

Town of Troy and Village of North Troy Multi-Jurisdiction Local Hazard Mitigation Plan

Prepared by:

The Town of Troy/Village of North Troy and
Northeastern Vermont Development Association



**Adopted by the Troy Selectboard and
Village of North Troy Trustees on
November 15, 2022**



FEMA

January 17, 2023

Stephanie A. Smith, State Hazard Mitigation Officer
Vermont Emergency Management
45 State Drive
Waterbury, Vermont 05671-1300

Dear Stephanie Smith:

As outlined in the FEMA-State Agreements for FEMA-4621-DR-VT, FEMA-4532-DR-VT, and FEMA-4474-DR-VT, your office has been delegated the authority to review and approve local mitigation plans under the Program Administration by States Pilot Program. Our Agency has been notified that your office completed its review of the Town of Troy and Village of North Troy Multi-Jurisdictional Local Hazard Mitigation Plan and approved it effective **December 5, 2022** through **December 4, 2027** in accordance with the planning requirements of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, the National Flood Insurance Act of 1968, as amended, and Title 44 Code of Federal Regulations (CFR) Part 201.

This plan approval includes the following participating jurisdictions that provided copies of their resolutions adopting the plan.

- Troy, Town of
- North Troy, Village of

With this plan approval, the communities listed above are eligible to apply to the Vermont Emergency Management for mitigation grants administered by FEMA. Requests for funding will be evaluated according to the eligibility requirements identified for each of these programs. A specific mitigation activity or project identified in the community's plan may not meet the eligibility requirements for FEMA funding; even eligible mitigation activities or projects are not automatically approved.

The plan must be updated and resubmitted to the FEMA Region I Mitigation Division for approval every five years to remain eligible for FEMA mitigation grant funding.

Stephanie A. Smith
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Thank you for your continued commitment and dedication to risk reduction demonstrated by preparing and adopting a strategy for reducing future disaster losses. Should you have any questions, please contact Sean Loughlin at (617) 832-4780 or Sean.Loughlin@fema.dhs.gov.

Sincerely,

Dean Savramis
Mitigation Division Director
DHS, FEMA Region I

DS:sl

cc: Brian McWalters, State Hazard Mitigation Planner, VEM
Caroline Paske, State Hazard Mitigation Planner, VEM
Ben Rose, Recovery and Mitigation Section Chief, VEM

CERTIFICATE OF LOCAL ADOPTION
A Resolution Adopting the
Town of Troy and Village of North Troy Multi-Jurisdiction Local Hazard Mitigation Plan

WHEREAS, the Town of Troy, inclusive of the Village of North Troy, in Orleans County 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 Town of Troy and Village of North Troy **Multi-Jurisdiction Local Hazard Mitigation Plan** contains recommendations, potential actions and future projects to mitigate damage from disasters in the community; and


WHEREAS, the Town of Troy and Village of North Troy 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 joint meeting was held on Nov 15 2022 by the Town of Troy Selectboard and Village of North Troy Trustees to formally approve and adopt the **Town of Troy and Village of North Troy Multi-Jurisdiction Local Hazard Mitigation Plan**

NOW, THEREFORE BE IT RESOLVED that the Town of Troy/Village of North Troy in Orleans County adopts this **Town of Troy and Village of North Troy Multi-Jurisdiction Local Hazard Mitigation Plan**

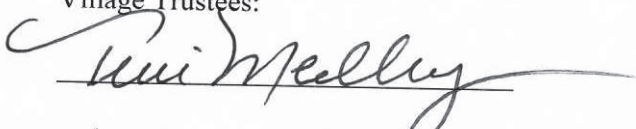
Nov 15 2022
Date


Selectboard Chair


Selectboard member

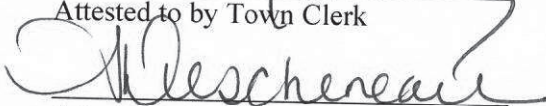
Selectboard member

Village Trustees:






Attested to by Town Clerk


Attested to be Village Clerk

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1. INTRODUCTION AND PURPOSE

1.1 Purpose and Scope of the Plan

The purpose of the 2020 Town of Troy and Village of North Troy Multi-Jurisdiction Local Hazard Mitigation Plan is to identify all hazards facing each jurisdiction and the community as a whole, and to identify policies and actions that can be implemented to reduce risk and future losses from the identified natural hazards. This includes modifying structures, such as culverts, so they can better withstand natural hazards, and avoiding development in identified hazardous areas. The mitigation actions identified in this plan are intended to reduce or eliminate long-term risks to hazards. It is recognized that it is less expensive to prevent damage from disasters than to get caught in a cycle of repetitive repair after a disaster has struck.

In order for the Town of Troy and Village of North Troy to continue to be eligible for grant funding of mitigation projects, the Plan must be reviewed, revised and re-submitted to FEMA for approval every five (5) years.

1.2 Hazard Mitigation

The 2018 Vermont State Hazard Mitigation Plan (SHMP) 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 2018 Vermont SHMP was developed to help the State of Vermont and local governments identify all natural hazards facing communities in the state and establish actions that reduce risk. This plan will reference data and mitigation strategies included in the State Plan where relevant.

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

Hazard mitigation planning is the process that analyzes a community’s risk from natural hazards, coordinates available resources, and implements actions to reduce risks. Per *44 CFR Part 201: Hazard Mitigation Planning*, this planning process establishes criteria for State and local hazard mitigation planning authorized by Section 322 of the Stafford Act as amended by Section 104 of the *Disaster Mitigation Act of 2000*.

FEMA requires state and local governments to develop and adopt hazard mitigation plans as a condition for receiving certain types of non-emergency disaster assistance, including funding for mitigation projects. Jurisdictions must update their hazard mitigation plans and re-submit them for FEMA approval every five years to maintain eligibility.

FEMA’s “Building Resilient Infrastructure and Communities” (BRIC) is a new FEMA pre-disaster hazard mitigation program that replaces the existing Pre-Disaster Mitigation (PDM) program and is a result of amendments made to Section 203 of the Stafford Act by Section 1234 of the Disaster Recovery Reform Act of 2018 (DRRA). The BRIC program supports states and local communities as they undertake hazard mitigation projects reducing the risks they face from disasters and natural hazards.

FEMA recently released a new policy (FP-108-024-02: Ecosystem Service Benefits in Benefit-Cost Analysis for FEMA's Mitigation Programs Policy) that allows for ecosystem service benefits to be included in a mitigation project's Benefit-Cost Analysis regardless of the Benefit-Cost Ratio (BCR). Previous policy limited the use of these benefits to projects meeting a .75 BCR.

With this new policy, ecosystem service benefits can be used for all project types eligible under the Hazard Mitigation Assistance (HMA) programs that support the incorporation of ecosystem service benefits and result in the improvement of the natural environment.

1.4 Eligibility for State and Federal Funds

Having a locally adopted, FEMA-approved Local Hazard Mitigation Plan makes the Town of Troy and Village of North Troy eligible for Flood Mitigation Assistance Grant Program (FMA) funds, Hazard Mitigation Grant Program (HMGP) project grants, and Pre-Disaster Mitigation program funding, as noted above.

Since October 14th, 2014, a community that lacks a Local Hazard Mitigation Plan gets less matching funds from the State of Vermont under the Emergency Relief Assistance Fund (ERAF) when FEMA Public Assistance grants are awarded after a Presidentially-declared emergency. While 75% of the project cost is covered by federal funds, and the default rate for State contribution towards non-federal match dropped to 7.5% in 2014, requiring municipalities to cover the other 17.5% for Public Assistance projects. However, municipalities that take the following proactive measures are awarded 12.5% State match:

1. Participate in the National Flood Insurance Program (NFIP),
2. Adopt Town Road and Bridge Standards that meet or exceed the VTrans 2013 template,
3. Adopt a Local Emergency Operations Plan annually, and
4. Submit a Local Hazard Mitigation Plan to Vermont Emergency Management (VEM) for review.

Municipalities that wish to further decrease their cost share to 7.5%, with a 17.5% State match, must also meet one of the following criteria:

5. Adoption of ANR's River Corridor bylaws, or
6. Enrollment in the Community Rating System (CRS).

The 2018 State Mitigation plan notes that a significant advancement in hazard mitigation initiatives has been the revision of Vermont's Stream Alteration General Permit (SAGP), and FEMA's subsequent recognition of the new general permit as "codes and standards" for purposes of future Public Assistance (PA) repairs. Beginning with the Vermont Disaster Declaration DR-4330 in the summer of 2017, structure replacements that fall under the jurisdiction of and meet the standards of the SAGP are presumed to be PA-eligible and do not require approval by FEMA prior to construction. This significant improvement allows Vermont to more quickly and appropriately address vulnerable infrastructure in a sustainable way during the immediate response and recovery phase following a disaster.

1.5 Local Hazard Mitigation Plan Goals

This Local Hazard Mitigation Plan establishes the following general goals for the town and its residents:

- 1) Reduce at a minimum, and prevent to the maximum extent possible, the loss of life and injury resulting from all hazards.
- 2) Mitigate financial losses and environmental degradation incurred by municipal, educational, residential, commercial, industrial and agricultural establishments due to various hazards.
- 3) Maintain and increase awareness amongst the town's residents and businesses of the damages caused by previous and potential future hazard events as identified specifically in this Local Hazard Mitigation Plan.
- 4) Recognize the relationship between the relative frequency and severity of disaster events and the design, development, use and maintenance of infrastructure such as roads and storm water management.
- 5) Maintain existing municipal plans and programs, adherence to state standards and ordinances that directly or indirectly support hazard mitigation.

1.6 Integration into Town Planning

The proposed mitigation actions in this Plan will provide a basis for town budgeting decisions, will help the Town be better prepared for future disasters, and will ease the receipt of post-disaster state and federal funding because the list of mitigation actions is already identified. The Municipal Plan for the Town of Troy and North Troy Village was updated and adopted in early 2020. This Hazard Mitigation Plan makes use of the recent data on the state of public infrastructure and development, and is consistent with the goals and strategies of the Municipal Plan, in particular those articulated in the Flood Resilience and the Utilities and Public Facilities sections.

In the Flood Resilience section, the articulated goal of reducing the risk of flood damage to infrastructure and improved property is proposed to be achieved through the following strategies:

- Partner with DEC and other organizations to facilitate restoration projects in river corridors.
- Encourage best practices to handle stormwater runoff from existing and new development.
- Discourage development on steep slopes and within river corridors.
- Create a capital improvement plan to address the mitigation projects identified in the LHMP, beginning with the highest priority projects.
- Consider regulating river corridors as part of the flood hazard regulations in order to mitigate flood and fluvial erosion hazard risks, protect investments in streambank restoration projects, and receive a higher amount of funding under ERAF
- Hold periodic education events to inform local residents how to mitigate flood and fluvial erosion hazards.

In the Utilities and Public Facilities section, the following strategies are relevant to and consistent with the goals of this hazard mitigation plan:

- Pursue the purchase and installation of generators for the most critical town utilities and facilities.

- Investigate the grant funding potential to meet facility needs.
- Develop a capital improvement plan to guide budgeting and expenditures for future infrastructure needs.

In the Transportation section, the following strategies are relevant to and consistent with the goals of this hazard mitigation plan:

- Maintain gravel roads and utilize local gravel resources.
- Address the safety concern areas in town with local maintenance or encourage state improvements and maintenance, especially along Route 105.
- Practice access management for new drives along major through traffic routes.
- Develop a capital budget plan for road maintenance and equipment acquisition.
- Guide truck related business development along main truck routes.
- Repair bridges in a timely fashion.
- Maintain and replace equipment in a timely fashion.
- Encourage dense development in and around the Village of North Troy and the Hamlet of Troy to support these multi-modal areas.
- Develop a maintenance plan for pedestrian facilities.
- In order to decrease road maintenance, roads with limitations on weight capacities should be posted as such.
- Encourage adequate bicycle facilities (wide-paved shoulders) to be added when substantial roadwork is to be undertaken, especially for Routes 100 and 105.

1.7 Community Overview

Troy Town

Orleans County

Area: 23,341 Acres/36.47 Square Miles

Chartered: October 28, 1801 (Vermont Charter)

Coordinates: 44°26' 57"N 72°23' 50"W

Altitude ASL: 764 feet

Troy is located in northern Orleans County, adjacent to the Canadian border. The Green Mountains lay to the west and the Vermont Piedmont lies to the east. It is bound on the north by the province of Quebec, Canada; on the east by the Town of Newport; on the west by the towns of Jay and Westfield; and on the south by Lowell. There is an international border crossing along VT Route 243, a short distance from the center of North Troy Village. The Village of North Troy is located entirely within the geographic boundaries of the Town of Troy (see Troy Base Map in Appendix). The area in southwestern part of the town encompassing the intersection of State Routes 100 and 101 is referred to as the "Troy hamlet." Although there is a Census Designated Place (CDP) delineating the hamlet of Troy, this is not a political boundary. Both the Town of Troy and Village of North Troy share the same Municipal Plan and the Town zoning regulations apply to all land within the geographic boundary of Troy, including the Village of North Troy.

1.7.1 Public Lands, Facilities, and Services

Public Water

Public water is available to the residents of the Village of North Troy and the Troy hamlet. The sources of water for the Village of North Troy are from wells located southeast of the Village along River Road that pump up hill to the reservoir. The Village demands approximately 150,000 gallons per day. The Village may have to add another tank, or process water differently in order to meet the demand should additional housing be developed in the future. A lack of back-up power is another major concern for the Village, as blackouts shut down the pumps required to supply the system.

The hamlet of Troy utilizes a well, which is just south of the hamlet along the west side of the Missisquoi River. The well provides 120,000 gallons per day. The water is pumped to a tower north of the hamlet on Route 101 from which it gravity feeds to the hamlet inhabitants. This water system also lacks back up power. When there are large demands on this water supply, it recovers slowly. To address this issue, the town installed a telemetry system that runs the pump only when reservoir levels get low. This has proven to significantly improve the level of the aquifer. In addition, a filtration system has been installed to lower iron and arsenic levels in the water supply. A new well to replace the old well was installed in July of 2016.

The inhabitants of the outlying regions of the town utilize private wells and springs for their water source.

Wastewater

The Village of North Troy is served by its own wastewater treatment plant. It is located on Elkins Drive adjacent to the Missisquoi River south of Route 105 and has a capacity of 110,000 gallons per day. The present committed capacity of the plant is 70,000 – 80,000 gallons per day. Future growth in the Village would easily be accommodated with the current level of capacity.

A wastewater treatment plant located off Route 101 serves the hamlet of Troy, portions of Route 101 and Route 242. The plant is jointly owned with the Town of Jay and has recently undergone an expansion. Currently the plant is operating at 150,000 gallons per day and is designed to accept 800,000 gallons per day. Troy's share is 110,000 gallons per day, although usage is not currently at this level. The added capacity is expected to be adequate for future expansions at Jay Peak, with additional capacity for related growth in Jay and the Hamlet of Troy.

The majority of the residents of Troy outside the hamlet have private sewage disposal systems consisting of septic tanks and leach fields.

Medical

Troy does not have a health clinic. Most residents use the North Country Hospital in Newport City, located approximately 14 miles from the Municipal Offices in North Troy.

Electric and Communications

The Vermont Electric Cooperative (VEC) services the Town of Troy. There is a major transmission line running east-west through the Town, just south of Village of North Troy.

Consolidated Communications provides telephone service in town. Rural customers appear to be discontent with the service due to the high cost, restricted local calling area, and poor service response time. Cellular service has limited coverage and is provided by AT&T Mobility and Verizon Wireless.

DSL is available throughout the town, but high-speed connection is limited at this time. Areas with higher density of residences and commercial buildings are fairly well served, however buildings in the lower density areas of town struggle with hit or miss availability of fast, reliable, affordable service. Residents and businesses in this situation are often required to pay for the infrastructure installation, which is sometimes miles away.

Town Garage

The Town Garage was built in 1984 to serve the needs of the Town of Troy. The garage houses the equipment owned by the town, which includes a grader, three dump trucks and a bucket loader. The Town Garage is located on State Route 105, east of the Mississquoi River.

Village Garage

The North Troy Village Garage serves the Village. It is located in the Village Office Building and houses a plow truck and backhoe.

Town Office Building

The Troy Town Office is located in North Troy at 142 Main Street directly in front of the Troy Elementary School. The town office is also designated to serve as the local Emergency Operations Center (EOC) for the town during local emergencies and natural disaster situations.

Village Office Building

The Village Office Building located at 160 Railroad Street houses the Village Offices, Clerk's Office, Meeting Room, Rand Memorial Library, Community Room, Village Garage, and the Village Fire Department. The building was originally built in the 1950's, was given to the Village in 2000, and was renovated in 2002 to incorporate these facilities.

Troy Elementary School

The Troy Elementary School serving the Village of North Troy and Town of Troy is located on Main Street in the village of North Troy. The building was built in 1978 and has had only one addition, which provided an additional classroom. The Pre-Kindergarten is located in a manufactured building. Over the years, school enrollment has remained consistently between 150 and 170 students. Enrollment in grades Pre-K through 8 as of January 2019 was 179, with 18 students in Pre-K. Enrollment is expected to continue to remain stable over the next several years unless the town receives a major industry or new housing developments.

Child Care Facilities

According to the Bright Futures Child Care Information System on the VT Department for Children and Families website, there are currently nine childcare providers in the Town of Troy.

Six of the childcare providers are "Registered Family Child Care Homes" and three are "Licensed Providers."

The location of and capacity of each are listed in the “Critical Facilities” section of the plan.

Emergency Facilities and Disaster Response

Troy’s emergency response facilities include two fire stations, the Town Office (EOC), and locally designated shelters. The Village of North Troy also includes a Federal Border Crossing Station along Rt. 243. The American Legion, Masonic Hall, and Troy School are the three primary shelters designated and VT Routes 100, 105, 243 and 101 are the designated emergency evacuation routes for the town. Missisquoi Valley Ambulance, located in Jay, provides local EMS service and is dispatched (along with fire and police dispatch services) through the Williston – Public Safety Answering Point. The Town Constables, Orleans County Sheriff Department, and Vermont State Police Troop B (Derby Base) all provide Troy with local policing.

Troy belongs to the State Police Troop B Terrorism District and Local Emergency Planning Committee (LEPC) 10, both of which coordinate emergency response and planning for the towns in Orleans County.

