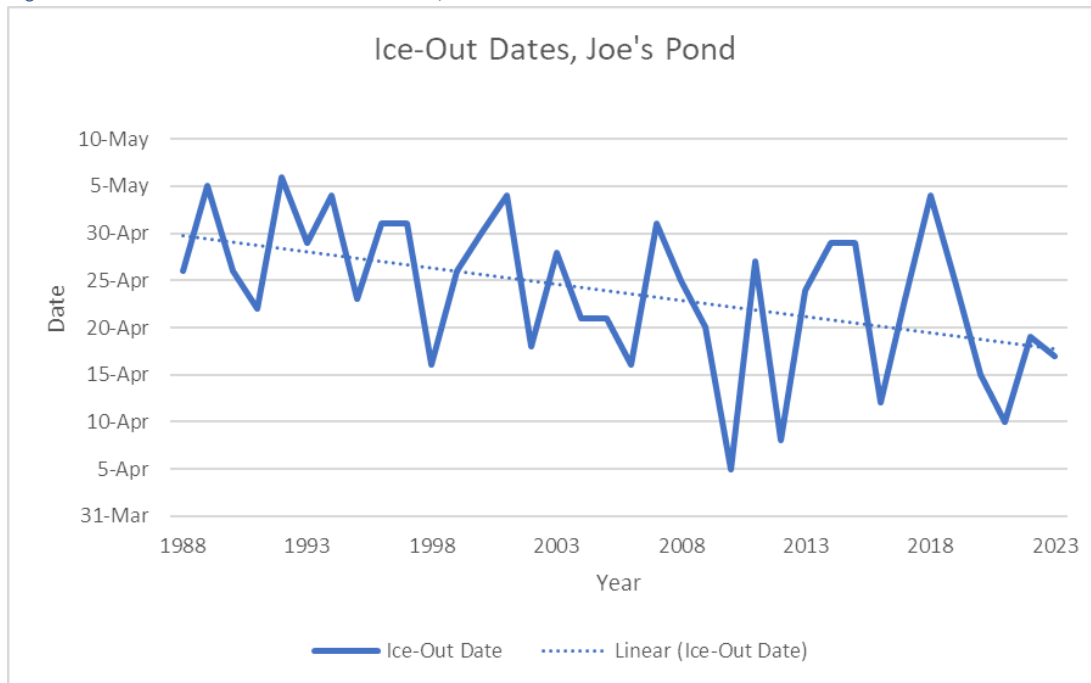
Danville did not experience damage due to the ice storm of 1998 where much of northern Vermont lost power for several days.

Table 2C.4.3: Ice Storms in Caledonia County

Date	Episode Narrative	Total Property Damage
01/06/1998	<p>A storm system moved from the Tennessee Valley on Wednesday (January 7) and Thursday (January 8) into New England thereafter. A cold front across New England and New York associated with an Arctic High Pressure system across Canada resulted in a flow of low level cold air into Vermont. Warm moist air riding over this low level cold air resulted in icing across portions of this area. Significant icing was generally restricted between 1500 and 2500 foot level.</p> <p>Ice accumulations during this event were generally 3/4 of an inch or less. The impact on the region ranged from ice accumulations damaging tens of thousands of trees. Downed power lines resulted from the weight of the ice with several thousands without power. Farmers who lost electricity were unable to milk cows with loss of income and damage to cows. Automobile travel was negatively impacted with a number of roads closed due to ice and fallen trees. There were numerous traffic accidents.</p> <p>INDIRECT injuries were reported due to carbon monoxide poisoning while improperly using generators. Falling tree limbs and other debris was a significant hazard during and following the storm.</p>	\$80,000

Source: NOAA Storm Database

Figure 2C.4.5: Ice-Out Date at Joe's Pond, 1988-2023



Source: Joe's Pond Association

Joe's Pond Association has also been recording Ice-out dates on Joe's Pond since 1988. The lake has seen a trend of losing its ice earlier in the year, with the earliest being April 5th in 2010. (Figure 2C.2.5). For reference, *West Danville, Vermont: Then and Now 1781-2021* reports an ice-out for Joe's Pond in 1893 on May 13th.

Table 2C.4.4: Severe Winter Conditions Hazard Summary Table

Hazard	Location	Vulnerability	Extent	Observed Impact	Probability
Cold	Town-wide	People living in older structures; energy burdened households. Potential for Structure fires Damage to water pipes Damage to agricultural crops.	January, 2022. Cold wind chills of 20 to 30 below zero. Many locations did not witness temperatures above freezing for 25 to 45 consecutive days from mid-January through early March, 2015.	Major: Burst water pipes and flooding; school cancellations and delays; outdoor recreation events canceled. damage to infrastructure, frozen water mains, and dead vehicle batteries.	Highly Likely: > 75% in any given year
Snow	Town-wide	Roofs prone to collapse from weight; Single-	18-20 inches of snow reported in 1816.	Moderate:	Highly Likely: > 75% in any given year

		person households unable to leave house.	Multiple episodes report between 10-15 inches of snow in Caledonia County.	\$261,000 in property damages recorded by NOAA storms	
Ice	Town-wide	Road accidents, Power outages from downed tree limbs, Limited evacuation routes. Burst water pipes	1998 ice storm. Shoreline ice damage, property damage, culvert freezes, power outages from fallen limbs.	Major: \$80,000 in property damage Extended power outages; lost income from dairy operations; road accidents; carbon monoxide from improper use of generators. Numerous traffic accidents	Highly Likely: > 75% in any given year

5. Drought

Drought is defined as a shortage of water relative to need. According to the Vermont 2018 Hazard Mitigation Plan, drought is a complex phenomenon for several reasons:

- It 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.
- 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, making it difficult to determine the onset, duration, intensity, and severity, all of which affect the consequences and corresponding mitigation techniques.

This section of the Plan satisfies the requirements of 44 CFR §201.6(c)(2)(i) and 44 CFR §201.6(c)(2)(ii): Hazard Identification and Risk Assessment for Drought

Extended periods of drought during a Vermont growing season can be devastating for agriculture. USDA data show occasional payouts from crop insurance due to drought damage, but this data is at the county level, so it is not possible to determine if these losses occurred in Danville. Furthermore, not all local growers carry crop insurance. Forestry operations are susceptible to drought as well, because extended warm and dry seasons can increase the risk of disease. Drought also weakens or kills wildlife, and the dieback of vegetation and increased risk of wildfire destroys habitat. In 2020, farmers reported at least \$27 million in crop losses from the growing season drought of that year.¹²

¹² [Vermont Climate Assessment, 2021](#)

Drought can also result in loss of potable water when wells run dry. Although the surface waters may appear to have recovered from a period of drought following a return to normal precipitation, replenishing groundwater levels is a longer process. Low water levels in wells can yield higher concentrations of metals (uranium, iron, sulfur, arsenic, and manganese) in drinking water, making the water unsafe to drink. Three out of ten Vermont households get their drinking water from private wells, and about 60% of Vermonters rely on groundwater for drinking. Downstream water contamination is also an issue in local wastewater treatment facilities with concerns of drought and lower water levels, both in Danville with the Water Andric and the Sleepers River from St. Johnsbury.

Drought conditions are also favorable for wildfires. Low water levels can also affect recreation and fishing. Low water levels, paired with rising temperatures, can trigger the occurrence of blue-green algae in lakes and ponds. Streamflow conditions are considered low throughout the State of Vermont.

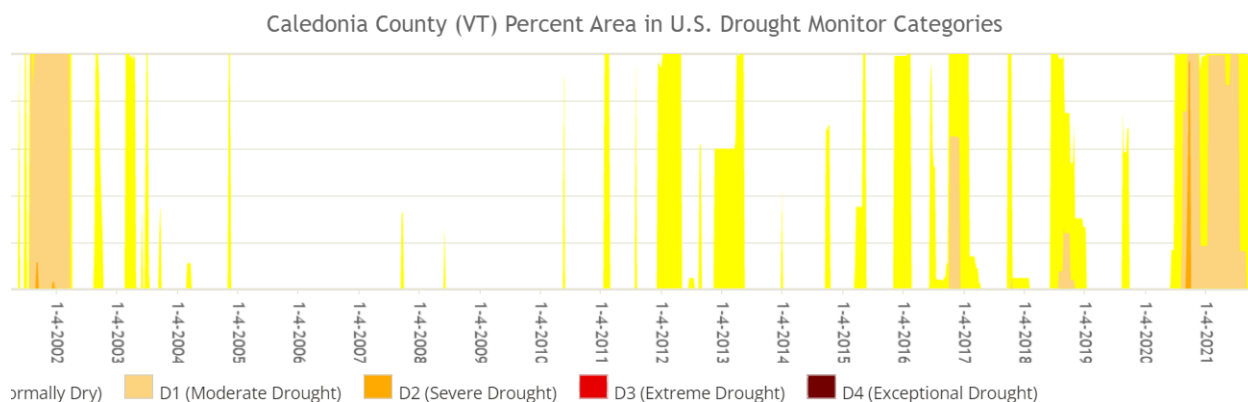
Table 2C.5.1: Drought Severity Table

Classification	Description	Possible Impacts
DO	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures. Coming out of drought: some lingering water deficits pastures or crops not fully recovered
D1	Moderate Drought	Some damage to crops, pastures. Streams, reservoirs, or wells low, some water shortages developing or imminent. Voluntary water-use restrictions requested.
D2	Severe Drought	Crop or pasture losses are likely. Water shortages common. Water restrictions imposed.
D3	Extreme Drought	Major crop/pasture losses. Widespread water shortages or restrictions.
D4	Exceptional Drought	Exceptional and widespread crop/pasture loss; Shortages of water in reservoirs, streams, and wells creating water emergencies.

Source: U.S. Drought Monitor <https://droughtmonitor.unl.edu/About/AbouttheData/DroughtClassification.aspx>

It seems paradoxical that while climate change is generally bringing increased levels of precipitation that Vermonters should experience drought. However, climate change also is linked to climate instability and extremes. According to the US Drought Monitor, Caledonia County has recently experienced the longest period of dry/drought conditions in decades (Figure 2C.5.1). All of Caledonia County experienced a minimum of abnormally dry conditions (DO) from July, 2020 through March, 2022. Nearly all of Caledonia County experienced moderate drought (D1) from September, 2020 to November, 2021. Minor portions of the county also experienced severe drought (D2) from September to October of 2020.

Figure 2C.5.1: Drought Conditions in Caledonia County, 2000-Present



Source: US Drought Monitor

In late 2020, USDA Farm Services Agency issued a declaration of drought-related disaster conditions, making all Vermont farmers eligible to [apply for emergency loans](#). With drought conditions persisting for more than a year, the State of Vermont reactivated its Drought Task Force in July 2021. The Agency of Natural Resources maintains a crowd-sourced database called the ANR Drinking Water Drought Reporter.

<https://vtanr.maps.arcgis.com/apps/CrowdsourcingReporter/index.html?appid=3f0dd46b0add49c0b8010bb76107e354>

The database does not identify any water outages or shortages for Danville. Ten(25%) respondents to the survey indicated they had been affected by drought. Twenty-four respondents (62%) were “mildly concerned,” whereas four respondents (10%) were “very concerned” about future impacts from drought.

Given the town’s waste treatment facility size and effluent discharge point, water contamination could present an issue if low water flow became more common. This has the potential to compromise infrastructure at a village-area scale.

Based on the Multi-Indicator Drought Index (MIDI) developed by the National Integrated Drought Information System (NIDIS) as well as 2021 Vermont Climate Assessment, episodes of droughts are likely to increase. Though experimental, the MIDI long-term outlook projects more drought conditions in Caledonia County than compared to other counties in the state.

West Danville, Vermont: Then and Now makes mention of springs running low and crop loss during extended dry spells in 1906.

Table 2C.5.2: Drought Risk Summary Table

Location	Vulnerability	Extent	Observed Impact	Probability
Townwide	Crop damage, loss of drinking water, unsafe drinking water, higher occurrence of algae blooms with increased nutrient	2+ years of abnormally dry/moderate drought conditions countywide	Minor: Well ran dry, water level in another well with arsenic results.	Likely: >10% but < 75% in any year

	loads, increased risk of wildfire, recreation economy			
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6. Heat

Heat events impact air quality and worsen air pollution. Heat waves create stagnant air that traps pollution particles that are then breathed in. Increased temperatures also increase the likelihood for drought, which dries out vegetation. This vegetation is then more susceptible to wildfire, which also lowers air quality once burned and emitted into the atmosphere.

The Centers for Disease Control reports that more people die from heat than other weather-related events. The actual number of deaths are most likely underreported because heat can exacerbate other underlying conditions such as heart and respiratory disease, leading to death.¹³ The impacts of extreme heat can be particularly challenging in regions such as the Northeast Kingdom where residents are not accustomed to high temperatures and are less likely to live in air-conditioned structures.

This section of the Plan satisfies the requirements of 44 CFR §201.6(c)(2)(i) and 44 CFR §201.6(c)(2)(ii): Hazard Identification and Risk Assessment for Heat

As a rule, the National Weather Service considers “excessive heat” to be an event when the maximum heat index is expected to be 105° or higher for at least two days and nighttime air temperatures will not drop below 75°. The primary impact of extreme heat or prolonged periods of hot weather is to human life. Heat conditions 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. Children and the elderly are especially vulnerable to heat-related illnesses.

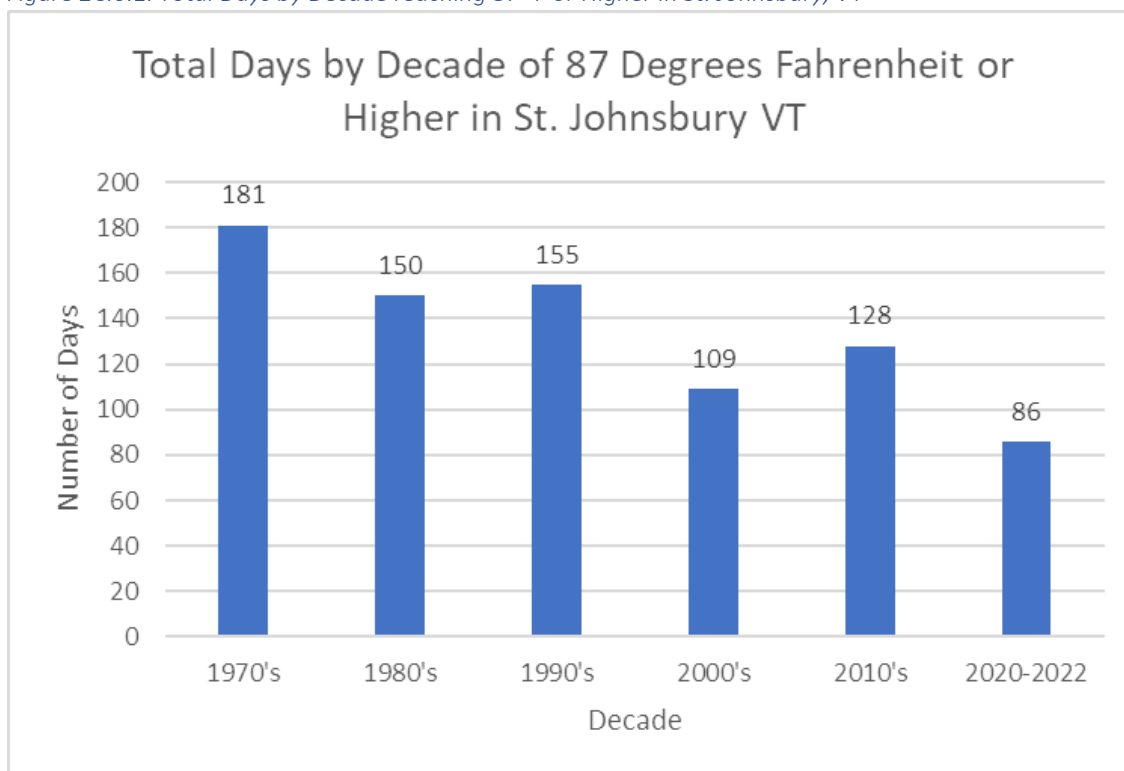
Vermonters are at greater risk for serious heat-related illnesses, and even death, when the statewide average temperature reaches 87°F or hotter.¹⁴ Working with the Vermont State Climate Office, the Vermont Department of Health analyzed 14 years of temperature and mortality data, and ten years of surveillance data for emergency department (ED) and urgent care visits. The research found that on days when the statewide average temperature reached 87°F, ED visits for heat-related illnesses such as heat exhaustion and heat stroke increased eightfold, and there was one additional death per day among individuals aged 65 and older. Deaths due to heart disease, stroke, and neurological conditions were relatively more common these days, reaching at least 87°F as compared to cooler days.

The NOAA Event Database does not have any Extreme Heat event for Caledonia County. July is traditionally the hottest month of the year in Danville with the greatest number of days of 87° or higher, but hot days can occur from May through September, with occasional outliers as early as April.

