TOWN OF EGREMONT

2022 MUNICIPAL VULNERABILITY PREPAREDNESS (MVP) - HAZARD MITIGATION PLAN (HMP)

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transform your environment

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1 Introduction

1.0 INTRODUCTION

The Town of Egremont prepared a Municipal Vulnerability Preparedness and Hazard Mitigation Plan (MVP-HMP) to create an action roadmap to reduce the impacts of natural hazards and climate change within the community and the region. The Egremont MVP-HMP Summary of Findings Report was adopted by the Select Board on June 28, 2022 to update and replace the Berkshire County Hazard Mitigation Plan from 2012.

1.1 What is a Hazard Mitigation Plan?

Natural hazards, such as earthquakes, hurricanes, and flooding, can result in loss of life, disruptions to everyday life, and property damage. Hazard mitigation is the effort to reduce these impacts through community planning, policy changes, education programs, infrastructure projects, and other activities (FEMA, 2020a). Hazard mitigation planning uses a multi-step process with the participation of a wide range of stakeholders to:

1. define local hazards
2. assess vulnerabilities and risks
3. review current mitigation measures
4. develop priority action items

HMPs focus resources and attention on the community's greatest vulnerabilities. The resulting plan and implementation saves lives and money. For every dollar spent on federal hazard mitigation grants, an average of six dollars are saved (Figure 1-1; FEMA, 2018). There are many additional benefits of mitigation planning. HMPs increase public awareness of natural hazards that may affect the community. They help state, local, and tribal governments to collaborate and combine hazard risk reduction with other community goals and plans.

Once an HMP is completed, hazard mitigation funding is available to address the community's top mitigation priorities through the Federal Emergency Management Agency (FEMA). To be eligible for FEMA grants, local governments are required to prepare an HMP that meets the requirements summarized in Figure 1-2 (on page 1-4), established in the *Robert T. Stafford Disaster Relief and Emergency Assistance A*ct, as amended by the *Disaster Mitigation Act of 2000.*

Figure 1-1. FEMA Hazard Mitigation Planning Saves Money Graphic (FEMA, 2018)

Table 1-1. FEMA Grants (FEMA, 2020b)

FEMA Grants	Purpose
Hazard Mitigation Grant Program (HMGP)	Helps communities implement hazard mitigation measures following a Presidential Major Disaster Declaration.
Building Resilient Infrastructure and Communities (BRIC)	Assists in implementing a sustained pre-disaster natural hazard mitigation program, to reduce risk to the population and structures from future hazard events.
Public Assistance Grant Program (PA)	Provides supplemental grants so that communities can quickly respond and recover from major disasters or emergencies.
Fire Management Assistance Grant Program (FMAG)	Available for the mitigation, management, and control of fires on publicly or privately owned forests or grasslands.

1.2 What is a Municipal Vulnerability Preparedness Plan?

A Municipal Vulnerability Preparedness (MVP) plan identifies priority action items to address vulnerabilities and utilize strengths in preparation for climate change. In 2017, the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) initiated the state's MVP grant program to help communities become more resilient to the impacts of climate change. The program has two grant phases:

1. The first grant phase is the Planning Grant, which funds the vulnerability analyses, engagement, and planning processes. Towns convene a team of municipal staff, engage stakeholders in a Community Resilience Building (CRB) Workshop, and engage community members in developing

Ad

the plan. Communities that complete the Planning Grant program and prepare an MVP plan are eligible for the second phase of MVP grant funding and receive increased standing for other state grants.

2. The second phase of the MVP program is the Action Grant, which funds the implementation of priority climate adaptation actions described in the MVP plan. Since these Action Grants are only distributed to Massachusetts municipalities, they are less competitive than similar grants awarded at the national level.

Community Resilience Building Workshop

The Community Resilience Building Workshop was developed by the Nature Conservancy and provides a process for developing resilience action plans with stakeholder input. The process has been successfully implemented in over 400 communities.

The Community Resilience Building Workshop's central objectives are to:

- Define top local natural and climate-related hazards of concern
- Identify existing and future strengths and vulnerabilities
- Develop prioritized actions for the Community
- Identify immediate opportunities to collaboratively advance actions to increase resilience

Each step in the process (below) is rich in information and dialogue and results in actionable plans and strong collaboration.

1.3 Combining Hazard Mitigation and Municipal Vulnerability Preparedness Planning in Egremont

The Town of Egremont received an MVP Planning Grant to prepare an MVP plan in coordination with an HMP process. This combined approach enabled Egremont to consider the impacts of climate change in addition to historic hazard events as part of its planning process. Also, many of the required steps of the MVP process satisfy FEMA requirements for updating an HMP. For example, an MVP requires convening a Core Team and hosting a CRB Workshop and Public Listening Session, which are not required specifically by FEMA, but do meet the public input needs of the hazard mitigation planning process (see Figure 1-2).

The town prepared this joint MVP-HMP in accordance with FEMA guidelines for hazard mitigation planning (*Title 44 Code of Regulations (CFR) 201.6*) and with the Massachusetts Executive Office of Energy & Environmental Affairs' (EOEEA) requirements for MVP plans. This approach followed the state's lead in adopting the first-ever Massachusetts State Hazard Mitigation and Climate Adaptation Plan (EEA and EOPSS, 2018). By completing a joint MVP-HMP, Egremont was able to fulfill the requirements and enhance the impact of both processes.

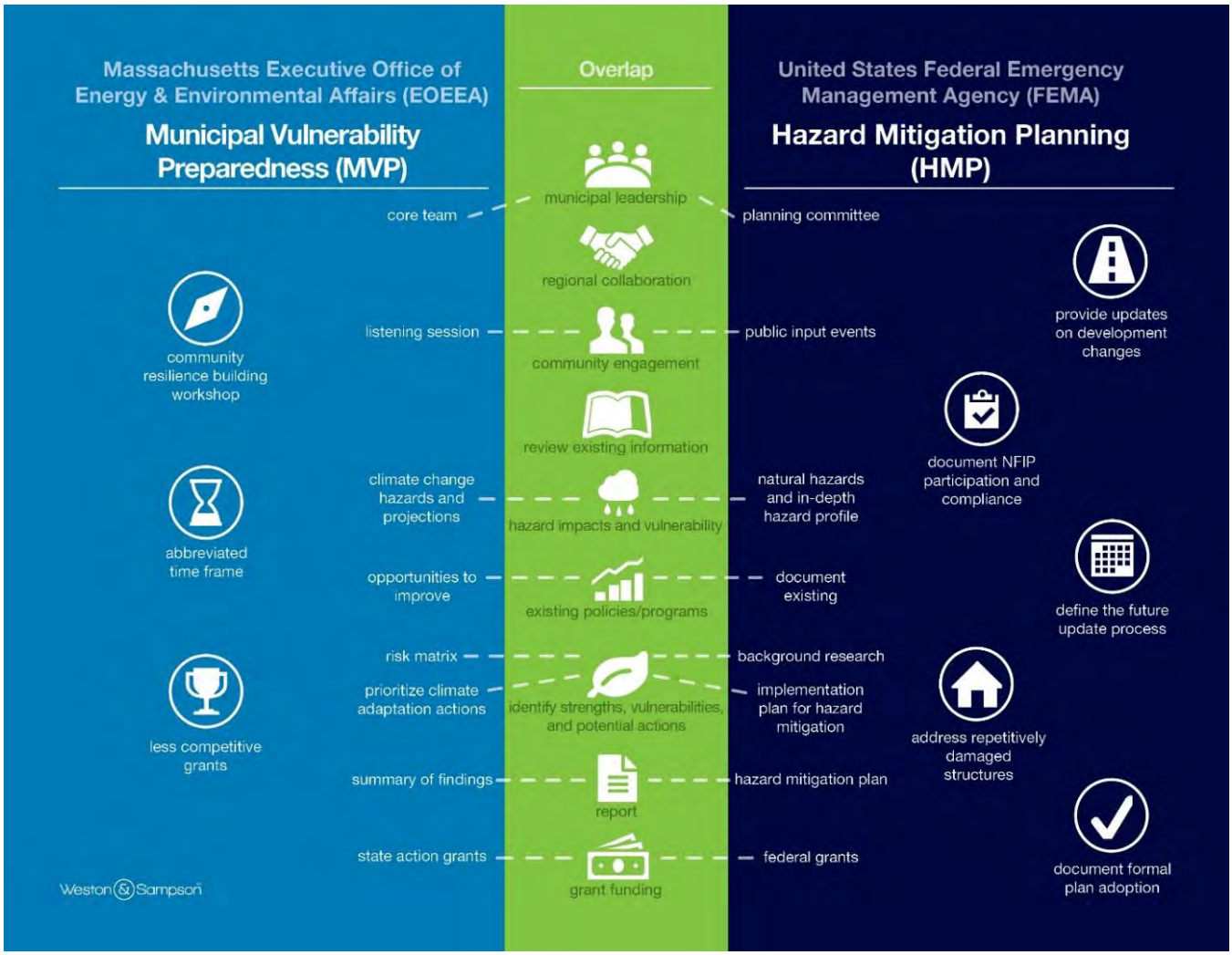


Figure 1-2. Comparison of the MVP and HMP Process

1.4 Planning Process Summary

An important aspect of the natural hazard and climate change impact mitigation planning processes is facilitating discussion among stakeholders, including about how to create a safer, more resilient community. The involvement of a variety of stakeholders in identifying mitigation strategies helps reflect the Town's values and priorities and builds greater community support and success in implementing actions that reduce risk. The planning and outreach strategy used to develop this MVP-HMP collected input from three categories of stakeholders:

1. The Core Team, which includes representation from municipal and local leadership
2. Local, regional, and state-level stakeholders who could be vulnerable to, or provide strength against, natural hazards and climate change
3. Residents, business owners, and all those who are interested in the Town's future

1.4.1 Core Team

The Town of Egremont convened the Core Team, which includes members of the MVP-HMP Committee, led by specific team members acting as a planning committee, for the development of the MVP-HMP. The Town requires at least four planning committee members to be present at any MVP-HMP meeting.

The Core Team met on October 5th, 2021 to set goals for the planning process, confirm the critical facilities and stakeholders lists, discuss the public engagement process, and plan for the CRB Workshop. The Core Team met again on March 1 and April 19, 2022 to prioritize the mitigation actions and review the implementation mechanisms. More information on these meetings is included in Appendix A. The Core Team also provided regular input through email and interviews. The Core Team played an important role in identifying critical infrastructure, involving key stakeholders, and capturing the Town's capacity to mitigate hazards alongside ongoing operations. Members of the Core Team are listed in Table 1-2.

Table 1-2. Egremont's Core Team

Name	Title
Juliette Haas*	Board of Health Director / Town Clerk / Sustainability Coordinator
Dave Rejeski*	Egremont Resident
Ed McCormick*	Emergency Management Director
Jim Noe*	Highway Department Superintendent
Lucinda Fenn-Vermeulen*	Select Board Vice Chair
Will Conklin*	Greenagers Director
Donna Bersch	Planning Board Member - former
Frederick Gordon	Housing Committee Member
Bruce Bernstein	Council on Aging Chair
William Brinker	Water Commissioners' Clerk
Emily Eyre	Green Committee Co-Chair
Joyce Frater	Conservation Commission Associate

*: MVP-HMP Planning Committee

The Core Team also suggested or made available reports, maps, and other pertinent information related to natural hazards and climate change impacts in Egremont. These included:

- Egremont News (Town of Egremont, July 2021)
- Annual Report of the Town Offices (Town of Egremont, 2020)
- Annual Report of the Town Offices (Town of Egremont, 2019)
- General Bylaws (Town of Egremont, 2017b)
- Zoning Bylaws (Town of Egremont, 2017a)
- Berkshire Regional Hazard Mitigation Plan (BRPC, 2012)
- Master Plan for the Town of Egremont (BRPC, 2003)
- Open Space and Recreation Plan (BRPC, 2001)
- Massachusetts Climate Change Projections (NESEC, 2018)
- Massachusetts Climate Change Adaptation Report (EEA, 2011)
- Massachusetts State Hazard Mitigation and Climate Change Adaptation Plan (EEA and EOPSS, 2018)
- Local Mitigation Planning Handbook, March 2013 (FEMA, 2013)
- Storm Event Database, National Center for Environmental Information (NOAA, 2020)
- Decennial Census (US Census Bureau, 2020)
- Decennial Census (US Census Bureau, 2010)
- American Community Survey, 5-year estimates (US Census Bureau, 2019)

1.4.2 Stakeholder Involvement: Community Resilience Building (CRB) Workshop

Due to the COVID-19 pandemic, the Community Resilience Building (CRB) Workshop could not be conducted in person. Instead, the Town hosted a series of three online webinars on December 14-16, 2021, organized around topic areas that included infrastructure assets, community resilience, and natural resources. Stakeholders with subject matter expertise and local knowledge and experience, including public officials, regional organizations, neighboring communities, environmental organizations, business owners, and local institutions, were invited to attend. During these webinars, Weston & Sampson provided information about natural hazards and climate change, including the top four hazards impacting Egremont. Participants were invited to comment on and edit pre-selected infrastructural, societal, and environmental features in town that are vulnerable to, or provide strength against, these challenges.

Figure 1-3. Examples of infrastructure assets, natural resources, and community resilience in Egremont.

These include the Egremont Brush Truck (left), Prospect Lake (center) and a Public Meeting (right). Photos by the Town of Egremont

Participants also identified and prioritized key actions that would improve the Town's resilience to natural and climate-related hazards. A full list of community representatives who were invited and those who participated in the process are presented in Appendix C, along with the materials from each webinar. The broad representation of local and regional entities that participated in these webinars ensures that the HMP-MVP aligns with the operational policies and hazard mitigation strategies at different levels of government and implementation. For example, as the Planning Board has the authority to regulate development in Egremont, a representative of the Planning Board was invited and attended the CRB Workshop series.

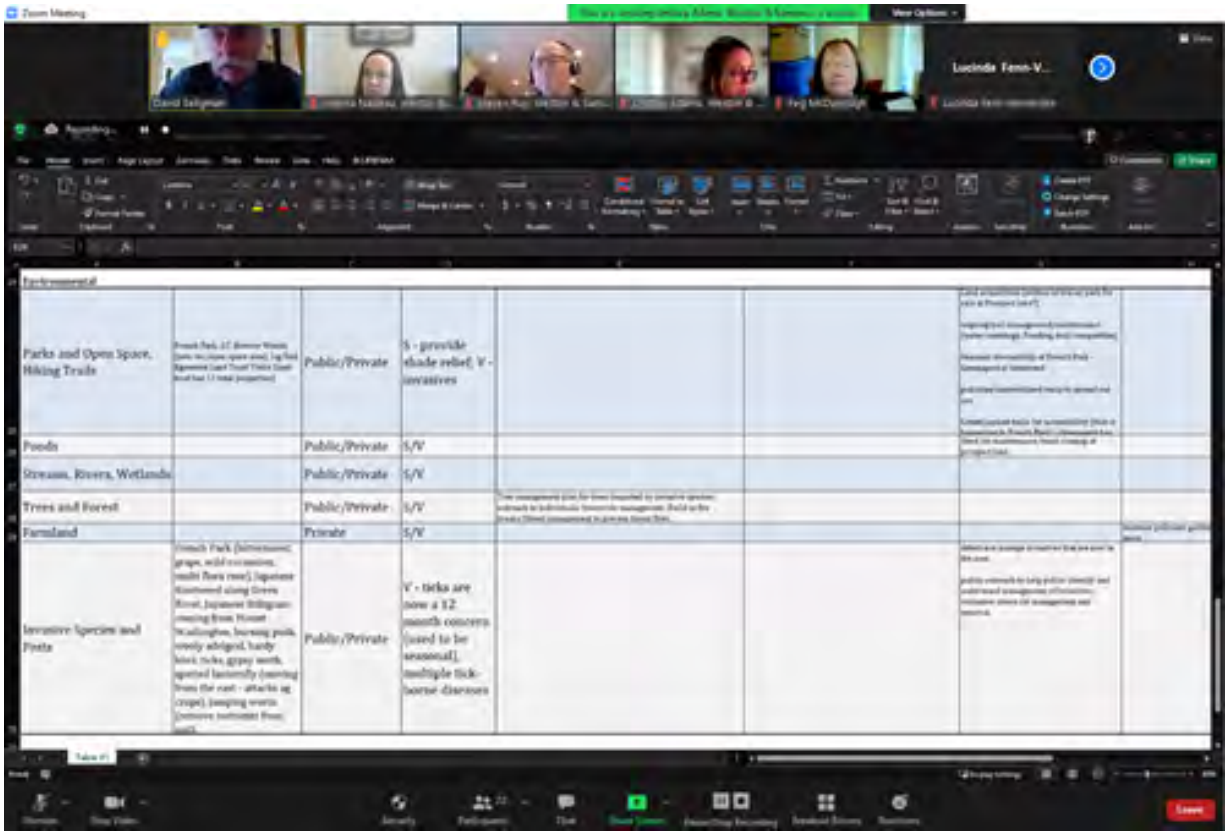
A summary of key participants at each webinar is included below.