Troy Fire Station

The Troy Fire Station is located in South Troy and services all parts of Troy to the south of Route 105, Veilleux Road (Town Road #12), Bergeron Road (Town Road #16) and Searles Road (Town Road #19). The Troy Volunteer Fire Department owns the facility and is also contracted by the town of Westfield to respond to calls within the entire town of Westfield. In an average year, the fire department covers approximately 45 calls with a dedicated group of 30 volunteers.

The department’s equipment includes a 1998 Spartan Engine, a 2005 International/E-One 1800 gallon Pumper Tank, a 1991 Sutphen 100 Ft. Aerial Platform and a 2007 Chevrolet rescue van.

The Troy Volunteer Fire Department is currently dispatched through the Vermont State Police out of the Williston Barracks. The Department does have a generator and battery backup to maintain emergency communications in the event the town has lost power.

North Troy Fire Station

The North Troy Fire Station services the Village of North Troy and residents within the town living north of Route 105, and along Veilleux Road (Town Road #12), Bergeron Road (Town Road #16) and Searles Road (Town Road #19). In an average year, the fire department handles 18-25 fires including structure fires, brush fires, and automobile fires. The department has operated out of the Village Office Building since 2003. The new station adequately serves the needs of the 23 member department.

The equipment owned and used by the North Troy Fire Station includes a 1,000 gallon pumper, a 750 gallon pumper, one 1,000 gallon tanker and a utility van. The 1,000 gallon pumper and the utility van are the newest vehicles and were purchased by the department in 2003. Funding for the department comes from a combination of municipal funds, village funds, and department fundraisers.

Department volunteers are dispatched through the Williston Dispatch and belong to Orleans County Mutual Aid.

Border Station and Transportation Infrastructure

Troy hosts an important transportation network for Orleans County. The town is a port of entry for permitted trucking and railway shipments, as well as for Canadians visiting the region. The North Troy–

Highwater Border Crossing connects the town of Highwater, Quebec with North Troy. It is located at the meeting point of Vermont Route 243 and Quebec Route 243.

Vermont State Routes 105 and 100 are the two major routes within town and carry the bulk of the town's through traffic. Route 105 runs east-west from Newport Town into the Village of North Troy and then south where it meets Route 101 and turns west into the Town of Jay. Route 100 is the other major east-west route and is located approximately 6 miles south of Route 105. East Hill Road, River Road, and Route 101 act as the north-south connectors between Routes 105 and 100. The remaining state roads include Route 242 and 243. Route 242 accesses Jay Village to the west of Route 101 and Route 243 is the main route across the Canadian Border in the Village of North Troy. The remainder of the road network is comprised of rural local roads. The majority of these roads are gravel with the exception of East Hill Road, a portion of Loop Road, a portion of River Road, and the roads within the Hamlet of Troy and the Village of North Troy. Altogether there are 60.025 miles of roadways in Troy, including Class 4 roads. The Town maintains approximately 40.61 miles and the Village maintains 5.051 miles of these roads. The rest are the responsibility of the State.

In the Town of Troy, the maintenance of the road system is the second largest part of the municipal budget. The Road Commissioner reevaluates the road network every spring for maintenance needs and prioritizes projects for completion during the summer months.

The Northeast Kingdom International Airport is the nearest airport to Troy and is located in Coventry VT, approximately 15 miles south-east of North Troy Village. The facility has expanded the runway in recent years, and additional improvements have been planned.

Troy contains one freight rail line that is an important connection for regional and international rail service. Locally the rail line runs east-west from Newport City to the Village of North Troy and then north into Canada. The line is currently owned by the State of Vermont and operated by Central Maine & Quebec Railway, Inc. Heading north, the line connects to a freight yard in Farnham, Quebec where it can join the Canadian Pacific and Canadian National rail systems. Heading south, the line connects Newport City to White River Junction. This segment of the line is operated by the Washington County Railroad

1.7.2 Population and Housing

Based on the American Community Survey estimates, 2015-2019, the current population Town-wide is 1,428. The median age was 35.9, and 15.3% of the population were 65 and older. 17.2% of the population were below the poverty level. Median household income was \$45,833.

The number of houses were estimated at 800, with 612 occupied (households). 467 were owner-occupied and 145 were renter-occupied. Median rent was \$719, and the median value of an owner-occupied housing unit was \$145,300.

1.7.3 Income and Employment

The economic base in Troy is primarily one of small businesses, with a handful of establishments which employ a proportionally large number of workers. The Troy Elementary School is the single largest employer, with approximately 46 faculty and staff.

Economic activity in Troy is also driven by its location along major transportation routes between Newport City, Canada and the Jay Peak Resort. There are two trucking companies in town. Small manufacturing is important as well. Agriculture also continues to play part in commerce despite conversion and/or consolidation of farms over the past six decades. Percentage of land in farms has remained relatively steady at about 30% in the last decade. The small businesses that make up the remainder Troy's economy include retail establishments, auto repair shops, fuel oil dealers, child care facilities, some of which are pre-school certified; as well as home- based businesses.

The labor force participation for the population 16 years and older was estimated at 64.9% by the American Community Survey 5-year estimates 2015-2019. The unemployment rate was 4.4%.

1.7.4 Governance and Regulations

The Town of Troy is governed by a three-member Select Board. The Select Board is responsible for adopting the Municipal Plan and zoning bylaws that are prepared by the Troy Planning Commission. There is an active Planning Commission that has recently completed an update to the Town Plan, which was adopted by the Town in March of 2020. The Town Plan is a guidance document, rather than a regulatory document. The Village of North Troy is covered by the Municipal Plan and zoning bylaws adopted by the Town of Troy. The Village of North Troy Trustees are responsible for the water and sewer departments in North Troy. The Town of Troy maintains a water system in the hamlet of Troy, and has a joint wastewater system with the neighboring town of Jay. The water system is overseen by the Troy/Jay Sewer Board. The main purpose of the Sewer Board is to oversee the sewer system and wastewater treatment plant. The board also administers the rate, structures, the billings, environmental impacts, governmental regulations, personnel, building maintenance, and future expansions. The Troy/Jay Sewer Board consists of 3 members each from Jay and Troy.

Land development that exceeds thresholds established in State statute triggers Act 250 development review and/or other State permits such as wetlands, stream encroachment, or stormwater permits. The State Department of Environmental Conservation issues permits for potable water supplies and wastewater systems for all residential development in town.

The Town of Troy has adopted the State Road and Bridge Standards, and has an up-to-date Local Emergency Operations Plan. The Town is served by Vermont Agency of Transportation (VTRANS) Maintenance District #9.

The Town of Troy has locally-adopted zoning bylaws which include flood hazard regulations, and is a member of the National Flood Insurance Program (NFIP). In early 2021, the Planning Commission embarked on an update of the local zoning regulations.

1.8 PLANNING PROCESS

1.8.1 Previous Draft Plan

In 2005, the Troy Selectboard adopted the "Troy All-Hazards Mitigation Plan" as an annex to the Northeastern Vermont Development Association's (NVDA) All Hazard Mitigation Plan. The 2005 plan

profiled both natural and man-made hazards affecting the Town of Troy, inclusive of the Village of North Troy, although FEMA’s funding is only available to mitigate natural hazards. The natural hazards identified in the 2005 plan as having both a medium or high likelihood and medium or high impact were “Flood” and “Winter Storm/Ice.”

There were two proposed mitigation actions in the 2005 Plan, shown below:

Project/Priority	Mitigation Action	Who is Responsible	Time Frame and Potential Funding	Initial Implementation Steps
Generators with hookups HIGH	Backup power for the school and emergency operations center.	Fire Chief, Lee Forbes	2005 – HMGP, FMA	Seek grant sources and cost estimates.
Road and culvert upgrades	Continue to replace undersized culverts with larger culverts to prevent flooding.	Road Foreman, Lee Forbes	2005 – HMGP, Bridge and Culvert Program	Seek engineering solution and cost estimates.

Since 2005, road and culvert upgrades have been ongoing. Details of PA-funded projects to replace culverts are included at the bottom of Table 3.1 in section 3 of this document. The Town has not been successful in acquiring power generators for the school and emergency operations center.

See also pages 37-38 of this document for a discussion of changes in priorities since the adoption of the 2005 Hazard Mitigation Plan.

1.8.2 Development of New Plan

In late July of 2015, NVDA was awarded a grant from the State of Vermont Department of Emergency Management and Homeland Security (DEMHS) for the development of Local Hazard Mitigation Plans for a number of municipalities in the Northeast Kingdom, among which was Troy and the Village of North Troy.

After working on a comprehensive update to the Municipal Plan in 2019, the Troy Planning Commission and Selectboard elected to begin work on creating the new multi-jurisdiction hazard mitigation plan. In late November, representatives of the Town and Village signed a Memorandum of Understanding with NVDA, which outlined the respective responsibilities of NVDA and municipal officials in developing the LHMP for the Town.

After the updated Municipal Plan was adopted in the Spring of 2020, and received regional approval by the regional planning commission, Irene Nagle, staff planner at NVDA, began information gathering for the updated Hazard Mitigation Plan for the Town of Troy and Village of North Troy. An online survey was posted on the Town of Troy website, the town’s Facebook page, and the Troy page of NVDA’s website on June 9, 2020 to gather information from the community on hazards and impacts, and to inform residents of the hazard mitigation planning process. A press release was sent on June 8, 2020 to both the Barton Chronicle and the Newport Daily Express regarding the public survey (see appendix). On June 24, 2020, the survey responses were downloaded. There were a total of ten responses (see appendix). Although the survey remained posted online until October 2021, no additional responses were recorded.

A Local Hazard Mitigation Planning team was assembled, consisting of members of the Troy Planning Commission, and the following individuals:

- Selectboard Chair and Troy Emergency Management Coordinator, Robert Langlands
- Town Clerk and Village Trustee, Terri Medley;
- Town Road Commissioner, Robert “Bobby” Jacobs;
- Health Officer, Gaston Bathalon;
- North Troy public works supervisor, Karson McMahon (water and wastewater); and
- Steve Button, water department plant operator for Troy, and Chief Operator of the Troy/Jay Sewer Plant.

Due to the COVID-19 pandemic, in person meetings were not feasible, so a virtual public kickoff meeting was held via Zoom on June 24, 2020. The meeting was advertised on the Town of Troy website and in the newspaper of record, the Newport Daily Express (see appendix for copy of published notice.) In attendance at the June 24th meeting were Irene Nagle from NVDA; Terri Medley, Town Clerk and Village Trustee; Robert Langlands, Selectboard Chair and Troy Emergency Management Coordinator; Irene McDermott, Troy Planning Commission; Bobby Jacobs, Town Road Commissioner; Katherine Langlands, Troy Planning Commission, and John Coburn, local resident. NVDA presented an overview of the hazard mitigation planning process and the benefits of having a local, FEMA-approved hazard mitigation plan. After the presentation, participants reviewed the list of critical facilities in the town and village, and reviewed a list of natural hazards, rating their likelihood of occurring and the impact they would have on the community. Meeting attendees shared stories of past occurrences of damage due to flooding, thunderstorms, and winter storms. The results of that meeting formed the basis for the risk assessment and the vulnerability assessment in sections 4 and 5 of this plan.

A second public meeting was held on July 22, 2020 and members of the Hazard Mitigation Team discussed critical facilities and vulnerable areas. Only members of the Hazard Mitigation Planning Team attended this meeting. After a break of several months, the hazard mitigation team reconvened in a virtual meeting on February 22, 2021 to review potential mitigation actions. A follow-up meeting, again virtual, was held on March 1, 2021 to review potential costs of mitigation actions.

A draft Plan was prepared using data sources that included:

- The results of surveys and public comments provided at public meetings
- Input of the Troy Town Road Foreman regarding problem culverts and vulnerable stretches of road
- 2018 Vermont State Hazard Mitigation Plan (provided key guidance language and definitions throughout the plan).
- Vermont Agency of Natural Resources (ANR) and the Vermont Department of Transportation (VTrans) (Provided key policy recommendations on environmental conservation, climate change and fluvial erosion data, and road and stormwater infrastructure).
- Vermont Department of Environmental Conservation (DEC) (provided river corridor data)
- FEMA Open Source (data.gov) Data for Disaster History and PA funding (provided comprehensive declared disaster by year and type as well as project descriptions and cost per event).

Using the above data sources, the planning team worked with NVDA to create the Plan.

Changes based on initial comments received from the State were incorporated into a revised draft of the LHMP, and the revised draft was posted on the Town of Troy and Village of North Troy websites from April 8th until May 9th for public review and comment, with instruction to address comments to Irene Nagle, NVDA planner. On April 8th the document was also emailed directly to the Town Clerks of the four adjacent Towns: Jay, Newport Town, Westfield and Lowell. Individuals were instructed to address comments on the plan to Irene Nagle, NVDA planner. A copy of the email sent to the Town Clerks of the surrounding towns is included in the appendix to this document. No comments on the draft were received.

2. HAZARD IDENTIFICATION

The planning team looked at natural hazards identified in the State hazard mitigation plan, and for each considered prior history, current trends and available data in order to select (profile) hazards that are most likely to impact Troy/Village of North Troy and for which local mitigation actions could be developed.

The 2018 State of Vermont Hazard Mitigation Plan identified the following natural and technological hazards, and ranked them according to vulnerability. The table below is from the State’s Hazard Mitigation Plan

Table 3: Hazard Assessment

Hazard Impacts	Probability	Potential Impact					Average:	Score*:
		Infrastructure	Life	Economy	Environment	Average:		
Fluvial Erosion	4	4	3	4	4	3.75	15	
Inundation Flooding	4	4	3	4	2	3.25	13	
Ice	3	3	3	3	2	2	8.25	
Snow	4	1	3	2	1	1.75	7	
Wind	4	2	2	1	1	1.5	6	
Heat	3	1	3	2	2	2	6	
Cold	3	1	3	2	2	2	6	
Drought	3	1	2	2	3	2	6	
Landslides	3	3	2	1	2	2	6	
Wildfire	2	3	3	3	2	2.75	5.5	
Earthquake	2	3	3	3	2	2.75	5.5	
Invasive Species	2	1	1	2	3	1.75	3.5	
Infectious Disease Outbreak	2	1	3	2	1	1.75	3.5	
Hail	3	1	1	1	1	1	3	

*Score = Probability x Average Potential Impact

While it is understood that FEMA will only reimburse the town for disasters caused by natural hazards, considerations for other the categories can increase resilience to a natural disaster. Technological hazards are distinct from natural hazards primarily in that they originate from human activity. In contrast, while the risks presented by natural hazards may be increased or decreased as a result of human activity, they are not inherently human-caused.

Technological and social hazards often occur as a secondary consequence of a natural disaster, and become vulnerabilities. For example, loss of telecommunications or electrical service can be the result of a natural hazard such as high winds or heavy snowfall.

While recognizing them as potential vulnerabilities, the Town decided not to profile man-made/ technological hazards for the purposes of this plan.

The Town and Village have reviewed information for all natural hazards, and has divided them into “profiled” and “non-profiled” hazards. In order to determine which hazards should be profiled, the planning team reviewed a “Hazards Checklist” (see Table 3.2 in Section 3. Risk Assessment). Based on this exercise, the following hazards were chosen to be profiled because they had both a medium or high probability of occurring and posed a moderate to major impact if they did occur.

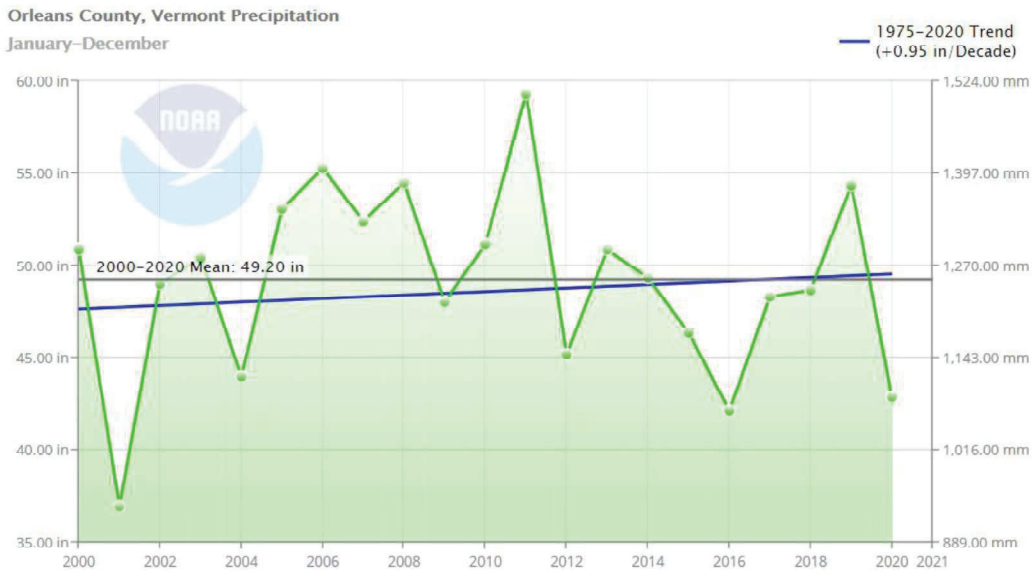
- Flooding/Stream Bank Erosion (these were listed separately in the State Hazard Mitigation Plan, but were addressed together in Troy’s Plan)
- High Winds
- Severe Winter Storms (included the hazards of ice and snow identified in the State Hazard Mitigation Plan)
- Extreme cold
- Invasive Species
- Infectious Disease Outbreak

The Hazard Mitigation Planning Team identified Heat, Drought, Landslides, Wildfire, Earthquake and Hail as low probability and low impact in the communities of Troy and North Troy. Accordingly, and due to a lack of resources and capacity in the Town and Village, these hazards will not be discussed in detail in this plan. For a detailed description of these hazards, the reader can consult the Vermont State Hazard Mitigation Plan.

2.1 Natural Hazards

2.1.1 Climate Change:

From 1962 to 2006, each five-year period resulted in 0-6 Major Disaster Declarations in Vermont. From 2007-2011, there were 11. It is commonly accepted that weather extremes are becoming more commonplace in Vermont. Since 2011, record setting snow, rain and cold have been experienced in the state. In recent years, it has become evident that human activities, mostly associated with the combustion of fuel, have added to the natural concentration of greenhouse gases in the atmosphere and are contributing to rapid climate change on a global scale. While projections of the effects of climate change vary, it is generally predicted that Vermont will have warmer temperatures year-round, with wetter winters and drier summers. An increase in the size and frequency of storms is also predicted. Thus, climate change in the next century will likely increase the chance of weather-related hazards occurring. An increase in precipitation may also result in increased flooding and fluvial erosion. In Orleans County, annual precipitation from 1975 to 2020 has been increasing by .95 inches per decade (see graph below).