¹³ Centers for Disease Control, Heat Related Illness: Picture of America Report

¹⁴ [Vermont Department of Health: Heat Vulnerability in Vermont, Local Indicators of Heat Illness Risk. 2016.](#)

Figure 2C.6.1. Total Days by Decade reaching 87° F or Higher in St. Johnsbury, VT

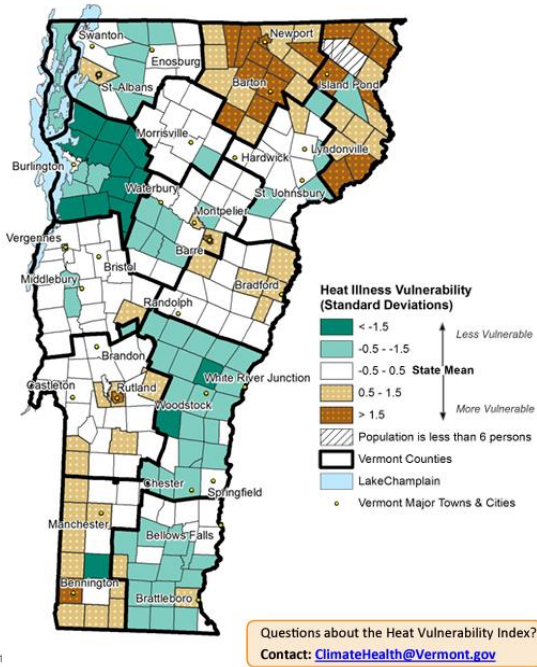


Source: NOWData, NWS

Using 87° as a standard, the hottest July recorded by the NWS NOWData for St. Johnsbury, VT was in 1987, with 14 days reaching 87° or more and a mean monthly maximum temperature of 83.2° in July 2018. While St. Johnsbury's total observed days over 87° have declined in the past decades, the 2020's have already experienced 86 days of 87° or above. This is over half of the mean number of days per decade (144.6) in just three years and projects to 200 days for the 2020 decade. (Figure 2C.6.1) The Vermont Department of Health anticipates a statewide increase to an average of 33 days per year by the end of the century.¹⁵

The Department of Health data indicate that the Northeast Kingdom has some of the highest concentrations of communities with high heat vulnerability indices. [The Vermont Heat Vulnerability Index](#) (Figure 2C.6.2) draws on 17 different measures from six different themes: population, socioeconomic, health, environmental, and heat illness. Both Orleans and Essex County possess the most vulnerable populations due to high historic incidence of heat illness and lack of heat acclimation.

¹⁵ [Vermont Department of Health: Vermont Climate and Health Profile Report: Building Resilience Against Climate Change in Vermont, September 2016](#)



Danville's heat vulnerability index resides between -0.5-0.5 and Caledonia is at much lower risk in general.

Figure 2C.6.2. Vermont Heat Vulnerability Index

Source: Vermont Department of Health

Danville has made progressive advances preparing for excessive heat days by implementing a heating/cooling center strategy within their Local Emergency Management Plan (LEMP), updated on April 20th, 2023. It guides as a checklist to open, operate and close warming or cooling centers as needed, with the intention of an Incident Commander (IC) used to make proactive decisions to aid the community. While the Town does not have plans or resources to operate a shelter, the LEMP identifies the Emergency Operations Centers (EOC) - the Town Office, the North Danville Community Center, and the CALEX building - as the most likely places for such centers. While their centers have been established, retrofitting for climate control and defining capacity limits for each center are still needed.

While excess summer heat in Danville may be seen as a boon to agricultural crops, a continuing warming trend is likely to stress livestock production. Increased evapotranspiration and soil drying are also likely to stress or deplete water supplies. Additionally, 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. The stratified water layers create more favorable conditions for cyanobacteria blooms, which can create health risks for boaters and swimmers who use Danville's lakes and ponds, as well as restrict available oxygen levels for fish and aquatic species. Low water level and warming of stream and lake water can also change physiological stability in fish or limit suitable habitat, inducing mass die-off.

Neither FEMA nor NOAA have any extreme heat episodes recorded in their databases for Caledonia County.

Table 2C.6.2: Extreme Heat Hazard Summary Table

Location	Vulnerability	Extent	Observed Impact	Probability
Town-wide	Children, seniors, people with underlying conditions, people below the poverty line; water supplies and water bodies; livestock and agricultural crops	July 2018, with 14 days 87° or higher	Moderate: Increased hospitalizations due to heat-related illness (VT Dept. of Health data), four heat-related deaths reported statewide in the summer of 2018	Likely: >10% but < 75% in any year; at least one chance in next 10 years

7. Landslide

Landslides are sudden failures of steep slopes and can cause significant damage to streams, infrastructure, and property. While landslides can be linked to fluvial erosion, they can also be caused by slope steepening due to non-fluvial erosion, increased loading on the top of a slope, or pore-water issues. Landslides can destroy or damage structures and infrastructure that lie either above or below the slope.

A report by Cruden and Varnes (1976) researched landslides types and processes. Landslides are recorded in various ways and types, including the width of displaced mass, surface rupture, length of displaced mass and surface rupture, and depth. Landslides can alter landscapes for thousands of years and can be recorded as *active*, *reactivated*, *suspended*, *inactive*, *dormant*, *abandoned*, and *stabilized*. The distribution of the landslide also possesses numerous terms, including *enlarging*, *retrogressing* (if the rupture is moving in the opposite direction of the original displaced material), *advancing*, and *widening*.

FEMA possesses its own landslide recording system, where Caledonia County has a Relatively Low risk assessment through the [National Risk Index](#).

The USGS has a GIS-based [Landslide Inventory](#). Within Danville, there are numerous points of data along the Sleepers River and Water Andric. While dates are not available, data for erosion along the Sleepers River includes the largest extent of landslides of up to 400 meters in length, 22 meters in height, with the largest aspect of 356 degrees and a slide angle of 48 degrees.

The 2018 Vermont State Hazard Mitigation Plan notes that while minimal data exists on damages associated with landslides, they often occur in tandem with periods of significant rainfall and erosion. Disaster declarations and estimates specific to landslide-only damages are not well defined. The 2018 Plan also notes that “Vermont has not previously developed a landslide inventory or an adequate tracking system to establish frequency of this hazard.” The nearest landslide risk is probably the rock-lined portion along Route 15 just at the entry to downtown Hardwick, where numerous report have been recorded. There is no similar land formation in Danville.

In the [Landslide Inventory of Caledonia County, Vermont](#) (2021), a case study was conducted in Hardwick in 2003 of a landslide above Route 15. The area sliding was about 400 feet long, 105 feet high, with an overall slope of approximately 28 degrees. Overall, the report concluded and identified over 300 unstable slope features within the county.

No landslides were identified in the NOAA Storm Events Database.

Table 2C.7.: Landslide Hazard Summary Table

Location	Vulnerability	Extent	Observed Impact	Probability
Town-wide;	Steep slopes along river banks and altered land near development and infrastructure; water supplies and water bodies; livestock and agricultural crops	Sleepers River landslides maximum extent - 400 meters long, 22 meters in height, aspect 356 degrees and slide angle of 48 degrees	Minor: isolated occurrences of moderate to severe property and environmental damage, potential for injuries, minor economic disruption	Occasionally: 1-10% of occurrence in any year; at least 1 chance in 100 years

8. Wildfire

Although wildfires are relatively uncommon in Vermont, they have potential for moderate to severe community-scale damage to town infrastructure, personal safety, as well as loss of wildlife and wildlife habitat. Wildfires can also have moderate to severe damage to economic operations, such as outdoor recreation and forestry. Regional wildfires pose major health risks from smoke and particulate inhalation from poor air quality.

Extended periods of warming due to climate change, combined with an extended period of drought conditions and an early snowmelt, have raised the risk of wildfire. As temperatures tend to increase and snowpack decreases, forest floors have the propensity to be literal hotbeds during periods of drought. Forested areas with heavy brush, downed trees or limbs, and clear-cutting swaths of land provide ample fuel for wildfire. During episodes of increased volatile winds, wildfires can produce unprecedented disaster outcomes for regions unaccustomed and therefore unprepared for such a hazard.

This section of the Plan satisfies the requirements of 44 CFR §201.6(c)(2)(i) and 44 CFR §201.6(c)(2)(ii): Hazard Identification and Risk Assessment for Wildfire

The risk for wildfire is usually greatest in the spring and fall, shortly after snowmelt extends into the beginning of June and prior to the rain setting back in during September. During these periods weather conditions are favorable for drying wildland fuels, dead grasses, leaves and twigs. Low humidity and gusting winds, combined with dry wildland fuels can make controlling a wildfire difficult and dangerous. Hot and dry conditions in the summer can also elevate wildfire risk. Campfires, logging operations, and even lightning strikes can cause a summer fire. In the fall, after leaf drop, warm and dry conditions and a delayed snowfall can raise the risk of wildfire as well.

Fire danger ratings are determined by forest fuel conditions, recent weather conditions, and various fire start risk factors. During non-snow periods of the year, the Department of Forests, Parks and Recreation monitors forest fire danger levels daily. Monitoring fire danger can be viewed [here](#). Open burning is regulated in every town in Vermont and Town fire wardens are responsible for issuing open burning permits, if fuel and weather conditions are safe for outdoor burning. Fire wardens have the authority to ban open burning in their towns during times of high fire danger or hazardous local conditions. Unfortunately, routine disregard of open burning regulations contributes to the risk.

Though every fire is innately unique due to conditions, topography, and loss, the National Wildfire Coordinating Group has established a scale for classifications of burns as follows:

- Class A - one-fourth acre or less;
- Class B - greater than one-fourth acre, but less than 10 acres;
- Class C - 10 acres or more, but less than 100 acres;
- Class D - 100 acres or more, but less than 300 acres;
- Class E - 300 acres or more, but less than 1,000 acres;
- Class F - 1,000 acres or more, but less than 5,000 acres;
- Class G - 5,000 acres or more.

While wildfires have not been a historical hazardous threat to Vermont and the Northeast Kingdom, the magnitude of young forests coupled with warming trends and declining snowpack leaves the likelihood of such events to increase. Vulnerabilities include aged population due to severely impaired air quality, being stranded from road closures, and vast destruction of sensitive habitat. Wildfires also create prolonged periods of dense smoke, inhibiting air quality affecting everyone's breathing capacity.

The Danville Fire Department responded to a record number of emergency calls in 2022, a growing trend that has been reported in recent Town Reports and recruited eight new members.

Danville's interior forest blocks would be more susceptible to fire were drier conditions to increase and persist.¹⁶ Though only one survey respondent (2% of respondents) expressed being affected by wildfires, four were very concerned and fifteen were moderately concerned about future wildfire impacts.

Neither FEMA nor NOAA have any fires recorded in their databases for Caledonia County.

Table 2C.8.1. Wildfire Hazard Summary Table

Location	Vulnerability	Extent	Observed Impact	Probability
Townwide (town is approximately 90% forested)	Aged population; residents with limited alternate route access. forested areas; sensitive habitat. Smoke inhalation for any sensitive populations	Occasional brush fires, but minimal history of wildfire in Danville.	Negligible - Though future conditions likely to increase	Likely: >10% but < 75% in any year; at least one chance in next 10 years

9. Earthquake

Earthquakes happen everyday throughout the world as the earth's tectonic plates move and bump into each other. The closest fault line to Vermont is where the North American Plate and the Caribbean Plate along the Virgin Islands.

The risk of earthquakes is quite low in Vermont -- low enough that it is not prudent to invest in mitigation beyond awareness. According to FEMA Seismic Hazard Maps, Danville (and nearly all of the state) is in a "Seismic Design Category B" area, which means that only moderate shaking is to be expected in an earthquake. Although the sensation can be extremely disconcerting, the potential for damage is slight. The nearest reported earthquake was of a 2.9 in Gorham, New Hampshire on February 4th, 2022 recorded by the United States Geological Survey (USGS), as well as a 2.2 magnitude about 11 km ENE from Ticonderoga, NY, which occurred on June 30, 2017 and was felt by people in Montpelier and Plainfield, VT. The Western Observatory at Boston College recorded a 2.1 magnitude earthquake 6 kilometers west-northwest of White River Junction on April 1st, 2022.

Magnitude	Earthquake Effects	Estimate Number Each Year
2.5 or less	Usually not felt, but can be recorded by seismograph	Millions
2.5 - 5.4	Often felt, but only causes minor damage	500,000
5.5 - 6.0	Slight damage to buildings and other structures	350
6.1 - 6.9	May cause a lot of damage in very populated areas.	100
7.0 - 7.9	Major earthquake. Serious Damage	10-15

¹⁶ [New England and Northern New York Forest Ecosystem Vulnerability Assessment and Synthesis: A Report from the New England Climate Change Response Framework Project](#)

8.0 or greater	Great earthquake. Can totally destroy communities near the epicenter.	One every year or two
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Source: Michigan Technological University

Because of these low seismic occurrences, damage history, impact, and extent are not available.

Table 2C.9.1:Earthquake Summary Table

Location	Vulnerability	Extent	Observed Impact	Likelihood/Probability
Townwide	Infrastructure, aged buildings, and critical facilities	Not Available	Negligible: isolated occurrences of minor property and environmental damage, potential for minor injuries, no to minimal economic disruption	Unlikely: <1% probability in any year

10. Infectious Disease Outbreak

COVID's unprecedented disruption of daily life is a grim reminder that climate change increases the risk of future infectious disease outbreaks. According to the Centers for Disease Control, vector borne illnesses such as Lyme disease, West Nile virus disease, and Valley fever are already on the rise and spreading to new areas of the United States. Milder winters, warmer summers, and fewer days of frost make it easier for these and other infectious diseases to expand into new geographic areas and infect more people.

The COVID-19 pandemic resulted in the first ever major disaster declaration of all 50 states, five territories, and the District of Columbia. In March of 2020, by Executive Order No. 01-20, the Governor declared a State of Emergency for Vermont, and restrictions to protect public health were enacted.

This section of the Plan satisfies the requirements of 44 CFR §201.6(c)(2)(i) and 44 CFR §201.6(c)(2)(ii): Hazard Identification and Risk Assessment for Infectious Disease Outbreak

While a variety of measures were recommended by the Center for Disease Control and the Vermont Department of Health to help curb the spread of disease, including frequent hand washing, wearing masks, and keeping a distance of 6 feet from other persons, vaccination was identified as the best way to keep from getting and spreading COVID-19. In Vermont, the vaccine was first made available to residents and staff of long-term care facilities in December 2020, and then to those 75 and older in mid-January 2021. The Vermont State of Emergency was extended for over a year until all restrictions were lifted on June 14 of 2021, when the benchmark of an 80% vaccination rate for the eligible population of Vermont was reached.

Even though the State of Emergency is behind us, the COVID-19 crisis is still unfolding, and the long-term impacts are still unclear. As of May 31, 2023, the Vermont Department of Health reports that there have been 969 COVID deaths in Vermont. The death toll is based on death certificates that list COVID as a cause or probable cause of death. Caledonia County reported 6,524 cases with 41 related deaths. The Department of Health does not publish death counts at the municipal level.

Essential services, government operations, schools and businesses were severely disrupted during COVID, requiring rapid implementation of safety protocol to continue critical operations. While "social

distancing” was an appropriate response to mitigate the spread, all sectors of Danville population experienced some form of disruption, especially those with no broadband or spotty broadband coverage. The pivot to a virtual environment has demonstrated that reliable broadband is a vital utility for business, work, school, healthcare, and civic involvement.

With so many individuals unable to work or working reduced hours, food insecurity (defined as a lack of consistent access to enough food for an active, healthy life¹⁷) has increased. In a University of Vermont survey, 441 Vermonters were interviewed at the following intervals: March/ April 2020, June 2020, and March/ April 2021. Of those surveyed, 31.9% were food insecure at some point during the pandemic. Of those who experienced food insecurity during the pandemic, 46.9% were food insecure prior to the pandemic but the remainder were *newly* food insecure. The survey also found that those who were more likely to experience food insecurity were people without a college degree, those with a job disruption, households with children, women, and younger people.¹⁸

The town’s LEMP has devised a pandemic incident response for future episodes of infectious disease outbreak, offering a directive for businesses and town operations during stages of outbreak, which can be seen in Appendix G.

Danville is fortunate to have an asset in the Open Door food bank in their village center, where they also serve as a thrift and consignment shop. During the pandemic, they allowed scheduled food and services to be picked up free and no questions asked. They also assist with rent and utilities.

Table 2C.10.1: Infectious Disease Summary Table

Location	Vulnerability	Extent	Observed Impact	Likelihood/Probability
Townwide	Seniors, people with underlying conditions; critical facilities and healthcare	Statewide emergency declaration from March 13, 2020 to June 14, 2021.	Major: Caledonia County reported 6,524 cases with 41 related deaths. Widespread alteration of life & communication	Likely: >10% but < 75% in any year; at least one chance in next 10 years

11. Hail

Hail storms usually occur in Vermont during the summer months and typically accompany passing thunderstorms, when updrafts carry raindrops into extremely cold areas of a cloud. The raindrops form into chunks of ice known as hailstones. The size of the hailstone is directly related to the severity and strength of the thunderstorm. As long as the ice is continually pushed back into the cold areas, it continues to hit water droplets which then freeze to the hailstone, adding another layer of ice. The ice

¹⁷ [Feeding America. What is Food Insecurity?](#)

¹⁸ [University of Vermont. Food Security Impacts of the COVID-19 Pandemic: Following a Group of Vermonters During the First Year](#)

accumulations continue until the hailstones become too heavy to remain in the cloud, or the updraft slows down.

Hail storms occur infrequently in Vermont and it is not clear that climate change will increase their frequency. The NOAA Storm Events Database reported zero hail events in Caledonia County since 1964. Official and/or reliable documenting information on hail events is scant for the State of Vermont

Severity of hail is measured on the TORRO Scale, ranging from “HO-Hard Hail,” with the maximum size of hailstone about the size of a pea, to “H10-Super Hailstorm,” with the maximum size of the hailstone about the size of melon. However, size may not always be a reliable indicator of severity for agricultural growers, since small hailstones – especially when driven by strong winds – can easily strip crop heads and destroy young plants. A single hail event can wipe out an entire season’s crops. Six respondents to the Danville Hazard Mitigation Survey cited adverse impacts to hail, and at least one local grower could specifically attest to crop losses. USDA data show occasional payouts from crop insurance due to hail damage, but this data is at the county level, and not all local growers carry crop insurance.

This section of the Plan satisfies the requirements of 44 CFR §201.6(c)(2)(i) and 44 CFR §201.6(c)(2)(ii): Hazard Identification and Risk Assessment for Hail

Due to the unpredictability of hailstorms, there is little in the way of hail mitigation in Vermont. Structural mitigation efforts such as hail nets are not cost-effective for small growers. Most efforts related to hail are in the response and recovery sectors. In addition to crop insurance, USDA’s Farm Service Agency may on occasion provide emergency loans to growers in the event of a disaster declaration. The Vermont Farm Fund, administered by the Center for an Agricultural Economy in Hardwick, also provides emergency loans to agricultural producers.

85% of survey respondents reported being at least “moderately concerned” to potential economic damage during natural hazard events, including business interruption, crop damage, and equipment damage. 12% were “very concerned”.

