

TOWN OF EDEN, VERMONT

LOCAL HAZARD MITIGATION PLAN

2017 – 2022

Selectboard Approval to send Draft Plan to FEMA:

FEMA Approval Pending Adoption:

FEMA Formal Approval:

Eden Selectboard Adopted:

Plan expires:

This plan was prepared with funding support of the Hazard Mitigation Grant Program Planning Grant from the Federal Emergency Management Agency. Lamoille County Planning Commission assisted in drafting this plan.

1.0 Introduction

Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazardous conditions. The purpose of this Local Hazard Mitigation Plan (Plan or LHMP) is assess atmospheric hazards facing the community and identify strategies to reduce or eliminate the hazards.

The previous Hazard Mitigation Plan was adopted by the Town of Eden on October 26, 2012 as an “annex” to the multi-jurisdictional All-Hazards Pre-Disaster Mitigation Plan adopted by the Lamoille County Planning Commission in 2012. This plan is intended to be a standalone plan for the Town of Eden.

1.1 Community Profile

Eden is located in northeastern Lamoille County. The town borders Belvidere to the northwest, Johnson to the southwest, Hyde Park to the south, Craftsbury to the east and Lowell to the northeast. Two major highways bisect Eden. VT Route 100 is a major north/south regional truck route, carrying goods from Canada and the Northeast Kingdom south to Interstate 89. Route 118 is also a significant east/west roadway carrying traffic and goods across the town from Eden to Belvidere and Route 109.

Eden is a predominantly rural, residential community. The main town center is located around the intersection of Routes 100 and 118, south of Lake Eden— a popular seasonal and recreation destination. Eden is a small, but growing community; between 2000 and 2010 the town’s population increased from 1,152 to 1,323 residents (14.8%). Accordingly, the number of housing units in town increased by more than 22% during the decade (from 582 to 712). According to E 911 data, no development occurred in 100-year flood plain areas and as such, the assessment of community vulnerability to Eden’s most significant natural hazards remains unchanged.

Vermont Electric Cooperative (VEC), headquartered in nearby Johnson, provides electric service to nearly all residents and businesses. Central Vermont Public Service (CVPS) has lines that cross Eden, although there are no hookups. CVPS owns one parcel with a substation west of Route 100, on Route 118. There is no municipal water supply system provided for Eden residents. All water is supplied by private wells and springs. There is also no central public sewage treatment system or facility. All sewage is treated in individual, on-site septic systems. Eden has numerous bridges and culverts it must maintain on local roads. Because of the high cost of bridge repairs, the town relies heavily on state aid for such work.

Locally, fire coverage is provided primarily by the volunteer North Hyde Park/ Eden Fire Department, which covers the northern half of Hyde Park as well as all of Eden. The fire station is located on Route 100 in North Hyde Park. The North Hyde Park/Eden Fire Department participates in the Lamoille Mutual Aid Association (LMMA), which functions as a mutual aid response network among all eight Lamoille County fire departments. The Northern Emergency Medical Services Division of Newport Ambulance Service, Inc. (NEMS) provides full-time emergency ambulance coverage for Eden. Law Enforcement support is provided by the Vermont State Police (VSP) and as needed emergency coverage is provided by Lamoille County Sheriff’s Department.

Eden’s Emergency Operations Center is located at Eden’s Town Offices on Route 100. Emergency Operations Shelters, both Red Cross certified, are at Eden Elementary School and St. Gabriel’s Catholic Church.

Overall, Eden's capabilities to address natural hazards are considered adequate in relation to the size of the community and the available financial resources, and cannot be expanded at this time. Added demands to improve emergency response and hazard mitigation will necessitate access to more financial resources which, for a small community with a modest tax base, is a significant challenge.

2.0 Planning Process Overview and Public Participation

This plan was prepared by the Eden Selectboard during regular monthly public meetings of the Selectboard. All Selectboard meetings are open to the public and publicly warned according to Vermont's Open Meeting Law requirements. Lamoille County Planning Commission guided the plan development. The Planning Committee consisted of three Selectboard members (Chair and two-members), assistant to the Selectboard and the Emergency Management director. The following meetings and activities were held to prepare the plan:

- May 30, 2017 Town staff met with LCPC staff to begin review of existing HMP
- May 31, 2017 Town staff provided updated event dates & amounts for initial draft
- June 12, 2017 Selectboard and Emergency Management Director given initial draft, item placed on agenda of next meeting for public input.
- June 19, 2017 Eden Planning Commission given initial draft, advised of public input meeting June 26th.
- June 26, 2017 Selectboard meeting included public input during review of initial draft.
- July 24, 2017 Selectboard given latest draft, reviewed and comments noted.
- July 31, 2017 Draft plan delivered to LEPC, posted at Eden web site and LCPC Facebook page for additional comment.