Source: NOAA National Centers for Environmental information, Climate at a Glance: County Time Series, published July 2021 <https://www.ncdc.noaa.gov/cag/>

2.1.2 Disaster History

There have been 20 disasters and 2 emergencies declared in Orleans County from 1973 through 2019. Incident types in Orleans County have been Severe Storm, Flood, Severe Ice Storm, Hurricane, and Snow. Table 2.1 lists hazard events, with those affecting Troy and/or North Troy shown in bold.

Table 2.1:
Summary of Disasters (DR) and Emergency Declarations (EM) in Orleans County

Disaster Number	Declaration Date	Disaster Type	Incident Type	Title
4474	2019-10-31	DR	Severe Storm(s)	SEVERE STORM AND FLOODING
4380	2018-05-04	DR	Severe Storm(s)	SEVERE STORM AND FLOODING
4356	2017-10-29	DR	Severe Storm(s)	SEVERE STORM AND FLOODING
4207	2014-12-09	DR	Severe Storm(s)	SEVERE WINTER STORM
4178	2014-04-15	DR	Flood	SEVERE STORMS AND FLOODING
4163	2013-12-20	DR	Severe Ice Storm	SEVERE WINTER STORMS
4140	2013-06-25	DR	Flood	SEVERE STORMS AND FLOODING
4066	2012-05-29	DR	Severe Storm(s)	SEVERE STORM, TORNADO, AND FLOODING
4022	2011-08-27	DR	Hurricane	TROPICAL STORM IRENE
3338	2011-08-26	EM	Hurricane	HURRICANE IRENE
1995	2011-04-23	DR	Severe Storm(s)	SEVERE STORMS AND FLOODING
1715	2007-07-09	DR	Severe Storm(s)	SEVERE STORMS AND FLOODING
1559	2004-08-12	DR	Severe Storm(s)	SEVERE STORMS AND FLOODING
1428	2002-06-05	DR	Severe Storm(s)	SEVERE STORMS AND FLOODING
3167	2001-03-05	EM	Snow	SNOW

1307	1999-09-16	DR	Severe Storm(s)	TROPICAL STORM FLOYD
1228	1998-06-17	DR	Severe Storm(s)	SEVERE STORMS AND FLOODING
1184	1997-07-15	DR	Flood	EXCESSIVE RAINFALL, HIGH WINDS, AND FLOODING
1101	1996-01-19	DR	Flood	ICE JAMS AND FLOODING
1063	1995-08-04	DR	Severe Storm(s)	EXCESSIVE RAINFALL, FLOODING
518	1976-08-05	DR	Flood	SEVERE STORMS, HIGH WINDS & FLOODING
397	1973-07-06	DR	Flood	SEVERE STORMS, FLOODING, & LANDSLIDES
Source: Data.gov, FEMA Declarations Data Set				

The following discussion on natural hazards is based upon information from several sources, but specific extent data for Troy was limited. Extent data available for Orleans County and nearby towns can be used to capture the extent of natural hazard events for Troy. General descriptions of hazards are based upon the 2018 Vermont State Hazard Mitigation Plan.

2.1.3 Profiled Hazards

Flooding and Stream Bank Erosion

Flooding

Flooding is the most common recurring hazard event in the state of Vermont. According to the State Hazard Mitigation Plan, there are three main types of flooding that occur in Vermont: flooding from rain or snow melt, flash flooding, and urban flooding. Flooding has also been known to occur as a result of ice jams in rivers adjoining developed towns and cities. These events may result in widespread damage in major river floodplains or localized flash flooding caused by unusually large rainstorms over a small area. The effects of all types of events can be worsened by ice or debris dams and the failure of infrastructure (especially culverts), private and/or beaver dams.

As previously noted, precipitation in Orleans County has been increasing by .95 inches per decade.

The National Oceanic and Atmospheric Administration (NOAA) Storm Events Database lists 26 “Flood” events, 17 “Flash Flood” events and six “Heavy Rain” events in Orleans County from January 2000 to February 28, 2021.

The 26 Flood events in Orleans County caused a total of \$501.083 M in property damage and \$250K in crop damage. The Flash Flood events caused a total of 1.21 M in property damage and 25K in crop damage, and the Heavy Rain events caused 10K in property damage. Some, but not all, of these events correspond with declared disasters listed in table 2.1 above.

Specific narrative accounts of Flood events that affected Troy and North Troy are included in the NOAA database as follows:

June 12, 2002: *A frontal boundary stalled across portions of New York and New England and helped to focus heavy rainfall across this area. Convective precipitation moved from northwest to southeast across the area from Canada. Rainfall from midday on June 11th through midday June 12th averaged 2 to 4 inches with locally higher amounts in the mountainous areas. Countywide flooding of small streams and*

fields started during the early morning hours of June 12th and continued into the evening of the 12th. A few minor road washouts and a few minor mudslides were reported. This was followed by continued flooding of main stem rivers through late afternoon and evening of June 13th. These main stem rivers were the Passumpsic, Lamoille and Missisquoi Rivers.

August 3, 2006: A warm, very humid and moisture laden airmass was located across Vermont on the night of the 2nd. In addition, a cold front was draped along the Vermont and Canadian border during this time. Showers and thunderstorms developed along this frontal boundary and moved across the headwater region of the Missisquoi river basin in Orleans county during the night of the 2nd and into the early morning hours of the 3rd. Several inches of rain fell in this region with Newport at 2.86 inches and Jay Peak at 3.30 inches. This resulted in some stream flooding as well as the Missisquoi river at North Troy to crest above flood stage (9 feet), during the early morning hours of the 3rd, with a reading of 10.06 feet, that caused some minor flooding of Loop and River roads in North Troy.

July 24, 2008: A cold, unstable upper atmospheric low slowly moved across the eastern Great Lakes during the afternoon of July 24th. Meanwhile, a surface low slowly traveled north along a cold front which moved into an moisture laden atmosphere across New York and Vermont. Numerous showers and embedded thunderstorms with localized heavy rainfall moved across portions of Vermont, already saturated by previous rainfall events, during the afternoon and evening hours. Much of central and northern Vermont had saturated antecedent conditions due to very significant severe weather and heavy rainfall events of July 18th and July 21st-22nd. Widespread rainfall of 1 to 2 inches occurred during the afternoon and evening of July 24th with localized amounts that exceeded 3 inches. This heavy rainfall caused flood problems across central and north central Vermont, especially portions of Washington, Lamoille, Orleans and Caledonia counties. Route 100 between Lowell and Westfield flooded and closed as well as several other roads in Lowell.

March 23, 2010: Low pressure moved out of the Mid-Atlantic region and across southern New England on March 22nd and 23rd. The storm system produced 1.5 to 2 inches of rain across central and southern Vermont. This heavy rainfall combined with runoff from melting snow in the higher elevations produced scattered flooding. Runoff from heavy rain and snow melt caused flooding of River Road along the Missisquoi River between Troy and North Troy VT. The river gage on the Missisquoi near North Troy went above flood stage of 9 feet at 14:15 EST, crested at 9.31 feet from 19:00 to 20:15 EST, and fell below flood stage at 22:42 EST.

April 11, 2011: Light to moderate rain associated with a warm front late on April 10 was preceded by several days of above freezing temperatures and melting snow. On April 11 a cluster of thunderstorms moved west to east across northern Vermont during the morning hours. Flooding resulted from the combination of snowmelt and rainfall totals of 1 to 2 inches. Runoff from heavy rain and snowmelt combined to cause flooding on rivers in Orleans County. The Missisquoi River at North Troy VT exceeded flood stage of 9 feet at 09:11 EST on 4/11/2011, and crested at 11.27 feet at 23:00 on 4/11/2011. The Barton River at Coventry VT exceeded flood stage of 8 feet at 08:12 EST on 4/11/2011, and crested at 9.42 feet at 23:00 EST on 4/11/2011. The Barton River flooded portions of River Road between Orleans and Coventry Station.

May 26, 2013: An area of low pressure developed on a stalled surface front in southern New England on May 24, and developed into a coastal storm that lasted through May 26. Widespread steady rainfall of one to two inches produced minor flood problems, especially for areas that flooded on May 23. Heavy wet snow fell at elevations above 1200 to 1500 feet, and the combination of snow load and winds of 25 to 35 mph caused power outages. The low pressure moved out of the area on May 26.

Runoff from heavy rainfall caused the Missisquoi River at North Troy VT to flood. The river crested at 9.27 feet at midnight on 26 May 2013, flooding local roads along the river. Flood stage is 9 feet.

November 1, 2019: *A developing area of low pressure moved from the Gulf of Mexico on during the night of the 30th and 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. The upper level pattern was very strong and dynamic with a direct moisture feed from the Gulf of Mexico, thus delivering copious amounts of moisture into the northeast and NY. Steady rain developed during the mid to late evening of October 31st and became heavy at times through the early morning hours of November 1st. Rainfall amounts 1.5 to 2 inches were common across much of Vermont with a swath of 2 1/2 to 4 inches across northwest and north central Vermont. Numerous flooded streams, flooded and several washed out roads were reported in northern Vermont beginning just after midnight on November 1st and several larger rivers flooded as well, including the Lamoille, Missisquoi basins and portions of the Winooski and Mad River basins. Urban street flooding occurred in the Burlington area just after 10 pm on October 31st. In addition, 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. Estimated public infrastructure damage in excess of \$5 million. Several roads flooded due to very heavy rainfall across Orleans county. Some of the more intense flooding occurred near the headwaters region of the Missisquoi near Lowell and North Troy.*

As noted above, ice jams can cause or exacerbate flooding when combined with rainfall and snowmelt.

Winter and spring thaws, occasionally exacerbated by ice jams, are another significant source of flooding, especially when coupled with high rain levels. Much of this flooding is flash flooding, occurring within hours of a rainstorm or other event. Flash flooding, as opposed to flooding with a gradual onset, causes the largest amount of damage to property and infrastructure. Floods cause two major types of damage: water damage from inundation and erosion damage to property and infrastructure. The 2018 Vermont Hazard Mitigation Plan discusses flooding extensively. While that plan is concerned with all of Vermont, the information on flooding is all relevant to Troy. The Plan states that “fluvial erosion and inundation flooding continue to be the first and second most significant natural hazards in Vermont, respectively.”

The estimated Capacity-Disruption Levels Given a Measured Rainfall Event can be interpreted as the conditional probability that a particular roadway capacity disruption occurs, given that a rainfall event occurs. For Orleans County, the probability that the intensity of a rain event will result in approximately a 2%, 7.5%, or 13.5% roadway capacity reduction are 7.35%, 23.96%, or 1.3%, respectively (Source: A Risk-Based Flood-Planning Strategy for Vermont’s Roadway Network, 2015).

Stream Bank (Fluvial) Erosion

It is noted that extent data for fluvial erosion is unavailable because it is beyond the capacity of the Town or Village to track after flooding events. Erosion occurs on a consistent, but small-scale, basis within the riparian corridor of Troy’s streams. This is a part of normal natural processes and as such is necessary for the proper functioning of the ecosystem of these waterways. However, fluvial erosion on a large scale can damage stream banks and undercut infrastructure such as roads, bridges and culverts

as well as agricultural land and structures, causing severe damage. Fluvial erosion on a large scale can cause stream bank collapses, which are generally classified as landslides.

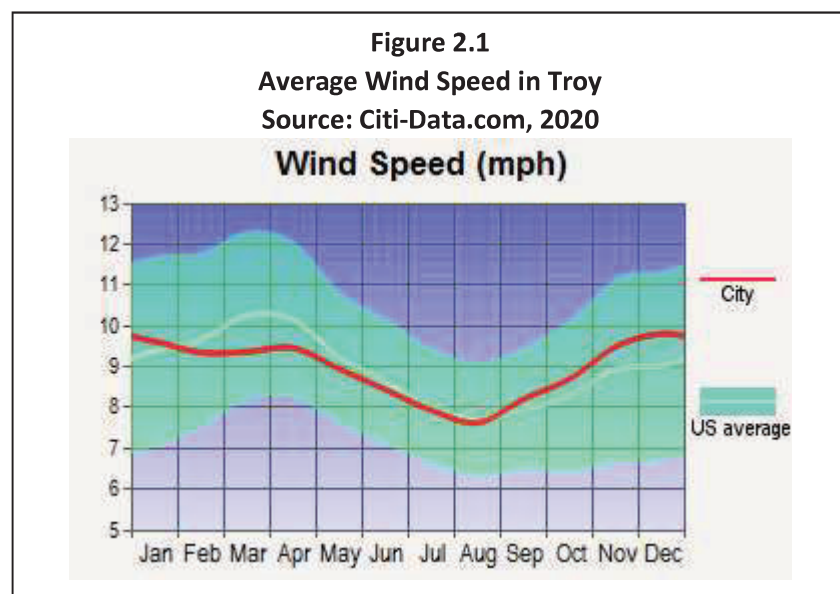
Most flood damage in Vermont is associated with fluvial erosion rather than inundation. The *2018 Vermont State All-Hazards Mitigation Plan* contains the following discussion of fluvial erosion:

“Data indicate that greater than 75% of flood damages in Vermont, measured in dollars, are associated with fluvial erosion,¹ not inundation. These events may result in widespread damage in major rivers’ floodplains or localized flash flooding caused by unusually large rainstorms over a small area. The effects of both inundation flooding and fluvial erosion can be exacerbated by ice or debris dams, the failure of infrastructure (often as a result of undersized culverts), the failure of dams, continued encroachments in floodplains and river corridors, and the stream channelization required to protect those encroachments..”

The State of Vermont Agency of Natural Resources (ANR) has mapped “River Corridors” throughout the State. The River Corridors, as defined by ANR, “encompass the area of land surrounding a river that provides for the meandering, floodplain, and the riparian functions necessary to restore and maintain the naturally stable or least erosive form of a river thereby minimizing erosion hazards over time.” Since lands within and immediately abutting a river corridor are at higher risk to fluvial erosion, the State recommends that development within mapped River Corridors be avoided, and that a 50 foot setback be maintained from smaller streams.

As an incentive to encourage Towns to restrict new development within River Corridors, the State provides an increased State match under ERAF for Towns that adopt local flood regulations incorporating regulation of State River Corridors.

River Corridors have been mapped by the State for Troy. An estimated 1271 acres of land in Troy are within the State-identified River Corridors, indicating the extent of land that may be subject to fluvial erosion hazards. Most of this acreage is within undeveloped areas of Town, although there are a few locations where roads or existing houses are located within the River Corridor (see map in the Appendix).



High Winds

Average wind speeds in Troy as indicated on Figure 2.1 are below 10 miles per hour, what is described on the Beaufort

Scale as a “gentle breeze.”

The Beaufort Scale is one of the first scales developed to estimate wind speeds and their effects. It was created by Francis Beaufort in 1805 to help sailors estimate the winds via visual observations, and is still used today to estimate wind strengths.

Transportation route access and electric power supply are at risk during a major wind event. As illustrated by the incidents described below, high winds can result in downed trees, property damage, and loss of life.

The National Oceanic and Atmospheric Administration (NOAA) lists three type of wind events that affect Orleans County: “Strong Wind,” “High Wind,” and “Thunderstorm Wind.”

“Strong Wind” is defined as non-convective winds gusting less than 50 knots (58 mph), or sustained winds less than 35 knots (40 mph).

“High Wind” is defined by NOAA as 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.

“Thunderstorm Wind” is defined as 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.

According to the NOAA *Storm Events Database*, throughout Orleans County from January 1, 1995 through the end of February 2021 there were 21 “Strong Wind” events, causing a total of \$349.5K in property damage; 14 “High Wind” events causing a total of \$695K in property damage; and 99 “Thunderstorm Wind” events causing 934K in property damage and 10K in crop damage.

Events with documented impacts in Troy and/or North Troy included the following:

- A thunderstorm wind event on July 5, 1999 caused 50K in property damage and resulted in 1 fatality. The description was as follows:

“A mesoscale convective complex consisting of a cluster of thunderstorms moved across northern New York and northern Vermont during the early morning hours of Monday, July 5th. Across Orleans county Vermont, there were numerous reports of trees and power lines blown down with thousands without power.

One death occurred on Lake Salem in Derby, Vermont when a person camping in a tent on a raft was blown away by thunderstorm winds. The tent became submerged and entangled in the water and the camper drowned.

In the Newport area, damage resulted when trees fell on tents and campers as well as on cars and boats. In North Troy, a tree was blown onto a house. Across the county, some damage resulted when trees fell on cars.”

- A strong wind event on November 2-3, 1999 caused \$15K in property damage. The description was as follows:

“A storm system over the Tennessee Valley Tuesday morning, November 2, 1999 moved northeast into the St. Lawrence Valley Wednesday morning, November 3, 1999. Strong winds developed ahead of this system. Trees were uprooted in Newport Center with power outages. Across the county, numerous trees and power lines were blown down. Power outages were

reported in Lowell, Westfield, Craftsbury, Coventry, Irasburg, Derby Center, Troy, Jay, Morgan and Holland.”

- A strong wind event on December 18, 2000 caused \$20K in property damage. The description was as follows:

A storm system tracked through the eastern Great Lakes region and into Canada on Monday, December 18, 2000. Gusty winds accompanied this system. Trees and power lines were blown down in portions of Orleans county. Specifically, trees were blown down in Irasburg, Troy, North Troy and Newport Center.

- A thunderstorm wind event on July 8, 2003 had a magnitude of 50 kts and caused \$5K in property damage. The description was as follows:

“A cold front moving into a warm and humid airmass triggered late afternoon thunderstorms. A few of the storms across northern Vermont were severe. In the town of Troy, thunderstorm winds blew down tree limbs.”

- A thunderstorm wind event on June 10, 2008 had a magnitude of 50 kts and caused \$10K in property damage. The description was as follows:

“A very energetic mid-atmospheric disturbance moved across the Great Lakes during the afternoon and evening of June 10th. This developed a surface low along a cold front, which moved across Vermont during the afternoon and evening hours. These features moved into a very warm, humid and unstable airmass draped across Vermont that resulted in two rounds of widespread severe thunderstorms.

The first round moved across Vermont during the early to mid afternoon hours and the second round occurred during the evening. In Vermont...hundreds to thousands of trees were damaged, downed or uprooted which caused downed power lines and structural damage to numerous buildings and vehicles. Tens of thousands of customers lost power due to the storms, with some outages that lasted several days. Numerous large branches and few trees down across North Troy.”