Table 2C.11.1. Hail Hazard Summary Table

Location	Vulnerability	Extent	Observed Impact	Probability
Town-wide	Local growers	Fruit-bearing trees damaged for season	Negligible	Highly Likely: > 75% in any given year

3. MITIGATION STRATEGIES

A. Mitigation Goals

The mission for this plan is to create a disaster-resilient Danville. With focused attention towards preparedness, response, and recovery. Through increased public awareness and community engagement, coordination with resource restoration management groups, and identifying actions to build a safer, more resilient community, the following goals can be achieved:

This section of the plan satisfies 44 CFR §201.6(c)(3)(i-iv) Does the plan document each participant’s existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs?

- Prevent/reduce the loss of life and injury resulting from all-hazard events.
- Prevent/reduce the financial losses and infrastructure damage incurred by municipal/residential, agricultural, and commercial establishments due to disasters.
- Include hazard mitigation planning in the municipal planning process, including the Town Plan, municipal budget, and Local Emergency Management Plan.
- Ensure the general public is part of the hazard mitigation planning process.
- Protect natural and cultural resources.
- Increase cooperation and coordination among private entities and local, state, and federal agencies.
- Increase awareness, engagement, and education within Danville and surrounding communities.

The process of assessing mitigation strategies for Danville involved in-depth interviews with multiple frontline community representatives, including the fire warden, the road foreman, and the owner of the non-profit thrift store and food bank The Open Door. These conversations gained first-hand knowledge from people that have worked with individuals within the community during times of need and are best positioned to communicate actions, needs, and challenges to the community. The Health Officer was reached out to but they did not make themselves available for comment.

Danville's LHMP Committee also possessed an abundance of in-depth knowledge of the community through their roles and careers, including the town's Emergency Management Coordinator, a member of the selectboard, and senior regional planner, and an environmental scientist with the state. The range of expertise both local and regional provided rich insight into specific hazards that most villages of this scale might not have.

For the purpose of this plan, it was deemed that correspondence with the Danville Health Center was not needed at this time. Though integral to local stability, day-to-day health services, and greater connectivity, beyond a situation similar to the COVID-19 pandemic their role with other hazards were determined to not be necessary in the planning process.

B. Evaluation of Mitigation Strategies

In support of these goals, the Danville Hazard Mitigation Planning Team presented a set of proposed mitigation actions for consideration in a widely publicized public meeting on May 24, 2022. To obtain FEMA approval for this proposed hazard mitigation plan, the team was required to identify and analyze a comprehensive range of specific mitigation actions. To make this analysis objective, the team used a ranking process for each proposed mitigation action, assigning a score of 1 (poor) to 5 (excellent) for each of the following criteria:

- **Social:** The proposed mitigation action doesn't hurt anyone, and it's compatible with social and cultural views.
- **Technical:** The proposed mitigation action reduces losses in the long-term with minimal secondary adverse impacts.
- **Administrative:** We have capacity (paid or volunteer staffing and funding to carry out the proposed mitigation action.
- **Political:** Everyone is behind the proposed mitigation action. There is broad public consensus.
- **Legal:** Whoever is carrying out the proposed mitigation action has the authority to do it.
- **Economic:** The proposal mitigation action is cost-effective.
- **Environmental:** The proposed mitigation action is environmentally sound.

Based on overall scoring, the Danville Hazard Mitigation Planning Team grouped proposed mitigation actions into three categories for implementation:

- **Near-term:** Mitigation strategies that can be readily implemented within the next 24 months because the capacity and funding are already in place, and there is widespread support. This also includes strategies that are ongoing efforts.
- **Mid-term:** Mitigation strategies that could be implemented within the next 24 months, but will require research, technical support, funding, public buy-in, or all of the above.
- **Long-term:** Mitigation strategies that could be implemented within the next 24-60 months, and may take longer due to their complexity or the need for research, technical funding, or public buy-in.

A mid- or long-term prioritization does not mean that the mitigation action has less value to the community. Proposed actions with questionable value or too many obstacles for implementation were ultimately not included in this plan. This ranking ultimately balances a consideration of readiness with potential benefit to the community. More information on the ranking process is available in Appendix A.

The primary party of implementation of each action will be highlighted in bold.

Table 3B.1 Mitigation Actions

All Hazards					
Proposed Action	Local Leadership	Timeframe	Cost (\$-\$\$\$)	Potential Funding Sources	Resources/Notes
Create a Community Risk Map	Selectboard, Road Foreman, Emergency Management Coordinator , Fire District, and Planning Commission	Mid-term	\$	Hazard Mitigation Grant Program (HMGP) Building Resilient Infrastructure and Committees (BRIC) Pre-Disaster Mitigation Grant (PDM)	<i>During a committee meeting, this idea was thought as a viable solution to connect issues and resources available. Visualizations and distribution of such a map can aide future officials and the community.</i>
Maintain an emergency response volunteer program that addresses critical facilities and responsibilities. Solicit people in staffing as a method of unity.	Town Clerk Conservation Commission Fire District	Near-Term	\$	Town Budget	<i>This was voiced as an area of interest, however concern was brought up about getting people on board and available while not over-stressing members who already fill a lot of roles for the town.</i>
Pamphlet and distribute the LEMP on a residential scale. Send to listers and real estate agencies to send to new residents that includes information on lifestyle and social infrastructure.	Selectboard, Emergency Management Coordinator Town Clerk	Near-term (within 24 months)	\$	Town Clerk/Budget	<i>The LEMP is already an excellent, detailed asset for the community, and could be distributed for greater awareness</i>
Flooding and Fluvial Erosion					
Proposed Action	Local Leadership	Timeframe	Cost (\$-\$\$\$)	Potential Funding Sources	Resources/Notes
Ensure continued compliance in joining the National Flood Insurance Program and include ANR flood regulations. Ascend out of the emergency phase by	Planning Commission, Selectboard	Near-Term (6-12 months)	\$	Community Recovery and Revitalization Program Flood Mitigation Assistance (FMA)	Agency of Natural Resources, NVDA – Both will provide technical assistance

having a FHBM and FIRM.				Flood Resilient Communities Fund (FRCF)	
Reinforce frequent washout areas, including correcting the stormwater drainage on Hill St. in the village center. Assess other areas for appropriate stormwater drainage.	Planning Commission, Road Foreman	Continual	\$\$	Flood Resilient Communities Fund (FRCF) Flood Mitigation Assistance (FMA) Hazard Mitigation Grant Program (HMGP) Building Resilient Infrastructure and Committees (BRIC) Better Roads Grant Program	Agency of Natural Resources; floodready.vermont.gov; <i>Some washout areas have already been mapped, and in conjunction with this plan, funding for specific projects would be very achievable for the town.</i>
Stay out of the floodplain by implementing River Corridor protection within the town plan to qualify for ERAF.	Planning Commission	Mid-Term	\$\$	Flood Resilient Communities Fund (FRCF) Flood Mitigation Assistance (FMA) Hazard Mitigation Grant Program (HMGP)	<i>The Committee is interested in receiving more information to learn about the ERAF benefit and is generally committed to helping their neighbors and community in receiving the most disaster relief possible. NVDA will generate information to help the Committee and Town make the best decision for them.</i>

Review floodplain maps and revise regulations based off the upcoming release of new FEMA maps.	Planning Commission	Long-term (36-60 months)	\$\$	Flood Resilient Communities Fund (FRCF) Flood Mitigation Assistance (FMA) Better Roads Grant Program Hazard Mitigation Grant Program (HMGP)	<p>Agency of Natural Resources, NVDA, basin planners; grants include Municipal Planning Grants, and 604(B) water quality programming</p> <p><i>The Committee is interested in pursuing information for national flood insurance once FEMA maps are released to better understand special hazard flood areas (SHFA) and the buildings in this area. The committee would like to prepare themselves for the eventual release of the new flood maps to make the best decision for the town with the right information. Capacity, information availability, and enforcement are issues preventing this.</i></p>
Create a natural river abatement program utilizing strategies in the TBP and Tributaries plan, and prioritizing floodplain restoration projects to improve Water Andric and other local subwatersheds	Conservation Commission Planning Commission	Long-term	\$\$\$	Flood Resilient Communities Fund (FRCF) Flood Mitigation Assistance (FMA) Hazard Mitigation Grant Program (HMGP) Building Resilient Infrastructure and Committees (BRIC)	<p><i>The Conservation Commission proposed this and could spearhead initiatives to improve water retention in local floodplains.</i></p>
Ice					

Proposed Action	Local Leadership	Timeframe	Cost (\$-\$\$\$)	Potential Funding Sources	Resources/Notes
Continue to train staff on road maintenance, accounting for differences between the town's paved and unpaved roads. Support road foreman as needed	Selectboard, Road Foreman	Continual (ongoing)	\$	Hazard Mitigation Grant Program (HMGP) Building Resilient Infrastructure and Communities (BRIC)	NVDA Road Foreman trainings <i>This is already achieved and is within the town's capacity. The road foreman could use technical/administrative support from adjoining town departments.</i>
Establish an emergency agreement to ensure residents with private wells have access to town water during heavy ice episodes or prolonged power outages	Selectboard/ Road Foreman, Fire/water district	Near-term (0-24 months)	\$	Town Clerk	<i>The Town should establish a level of feasibility in helping residents access water in times of need.</i>
Increase stormwater retention for periods of quick thawing or melting	Road Foreman, Emergency Management Coordinator, Conservation Commission	Near-term (ongoing)	\$\$	Pre-Disaster Mitigation Grant (PDM) Hazard Mitigation Grant Program (HMGP) Flood Resilient Communities Fund (FRCF)	<i>The LHMP had thought of this, and the Conservation Commission was in full support. TBP could be integrated with this strategy for heavy summer floods.</i>
Wind					
Establish an emergency agreement to ensure residents with private wells have access to town water during high wind episodes that	Selectboard	Near-term (0-12 months)	\$	Town Budget	<i>The Town should establish a level of feasibility in helping residents access water in times of need.</i>

create prolonged power outages					
Upgrade lines and poles to improve wind loading and underground critical power lines. Consider other strategies that focus on improving resistance and resilience	Energy Committee, Selectboard, Road Foreman	Mid-term	\$\$\$	Building Resilient Infrastructure and Committees (BRIC) Pre-Disaster Mitigation Grant (PDM) Hazard Mitigation Grant Program (HMGP)	<i>Though ambitious and costly, this strategy will bring both Green Mountain Power and Washington Electric into the fold of reinforcing their utility network. Doing so would add resilience from other hazards.</i>
Work with Green Mountain Power and Washington Electric to identify common areas of power outages during extreme wind events and develop a database to track community vulnerability to severe wind	Energy Committee , Selectboard, Emergency Management Coordinator	Near-term/Ongoing (0-24 months)	\$\$	Building Resilient Infrastructure and Committees (BRIC) Town Budget Pre-Disaster Mitigation Grant (PDM)	<i>This was identified as a viable strategy yet would have to be fleshed out to become realistic, effective, and efficient. The Community Risk Map could inform this strategy and be informed by this strategy, deepening resilience.</i>
Snow					
Educate the public on keeping heating exhaust vents clear in the case of extreme snowfall.	Planning Commission , Selectboard, Emergency Management Coordinator	Near-term (0-24 months)	\$	Building Resilient Infrastructure and Committees (BRIC) Pre-Disaster Mitigation Grant (PDM) Town Budget	Front Porch Forum, town website <i>This was identified as a viable strategy yet would have to be fleshed out to become realistic, effective, and efficient.</i>
Establish a policy to dig out Town Hall in accordance with proposed emergency response volunteer program	Planning Commission , Selectboard	Near-term	\$	Building Resilient Infrastructure and Committees (BRIC) Pre-Disaster Mitigation Grant (PDM)	Front Porch Forum, town website <i>This also was identified as a possible strategy yet would have to be developed</i>

				Town Budget	<i>as to be localized for assistance and not stretch volunteer capacity unnecessarily thin.</i>
Explore appropriate uses of snow fences or “living snow fences” (e.g., rows of trees or other vegetation) to limit blowing and drifting of snow over critical roadway segments.	Conservation Commission, Planning Commission, Road Foreman	Long-term	\$	Building Resilient Infrastructure and Committees (BRIC) Pre-Disaster Mitigation Grant (PDM) Town Budget	<i>Living snow fences is one of FEMA’s suggested mitigation actions, and the committee thought that the use of this along Route 2 and other arterial roads could have a positive effect.</i>
Drought					
Proposed Action	Local Leadership	Timeframe	Cost (\$-\$\$\$)	Potential Funding Sources	Resources/Notes
Establish an emergency policy with the fire district to make water supply available for towns and/or farms in cases of extreme drought or water shortage. Utilize old reservoir for agriculture support purposes (Level 1) and distribute municipal supply to well residences (Level 2)	Planning Commission, Selectboard, Fire District	Near-term (ongoing)	\$	Town Budget Vermont Drought Resources Pre-Disaster Mitigation Grant (PDM)	<i>The committee proposed the idea of preparing residents for possible future drought conditions in relation to the region’s dependence on surface and spring water. Some farmers already do this on a neighbor-level, and the Town could support and expand this resilient effort.</i>
Explore and generate committee to develop Groundwater Mapping project to better inform the residents who use well or spring water supplies about the quality and condition of the water sources based off of well-	Selectboard, Planning Commission, Conservation Commission, Joe’s Pond Association	Mid-term (next 24 months)	\$	Town Budget Vermont Drought Resources	<i>The committee proposed this strategy to get an understanding of spring water users, conditions, and shortages.</i>

water driller logs on the ANR Atlas					
Cold					
Proposed Action	Local Leadership	Timeframe	Cost (\$-\$\$\$)	Potential Funding Sources	Resources/Notes
Make information available about low- and no-cost weatherization programs such as HEAT Squad and Northeast Employment Training Organization (NETO).	Emergency Management Coordinator, Selectboard, Town Clerk	Near-term (ongoing)	\$	Vermont Clean Energy Development Fund	HEAT Squad, Northeast Employment Training Organization, Heat Saver Loans, Efficiency Vermont, USDA Direct and Guaranteed Loan programs.
Work with Energy Committee to implement enhanced energy plan	Selectboard, Planning Commission, Energy Committee	Long-term)	\$\$\$	Building Resilient Infrastructure and Committees (BRIC)	Energy Committee, Vermont Energy Dashboard <i>The Energy Committee has already established the enhanced energy plan, and the Town should do everything in its power</i>
Invasives					
Proposed Action	Local Leadership	Timeframe	Cost (\$-\$\$\$)	Potential Funding Sources	Resources/Notes
Conduct outreach to adjacent conservation groups to coordinate regional education and outreach for private residents' information	Conservation Commission/ Road Foreman, Joe's Pond Association	Long-term (24-60 months)	\$\$	Town Budget Pre-Disaster Mitigation Grant (PDM)	<i>In a meeting with the Conservation Commission, this was brought up as an idea to acknowledge that invasives don't recognize town boundaries, and that resilience and awareness could be increased by this action.</i>
Enlist VT Invasives to conduct lakeshore and road crew training and education	Lake associations/ Conservation Commission	Mid-term	\$\$	Town Budget Aquatic Invasive Species Program	<i>Most of the lake community identifies with the need to keep the lake clean and well-managed, and the committee expressed interest in</i>

					<i>developing this as a way to develop clear messages and enhance regional awareness.</i>
Establish education and best practices for seasonal mowing for both road crew members and residences to reduce the spread of invasives along roadways and management areas	NCS and NRCD, Conservation Commission	Continual	\$	Town Budget	<i>This is already met and delivered by Northwoods Stewardship Center. More attention will be given to highlighting current efforts by NSC and Essex NRCD.</i>
Heat					
Proposed Action	Local Leadership	Timeframe	Cost (\$-\$\$\$)	Potential Funding Sources	Resources/Notes
Work with visiting service providers and volunteers to increase awareness of heat illness. The Vermont Department of Health has outreach and training materials to spot the symptoms of heat illness and administer first aid.	Planning Commission	Mid-term (next 24 months)	\$	Pre-Disaster Mitigation Grant (PDM) Town Budget	The Dept. of Health has grants, outreach materials, and a media toolkit. NVDA has a climate health planner.
Retrofit Emergency Operations Center (EOC) and cooling centers with air conditioning	Selectboard, Planning Commission, Emergency Management Coordinator	Mid-term (next 24 months)	\$\$	Town Budget Building Resilient Infrastructure and Committees (BRIC) Vermont Clean Energy Development Fund	The Dept. of Health, NVDA climate health planner, NEK Council on Aging <i>The extensive work of the LEMP for the town is a huge asset, and while heating/cooling centers and protocols have been identified, ensuring that they can house people comfortably in time of need is necessary.</i>
Landslide					

Proposed Action	Local Leadership	Timeframe	Cost (\$-\$\$\$)	Potential Funding Sources	Resources/Notes
Manage development in identified recurring landslide areas	Selectboard, Zoning Administrator	Near-term (ongoing)	\$	Building Resilient Infrastructure and Committees (BRIC) Town Budget Pre-Disaster Mitigation Grant (PDM)	<i>The town could use gis mapping and river corridor planning documents of the area to identify and limit further erosion along the Sleepers River and Water Andric.</i>
Prevent impact to waterways and arterial roadways through netting and removal of existing structures	Road Foreman, Highway Department, Planning Commission, Selectboard	Long-term (0-48 months)	\$\$\$	Building Resilient Infrastructure and Committees (BRIC) Town Budget Pre-Disaster Mitigation Grant (PDM)	<i>Using GIS mapping, the town could identify vulnerable built environment elements and target areas for prevention to reduce the risk of an increased hazard</i>
Wildfire					
Proposed Action	Local Leadership	Timeframe	Cost (\$-\$\$\$)	Potential Funding Sources	Resources/Notes
Increase transparency of burn permit and report log of burns between fire warden and fire department .	Fire Warden, Fire District, Selectboard	Near-term (ongoing)	\$	Fire Safe 802 Program Town Budget	<i>Numerous non-permitted burns happen throughout Vermont, and more accountability upon the Town should be made to ensure its population is safe from unregulated and uneducated burns.</i>
Post information about fire danger levels and the need for burn permits. · Display fire weather forecast on town website https://www.weather.gov/btv/firewx	Selectboard/ Town Web Site Content Manager	Near-term (0-12 months)	\$	Town Budget	Campaigns can be seasonal and/or deployed around drought. Front Porch Forum and other social media can be useful.