1. Infrastructure Assets Webinar: 20 participants, including:
    - Municipal staff members from the *Highway Department, Emergency Management, and Water Department*
    - Members of boards and committees, including *Board of Health, Select Board, Planning Board, Conservation Commission, Green Committee, Bylaw Review Committee and the Housing Committee*
    - Representatives from local groups, including *Greenagers*
    - Representatives from State agencies and regional organizations, including *the EEA, MassDOT, and National Grid*

2. Community Resilience Webinar: 17 participants, including:
    - Municipal staff members from the *Water Department and Emergency Management*
    - Members of boards and committees, including *Board of Health, Select Board, Planning Board, Housing Committee, Green Committee, Council on Aging, Conservation Commission, and the Bylaw Review Committee*
    - Representatives from local groups, including *Greenagers*
    - Representatives from State agencies and regional organizations, including *EEA and National Grid*

3. Natural Resources Webinar: 17 participants, including:
    - Members of boards and committees, including *Board of Health, Select Board, Planning Board, Housing Committee, Green Committee, Council on Aging, Conservation Commission and the Bylaw Review Committee*
    - Representatives from local groups, including *Greenagers*
    - Representatives from State agencies and regional organizations, including *Mass Audubon and Southern Berkshire Regional School District*

Figure 1-4. A screenshot from Egremont's Community Resilience Building Webinar Recording



For each of these webinars, leadership from neighboring communities of Alford, Great Barrington, Sheffield, Mount Washington, and Hillsdale, NY were invited to participate in the workshop, though no representatives were able to attend the workshop from these Towns.

1.4.3 Public Listening Sessions

Due to the COVID-19 pandemic, the required public listening session could not be conducted in person. As a solution, and to gather information from the community and educate community members on hazard mitigation and climate change, the Town pursued the following approach:

1. Getting the word out (Video/Survey): This first step involved posting a video online along with an online survey to capture initial input. These online materials allowed residents to engage with the project on their own time, and as their scheduled allowed. Online and printed materials were posted for four weeks in November on the Egremont Town website and advertised town wide through the Shopper's Guide, Egremont Posts, Egremont Forum, the town's email distribution list, posted at local facilities, mailed to residents, and shared at the Transfer Station. The survey received 320 responses.

Survey results suggested that winter weather (Nor'easters, snowstorms, blizzards, ice storms), flooding, extreme temperatures, and severe wind events (tornado, thunderstorms, hurricane) are the hazards of most concern to the Egremont community. Residents shared stories of when winds and heavy snow had affected power and communications systems and flooding had caused impassible roads. They also expressed concern for the natural environment and species under stress. Respondents also indicated their priorities for Town mitigation activities. See Appendix D for survey questions and a summary of results.

> ***"Wind events frequently cause power outages, and then we have no way to call for help."***
> *-survey response from Egremont resident*

2. Virtual webinar on draft plan: This second step involved hosting and recording a Virtual Public Listening Session Webinar in March, 2022. More information on this webinar is included below.

The project team planned the webinar to maximize participation and engagement. Step-by-step instructions for joining the webinar were shared with attendees in advance, and moderators were on-hand to assist participants with troubleshooting. An alternate call-in number was provided. The staffing plan for the meeting included a main facilitator to present information and encourage discussion and a second facilitator to help field questions and moderate the chat. The team also created a presentation that prioritized dynamic, accessible visuals over text-heavy slides.

The webinar presented information related to the MVP program, climate change in Egremont, local strengths and vulnerabilities, existing mitigation measures, and priority action items for future climate adaptation. Attendees were asked to rank their priorities for mitigation actions, and their input was used to update the draft plan. They were also invited to submit comments on the draft plan through an online comment form, available for three weeks. More information about the virtual Public Listening Session and Comment Period is in Appendix D.

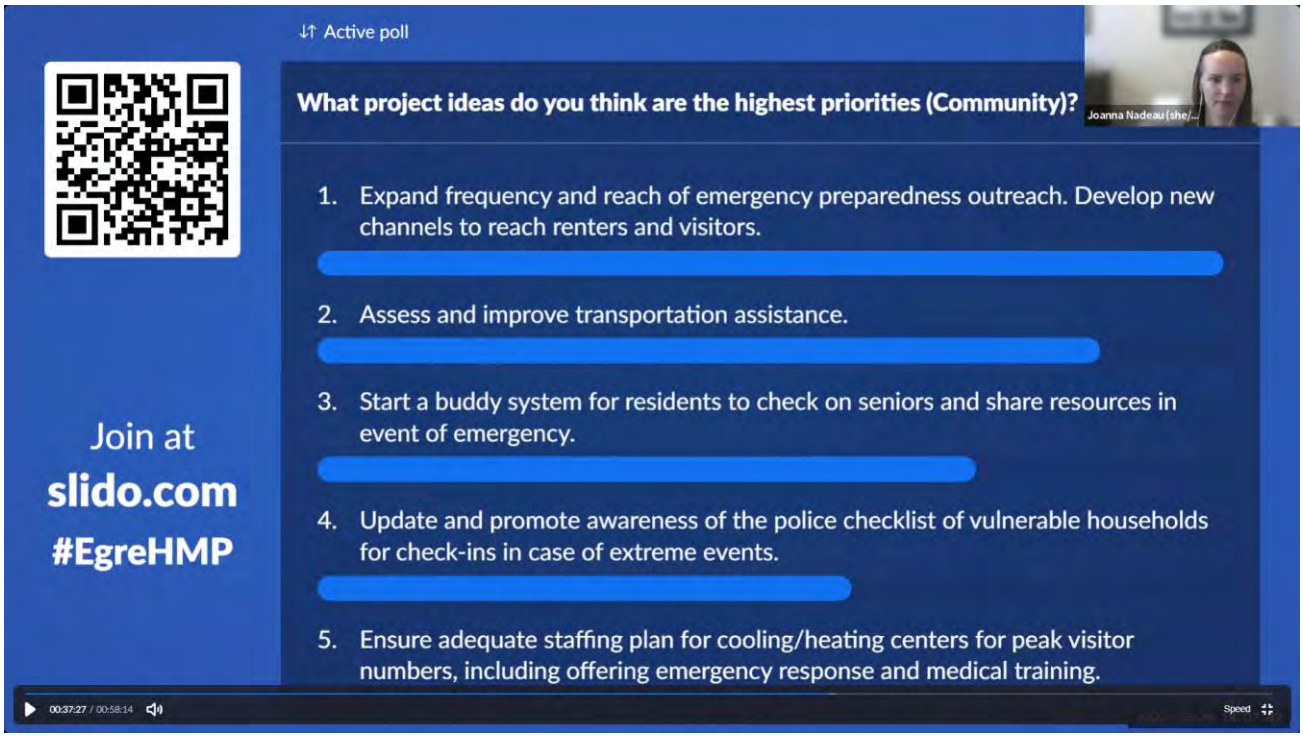


Figure 1-5. A screenshot from Egremont's Public Listening Session Webinar

1.4.4 Planning Timeline

The MVP-HMP planning process proceeded according to the timeline below.

1.5 MVP-HMP Report Layout

The report that follows presents the results of the planning process, which was informed by input received from the Core Team and during the CRB Workshop and Public Listening Sessions. This report is organized into these chapters:

Chapter 1: Project introduction and overview; summary of planning process

Chapter 2: Hazard mitigation and climate adaptation goals

Chapter 3: Community profile; societal, economic, infrastructural, and environmental features; land use and development, critical facilities, and vulnerable populations

Chapter 4: Detailed assessment of the Town's vulnerability and strengths by hazard, including:

- flooding,
- wind-related risks (such as hurricanes, tropical storms, tornadoes, nor'easters, and severe thunderstorms),
- winter storms,
- geological hazards (such as earthquakes and landslides),
- brush fires,
- extreme temperatures, and
- drought.

Each profile also describes the hazard's historic occurrences and impact, frequency, level of risk, and climate change projections.

Chapter 5: Summary of the existing mitigation measures the Town is currently undertaking

Chapter 6: An update of the progress made since the last HMP

Chapter 7: An action plan for next steps

Chapter 8: Plan adoption, maintenance, and implementation

Chapter 9: References

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Goals

2.0 HAZARD MITIGATION AND CLIMATE ADAPTATION GOALS

Protection: Develop equitable programs, strategies, and actions to protect the following from natural hazards and climate change impacts:

a. Residents, with an emphasis on supporting and empowering the elderly, youth, households with limited income, and populations with restricted mobility
b. Open space and other natural resources
c. Cultural and historic resources
d. Critical infrastructure
e. Utilities
f. Public facilities and services
g. Homes and businesses
h. Future development

Planning: Incorporate climate adaptation and hazard mitigation measures into local plans, bylaws, regulations, and practices to protect critical infrastructure, safeguard property, encourage resilient development, and promote universal design.

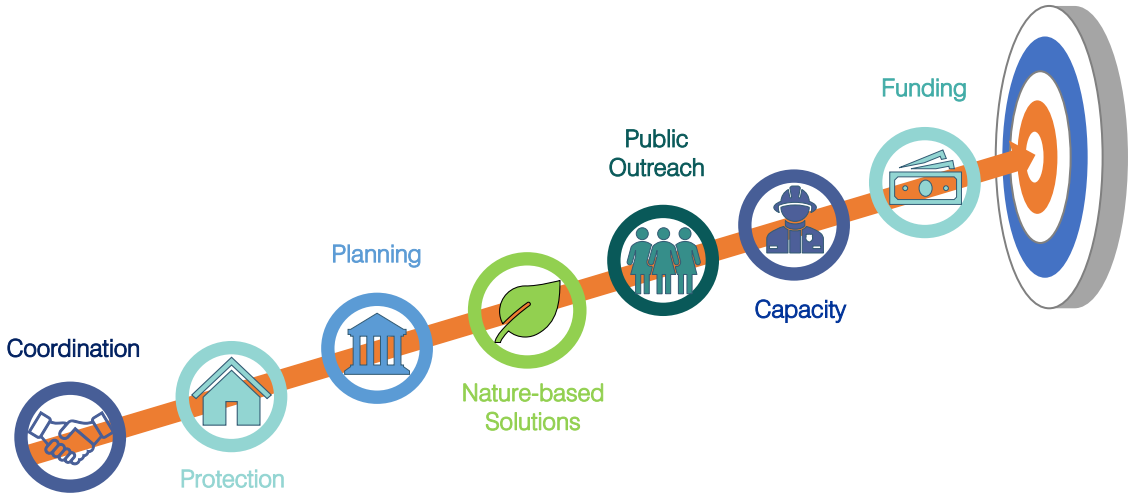
Nature-based solutions: Investigate, design, and implement hazard mitigation and climate adaptation measures that employ nature-based solutions and protect the natural environment.

Coordination: Collaborate in hazard mitigation planning and climate adaptations with local utilities, businesses, institutions, non-profits, community-based organizations, surrounding communities, and state, regional, and federal agencies.

Capacity*:* Increase the capacity of all Town Departments, committees, boards, businesses, and residents to respond to climate change impacts and natural hazards events with adequate and up-to-date data on climate change projections and emerging risks, guidance, staff, digital access, and equipment.

Public Outreach: Increase public awareness and provide resources for hazard mitigation and climate resilience to businesses and residents through inclusionary outreach and education.

Funding: Identify and seek funding for measures to mitigate or eliminate each known significant hazard area and adapt to climate change.



3

Community Profile

3.0 COMMUNITY PROFILE, LAND USE, AND DEVELOPMENT TRENDS

3.1. Community Profile

Located in the Berkshire Hills of southwestern Massachusetts, the Town of Egremont is made up of the two villages of North Egremont and South Egremont, split by Baldwin Hill (BRPC, 2012; Egremont Land Trust, 2021). Egremont has a total population of 1,372 (US Census Bureau, 2020). Egremont is a quiet town with a rich history of agriculture and industry. The Stockbridge-Munsee Community Band of Mohican Indians originally inhabited the town, and Dutch farmers claimed the land upon their arrival in 1722. English settlers started arriving in 1725, and the Town was incorporated in 1775. Egremont played a role in the Revolutionary War when General Knox passed through to deliver artillery to troops forcing the British Army out of Boston. Much of Egremont's history can still be seen

today in the historic properties that were preserved by the Olde Egremont Association in the 1930s and featured as part of the larger Housatonic Valley National Heritage Area. These historic sites draw tourists along with a wealth of hiking and outdoor recreation opportunities, which are associated with the Jug End State Reservation, Appalachian Trail, local rivers, and other mountains of the area.

Egremont is located on the western side of Berkshire County, Massachusetts, and bordered by Columbia County, New York, on its western boundary. Specifically, Egremont is bordered by the towns of Copake and Hillsdale, NY to the west, Mount Washington, MA to the southwest, Sheffield, MA to the southeast, Great Barrington, MA to the east, and Alford, MA to the north. Egremont is about 23 miles south-southwest of Pittsfield, the largest city in Berkshire County. Governance of Egremont is overseen by a board of selectmen and an administrative assistant (Town of Egremont, 2021). Egremont maintains a website at egremont-ma.gov.

No designated Environmental Justice populations are located in Egremont (EEA, 2021). Additional demographic information can be found in Table 3-1.

Table 3-1. Population Demographics

	2020	Egremont	Massachusetts
	Population	1,372	6,892,503
	Under the Age 18	17%	20%
65+	Over Age 65	27.9%	17%
	Bachelor's degree or higher	42.4%	45%
$	Median household income	$71,528	$85,843
	Poverty Rate	5.1%	9%
	With a Disability	12.6%	12%
	Limited English-Speaking Skills	0%	9%
	Housing Units	634 Occupied, 941Total	2,928,732
	Renter-Occupancy Rate	17%	38%

(US Census Bureau, 2019, 2020)

3.2. Societal Features

Although it is a small town, Egremont offers numerous public services, including a public library, volunteer fire department, police, recycling center, Council on Aging, and Highway Department (Town of Egremont, 2021). The Southern Berkshire Regional School District serves children's education. The elementary school (South Egremont K-1) is in Egremont, and Undermountain Elementary School (K-6) and Mount Everett High School (7-12) are in Sheffield. The North Egremont

Village and South Egremont Village are on the National Register of Historic Places, providing aesthetic and cultural benefits to the town and its visitors (BRPC, 2003).

Figure 3-1. Southern Berkshire Regional School District; South Egremont Elementary School (SBRSD, 2021)

With a higher median income and lower poverty rate than the rest of the state, many Egremont residents are in a strong position financially. However, Berkshire County workers, on average, earn significantly less relative to workers in other areas across the state, regardless of industry sector (BRPC, 2020). Climate vulnerable populations in the town include residents whose physical situations or everyday stressors make it harder to adapt and recover when shocks or hazards occur. In Egremont, seniors, youth, people living with disabilities, and low-income individuals are likely more vulnerable to climate impacts and natural hazards. Residents over the age of 65 are the largest vulnerable group in Egremont and represent 27.9% of the total population, 10.9% more than Massachusetts as a whole (Table 3.1), and youth represent 17% of the town's population (US Census Bureau, 2019). Organizations representing older residents include the Council on Aging, Library, and Board of Health.

3.2.1. *CRB Workshop Discussion of Societal Features*

Workshop participants identified key societal aspects of Egremont that are most vulnerable to, or provide protection against, natural hazards and climate change impacts.

Table 3-2: Societal Features Identified in the CRB Workshop

Strengths	Vulnerabilities
• Communications systems (Reverse 911 and emergency communication) • Emergency services • Transportation services • Neighbor relationships	• No public transportation • Vector-borne diseases • People with possible barriers to building resilience • Communication channels with visitors/renters • Historic district at risk of dam failure • Lack of affordable housing

Figure 3-2: Societal features in Egremont.
COVID-19 Vaccination Clinic, Fire Department (left to right; Town of Egremont 2020)

3.3. Economic Features

Farm products, outdoor recreation and tourism, and education are Egremont's primary products. See list of businesses in Table 3-3 for more details, followed by a discussion of economic resilience.