Severe Winter Storm

Winter storms impact the entire planning area. According to the *2018 Vermont State All-Hazards Mitigation Plan*:

“Severe winter storms develop through the combination of multiple meteorological factors. In Vermont and the northeastern United States, these factors include the moisture content of the air, direction of airflow, collision of warm air masses coming up from the Gulf Coast, and cold air moving southward from the Arctic. Significant accumulations of ice can cause hazardous conditions for travel, weigh down trees and power lines, and cause power outages. Freezing rain can also be combined with snowfall, hiding ice accumulation and further hindering travel, or with mixed precipitation and potentially ice jams or flooding.”

County-wide, the winter of 2010-2011 was the third-snowiest on record with a total of 124.3 inches. The record of 145.4 inches was set in 1970-1971.

Figure 2.2 Average snowfall in Troy, VT

Source: City-data.com

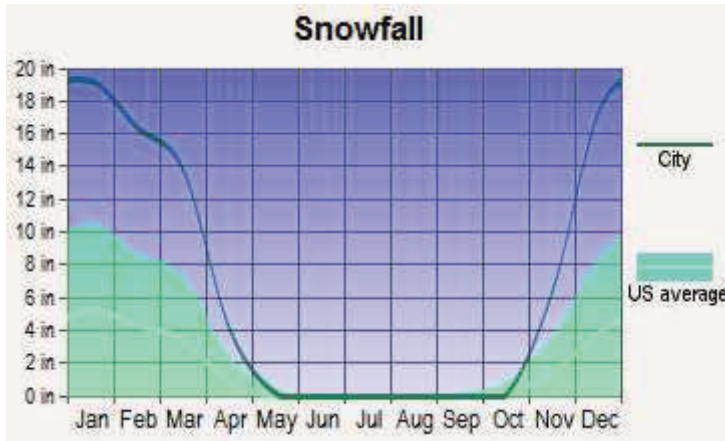


Figure 2.2 depicts average snowfall in Troy, which is well above the U.S. average. According to the NOAA Database, there are four types of events that have occurred in Orleans County that are associated with the locally identified hazard of severe winter storms: “Winter Weather,” “Winter Storm,” “Heavy Snow” and “Ice Storm.”

NOAA defines “Winter Weather” as a “winter precipitation event that causes a death, injury, or a

significant impact to commerce or transportation, but does not meet locally/regionally defined warning criteria. A Winter Weather event could result from one or more winter precipitation types (snow, or blowing/drifting snow, or freezing rain/drizzle).”

By comparison, a “Winter Storm” event is defined as a “winter weather event that has more than one significant 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.”

From January 2000 to the end of February 2021 in Orleans County there were 107 “Winter Weather” events, 103 “Winter Storm” events, 5 “Heavy Snow” events, and 1 “Ice Storm” events.

Winter Weather events in Orleans County during this period accounted for 453.5K in property damage. Winter Storm events accounted for 1.69M in property damage and 10K in crop damage. Heavy Snow events during this period accounted for 227K in property damage. Although there was only one “Ice Storm” event logged during this period affecting Orleans County, this event accounted for 750K in property damage. That Ice Storm event, which occurred on December 21, 2013, is recounted below:

A stationary boundary was draped across the Adirondacks of New York into portions of central and northern New England from December 20th through 22nd with several disturbances delivering precipitation. An impressive battle between mild to warm moist air, south of the boundary with temperatures in the 50s, overriding a very cold, dense shallow air mass with temperatures in the teens and 20s in northwest Vermont but single digits just north across the border into Canada.

First round of wintry precipitation fell across northwest Vermont, especially along the Canadian border during Friday afternoon and evening (December 20th). Most of the precipitation fell as freezing rain, approximately 1/4 to 1/3 of ice accumulation, along with some sleet. The second round began during the early afternoon hours of December 21st and peaked during the evening and overnight hours. An additional 1/2 to 3/4 inch of ice accumulation as well as 1 to 2 inches of

sleet occurred in portions of northern Vermont. Very cold temperatures (-10 to teens) followed the event with no melting, thus ice stayed on trees and utility lines through December 28th-29th, thus prolonging recovering efforts.

The greatest impact was in northwest Vermont, especially along the Canadian border, with widespread tree and utility line damage as well as numerous vehicle accidents. More than 75,000 customers were without power from hours to days across the region. The areas impacted were similar to the Ice Storm of January 1998, but not the severity as precipitation and ice accumulation were half of the 1998 storm.

Ice jams also developed during this time period as runoff from melting snow and rainfall swelled area rivers. River rises were enough to break up and move ice cover, resulting in scattered ice jams.

Freezing rain accumulated between 1/2 to 3/4 inch, across portions of Orleans county, especially along the Canadian border, causing numerous vehicle accidents as well as damage to trees and utility lines.

The one Winter Storm event that caused crop damage occurred on March 6th – March 7th, 2011 and is recounted below:

On March 6th, a slow moving north-south oriented cold front, laden with copious amounts of moisture, entered western Vermont by late morning, central Vermont around midday and eastern Vermont by late afternoon...On March 5th into the morning hours of March 6th, temperatures were in the 40s across Vermont which promoted significant snow melt to the region.

On March 6th, heavy rainfall preceded the cold front as it moved across Vermont. The cold front crept across western Vermont during the late morning hours, temperatures fell 12-15 degrees within an hour and heavy rain changed to heavy sleet and then wet snow.

The cold front slowed across central Vermont during midday resulting in more rainfall (up to an inch) with a gradual changeover to sleet then snow. In eastern Vermont, heavy rainfall (1-2 inches) fell through early to mid-afternoon before colder air eventually filtered into the region...reaching the lower Connecticut River valley toward evening, where icing was the main hazard.

At the same time, rapid snow melt and heavy rainfall accounted for ice-covered rivers to swell and cause ice flows. There were several reports of ice jams and flooding related problems in the Passumpsic, Missisquoi and Winooski river valleys.

Heavy snow continued from the afternoon of March 6th to midday on March 7th with the heaviest occurring in the early morning hours of the 7th with snowfall rates of 1 to 3 inches per hour. Total snowfall accumulations ranged from 20 to 30 inches across much of the Champlain Valley and northern 1/3 of Vermont, 10 to 15 inches of snow with ice accumulation up to 1/4 inch in central Vermont and 2 to 6 inches of snow with 1/4 to 1/2 inch ice accumulation in the lower Connecticut River valley.

NWS Burlington office in South Burlington received 25.8 inches, a new March snowfall record and the 3rd highest snowfall total all-time.

Most roads were impassable with numerous accidents and stuck vehicles with portions of Interstate 89 closed multiple times. Burlington Int'l Airport was closed from midday on the 6th to

midday on the 7th. Nearly 10,000 customers lost electrical power, nearly all school districts were closed on the 7th along with local/state governments.

Slightly more than a dozen dairy farms lost milk production due to trucks unable to reach farms and production facilities.

Snowfall amounts of 18 to 30 inches were reported in Orleans county, including 30 inches in Westmore, 29 inches in Newport and 25 inches in Morgan and Barton.”

Extreme cold

NOAA defines “Extreme Cold/Wind Chill” as “a period of extremely low temperatures or wind chill temperatures reaching or exceeding locally/regionally defined warning criteria (typical value around -35 degrees F or colder).

During the period January 1, 2000 to February 28, 2021, there were five extreme cold events, none of which had documented costs for property or crop damage. An event that occurred from January 14 – 18, 2009 was described as follows:

An arctic cold front moved across Vermont during the early morning hours of January 14th which delivered some of the coldest temperatures across the region in several years. As the arctic front passed across northern Vermont, temperatures dropped over 20 degrees within several hours.

Temperatures averaged 20 to 25 degrees below normal values, which were already at climatological winter minimums. Daytime maximum temperatures ranged from single digits above and below zero during this stretch while nighttime minimums were 10 to 30 below zero with isolated readings colder than 40 below zero at times.

Some observed minimum temperatures for January 15th included: 32 degrees below zero at Island Pond (Essex county), 31 degrees below zero in Canaan (Essex county), 24 degrees below zero at North Troy (Orleans county), Granby and Gallup Mills (Essex county) with 22 degrees below zero at Plainfield and Marshfield (Washington county), 21 degrees below zero at Morrisville (Lamoille county) and 20 degrees below zero at Lyndonville (Caledonia county), Newport (Orleans county) and Waltham (Addison county).

Some observed minimum temperatures for January 16th included: 42 degrees below zero in Island Pond (Essex county), 37 below zero in Sutton (Caledonia county), 34 degrees below zero in Walden (Caledonia county), 32 degrees below zero in Gallup Mills (Essex county), 31 degrees below zero in East Berkshire (Franklin county), 30 degrees below zero in Granby (Essex county), Enosburg Falls (Franklin county), and St. Johnsbury (Caledonia county) and 29 degrees below zero at Plainfield and Waitsfield (Washington county) and Bethel (Windsor county).

Record cold daily temperatures were set on January 16th for the following sites; Morrisville-Stowe Airport with 32 degrees below zero, St. Johnsbury Fairbanks Museum with 30 degrees below zero, Montpelier-Barre Airport at 26 degrees below zero and Burlington International Airport at 21 degrees below zero.

These extremely cold temperatures led to numerous cold weather related problems including numerous dead vehicle batteries and broken home/business water pipes.

Invasive Species

Invasive species was identified as an issue in the town-wide survey that was distributed to residents at the start of the hazard mitigation planning process in 2019. 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.

According to Vermont Invasives.org, “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 longhorned beetle (ALB) and hemlock wooly adelgid (HWA). These three pests threaten more than 14 different species of trees in Vermont including maple, elm, horsechestnut, 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 caterpillar 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. Forest tent caterpillars are especially of concern to maple syrup producers. Technical advice for land managers, sugar bush owners, arborists and home owners is available from VT FPR through the Orleans County Forester or VT FPR’s Forest Biology Lab at 802-879-5687.

Another pest in the region is the balsam wooly adelgid (BWA). The Vermont Department of Forests, Parks, and Recreation issued an information sheet on this forest pest in 2016 which includes a description of management options.

Infectious Disease Outbreak

The FEMA 2020 National Preparedness Report notes, “The COVID-19 pandemic resulted in the first ever Stafford Act major disaster declaration of all 50 states, five territories, and the District of Columbia for a naturally occurring infectious disease.”

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.

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. Availability of the vaccine continued to expand to successively younger age-groups.

The Vermont State of Emergency was extended for over a year until all restrictions were lifted on June 14 of 2021, at which time the benchmark of an 80% vaccination rate for the eligible population of Vermont was reached.

The Vermont Department of Health has been tracking statistics on COVID-19 within the State and developed a page on its website devoted to COVID-19 information. From March 5, 2020 to July 14, 2021, there were 109 cases of COVID-19 in the Town of Troy, and a total of 24,550 Statewide. As of July 2021, 69.5% of the eligible population in Troy were vaccinated.

<https://www.healthvermont.gov/covid-19/current-activity>

The Centers for Disease Control and Prevention (CDC) provides direction on how to mitigate the impacts of the COVID-19 pandemic and slow the spread. The CDC website includes a page entitled “Implementation of Mitigation Strategies for Communities with Local COVID-19 Transmission”

<https://www.cdc.gov/coronavirus/2019-ncov/community/community-mitigation.html>

While these measures were developed specifically in response to the COVID-19 Pandemic, they can be utilized to reduce the spread of other similar infectious diseases.

3. RISK ASSESSMENT

3.1 Natural Hazard Events

The process of risk assessment for Troy began with a review of the 2018 State of Vermont Hazard Mitigation Plan. The State Plan notes:

“Risk assessment measures the potential loss of life, personal injury, economic injury, and property damage resulting from natural hazards by assessing the vulnerability of people, buildings, and infrastructure to natural and technological disasters.”

The Hazard Mitigation Planning team assessed the hazards that were likely to impact Troy, and discussed probability, impact, risk level and history (see Table 3.2).

The Town of Troy and Village of North Troy received Public Assistance grants under five declared disasters, from 2001 through 2014. The incident types and costs are shown in Table 3.1 below.

Table 3.1 FEMA Declarations Public Assistance Details						
Disaster No.	Declaration Date	Incident Type	Application Title	Applicant	Damage Category	Federal Share Obligated
4022	2011-09-01	Hurricane	NCNO catG01 tennis courts	North Troy	Recreational or Other	14773.5
4022	2011-09-01	Hurricane	NCNO catG01 tennis courts	North Troy	Recreational or Other	-3138.3
4022	2011-09-01	Hurricane	NCNO catG01 tennis courts	North Troy	Recreational or Other	73867.5
4022	2011-09-01	Hurricane	NCNO catG01 tennis courts	North Troy	Recreational or Other	-5725.8
4022	2011-09-01	Hurricane	NCNO c02 hill st.	North Troy	Roads and Bridges	243.26
4022	2011-09-01	Hurricane	NCNO c02 hill st.	North Troy	Roads and Bridges	1216.28
1428	2002-07-12	Severe Storm(s)	ROADS AND BRIDGES	Troy	Roads and Bridges	6489.99
1428	2002-07-12	Severe Storm(s)	ROADS AND BRIDGES	Troy	Roads and Bridges	1447.07
1428	2002-07-12	Severe Storm(s)	ROADS AND BRIDGES	Troy	Roads and Bridges	5904.95
1428	2002-07-12	Severe Storm(s)	ROADS AND BRIDGES	Troy	Roads and Bridges	1124.08
1428	2002-07-12	Severe Storm(s)	ROAD REPAIR	Troy	Roads and Bridges	2838.32
1428	2002-07-12	Severe Storm(s)	ROADS AND BRIDGES	Troy	Roads and Bridges	5589.37
1428	2002-07-12	Severe Storm(s)	ROADS AND BRIDGES	Troy	Roads and Bridges	18182.53
1428	2002-07-12	Severe Storm(s)	ROADS AND BRIDGES	Troy	Roads and Bridges	22093.79

1428	2002-07-12	Severe Storm(s)	Not Provided	Troy	Roads and Bridges	3324.46
1428	2002-07-12	Severe Storm(s)	ROAD REPAIR	Troy	Roads and Bridges	3860.95
1428	2002-07-12	Severe Storm(s)	ROADS AND BRIDGES	Troy	Roads and Bridges	14830.48
1428	2002-07-12	Severe Storm(s)	PROTECTIVE MEASURES	Troy	Protective Measures	768.68
1428	2002-07-12	Severe Storm(s)	SLOPE FAILURE	Troy	Roads and Bridges	1338.75
1559	2004-09-23	Severe Storm(s)	ROAD SURFACE AND BASE REPAIR	Troy	Roads and Bridges	5161.59
1559	2004-09-23	Severe Storm(s)	ROAD SURFACE AND CULVERT REPAIR	Troy	Roads and Bridges	7611.51
1559	2004-09-23	Severe Storm(s)	ROAD AND CULVERT REPAIR.	Troy	Roads and Bridges	12246.84
3167	2001-04-10	Snow	EMERGENCY PROTECTIVE MEASURES (SNOW REMOVAL ASSISTANCE)	Troy	Protective Measures	3111.29
4178	2014-06-11	Flood	****TROYC1 River Rd Area	Troy	Roads and Bridges	12312.66

Note: Projects already completed but not noted on this chart include

- In 2018 a Box Culvert on Loop Road was replaced in 2018, with help of State funding.
- In 2019 a squash culvert on River Road was installed with use of emergency assistance funds 90/10 grant to address October/November 2019 flood, "Halloween storm."
- In 2019-2020, grant funding from Missisquoi Wild and Scenic funded work where Jay Brook is eroding the bank near Veilleux Road.

3.2 Local Risk Assessment

A “Hazards Checklist and History” was completed as a group by attendees at the June 24, 2020 meeting, and the results of this preliminary assessment are shown in Table 3.2.

Table 3.2 Troy Hazards Checklist and History (Completed as a group at June 24, 2020 public meeting)				
Natural Hazards	Probability Likelihood of it happening in any given year HIGH: 75%+ MED: 10-75%(at least once in next ten years) LOW: 1-9% (less than every 10 years)	Impact Damage, injuries, disruption MINOR MODERATE MAJOR: severe damage town-wide, multiple injuries/fatalities, critical facilities shutdown	Risk Level Based on probability, impact, and warning time LOW MODERATE HIGH	History: When, where, extent and impact Extent: wind speed, snow depth, earthquake magnitude Impact : the effect that the hazard event had on people, property and infrastructure. Dollar amount value of damage, if known.
Flooding/Stream Bank Erosion	High	Major	High	September 2019. Damage to residential properties. Culverts failed, roads washed out. Halloween Flood, 2019 – about half of roads flooded. Pump station flooded for Troy/Jay wastewater system and house next to pump station. Repaired. House on Routhier Road also flooded. Repaired. April 2019, River Road near Covered Bridge. Added stone and fill to riverbank, under State guidance.
Earthquake	Low	Minor	Low	
Hurricane/Tropical Storm	Low	Minor	Low	
High Winds	Medium	Moderate	Moderate	Winter 2020 – Trees came down.
Severe Winter Storm (ice storms, snowstorms)	High	Moderate	High	2013 ice storm -- Jay Peak shut down. 2018/2019 several events.
Extreme Cold (25 below)	Medium	Major	High	Events caused pipes to freeze – water mains in North Troy and Troy froze.

Extreme Heat (87+)	High	Minor	Low	Summer 2019 and Summer 2020. Residents in neighboring towns hospitalized due to lack of cooling equipment.
Hail	Low	Low	Low	Spring 2020, brief occurrence.
Drought	Low	Moderate	Low	----
Invasive Species (animals, insects or vegetation)	High	Minor	Moderate	Respondent to online survey indicated a mold spore has killed a local Colorado Blue Spruce plantation
Wildfire	Low	Moderate	Low	---
Infectious Disease Outbreak	Low	Moderate	Moderate	----

Based on this exercise, the planning team decided to profile in detail the hazards that posed the greatest risk to Troy (rated moderate to high risk), and to develop mitigation measures for those hazards. These included:

- Flooding/Stream Bank Erosion
- High Winds
- Severe Winter Storms
- Extreme cold
- Invasive Species
- Infectious Disease Outbreak

The Hazard Mitigation Planning Committee did not profile man-made, or “technological” hazards.

4. ASSESSING VULNERABILITY

4.1 Populations at Risk

Vulnerability refers to the potential impact of a specific loss related to an identified risk.

Areas of repetitive flooding and ongoing streambank erosion was discussed by the planning team, with the Town Road foreman providing information on the problem areas (see page 34).