					<p><i>The Committee is interested in posting fire level danger signs on the appropriate community boards, roads, and websites, and some of that information is already available.</i></p> <p><i>Broadcasting high danger episodes in late summer and early fall can be implemented.</i></p>
Earthquake					
Proposed Action	Local Leadership	Timeframe	Cost (\$-\$\$\$)	Potential Funding Sources	Resources/Notes
Create and ensure awareness of earthquake risk	Planning Commission. Emergency Management Coordinator	Mid-term (next 24 months)	\$	Town Budget Building Resilient Infrastructure and Committees (BRIC)	www.fema.gov/sites/default/files/2020-07/fema_earthquake_earthquake-safety-checklist_110217.pdf
Provide information on critical facility structural retrofiting	Planning Commission. Emergency Management Coordinator	Mid-term (next 24 months)	\$	Town Budget Building Resilient Infrastructure and Committees (BRIC)	www.fema.gov/sites/default/files/2020-07/fema_earthquake_earthquake-safety-checklist_110217.pdf
Infectious Disease Outbreak					
Proposed Action	Local Leadership	Timeframe	Cost (\$-\$\$\$)	Potential Funding Sources	Resources/Notes
Maintain reliable internet connectivity as a priority. Have communication outreach prepared for any new event	Selectboard, NEK Broadband	Near-Term (0-24 months)	\$\$	Community Recovery and Revitalization Program	https://nekbroadband.org/
Work with Open Door to expand their services in times of need, including	Selectboard, Planning Commission, Open Door	Long-term (0-48 months)	\$\$	Vermont Community Foundation Grants	

reporting, volunteer work, distribution of goods. Integrate them into emergency food and water plans					
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Hail					
Proposed Action	Local Leadership	Timeframe	Cost (\$-\$\$\$)	Potential Funding Sources	Resources/Notes
Explore options for accessible crop insurance for small growers.	Selectboard Planning Commission	Near-Term (0-24 months)	\$	Pre-Disaster Mitigation Grant (PDM) USDA Claim Process	N/A
Increase awareness on farm funding and insurance	Selectboard, Planning Commission	Long-term (0-48 months)	\$\$	Town Budget Pre-Disaster Mitigation Grant (PDM)	N/A

Table 3B.2: Update on Mitigation Actions from 2005 Danville All-Hazards Plan

When determining the proposed mitigation actions for the 2022 plan, the Hazard Mitigation Team also evaluated the prioritized mitigation actions from the original plan.

This section of the Plan satisfies the requirements of 44 CFR 201.6(d)(3).

Table 3-B.2 Mitigation Projects by Priority

Project/Priority	Mitigation Action	Who is Responsible	Time Frame and Potential Funding	Initial Implementation Steps
Need a new fire truck	To be able to adequately respond to fires.	The Selectboard and Fire Chief	2005/6 HMGP, EMPG, Homeland Security, Fire Grants	Seek appropriate grant source, obtain cost estimate and apply for funding.
Need one large and 3 small generators	One for school/shelter, one for H2O pumping station, one for fire station and one for town hall.	The Selectboard and Fire Chief	2005/6 HMGP, EMPG	Seek appropriate grant source, obtain cost estimate and apply for funding.

Evaluate water distribution system. Need an engineering study evaluation.	May not be adequate for fire protection	The Selectboard and Fire Chief	2005/6 HMGP, EMPG, Homeland Security, Fire Grants	Seek appropriate grant source, obtain cost estimate and apply for funding.
Need adequate coverage for daytime calls on fire and rescue squads	Actively seek and train volunteers that work in the community.	Fire Chief	2005/6	Begin a public safety need campaign, prepare flyers, put up posters, word of mouth.
GIS mapping of NFIP areas	Identify flood areas with vulnerable structures consistent with Vermont GIS mapping effort.	Northeastern Vermont Development Association	2006/7 – FEMA FMA funds, HMGP or EMPG funds	Coordinated statewide NFIP mapping effort for all towns.

Table 3B.3: Status of Community Resources and Capabilities

Danville does possess a robust set of zoning bylaws for the scale of its town, which can be [here](#). Development is generally allowed only along shorelines, roadways, and within the village center. The town does employ a zoning administrator along with a development review board to ensure compliance and adherence to their bylaws.

This section of the Plan satisfies the requirements of 44 CFR 201.6(c)(3) and 44 CFR 201.6(c)(3)(ii).

The Town does restrict building permits within the Special Flood Hazard Area (SFHA), in accordance with the NFIP, requiring a variance if a community member wishes to seek non-agricultural alterations within the identified floodplain. However, specific building code and compliance could not be located.

Resource	Description	How it can help implement Hazard Mitigation Goals	Status
Danville Town Plan	Plans for coordinated town-wide planning for land use, municipal facilities. It also establishes the legal	Addresses flood resilience, which became a statutory requirement in 2014.	The Town Plan is current but is set to expire in 2025. Amendments to the plan should incorporate relevant findings from this plan.

	basis for flood hazard regulations.		
Danville Planning Commission	Drafts amendments to the town plan and flood hazard regulations.	Helps to keep flood risks at the forefront with the general public and ensures ongoing participation in the National Flood Insurance Program.	Outreach to public to create awareness of regulations and their role in hazard mitigation may improve effectiveness of the regulations. Trainings and outreach from the Agency of Natural Resources and the regional planning commission would be helpful.
National Flood Insurance Program (NFIP)	The Federal Emergency Management Agency (FEMA) produced a Flood Hazard Boundary Map (FHBM) for Danville 1975 which identifies an area adjacent to Whiteman and Roy Brooks in the northeastern part of Town as a “special flood hazard area.”	Covers damage caused by flooding and informs residents of flood risk. Effective in ensuring that future development is safe from flooding.	Danville is in the "Emergency Phase" of the National Flood Insurance Program, because FEMA never issued a Flood Insurance Rate Map (FIRM), and includes flood hazard area requirements in Section 313 of its Zoning Ordinance. In the Emergency Phase, flood insurance coverage limits are much lower.
Zoning Administrator and Development Review Board	Issues permits by ensuring compliance with zoning bylaws and flood hazard regulations.	Implements the local flood regulations to minimize flood hazard risk.	Not known. The capacity to improve or expand is not known.

Open Door	A local thrift shop and food pantry that has helped hundreds of community members in the area on a “no questions asked” basis.	Open Door and its volunteers can be a strong source of community vitality, support, and mobilization. They can help broadcast information and events, and can be a leading entity in distribution of essential services.	VEM updated the LEMP process in 2019 to allow more flexibility and incorporate more planning resources. The role of Open Door in responding to the social welfare issues created by disasters (particularly COVID), is documented in the plan. The non-profit’s capacity to expand or improve is limited, yet with support from the town it could be expanded.
Local Emergency Management Plan (LEMP)	Basic municipal procedures for emergency response. This gets updated annually.	The LEMP outlines procedures for call-outs, evacuations, etc.	VEM updated the LEMP process in 2019 to allow more flexibility and incorporate more planning resources. The local emergency management coordinator has filled out the long-form version for the town, which is much more useful. The Local Emergency Management Coordinator fills many roles for the town, and their ability to improve or expand their capacity would not be feasible.
Energy Committee	The Town Energy Committee’s mission is to help guide the town and its citizens into a more sustainable energy future.	Members can assist with outreach regarding effective weatherization opportunities, as well ways to improve cooling and ventilation in the home.	Regional organizations like HEAT Squad and Northeast Employment Training Organization can help with outreach. Capacity to expand or improve their efforts is unknown.

Conservation Commission	The major goal of the Conservation Commission is to encourage responsible stewardship of Danville's natural and cultural resources.	The commission has held workshops on identification as well as removal techniques for various species. The commission has also provided a 'field guide to invasive plants' for the Danville Road Crew.	Representation on the local hazard mitigation team will assist with coordination of hazard mitigation actions. They have the capacity and spirit to offer more town and regional coordination concerning the town's natural resources.
Joe's Pond Association	Volunteer organization involved in hazard mitigation efforts.	Joe's Pond Association can help in assisting with VT Invasives, other lake associations, and conservation commissions. They are a very proactive group, and with support of the Town could initiate specific actions.	Capacity is volunteered-based. The Association has been very proactive to date, however the ability to improve or expand is unknown.
Municipal Roads General Permit (MRGP)	State standards have been updated to include the MRGP to control runoff and drainage on hydrologically connected road segments. Compliance is being phased in over time.	Effective in controlling road erosion and stormwater runoff. Provides funding sources for compliance.	Work with regional planning commission to pursue grant opportunities to implement recommended improvements.
Fire District	Volunteer-based fire department that also manages the municipal water.	Detailed knowledge of events, tools, and resources. The district should be seen as a primary leader in mitigation actions by the Town.	The fire district and department manages a lot for the town. Their ability to expand or improve their capacity is limited, but with greater cohesion and support from the town they could meet more needs.
Road Foreman	Ensures grading of roads, manages Better Back Roads, Municipal	Can play (and already does) a vital role in road safety, invasive	While they have recently expanded their workforce, better town cohesion, training, and

	Roads General Permit, and more	management, and ROW management.	administrative support is necessary in order to improve or expand their capacity.
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4. KEEPING THE PLAN RELEVANT

A. Integration with Future Planning Endeavors and Local Decisions

The existing Danville Town Plan, Annual Town Reports, Local Emergency Management Plan, and other pertinent documents informed the development of this Local Hazard Mitigation Plan. Once adopted, there are significant opportunities to make this document a relevant and dynamic force in local decision making. State statute, for example, requires town plans to contain a flood resilience element. This element can and should incorporate a locally adopted and FEMA-approved hazard mitigation plan.

Subsequent updates to Danville's Town Plan, which expires in 2023, will incorporate recommendations from this updated plan.

This section of the plan satisfies 44 CFR 201.6(c)(4)(i-ii))

Danville had an All-Hazards Mitigation Plan completed in 2005. A review and update of the regulations will occur when new FEMA mapping data is available. Updates will, at a minimum, assure ongoing compliance with 44 CFR, the federal code of regulations that governs participation in the National Flood Insurance Program. Additional flood risks, such as fluvial erosion and river corridor protection, will be considered; however, this plan cannot guarantee adoption.

Danville's Local Emergency Management Plan, a guidebook to be used in the early stages of disaster response, must be updated every year in the period between Town Meeting Day and May 1. The LEMP must follow the format of State-provided templates. The LEMP can and should be updated to delineate local response strategies to the natural hazards outlined in this Hazard Mitigation Plan. The regional planning commission has staff that can assist.

B. Implementation and Monitoring of Mitigation Strategies

After adoption of this Hazard Mitigation Plan, the Town of Danville will make the plan available to the general public from its website (<https://www.Danville-vt.org/>). The plan will also be available from the regional planning commission's website (nvda.net).

Once approved by FEMA and adopted by the Town, Danville's Local Hazard Mitigation Plan (LHMP) will be valid for five years. In the interim, the plan can be amended if desired to include updates on mitigation progress and new mitigation action strategies. Interim amendments do not require a formal re-adoption of the plan. Danville plans an annual interim review of its LHMP in tandem with the annual review of the Local Emergency Management Plan (LEMP).

Plan for Interim Review

Moving forward Danville will conduct its annual interim review of LHMP progress and action items utilizing the same or similar group and in tandem with the LEMP, thereby optimizing collaboration and knowledge among town subject matter experts and minimizing duplication of effort. The annual review is not intended to be burdensome or exhaustive, but rather an interim check on the implementation and progress of outlined hazard mitigation strategies, noting those that have been completed and identifying barriers to or next steps for implementing remaining strategies.

Danville's selectboard chair is responsible for initiating this annual review process and will take primary responsibility for ensuring the process occurs. No less than two months prior to the annual LEMP due date the Chair will call together the LHMP review group and charge them with 1) contacting individuals and entities tasked with carrying out mitigation actions to review progress and needs, 2) meeting with the LEMP review team to review discoveries, consider adjustments to strategies, and 3) setting a date to discuss results with the Selectboard at a warned meeting prior to LEMP due dates. This Selectboard meeting will provide opportunity for citizens and town officials to consider the town's progress in implementing mitigation strategies and to give input on future activities and possible plan revisions.

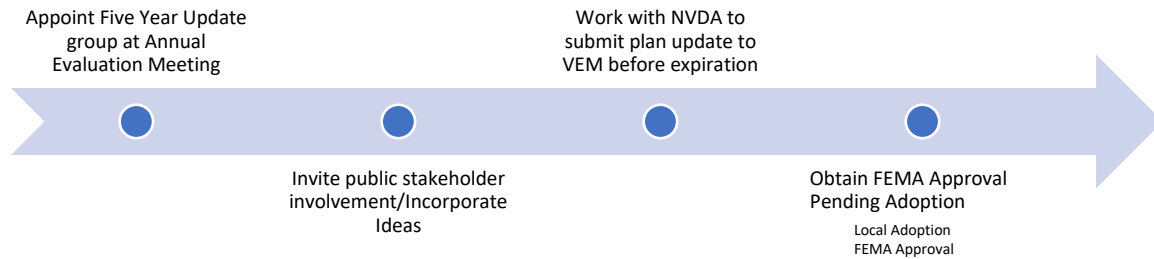
As part of the annual interim review, reviewers will note any significant losses that occurred over the previous year (regardless of whether the loss was associated with a federal disaster declaration) and include such information for the Selectboard. Significant losses may include, but are certainly not limited to, damage to buildings, widespread power outages, fires, loss of water supplies, damage to roads and public infrastructure, business interruptions, and crop losses. This information will be helpful for subsequent updates to the Hazard Mitigation Plan, since published datasets rarely capture a thorough and nuanced depiction of local hazards and vulnerabilities.

Entities tasked with mitigation actions will be encouraged to participate at the Selectboard meeting. Additional stakeholders may also be invited, including local businesses and nonprofits, VTrans, the Vermont Agency of Natural Resources (VT ANR), and Northeastern Vermont Development Association (NVDA).

Five Year Update

Before the LHMP expires, the Town must prepare a plan update and submit it to Vermont Emergency Management for formal review before readoption. The ongoing evaluation process should keep this in mind to ensure annual reviews both inform and lessen the burden of the five-year update and readoption process, which must be officially completed before the plan's expiration date. At the four-year joint interim annual review described above, the review team will advise the Selectboard chair of the anticipated length of time needed to perform the five-year update, and the Selectboard will charge the same or similar group with the timely undertaking of the five-year plan update. NVDA will help with the plan update if requested by the Selectboard and if funding is available. Ultimately, it is the Town's responsibility to update the Local Hazard Mitigation Plan.

Year Four of Plan



Public Involvement Following Plan Approval

After adoption, the Town of Danville will make its Local Hazard Mitigation Plan available to the general public, providing the community an opportunity to provide ongoing input. (The Danville Local Hazard Mitigation will also be available from the regional planning commission's web site, www.nvda.net. 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 LEPC will also host an annual mitigation plan presentation where response/state agencies, neighboring communities and other stakeholders can provide input. 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.

Project Lead and Monitoring Process

The town's Selectboard chair is the project lead and will work in conjunction with the Selectboard, town clerk and NVDA to complete the yearly progress report included in the plan. 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 implementation matrix (identified below) 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.

Plan Evaluation and Update Process

The town's 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 of, 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; and
- 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 Road Foreman but also the community at large, including the organizations and entities represented by the current planning team. 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 consistency required to enhance resilience through planning, assessment and actions devoted to mitigation.

The Plan update will be led by the Selectboard Chair and Town Clerk. 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 six 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, LEOP updates, Fire Safety Awareness, meetings, etc.), will provide the town the bulk of information required in the update process.

Implementation Matrix for Annual Review of Progress

The following table is intended to aid municipal officials in implementing the mitigation actions for The Town of Danville 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 means to establishing an accurate evaluation of the plan’s efficacy and the information required for the succeeding update to the plan. Ultimately, it is the responsibility of the LHMP Committee members, the Planning Commission, and the Selectboard for monitoring, evaluating, and updating the plan.