2.1. Existing Plans, Studies, Reports, and Technical Information

To develop this plan, Lamoille County Planning Commission reviewed and referenced the following resources:

- Eden Municipal Development Plan 2013-2018
- Eden Highway Codes and Standards (These establish minimum dimensional requirements, and construction and ditching techniques for local roads, bridges and culverts).
- 2017 Eden Local Emergency Operations Plan
- 2011 Regional All-Hazards Mitigation Plan and Eden Annex to the Regional Plan
- 2013 State of Vermont Hazard Mitigation Plan
- National Centers for Environmental Information, National Oceanic and Atmospheric Administration <http://www.ncdc.noaa.gov/stormevents/>
- FEMA <https://www.fema.gov/disaster>
- State of Vermont – Flood Ready Information <http://floodready.vermont.gov>
- U.S. Census, 2010
- American Community Survey, 2011 – 2015

2.2 Planning Process and Neighboring Communities

Neighboring communities have been encouraged to provide input into the development of this plan and review the draft plan. On XXXXXX, 2017, the draft plan was distributed to Local Emergency Planning Committees #11 and #4) members. The LEPCs are composed of emergency management professionals and volunteers and include representatives from all of Eden's neighboring communities, i.e. Belvidere, Johnson, Hyde Park, Craftsbury, Lowell, Albany and Montgomery. On XXXXXX, 2017 this Plan was posted on Eden's web site. The LEPC members and the public were instructed to provide feedback to Lea Kilvadyova, Lamoille County Regional Planner via email or phone.

2.3 Plan Maintenance Process and Continued Public Involvement in the Plan Maintenance Process

Eden Selectboard will evaluate Eden's LHMP annually by reviewing the status of mitigation actions and assessing whether plan goals are being achieved and priority actions implemented. This evaluation will occur at public meetings of the Selectboard warned according to the Open Meeting Law requirements. Additionally, any significant disaster event may prompt a review of this plan by the Select Board or Emergency Management Director. One year prior to the expiration of the Plan, the Select Board will initiate and lead the process of the Plan update-with possible assistance from Lamoille County Planning Commission. Continued public involvement will occur through maintaining the existing processes as cited above plus the addition of all evolving required process changes. By Vermont Statute, the Select Board is the authority to vote on the plan approval.

3.0 Hazard Identification and Risk Assessment (HI/RA):

A 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 atmospheric disasters. During the preparation of this plan, Eden evaluated ten atmospheric hazards. These hazards, presented in the table below, were ranked based upon the frequency and severity of the event, and the community's vulnerability to the hazard.

The Frequency of occurrence is classified as shown:

- Rare: < 1% probability in the next 100 years; may never have occurred in Vermont.
- Unlikely: 1% to 4% probability in the next year, this type of event has occurred in Vermont.
- Unusual: 4% to 10% probability in the next year, or at least one chance in the next 100 years.
- Likely: 10% to 50% probability in the next year, or at least one chance in the next 10 years.
- Frequent: Greater than 50% probability in the next year; an event that occurs often but degree varies.

The Severity (percentage of the community affected) of the hazard can be classed as follows:

- Minor: < 10% of properties damaged/Minimal disruption to quality of life.
- Serious: 10% to < 25% of properties damaged/Loss of essential facilities/services for up to 7 days/Few (< 1% of population) injuries possible.
- Extensive: 25% to 50% of properties damaged/Loss of essential facilities/services for > 7 days < 14 days/Major (< 10% of population) injuries/few deaths possible.
- Catastrophic: > 50% of properties damaged/loss of essential facilities/services for > 14 days/Severe (> 10% of population) injuries/multiple deaths possible.

The combination of the Severity and the Frequency was used to determine the Community Vulnerability as *High, Moderate or Low*.