There are an estimated 19 structures in the town of Troy in the FEMA-mapped Special Flood Hazard Area (SFHA), six of which are in the Village of North Troy. It is noted that since the Flood Insurance Rate Maps (FIRM) for Troy and North Troy are not digitized, it cannot be accurately geo-referenced on the map, and numbers of structures within the SFHA are rough estimates. In addition, the FIRM dates to 1980, which also affects its accuracy. The VT “Flood Ready” site does not have information on the percentage of structures within the SFHA that have flood insurance in Troy or North Troy Village. The Town of Troy has one NFIP severe repetitive loss residential property. The Village of North Troy has two repetitive loss properties, one residential and one non-residential. The severe repetitive loss property is insured.

The State River Corridors, depicted on the map included in the appendix, provide an indication of areas that are vulnerable to fluvial erosion. Much of the mapped River Corridor coincides with the mapped SFHA. Approximately 10 residences in or directly adjacent to the mapped River Corridors, indicating that these properties may be at risk of damage. There are also portions of the town’s road infrastructure that are within the mapped River Corridors.

Vulnerable, or “at-risk” populations would include the Troy School, child care facilities and nursery schools, and senior residences on South Street in North Troy. (See Table 4.1)

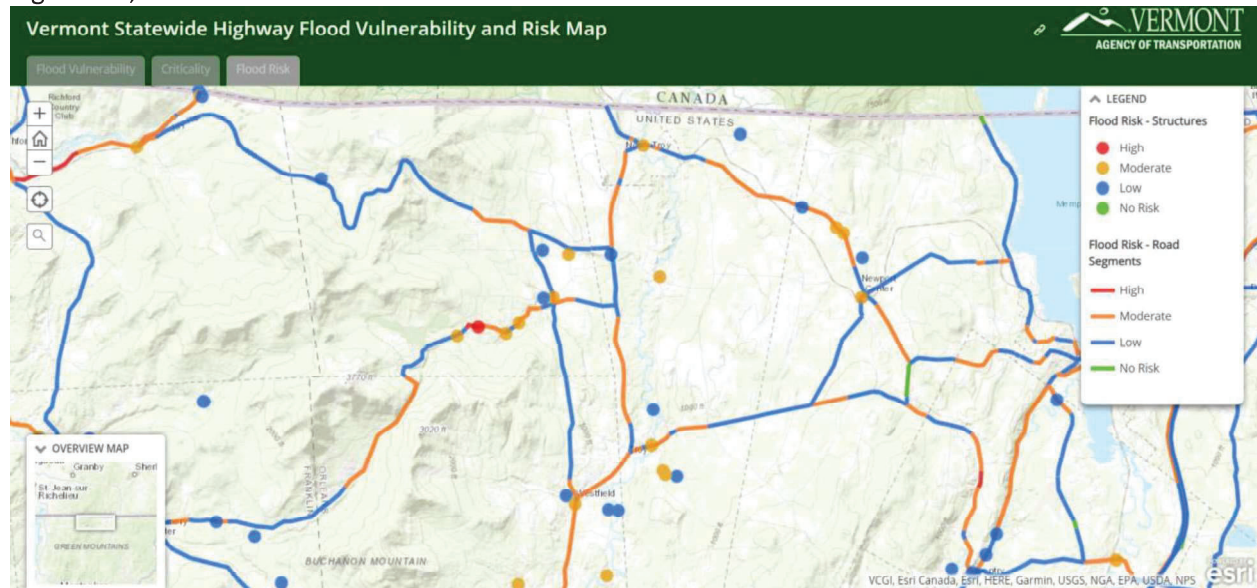
4.2 Critical Assets and Infrastructure

Critical facilities are structures critical to the operation of the community and the local economy, which may include historic structures.

The Vermont Statewide Highway Flood Vulnerability and Risk Map is a useful tool for assessing vulnerability and risk to road infrastructure in Troy. The Vermont Agency of Transportation has developed a vulnerable and risk map for state highways, that is intended to provide a reliable estimate that can support emergency preparedness, capital programming and hazard mitigation planning. The statewide assessment also provides a metric for use in the project selection and prioritization process. The limitation is that small bridges and culverts on town highways are not included in this assessment -- data on those structure are inventoried at the town level and entered on www.vtculverts.org.

Transportation *criticality* metrics quantify the importance of a road segment in the network related to general travel and emergency services accessibility. The *flood vulnerability* and *transportation criticality* metrics are combined to develop a *risk score*, which can help prioritize the need for mitigation. The map showing flood risk for critical transportation routes and associated infrastructure in Troy is shown below in Figure 4.1.

Figure 4.1, Flood Risk



A Road Erosion Inventory was undertaken for the Town of Troy in the fall of 2019, and the report was completed in 2020. This inventory is one of the requirements of the Municipal Road General Permit, which is intended to mitigate water quality impacts, particularly as it affects the waters that drain to Lake Champlain. Town-wide, 295 road segments that are hydrologically connected to waterways were inventoried, with 120 found to not meet the State standards. 140 segments partially met the standard, and 35 fully met the standard. 235 of the road segments inventoried were on gravel roads.

In the Village of North Troy, 27 road segments were inventoried. Of those, 13 did not meet the standard, 12 partially met the standard, and 2 fully met the standard.

The Road Erosion Inventory Report is meant to inform the Road Stormwater Management Plan (implementation table that was produced by the inventory work). Work that is undertaken to ameliorate erosion problems on hydrologically-connected roads not only has a water quality benefit, but can mitigate flood hazards to roadways as well.

Previous and continuing problem areas with the road infrastructure in town include but are not limited to the following:

- Ice dams below the Town Garage before it gets to dam on Route 105. This causes flooding on River Road.
- In the past, Ice jams caused flooding on River Road and Loop Road at Rt. 100.
- Fallen trees in the river cause jams leading to flooding on River Road.
- Flooding on Bear Mt. Road, caused by problems near Maurice Titus Road. The culverts are undersized, the road is low, and beaver dams exacerbate flooding problem.

In addition to the critical road infrastructure, critical facilities/assets within the Town of Troy and Village of North Troy that are important to protect during hazard events are listed in Table 4.1., along with the estimated replacement cost, if relevant. These include both publicly and privately-owned properties.

**Table 4.1
Critical Facilities in Troy Town**

Asset / Critical Infrastructure	Location	Ownership	Assessed Value (\$)*	Notes
Troy Town Office	Main Street, North Troy	Town of Troy	\$76,400	
Troy Town School	126 Main St, North Troy	Town of Troy	\$1,301,900	Enrollment in 2021 was 199, including PreK
Troy Town Garage	562 East Main Street, North Troy	Town of Troy	\$86,200	North Troy Village contracts with Town for road work
Troy Volunteer Fire Dept.	6850 VT RT 100, Troy	Troy Fire Dept.	\$226,600	
Village of North Troy Municipal Offices, Fire Department, and Rand Memorial Library	160 Railroad St. North Troy	Village of North Troy	\$706,700	
North Troy Public Water Supply -Well house -reservoir	Well at 1200 River Rd; reservoir at 247 N. Jay Rd.	Village of North Troy	\$44,400	A value for the reservoir was not available
North Troy Public Wastewater Treatment System	122 Elkins Drive, North Troy	Village of North Troy	NA	
Troy/Jay Public Wastewater Treatment System	355 Starrs Drive, Troy	Town of Troy and Jay	\$234,500	
Troy Town Public Water Supply -	Well/water treatment house: 6957 VT RT 100 Water tower: 3364 VT RT 101	Town of Troy	\$20,800	A value was not available for the water tower
North Troy Dam/ Missisquoi River Hydroelectric	9 East Main, North Troy	Private	\$411,200	net metered, with a capacity of 370 kW
Troy Mills Hydroelectric	164 Citizens Utilities Rd. Troy	Private	\$1,659,700	developed under the Sustainably Priced Energy Enterprise Development (SPEED) program, with a capacity of 850 kW

North Troy–Highwater Border Crossing	VT Route 243	Federal Government	NA	Important to local/ regional commerce and tourism
Asset / Critical Infrastructure	Location	Ownership	Assessed Value (\$)*	Notes
Telecommunications equipment building	4132 VT RT 101, Troy	Telephone Operating Co. of Vermont	\$102,500	
Telecommunications equipment building	606 East Main St., North Troy	Telephone Operating Co. of Vermont	\$161,400	
Missisquoi Valley Historical Society	155 Main Street, North Troy	Village of North Troy	\$114,400	
Senior Housing and Child Care Facilities**:				
Multi-family housing for seniors and disabled	South Street, North Troy	Private	NA	
North Troy Child and Family Development Program (licensed provider)	North Pleasant Street, North Troy	Northeast Kingdom Community Action	\$145,000	Capacity for 19 pre-school aged children
Troy School Early Education Program (Licensed Provider)	Main Street Troy, North Troy	Troy School District	NA	Capacity for 14 pre-school aged children
Nanny's Early Learning Center (Licensed Provider)	Pine Street, North Troy	Private	NA	Licensed to care for 12 children at any one time (infant to school age)
*Based on 2020 Grand List values				
** In addition to the listed licensed providers, there are six private homes registered for child care with a combined capacity of 50+ children. Four are in North Troy Village and two are in the town of Troy.				

Development Trends: Population and Housing

While the population in the Town of Troy has been in decline over the last 20 years, the Town is currently working on an update to the Town Zoning Ordinance, which will align with the goals for development articulated in the latest Town Plan, adopted in 2020. The Town would like to see increased development, particularly housing, in the areas served by water and sewer in the Village of North Troy and the Hamlet of Troy. If this is successful, the Town is likely to see an increase in population. The Town is a member of the National Flood Insurance Program, so new construction would be done in locations and in such a way as will comply with the Town’s flood hazard regulations. The Town is also considering regulating areas within the State-mapped River Corridors.

Changes in Priorities

The last “All-Hazards Mitigation Plan” adopted in 2005 (included in the appendix to this document) identified in Section 2.3 seven hazards, some of which were technological or man-made, to which the

Town and Village had a medium to high vulnerability. These were flooding, hazardous materials, water supply contamination, dam failures, chemical or biological incident, school safety, and terrorism.

Flooding continues to be a risk for the communities and is profiled in this plan. Hazardous materials incidents, chemical/biological incidents, and terrorism continue to be concerns, but have not been addressed in this plan since the Local Emergency Management Plan, which is updated annually, is an appropriate document in which to address preparedness for such incidents.

The concern about water supply contamination has been partially addressed by improvements to the water supply system in the hamlet of Troy, as discussed in section 1.7.1 of this plan. There continues to be a need for upgrades to the North Troy Village public water system and the need for a generator in the case of power outages. Obtaining back-up generators for critical facilities is included as a mitigation action for several identified hazards in the current plan.

The concern for dam failure has been reduced, since the dam located adjacent to the North Troy business district has changed hands since 2005 and repairs were undertaken by the new owner.

The Troy Town School has been remodeled since 2005 to address safety during an emergency situation. An emergency generator is still needed, and is identified as a mitigation action as noted above.

Infectious disease outbreaks have become a concern to community members in the wake of the COVID-19 pandemic, and invasive species have emerged as a priority concern as well. Neither of these hazards were addressed in the 2005 plan.

5. MITIGATION STRATEGY

5.1 Evaluation of Mitigation Actions

At the public meetings on February 22 and March 1, 2021 several mitigation strategies were evaluated using an evaluation matrix. This evaluation helped to prioritize actions. The hazard type which was addressed by each action appears in the first column, followed by the proposed mitigation action. The following criteria were considered in the matrix:

- What is the likelihood of securing funding for the action?
- Does the action protect threatened infrastructure and is it environmentally sound?
- Can the action be implemented quickly?
- Is the action socially and politically acceptable?
- Is the action technically feasible?
- Is the action administratively realistic given the capabilities of responsible parties?
- Does the action offer reasonable benefit compared to its cost of implementation?

Each criteria was rated on a scale of 1 to 5, 1 being “poor” and 5 being “excellent.” The results are shown on Table 5.1. Some of the mitigation actions that were identified as having the highest benefit, were also the most costly or were deemed to have low social/political acceptance, resulting in a lower overall rating. The team identified at least two mitigation actions for each hazard.

The last hazard mitigation plan adopted by Troy in 2005 identified two mitigation projects: obtaining generators for backup power and ongoing replacement of undersized culverts throughout the town. Both these mitigation actions remain on the current list, although a number of other actions are also proposed. Flooding continues to be a major concern. Although the last hazard mitigation plan identified hazardous materials incidents and a main threat, this hazard is not identified in this updated plan, as it is not a natural hazard. Preparedness for hazardous materials incidents is addressed in the Town’s Local Emergency Management Plan, which is updated on a yearly basis.

**Table 5.1
Evaluation of Mitigation Actions**

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

Hazard Type	Mitigation Action	Funding potential	Protection value/ Environmental Advantage	Time to implement	Social and Political acceptance	Technical Feasibility	Admin. Feasibility	Benefit to cost	Total Score
All Hazards	Create a capital improvement plan to address the mitigation projects identified in the LHMP, beginning with the highest priority projects.	5	5	3	4	5	3	5	4.3
Flooding/Stream Bank Erosion	Partner with DEC and other organizations to facilitate restoration projects in river corridors.	5	5	4	4	5	5	5	4.7
	Partner with environmental organizations, (MRBA, etc) to hold periodic education events to inform local residents how to mitigate flood and fluvial erosion hazards.	5	5	4	5	5	5	5	4.9
	Discourage development on steep slopes and within river corridors; consider regulating river corridors as part of the flood hazard regulations	5	5	3	2	5	5	5	4.3
	Undertake repair projects to correct road erosion problems and/or replace undersized culverts to avoid washouts.	5	5	4	4	5	5	5	4.7

Hazard Type	Mitigation Action	Funding potential	Protection Value/ Environmental Advantage	Time to implement	Social and Political acceptance	Technical Feasibility	Admin. Feasibility	Benefit to cost	Total Score
	Continue to update culverts and bridges on vtculverts.org	5	5	3	5	5	5	5	4.7
	Work with VTrans to identify work based on a hydraulic study that will alleviate flooding on Bear Mt. Road, near intersection with Maurice Titus Road. The culverts are undersized, the road is low and beaver dams exacerbate flooding problem.	4	3	2	5	4	5	2	3.6
High Winds	Obtain back-up generators for critical facilities to mitigate impacts of a power-outage, including the Town Office, School, Village sewer system, Village Office/Fire House.	5	5	3	5	5	5	5	4.7
	Protect public buildings, and town roads from wind damage through regular tree pruning, maintenance and upkeep.	5	5	5	3	5	5	5	4.7
Severe Winter Storms	Develop a local warning notification system such as automated text/email.	5	4	3	5	5	3	5	4.3
	Obtain back-up generators for critical facilities. (see above for High Winds)	5	5	3	5	5	5	5	4.7

Hazard Type	Mitigation Action	Funding potential	Protection value/ Environmental Advantage	Time to implement	Social and Political acceptance	Technical Feasibility	Admin. Feasibility	Benefit to cost	Total Score
Extreme Cold	Increase public awareness of available weatherization and heating assistance programs, how to protect pipes from freezing, and how to guard against carbon monoxide poisoning.	5	5	4	5	5	4	5	4.7
	Set up Front Porch Forum account for Village/Town water systems, to alert residents of extreme freezes and how to protect water pipes.	5	5	5	5	5	4	5	4.9
Invasive Species	Identify organizations that can provide information/education regarding invasive plants and insects and ways to curb spread.	5	5	3	5	5	5	5	4.7
	Partner with DEC, Orleans County NRCD, and Missisquoi River Basin Association (Basin 6) on riparian buffer restoration programs, and other projects identified in the Basin Plan.	5	5	3	5	5	5	5	4.7
Infectious Disease Outbreaks	Partner with the VT Dept. of Health and the Orleans/Essex Visiting Nurse Association to disseminate information regarding treatments, testing, and vaccines to the community, particularly the elderly and homebound. Provide public	5	5	4	4	5	5	5	4.7

	education via town mailings or internet postings (e.g. Front Porch Forum) regarding safety measures to curb the spread								
	Provide personal protective equipment at town properties to help curb the spread	5	5	4	4	5	5	5	4.7

5.2 Capabilities

The Town of Troy has a relatively low year-round population, and limited paid staff. The Town has a three-member Selectboard and a seven-member Planning Commission. The Town’s paid staff includes a Zoning Administrator, Town Clerk, a water system operator, and a road foreman, a.k.a Road Commissioner (the job description for the Road Commissioner is included in the appendix to this document). The Town of Troy and Jay have a joint Troy/Jay Sewer Board that consists of 3 members each from Jay and Troy Selectboards. The Sewer Board employs chief engineer/operator.

The Village of North Troy has a three-member Board of Trustees and employs a Village Clerk, who also holds the roles of Treasurer and Delinquent Tax Collector, a public works supervisor who operates the wastewater and water system, and a Librarian/Assistant Treasurer.

Emergency services are currently provided by the Missisquoi Valley Ambulance, and the organization is currently working with communities in the service area to develop a budget.

The Village and Town each has taxing authority, and develops a yearly budget. Each entity holds an annual meeting for the choice of officers and the transaction of any business specified in the warning for the meeting.

The Village of North Troy has a Traffic Ordinance and All Terrain Vehicle (ATV) ordinance, both adopted March 8, 2022.

The Town of Troy has zoning regulations, including flood hazard regulations, that apply to the entirety of the Town, including the Village of North Troy. The effective date of the Flood Insurance Rate Map (FIRM) is December 2, 1980. The Zoning Administrator for the Town reviews applications for zoning permits in both the Town of Troy and the Village of North Troy. The Troy Planning Commission has been working on an update to the zoning regulations in 2021 and 2022, with amendments expected to be adopted in 2022. A copy of the Town zoning regulations, with proposed revisions indicated, is included in the appendix to this document. If adopted, the Town will regulate development within the State-designated River Corridors, and will move to a Development Review Board (DRB) model, where the DRB will take on the regulatory review responsibilities (e.g., site plans, special permits) currently undertaken by the

Planning Commission and Zoning Board of Adjustment. Proposed amendments also include changes that will facilitate infill development in the existing center of North Troy, and protect forest blocks and other natural features by incentivizing the use of planned unit developments.

Steve Button operates the water system for Troy and the joint Troy/Jay wastewater system. Karson McMahon is the public works supervisor for North Troy and handles both water and wastewater for North Troy Village. Robert (Bobby) Jacobs is the road foreman for the Town of Troy, and the Village of North Troy contracts with the Town of Troy for road work in the Village.

It is noted that the Troy School District owns property in the northern part of the Town, off River Road that could provide an opportunity for education on invasive species. The Missisquoi River Basin Association (MRBA) serves as an existing education outlet and could be enlisted to assist with such education.