Process Illustration: After Plan Adoption – and every year



APPENDIX A: EVALUATION OF PROPOSED MITIGATION ACTIONS

When evaluating proposed hazard mitigation actions, the Danville Hazard Mitigation Team used a version of the STAPLE+E which assigns a score of 1 to 5 on seven factors:

Social: It doesn't hurt anyone, and it's compatible with social and cultural views

- Technical: It reduces losses long-term with minimal secondary adverse impacts
- Administrative: The staffing and funding to do it is there
- Political: Everyone's behind it
- Legal: Whoever is doing it has the authority to do it
- Economic: It's cost effective
- Environmental: It's environmentally sound

Poor

1. Below average/Unknown
2. Average
3. Above Average
4. Excellent

All Hazards								
Mitigation action	Social	Technical	Admin	Political	Legal	Economic	Environmental	Total
Create a Community Risk Map	5.00	3.67	2.67	4.33	4.67	4.00	4.33	4.10
Maintain emergency response volunteer program that addresses critical facilities and responsibilities. Solicit people in staffing as a method of unity.	5.00	4.00	2.67	4.33	4.33	4.67	3.67	4.10
Pamphlet and distribute the LEMP on a residential scale. Send to listers and real estate agencies to send to new residents that includes information on lifestyle and social infrastructure.	5.00	4.00	3.00	5.00	5.00	3.00	3.33	4.05
Institute Town Administrator position to help coordinate respective departments, increase communication, reporting, grant research, and address public relations on a door-to-door level	4.00	3.67	2.00	2.67	4.33	3.67	3.67	3.43

Flooding and Fluvial Erosion								
Mitigation action	Social	Technical	Admin	Political	Legal	Economic	Environmental	Total
Ensure continued compliance in joining the National Flood Insurance Program and include ANR flood regulations. Ascend out of the emergency phase by having a FHBM and FIRM	4.67	4.33	3.67	4.33	4.67	4.67	4.33	4.38
Review floodplain maps and revise regulations based off the upcoming release of new FEMA maps.	4.67	4.00	3.00	4.33	3.67	4.00	4.00	3.95

Stay out of the floodplain by implementing River Corridor protection within the town plan to qualify for ERAF.	4.00	4.33	3.00	3.33	4.67	4.67	5.00	4.14
Reinforce frequent washout areas, including correcting the stormwater drainage on Hill St. in the village center. Assess other areas for appropriate stormwater drainage.	5.00	4.33	2.67	5.00	5.00	4.00	4.33	4.33
Create a natural river abatement program utilizing strategies in the TBP and Tributaries plan, and prioritizing floodplain restoration projects to improve Water Andric and other local subwatersheds	4.00	4.33	2.00	3.67	3.67	3.67	5.00	3.76

Ice								
Mitigation action	Social	Technical	Admin	Political	Legal	Economic	Environmental	Total
Ice								
Continue to train staff on road maintenance, accounting for differences between the town's paved and unpaved roads. Support road foreman as needed	5.00	5.00	3.67	5.00	5.00	4.00	4.33	4.57
Establish an emergency agreement to ensure residents with private wells have access to town water during heavy ice episodes or prolonged power outages	4.67	4.00	4.33	3.00	3.67	3.67	3.67	3.86
Increase stormwater retention for periods of quick thawing or melting	4.00	4.00	2.00	4.00	4.00	3.33	3.67	3.57

Wind								
Mitigation action	Social	Technical	Admin	Political	Legal	Economic	Environmental	Total
Establish an emergency agreement to ensure residents with private wells have access to town water during high wind episodes that create prolonged power outages	4.00	4.00	3.00	4.33	4.33	3.67	4.33	3.95
Upgrade lines and poles to improve wind loading and underground critical power lines. Consider other strategies that focus on improving resistance and resilience	5.00	4.67	2.00	4.00	3.67	3.33	3.67	3.76
Work with Green Mountain Power and Washington Electric to identify common areas of power outages during extreme wind events and develop a database to track community vulnerability to severe wind	4.67	3.00	2.00	4.67	3.33	3.00	3.67	3.48
Snow								
Mitigation action	Social	Technical	Admin	Political	Legal	Economic	Environmental	Total
Educate the public on keeping heating exhaust vents clear in the case of extreme snowfall.	5.00	5.00	2.33	5.00	4.67	3.33	3.67	4.14
Establish a policy to dig out Town Hall in accordance with proposed emergency response volunteer program	5.00	3.67	2.00	3.67	3.67	4.33	3.67	3.71
Explore appropriate uses of snow fences or “living snow fences” (e.g., rows of trees or other vegetation) to limit blowing and drifting of snow over critical roadway segments.	3.67	3.67	2.67	3.33	4.00	3.67	3.00	3.43

Drought								
Mitigation action	Social	Technical	Admin	Political	Legal	Economic	Environmental	Total
Explore and generate committee to develop Groundwater Mapping project to better inform the residents who use well or spring water supplies about the quality and condition of the water sources based off of well-water driller logs on the ANR Atlas	4.33	3.67	2.00	4.00	4.00	3.00	4.00	3.57
Support all forms of water retention strategies on an individual scale, including rain gardens, barrels, etc.	4.33	4.00	2.33	4.00	3.00	3.00	4.00	3.52
Establish an emergency policy with the fire district to make water supply available for towns and/or farms in cases of extreme drought or water shortage. Utilize old reservoir for agriculture support purposes (Level 1) and distribute municipal supply to well residences (Level 2)	4.00	4.00	3.67	4.00	3.33	4.33	3.67	3.86
Examine earth extraction policies in relation to groundwater retention and protection, especially in instances that damage neighboring water supplies	4.00	2.67	2.33	3.00	4.00	3.00	5.00	3.43
Wildfire								
Mitigation action	Social	Technical	Admin	Political	Legal	Economic	Environmental	Total
Post information about fire danger levels in town and on town website	5.00	3.67	4.33	4.67	4.33	5.00	5.00	4.57
Improve postings about burn bans and increase education through neighborly	4.33	3.67	3.00	4.00	3.00	2.33	3.00	3.33

pressure, including residential fireworks use and non-permitted burns								
Prepare heating/cooling center with air purifiers in the event of heavy smoke episodes.	4.67	3.67	2.00	4.67	4.67	3.67	3.67	3.86
Increase transparency of burn permit and report log of burns between fire warden and fire department	5.00	4.00	2.33	4.00	4.33	4.33	3.67	3.95
Invasives								
Mitigation action	Social	Technical	Admin	Political	Legal	Economic	Environmental	Total
Establish education and best practices for seasonal mowing for both road crew members and residences to reduce the spread of invasives along roadways and management areas	3.67	4.33	2.67	4.00	4.67	4.00	4.33	3.95
Conduct outreach to adjacent conservation groups to coordinate regional education and outreach for private residents' information	5.00	3.33	3.33	4.67	4.67	3.67	5.00	4.24
Conduct a survey of trees in public ROWs that may be impacted by Emerald Ash Borer.	3.33	2.00	1.33	2.67	2.67	2.00	3.33	2.48
Prioritize native seed or cover crops for revegetation to reduce erosion and spread of invasives	4.33	4.67	2.67	4.00	3.00	4.00	4.67	3.90
Enlist VT Invasives to conduct lakeshore and road crew training and education	4.33	4.00	3.00	4.00	4.67	4.00	5.00	4.14
Build capacity for a monthly invasive plant/aquatic database survey for residents to engage with.	4.33	3.00	1.33	3.33	3.00	2.33	4.00	3.05

Hail

Mitigation action	Social	Technical	Admin	Political	Legal	Economic	Environmental	Total
Explore options for accessible crop insurance for small growers.	4.33	3.33	2.00	4.00	3.33	3.33	3.33	3.38
Increase awareness on farm funding and insurance	4.67	3.33	2.67	4.67	3.33	3.33	3.67	3.67

Cold								
Mitigation action	Social	Technical	Admin	Political	Legal	Economic	Environmental	Total
Work with Energy Committee to implement enhanced energy plan	4.33	4.00	3.33	3.33	4.00	4.00	4.67	3.95
Make information available about low- and no-cost weatherization programs such as HEAT Squad and Northeast Employment Training Organization (NETO).	5.00	4.67	4.00	4.67	4.00	4.67	4.67	4.52

Heat								
Mitigation action	Social	Technical	Admin	Political	Legal	Economic	Environmental	Total
Work with visiting service providers and volunteers to increase awareness of heat illness. The Vermont Department of Health has outreach and training materials to spot the symptoms of heat illness and administer first aid.	4.33	4.00	2.67	5.00	4.67	4.00	4.67	4.19
Retrofit EOC and cooling centers with air conditioning	4.67	4.33	2.00	4.33	5.00	3.00	3.67	3.86

Infectious Disease								
Mitigation action	Social	Technical	Admin	Political	Legal	Economic	Environmental	Total

Maintain reliable internet connectivity as a priority. Have communication outreach prepared for any new event	5.00	4.67	2.67	5.00	3.33	3.67	4.00	4.05
Work with Open Door to expand their services in times of need, including reporting, volunteer work, distribution of goods. Integrate them into emergency food and water plans	5.00	4.67	2.33	3.67	4.33	4.33	3.67	4.00

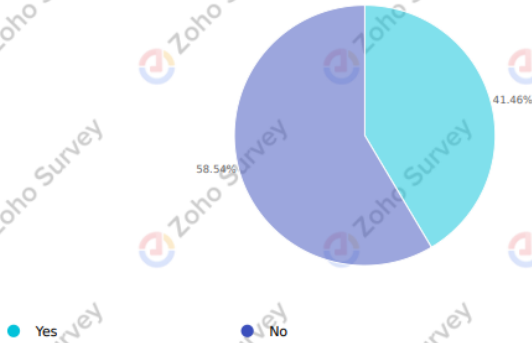
APPENDIX B: DANVILLE HAZARD MITIGATION SURVEY SUMMARY: (45 RESPONSES)

Page 1

Q1

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

Answered: 41 Skipped: 4

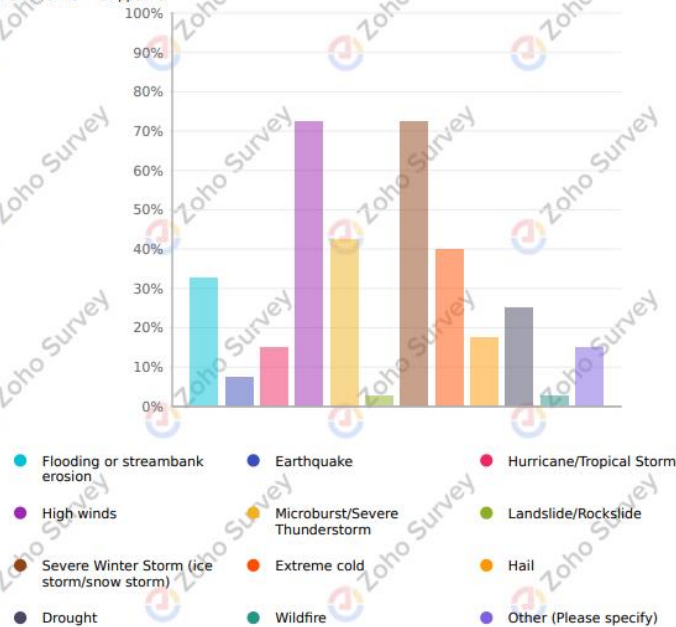


Choices	Response percent	Response count
Yes	41.46%	17
No	58.54%	24

Q2

What hazards have you experienced in Danville? (check all that apply)

Answered: 40 Skipped: 5



Choices	Response percent	Response count
Flooding or streambank erosion	32.50%	13
Earthquake	7.50%	3
Hurricane/Tropical Storm	15.00%	6
High winds	72.50%	29
Microburst/Severe Thunderstorm	42.50%	17
Landslide/Rockslide	2.50%	1
Severe Winter Storm (ice storm/snow storm)	72.50%	29
Extreme cold	40.00%	16
Hail	17.50%	7
Drought	25.00%	10
Wildfire	2.50%	1
Other (Please specify)	15.00%	6

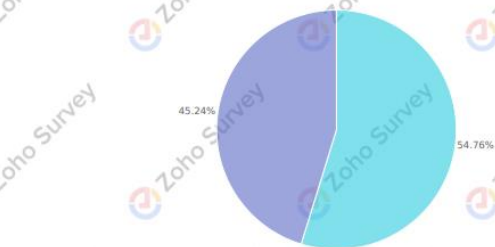
Other (Please specify)

1. "subsidence in driveway due to culvert failure.
2. We had small earthquake
3. Lightning strike knocked out Wifi on entire road. Fried modems
4. Almost all of the topics I have checkmarked above are standard day-to-day life in Northern Vermont. Defining them as anything other than "what do you expect" is irresponsible and a personal failure. Viral Pandemic falls outside.
5. freezing rain/glare ice on roadway
6. Muddy roads

Q3

Have you ever been unable to travel due to impassable roads in severe weather?

Answered: 42 Skipped: 3



Yes

No

Choices	Response percent	Response count
Yes	54.76%	23
No	45.24%	19

If so, which roads?

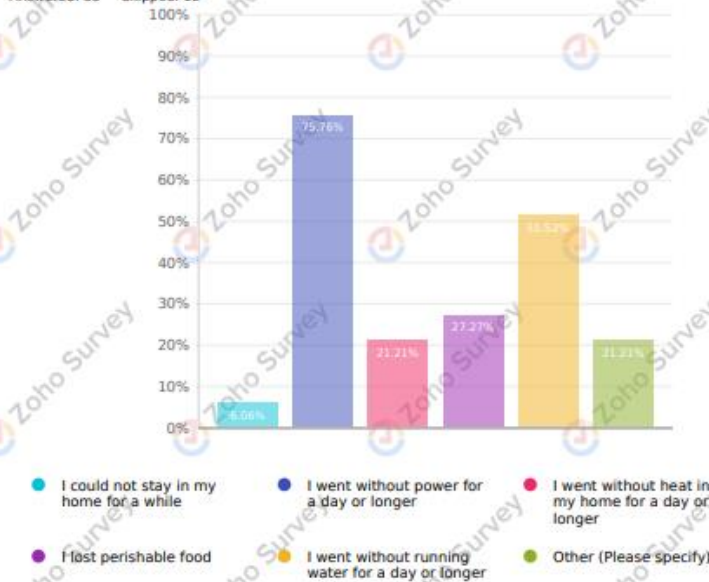
Answered: 22 Skipped: 23

1. there was the straight-line storm in 2013 that locked down most of North Danville, including Jamieson Road and the North Danville road. Hawkins road got eaten by weather a few times. Most of this got dealt with quickly. An ongoing problem is that in slick storms Route 2 can become very treacherous for big trucks, especially those that have to climb the hill to the stoplight. More than once route 2 has been hopelessly blocked by a truck stopped at the light with no way to go forward.
2. Water Andric Road and County Hill Road only once in the big storm that washed away the roads years ago.
3. Calkins Camp
4. Route 2, Peacham Road, Bruce Badger Memorial
5. Morrill Rd, Bruce Badger Hwy
6. Every single one of them that didn't make sense to drive on at the time. Stay home. If you don't - as my mother said, dress assuming you are going to walk home.
7. Trees down after high winds. Several different roads but road crew was working immediately. Good job! Thank you.
8. Woods hill road
9. Greenbanks Hollow Road, Joes Brook Road
10. Muddy roads Please road crew, don't grade any dirt road a day before a rain event. The road turns into (like) pottery slip. !Think first!
11. Bruce Badger Memorial Highway
12. Rt 2 in West Danville. Total ice
13. Oneida Road
14. All of them
15. Only for short periods when trees have been blown down. Our road crew does a great job in quickly removing these hazards.
16. Route 2B, Pumpkin hill, Library road.
17. Fellows Road and Morrill Road - only during wind storm that downed trees everywhere several years back and occasionally when mud is too deep. Road crews do a great job though.
18. Old Stagecoach Rd
19. Red Barn Road (class 4).
20. Keiser pond rd. Culvert has been washed out. I believe there may be a larger culvert now
21. Peacham Rd. in snow (hill coming up toward town from Brook Rd./Harvey's Hollow Rd.)
22. Walden Hill Road -lucky to get through all last week and, especially last night at 7:30 when we barely made it through. There has been an orange cone in the middle of the mud for days, but no sign of any work done to improve road conditions. We went out last night by another route but that was almost as bad. We returned via Walden Hill Road, which was a huge mistake. We are now trapped at home until Walden Hill Road is fixed.

Q5

Regarding previous extreme weather events or natural disasters in Danville, which of the following statements are true for you? (check all that apply)

Answered: 33 Skipped: 12



Choices	Response percent	Response count
I could not stay in my home for a while	6.06%	2
I went without power for a day or longer	75.76%	25
I went without heat in my home for a day or longer	21.21%	7
I lost perishable food	27.27%	9
I went without running water for a day or longer	51.52%	17
Other (Please specify)	21.21%	7

Other (Please specify)

1. Not my primary residence but did have access blocked for several days by downed trees.

2. None of above

3. #1 = FAIL #2 Yes, why do you ask? #3 No, FAIL - what were you thinking? #4 - Perishable, that is a gamble no matter what century #5 - Nope, rabbit died in the spring once and that slowed things up a bit but didn't kill no one.

4. Trees across road and driveway

5. Only once went without power for more than a day. Considering we live in a rural area I'm amazed how quickly Green Mountain Power crews address the outages.

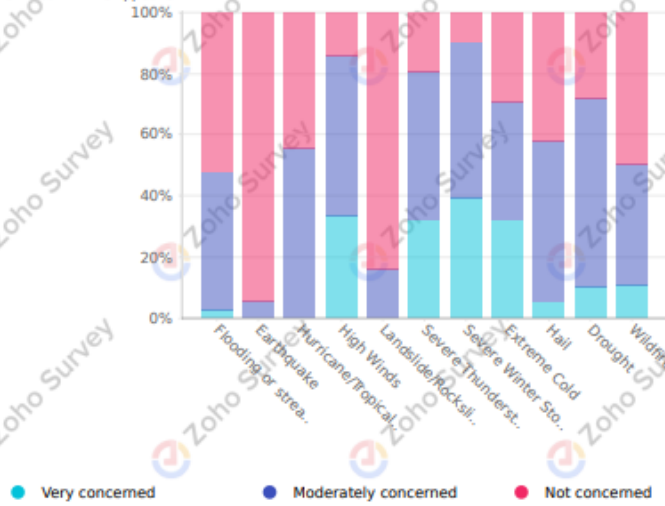
6. None apply

7. If there was an emergency, we would be unable to get out to Route 2 via Walden Hill Rd.

Q6

How concerned are you about the following hazards?