Possible Hazard	Frequency	Severity	Community Vulnerability	Most vulnerable
Significant Hazards:				
Flooding, fluvial erosion and ice jams	Frequent	Catastrophic	High	Damage to roads, culverts, bridges, and residences; potential water source contamination
Severe Winter Storms (snow and ice storms)	Frequent	Serious	Moderate	Property damage, road closures, loss of electricity from fallen trees
Severe Wind Storms, (thunderstorms, hurricanes and tropical storms)	Likely	Serious	Moderate	Loss of electricity from fallen trees; other vulnerabilities associated with flooding
Other Hazards:				
Major Hailstorm	Unlikely	Minor	Low	Damage to structures and other private and public property
Major Wildfire or Forest fire	Unusual	Extensive	Moderate	Widespread damage to structures, infrastructure
Drought	Unusual	Serious	Moderate	Private well failures, wildfires, agricultural losses
Earthquake	Unlikely	Serious	Low	See VT Geological Survey HAZUS report (9/03)
Landslide	Unusual	Minor	Low	Damage to roads and structures
Tornado	Unusual	Serious	Low	Road closures and loss of electricity from fallen trees; major structure damage
Extreme Temperatures	Unlikely	Minor	Low	Cold –plumbing, machinery transportation; Hot – crop and livestock
Lake Eden Dam South Pond Dam	Unusual	Catastrophic	High	Damage to roads, culverts, bridges, residences, potential water source contamination.

Section 3.1 of the plan will address, in detail, three hazards evaluated by Eden as “significant hazards”. These are Flooding, Severe Winter Storms and Severe Wind Storms. The remaining hazards from the table above are omitted due to low event probability.

3.1. Significant Hazards

There are three types on natural hazards that Eden identified as having potential significant impact on the community: Flooding, winter storms and wind storms. Over years, these hazards resulted in federal disaster declarations for Lamoille County and as such, Lamoille County communities benefited from

FEMA public assistance funding to address damages caused by the flooding and storms. A history of federal declarations, starting in year 2011 is listed on the next page.

Federal Disaster Declarations that included Lamoille County communities:

Year and Event number	Type of Event	County- Wide Damage Assessment	FEMA public assistance funds received by Eden
December 2014 (DR 4207)	Severe Winter Storm	\$230,000	None
April 15, 2014 (DR-4178)	Severe Storms and Flooding	\$326,000	None
December 2013 (DR-4163)	Severe Winter Storm(Ice)	\$390,000	\$30,521
May 23, 2013 (DR-4120)	Severe Storms and Flooding	\$145,000	\$6,572
May 29, 2012 (DR-4066)	Severe Storm, Tornado and Flooding	\$306,000	\$25,965
August, 2011	Tropical Storm Irene	\$460,000	None
April-May, 2011 (DR-1995)	Severe Storms and Flooding	\$1,162,000	\$66,293 to repair road and culvert

Additional natural disasters that caused damages in Eden but did not qualify for FEMA funding included an ice storm in 2014 (cost of damage repairs - \$2,222); flooding in 2014 (cost of repairs - \$8,710) and heavy rain in June 2016 (damage repairs at \$146,520).

3.1.1 Flooding (also includes fluvial erosion and ice jams)

Hazard Definition: Flooding is the overflowing of rivers, streams, drains, and lakes due to excessive rain, rapid snow melt, or ice. Fluvial erosion is the removal of sediment from stream channel banks by the channel flow. This process occurs naturally over time as a stream channel makes adjustments. However, fluvial erosion can occur more quickly and severely during flood events and can pose a significant risk to infrastructure and buildings within the river corridor. Ice jams occur when warm temperatures and heavy rain cause snow to melt rapidly. Snowmelt combined with heavy rains can cause frozen rivers to swell, which breaks the ice layer on top of the river. The ice layer often breaks into large chunks, which float downstream and often pile up near narrow passages or other obstructions, such as bridges and dams.

Extent: The worst flooding that can be anticipated is reflected by the 2011 events during Tropical Storm Irene in southern Vermont, where most areas received between 5 and 7 inches of rain, with the highest recorded amount in the Town of Mendon (11 inches). Had the northern part of the state- including

Eden – received a comparable amount of rain during Irene, the results would have been equally catastrophic. The extent information for fluvial erosion or ice jams is unavailable.

Location: In Eden, parts of community most at risk are the ones located in flood hazard areas depicted on the Flood Hazard Map as well as town highways with steep grades and various roads, including private roads around Lake Eden which tend to see roadside erosion and culvert washouts. (Note: map yet needs to be added)

National Flood Insurance Program

Eden does not participate in the NFIP and thus has no repetitive loss properties. The town has no flood hazard bylaw and must have one in place in order for residents to apply for federally subsidized insurance. Eden has elected not to enroll in NFIP due to the small extent of floodplain in the community and limited demand for flood insurance among residents.

3.1.2 Severe Winter Storms (snow storms and ice storms)

Hazard Definition: Severe winter storms bring the threat of heavy accumulations of snow, cold/wind chills, strong winds, power outages and property damage.