In addition to the proposed zoning amendments mentioned above, potential for expansion of the communities' existing capabilities include:

- ongoing training of the Town road crew
- development of new health protocols currently by the Town health officer and assistant health officer
- desktop emergency training exercise coordinated by the Town Emergency Management Director (EMD) and the Emergency Management Specialist at NVDA
- the update and digitization (at the federal level) of the FIRM, which will provide more accurate information as the basis for the Town's flood hazard regulations
- Creation of capital improvement plans for both the Town of Troy and Village of North Troy.

Table 5.2 lists each mitigation action, along with the party or parties that would have the capability of implementing the action, and time-frame. The lead for each mitigation action is shown in **bold**, with supporting entities also indicated. Since this plan serves both the Village of North Troy and Town of Troy, some proposed actions will have two leads. Source of funding, if relevant, is also noted. The estimated cost is noted as a 1 if low (under \$5,000); 2 if medium (\$5,000 to \$10,000); or 3 if high (over \$10,000).

For time frame, 1 would be within the next 12 months, 2 would be 1 to 2 years, 3 would be 2+ years, or ongoing.

**Table 5.2
Capabilities, Costs and Timeframes**

Hazard Type	Mitigation Action	Responsible Party	Estimated Cost	Funding Source	Time Frame
All Hazards	Create a capital improvement plan to address the mitigation projects identified in the LHMP, beginning with the highest priority projects.	Planning Commission, Selectboard and Village Trustees	1	General Fund from Town and Village	2
Flooding/Stream Bank Erosion	Partner with DEC and other organizations to facilitate restoration projects in river corridors.	Planning Commission and Missisquoi River Basin Association (MRBA)	2	Grant funds	ongoing
	Partner with environmental organizations, including the Missisquoi River Basin Association (MRBA) to hold periodic education events to inform local residents how to mitigate flood and fluvial erosion hazards, ideally at Town/Village Meeting.	Planning Commission and MRBA.	1	General Fund and MRBA's budget (grant funds).	1
	Discourage development on steep slopes and within river corridors, and consider regulating river corridors as part of the town flood hazard regulations.	Planning Commission and Selectboard	1	Municipal Planning Grant Grant and general fund	1
	Undertake repair projects to correct road erosion problems and/or replace undersized culverts to avoid washouts.	Town of Troy/Village Trustees , in each respective jurisdiction	3	Grants from Vtrans, and the Highway budget.	ongoing
	Continue to update culverts and bridges on vtculverts.org	Town Road Foreman	1	Town Highway budget	ongoing
	Work with VTrans to identify work that will alleviate flooding on Bear Mt. Road, near intersection with Maurice Titus Road. The culverts are undersized, the road is low and beaver dams exacerbate flooding problem.	Town Selectboard	3	Grant Funds, VTrans	3
High Winds	Obtain back-up generators for critical facilities	Town Selectboard,	3	Grants from	1

	to mitigate impacts of a power-outage, including the Town Office, School, Village sewer system, Village Office/Fire House.	Village Trustees and Emergency Management Director (Town)		VEM,DHS, and General Fund	
	Protect public buildings, and town roads from wind damage through regular tree pruning, maintenance and upkeep.	Town Selectboard and Village Trustees , for each respective jurisdiction	1	Town Highway Budget and Village Highway Budget	ongoing
	Prepare a feasibility for the implementation of a mini-grid to supply electrical power to critical Town and Village facilities in the event of an emergency	Private consultant commissioned by Town Selectboard with input by Planning Commission	3	Grants, such as a mitigation planning grant, or MPG.	3
Severe Winter Storms	Develop a local warning notification system such as automated text/email.	Town and Village Clerks working w/ EMD	1	General funds for Town and Village	1
	Obtain back-up generators for critical facilities. (see above for High Winds)				1
Extreme Cold	Increase public awareness of available weatherization and heating assistance programs, how to protect pipes from freezing, and how to guard against carbon monoxide poisoning.	EMD , in conjunction with Heat Squad and Efficiency Vermont for weatherization/heating assistance. Water operators for Town and Village for information on protecting water pipes from freezing	1	NA	1
	Set up Front Porch Forum account for Village/Town water systems, to alert residents of extreme freezes and how to protect water pipes.	Town and Village Clerks in coordination Water System Operators	1	NA	1
Invasive Species	Identify organizations that can provide information and education regarding invasive	Planning Commission working with MRBA ,	1	NA	ongoing

	plants and insects and ways to curb their spread.	Vermont Invasives, ECHO, Troy Town School			
	Partner with DEC, Orleans County NRCD on riparian buffer restoration programs, and other projects identified in the Basin Plan.	MRBA Planning Commission	1	Grants through various environmental organizations	ongoing
Infectious Disease Outbreaks	Partner with the VT Dept. of Health and the Orleans/Essex Visiting Nurse Association to disseminate information regarding treatments, testing, and vaccines to the community, particularly the elderly and homebound. Provide public education via town mailings or internet postings (e.g. Front Porch Forum) regarding safety measures to curb the spread	EMD/Town Health Officer	1	NA	As needed/ongoing
	Provide personal protective equipment at town properties to help curb the spread	EMD/Town Health Officer	1	FEMA assistance grants	As needed/ongoing

5.3 Implementation and Monitoring of Mitigation Strategies

5.3.1 Public Involvement Following Plan Approval

After the Plan has received approval from FEMA and has been adopted by the Town, the Town Selectboard will provide a summary in the Annual Town Report regarding any progress to date on mitigation actions in the Plan, any changed conditions, and an evaluation of the plan to assess whether it is still effectively promoting Troy's hazard mitigation goals. At Town Meeting every March, the public will have the opportunity to ask questions and provide comments on the mitigation strategy. The Village and Town hold separate annual meetings, everything is passed by floor vote, including the Town and Village budgets.

5.3.2 Project Lead and Monitoring Process

Once the Plan is approved by FEMA, the calendar will begin for annual review of the mitigation plan.

The Troy Selectboard Chair is the project lead and will work in conjunction with the Troy Emergency Management Director, the Road Foreman, the Town Clerk, and the Planning Commission to complete the yearly progress report included in the Annual Town Report. The Town Clerk will assure that all road improvement projects are tracked in collaboration with the Road Foreman.

5.3.3 Plan Update Process

The Plan update will be led by the Planning Commission. The Planning Commission may elect to acquire the assistance of the Northeastern Vermont Development Association or a consultant to update the plan following a declared disaster and/or the next five-year planning cycle. The process of updating the Hazard Mitigation Plan will begin one year prior to its expiration. The update process will begin with a review of the annual progress reports, and will include an update of data on population and development. Any changes in vulnerability will also be documented. The Planning Commission will seek public involvement through methods similar to those used in the development of this Plan: online resident survey, direct emails to adjacent Town officials, announcements in the local newspaper, and public meetings.

APPENDIX

1. Troy 2005 All Hazard Mitigation Plan
2. June 9, 2020 press release announcing survey
3. June 18, 2020 Newport Daily Express advertising June 24, 2020 public meeting
4. Presentation delivered at June 24, 2020 public meeting
5. Troy Hazard Mitigation Survey
6. July 22, 2020 public meeting notice
7. Road Commissioner job description
8. Troy Local Emergency Operations Plan (LEMP)
9. Troy Zoning Bylaw with proposed amendments
10. Troy River Corridors and Flood Hazard Areas
11. Email sent on April 8, 2022 to Town Clerks of surrounding towns.

Town of Troy, Vermont

All-Hazards Mitigation Plan



**Selectboard
Town of Troy
P.O. Box 80
Troy, Vermont 05859
(802) 988-2663**

April 25, 2005

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Prerequisites
Certificate of Local Adoption

Town of Troy

A Resolution Adopting the All-Hazards Mitigation Plan

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

WHEREAS, the Troy All-Hazards Mitigation Plan contains recommendations, potential actions and future projects to mitigate damage from disasters in the Town of Troy; and

WHEREAS, a meeting was held by the Troy Selectboard to formally approve and adopt the Troy All-Hazards Mitigation Plan as an annex to the Northeastern Vermont Development Association's (NVDA) All-Hazards Mitigation Plan.

NOW, THEREFORE BE IT RESOLVED that the Troy Selectboard adopts The Troy All-Hazards Mitigation Plan Annex as well as the associated NVDA All-Hazards Mitigation Plan.

Date

Selectboard Chair

Selectboard Member

Selectboard Member

Selectboard Member

Selectboard Member

Attested to by Town Clerk

Section One - Planning Process

1.1 Introduction and Purpose

This Annex, when used with the appropriate sections of the basic NVDA All-Hazards Plan, is an All-Hazards Mitigation Plan for the Town of Troy. The purpose of this plan is to assist the Town of Troy to identify all hazards facing the community and identify strategies to begin reducing risks from identified hazards. A Pre-Disaster Mitigation Planning Grant to the Northeastern Vermont Development Association (NVDA) assisted the Town of Troy in preparing this plan.

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

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

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

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

1.2 About Troy

Meeting Date: 12/17/03

Meeting Attendees: Lucille Cadieux, Town Clerk

Population: 1,638

Median Housing Value: \$62,934

Orleans County

Chartered: October 28, 1801 (Vermont Charter)

Area: 23,341 Acres / 36.47 Square Miles
Coordinates (Geographic Center): 72°24'W 44°54'N
Altitude ASL: 764 feet
Population Density (persons per square mile): 42.9
Tax Rate: \$2.057 ('03)
Equalized Value: \$75,850,928 ('03)

1.3 Community History and Background

Troy is located in the extreme northern part of Orleans County at 44 degrees, 55 minutes north latitude and 74 degrees, 36 minutes west longitude. The Green Mountains lay to the west and the Vermont Piedmont lies to the east. It is bound on the north by the Province of Quebec, Canada, on the east by the Town of Newport Center, on the west by the Towns of Jay and Westfield, and to the south by Lowell. There is one international border crossing along Vermont Route 243, just a short distance from the village area of North Troy. This is the main center of commerce for the Town of Troy. The Montreal, Maine and Atlantic Railroad crosses between US and Canada. The Portland Pipeline goes through Troy and crosses into Canada less than ½ mile to the west of the Route 243 and railroad border crossing. The center of the Town of Troy is located about 3 ½ miles south of the Canadian border at the intersection of Routes 100 and 101.

The Troy fire department is entirely volunteer and also serves the Town of Westfield. The village of North Troy has a separate fire department that is well equipped and trained. Jay and Newport Center have their own fire departments, as does Mansonville, P.Q., just over the border into Canada. Mutual Aid with surrounding communities is very good. A grant has been written for a new fire truck through Homeland Security funds. Troy has three identified shelters: the American Legion, the Masonic Hall and the Troy School. The American Legion has a generator but others are needed at the other facilities for back-up power. Troy has a Shelter Pre-Agreement with the Vermont Red Cross. Troy does not have a health clinic. Most residents use the North Country Hospital in Newport City, approximately 10 miles away. There are many day care centers in Troy that may have special evacuation needs.

There are two sewer treatment plants (one in North Troy and one in Troy in a flood area). The village areas of Troy and North Troy each have their own municipal water systems. The Troy well produces a little low, but the North Troy well can pump 650 gallons/minute. Electrical power is supplied by the Vermont Electric Coop where power is fairly reliable. During the ice storm of 1998, power was out for five to six days.

Troy, including both village areas, has zoning and flood hazard zoning. They are members of the National Flood Insurance Program. The existing town plan is outdated, but the Planning Commission is working on a new one with assistance from the Northeastern Vermont Development Association.

Section Two - Risk Assessment

2.1 Identify Hazards

Troy local officials have identified several hazards that are addressed in this Annex. These were identified through interviewing the Town Clerk. This individual has a thorough knowledge of the community through many years of direct involvement in local issues.

Table 2-A Hazard Inventory and Risk Assessment

Possible Hazard	Likelihood	Impact	Community Vulnerability	Most Vulnerable
Tornado	Low	Medium	Low	Structures
Flood	High	High	High	Infrastructure/ homes, farms
Flash Flood	Low	Low	Low	Not really susceptible
Hazardous Materials (Canadian initiated)	Low/Med	High	High	Roads, water supply, downtown.
Radiological Incident	Low	High	Low	Residents
Structure Fire	Low/Med	Low/Med	Low/Med	Downtown, residences
Power Failure	Medium	Medium	Medium	Residences, businesses
Winter Storm/Ice	High	Medium	Medium	Residences, businesses
High Wind	Low	Low	Low	Trees down, loss of power
Aircrash	Low	Low	Low	Site specific
Water Supply Contamination	Low/Med	Medium	Medium	Public water supply, rivers
Hurricane	Low	Low	Low	Power lines, residences
Earthquake	Low	Low	Low	Site specific
Dam Failures	Low/Med	Low	Low	Low to Troy, High risk to Canada
Drought	Low	Low	Low	Water supply
Chemical or Biological Incident	Med/High	Medium	Medium	Site specific. Railroad/border. North Troy
Highway Incidents	Low	Low	Low	Site specific
Wildfire/Forest Fire	Low	Low	Low	Not big risk
Landslide	Low	Low	Low	Site specific, no high elevators
School Safety Issues	Low/Med	High	High	Students, teachers, hostage issues/Hazmat
Terrorism	Low	High	High	Residents, businesses, local officials

The threats to Troy causing medium to high community vulnerability are: flooding, hazardous materials (including chemical incident), severe weather, water supply contamination, school safety issues and terrorism.

2.2 Profiling Hazards

Only those hazards that are considered a MEDIUM or HIGH vulnerability in Troy will be profiled below. While those not being profiled are still important, they are considered a lower threat to the community where damage would be minimal.

2.2.1 Flood History

The Town of Troy has a history of flooding, especially during the last several years. The summer of 1997, 2002 and 2004 saw heavy road damage throughout the town and in the village areas. There were no FEMA declarations between 1989 through 1996. River Road and Cook Brook are problematic areas. Many sections of road were town highways and were repaired through the Vermont Agency of Transportation. Ice

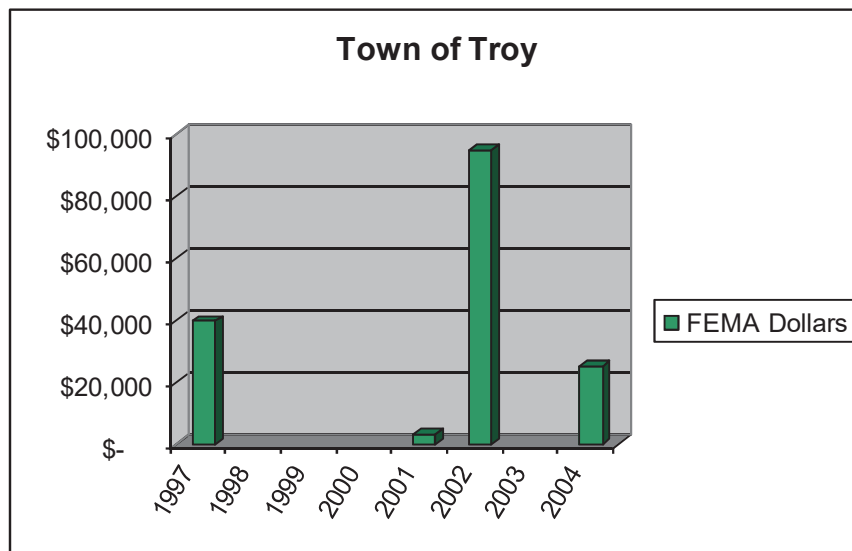
jams are frequent along the branches of the Missisquoi River at the covered Bridge and Big Falls areas. The southern end of the town has frequent washouts due to nearby clear cutting.

The Town of Troy has diligently replaced undersized culverts with larger culverts in the past several years. One property has received repetitive flood damage. This and an adjoining property were bought-out through a FEMA HMGP grant in 2003/4.

The ski area of nearby Jay Peak drains to Missisquoi. Jay Brook flows into Missisquoi on River Road. The dam in North Troy was built after flood of 1927 and controls the flow of the Missisquoi River into Canada and causes flooding upstream. The dam is privately owned and not regularly operated or maintained. A dam breach would impact Canada, not North Troy. Elimination of the dam would improve existing flooding along River Road. Cook Brook also flows into the Missisquoi at River Road.

FEMA Declarations and Funding

Town	Repetitive Damage	# of Properties	NFIP	1184 Jul-97	1428 Jul-02	3167 Mar-01	1559 Sep-04	Total DR Funds
Troy	\$ 24,108.00	1	YES	\$ 39,719	\$ 94,821	\$ 3,300	\$ 25,020	\$ 162,860



2.2.2 Hazardous Materials

The most hazardous materials are located on the roads, railroads and the Portland Pipeline. A high accident location is the intersection of Routes 242 & 105. Should an incident occur near the North Troy Village area, an evacuation would take affect. North Troy would be most vulnerable because the school, town offices flood area, historic buildings, customs, and railroad are all within a short distance. A factory across border with foam insulation may have chemicals or explosive materials. The fire department maintains a list of hazardous materials but those in nearby Canada are unknown. The worst-case scenario would involve a train incident with hazardous materials derailing on the trestle over the river.

2.2.3 Structure Fire

Structure fires in Troy are not common, maybe one to two per year. See Hazardous Materials and Chemical Incidents as the higher but associated threats.

2.2.4 Water Supply Contamination

Both North Troy and the Village of Troy have municipal water systems. The wells are in the flood plain and could become contaminated. The well for the Village of Troy is near the intersection of Routes 100 and 101. They are secured and checked daily for possible contamination.

2.2.5 Dam Failures

The Village of North Troy has a dam located very close to the historic commerce section of the community. This is also a frequent flood area. If the dam were to breach, it would flow northward into Canada, causing problems for the northern community. See flood discussion.

2.2.6 Chemical or Biological Incident - Border Crossings

Troy has one highway border crossing into Canada, a railroad crossing and the Portland Pipeline going through town and the border. Border security is low and traffic volumes are low. Many farmers own contiguous fields on both sides of the border and go back and forth regularly to maintain their crops. A barn fire had occurred several years ago that ended up as an international HAZMAT incident. The barn was being used as a small business that had chemicals and nutrients on site. These chemicals and nutrients flowed into the Missisquoi River that flows into north into Canada, causing pollution and many fish to die.

2.2.7 School Safety Issues

School safety issues are related to the school being in close proximity to the railroad, the dam, and the border crossing, and because it is located close to the flood area. Evacuation will be difficult in high flood situations. The close proximity to the border crossing is a potential problem if terrorists are involved. This is a K-6 school. The school has prepared an emergency plan for a variety of potential incidents ranging from bomb scares to drugs to guns. A generator is needed at the school for backup power.