Table 3-3. Egremont Businesses

Company name	Address	Number of employees	Sector
Amanda's Kennel	91 Hillsdale Rd	1-2	Businesses & Offices
Blue Rider Horse Farm	113 Jug End Rd		Farms
Brookside Quilts	2 Sheffield Rd	1-2	Retail
Catamount Ski	78 Catamount Rd	100-249	Outdoor Recreation
Egremont Fire Dept	Main St	10-19	Municipal
Egremont Village Inn/The Barn	17 Main St		Outdoor Recreation/Tourism
Fiber Connect	Pumpkin Hollow Rd		Businesses & Offices
Gogel & Gogel	40 Main St	1-4	Businesses & Offices
Greenagers Inc	Undermountain Rd	5-9	Farms
Greenhouse Yoga Studio/Nail Salon	45 Main St	2-4	Businesses & Offices
Indian Line Farm	57 Jug End Rd		Farms
John Andrews Restaurant	Hillsdale Rd	20-49	Retail
Jug End State Reservation	Jug End Rd	1-4	Outdoor Recreation

Kenver Ltd	39 Main St	20-49	Retail
Main St Antiques	41 Main St	1-2	Retail
Mom's Country Cafe/Country Market	65 Main St	5-9	Retail
North Egremont Store	223 Egremont Plain RD	3-4	Retail
Old Mill	53 Main St	20-49	Retail
Only in My Dreams Events	73 Main St		Businesses & Offices
Prospect Lake Campground	50 Prospect Lake Rd	3-4	Outdoor Recreation & Tourism
Salisbury Bank & Trust Co	51 Main St	1-4	Businesses & Offices
Schumacher Society for a New Economics	140 Jug End Rd	1-4	Businesses & Offices
South Egremont Spirit Shoppe	71 Main St	1-2	Retail
The Browserie	48 Main St	1-2	Retail
The Inn at Sweet Water Farm	1 Prospect Lake Rd	1-2	Outdoor Recreation/Tourism
The Shop	45 Main St	1-2	Retail
Turner Farms Maple Syrup	Phillips Rd	1-4	Farms
Zorn Chiropractic/Zorn Core Fitness	44 Main St	3-4	Businesses & Offices

(DUA, 2021; MAGIS, 2021)

In 2020, 173 people worked in Egremont in 37 establishments (DUA, 2020). Most residents work outside of Egremont. For those who commute, the average travel time to work is 22 minutes, seven minutes shorter than the state's average, but three more minutes than workers in other parts of Berkshire County. See Table 3-4 for an overview of economic information about Egremont.

Table 3-4: Economic Statistics

	Egremont	Massachusetts
Labor Force	761	3,858,104
Unemployment Rate	1.8%	6.0%
Employed in Top Employment Industry – Education, Healthcare & Social Assistance	24.7%	28.2%
Mean Travel Time to Work (minutes)	22.2	29.7

(United States Census Bureau, 2019)

Approximately 25% of working adults living in Egremont work in the education, healthcare, and social assistance industries, while approximately nine percent work in manufacturing and 12% in construction. Another 14% are in the scientific/management/administration industries; and 11% work in arts, entertainment, recreation, accommodation, and food services (US Census Bureau, 2019).

Egremont also supports a growing population of self-employed entrepreneurs. As of 2019, 11% of Egremont residents worked at home, a number that may have gone up during the coronavirus outbreak of 2020 and 2021, particularly for those with jobs that can be done remotely.

Forty-six percent of Egremont residents have management, business, science, or arts occupations, while 20% are in service occupations, 14% have sales or office jobs, and the rest (19%) work in construction, production, or related fields.

Table 3-5. Egremont's Occupations

Occupation	Percent of working population
Management, business, science, or arts	46%
Service	20%
Sales and office	14%
Natural resources, construction, and maintenance	14%
Production, transportation, and material moving	5%
Total	100%

(United States Census Bureau, 2019)

Current land use regulations allow residential or mixed-use development on 60% of land in the town. Agricultural activities are an authorized use on 11% of the town. Commercial activities are only allowed on one percent of the land area (MassGIS, 2016).

3.3.1. *CRB Workshop Discussion of Economic Features*

Participants in the workshop and in a focus group identified key economic aspects of Egremont that are most vulnerable to, or provide protection against, natural hazards and climate change impacts. Minutes from the economic focus group discussion are included in Appendix D.

Table 3-6: Economic Features Identified in the CRB Workshop

Strengths	Vulnerabilities
• Agriculture providing local food and jobs • Many outdoor recreational activities • Increasing tourist activity	• Changing growing season, droughts, and flooding disrupting farming • Loss of farmland • Reduced snow increasing cost of ski area maintenance • Impacts on amenities by increased use • Limited workforce housing

3.3.2. *Economic Outlook*

The labor force in Berkshire County has declined slightly in recent years, likely related to the aging and declining population as well as broader adverse economic conditions. The regional economy is transitioning to a more diverse mix of small- to medium-sized firms, as few large employers dominate the employment landscape (BRPC, 2020a).

Egremont's economy is dominated by natural resource-based activities, including outdoor recreation and agriculture. Egremont's agriculture, small business, and tourism sectors depend heavily on climate conditions and infrastructure resilience to support food production, business activities, workers, and customers.

Egremont's economic future includes both strengths and vulnerabilities in terms of natural hazards and climate change. Extreme weather is likely to strain the region's natural resources, transportation, communications, energy, water, and waste infrastructure (EEA and EOPSS, 2018). Facing possible climate migration into the Town, Egremont is also concerned that drought will reduce water supplies while economic growth might be increasing demand.

Because of their local revenues and employment, the major sectors of concern include agriculture, food production, ski operations, and small businesses. In a focus group with business and agricultural interests in the town, interviewees noted changing weather patterns, such as increased rainfall and higher temperatures, that have directly affected farm production and harvesting activities as well as snowmaking for skiing. Recent increases in visitors and new residents brought more customers for local businesses while also leading to impacts at recreation areas, more conflicts with farm activities, and a general pressure towards higher property values (and the associated taxes).

Risks and opportunities from climate change to farms (food production and agriculture), construction and natural resources businesses, outdoor recreation/tourism, retail, and other office-based businesses are each described below and shown on the map in Figure 3-3.

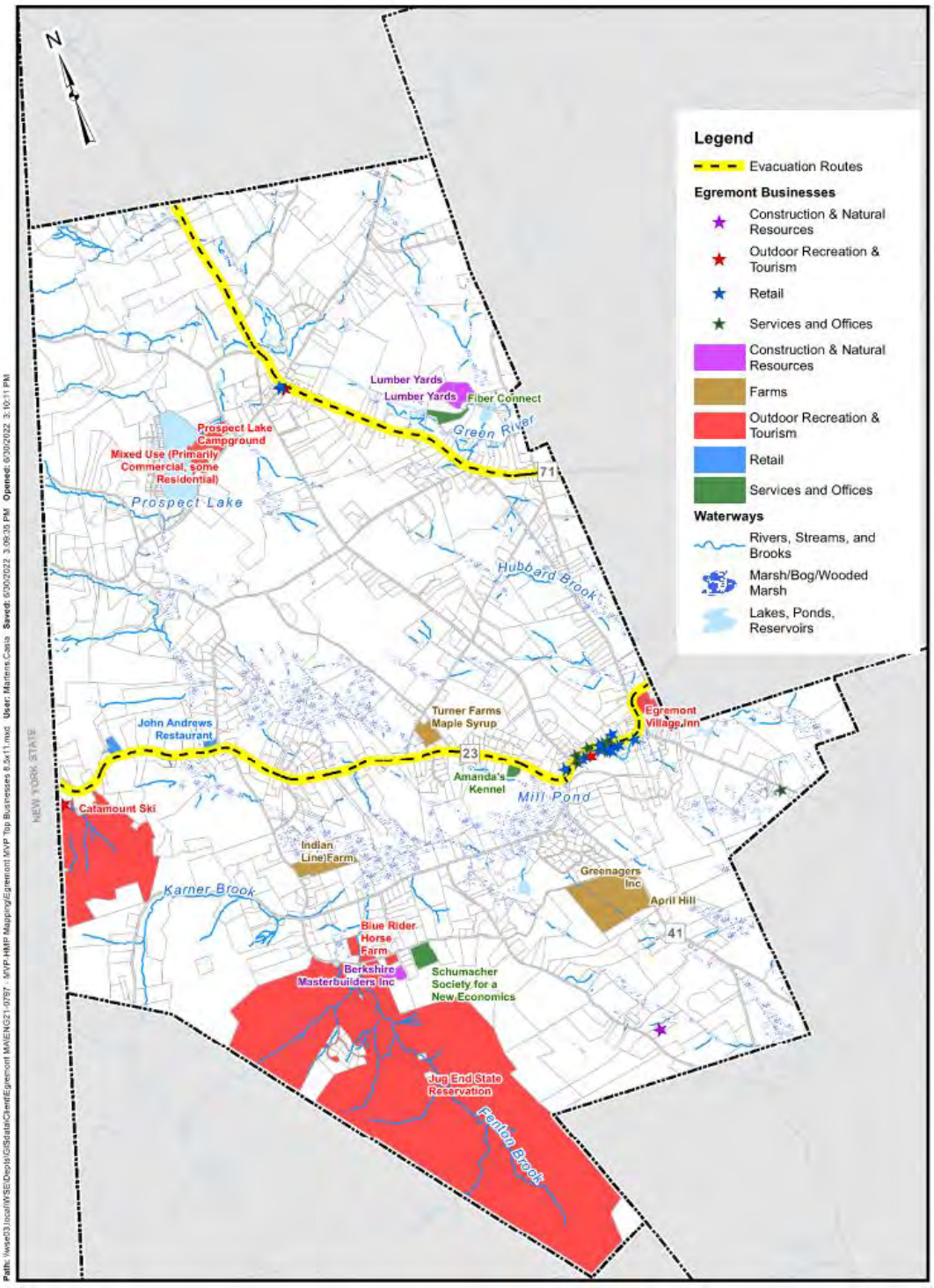


Figure 3-3. Egremont Businesses and Flood Risk

Outdoor Recreation Industry

The outdoor recreation industry contributes nearly $150 billion in consumer spending to the Northeast economy and supports more than one million jobs across the region, and towns heavily dependent on tourism expenditures will feel the financial impacts of a changing climate (US Global

Change Research Program, 2018). Hiking, skiing, and leaf-peeping are favored activities by Egremont's visitors and residents. These activities are closely tied to the seasonal climate, natural systems, and accessibility of roads and open spaces, which are threatened by declining snow and ice, extreme storms, and rising temperatures. Reductions in natural snowfall and higher temperatures have contracted the ski season and make it more difficult and energy-intensive to create favorable skiing conditions (Burdalo et al, 2014). In Egremont, residents specifically noted the ripple effect of a shorter ski season on other local businesses, because residents with reduced income (who typically work at the resort) and shorter visitations by tourists tend to result in less purchasing activity overall.

Egremont will also see impacts as a warming climate changes the composition and abundance of species that residents currently enjoy in their backyards or when hiking (BRPC, 2014). Economically, however, the climate impacts will ripple through the community. Not only does the town benefit from the success of the local ski resort, for example, but tourists also spend money on equipment rental, lodging, and dining activities. Additionally, those whose livelihoods depend on outdoor recreation activities such as hunting, hiking, or outdoor sports, will feel the economic impacts of climate change as well (Town of Great Barrington, 2020). Where hotter conditions in cities drive increased migration to rural mountain towns like Egremont, the Town can expect to see some economic benefits of increased tourism. At the same time, increased usage of amenities and natural areas may have negative impacts on the resources and require additional maintenance and protection, leading to higher energy and water usage.

Agricultural and Forestry Industries

Agricultural activities will be impacted by extreme storms, flooding, drought, wildfire, heat, and cold. Hot days and droughts can change species and yields, reducing profits and forcing shifts to different types of production. Water-dependent agricultural operations will be strained by the reduced availability of fresh water supplies and longer droughts (EEA, 2011; EEA 2021). Flooding and wetter spring days can delay planting dates, further reducing yields, or even erode and destroy fields as stormwater runoff from nearby roads drains onto farm properties.

Some farm types will do better with a longer growing season and fertilizing effects of higher carbon dioxide levels (EPA, 2016). Other activities, including forestry, will see changing species composition as hardwoods recede to higher elevations and spruce-fir forests become rarer. Changes in sugar maple sap flow and harvesting seasons could affect maple syrup production (EEA, 2021). These impacts will be felt by individuals working in agriculture-related fields, business owners, and town finances as profits fall and work opportunities decline (BRPC, 2020b). Industrial operations that are important parts of local and regional supply chains, providing essential goods and services to other businesses, can be disrupted by a changing climate as well.

Retail and Office-Based Industries

More frequent and extreme storms and droughts from climate change could disrupt business operations and limit tourism activity. Retail, business, and office-based industries are at risk of power outages, transportation obstructions, and for restaurants especially, water supply disruptions or issues (EEA, 2011). These occupations are less vulnerable to extreme heat or cold impacts, but rising temperatures will increase the need for climate control in the workplace. In the event of extreme storms, regional travel can come to a halt, disrupting deliveries and slowing commerce dramatically. Loss of sales in combination with property damage from falling branches and ice buildup can cause small businesses to face financial shortfalls. Lost economic value will also be accompanied by critical gaps in public services and increased safety risks for all.

Adaptation options exist for many industries, but may be easier for some sectors than others. For example, the Catamount Ski Resort now offers off-season recreation in the form of aerial adventures, bringing in additional revenue as ski season revenues go down. In addition, ski operators are encouraged to pursue new energy and water supplies to prepare for increased snowmaking needs and energy demands of warmer, shorter, and drier winters (NSAA, 2021). For some farmers, development pressure on farmlands and increasing costs of farming inputs may make adaptation too costly for some, without external support.

Figure 3-4. Expanding outdoor recreation opportunities

Climate risk and resilience not only look different for various business sectors but also depend heavily on the infrastructure necessary for operations. The infrastructural assets that support Egremont's economy include roads, energy and water systems, housing, and emergency services. Figure 3-3 identifies those most vulnerable to flooding or drought. Consideration of infrastructure limitations for Egremont's businesses indicates other needed strategies for resilience and mitigation actions to address vulnerabilities, covered in later chapters.

3.4. Infrastructure Features

Massachusetts Route 23 and Route 41 meet in Egremont and continue through Great Barrington to the east. Route 23 continues to the west over the state border into New York and serves as a major access road to nearby communities. Massachusetts Route 71 also passes through Egremont going northwest and southeast and carries part of the historic Henry Knox Trail. Interstate 90's Exit 1, twelve miles north of Egremont, is the nearest highway exit. Rail, bus, or air services are located in nearby Great Barrington. (BRPC, 2003)

The Town has over 10 miles of gravel roads to maintain, which are especially problematic during flooding events because they can be washed out and contribute to sedimentation in the watershed. Ongoing culvert improvement projects are addressing several local roadway flooding concerns, but the recent assessment has identified additional culverts needing upsizing or replacement (HVA, 2021). The Town has very little impervious cover (3.2%), but increased development or road paving could increase stormwater runoff concerns (MassGIS, 2016).

Egremont Water Department provides water to approximately 650 people and eight businesses based on surface water supplied from Karner Brook (Egremont Water Department, 2020). Water users not supplied by the town's water system draw water from private groundwater wells. Wastewater is disposed of via septic systems, which requires oversight of safe disposal to prevent harm to rivers and wetlands.

Egremont has four dams, with two rated as "Significant Hazard" (BRPC, 2012; MAGIS). Electric and communication infrastructure is vulnerable to forest fires (often spurred by droughts) and wind, ice, and tree damage causing power outages. Emergency services are generally well equipped; however, the Town could enhance response times and reliability by conducting an inventory of supplies and ensuring that all facilities are equipped to handle likely hazards. Additionally, services around Egremont could be impacted if critical roadways and bridges are flooded. This is a particular concern because the closest overnight emergency shelter is in another town. Several local roads are vulnerable to flooding. See Section 3.8 for more information on critical facilities in Egremont.

Figure 3-5. Infrastructural features in Egremont.
(From left to right: Turner Farms Maple Syrup, Power Lines, Brush Truck; Town of Egremont)

3.4.1. *CRB Workshop Discussion of Existing Infrastructure*

Workshop participants identified key infrastructure features in Egremont that are most vulnerable to, or provide protection against, natural hazards and climate change impacts, seen in Table 3-7.

Table 3-7: Infrastructural Features Identified in the CRB Workshop

Strengths	Vulnerabilities
• Municipal buildings • Water supply wells • Communications infrastructure	• Undersized culverts and drainage • Privately owned drinking water wells, especially wells vulnerable to drought and those without backup power • Dams • Power and communication lines • Lack of power and utility redundancies

3.5. Environmental Features

Egremont covers 18.9 square miles, most of which lies in the Housatonic River Watershed. The Town contains the headwaters and middle reaches of the Green River and Hubbard Brook, two tributaries that flow east into the Housatonic through the lower elevations of Egremont (NHESP, 2011). The

Green River serves the City of Great Barrington's water supply, and it is classified as a cold water fish resource by the Massachusetts Department of Environmental Conservation for its trout habitat and recreation values (HVA, 2017). Less than a square mile of the western edge of the Town lies within the Roeliff Jansen Kill watershed of the Hudson River Basin. Other bodies of water in Egremont include Prospect Lake, Marsh Pond, Karner Brook, Fenton Brook, Smiley's Pond, and Marsh Pond (BRPC, 2001). There is a medium yield aquifer in the Northeast portion of Egremont, and many residents rely on groundwater for drinking water supplies.

There are three vernal pools in Egremont, certified by the Natural Heritage and Endangered Species Program (NHESP) and important for reproduction of rare plants and animals. Egremont has a thriving forest system, with 60% of its 12,061 acres covered in forests. Future drought conditions and lack of forest management could perpetuate uncontrolled burns and shift this resource toward a vulnerability. See Section 3.3 for a discussion of other climate vulnerabilities associated with agriculture and natural resources.