Extent: The worst winter storm that can be anticipated in Eden would be comparable to the ice storm of January of 1998 when an unusual combination of precipitation and temperature led to the accumulation of more than three inches of ice in many locations, causing closed roads, downed power lines, and damage to thousands of trees. This storm was estimated as a 200–500 year event. Alternatively, the worst snow storm that can be expected is snowfall of up to 30", which has occurred multiple times. While large snowfalls often disrupt business for one or more days, Vermont communities are well prepared for handling snow.

Location: During a severe winter storm, an entire community is at risk.

3.1.3. Severe Wind Storms (Thunderstorms, Tropical storms, Hurricanes)

Hazard Definition: Severe thunderstorms, hurricanes and tropical storms are compound hazards are capable of producing precipitation, high winds, flooding, and fluvial erosion. Thunderstorm winds are generally short in duration, involving winds or gusts in excess of 50 mph. A tropical storm has a maximum sustained wind speed of 39–73 mph. A hurricane is a tropical cyclone with sustained winds that have reached speed of 74 mph or higher.

Extent: The worst windstorm that can be anticipated in Eden would be comparable to that of the September 1938 hurricane, which caused widespread property damage throughout the state (reaching a force of 12 on the Beaufort Wind Scale, with estimated winds of 74+ mph).

Location: While severe winds can have an equal impact on the entire community, parts of community most at risk and likely to be impacted by severe winds are the ones located in flood hazard areas depicted on the Flood Hazard Map as well as high elevation areas.

4.0 Goals and Actions: Community Preparedness and Mitigation

Eden's overarching hazard mitigation goal is to reduce and avoid long-term vulnerabilities to hazards identified in this plan. In reaching this goal, Eden engages in emergency preparedness activities of an ongoing nature as well as hazard mitigation action projects.

4.1 Community Preparedness Actions

Eden's community preparedness activities include:

- Annual adoption of Local Emergency Operations Plan (last adopted in April 2017)
- Upkeep of Radio Communications (last updated in FY12/13)
- Installation of Two Emergency Generators (FY13/14 and FY15/16)
- Installation of Dry Hydrants for Fire Protection (Warren Rd in FY12/FY13 and East Hill Rd in FY16/17)
- Participation in Local Emergency Planning Committee meetings and activities.
- Maintenance of vegetation management schedule for electric right of way. Inspect and remove, if necessary, trees and/or limbs which endanger electrical lines during wind storms (performed by Vermont Electric Cooperative)

4.2. Mitigation Actions

When evaluating investments in hazard mitigation, Eden considers both the cost of the investment as well as the benefit of the investment to the community. Since the adoption of the 2012 hazard mitigation plan annex, Eden simplified its process to identify priority actions. In 2012, Eden used the following criteria to evaluate the priorities: 1) Action responds to significant hazard; 2) Likelihood of Funding; 3) Protects threatened infrastructure; 4) Socially and politically acceptable; 5) Technically Feasible; 6) Administratively realistic; 7) Reasonable cost to benefit; and 8) Environmentally sound.

In this plan, Eden determined that some criteria used in 2011 (such as whether the project is politically acceptable, technically feasible or administratively realistic) were hard to evaluate at the planning stage. For this reason, the criteria were streamlined to the following two areas: 1) Cost and 2) Benefit. Cost is assessed based on a scale of Low (0 - \$5,000), Medium (\$5,001 - \$15,000), High (\$15,001 - \$50,000) or Very High (More than \$50,000). Benefit is defined as improved resilience of existing buildings or improved infrastructure, and improved public safety. Benefit is Low, Medium or High.

A note about funding of mitigation actions: While the availability of funding to implement mitigation actions is important to all communities, the criticality of funding is amplified in small towns like Eden. Grant programs available through FEMA or Vermont funding streams have been invaluable. However, these grant programs require local matching funds and for high cost projects it may take several years for the town to be able to set aside enough reserve funds to match the grant funding.

Hazard mitigation actions listed in this plan were carefully considered and will be incorporated into a Town Plan during the next town plan update in 2018. During the Town update process, the Planning Commission will review this plan when they begin the process of updating the town plan in 2017 and incorporate the hazard mitigation actions. Additionally, actions identified in this plan will be made available to state agencies for their incorporation into statewide plans including the Tactical Basin Plan for Lamoille River Watershed of the VT Agency of Natural Resources or the List of Priority Infrastructure Projects developed annually by the VT Agency of Transportation.