2.2.8 Terrorism

Troy is not a high threat target area for terrorists, but given the close proximity to the border, an incident is always a possibility. Should an incident occur, it would be devastating to the community. See related School Safety Issues.

2.3 Vulnerability: Overview

In terms of vulnerability, Troy rated these potential hazards below as High or Medium-High threat: flooding, hazardous materials, water supply contamination, dam failures, chemical or biological incident, school safety and terrorism issues. Mitigation strategies are identified for the highest priority projects in Section Three. Only those hazards that were identified as a high risk to the town were profiled. While other types of hazards may cause smaller problems for the community, they are a lower risk.

2.4 Identifying Structures

It is difficult to estimate the total number of structures in the 100-year limit of the FIRM identified floodplain as those maps do not accurately match up to the E911 maps that are based on the structures' geographical location (latitude and longitude). However, it can be estimated that there are approximately 50 to 100 structures in or near the flood areas depicted on the NFIP maps. The most vulnerable area is the historic village area of North Troy. The center of commerce is here along with its school, higher density historic homes and an international border crossing into Canada.

2.5 Estimating Potential Losses

Future losses should be lessened through mitigation of the repetitively flooded properties, most of which are roads, bridges and culverts. The FIRM maps are not compatible with the GIS maps containing contour, rivers, roads and structures and it is not possible to estimate the amount of potential loss at this time. It is recommended that the NFIP maps be redone using the Vermont Geographic Information System standards based on orthophoto mapping. The Median Housing Value (MHV) for Troy in 2003 was \$62,934. The Equalized Value for all properties in Troy in 2003 was \$75,850,928. If one percent (1%) of all properties in Troy were damaged, the value would be assessed at \$75,850. The past FEMA damages amounted to \$162,860 over 16 years, so while future damage could be significant, it would not be totally devastating.

2.6 Analyzing Development Trends

The growth rate of Troy is 4.7% or a total population increase of 74 persons between 2000 and 2003. The Town of Troy has adopted a local plan and zoning regulations to guard against future development in inappropriate locations such as floodprone areas. Troy is a member of the National Flood Insurance Program (NFIP). Troy is not a rapidly developing community and is not expected to have a rapid influx of new development in the near future. All development strategies are carefully reviewed by the Zoning Board of Adjustment. All buildings being improved in or near frequently flooded areas are required to elevate or provide additional mitigation measures.

Section Three - Mitigation Strategy

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

- **Town Plan** - this document contains goals and objectives for community growth, health, safety and welfare for public and private interests.
- **Zoning Status** – This is a snapshot of the current zoning tools in effect. Note the progress listed above for some communities.
- **NFIP** – National Flood Hazard Insurance Program – Troy is in the program.
- **Flood Regulations** – Some communities have adopted Flood Regulations but may not be a member of the NFIP program.
- **C & S = Highway Codes and Standards** – Most all Vermont communities have adopted the Vermont Transportation Agencies recommended Highway Codes and Standards. This is perhaps the one most beneficial mitigation program in Vermont and the NVDA region. By adopting these codes, all maintenance and new construction on roads, highways, bridges and culverts must be enhanced to meet the new standards to withstand large flood events.
- **VTRC** – Troy does have a Vermont Red Cross Shelter Pre-Agreement. When a Pre-Agreement is in effect, local representatives are trained to open a shelter if needed. This will allow for a more efficient use of the VT Red Cross if and when needed.

- **Emergency Operation Plan (EOP)** – Troy is in the process of having its EOP updated to include all-hazards through a Homeland Security Grant to the NVDA. This plan will be substantially completed by July 2005 and will include this Plan as its risk assessment to all-hazards.
- **Rapid Response Plan (RRP)** – Troy has updated its RRP as of November 3, 2004.
- **Emergency Training** - Fire and rescue personnel continue to participate in training offered for its volunteers, particularly with the equipment upgrades through the Dept. of Homeland Security.

Table 3-A Development Tools

Town	Town Plan	Zoning	NFIP	Rapid Response Plan	Subdivision	Highway Codes & Standards	Culvert Inventory	Vermont Red Cross
Troy	N	YES	YES	YES	N	YES	N	Yes

3.1 Regional Hazard Mitigation Goals

- Reduce the loss of life and injury resulting from all hazards.
- Mitigate financial losses incurred by municipal, residential, industrial, agricultural and commercial establishments due to disasters.
- Reduce the damage to public infrastructure resulting from all hazards.
- Recognize the connections between land use, storm-water road design and maintenance and the effects from disasters.
- Ensure that mitigation measures are compatible with the natural features of community rivers, streams and other surface waters; historic resources; character of neighborhoods; and the capacity of the community to implement them.
- Encourage all-hazard mitigation planning as a part of the municipal planning process.

3.2 Community Preparedness Goals

Overall, Troy is working to decrease its risk to flooding, water supply contamination and hazardous material incidents through proactive planning, policies and mitigation actions. Other lesser risks are being addresses through the same procedures and policies.

- Review this plan with essential town government.
- Review and study the need for additional capacity and capability in the Fire Department to minimize the impact of a HAZMAT incident.
- Ensure that all emergency response and management personnel receive HAZMAT Awareness training as a minimum.

3.3 Existing Hazard Mitigation Programs

Troy has been proactive in planning its future as well as protecting its citizens from potential disasters. Troy is in the NFIP program and has recently participated in the HMGP program to buy-out two flood prone homes.

3.3.1 Emergency Management Planning

Troy has recently updated their Rapid Response Plan. They have representatives that regularly attend the Local Emergency Planning Committee (LEPC) 10 meetings each month in Derby. Troy is participating in a joint exercise through LEPC 10. The exercise will be completed in May 2005. The fire department has upgraded its equipment through Homeland Security funds. The fire department is well trained. Troy has an Emergency Operations Plan with a new one in the development stages to meet All-Hazards response.

3.3.2 Codes and Standards

Troy has adopted the recommended Highway Codes and Standards that require regular upgrades on bridges, highways, ditching and culverts to avoid flood damage. A number of culverts have already been upgraded.

3.3.3 Local Planning and Zoning, NFIP

Troy has adopted a Town Plan and Zoning. They are a member of the National Flood Insurance Program. All new development must be reviewed by the Zoning Board of Adjustment. Most new development is for subdivisions, renovations and existing building modifications. All development in or near the identified flood areas must conform to zoning standards.

3.3.4 Protection of Municipal Water System

Troy checks its water system daily as required by State regulations. They system is locked to protect against vandalism or unwanted substances.

3.3.5 Protection of Town Records

The Town office has a vault to protect public records from damage or theft/vandalism.

3.3.6 School Drills

The K-6 Troy School practices regular evacuation drills.

3.4 Preparedness Tools

Public Awareness, Training, Education

- Conduct Emergency Drills involving all elements of the community to practice procedures associated with a simulated varies incidents.
- Use this plan for Hazard Identification and Mapping.

Public Protection

- Designate shelters.
- Emergency communications and information systems (NOAA weather receivers, Emergency Alert System (EAS)) are at the Command Center.
- Update Hazard Vulnerability Assessments as needed.
- Review and modify evacuation and sheltering plans based on the results of drills and exercises or procedures implemented in an actual incident.
- American Red Cross chapter may be contacted to assist with community education programs.
- Maintain current Rapid Response Plans and the Emergency Management Operations Plans.

- Regularly scheduled maintenance programs are ongoing (culvert survey & replacement, ditching along roadways, cutting vegetation to allow visibility at intersections).
- The town is proactive in preparing for potential disasters.
- One shelter facility has a generator.

Financial and Tax Incentives.

- Use State and Federal funding for mitigation projects and activities.

Hazard Control and Protective Works.

- Utilize regular maintenance programs (culvert survey & replacement, ditching along roadways, cutting vegetation to allow visibility at intersections).

Insurance Programs.

- Participate in NFIP.

Land Use Planning/Management: Flood.

- Troy has a municipal plan and local zoning. They have established Flood Hazard Areas through the NFIP.

Protection/Retrofit of Infrastructure and Critical Facilities.

- A map of Critical Facilities is attached.
- Auxiliary power for the critical facilities is needed.

3.5 Analysis of Mitigation Actions

Priority Actions:

Local officials in Troy have identified several mitigation actions to be included in the Hazard Mitigation Plan. Table 3-B, Implementation Strategy contains these actions, along with the responsible agency, the funding source, and implementation timeframe.

The Troy local officials have prioritized the actions using the STAPLE+E criteria, a planning tool used to evaluate alternative actions. The following table explains the STAPLE+E criteria.

S – Social	Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the population, do not cause relocation of lower income people, and if they are compatible with the community’s social and cultural views.
T – Technical	Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	It is critical that the jurisdiction or implementing agency have the

	legal authority to implement and enforce a mitigation action.
E – Economic	Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E – Environmental	Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, and that are consistent with the community’s environmental goals, have mitigation benefits while being environmentally sound.

3.6 Implementation of Mitigation Actions

Flooding and the potential for hazardous material incidents are the two main threats to Troy. Local officials are proactive in preparing for the hazards for which they are most vulnerable. Their highest priority concern is the health safety and welfare of the local citizens and businesses. The mitigation action determined to have the highest priority was the most cost effective alternative to the potential loss of life. Readiness and timeliness of project was also important.

Potential hazardous material incidents are caused mainly by highway features combined with areas that typically flood. These areas are Vermont State highways, which are the responsibility of the Vermont Agency of Transportation and are being evaluated by their engineers in conjunction with local officials.

The evaluating of these criteria is largely based on best available information and best judgment, as many of the projects are not fully scoped out at this time. The actions are listed in the Table 3-B in order of importance, cost effectiveness and feasibility to the community.

Table 3-B Mitigation Projects by Priority

Project/Priority	Mitigation Action	Who is Responsible	Time Frame and Potential Funding	Initial Implementation Steps
Generators with hookups HIGH	Backup power for the school and emergency operations center.	Fire Chief, Lee Forbes	2005 – HMGP, FMA	Seek grant sources and cost estimates.
Road and culvert upgrades	Continue to replace undersized culverts with larger culverts to prevent flooding.	Road Foreman, Lee Forbes	2005 – HMGP, Bridge and Culvert Program	Seek engineering solution and cost estimates.

Section Four - Plan Maintenance Process

4.1 Initial Approval Process

In addition to public involvement in the initial development of the plan, opportunities for public comment will include a warned adoption to review the plan prior to final adoption. The fire chief has been instrumental in participating in the review of the document with the local officials.

After local review and comment, the draft local annex is presented to the State Hazard Mitigation Committee through the State Hazard Mitigation Officer (SHMO) for review and comment. The SHMO will issue a recommendation for forwarding the plan to the FEMA Region I. After receipt of comments from

FEMA Region I staff, final changes will be made and the resulting document adopted by the Troy Selectboard. The final plan will be returned to FEMA Region I for formal approval.

4.2 Routine Plan Maintenance

The Hazard Mitigation Plan is dynamic and changing. To ensure that the plan remains current it is important that it be updated periodically. The plan shall be updated every five years, pending ongoing financial resources, in accordance with the following procedure:

- 4.2.1 The Troy Selectboard will either act as the review committee or appoint a review committee.
- 4.2.2 The committee will discuss the process to determine if the evaluation criteria is still appropriate or modifications or additions are needed to the mitigation strategies based on changing conditions since the last update occurred. Data needs will be reviewed, data sources identified and responsibility for collecting information will be assigned to members.
- 4.2.3 A draft report will be prepared based on the evaluation criteria and in conformance with the FEMA Region I Local Hazard Mitigation Plan Crosswalk document.
- 4.2.4 The Selectboard will have the opportunity to review the draft report. Consensus will be reached on changes to the draft.
- 4.2.5 Changes will be incorporated into the document.
- 4.2.6 The plan will be reviewed by Vermont Emergency Management (SHMO) staff and then FEMA Region I staff.
- 4.2.7 VEM and FEMA comments will be incorporated into the plan.
- 4.2.8 The Selectboard will warn the plan for approval at its regular meeting.
- 4.2.9 The Selectboard will incorporate any community comments into the plan.
- 4.2.10 The Selectboard will finalize and adopt the plan and distribute to interested persons.

4.3 Programs, Initiatives and Project Review

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

4.4 Post-Disaster Review Procedures

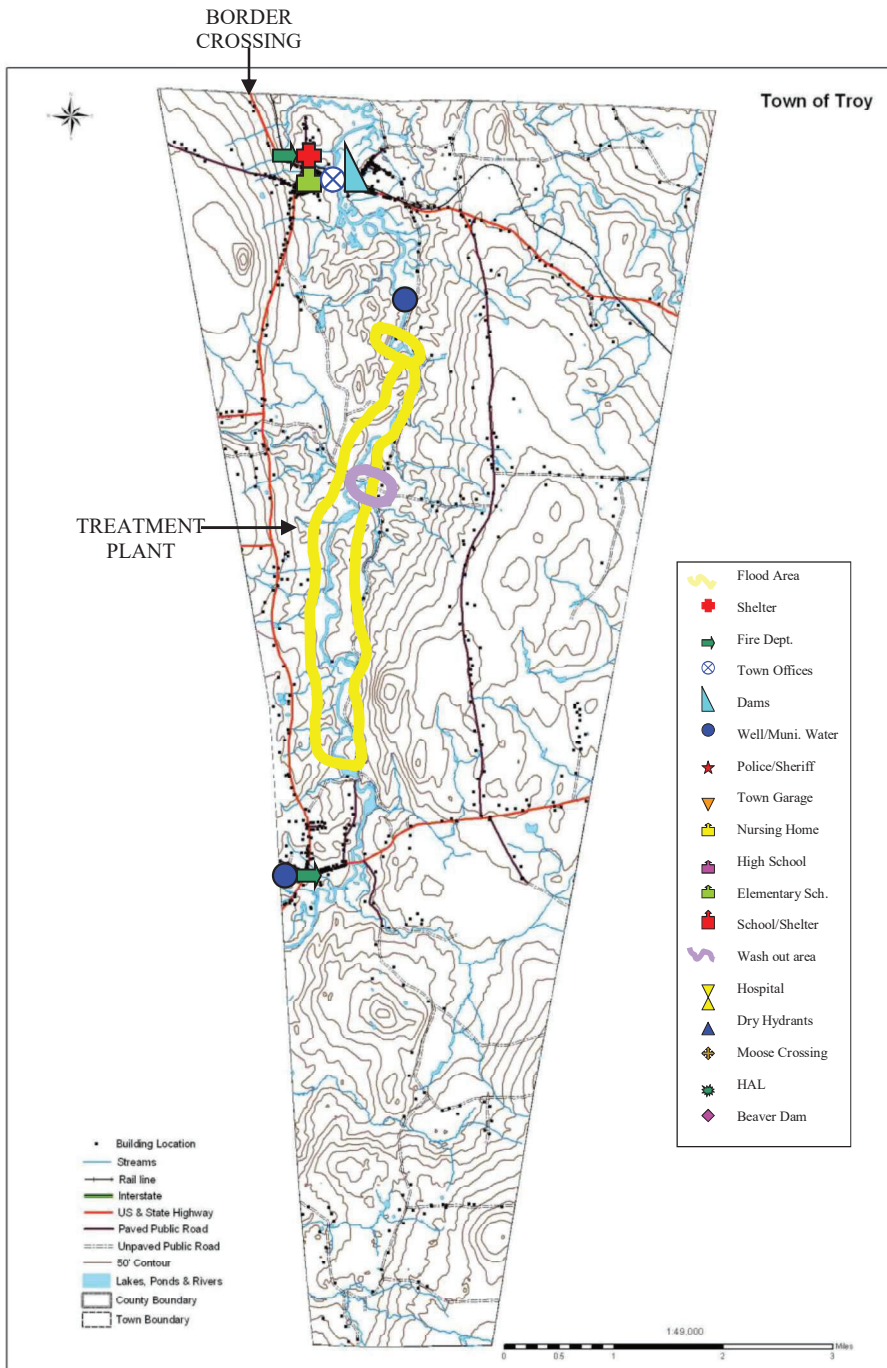
Should a declared disaster occur, a special review will occur in accordance with the following procedures:

1. Within six (6) months of a declared emergency event, the town will initiate a post-disaster review and assessment.
2. This post-disaster review and assessment will document the facts of the event and assess whether existing Hazard Modification Plans effectively addressed the hazard.
3. A draft report After Action Report of the assessment will be distributed to the Review/Update Committee.
4. A meeting of the committee will be convened by the Selectboard to make a determination whether the plan needs to be amended. If the committee determines that NO modification of the plan is needed. Then the report is distributed to interested parties.

5. If the committee determines that modification of the plan IS needed, then the committee drafts an amended plan based on the recommendations and forwards it to the Selectboard for public input.
6. The Selectboard adopts the amended plan.

Section Five - Maps

Tab a - Critical Facilities and Local Areas of Concern Map



June 9, 2020

For Immediate Release

Contact: Irene Nagle, NVDA, (802) 424-1423, inagle@nvda.net

Troy Hazard Mitigation Plan

The Town of Troy and the Village of North Troy are embarking on a planning process to become less vulnerable to disasters caused by natural hazards, and public participation is essential.

In order to kick off this process, a survey has been prepared to solicit public input on the natural hazards that residents are concerned about or have experienced first-hand. Members of the community are invited to complete the Troy Hazard Mitigation Community Survey online, which can be accessed on the Town of Troy website at <https://troyvt.org/>. The information provided will help the hazard mitigation planning team better understand local hazard concerns and can lead to mitigation activities that should help lessen the impacts of future disasters.

The Troy hazard mitigation planning team will be holding a public meeting in the coming weeks, via Zoom, in order to discuss the process of preparing an updated Local Hazard Mitigation Plan, and to discuss vulnerable areas and the hazards that pose the greatest risk. The last hazard mitigation plan for Troy was prepared in 2005 and has since expired.

Upon completion, the updated Hazard Mitigation Plan will be presented to the Town of Troy for adoption and submitted to the Vermont Division of Emergency Management and Homeland Security (DEMHS) for review and approval. An approved plan makes the Town eligible for federal and state mitigation grant funding.

If you have any questions regarding the survey, or would like to learn about more ways you can participate in the development of the Hazard Mitigation Plan, please contact Irene Nagle, Senior Planner, Northeastern Vermont Development Association at 802-424-1423 or inagle@nvda.net.

###

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Must have knowledge of reading and preparing recipes, operating computer/computerized systems, proper sanitation and food safety practices. Must be able and willing to take direction from acting Food Service Manager.

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Background check is required.
E.O.E.

Position open until filled.
Job begins at the opening of school (August 2020).