Egremont has a wealth of natural resources that support human and other activities. Thirteen Priority Habitats of Rare Species, and the Sedge Wren, Indiana Bat, and Pied-billed Grebe - state-listed endangered animals – are recorded in Egremont (NHESP, 2011). The Hairy Wood-mint, Devil's Bit, Drooping Speargrass, Capillary Beak-sedge, Hooded Ladies-tresses, and Narrow-leaved Vervain are state-listed endangered plants recorded in Egremont. The Appalachian Trail runs through the Town, and the Town has several large, open spaces, including Jug End and French Park. A large commercial ski area provides open space along the New York border along Route 23. Egremont's 2001 Open Space and Recreation Plan looks in detail at Egremont's assets, liabilities, and collective goals for open space. The Plan describes the Town's vast tracts of mountain views, forest land, wetlands, farmlands, soils, terrain, water quality, historic attractions, and examines how and why they need protection.

An estimated 32% of Egremont is permanently protected, more than most towns in Massachusetts (Mass Audubon, 2020). Future potential development represents both a strength and vulnerability and proper oversight and consideration of environmental concerns and groundwater resources needs to be considered in siting and design. Egremont has three small hazardous material sites, including the former Jug End Gun Club site and the gas station on Route 23, and other ecological threats may include runoff from agricultural activities.

Figure 3-6: Environmental features in Egremont.
Town Hall (left), Smiley's Pond (center), and Baldwin Hill (right; Town of Egremont, 2021)

3.5.1. *CRB Workshop Discussion of the Environment*

Workshop participants identified key environmental features in Egremont that are most vulnerable to, or provide protection against, natural hazards and climate change impacts, listed in Table 3-7.

Table 3-8: Environmental Features Identified in the CRB Workshop

Strengths	Vulnerabilities
• Open Space • Trails and other recreation opportunities • Local agriculture • Wetlands and waterbodies	• Outdated plans and bylaws/protections • Stress on local agriculture • Invasive species • Impact of increased recreation • Sedimentation and erosion

3.6. Land Use

Egremont covers an area of 12,096 acres. According to MassAudubon's Losing Ground Report, only 6% of the town is developed, while 70% remains as natural land and another 20% is open land, which is predominantly farmland (MassAudubon, 2020). Developed land primarily consists of residential housing in Egremont (Figure 3-7).

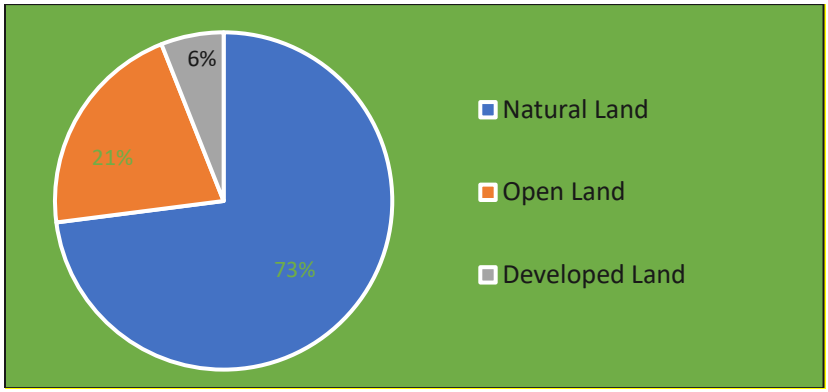


Figure 3-7. Land Use Distribution in Egremont, MA

3.7. Recent and Potential Development

New development since the last HMP (in 2012) has strictly been residential, with typically between five and nine new homes developed each year. While commercial properties occasionally change hands, no new commercial buildings have been built or permits requested.

Much of Egremont is undevelopable due to protected land, wetlands, or extreme slopes. The Town is currently zoned in favor of residential and agricultural development, but with the decline of agriculture, residents of Egremont cover the majority of the tax base (BRPC, 2003). A list of recent development can be found in Appendix B.

3.8. Community Lifelines and Critical Facilities

Community lifelines and critical facilities are essential components of the Town's function and protecting them from natural hazards is paramount. These resources enable the continued

performance of the town and are essential to the life and safety of Egremont's residents. Community lifelines and critical facilities include:

1. Resources that can be utilized to respond and recover from natural hazards.
2. Facilities where additional assistance might be needed.
3. Hazardous sites that could be dangerous if it is compromised during a natural disaster.

Community lifelines and critical facilities in the Town of Egremont have been identified with help from knowledgeable Town staff, MassGIS data, and existing Town and regional plans, including the Egremont Hazard Mitigation Plan (BRPC, 2012). They have been separated into categories and are listed in table 3-8.

Table 3-9: Egremont Community Lifelines and Critical Facilities

Feature Type	Name	Address
SAFETY AND SECURITY		
Emergency Operations Center	Egremont Town Hall	171 Egremont Plain Road
Alternative Emergency Operations Center/Fire	Fire Station #1	175 Egremont Plain Road
	Fire Station #2	36 Main Street
Town Offices/Police	Egremont Town Hall, Police Station, Highway Garage	171 Egremont Plain Road
FOOD, WATER, SHELTER		
Agriculture	Turner Farms	11 Phillips Road
	Indian Line Farm	57 Jug End Road
	Westover-Bacon-Potts Farm/April Hill	62 N Undermountain Road
Shelters	Undermountain School	491 Berkshire School Road, Sheffield
Reception Centers/Transport Centers	Fire Station #2	36 Main Street
	Catamount Mountain Resort	6 Nicholson Rd
	Fire Station #1	175 Egremont Plain Road
	South Egremont School	42 Main Street
	Town Hall	171 Egremont Plain Road
Grocery Stores	Old Egremont Country Store	223 Egremont Plain Road
	Egremont Market	47 MA-23
	IGA Hillsdale Supermarket	2628 NY-23, Hillsdale, NY
	Big Y Supermarket	740 South Main St, Great Barrington
Food and Fuel Assistance	Berkshire Community Action Council	292 West Street, Pittsfield, MA
Food Assistance	Elder Services of Berkshire County Meals on Wheels	877 South Street #4e, Pittsfield, MA
	The People's Pantry	5 St James Pl, Great Barrington
	Berkshire Bounty	33 Commonwealth Ave, Great Barrington
Water Supply	Private Wells	
	Egremont Water Department	Karner Brook Reservoir

		180 Service Connections: 8 businesses/650 people
Wastewater	Private Septic Systems	Town-wide
HEALTH AND MEDICAL		
Cemeteries	Hillside Cemetery	177 Egremont Plain Road
	Riverside Cemetery	230 Egremont Plain Road
	Town House Hill Cemetery	100 Town House Hill Road
Health Services	Rosecare Patient Advocacy & Elder Services	223 Egremont Plain Road
	Fairview Hospital	29 Lewis Ave, Great Barrington
	East Mountain Medical	780 South Main St, Great Barrington
ENERGY		
Electrical Transmission	National Grid	
Gas Stations	Mobil	696 S Main Street, Great Barrington
	Gulf	2690 NY-23, Hillsdale NY
COMMUNICATIONS		
Radio Receivers	ARES	
Post Office	South Egremont Post Office	64 Main Street
	Old Egremont County Store (private mail boxes)	223 Egremont Plain Rd
TRANSPORTATION		
Evacuation Routes		Route 71
		Route 23
		Route 41
HAZARDOUS MATERIAL		
Waste Management	Egremont Transfer Station	171 Egremont Plain Road
Underground Storage Tank		
Chemical Building		
Pump Station		
COMMUNITY AND CULTURAL FACILITIES		
Library	Egremont Free Library	1 Buttonball Lane
School	South Egremont School	42 Main Street
Campground	Prospect Lake Park Campground	50 Prospect Lake Road
National Historical Sites		MassGIS layer
Local and State Historic Resources		MassGIS layer
NATURAL RESOURCE ASSETS		
BioMap2 Areas		MassGIS layer
Groundwater Protection Areas		MassGIS layer
Surface Water Protection Areas	Karner Brook Prospect Lake Green River	MassGIS layer

Parks and Open Space	French Park Egremont Land Trust Jug End State Park	MassGIS layer
Water Bodies		MassGIS layer
Dams	Smiley's Pond Dam	MassGIS layer
	Barrett Pond Dam	
	Prospect Lake Dam	
	Marsh Pond Dam	
REGIONAL FACILITIES		
Shelters	Regional Shelter at Simon's Rock	Bard College at Simon's Rock
Cell Tower/Communications	Public Service Communications	
Schools	Mt. Everett Regional School	491 Berkshire School Road, Sheffield
	South Egremont School	42 Main St
Food and Fuel Assistance	Berkshire Community Action Council	292 West Street, Pittsfield, MA
Food Assistance	Elder Services of Berkshire County Meals on Wheels	877 South Street #4e, Pittsfield, MA
	The People's Pantry	5 St James Pl, Great Barrington
	Berkshire Bounty	33 Commonwealth Ave, Great Barrington
Transit	Berkshire Regional Transit Authority	Nearest bus service is in Great Barrington
ECONOMIC SECTOR REPRESENTATIVES/CLUSTERS OF BUSINESS		
Top 25 Employers	See Map	Map specific to Egremont boundary, but see Section 3.3 discussion of regional economy as a consideration

4

Hazard Profiles, Risk Assessment & Vulnerabilities

Source: McGurn Media

4.0 HAZARD PROFILES, RISK ASSESSMENT & VULNERABILITIES

This chapter details the natural hazards that might affect the Egremont community and how they could impact the features detailed in Chapter 3. Each natural hazard that has the potential to occur in Egremont has varied risk based on the severity, extent of impact, probability, and the vulnerability of the assets within the social, natural, and built environments. For each hazard, a hazard profile was developed that presents information that can be used to assist in determining risk, which is further explained within section 4.1.8. Each profile is structured the same to make information easy to locate within the plan.

In some cases, more data is readily available or documented for some hazards than others. Because of that, some profiles are more robust than others. Whenever possible the hazard profiles were updated with information from:

- Local, State, and National Hazard Mitigation and Climate Adaptation Resources.
- Local and National Hazard and Weather Event Databases.
- Workshop and Survey Results.
- Geographic Information System (GIS) Assessments.
- HAZUS Software Analysis.

4.1 Hazard Profiles

4.1.1 Description

Using the 2018 State Hazard Mitigation and Climate Adaptation Plan (MEMA and EOPSS) and the 2012 Berkshire Regional Hazard Mitigation Plan (Berkshire Regional Planning Commission) as a guide for the types of hazards that can occur in the state, the following hazards are included in this plan:

Flooding Hazards
- Riverine
- Inland/Stormwater

Dam Hazards
- Dam Failure

Wind Related Hazards
- Severe Storms and Thunderstorms
- Hurricanes and Tropical Storms
- Tornados
- Nor'easters

Winter Storm Hazards
- Heavy Snow and Blizzards
- Ice Storms

Geological Hazards
- Earthquakes
- Landslides

Fire Hazards
- Brushfires

Extreme Temperature Hazards
- Extreme Heat
- Extreme Cold

Drought Hazards

4.1.2 Severity

The severity of each hazard is synonymous with the magnitude of event, or how serious the hazard event is. Where possible, the severity of a hazard can be measured using an established indicator like the Richter Scale for earthquakes. Severity is sometimes described as the duration or force of an event. In other cases, severity is ranked by the consequence or risk. For example, a catastrophic event may have widespread infrastructural damage and loss of life, whereas a minor event may have minimal infrastructure damage and no loss of life.

4.1.3 Probability

Probability is the likelihood, or the estimated potential, for a natural hazard to occur within a specific time period. The probability of an event is often directly related to the severity. For example, minor rain events have a high probability of occurring each year, as they are fairly common occurrences; however, there are intense rain events that are only likely to occur every fifty years, making them far less common.

4.1.4 Location

Some hazards, such as drought, are equally likely to occur across the entire geographic extent of Egremont. However, some hazards are more likely to occur in specific areas and therefore these geographic locations are considered more vulnerable, such as a floodplain.

4.1.5 Historic Occurrences

Tracking historic occurrences of hazards and federally declared disasters that occur in Egremont or Berkshire County helps planners understand the possible severity, frequency, and geographic extent of hazards.

Within this Chapter, the National Oceanic and Atmospheric Association's (NOAA) National Centers for Environmental Information (NCEI) Storm Events Database (2021) was used as the primary source for historic occurrences of hazard events. The definitions for the event types can be found online under the

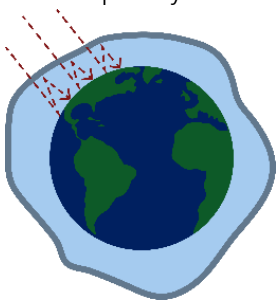
Storm Data Preparation documentation (NOAA, 2018a). Throughout the hazard profiles, record information has been provided from this database. Record information is not always synonymous with a single storm event but rather recorded occurrences of an event. For example, if a storm causes flooding over four days, the database may return four records for a single event. This information, although incomplete, is the only information readily available on historic records over the period of concern that is not institutional or local knowledge based. Data for the date range of 2000-2021 has been provided in most circumstances, however at the time of data collection, the database was only updated to reflect events through December 2021. Some hazard profiles provide additional historical information beyond this time frame when it was available.

4.1.6 Federally Declared Disasters in Massachusetts

Tracking historic hazards and federally declared disasters that occur in Massachusetts, and more specifically Berkshire County, helps planners understand the possible extent and frequency of hazards. Historically, Massachusetts has experienced multiple types of hazards, including flooding, blizzards, and hurricanes. Since 2000, there have been 29 storms in Massachusetts that resulted in federal or state disaster declarations. Fifteen disaster declarations occurred in Berkshire County. Federally declared disasters present additional FEMA grant opportunities for regional recovery and mitigation projects. The hazard profiles included in this chapter contain more information about federally declared disasters.

4.1.7 Impacts of Climate Change

Many of the hazards that Egremont commonly experiences are projected to increase in both severity and frequency due to climate change. Climate change refers to changes in regional weather patterns that are linked to warming of the Earth's atmosphere as a result of both human activity and natural fluctuations. The Earth's atmosphere has naturally occurring greenhouse gases (GHGs) like carbon dioxide (CO2) that capture heat and contribute to the regulation of the Earth's climate. When fossil fuels (including oil, coal, and gas) are burned, GHGs are released into the atmosphere and the Earth's temperature tends to increase. The global temperature increase affects the jet stream and climate patterns.



Due to these changes, the future climate in Massachusetts is expected to resemble historic climate patterns of Southern New England or Mid-Atlantic States more closely, depending upon GHG emission scenarios. Climate change has already started to impact Massachusetts and these trends are likely to continue. Climate change is anticipated to affect Massachusetts's typical precipitation cycle, leading to more intense rainfall and storms and more episodic or flash droughts. Temperatures will increase in both summer and winter. Each of the hazard profiles provided below includes more detail on how hazard frequency and intensity is likely to shift with climate change.

4.1.8 Vulnerability and Risk

To understand risk, one must first understand vulnerability. Vulnerability is determined by the amount of exposure, sensitivity, and adaptative capacity of an asset in the social, natural, and built environment and is the predisposition to being negatively affected by a natural hazard. The amount of exposure is influenced by the location of the asset and the severity of the event. Sensitivity refers to the impact of a natural hazard due to the existing conditions or characteristics of the assets. For example, a building with an older roof may be more sensitive to wind damage and may lose its ability to function or keep rain out of the building. Adaptive capacity is the ability of a system, service, or asset to adapt or prepare for an anticipated hazard or climate impact (as further explained in Chapter 3).

Risk, or the possible adverse outcome, is determined through the consideration of vulnerability, the severity of an event, and the probability of that event occurring. In some instances, risk can be calculated in dollar amount or other metrics. In other cases, risk can be conveyed through the consequence and follow-on impacts. The consequence may be the amount of damage, length of service disruption, and the loss of life or number of injuries. Follow-on impacts could include public health concerns and environmental damage.

4.1.9 Top Hazards as Defined in the CRB Workshop

Workshop participants were asked to identify the four top hazards/climate change impacts that Egremont faces. Extensive discussion led to the selection of the following:

Flooding

Drought

Extreme Temperatures

Winter Weather (Nor'easters, ice storms, snow storms, blizzards)

The workshop was designed to bring stakeholders together to brainstorm action items that will result in a more climate resilient future while also supporting the Town's unique features and characteristics. Concerns related to hazardous events such as heavy rain resulting in flooding and erosion, and winter weather were topics of discussion. The Town of Egremont has approximately ten miles of gravel roads that are often in need of repair due to extensive rainfall and erosion. Stakeholders also discussed concerns around drought events because of the reliance in the Town on private drinking water wells.