Answered: 42 Skipped: 3



Row	Very concerned	Moderately concerned	Not concerned	Response count
Flooding or streambank erosion	2.50% (1)	45.00% (18)	52.50% (21)	40
Earthquake	0.00% (0)	5.26% (2)	94.74% (36)	38
Hurricane/Tropical Storm	0.00% (0)	55.26% (21)	44.74% (17)	38
High Winds	33.33% (14)	52.38% (22)	14.29% (6)	42
Landslide/Rockslide	0.00% (0)	15.79% (6)	84.21% (32)	38
Severe Thunderstorm/Microburst	31.71% (13)	48.78% (20)	19.51% (8)	41
Severe Winter Storm (ice storm/snow storm)	39.02% (16)	51.22% (21)	9.76% (4)	41
Extreme Cold	31.71% (13)	39.02% (16)	29.27% (12)	41
Hail	5.00% (2)	52.50% (21)	42.50% (17)	40
Drought	10.26% (4)	61.54% (24)	28.21% (11)	39
Wildfire	10.53% (4)	39.47% (15)	50.00% (19)	38
Any additional comments?				6

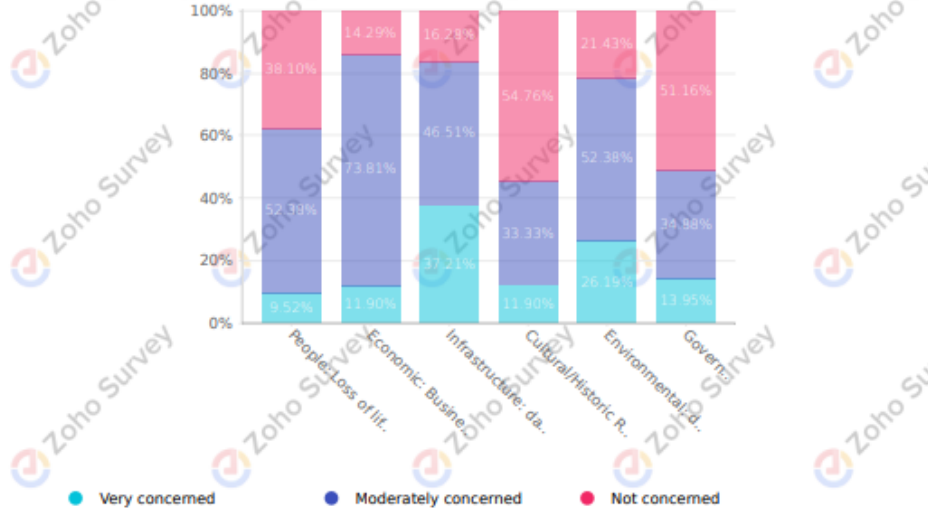
Any additional comments?

1. Town seems pretty on top of things.
2. Just that once in a lifetime storm so many years ago. Other than that nothing major happening except for COVID.
3. We live in Vt, anything can happen
4. Concerned about every single one. We call it life, concerned enough to check a box saying it is someone else's responsibility to wipe my own ass about it? Nope, WILDFIRE - decline in general functional intelligence may be a thing, possibly just equivalent of old school "don't tell me what to do" Vermonters though so maybe just a push.
5. With global warming these disasters will get worse but so far I personally have not been impacted more than I have in the past and I prepare in my own home.
6. Concerned about dependence on electricity for heat, water, refrigeration, and telecommunications from home

Q7

How concerned are you about the potential damage from natural hazards in Danville?

Answered: 43 Skipped: 2



Row	Very concerned	Moderately concerned	Not concerned	Response count
People: Loss of life or injury	9.52% (4)	52.38% (22)	38.10% (16)	42
Economic: Business interruption, crop damage, equipment damage	11.90% (5)	73.81% (31)	14.29% (6)	42
Infrastructure: damage to roads, bridges, utilities	37.21% (16)	46.51% (20)	16.28% (7)	43
Cultural/Historic Resources	11.90% (5)	33.33% (14)	54.76% (23)	42
Environmental: damage to trees, contamination of surface waters	26.19% (11)	52.38% (22)	21.43% (9)	42
Governance: Impeded ability to provide municipal services	13.95% (6)	34.88% (15)	51.16% (22)	43
Any additional comments?				2

Any additional comments?

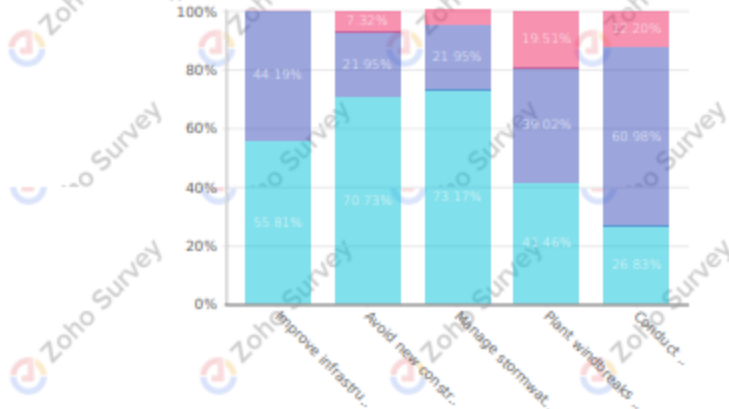
1. It will be interesting to see future paths and intensity of hurricanes on the Eastern Seaboard. I don't see this as a town/community problem though, your property and your personal safety is your responsibility at the end of the day.

2. Two things that have impacted me the most are loss of power and ice on roads. It won't go away and emergency response is generally very good compared to the past.

Q8

In your opinion, how effective would the following hazard mitigation strategies be in Danville?

Answered: 43 Skipped: 2



Very Effective Moderately Effective Not Effective

Row	Very Effective	Moderately Effective	Not Effective	Response count
Improve infrastructure (e.g. upgrades to culverts, roads, and bridges)	55.81% (24)	44.19% (19)	0.00% (0)	43
Avoid new construction in areas subject to flooding and erosion	70.73% (29)	21.95% (9)	7.32% (3)	41
Manage stormwater runoff from new development	73.17% (30)	21.95% (9)	4.88% (2)	41
Plant windbreaks to protect structures from wind damage	41.46% (17)	39.02% (16)	19.51% (8)	41
Conduct education and awareness programs	26.83% (11)	60.98% (25)	12.20% (5)	41
Any additional comments?				4

Any additional comments?

- Educate the Community regarding alternate routes around the Village Center, have good Shelter plans and have more education and clear info about burning outside.
- Improve Infrastructure = Where does it end, who knows the final answer. So yes, but be reasonable. New Construction in Flood = Duh. Wise about new development = Duh. Windbreaks = Duh, good luck though. Education = Absolutely, but don't shift responsibility away from personal to community shouldering.

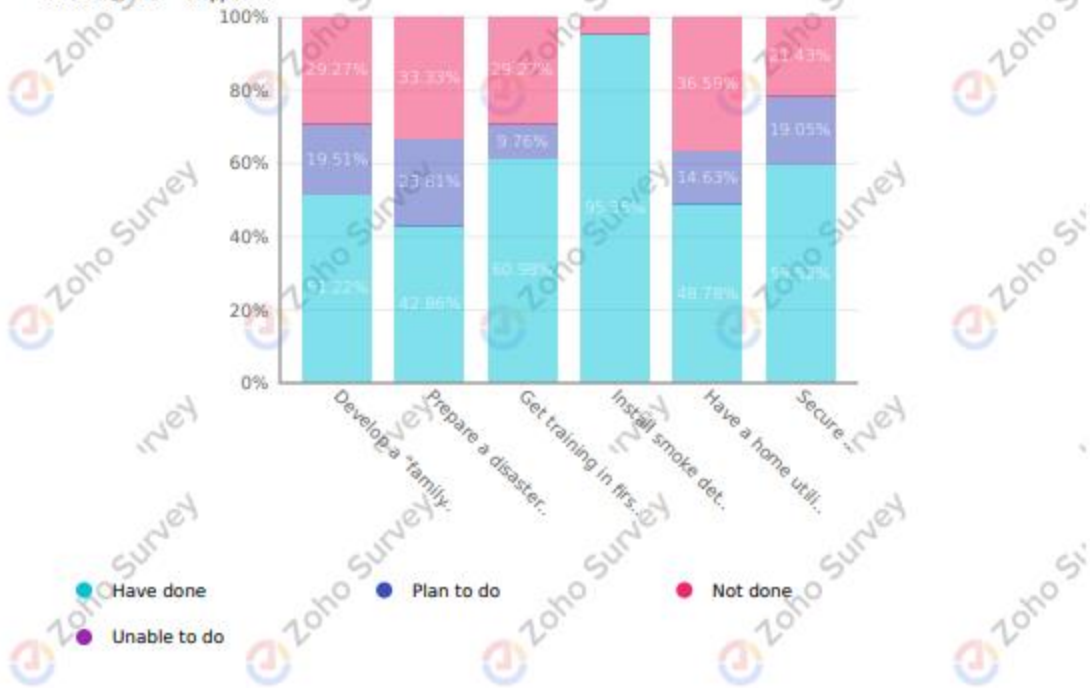
This survey was created on Zoho Survey, an online survey tool. Create unlimited surveys for free on www.zoho.com/survey

- Not aware of any pro or con
- I think Danville has good governance and zoning, but living on a dirt road there is always room for improvement there.

Q9

What you have done to prepare for a disaster?

Answered: 43 Skipped: 2



Row	Have done	Plan to do	Not done	Unable to do	Response count
Develop a "family emergency plan" (where to go, what to do in the event of an emergency)	51.22% (21)	19.51% (8)	29.27% (12)	0.00% (0)	41
Prepare a disaster supply kit	42.86% (18)	23.81% (10)	33.33% (14)	0.00% (0)	42
Get training in first aid or CPR	60.98% (25)	9.76% (4)	29.27% (12)	0.00% (0)	41
Install smoke detectors and carbon monoxide detectors in each level of home	95.35% (41)	0.00% (0)	4.65% (2)	0.00% (0)	43
Have a home utility shutoff procedure in the event of a disaster	48.78% (20)	14.63% (6)	36.59% (15)	0.00% (0)	41
Secure access to a backup generator for temporary power	59.52% (25)	19.05% (8)	21.43% (9)	0.00% (0)	42
Any additional comments?					4

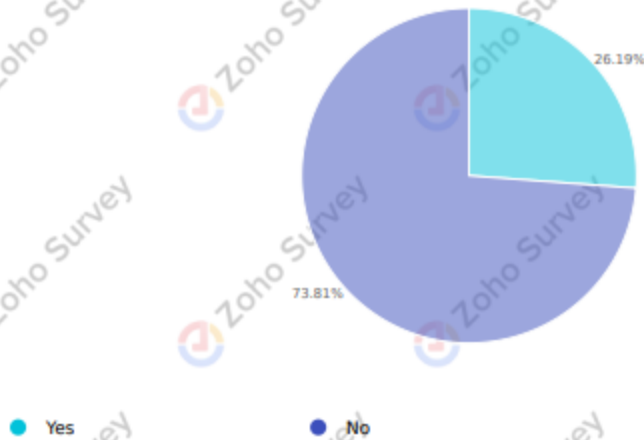
Any additional comments?

1. Family Emergency plan is same as last 200+ years in this town. Disaster Supply Kit is same as last 200+ years in this town....maybe more liquor, probably not. CPR/First Aid may need a brush up but since Joe's Pond swimming lessons they keep changing from 30/2 to 15/2 to no breaths so what the hell do they know anyways. Didn't grow up with one and didn't need it but do have a permanent generator that is annually preventative maintained. If still had wood heat wouldn't but oil and CPAP so did what needed to be done.
2. Single person household
3. Don't need to- off the grid
4. I feel prepared and have lived through power outages and know how to prepare for extended interruption of services. Perhaps education on surviving such conditions would be helpful.

Q10

Do you know where your nearest emergency shelter is?

Answered: 42 Skipped: 3

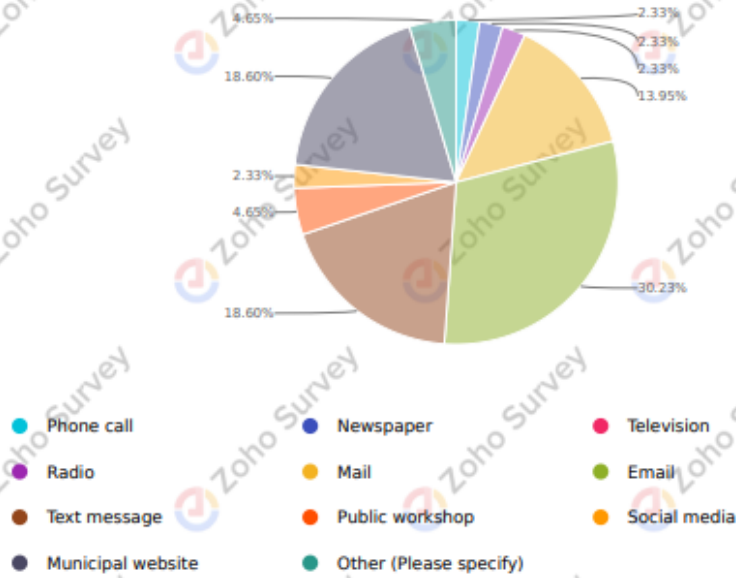


Choices	Response percent	Response count
Yes	26.19%	11
No	73.81%	31

Q11

What is the BEST way for you to get information about making your home and community more resistant to natural hazards? (choose one)

Answered: 43 Skipped: 2



APPENDIX C: GREEN MOUNTAIN POWER OUTAGE DATA

Storm Name	District	Feeder	Town	Incident	Type	Time Outage	Time Restored	Customers	Hours
16K 7/23-7/25	ST. JOHNSBURY	BA-071	DANVILLE	313883	MAJOR	7/23/2016 3:01:30 PM	7/23/2016 5:06:48 PM	1	2.08
				313924	MAJOR	7/23/2016 3:02:16 PM	7/23/2016 5:05:37 PM	5	2.05
				363600	MAJOR	5/6/2017 5:23:42 PM	5/7/2017 1:05:36 AM	3	7.70
17H 5/5-5/8	ST. JOHNSBURY	BA-071	DANVILLE	363751	MAJOR	5/7/2017 8:16:40 AM	5/7/2017 9:36:15 AM	1	1.33
				405638	MAJOR	11/3/2017 4:38:27 PM	11/3/2017 7:00:30 PM	17	2.37
				423340	MAJOR	4/4/2018 9:17:54 PM	4/5/2018 12:26:52 AM	17	3.15
17O 19/29-1	ST. JOHNSBURY	BA-071	DANVILLE	424110	MAJOR	4/4/2018 9:58:05 PM	4/5/2018 1:45:05 AM	6	3.78
				424938	MAJOR	4/4/2018 11:22:38 PM	4/5/2018 4:09:42 AM	1	4.68
				438190	MAJOR	5/4/2018 11:15:25 PM	5/5/2018 7:59:14 PM	11	20.73
18H 4/4-4/7	ST. JOHNSBURY	BA-071	DANVILLE	439462	MAJOR	5/5/2018 12:59:57 AM	5/5/2018 5:31:43 PM	28	16.53
				439470	MAJOR	5/5/2018 12:59:57 AM	5/5/2018 2:36:24 PM	21	13.60
				439471	MAJOR	5/5/2018 12:17:13 AM	5/5/2018 1:31:11 PM	23	13.23
				439472	MAJOR	5/5/2018 12:59:57 AM	5/6/2018 8:14:39 AM	47	31.25
				439487	MAJOR	5/5/2018 1:01:45 AM	5/6/2018 1:35:08 AM	26	24.55
				439493	MAJOR	5/5/2018 4:26:01 AM	5/5/2018 6:55:57 PM	2	14.50
				439494	MAJOR	5/5/2018 1:02:34 AM	5/6/2018 7:53:20 AM	68	30.85
				439495	MAJOR	5/5/2018 3:27:36 AM	5/6/2018 5:39:10 PM	9	14.10
				439496	MAJOR	5/5/2018 7:29:09 AM	5/6/2018 9:34:22 AM	1	26.08
				439687	MAJOR	5/5/2018 10:57:31 AM	5/6/2018 4:22:42 PM	17	5.42
				440242	MAJOR	5/6/2018 8:23:36 AM	5/6/2018 9:06:06 AM	1	0.72
				440419	MAJOR	5/6/2018 2:13:04 PM	5/6/2018 4:44:46 PM	1	2.53
				440552	MAJOR	5/6/2018 7:52:43 PM	5/6/2018 10:24:34 PM	1	2.53
				439721	MAJOR	5/5/2018 1:53:02 PM	5/5/2018 7:57:20 PM	1	6.07
				486328	MAJOR	11/27/2018 8:57:05 AM	11/27/2018 1:08:46 PM	4	4.20
18S 11/26-12/4	ST. JOHNSBURY	BA-071	DANVILLE	489225	MAJOR	11/27/2018 12:44:12 PM	11/27/2018 2:01:20 PM	1	1.26
				490409	MAJOR	11/27/2018 3:09:56 PM	11/28/2018 12:09:42 AM	15	9.00
				491948	MAJOR	11/27/2018 9:52:53 PM	11/28/2018 5:56:13 PM	3	18.05
				493435	MAJOR	11/28/2018 10:57:59 AM	11/28/2018 5:07:21 PM	8	6.15
				493634	MAJOR	11/28/2018 11:21:39 AM	11/28/2018 3:27:10 PM	8	4.10
				496042	MAJOR	11/29/2018 10:34:23 AM	11/29/2018 5:45:15 PM	57	7.18
				537965	MAJOR	10/17/2019 12:37:56 AM	10/17/2019 2:20:27 AM	1	1.72
19I 10/16-10/19	ST. JOHNSBURY	BA-071	DANVILLE	538858	MAJOR	10/17/2019 5:35:35 AM	10/17/2019 7:40:47 AM	1	2.08
				539597	MAJOR	10/17/2019 7:53:11 AM	10/17/2019 11:06:41 AM	4	3.23
				539904	MAJOR	10/17/2019 9:53:08 AM	10/17/2019 11:45:57 AM	1	1.88
				541641	MAJOR	10/18/2019 4:18:55 PM	10/18/2019 5:40:20 PM	1	1.35
				543710	MAJOR	10/31/2019 8:22:51 PM	10/31/2019 10:20:39 PM	14	1.97
19K 10/31-11/4	ST. JOHNSBURY	BA-071	DANVILLE	543955	MAJOR	10/31/2019 11:12:55 PM	11/1/2019 3:31:54 AM	8	4.32
				544335	MAJOR	11/1/2019 2:06:39 AM	11/1/2019 4:39:44 PM	266	14.22
				544394	MAJOR	11/1/2019 2:35:18 AM	11/1/2019 3:13:43 AM	2	0.63
				544435	MAJOR	11/1/2019 2:42:37 AM	11/1/2019 3:09:41 AM	1	0.45