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Opening for the 2020-2021

1.0 FTE EDUCATION

Submit Letter of Interest
3 Letters of Recommendation
and Copy of

Andre Messier
Lake Region Union
317 Lake Region Road
Orleans, VT

E.O.E./Background

Troy Hazard Mitigation Plan Public Meeting Wednesday, June 24, 2020 at 7:00 pm Via Zoom

Join the Troy hazard mitigation team via Zoom on the above date and time to get an overview of the hazard mitigation planning process and discuss natural hazards that are of particular concern in Troy. You can also participate

Coventry Senior Housing Immediate 1st Floor ~ 1 Bedroom Vacancy



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Appalachian Engineered Flooring is a local hardwood engineered flooring manufacturer that has been producing high quality engineered flooring in North Troy for eight years.

We are looking to fill several full time positions. These positions are 40 hours a week with occasional overtime and located at our North Troy facility.

Applicants should be able to lift 50 lbs, able to be on their feet all day in a fast paced manufacturing environment.

We are seeking committed employees who are willing to learn and grow with our company. Experience not required.

Benefits include competitive wages starting at \$13.13 per hour, a production based weekly bonus, health/dental/vision insurance, retirement plan, along with paid vacation and sick time.

Town of Troy
Hazard Mitigation Plan
Public Meeting
June 24 2020



NVDA
*Northeastern Vermont
Development Association*

What is a “Local Hazard Mitigation Plan” and what are the benefits?

- Involves all community stakeholders in identifying hazards facing the community, and prioritizes best strategies to reduce the risks.
- If prepared in accordance with federal guidelines and approved by FEMA, the plan makes communities eligible for FEMA grants for hazard mitigation projects.
- Less expensive to prevent disasters than to repeatedly repair damage
- A Local Hazard Mitigation Plan is **NOT** a regulatory document, and the Town is not required to carry out the mitigation actions identified in the Plan

Categories of FEMA Public Assistance

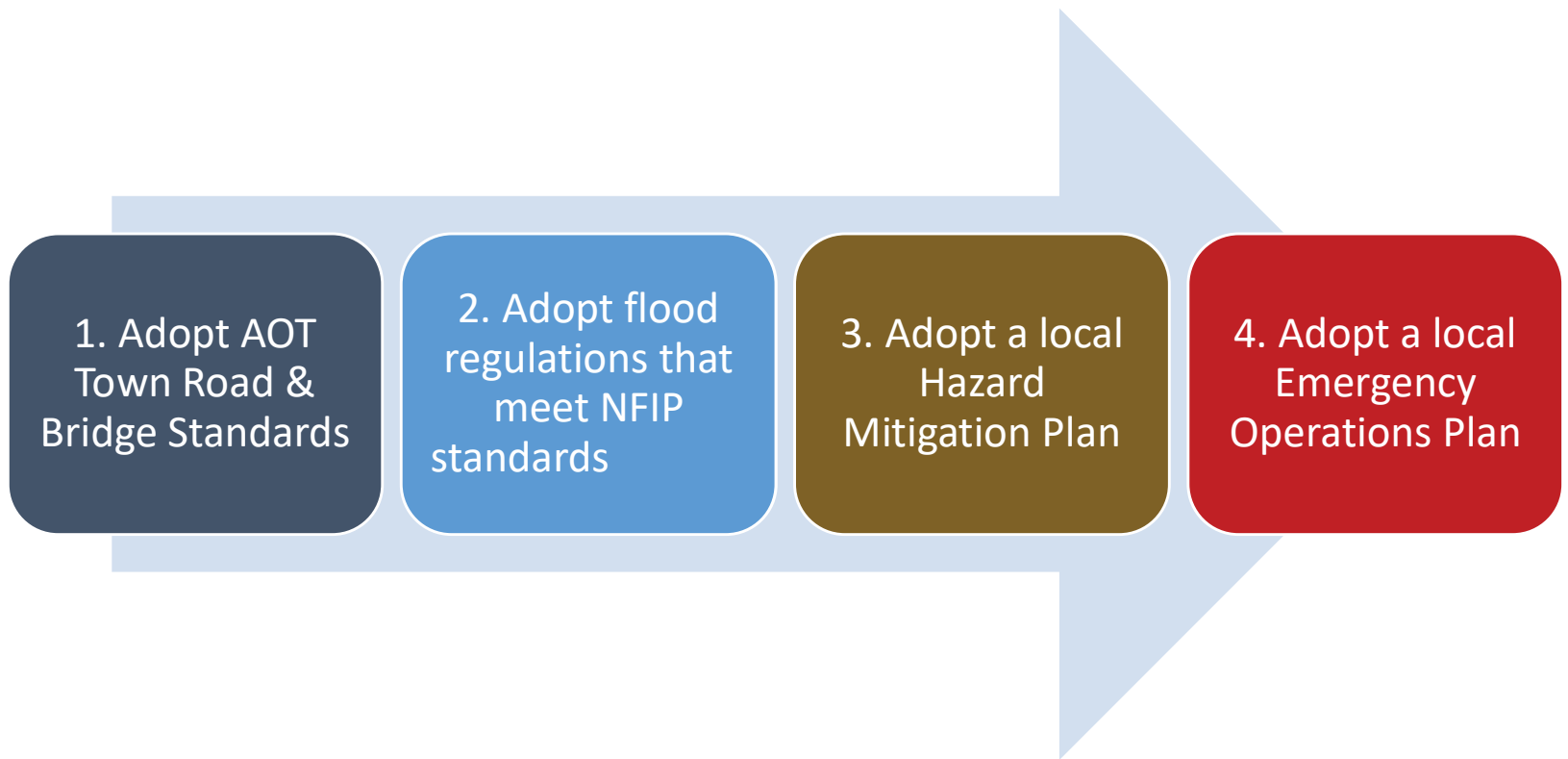
- **Emergency Work**
 - Debris Removal
 - Emergency Protective Measures
- **Permanent Work – Requires Mitigation Plan**
 - Road Systems and Bridges
 - Water Control Facilities
 - Buildings, Contents, and Equipment
 - Utilities
 - Parks, Recreation, and Other

FEMA reimburses 75% of costs

Emergency Relief and Assistance Fund (ERAF)

- **Public assistance grants through FEMA covers 75% of project cost**
- **Helps municipalities repair damaged infrastructure after a presidentially declared disaster**
- **Requires 25% non-federal match for approved projects**
- **State covers a portion of the non-federal match, depending on the measures that a town has taken...**

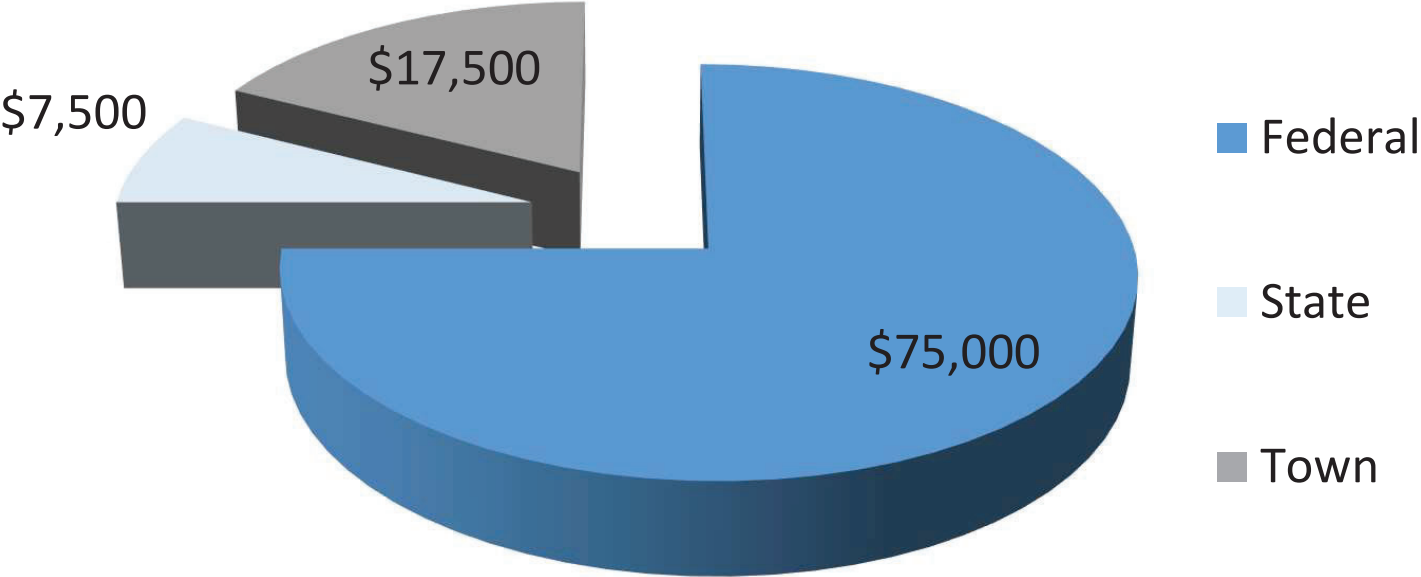
A Hazard Mitigation Plan is one of **four** measures needed to receive the highest amount of funding under the State's Emergency Relief Assistance Fund (ERAF)



ERAF Rule

(If all 4 measures are NOT in place)

Example: \$100,000 loss



The State's share of funding under ERAF is increased to **12.5%** if Town adopts first **4 measures**. State's share increases to **17.5%** if the town adopts flood hazard regulations that include **river corridor protection** guidelines that meet or exceed the state model.

Current ERAF Status for Troy:

- | | |
|-------------------------------------|---------------|
| 1. VT Road and Bridge Standards | YES |
| 2. Local Emergency Operations Plan | YES |
| 3. National Flood Insurance Program | YES |
| 4. Local Hazard Mitigation Plan | NO (underway) |
| 5. River Corridor Protection | NO |

Current State Share	7.5%
---------------------	-------------

River Corridor:

- “Wiggle room” needed for rivers
- Statewide River Corridors – areas with a watershed of 2 square miles or more



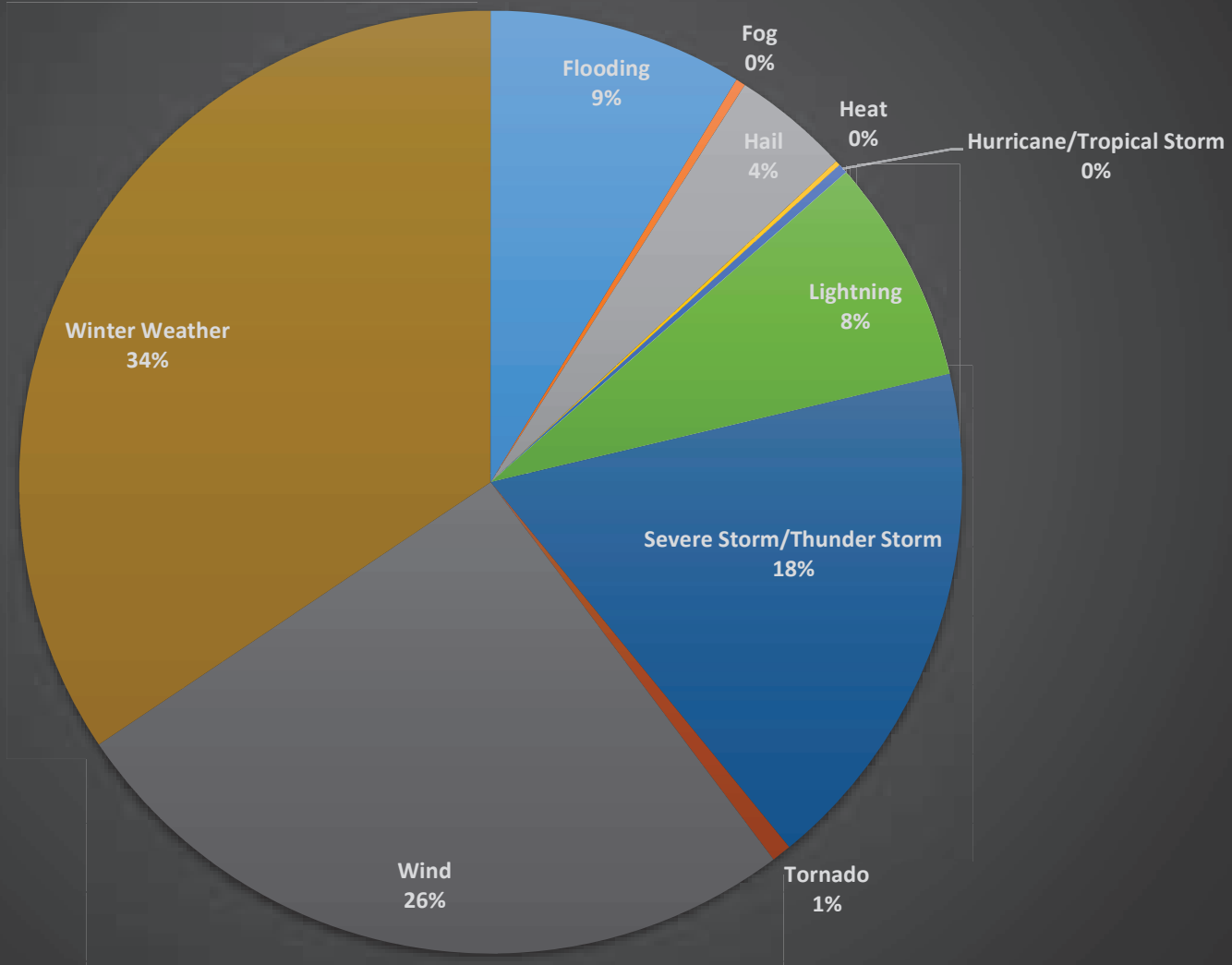
Hazard Mitigation Examples

A FEMA Approved Plan is required for FEMA-funded projects:

- Flood-proofing structures
- Buyouts for repetitive loss structures
- Securing propane/fuel tanks in flood-prone areas
- Elevating furnaces and water heaters in flood-prone areas
- Ensuring adequate water supply
- Elevating structures or utilities above flood levels
- Local Planning and Regulations
- Supplies of Personal Protective Equipment
- Protective barriers in Town and Village Offices
- Education and Awareness

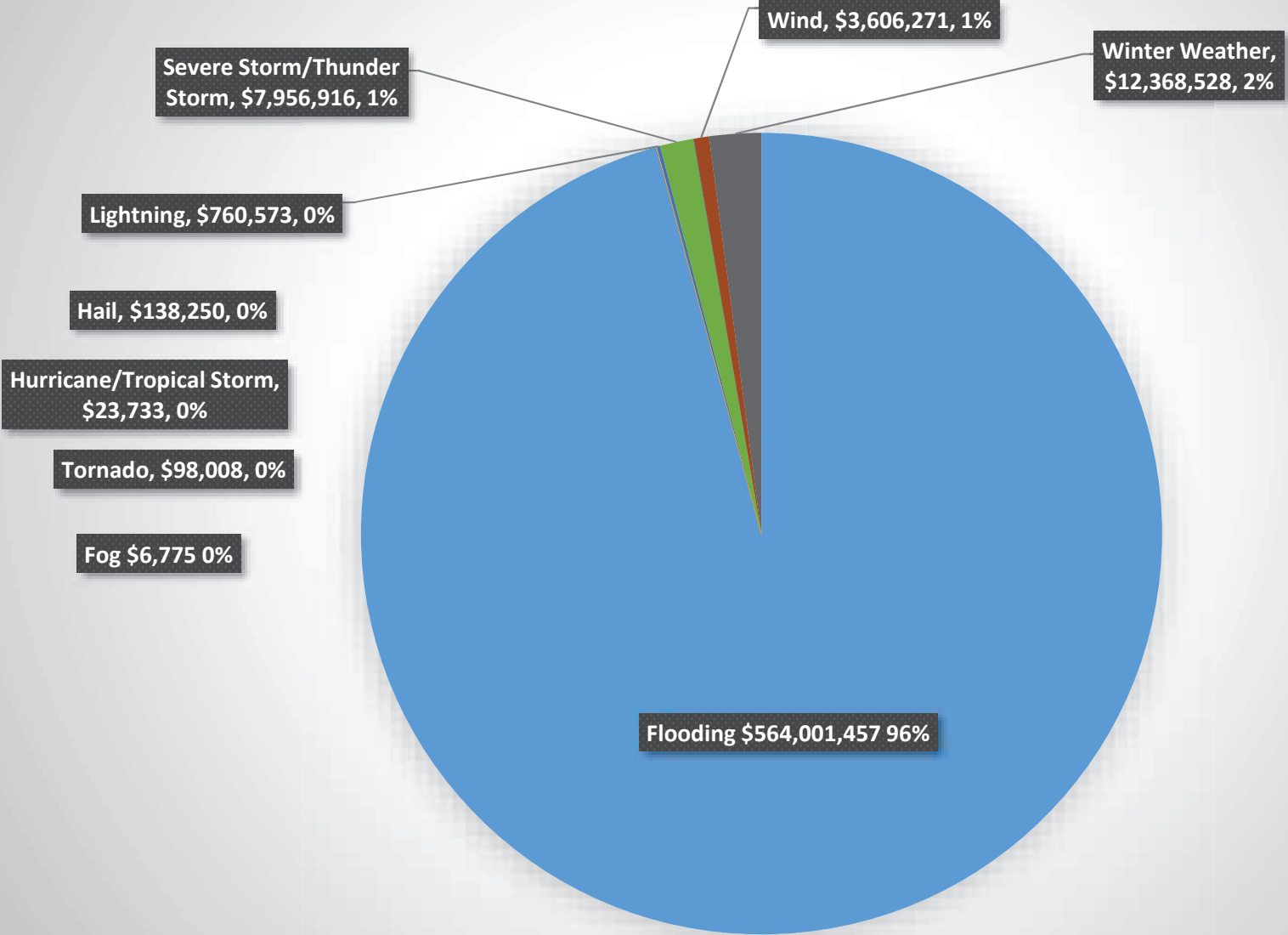
History of Hazard Events in Orleans County

Distribution of Hazard Events in Orleans County 1960-2014
(Frequency of Events)



Cost of Damage from Hazard Events in Orleans County

Distribution of Losses in Orleans County 1960 - 2014



Critical Facilities

- Troy Town Office
- Troy Town School
- Troy Volunteer Fire Dept.
- Village of North Troy Offices
- Village of North Troy Fire Dept.
- Public Water Supply
- Public Wastewater Systems
- Main routes

Others?

Vulnerable Areas

- Flood and Fluvial Erosion Hazard Areas
- Other Areas?

NEXT STEPS

Identifying and Evaluating Mitigation Actions