Workshop participants also brought up concerns recently with invasive plant and insect species. As a community with a high number of farming and agriculture operations, Egremont residents expressed concern about the impacts of climate change on farming as well as runoff from farms impacting waterbodies during heavy rain events. There was extensive discussion about wind causing downed trees and the potential for future events to worsen in frequency and severity. Egremont has a large number of trees, which can be a great strength to the community but can also be a challenge when they cause damage to overhead power lines during strong storms. Workshop participants also discussed bridges and culverts in the Town, some of which are in poor condition or undersized. This proves hazardous during flood events, and these vulnerabilities are also of concern during events when evacuation routes could become impassable.

4.2 Flood-Related Hazards

According to NOAA's National Severe Storms Laboratory (NSSL) a flood is "an overflowing of water onto land that is normally dry." Damaging flooding may happen with only a few inches of water, or it may cover a house to the rooftop. Floods can occur within minutes or over a long period, and may last days, weeks, or longer. Flooding can be caused by various weather events including hurricanes, extreme precipitation, thunderstorms, nor'easters, storm surge, and winter storms. Flooding is a potential threat throughout Egremont. Egremont experiences two types of flooding: riverine flooding and stormwater flooding, which are described in detail in the sections below. While a single type of flooding may pose

a threat to society, infrastructure, and the natural environment, they often occur simultaneously (both riverine and stormwater), resulting in compounded impacts to the Town.

Flooding was among the four main hazards identified by participants during Egremont's CRB Workshop. While Egremont already experiences some flood events, the impacts of climate change will likely lead to increasingly severe storms and increasingly severe impacts. The impacts of flooding include injury or death, property damage, and traffic disruption. The winter and spring thaws can also bring flooding challenges to the Town, when clogged catch basins or ice flows into dams. Figure 4-1 shows the general impacts of changing precipitation on the Commonwealth.

Flood hazards are directly linked to erosion, which can compromise receiving water quality, slope stability, and the stability of building foundations. Residents identified erosion occurring on gravel roads throughout Egremont. One area in particular that experiences erosion is Prospect Lake Road, where it borders Prospect Lake. Residents expressed concern over sediment running into the lake in this area.

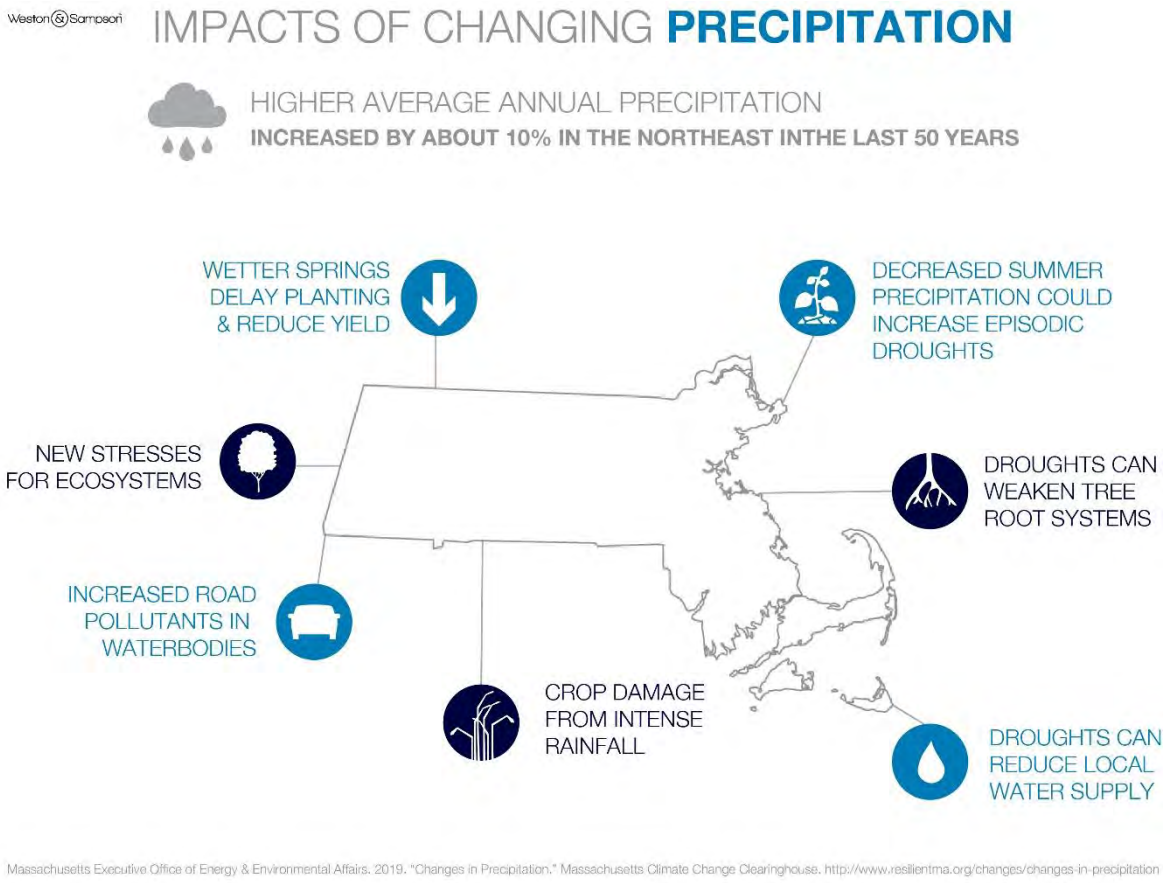


Figure 4-1. Impact of changing precipitation in future on the State of Massachusetts

Areas within FEMA Flood Zones, repetitive loss sites, and local areas identified as flood prone are most vulnerable to the impacts of flooding. The following sub-sections provide more information on historic flooding events, potential flood hazards, a vulnerability assessment, locally identified areas of flooding, and information on the risk of dam failures. The vulnerability assessment of flood hazard areas was informed by the most recent FEMA NFIP Flood Insurance Rate Maps (FIRMs) and a GIS vulnerability analysis.

4.2.1 Riverine Flooding

4.2.1.1 Description

Riverine or riparian flooding occurs when the volume of water in a waterbody exceeds the capacity and overflows the banks. Most waterbodies have the potential to experience riverine flooding, but many have flood control systems that mitigate the possibility of major damage. The majority of Egremont is located within the Housatonic River watershed, with a small area along the western side of town located in the Hudson River watershed. There are numerous rivers, streams, ponds, wetlands and lakes in the Town. Major bodies of water include Mill Pond, Marsh Pond, Prospect Lake, Green River, and Karner Brook.

4.2.1.2 Severity

Riverine flooding in Egremont is highly variable and can range from a few inches in depth to a few feet. Isolated flooding can leave one neighborhood inaccessible, while an adjacent neighborhood remains safe due to elevation or proximity to the waterbody. Flooding severity is dependent on the duration of the flooding event and the ability of the flood water to recede.

4.2.1.3 Probability

Based on historic occurrences, riverine flooding events in Egremont have been classified as a high frequency event. As defined by the 2013 Massachusetts State Hazard Mitigation Plan, this hazard occurs more frequently than once in 5 years or greater than 20% per year.

4.2.1.4 Location

Riverine flooding in Egremont occurs most frequently along the following bodies of water (BRPC, 2012):

- Boice Road and Rowe Road at intersection with Green River
- Locust Hill Road in Great Barrington causes flooding in Green River upstream
- Karner Brook and Sheffield Road
- Mount Washington Road and Jug End Road
- Shun Toll Road west of Route 71
- Taconic Lane
- Blunt Road

FEMA FIRMs designate areas most likely to experience flooding. The FIRMs delineate both the special flood hazard areas and the risk premium zones under the NFIP. This includes high risk areas that have a one percent chance of being flooded in any year (often referred to as the “100-year floodplain”), which under the NFIP, is linked to mandatory flood insurance purchase requirements for federally backed mortgage loans. It also identifies moderate to low-risk areas, defined as the area with a 0.2 percent chance of flooding in any year (often referred to as the “500-year floodplain”). The definitions of these flood zones are provided below. FEMA-designated flood zones for Egremont are included in Appendix B. A FEMA flood zone surrounds most of the water bodies and wetlands areas listed above.

Flood Insurance Rate Map Zone Definitions

Zone A (1% annual chance): Zone A is the flood insurance rate zone corresponding to the 100-year floodplains that are determined in the Flood Insurance Study (FIS) by approximate methods. Detailed hydraulic analyses are not performed for such areas, therefore, no BFEs (Base Flood Elevations) or depths are shown within this zone. Mandatory flood insurance purchase requirements apply.

Zone AE and A1-A30 (1% annual chance): Zones AE and A1-A30 are the flood insurance rate zones that correspond to the 100-year floodplains that are determined in the FIS by detailed methods. In most instances, BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone. Mandatory flood insurance purchase requirements apply.

Zone X (0.2% annual chance): Zone X is the flood insurance rate zone that corresponds to the 500-year floodplains that are determined in the Flood Insurance Study (FIS) by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or depths are shown within this zone.

Source: (FEMA, 2019a) https://www.fema.gov/flood-zones

4.2.1.5 Historic Occurrences

Berkshire County had four federally declared disasters related to flooding between 2000 and 2021, shown in Table 4-1.

Table 4-1. Previous Federal Disaster Declarations - Flooding

Disaster Name and Date of Event	Disaster Number	Type of FEMA Assistance	Counties Under Declaration
Severe Storm and Flooding October 7-16, 2005	DR-1614	Public Assistance; Individual & Households Program	**All** 14 Massachusetts Counties
Severe Storm and Flooding April 15-25, 2007	DR-1701	Public Assistance Grant	Essex, Plymouth, Barnstable, Dukes, Hampshire, Hampden, Franklin, **Berkshire**
Severe Winter Storm and Flooding December 11-18, 2008	DR-1813	Public Assistance	**All** 14 Massachusetts Counties
Severe Winter Storm, Snowstorm, and Flooding February 8-9, 2013	DR-4110	Public Assistance	**All** 14 Massachusetts Counties

Between 2000 and 2021, 133 heavy rain, flood, and flash flood events were reported in Berkshire County and recorded in the NOAA Storm Events Database (2021). Of the recorded events, two were characterized as heavy rain with some flooding noted in the description; 32 were characterized as flood events while another 99 were flash flood events. There were no deaths or injuries reported resulting from any of these events. Property damage from these events in Berkshire County totaled $657,000,

with $648,000 as a result of flash flooding and $9,000 as a result of flooding. See Appendix B for a detailed list of events.

Repetitive Loss Sites

As defined by FEMA and the NFIP, a repetitive loss property is any insured property which the NFIP has paid two or more flood claims of $1,000 or more in any given 10-year period since 1978 (FEMA, 2019b). There are no repetitive loss properties in Egremont, but there have been eight individual claims in Egremont's history. Notably, repetitive loss data only includes buildings that qualify for the repetitive loss designation, which does not represent all losses due to flooding. The number of buildings that experience losses due to flooding is likely higher than what is reported above.

4.2.1.6 Climate Change

Extreme rain and snow events are becoming increasingly common and severe, particularly in the Northeast region of the country, due to climate change (Figure 4-2). Severe rain or snow events that historically happened once a year in the middle of the 20th century now occur approximately every nine months. With this projected increase in rainfall, waterbodies in and around the Town will be increasingly likely to top their banks and cause localized flooding.

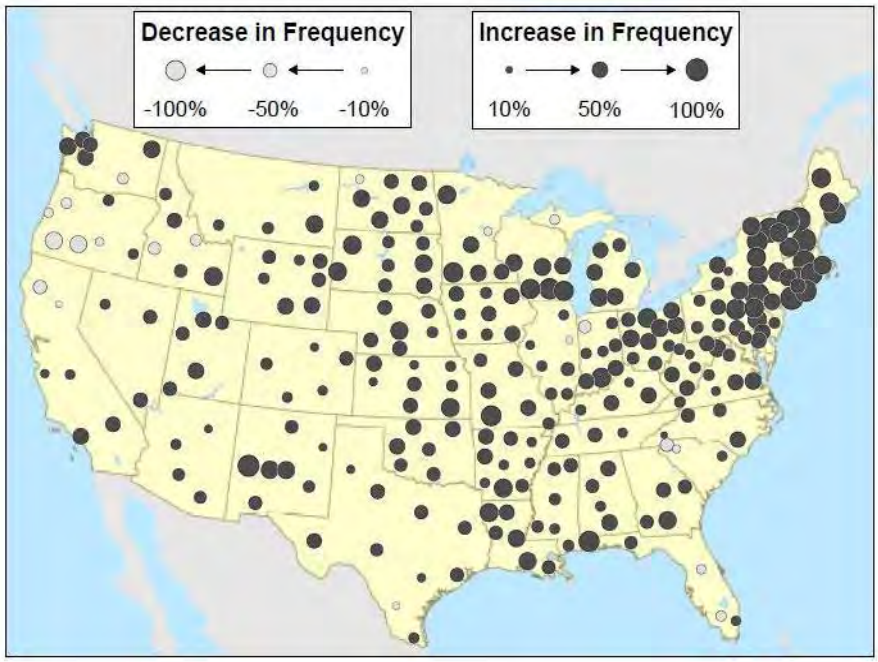


Figure 4-2. Changes in Frequency of Extreme Downpours

(Madsen and Willcox, 2012)

4.2.1.7 Vulnerability and Risk

The impacts of flooding can include injury or death, property damage, and traffic disruption. Flood hazards can also cause erosion, which can compromise water quality, slope stability, and the stability of building foundations. Erosion puts current and future structures and populations located near steep embankments or the coast, at risk. Erosion can also undercut streambeds and scour around stream crossings, creating a serious risk to roadways and bridges.

Much of the infrastructure in Egremont, including bridges and the stormwater system, were designed for historic flooding scenarios. Since the design and construction of this infrastructure, the Town has experienced flood events that have surpassed historic norms that have put this vital infrastructure at risk. This trend is likely to continue and get worse.

Critical Facilities Flood Vulnerability Analysis

Hazard location and extent of riverine flooding was determined using the FEMA 100-year and FEMA 500-year flood zones. A flood exposure analysis was conducted for critical facilities and vulnerable populations throughout the municipality utilizing MassGIS data, FEMA flood maps, and information gathered from the municipality. It was determined that no critical facilities in Egremont are located in the 500-year flood zone. Six of Egremont's critical facilities are located in the 100-year flood zone, as displayed in Table 4-2. It is important to protect this infrastructure from flooding as they are important facilities that residents rely on.

Table 4-2. Critical Facilities Located within the FEMA Flood Zone

Facility	Address	100-Year Flood Zone
Public Water Supplies: Guilder Hills Homeowners Association	N/A	X
Public Water Supplies: Prospect Lake Park	N/A	X
Salisbury Savings Bank	Route 23	X
Jug End State Reservation Dump	Jug End Road	X
Prospect Lake Park Campground	50 Prospect Lake Road	X
Egremont Market	47 MA-23	X

Development and Flood Vulnerability Analysis

To determine the Town's vulnerability to flooding, a GIS flood analysis was conducted on land use types in Egremont. The Town's land use was overlaid with the 100-year and 500-year FEMA flood zones, and the overlap was noted. A total of 7,297 parcels are located in Egremont.

The results of the vulnerability assessment conducted for Egremont's existing community assets are summarized in Tables 4-3 and 4-4. Table 4-3 below shows the exposure of parcels in 100-year flood zones by development status.

Table 4-3. Exposure of Parcels to 100-Year Flood Zones by Land Use Type

Land Use Type	Total Number of Parcels	Total Area of Parcels (acres)	Total Area of Parcels in the Flood Zone (acres	Percentage of Parcels in the Flood Zone
Developed	1,220	11,437	750	6.6%
Undeveloped	40	281	12	4.2%
Total	**1,260**	**11,717**	**762**	**6.5%**

The same analysis was conducted for parcels in the 500-year flood zone, and the results are shown in Table 4-4.

Table 4-4. Exposure of Parcels to the 500-Year Flood Zone by Land Use Type

Land Use Type	Total Number of Parcels	Total Area of Parcels (acres)	Total Area of Parcels in the Flood Zone (acres	Percentage of Parcels in the Flood Zone
Developed	1,220	11,437	61	0.5%
Undeveloped	40	281	0.4	0.2%
Total	**1,260**	**11,717**	**62**	**0.5%**

Since the last HMP completion, all new development in Egremont has been residential. In 2018, the Town updated their permitting system so that all development is tracked electronically, making the data much more accessible that previously. Egremont exported the recent residential developments permitted between 2018 and 2022, and they were overlaid with FEMA flood zone maps to determine their vulnerability to flooding. The exposure was documented by the area and percentage of parcels that overlap with a flood zone. Two recently developed residential parcels are located partially within the 100-year flood zone, and none are located within the 500-year flood zone (Appendix B). Development has only slightly increased vulnerability since the approval of the previous HMP.

4.2.2 Stormwater Flooding

4.2.2.1 Description

Stormwater flooding, also known as urban flooding, occurs during a short-term, high intensity precipitation event where the rate of rainfall is greater than the capacity of the stormwater management system. This may be due to an undersized culvert, poor drainage, topography, high amounts of impervious surfaces, debris that causes the stormwater system to function below its design standard, or a combination of these factors. In these cases, the stormwater management system becomes overwhelmed, causing water to inundate roadways and properties. The winter and spring thaw can also present flooding challenges for the Town by way of clogged catch basins, which can cause water to backup and flood parking lots and roadways.