544384	MAJOR	11/1/2019 2:35:18 AM	11/1/2019 3:13:43 AM	2	0.63
544435	MAJOR	11/1/2019 2:42:37 AM	11/1/2019 3:09:41 AM	1	0.45
544463	MAJOR	11/1/2019 2:45:01 AM	11/1/2019 3:22:33 AM	1	0.63
544476	MAJOR	11/1/2019 2:46:13 AM	11/1/2019 3:26:33 AM	1	0.67
544524	MAJOR	11/1/2019 2:52:25 AM	11/1/2019 3:07:05 AM	1	0.25
552057	MAJOR	11/1/2019 6:29:59 AM	11/1/2019 7:07:01 PM	148	12.62
552064	MAJOR	11/1/2019 3:12:50 AM	11/1/2019 5:45:51 PM	186	14.55
552074	MAJOR	11/1/2019 8:02:29 AM	11/1/2019 6:30:19 PM	65	10.47
552077	MAJOR	11/1/2019 2:26:39 AM	11/1/2019 6:30:56 PM	60	16.07
552120	MAJOR	11/1/2019 4:39:07 PM	11/2/2019 3:26:11 AM	6	10.78
552176	MAJOR	11/1/2019 4:50:34 PM	11/1/2019 8:58:04 PM	1	4.13
552478	MAJOR	11/1/2019 4:39:25 PM	11/2/2019 2:30:16 PM	47	21.65
552488	MAJOR	11/1/2019 5:52:54 PM	11/3/2019 1:04:42 PM	26	43.20
552611	MAJOR	11/1/2019 4:48:10 PM	11/2/2019 3:11:52 PM	7	22.40
552787	MAJOR	11/1/2019 7:09:24 PM	11/2/2019 1:00:15 PM	23	17.85
552869	MAJOR	11/1/2019 7:10:52 PM	11/3/2019 12:29:15 PM	16	41.30
552902	MAJOR	11/1/2019 7:42:35 PM	11/3/2019 11:42:09 AM	1	40.00
552907	MAJOR	11/1/2019 7:44:10 PM	11/3/2019 1:27:20 PM	1	41.72
553024	MAJOR	11/1/2019 4:49:46 PM	11/3/2019 8:41:55 AM	41	39.87
553097	MAJOR	11/1/2019 6:13:55 PM	11/3/2019 10:18:35 AM	13	40.08
553463	MAJOR	11/2/2019 6:09:23 AM	11/3/2019 1:14:22 PM	1	31.08
553824	MAJOR	11/1/2019 6:10:15 PM	11/3/2019 1:33:22 PM	3	42.38
553987	MAJOR	11/2/2019 12:02:50 PM	11/3/2019 3:46:15 PM	1	27.72
554168	MAJOR	11/1/2019 4:51:59 PM	11/3/2019 10:25:42 AM	9	41.55
554259	MAJOR	11/2/2019 2:34:40 PM	11/2/2019 6:00:45 PM	43	3.43
554288	MAJOR	11/1/2019 4:48:10 PM	11/2/2019 7:00:22 PM	19	26.20
554542	MAJOR	11/2/2019 2:34:40 PM	11/3/2019 4:25:13 PM	1	25.85
554552	MAJOR	11/2/2019 2:34:40 PM	11/3/2019 4:25:50 PM	3	25.85
554995	MAJOR	11/3/2019 7:51:28 AM	11/3/2019 4:03:01 PM	3	8.20
555028	MAJOR	11/3/2019 8:42:45 AM	11/3/2019 8:53:02 AM	18	0.17
555223	MAJOR	11/3/2019 11:58:22 AM	11/3/2019 12:36:04 PM	5	0.63
555287	MAJOR	11/3/2019 1:38:26 PM	11/3/2019 2:57:18 PM	3	1.32
555372	MAJOR	11/3/2019 4:11:53 PM	11/3/2019 5:39:15 PM	1	1.45
555422	MAJOR	11/3/2019 4:51:16 PM	11/3/2019 7:23:32 PM	1	2.53
555463	MAJOR	11/3/2019 2:53:16 PM	11/3/2019 8:15:05 PM	1	5.37
555331	MAJOR	11/3/2019 2:53:16 PM	11/3/2019 6:23:23 PM	16	3.50
543994	MAJOR	11/1/2019 12:02:52 AM	11/1/2019 2:10:47 AM	252	2.13

22Q 12/16-12/28	ST. JOHNSBURY	BA-G71	DANVILLE	734007	MAJOR	12/16/2022 7:08:27 PM	12/16/2022 10:19:05 PM	31	3.18
				734850	MAJOR	12/16/2022 8:41:40 PM	12/16/2022 10:36:33 PM	5	1.92
				736520	MAJOR	12/16/2022 10:52:03 PM	12/17/2022 8:40:48 AM	87	9.82
				742509	MAJOR	12/17/2022 2:02:54 PM	12/18/2022 7:40:36 PM	1	29.63
				743168	MAJOR	12/17/2022 8:44:46 AM	12/17/2022 9:12:54 PM	5	12.45
				743190	MAJOR	12/17/2022 9:41:01 AM	12/17/2022 9:16:40 PM	3	11.60
22R 12/29-12/27	ST. JOHNSBURY	BA-G71	DANVILLE	751699	MAJOR	12/23/2022 11:41:22 AM	12/23/2022 11:15:25 PM	1	11.57
				752595	MAJOR	12/23/2022 1:54:38 PM	12/24/2022 7:09:07 PM	1	29.23
				753228	MAJOR	12/23/2022 4:14:20 PM	12/24/2022 9:19:34 PM	9	17.08
				753247	MAJOR	12/23/2022 12:53:39 PM	12/23/2022 10:18:37 PM	2	9.42
				754144	MAJOR	12/23/2022 7:09:49 PM	12/25/2022 3:20:14 PM	2	44.17
				755209	MAJOR	12/24/2022 8:29:37 AM	12/24/2022 11:11:50 AM	55	2.70
				755217	MAJOR	12/24/2022 3:03:57 AM	12/24/2022 11:44:43 AM	2	8.68
				755441	MAJOR	12/24/2022 11:18:09 AM	12/24/2022 5:20:22 PM	1	6.03
				755452	MAJOR	12/24/2022 11:18:56 AM	12/24/2022 12:15:16 PM	10	0.93
23E 3/13-3/19	ST. JOHNSBURY	BA-G71	DANVILLE	778039	MAJOR	3/15/2023 6:49:07 AM	3/15/2023 9:44:33 AM	1	2.92
				779244	MAJOR	3/15/2023 4:08:56 PM	3/15/2023 9:05:18 PM	20	4.93

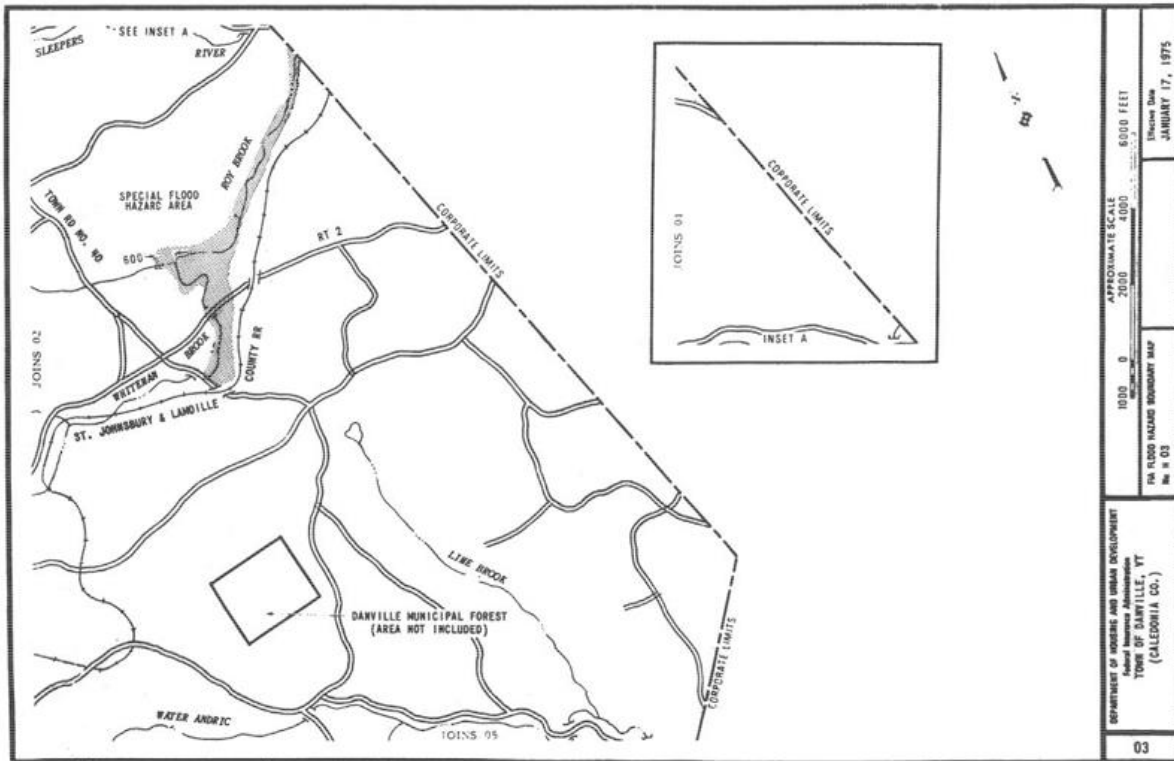
APPENDIX D: 2005 DANVILLE ALL HAZARD INVENTORY AND RISK ASSESSMENT SUMMARY

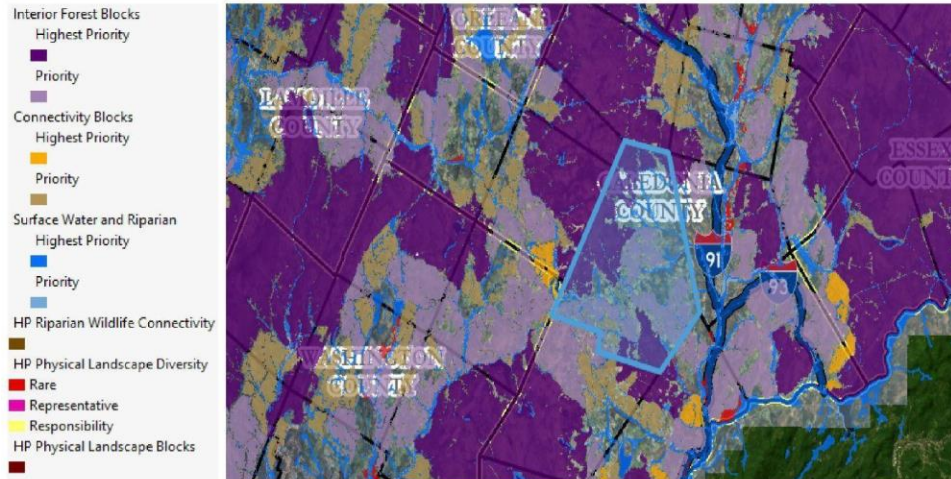
Table 2-A Hazard Inventory and Risk Assessment

Possible Hazard	Likelihood	Impact	Community Vulnerability	Most Vulnerable
Tornado	Low	Low	Low	Loss of power – trees
Flood	Medium	Low	Low	Individual homes
Flash Flood	Low	Low	Medium	Roads & culverts

Hazardous Materials	Medium	High	Medium	Roads, schools, K-12. Serves Walden & Peacham on tuition.
Radiological Incident	Low	High	Low	Residents
Structure Fire	Low	Medium	Low	Downtown, residences, chimney fires
Power Failure	Low/Med	Low	Low	Residences, businesses, schools
Winter Storm/Ice	High	Low	Low	Residences, businesses, roads
High Wind	High	Medium	Medium	Trees down, loss of power
Aircrash	Low	Low	Low	Site specific – lands on Joe’s Pond
Water Supply Contamination	Low	High	Medium	Public water supply, rivers
Hurricane	Low	Medium	Low	Power lines, residences
Earthquake	Low	Medium	Low	Site specific
Dam Failures	Low	Low/Med	Low	Residences
Drought	Low	Medium	Low	Water supply. Municipal water, individuals low
Chemical or Biological Incident	Medium	High	Medium	Site specific, especially vulnerable near school
Highway Incidents	Medium	Low	Low	Site specific
Wildfire/Forest Fire	Low	Low	Low	Farms, sugarbushes, residences
Landslide	Low	Medium/ Low	Low	Site specific
School Safety Issues	Low	Medium	Medium	Students, teachers, hostage issues
Terrorism	Low	Medium	Medium	Residents, businesses, local officials

APPENDIX E: MAPS



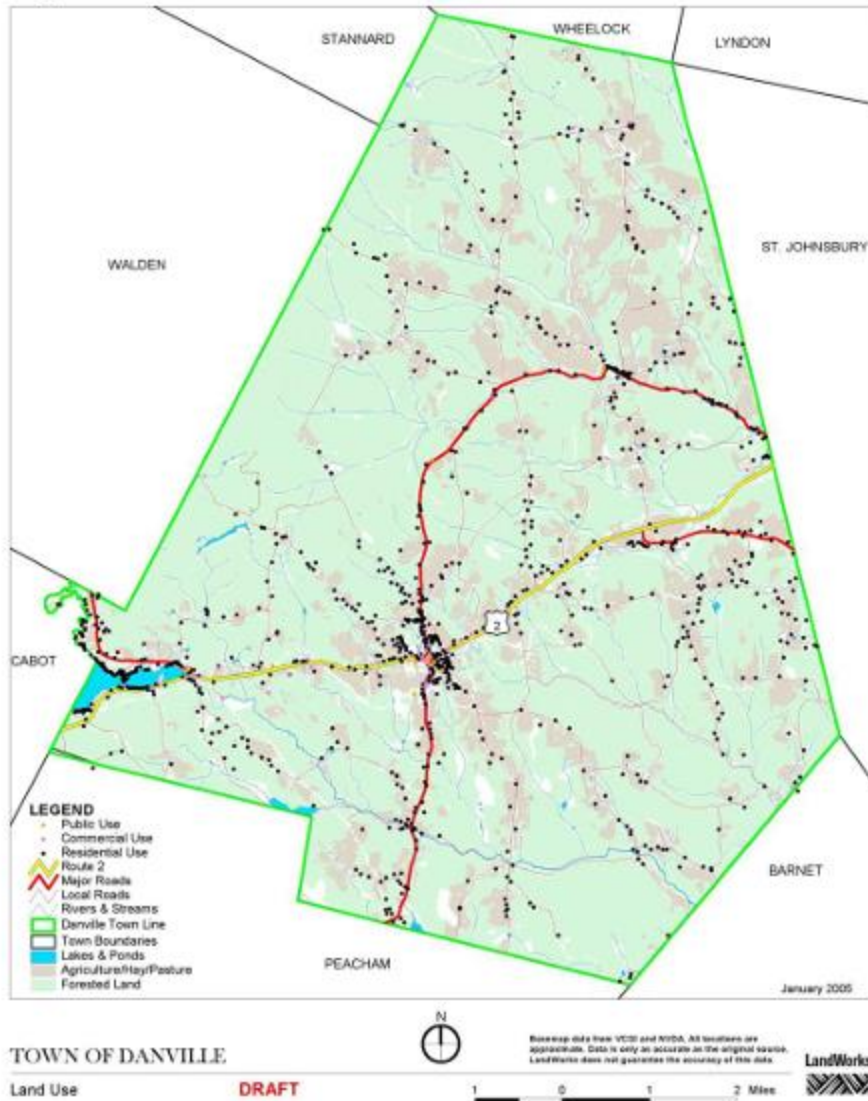


PRIORITY	ACRES	COMPONENT
Highest Priority	12018.55	Highest Priority Interior Forest Blocks
Priority	8776.01	Priority Interior Forest Blocks
Highest Priority	9984.63	Highest Priority Connectivity Blocks
Priority	6947.99	Priority Connectivity Blocks
Highest Priority	6156.26	Highest Priority Surface Water and Riparian Areas
Priority	126.19	Priority Surface Water and Riparian Areas
Highest Priority	5416.47	Riparian Wildlife Connectivity
Highest Priority	23430.14	Physical Landscape Diversity

Vermont Agency of Natural Resources
4/10/2023 9:22:49 AM

Shows the acreages of overlapping landscape scale components that are part of Vermont Conservation Design

Map: Land Use



APPENDIX F: 5-YEAR AMERICAN COMMUNITY SURVEY DATA (2017-2021)

Population

SE:A00001. Total Population	
Total Population	2,172

SE:A00002. Population Density (Per Sq. Mile)	
Total Population	2,172
Population Density (Per Sq. Mile)	35.8
Area (Land)	60.62

SE:A01001. Age		
Total Population:	2,172	
Under 5 Years	113	5.2%
5 to 9 Years	152	7.0%
10 to 14 Years	99	4.6%
15 to 17 Years	58	2.7%
18 to 24 Years	40	1.8%
25 to 34 Years	180	8.3%
35 to 44 Years	254	11.7%
45 to 54 Years	273	12.6%
55 to 64 Years	511	23.5%
65 to 74 Years	270	12.4%
75 to 84 Years	167	7.7%
85 Years and Over	55	2.5%

SE:A03001. Race		
Total Population:	2,172	
White Alone	2,087	96.1%
Black or African American Alone	0	0.0%
American Indian and Alaska Native Alone	11	0.5%
Asian Alone	11	0.5%
Native Hawaiian and Other Pacific Islander Alone	0	0.0%
Some Other Race Alone	0	0.0%
Two or More Races	63	2.9%

Housing

SE:A10045. Owner-Occupied Housing Units	
Owner-Occupied Housing Units	754

SE:A10008. Households by Household Type		
Households:	981	
Family Households:	593	60.5%
Married-Couple Family	512	52.2%
Other Family:	81	8.3%
Male Householder, No Wife Present	44	4.5%
Female Householder, No Husband Present	37	3.8%
Nonfamily Households:	388	39.6%
Male Householder	142	14.5%
Female Householder	246	25.1%

SE:A10024. Housing Units by Household Size		
Occupied Housing Units:	981	
1-Person Household	331	33.7%
2-Person Household	405	41.3%
3-Person Household	100	10.2%
4-Person Household	105	10.7%
5-Person Household	21	2.1%
6-Person Household	19	1.9%
7-or-More Person Household	0	0.0%