4.2.1 Status of mitigation actions from the previous Hazard Mitigation Plan (2011 Annex)

Action	Status
1. Review findings of 2011 Culvert Study	Completed
2. Investigate benefits of adopting flood hazard regulations	Completed
3. Upgrade the undersized double culvert on Knowles Flat Road	Culvert failed in 2016 and road has been closed since. This is a priority mitigation action for 2017.
4. Paving portions of steep-slope high traffic town highways (East Hill and Warren Road)	This is a recurring task as financial resources allow.
5. Address erosion issues at Eden Recreation Area	Completed

Note: Actions identified above are supported by transportation policies and implementation recommendations of the Town Plan currently in place.

Additionally to the actions listed above, Eden put in place drainage and erosion control measures in five locations: Square Hill, Cooper Hill and three locations along East Hill. Infrastructure replacements included Whitney Lane Bridge and Tree Farm Road Bridge. Currently in progress are two culvert replacement projects on Knowles Flat Road (Twin Culvert and Culvert #13-8)

New priority actions are listed below. The timeline indicates implementation priorities. The Selectboard will take these priorities into consideration annually, during the town budget development process. An onset of a significant disaster event may prompt a review of the priorities. Otherwise, it is the Selectboard's intent to implement the actions listed below as funding, time and public support allow.

The mitigation actions listed below focus on structure and infrastructure projects, and natural systems protections. Actions pertaining to education and awareness programs and changes to local regulations were considered and are currently not incorporated into this plan. Hazard mitigation priorities have not changed and remain focused on flooding, fluvial erosion, ice jams and severe wind events accompanied by rain. The Town evaluated the need to mitigate winter storm and ice storm hazard, and determined that the continued focus of the Town Highway Department will be on managing the storms as they happen.

4.2.2 Eden Mitigation Actions

Mitigation Actions	Hazard	Party to Initiate Action	Timeline	Possible Funding	Cost*	Benefit**
1. Upgrade failed double culvert on Knowles Flat Rd to concrete bridge	Road Closed, no access	Town, LCPC, AOT, State of VT Fed Priority Listing	2017-2020	Project has been included in VTrans' list of projects needed capital program funding. Town will provide a match.	High	Flood, Wildlife Habitat, Public Accessibility
2. Continue upgrade culverts identified in 2011 Culvert Study	Road erosion, flooding, property damage	Town, LCPC, AOT	Annually	Town, Vermont AOT, Vermont ANR-Better Back Roads	Medium	Flood, Erosion, Water Quality, Public Accessibility
3. Establish municipal road general permit plan.	Road erosion, flooding, property damage	Town, LCPC, AOT	2017-2018	Town, State	Medium	Flood, Erosion, Water Quality
4. Explore paving of high traffic, steep slope roadways to mitigate erosion & washouts	Road erosion, flooding, property damage	Town, LCPC, AOT	Annually	Town, Vermont AOT, Vermont ANR	High	Flood, Erosion, Winter Storms
5. Explore development of a plan to address water runoff into Lake Eden	Erosion, Water Quality, Property Damage	Town, LCPC, ANR	2017-2018	Town, Vermont ANR	High	Erosion, Water Quality

Resolution

Approving the Eden Local Hazard Mitigation Plan

The Selectboard of the Town of Eden find that:

- A) The adoption of a multi-hazard plan is required as a condition for communities to remain eligible for future Federal Emergency Management Agency (FEMA) mitigation grant funds.
- B) The Town of Eden has prepared the Eden Local Hazard Mitigation Plan in order to meet FEMA's funding requirement, a copy of which is attached as Exhibit A and incorporated herein by reference.
- C) The Selectboard has reviewed and considered the Eden Local Hazard Mitigation Plan.
- D) The mitigation strategies and actions identified in the plan will be implemented only when funding sources have been identified and projects have been prioritized as outlined in the Plan.

NOW THEREFORE,

BE IT RESOLVED BY THE SELECTBOARD OF THE TOWN OF EDEN, A MUNICIPALITY OF THE STATE OF VERMONT, AS FOLLOWS:

Section 1. Based on the above findings, which are hereby adopted, the Eden Local Hazard Mitigation Plan attached as Exhibit A is approved as the official Comprehensive Local Hazard Mitigation Plan for the Town of Eden.

Section 2. This resolution shall become effective immediately upon adoption.

The foregoing Resolution is hereby adopted this ____ the day of _____, 2017

Selectboard Chair _____

Selectboard Member _____

Selectboard Member _____

Town Clerk received _____