4.2.2.2 Severity

Stormwater flooding is primarily a nuisance that will dissipate within a few hours, but under some circumstances it can cause serious property damage and put people at risk. Stormwater flooding is typically shorter in duration and more localized than riverine flooding. When stormwater flooding occurs the flood waters can range from a few inches to a few feet in depth.

4.2.2.3 Probability

Based on historic occurrences, stormwater flooding is considered a high frequency event. As defined by the 2013 Massachusetts State Hazard Mitigation Plan, this hazard may occur more frequently than once in 5 years or greater than a 20% chance per year.

4.2.2.4 Location

Stormwater flooding is most likely to occur near stormwater collection sites that are undersized or at locations of blockages in the stormwater system. Stormwater flooding may also be caused by high water

at stormwater outfall sites, causing backflow to occur. Stormwater flooding is a Town-wide hazard for Egremont, with some known areas of undersized drainage being more susceptible.

4.2.2.5 Historic Occurrences

Due to old and undersized culverts, flooding is common along roadways in Egremont. Stormwater flooding has occurred along Jug End Road, where the residential area on the downhill side of the road is often affected by stormwater runoff. Shun Hill Road, west of Route 71, floods frequently due to an undersized culvert. Additionally, the Town Hall parking lot often experiences stormwater flooding.

4.2.2.6 Climate Change

Most stormwater systems in Massachusetts are aging and were designed with rainfall estimates that are no longer accurate. Figure 4-3 shows how anticipated rainfall during design storms has increased from 1961 to 2015, especially for the larger 24-hour, 100-year event. With climate change, the intensity and duration of rainfall is projected to increase, which will further stress the current system. This combination of issues will likely result in an increase of stormwater flooding events within the Town.

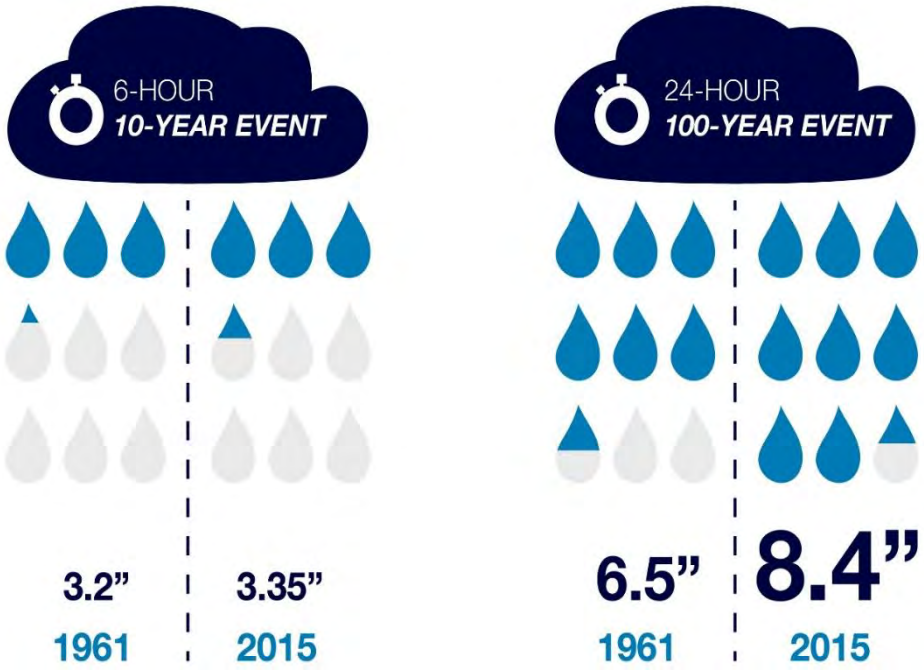


Figure 4-3. Stormwater Design Standards (NOAA TP 40, 1961 and NOAA, 2015)

Green infrastructure, or low impact development improvements, can help reduce demand on the existing stormwater system by increasing infiltration on-site. Rain gardens and pervious pavement are two examples of possible strategies. Upsizing culverts with new rainfall data is also recommended.

4.2.2.7 Vulnerability and Risk

The risks associated with stormwater flooding are relatively similar to those of riverine flooding. Property damage and public health and safety are primary concerns. Due to the localized nature of stormwater flooding, the risk can be less severe; however, predicted increase in frequency and severity of storm events means that even small storms can begin to overburden the stormwater system due to cumulative impacts. This will result in an overall increase in stormwater flooding events and the associated impacts.

4.3 Dam Failure

4.3.1 Description

Dam failure is defined as a collapse of an impounding structure resulting in an uncontrolled release of impounded water from a dam (DCR, 2017a). There are two types of dam failures that can occur. Catastrophic failure occurs when there is a sudden, rapid, uncontrolled release of impounded water. Design failure occurs as a result of minor overflow events, including dam overtopping. This occurs when water exceeds the capacity of the dam, which can be due to inadequate spillway design or other outside factors such as settlement of the dam crest or back of spillways. Thirty-four percent of all dam failures that occur in the United States are a result of overtopping (EEA and EOPSS, 2018). Many dam failures in the United States have been the secondary result of other disasters. Prominent causes include earthquakes, landslides, extreme storms, massive snowmelt, equipment malfunction, structural damage, foundation failures, and sabotage (MEMA and DCR, 2013).

There are four dams located within the Town of Egremont. Table 4-5 provides information on dams located in the Town of Egremont.

Table 4-5. Egremont Dam Inventory

Dam Name	Primary Owner	Hazard Class
Smiley's Pond Dam	DOT	Significant Hazard
Prospect Lake Dam	50 Prospect Lake LLC	Significant Hazard
Marsh Pond Dam	Private	N/A
Barrett Pond Dam	Unknown	N/A

(DCR, 2019; Egremont Core Team, 2021)

4.3.1 Severity

DCR categorizes dams according to the potential extent of the hazard in the case of a dam failure. Below is a description of dam hazard classification.

High Hazard:	Dams located where failure or mis-operation will likely cause loss of life and serious damage to homes(s), industrial or commercial facilities, important public utilities, main highway(s), or railroad(s).
Significant Hazard:	Dams located where failure or mis-operation may cause loss of life and damage home(s), industrial or commercial facilities, secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important facilities.
Low Hazard:	Dams located where failure or mis-operation may cause minimal property damage to others. Loss of life is not expected.

As of February 2017, all dams classified as a high hazard potential or a significant hazard potential were required to have an Emergency Action Plan (EAP) (DCR, 2017b). This plan must be updated annually and submitted to the DCR Commissioner and the Massachusetts Emergency Management Agency. The plan should also be retained by the dam owner and the City or Town in which the dam is located.

Guidelines and a template were established by the Office of Dam Safety to ensure that all EAPs follow the proper format. Egremont may want to consider requesting the EAPs for Prospect Lake Dam and the other dams upstream of the Town.

4.3.2 Probability

Dam failures as a result of flood events are of concern in Massachusetts given the high density of dams constructed in the 19th century (MEMA and DCR, 2013). Due to the large number of existing dams, DCR's Office of Dam Safety maintains records of dams located state-wide ensuring compliance with acceptable practices pertaining to dam inspection, maintenance, operation, and repair. Due in part to this proactive dam safety program, dam failure is classified as a low frequency event in the Town. As defined by the 2013 Massachusetts State Hazard Mitigation Plan, a low frequency hazard may occur less frequently than once in 100 years (less than a 1% chance per year).

4.3.3 Location

A total of four dams, as indicated in Table 4-5 above, are located in the Town of Egremont. The location of these dams is displayed on the critical facilities map in Appendix B.

4.3.4 Historic Occurrences

There have been no instances of dam failure in Egremont. Some of the dams in Egremont are in poor condition, causing concern among residents. The Prospect Lake Dam has been permitted and is scheduled for updates in 2022.

4.3.5 Climate Change

Climate change may indirectly affect dam breaches for a variety of reasons. Dams are typically designed based on historic water flows and known hydrology. Climate change projections indicate that the frequency, intensity, and amount of precipitation will increase in New England. This anticipated increase in precipitation may push dams over capacity, placing additional stress on dam infrastructure. Therefore, continuing and enhancing dam monitoring will be crucial to maintaining safe dam conditions. There are several mechanisms in place to manage increased volume in water bodies, such as slowly releasing impounded water at scheduled intervals. It is advised that these controlled events are monitored closely as they can add additional stress on the dam infrastructure.

4.3.6 Vulnerability and Risk

A dam failure could result in catastrophic impacts to both Egremont and municipalities located downstream of the dam. In addition, the breach may result in erosion on the rivers and stream banks that are inundated. These impacts can be at least partially mitigated through advance warning to communities impacted by a dam failure.

4.4 Wind Related Hazards

High winds occur during a variety of weather events, most notably during hurricanes, tropical storms, tornadoes, nor'easters, and thunderstorms, all of which affect Egremont to varying degrees.

4.4.1 Severe Thunderstorms

4.4.1.1 Description

According to NOAA's National Severe Storms Laboratory, a severe thunderstorm is a rain event, accompanied by thunder and one or more of the following: hail one inch or greater, winds gusting in

excess of 50 knots (57.5 mph), or a tornado (NOAA, n.d.-c). Thunderstorms in Massachusetts are usually accompanied by rainfall; however, thunderstorms with little or no rainfall have occurred, but are rare in New England (EEA and EOPSS, 2018).

4.4.1.2 Severity

Thunderstorms are typically less severe than other hazard events discussed in this section. Thunderstorms normally last for about 30 minutes and can generate winds of up to 60 mph. Winds associated with thunderstorms can knock down trees, resulting in power outages and blocked evacuation and transportation routes. Power outages can also disrupt access to well water or communications systems. Extreme rain during thunderstorms can cause inland flooding around waterbodies or due to surcharged drainage systems. During periods of drought, lightning from thunderstorm cells can result in fire ignition (EEA and EOPSS, 2018).

4.4.1.3 Probability

Based on historic occurrences, severe thunderstorms are considered high frequency events in Egremont. As defined by the 2013 Massachusetts State Hazard Mitigation Plan, this hazard may occur more frequently than once in five years (a greater than 20% chance per year).

4.4.1.4 Location

Thunderstorms can cause local damage and are a town-wide risk in Egremont. The entire town is equally susceptible to impacts from thunderstorms, which can include lightning, strong winds, heavy rain, hail, and sometimes tornados.

4.4.1.5 Historic Occurrences

NOAA's Storm Event Database offers thunderstorm and hail data for Berkshire County (NOAA, 2021). Between 2000 and 2021, 402 thunderstorm events caused $1,190,500 in property damages in Berkshire County. Five injuries and one deaths were reported. The major thunderstorm events that affected Egremont caused tree and power wire damage. Hail ranging from dime- to penny-sized was included in the description of 43 of the reports.

Between 2000 and 2021, there were 118 hail events on NOAA's Storm Event Database. No property damage, deaths or injuries were reported. The size of hail ranged from 0.75" up to 4" (NOAA, 2021).

4.4.1.6 Climate Change

There is evidence that rising temperatures will increase convective available potential energy (CAPE), which is one of the two ingredients needed for severe thunderstorms. The other is strong wind shear, which is a change in wind speed or direction over a short distance. It is projected that by warming the surface and putting more evaporation in the air CAPE will increase providing more raw fuel to produce rain and hail, and vertical wind shear, resulting in an increased amount of severe thunderstorm activity (NASA, 2021).

4.4.1.7 Vulnerability and Risk

Due to the large spatial extent, all populations and all existing infrastructure in Egremont, including critical facilities, are at risk to thunderstorms. Potential impacts include damage to buildings from wind, water, and lightning strike, which could cause business interruption, loss of communications, damage to transportation networks, and power failure.

4.4.2 Hurricanes and Tropical Storms

4.4.2.1 Description

Tropical cyclones (including tropical depressions, tropical storms, and hurricanes) form over the warm waters of the Atlantic, Caribbean, and Gulf of Mexico. A tropical storm is defined as having sustained winds from 39 to 73 mph. If sustained winds exceed 73 mph, it is categorized a hurricane. The official hurricane and tropical storm season runs from June 1 to November 30. However, storms are more likely to occur in New England during August, September, and October (MEMA and DCR, 2013).

4.4.2.2 Severity

The Saffir-Simpson scale ranks hurricanes based on sustained wind speeds from Category 1 (74 to 95 mph) to Category 5 (156 mph or more). Category 3, 4, and 5 hurricanes are considered "Major" hurricanes. Wind gusts associated with hurricanes may exceed the sustained winds and cause more severe localized damage (MEMA and DCR, 2013). The Saffir-Simpson scale (Table 4-6) categorizes or rates hurricanes from 1 (minimal) to 5 (catastrophic) based on their intensity. This is used to provide an estimate of the potential property damage and flooding expected along the coast from a hurricane making landfall. Wind speed is the determining factor in the scale, as storm surge values are highly dependent on context (EEA and EOPSS, 2018).

Table 4-6. Saffir-Simpson Scale

Scale No. (Category)	Winds (mph)	Potential Damage
1	74 – 95	**Minimal**: damage is primarily to shrubbery and trees, mobile homes, and some signs. No real damage is done to structures.
2	96 – 110	**Moderate**: some trees topple, some roof coverings are damaged, and major damage is done to mobile homes.
3	111 – 130	**Extensive**: large trees topple, some structural damage is done to roofs, mobile homes are destroyed, and structural damage is done to small homes and utility buildings.
4	131 – 155	**Extreme**: extensive damage is done to roofs, windows, and doors; roof systems on small buildings completely fail; and some curtain walls fail.
5	> 155	**Catastrophic**: roof damage is considerable and widespread, window and door damage are severe, there are extensive glass failures, and entire buildings could fail.

(MEMA and DCR, 2013) (table originally created by NOAA)

Potential hurricane damage in Egremont was estimated using a hurricane modeling software. Hazus Multi-Hazard (Hazus) is a GIS model developed by FEMA to estimate losses in a defined area due to a specified natural hazard. The Hazus hurricane model allows users to input specific parameters in order to model a defined hurricane magnitude, which is based on wind speed. The largest hurricane ever recorded in Massachusetts was a Category 3 hurricane, which occurred in 1954.

The return period of a hurricane is the frequency at which a certain intensity of hurricane can be expected within a given distance of a given location (NHC, 2021). In Massachusetts, the return period for a Category 2 hurricane is approximately 1 percent, and the return period for a category 4 hurricane is approximately 0.5 percent. Hazus models hurricanes based on their return period; therefore, a Category 2 was modeled as a 100-year hurricane and a Category 4 was modeled as a 500-year hurricane.

To model the hurricane, first the study region was defined. The Census Tract modeled is 52.83 square miles with 1,886 people (as of 2010). An estimated 1,489 buildings are in the tract with $449 million dollars value, and 92% of the buildings are residential (as of 2010). Egremont was outlined in the model using the larger Census Tract that includes the Town, and the probabilistic scenario was used. The census tract covers other towns beyond Egremont, so the results from Hazus are given for the entire census tract and are likely greater than impacts on Egremont alone. This scenario considers the impact of thousands of storms that have a multitude of tracks and intensities. The output shows the potential

Table 4-7. Estimated Damages in Egremont's Census Tract from Probabilistic Category 2 Hurricane

impact that could occur in the Census Tract if a Category 2 or a Category 4 hurricane made landfall. Hazus is based on 2010 Census data and 2014 dollars. Table 4-7 below shows the estimated damage from a Category 2 hurricane in the census tract, about $290,000, and Table 4-8 shows the same results from a Category 4 hurricane.

Building Characteristics	
Estimated total number of buildings	1,489
Estimated total building replacement value (Year 2014 $)	$449,000,000
Building Damages	
# of buildings sustaining minor damage*	0.9
# of buildings sustaining moderate damage*	0.01
# of buildings sustaining severe damage	0
# of buildings destroyed	0
Population Needs	
# of households displaced	0
# of people seeking public shelter	0
Debris	
Total debris generated (tons)*	697
Tree debris generated (tons)*	697
Brick/Wood debris generated (tons)*	0
Concrete/Steel debris generated (tons)*	0
# of truckloads to clear building debris (@25 tons/truck)*	0
Value of Damages	
Total property damage*	$289,950
Total losses due to business interruption*	$20

*Egremont shares a census tract with other communities, so these numbers are for the entire tract and not just the Town.

Building Characteristics	
Estimated total number of buildings	1,489
Estimated total building replacement value (Year 2014 $)	$449,000,000
Building Damages	
# of buildings sustaining minor damage*	25.61
# of buildings sustaining moderate damage*	0.81
# of buildings sustaining severe damage	0.01
# of buildings destroyed	0
Population Needs	
# of households displaced	0
# of people seeking public shelter	0
Debris	
Total debris generated (tons)*	9,156
Tree debris generated (tons)*	9,102
Brick/Wood debris generated (tons)*	54
Concrete/Steel debris generated (tons)*	0
# of truckloads to clear building debris (@25 tons/truck)*	2
Value of Damages	
Total property damage*	$1,435,030
Total losses due to business interruption*	$12,630

*Egremont shares a census tract with other communities, so these numbers are for the entire tract and not just the Town.