SE:A10003. Average Household Size	
Average Household Size	2.2

SE:A10001. Housing Units	
Housing Units	1,287

SE:A10060. Tenure		
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Occupied Housing Units:	981	
Owner Occupied	754	76.9%
Renter Occupied	227	23.1%
SE:A10044. Occupancy Status		
Housing Units:	1,287	
Occupied	981	76.2%
Vacant	306	23.8%
SE:A10047. Vacancy Status by Type of Vacancy		
Vacant Housing Units:	306	
For Rent	0	0.0%
For Sale Only	0	0.0%
Other Vacant	306	100.0%
SE:A10034. House Heating Fuel		
Occupied Housing Units:	981	
Gas (Utility, Bottled, Tank, or Lp Gas)	230	23.5%
Electricity	88	9.0%
Fuel Oil, Kerosene, Etc.	409	41.7%
Coal, Coke or Wood	247	25.2%
Solar Energy	0	0.0%
Other Fuel	7	0.7%
No Fuel Used	0	0.0%
SE:A10035. House Value for All Owner-Occupied Housing Units		
Owner-Occupied Housing Units:	754	
Less than \$20,000	22	2.9%
\$20,000 to \$49,999	0	0.0%
\$50,000 to \$99,999	39	5.2%
\$100,000 to \$149,999	45	6.0%
\$150,000 to \$299,999	403	53.5%
\$300,000 to \$499,999	187	24.8%
\$500,000 to \$749,999	48	6.4%
\$750,000 to \$999,999	10	1.3%
\$1,000,000 or More	0	0.0%

SE:A18001. Gross Rent (Housing Units with Cash Rent)		
Renter-Occupied Housing Units with Cash Rent:	227	
Less than \$300	71	31.3%
\$300 to \$599	16	7.1%
\$600 to \$799	38	16.7%
\$800 to \$999	64	28.2%
\$1,000 to \$1,249	0	0.0%
\$1,250 to \$1,499	38	16.7%
\$1,500 to \$1,999	0	0.0%
\$2,000 or More	0	0.0%

Income

SE:A14001. Household Income (In 2021 Inflation Adjusted Dollars)		
Households:	981	
Less than \$10,000	23	2.3%
\$10,000 to \$14,999	120	12.2%
\$15,000 to \$19,999	43	4.4%
\$20,000 to \$24,999	51	5.2%
\$25,000 to \$29,999	22	2.2%
\$30,000 to \$34,999	24	2.5%
\$35,000 to \$39,999	0	0.0%
\$40,000 to \$44,999	42	4.3%
\$45,000 to \$49,999	26	2.7%
\$50,000 to \$59,999	94	9.6%
\$60,000 to \$74,999	108	11.0%
\$75,000 to \$99,999	78	8.0%
\$100,000 to \$124,999	94	9.6%
\$125,000 to \$149,999	83	8.5%
\$150,000 to \$199,999	94	9.6%
\$200,000 or More	79	8.1%

SE:A14006. Median Household Income (In	
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2021 Inflation Adjusted Dollars)	
Median Household Income (In 2021 Inflation Adjusted Dollars)	\$62,617

SE:A10051. Selected Monthly Owner Costs as a Percentage of Household Income in the Past 12 Months (Dollars) for Housing Units Without a Mortgage		
Housing Units Without a Mortgage:	398	
Less than 30 Percent	324	81.4%
30 Percent or More	74	18.6%
50 Percent or More	32	8.0%
Not Computed	0	0.0%

SE:B10040. Residents Paying More Than 30% or at least 50% of Income on Selected Home Ownership Expenses		
Owner-Occupied Housing Units:	754	
Homeowners Who are Paying at Least 30% of Income for Ownership Costs	178	23.6%
Homeowners Who are Paying at Least 50% of Income for Ownership Costs	75	10.0%

SE:A13002. Poverty Status in of Families by Family Type by Presence of Children Under 18 Years		
Families:	593	
Income Below Poverty Level:	51	8.6%
Married Couple Family: with Related Child Living Below Poverty Level	24	4.1%
Married Couple Family: No Related Children Under 18 Years	2	0.3%
Male Householder, No Wife Present:	6	1.0%
With Related Children Under 18 Years	6	1.0%
No Related Children Under 18 Years	0	0.0%
Female Householder, No Husband Present:	19	3.2%
With Related Children Under 18 Years	19	3.2%
No Related Children Under 18 Years	0	0.0%
Income At or Above Poverty Level	542	91.4%

SE:A13004. Ratio of Income in 2020 to Poverty Level		
Population for Whom Poverty Status Is Determined:	2,172	
Under .50	43	2.0%
.50 to .74	17	0.8%
.75 to .99	92	4.2%
1.00 to 1.49	161	7.4%
1.50 to 1.99	145	6.7%
2.00 and Over	1,714	78.9%

SE:A10011. Households with Earnings	
Households:	981

With Earnings	709	72.3%
No Earnings	272	27.7%

SE:A10019. Households with Wage or Salary Income		
Households:	981	
With Wage or Salary Income	655	66.8%
No Wage or Salary Income	326	33.2%

SE:A10017. Households with Social Security Income		
Households:	981	
With Social Security Income	409	41.7%
No Social Security Income	572	58.3%

SE:B18002. Residents Paying More Than 30% or at least 50% of Income on Rent		
Renter-Occupied Housing Units:	227	
30 to 49 Percent	25	11.0%
50 percent or More	19	8.4%

SE:A18002. Gross Rent as a Percentage of Household Income in the Past 12 Months (Dollars)		
Renter-Occupied Housing Units:	227	
Less than 10 Percent	0	0.0%
10 to 29 Percent	183	80.6%
30 to 49 Percent	25	11.0%
50 Percent or More	19	8.4%
Not Computed	0	0.0%

Employment

SE:A17002. Employment Status for Total Population 16 Years and Over		
Population 16 Years and Over:	1,801	
In Labor Force:	1,103	61.2%
In Armed Forces	0	0.0%
Civilian:	1,103	61.2%

Employed	1,102	61.2%
Unemployed	1	0.1%
Not in Labor Force	698	38.8%

SE:A17005. Unemployment Rate for Civilian Population in Labor Force 16 Years and Over		
Civilian Population in Labor Force 16 Years and Over:	1,103	
Employed	1,102	99.9%
Unemployed	1	0.1%

SE:A17004. Industry by Occupation for Employed Civilian Population 16 Years and Over		
Total Employed Civilian Population 16 Years and Over:	1,102	
Agriculture, Forestry, Fishing and Hunting, and Mining	51	4.6%
Construction	77	7.0%
Manufacturing	141	12.8%
Wholesale Trade	22	2.0%
Retail Trade	80	7.3%
Transportation and Warehousing, and Utilities	92	8.4%
Information	27	2.5%
Finance and Insurance, and Real Estate and Rental and Leasing	20	1.8%
Professional, Scientific, and Management, and Administrative and Waste Management Services	101	9.2%
Educational Services, and Health Care and Social Assistance	306	27.8%
Arts, Entertainment, and Recreation, and Accommodation and Food Services	60	5.4%
Other Services, Except Public Administration	69	6.3%
Public Administration	56	5.1%

SE:A09001. Travel Time to Work for Workers 16 Years and Over		
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Workers 16 Years and Over:	1,068	
Did Not Work At Home:	966	90.5%
Less than 10 Minutes	164	15.4%
10 to 19 Minutes	287	26.9%
20 to 29 Minutes	158	14.8%
30 to 39 Minutes	105	9.8%
40 to 59 Minutes	111	10.4%
60 to 89 Minutes	95	8.9%
90 or More Minutes	46	4.3%
Worked At Home	102	9.6%
SE:A09005. Means of Transportation to Work for Workers 16 Years and Over		
Workers 16 Years and Over:	1,068	
Car, Truck, or Van	922	86.3%
Drove Alone	865	81.0%
Carpooled	57	5.3%
Public Transportation (Includes Taxicab)	0	0.0%
Motorcycle	0	0.0%
Bicycle	0	0.0%
Walked	33	3.1%
Other Means	11	1.0%
Worked At Home	102	9.6%

APPENDIX G: LOCAL EMERGENCY MANAGEMENT PLAN, ANNEX B & D

Guest Agreement Form

All guests age 18 and over must sign; forms will be destroyed on Center closure

Center Rules

- **Respect everyone**
- Quiet time from 10:00pm to 8:00am unless otherwise posted
- No abusive or belligerent behavior toward staff or other guests
- People under the influence of alcohol or drugs are not allowed in the Center
- No alcohol or drugs
- No stealing or destruction of property
- No weapons
- No sexual activity
- Dress appropriately at all times
- Keep your personal items, valuables, etc. with you at all times - the Center will not be held responsible for any missing or lost items
- Please use mobile phones in designated areas when making calls
- Please charge your electronic devices in designated areas
- Adults must accompany their children at all times
- Smoke breaks are available only at designated areas outside of the Center
- If you have any problems or concerns, find a staff volunteer to help solve it
- Keep any area(s) you and your family members occupy, bathrooms, and common areas clean and tidy
- Keep pets in designated areas at all times
- Check out with a staff member when you leave - take all your belongings!

The goal of the Center is to create a space that is physically and emotionally safe for all, regardless of race, ethnicity, religion, gender, or sexual orientation. This agreement makes the Center a better and safer place for everyone. If any of the above agreements are broken, you will be removed from the Center. The Town reserves the right to remove anyone that is not abiding by these rules from the premises.

I agree to abide by all of the rules above.

Signature: _____

Name (Print): _____

Date: _____

Checklist for Warming / Cooling Centers

This checklist sets up processes for the Town to open, operate, and close warming or cooling centers as needed. Centers are flexible, limited-hour locations intended for people to drop in, get warm/cool, find information, charge devices, use Internet or phones, and then return home or move on. They require minimal staffing and support.

*Note: Overnight **shelters** are multi-day operations intended to provide sleeping quarters, hygiene facilities, and other human services requiring significant trained staff and a fire inspection before opening. The Town does not have plans or local resources for operating a shelter.*

Incident Commander (IC) is used throughout as the Incident Command System (ICS) supervisor for the **Center Manager (CM)**. Depending on the situation, the IC may be the IC for an ongoing event, the Emergency Operations Center (EOC) Director, or the Selectboard Chair. The IC may also serve as CM and as Center staff.

Opening Decision (ideally several days prior)

- IC discusses requirement for a warming / cooling center with other town leaders
 - Are existing or forecast conditions bad enough that residents or transients are likely to need a center?
 - Are state and other area support options likely to be insufficient?
 - Are there resources available (staff, facilities, funding)?
 - Should a Center be only-if-needed, on-call, or planned (including now)?
- IC identifies a CM and determines Center location(s) [see LEMP Enclosure 6, Sheltering and Care]
 - CALEX building is best for small, only-if-needed Center
 - Town Office and/or North Danville Community Center are best for planned Centers to support up to 100 people
 - Danville School is best if there is a major ongoing incident and school is available / not in session
- CM develops and coordinates Center opening plan
 - Contact facility manager to arrange building access and identify supply needs
 - Plan for any purchasing support through IC (food, cleaning supplies)
 - Identify and brief volunteer staff (organize shifts as needed, goal should be 1 shift lead + 1 volunteer / 40 clients, minimum 2 staff)
 - Request Medical Reserve Corps support if desired (through VDH)
 - Determine whether to publicize Center
 - No if only-if-needed, yes if on-call or planned)
 - Make or arrange announcements as appropriate (social media, Front Porch Forum, town website, town bulletin boards)

Center Activation

- IC or CM determine Town should open a Center (whether at a planned time, including immediately after identifying the need, on-call, or if-needed)
- If not a planned opening, CM notifies staff and facility manager to open Center as coordinated
- CM arranges for facility to get sufficient copies of any needed forms
- Center staff opens facility
 - Take control from the facility manager as coordinated (ideally, CM conducts walkthrough with facility manager, taking pictures or video of any existing damage)
 - Determine handling for and set up trash and recycling
 - Identify bathroom facilities and cleaning supplies
 - Identify smoking area, client parking area(s), and any access issues
 - Move furniture and other items as needed to make space welcoming, comfortable, and safe for clients and staff
 - Post rules and other relevant situational information
 - Open doors to clients
- CM notifies IC of opening
- If opening was not already publicized, CM makes or arranges for announcements as appropriate
- CM notifies State Emergency Operations Center of opening (800-347-0488)

Center Operations

- Center Staff welcome clients
 - Welcome clients and record date/time of arrival (anonymously, number of adults and children only)
 - Ask if clients have any immediate needs
 - If appropriate, check clients for hot-weather / cold-weather injuries
 - Ensure clients are parked safely and appropriately
 - Point out facility layout
 - Ask clients to sign Guest Agreement Form (clients age 18 and over must sign, but forms will be destroyed if there are no issues)
- Center Staff support clients
 - Monitor Center for clients' safety at all times
 - Provide information on the current local and statewide situation
 - Provide information on Vermont 211 for human service needs
 - Answer questions and coordinate support for clients where possible
 - Record when clients leave (anonymously)
 - Clean spaces and remove trash/recycling periodically as needed
- As needed, Center Staff call 911 for law enforcement or medical support
- As needed, Center Staff contact CM for supply or other support
- As required, CM reports status periodically
 - Report any issues or support requirements to IC
 - Track and report number of current clients and total served
- As needed, CM manages shift change
 - Verify show time and transportation for incoming staff
 - Have outgoing staff share status, facility information, and lessons-learned with incoming staff
 - Identify any support issues for incoming staff
 - Release outgoing staff to return home or to other duties and verify that all demobilize safely

Center Demobilization and Recovery

- In consultation with IC, CM decides to close Center when there are no more current or expected clients
- Center staff closes facility
 - Close doors and post sign marking Center as closed, directing visitors to dial 911 for emergencies or 211 for any sheltering or human service needs
 - Restore any furniture or other items to their pre-opening state
 - Review Center operations and record any lessons-learned
 - Clean all areas the Center staff and clients used
 - Destroy all Guest Agreement Forms (unless needed to address potential legal issue)
 - Dispose of trash and recycling as the facility manager directs
 - Return control to the facility manager as coordinated (ideally, CM conducts walkthrough with facility manager)
- CM releases Center Staff to return home or to other duties and verifies that all demobilize safely
- CM notifies State Emergency Operations Center of closing (800-347-0488)
- CM notifies IC of closing
 - Report any issues from Center operations
 - Provide any expense information
 - Provide lessons-learned to improve this plan

Situation	Early Precautions Infectious disease may begin arriving in the area	Regional Outbreak There are more than X cases of disease within 20-30 miles	Major Local Outbreak There are more than X cases of infectious disease in Danville	Outbreak Recovery Most people have recovered from infectious disease in Danville
Incident Commander	Selectboard Chair	Selectboard Appointee	Selectboard Appointee	Selectboard Appointee
EOC/ICP	Town Clerk refers questions to VDH, Selectboard, or EMD	*EOC in Town Office with limited hours? Build At-Risk List *Request VT-Alert message with information and asking At-Risk population to self-identify Answer public questions, update Town website daily	EOC in Town Office (hours as required) Check on residents on At-Risk List as needed Answer public questions, update Town website daily Request VT-Alert message to send out info about town activities	*EOC in Town Office with limited hours? Answer public questions, update Town website daily *Close EOC when less than X families affected?
Town Business	Normal operations Ask people to observe good hygiene at meeting	Continue normal meetings, increase spacing for public Consider delaying public deadlines (dog registration, tax payments)	Delay non-essential meetings Hold meetings by teleconference with one body member at public location and increased spacing for public	Continue normal meetings Encourage public to keep spacing
Town Office	Normal operations Increased cleaning/sanitizing frequency	Practice social distancing Increased cleaning/sanitizing frequency Identify essential ongoing responsibilities Plan for additional customer service staff	*Limit hours if practical (delay non-essential tasks)? Practice social distancing Increased cleaning/sanitizing frequency	Practice social distancing Increased cleaning/sanitizing frequency
Highway Department	Normal operations	Practice social distancing Plan for additional support if staff fall ill	Practice social distancing Plan for additional support if staff fall ill Identify long-term projects that may be at risk if staff is not available (e.g. paving)	Normal operations
Fire Department	Respond to accidents/fires Identify and report potential resource needs	Respond to accidents/fires Follow VDH Responder guidance Plan for extended mutual aid if responders fall ill	Respond to accidents/fires Follow VDH Responder guidance Plan for extended mutual aid if responders fall ill	Respond to accidents/fires Follow VDH Responder guidance
Recycle Center	Normal operations Post information about disease	*Enforce social distancing (e.g. 3 people at a time)?	Enforce social distancing (e.g. 3 people at a time) *Extend hours (so less people are there at the same time) or close for duration?	*Enforce social distancing (e.g. 3 people at a time)?
Volunteers		*IC recruit Volunteer Coordinator? Solicit volunteers for checking on residents, potential supply delivery	Check on At-Risk residents as needed	Check on At-Risk residents every 2 days Remove residents from At-Risk List when their situation stabilizes
School	Take precautions per VDH and AOE	Take precautions per VDH and AOE *Close for several weeks? *Distribute school meals for those in need?	Take precautions per VDH and AOE *Close for several weeks? *Distribute school meals for those in need?	Take precautions per VDH and AOE School reopens
Residents	Follow VDH hygiene guidance Call doctor if disease is suspected Keep more essential, non-perishable supplies on-hand	Follow VDH hygiene guidance Practice social distancing where possible Call doctor if disease is suspected Enroll in At-Risk List if appropriate Stock up on (don't hoard!) food, water, medicine, fuel	Follow VDH hygiene guidance Practice social distancing where possible Self-isolate if sick Call 911 if medical condition worsens Call 211 or EOC if in need of other assistance Enroll in At-Risk List if appropriate	Follow VDH hygiene guidance Practice social distancing where possible Self-isolate if sick Call 911 if medical condition worsens Call 211 or EOC if in need of other assistance
Farmers		Plan for assistance if farm staff fall ill	Plan for assistance if farm staff fall ill	
* Asterisk marks items for decision		AOE - Agency of Education EOC - Emergency Operations Center	IC - Incident Commander ICP - Incident Command Post	VDH - Vermont Department of Health