In addition to the infrastructural damage, Hazus also calculated the potential societal impact of a Category 2 and Category 4 hurricane on the community. This calculation included lost monetary wage, capital-related rental and relocation costs, as well as expected damages to essential facilities and damages by building material type. A full Hazus risk report for the hurricane can be found in Appendix B.

4.4.2.3 Probability

Based on historic occurrences, hurricanes are considered a medium frequency event in Egremont. As defined by the 2013 Massachusetts State Hazard Mitigation Plan, this hazard can occur between once

Table 4-8. Estimated Damages in Egremont's Census Tract from Probabilistic Category 4 Hurricane

in five years to once in 50 years (a 2% to 20% chance per year).

4.4.2.4 Location

Hurricanes have a large spatial extent often spanning several hundred miles across. Due to their size, when hurricanes and tropical storms do occur, they will be a Town-wide hazard.

4.4.2.5 Historic Occurrences

The region has been impacted by hurricanes throughout its history, starting with the Great Colonial Hurricane of 1635, the first recorded hurricane in Massachusetts. Berkshire County faced seven hurricanes and tropical storms in the last 10 years. During the August 2011 Tropical Storm Irene and the August 2020 Tropical Storm Isaias, strong winds occurred across Berkshire County, resulting in numerous trees and powerlines going down throughout the County, resulting in power outages and impassable roads.

4.4.2.6 Climate Change

According to NOAA's Geophysical Fluid Dynamic Laboratory (NOAA, 2021) climate change is anticipated to impact hurricanes, although exactly how is not fully understood. A study by NOAA examined every hurricane from 1980 to 2018 and found that the buildup of greenhouse gases in the atmosphere, along with changes in other human pollution, has changed how often storms form in certain locations. Some spots, like the Atlantic basin, saw a "substantial increase" in storms. This indicates that the Atlantic Ocean is likely to experience an increase in the number of hurricanes due to climate change. Figure 4-4 provides additional information on where hurricanes have formed historically. The Atlantic East coast is highlighted in green, showing the Atlantic as a hurricane generating hotspot.

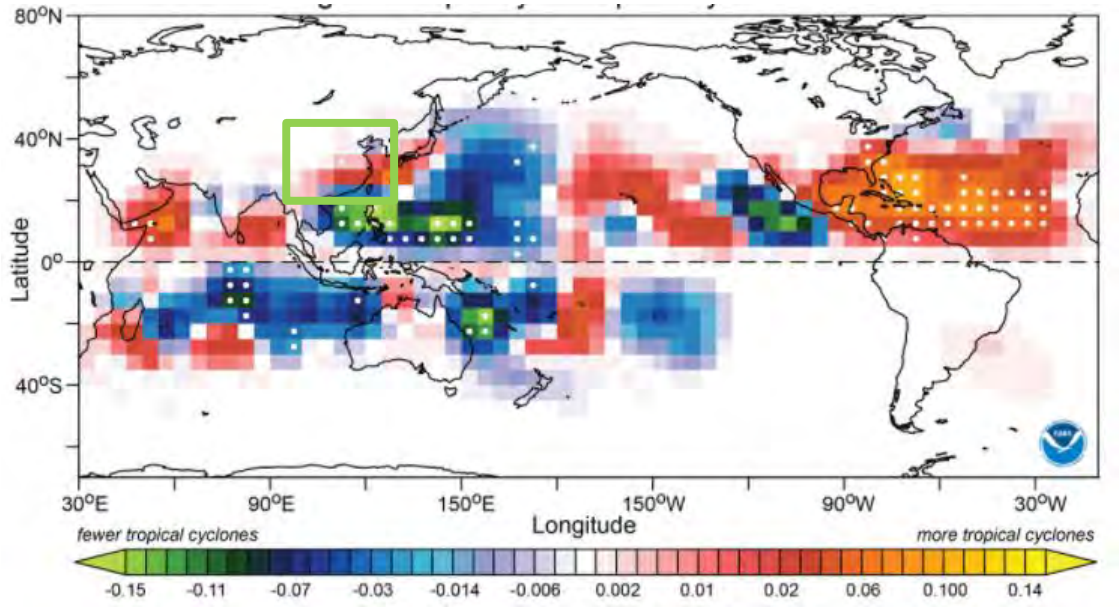


Figure 4-4. Observed Change in Frequency of Hurricanes from 1980 to 2018

(NOAA, 2020)

4.4.2.7 Vulnerability and Risk

Due to the large spatial extent, all populations and all existing infrastructure, including critical facilities, are at risk to hurricane and tropical storm hazards. Potential impacts include damage to buildings from wind and water, business interruption, loss of communications, damage to transportation networks, and power failure. Flooding is a major concern, as slow-moving hurricanes can discharge tremendous amounts of rain on an area. Figure 4-5 provides an overview of the impacts that these extreme events can have on Egremont.

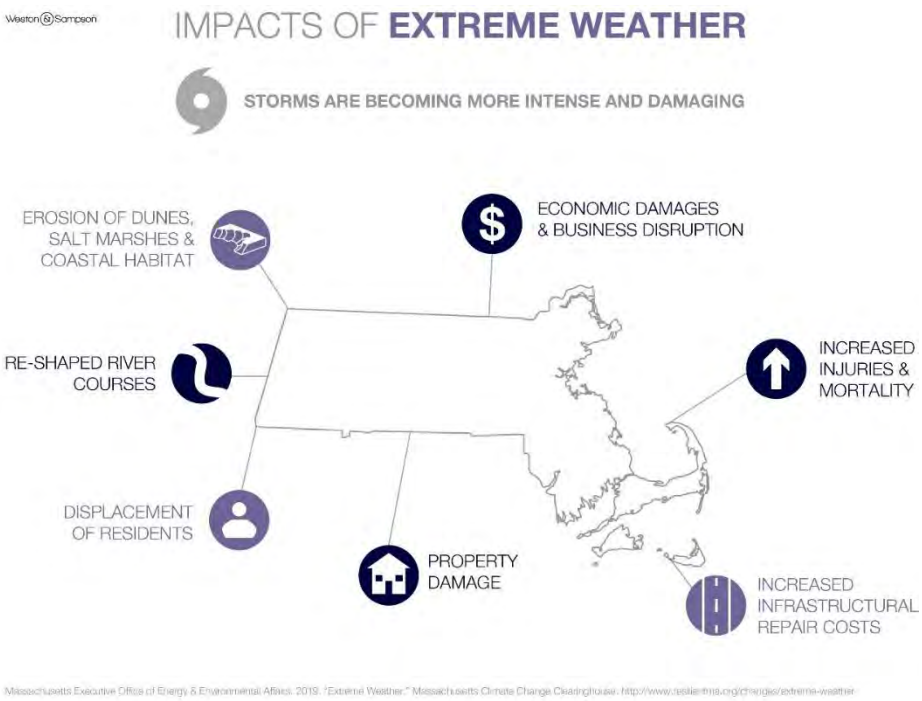


Figure 4-5. Impacts of extreme events and stronger storms on the State of Massachusetts

4.4.3 Tornados

4.4.3.1 Description

A tornado is a narrow, rotating column of air that extends from the base of a cloud to the ground. According to the 2018 SHMCAP, the following are common factors in tornado formation:

- Very strong winds in the middle and upper levels of the atmosphere.
- Clockwise turning of the wind with height.
- Increasing wind speed in the lowest 10,000 feet of the atmosphere (i.e., 20 mph at the surface and 50 mph at 7,000 feet).
- Very warm, moist air near the ground, with unusually cooler air aloft.
- A forcing mechanism such as a cold front or leftover weather boundary from previous shower or thunderstorm activity.

4.4.3.2 Severity

According to the NWS a tornado is a violently rotating column of air touching the ground, usually attached to the base of a thunderstorm (NOAA, n.d.-b). Tornadoes are the most violent of all atmospheric storms (EEA and EOPSS, 2018). They can be spawned by tropical cyclones or the remnants thereof, and weak tornadoes can even form from little more than a rain shower if air is converging and spinning upward. Tornados can cause fatalities and devastate a neighborhood in seconds. The winds of a tornado may reach 300 miles per hour with damage paths in excess of one mile wide and 50 miles long (NOAA, n.d.-b).

The Fujita Tornado Scale measures tornado severity through estimated wind speed and damage. The National Weather Service began using the Enhanced Fujita-scale (EF-scale) in 2007, which led to

increasingly accurate estimates of tornado severity. Table 4-9 provides more detailed information on the EF Scale.

Table 4-9. Enhanced Fujita Scale

Fujita Scale			Derived		Operational EF Scale	
F Number	Fastest ¼ mile (mph)	3-second gust (mph)	EF Number	3-second gust (mph)	EF Number	3-second gust (mph)
0	40 – 72	45 – 78	0	65 – 85	0	65 – 85
1	73 – 112	79 – 117	1	86 – 109	1	86 – 110
2	113 – 157	118 – 161	2	110 – 137	2	111 – 135
3	158 – 207	162 – 209	3	138 – 167	3	136 – 165
4	208 – 260	210 – 261	4	168 – 199	4	166 – 200
5	261– 318	262 – 317	5	200 – 234	5	Over 200

(MEMA and DCR, 2013)

4.4.3.3 Probability

Based on historical occurrences, tornado events in Egremont are considered a low frequency event. As defined by the 2013 Massachusetts State Hazard Mitigation Plan, this hazard may occur once in 100 years (a 1% chance per year). Historical tornado activity around Egremont is higher than the average probability in the State.

4.4.3.4 Location

Because tornados are typically generated by strong thunderstorms, the entire Town is equally susceptible, and tornadoes are considered a Town-wide hazard.

4.4.3.5 Historic Occurrences

Although no tornadoes have been reported to have touched down within the Town of Egremont, the neighboring town of Great Barrington experienced a tornado in May 1995 that killed three people and caused extreme damage to the Town. EEA calculated average tornado density throughout the state using historical data (MEMA, 2018), and found that Egremont is within the highest density bracket in the state with an estimated greater than 0.02 tornadoes per square mile. This analysis indicated that the areas at the highest risk of a tornado touchdown occurs in the southwestern corner of the state, and from central Massachusetts through northeastern Massachusetts.

On average, the commonwealth experiences 1.7 tornados per year. There have been four recorded tornadoes in Berkshire County since 2000 (NOAA, 2021). In 2011, there was an EF3 tornado that touched down in Westfield and passed through southwest and south-central Massachusetts over 38 miles. While this did not occur in Berkshire County, it terminated only 40 miles from Egremont. Three fatalities and 200 injuries were directly attributed to the tornado.

The most common months for tornadoes to occur are June, July, and August. There are exceptions: The 1995 Great Barrington, Massachusetts tornado occurred in May; and the 1979 Windsor Locks, Connecticut tornado occurred in October (EEA and EOPSS, 2018).

4.4.3.6 Climate Change

Tornadoes are typically spawned by strong thunderstorms. With climate change, storms such as this are expected to increase in frequency and severity. Tornados are difficult to simulate well in climate models because of their small size, but because they are generated by storm events that have been

modeled to increase, it is predicted that the frequency of tornados in western Massachusetts will also rise in the future due to climate change.

4.4.3.7 Vulnerability and Risk

As was experienced previously in local tornadoes, if a tornado were to occur in Egremont there is the potential for extensive damage. Damages would depend on the track of the tornado and would most likely be high due to the prevalence of older construction and the density of development that exists. Structures built before current building codes may be more vulnerable. Evacuation, sheltering, debris clearance, distribution of food and other supplies, search and rescue, and emergency fire and medical services may be required as part of an emergency response to a tornado event. Critical evacuation and transportation routes may be impassable due to downed trees and debris, and recovery efforts may be complicated by power outages.

4.4.4 Nor'easters

4.4.4.1 Description

A nor'easter is characterized by large counterclockwise wind circulation around a low-pressure center that often results in heavy snow, high winds, waves, and rain along the East Coast of North America. These storms usually develop in the latitudes between Georgia and New Jersey, within 100 miles east or west of the East Coast. They progress generally northeastward and typically attain maximum intensity near New England and the Maritime Provinces of Canada (NWS, 2021). The term nor'easter refers to their strong northeasterly winds blowing in from the ocean.

4.4.4.2 Severity

Nor'easters are among the worst storms in Massachusetts. The storm radius of a nor'easter can be as great as 100 miles and sustained wind speeds of 20 to 40 mph are common, with short-term gusts of up to 50 to 60 mph or higher. These storms have been known to sit in place for multiple days in a row, increasing impact and reducing the ability to provide aid to the community.

4.4.4.3 Probability

Currently the most frequently occurring natural hazard in the state, nor'easters generally occur on at least an annual basis, typically in late fall and early winter. Some years bring up to four nor'easter events. Nor'easters in Egremont are high frequency events. As defined by the 2013 Massachusetts State Hazard Mitigation Plan, this hazard may occur more frequently than once in 5 years (a greater than 20% chance per year).

4.4.4.4 Location

Due to their large size, the entire town and region is impacted by a nor'easter event. Higher snow accumulation is prevalent is the western side of the state, where the average annual snowfall is 79.7 inches (EEA and EOPSS, 2018). Additionally, ice storms occur more frequently in the higher-elevation areas of western Massachusetts, including Egremont. Nor'easters are considered a town-wide hazard.

4.4.4.5 Historic Occurrences

Some of the historic events described in the "Flood-Related Hazards" section of this report were caused by nor'easters, including the January 2015 Winter Storm Juno, and three back-to-back nor'easters in March 2018.

NOAA's National Centers for Environmental Information also offers high wind and strong wind data for Berkshire County. Between 2000 and 2021, 111 "high wind" and "strong wind" entries were uploaded into the database. Some of these wind events were related to low pressure cells, rain, and other hazard events. During this time period, there were no deaths or injuries, but there was a total of $263,600 worth of damages from high and strong wind events in Berkshire County. In some cases, winds up to 60 miles per hour were reported.

4.4.4.6 Climate Change

Nor'easters along the Atlantic coast are increasing in frequency and intensity. Increased sea surface temperatures will cause the air to hold more moisture, thus allowing for a greater amount of snowfall. Future nor'easters may become more concentrated during the coldest winter months when atmospheric temperatures are still low enough to result in snowfall rather than rain (EEA and EOPSS, 2018).

4.4.4.7 Vulnerability and Risk

The impacts of nor'easters can result in property damage, downed trees, erosion, power service disruptions, surcharged drainage systems, and localized flooding. Nor'easters can often last several days. These prolonged conditions can impact evacuation and transportation routes and complicate emergency response efforts in Egremont and throughout the state.

4.5 Winter Storms

Winter storm events are atmospheric in nature and can impact large areas at a time. All current and future buildings and populations are at risk of winter storms, which have a variety of potential impacts. Egremont's rural location magnifies impacts. Snow removal becomes difficult with limited staffing and a widespread population. Heavy snow loads may cause roofs and trees to collapse, leading to structural damage. Deaths and injury are also possible impacts. Additional impacts can include road closures, power outages, business interruption, business losses (due to road closures), hazardous driving conditions, frozen pipes, fires due to improper heating, and second-hand health impacts caused by shoveling (such as a heart attack). Public safety issues are also a concern, as streets and sidewalks can become difficult to pass. This issue may be especially difficult for vulnerable populations such as elderly people who may have trouble safely leaving their homes or crossing at intersections due to large accumulations of snow. Impassable streets can also complicate emergency response efforts during an extreme event.

Winter storms are a town-wide hazard in Egremont. These events can include wind, heavy snow, blizzards, and ice storms. Blizzards and ice storms in Massachusetts can range from an inconvenience to extreme events that cause significant impacts and require a large-scale, coordinated response. A list of previous federal disaster declarations during winter weather is shown in Table 4-10.

Table 4-10. Previous Federal Disaster Declarations – Winter Weather

Disaster Name and Date of Event	Disaster Number	Type of Assistance	Counties Under Declaration
Snowstorm March 5 - 7, 2001	EM-3165	FEMA Public Assistance	Middlesex, Essex, Norfolk, Worcester, Hampshire, Franklin, **Berkshire**
Snowstorm December 6-7, 2003	EM-3191	FEMA Public Assistance	Middlesex, Essex, Suffolk, Norfolk, Bristol, Plymouth, Barnstable, Berkshire, Hampshire, Hampden, Franklin, **Berkshire**
Snowstorm January 22 - 23, 2005	EM-3201	FEMA Public Assistance	**All** 14 Massachusetts Counties
Severe Winter Storm and Flooding December 11-18, 2008	DR-1813	FEMA Public Assistance; FEMA Hazard Mitigation Grant Program	**All** 14 Massachusetts Counties
Severe Winter Storm December 11-18, 2008	EM-3296	None	Middlesex, Essex, Suffolk, Bristol, Berkshire, Hampshire, Hampden, Franklin, **Berkshire**
Severe Winter Storm and Snowstorm January 11-12, 2011	DR-1959	FEMA Public Assistance Grant	Middlesex, Essex, Suffolk, Norfolk, Hampshire, Hampden, **Berkshire**
Snowstorm October 29-30, 2011	DR-4051	FEMA Public Assistance	Middlesex, Worcester, Hampshire, Hampden, Franklin, **Berkshire**
Severe Winter Storm, Snowstorm, and Flooding February 8-9, 2013	DR-4110	FEMA Public Assistance	**All** 14 Massachusetts Counties

(FEMA, 2022a)

4.5.1 Heavy Snow and Blizzards

4.5.1.1 Description

The National Weather Service defines "heavy snow" as snowfall accumulating to 4 inches or more in 12 hours or less; or snowfall accumulating to 6 inches or more in 24 hours or less (NOAA, n.d.-c). Winter storms can be combined with nor'easters discussed previously in the "Wind-Related Hazards" section. A blizzard is a winter snowstorm with sustained wind or frequent wind gusts of 35 mph or more, accompanied by falling or blowing snow that reduces visibility to or below a quarter of a mile. These conditions must be the predominant condition over a three-hour period. Extremely cold temperatures are often associated with blizzard conditions but are not a formal part of the criteria. However, the hazard created by the combination of snow, wind, and low visibility increases significantly with temperatures below 20°F. A severe blizzard is categorized as having temperatures near or below 10°F, winds exceeding 45 mph, and visibility reduced to near zero by snow (EEA and EOPSS, 2018).

4.5.1.2 Severity

NOAA tracks and records historic snowfall data. Table 4-11 shows maximum single day and three-day snowfall data in Berkshire County.

Table 4-11. Snowfall Extremes in Berkshire County

Event Type	Day	Snowfall Maximums
1- Day	October 30, 2011	25.9"
3-Day	March 4. 1947	43.3"

4.5.1.3 Probability

Blizzards are classified as high frequency events in Egremont. As defined by the 2013 Massachusetts State Hazard Mitigation Plan, this hazard can occur more than once in five years (a greater than 20% chance of occurring each year).

4.5.1.4 Location

Heavy snow and blizzards impact the entire Town of Egremont equally and are considered a Town-wide hazard. Higher snow accumulations are prevalent at higher elevations, meaning that the western side of Egremont may be at a greater risk of heavy snow.

4.5.1.5 Historic Occurrences

There have been 85 winter storms recorded between 2000 and 2021 totaling $63,000 in damages in Berkshire County (NOAA, 2021). Two of the entries were categorized as blizzards. No injuries or deaths were reported. The "Blizzard of 1978" is a well-known winter storm that deposited more than three feet of snow and led to multi-day closures of roads, businesses, and schools.

4.5.1.6 Climate Change

Climate change will impact the types of storms Egremont experiences. An increase in days hovering around freezing will mean an increase in ice storms, which are discussed in Section 4.5.2 below. Additionally, frequency of blizzards may decrease due to warmer temperatures, but intensity of blizzards when they do occur may increase. Additionally, historical data shows that the frequency of winter storms has doubled between the first and second halves of the 20th century. This will continue to increase as warmer ocean temperatures allow for more moisture held in the air, increasing storm intensity and amount of precipitation.

4.5.1.7 Vulnerability and Risk

Winter storms bring hazardous conditions, impacting travel and safety. Slippery roads and whiteout conditions lead to traffic accidents. Additionally, cold temperatures associated with winter storms impact vulnerable populations who may not have the means to stay inside and stay warm.

4.5.2 Ice Storms

4.5.2.1 Description

An ice storm is used to describe occasions when damaging accumulations of ice are expected during freezing rain situations (NOAA, n.d.-d). Ice storm conditions are defined by liquid rain falling and freezing on contact with cold objects creating ice build-ups of ¼ inch or more that can cause severe damage. An ice storm warning, now included in the criterion for a winter storm warning, is issued for severe icing conditions. This is issued when ½ inch or more of accretion of freezing rain is expected.

4.5.2.2 Severity

Due to the nature of ice storms, the impacts can be severe and long-lasting. Maintenance and cleanup following an ice storm requires more equipment than would be needed during a snowstorm. Ice is heavy and builds up on infrastructure and natural resources, causing them to collapse or break. If an ice storm is followed by cold weather, it is difficult to melt the ice and travel can be hazardous.

4.5.2.3 Probability

Ice storms are classified as high frequency events in Egremont. As defined by the 2013 Massachusetts State Hazard Mitigation Plan, this hazard can occur at least once in five years (a greater than 20% chance of occurring each year).

4.5.2.4 Location

The entire town is susceptible to ice storm conditions. However, high snowfall and ice storms are greater in higher elevations, such as the western side of Egremont. Ice storms are considered a town-wide event in Egremont.

4.5.2.5 Historic Occurrences

Five ice storms were reported in Berkshire County between 2000 and 2021 (NOAA, 2021). Climate shifts are resulting in a greater number of days hovering around freezing temperatures, resulting in more freezing rain than has previously been seen in Egremont.

4.5.2.6 Climate Change

Climate change will impact the frequency and intensity of ice storm events Egremont will experience. As winter temperatures rise, many storms that would previously have deposited snow on the Town are now occurring as ice storms. Additionally, as the intensity of storms increases due to climate change, the recovery time from these larger storms will increase. Ice removal is intensive and difficult, and often relies on above-freezing temperatures for the ice to melt. When ice storms are following by a cold front, the cold weather following the storm may inhibit ice removal and create long-lasting hazardous conditions.

4.5.2.7 Vulnerability and Risk

Ice storms may lead to dangerous walking or driving conditions and the weighing down of power lines and trees. Icy roads can also complicate emergency response efforts during an extreme event. Cities and towns in the state of Massachusetts that have experienced ice storms where they were without power for days and school were canceled.

4.6 Geological Hazards

Geologic hazards can include earthquakes, landslides, sinkholes, and subsidence.

4.6.1 Earthquakes

4.6.1.1 Description

An earthquake is the sometimes-violent vibration of the earth's surface that follows a release of energy in the earth's crust due to fault fracture and movement.

4.6.1.2 Severity

The magnitude or extent of an earthquake is a seismograph-measured value of the amplitude of the seismic waves. The Richter Magnitude Scale (Richter Scale) was developed in 1932 as a mathematical device to compare the size of earthquakes. The Richter Scale is the most widely known scale that measures earthquake magnitude. It has no upper limit and is not a direct indication of damage. An earthquake in a densely populated area, which results in many deaths and considerable damage, can have the same magnitude as an earthquake in a remote area that causes no damage. Table 4-12 summarizes Richter Scale magnitudes and corresponding earthquake effects (MEMA and DCR, 2013). Earthquakes are often so small that they are not felt in New England.

Table 4-12. Richter Scale and Effects

Richter Magnitudes	Earthquake Effects
Less than 3.5	Generally, not felt, but recorded
3.5- 5.4	Often felt, but rarely causes damage
Under 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1-6.9	Can be destructive in areas up to about 100 km across where people live.
7.0- 7.9	Major earthquake. Can cause serious damage over larger areas.
8 or greater	Great earthquake. Can cause serious damage in areas several hundred meters across.

(Louie, 1996)

4.6.1.3 Probability

Earthquakes occur less frequently in New England compared to other parts of the country. Earthquakes are classified as a low frequency event in Egremont. As defined by the 2013 State Hazard Mitigation Plan, these events occur from once in 50 years to once in 100 years, or 1% to 2% per year. According to the 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan, the probability of a magnitude 5.0 or greater earthquake centered in New England is about 10-15% in a 10-year period.

4.6.1.4 Location

There is no record of an earthquake epicenter being located in Egremont. While it is possible, damaging earthquakes are not common in Massachusetts. Ground motion during an earthquake is the primary cause of damage to structures. Soft soils amplify ground motion, while hard rock reduces it. In order to measure the ground motion during an earthquake, scientists look at the maximum horizontal acceleration (peak ground acceleration). This is expressed as a "percentage of gravity" or percentage of the force we experience from gravity. It is often shorted to %g. Probability of occurrence is described as the peak ground acceleration (%g) with a 2% probability of exceedance in 50 years. Peak ground acceleration in the state ranges from 8%g to 20%g (USGS, 2019a).

Egremont is located in an area with a PGA of 6-10 %g with a 2% probability of exceedance in 50 years (Figure 4-6). This is the highest zone in the state.

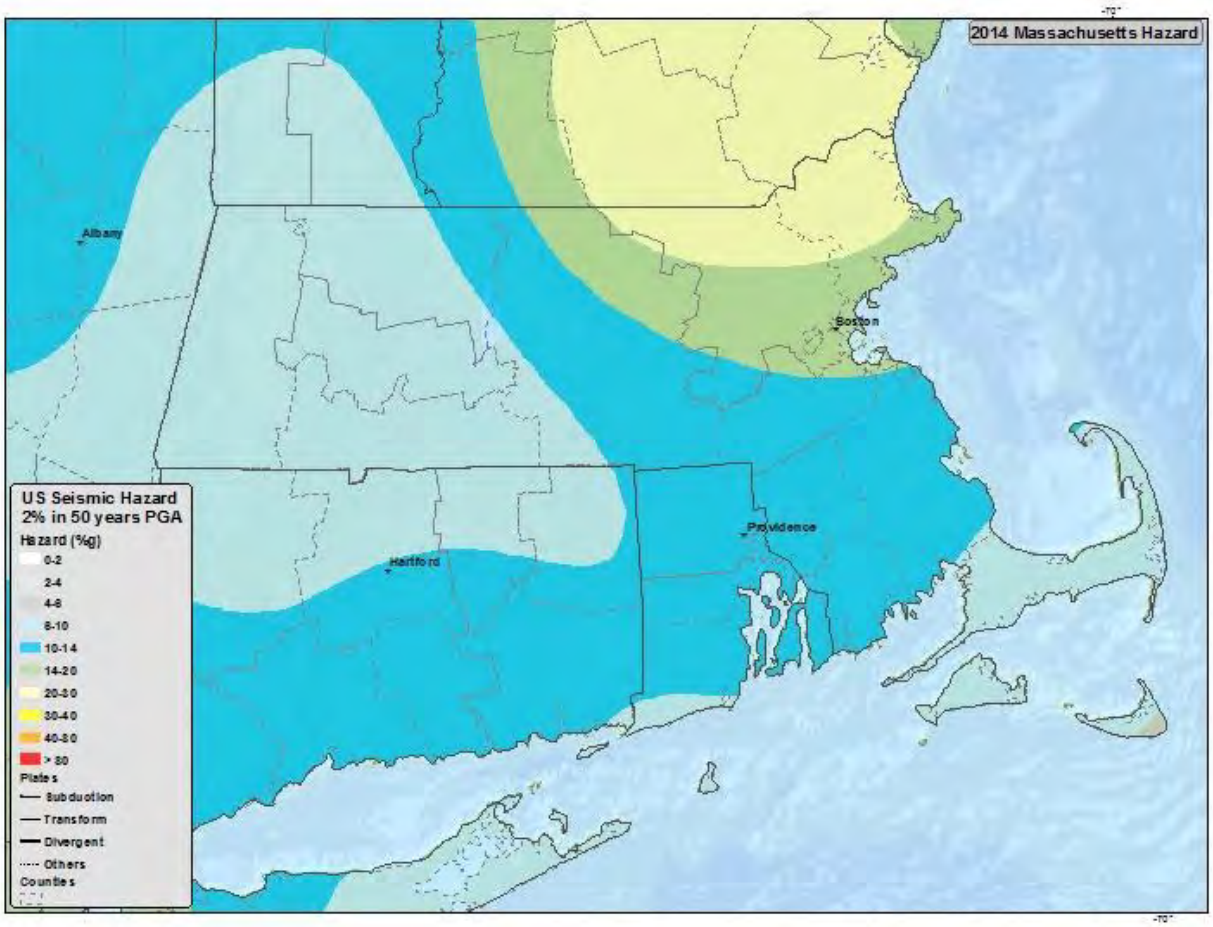


Figure 4-6. 2014 Seismic Hazard Map - Massachusetts

(USGS, 2014)

4.6.1.5 Historic Occurrences

The first recorded earthquake in MA was noted by the Plymouth Pilgrims and other early settlers in 1638. Historically, moderately damaging earthquakes strike somewhere in the region every few decades, and smaller earthquakes are felt approximately twice per year (MEMA and DCR, 2013). A summary of historic earthquakes in Massachusetts is included in Table 4-13 below.

Table 4-13. Historical Earthquakes in Massachusetts and Surrounding Area, 1727-2021

Location	Date	Magnitude
MA - Cape Ann	11/10/1727	5
MA - Cape Ann	12/29/1727	NA
MA - Cape Ann	2/10/1728	NA
MA - Cape Ann	3/30/1729	NA
MA - Cape Ann	12/9/1729	NA
MA - Cape Ann	2/20/1730	NA
MA - Cape Ann	3/9/1730	NA
MA - Boston	6/24/1741	NA
MA - Cape Ann	6/14/1744	4.7
MA - Salem	7/1/1744	NA

Location	Date	Magnitude
MA - Off Cape Ann	11/18/1755	6
MA - Off Cape Cod	11/23/1755	NA
MA - Boston	3/12/1761	4.6
MA - Off Cape Cod	2/2/1766	NA
MA - Offshore	1/2/1785	5.4
MA - Wareham/Taunton	12/25/1800	NA
MA - Woburn	10/5/1817	4.3
MA - Marblehead	8/25/1846	4.3
MA - Brewster	8/8/1847	4.2
MA - Boxford	5/12/1880	NA
MA - Newbury	11/7/1907	NA
MA - Wareham	4/25/1924	NA
MA - Cape Ann	1/7/1925	4
MA - Nantucket	10/25/1965	NA
MA - Boston	12/27/1974	2.3
MA - Nantucket	4/12/2012	4.5
MA – Newburyport	2/20/2013	2.3
MA – Freetown	1/9/2014	2.0
MA – Bliss Corner	2/11/2014	2.2
MA – off Northshore	8/18/2014	2.0
MA – Rockport Coast	6/1/2016	2.2
MA – Nantucket	8/18/2018	2.4
MA – Templeton	12/21/2018	2.1
MA – Gardner	12/23/2018	2.2
MA – Rockport	4/27/2019	2.1
MA – North Plymouth	12/3/2019	2.1
MA – Edgartown	7/24/2020	2.1
MA – Bliss Corner	11/8/2020	3.6
MA – Bliss Corner	11/22/2020	2.0

(USGS, 2021)

4.6.1.6 Climate Change

There is no established correlation between climate change and earthquakes (EEA and EOPSS, 2018).

4.6.1.7 Vulnerability and Risk

Although new construction under the most recent building codes generally will be built to seismic standards, much of the development in the Town pre-dates the current building code. These events can strike without warning and can have a devastating impact on infrastructure and buildings constructed prior to earthquake resistant design considerations. It can be assumed that all existing and future buildings and populations are at risk to an earthquake hazard. If an earthquake occurs, the entire region, not just the Town of Egremont, would face significant challenges.

Impacts from earthquakes can range from slight to moderate building damage, to catastrophic damage and fatalities, depending on the severity of the earthquake event. Events may cause minor damage such as cracked plaster and chimneys, or broken windows, or major damage resulting in building collapse.

Based on the Massachusetts State Hazard Mitigation and Climate Adaptation Plan, the degree of exposure "depends on many factors, including the age and construction type of the structures where people live, work, and go to school; the soil type these buildings are constructed on; and the proximity of these building to the fault location." Furthermore, the time of day exposes different sectors of the community to the hazard. Earthquakes can lead to business interruptions, loss of utilities, and road closures which may isolate populations. People who reside or work in unreinforced masonry buildings are vulnerable to liquefaction (liquefaction is the phenomenon that occurs when the strength and stiffness of a soil is reduced by earthquake). Earthquakes often trigger fires, and the water distribution system may be disrupted, thus posing a risk for public health and safety.

Potential earthquake damage was modeled for Egremont using Hazus. The Hazus earthquake model allows users to input specific parameters in order to model a defined earthquake magnitude, with the epicenter located at the center of the study region. In this case, the smallest study region available was a census tract. Egremont shares a census tract with multiple other small communities, and the results from the Hazus analysis show the impact on the entire census tract.

While large earthquakes are rare in Massachusetts, there was a magnitude 5.0 earthquake recorded in 1963 and a Cape Ann magnitude 6.5 earthquake, which was used as the basis for this modeling. The tables below show the estimated damage from a magnitude 5 and a magnitude 7 earthquake in Egremont. In addition to the infrastructural damage, Hazus also calculated the potential social impact, property damage, and business interruption loss. This calculation included a utility system inventory, building damages by construction type, damages to essential facilities and transportation systems, and casualty estimates (Tables 4-14 and 4-15). A full Hazus risk report for each earthquake category can be found in Appendix B.

Table 4-14. Estimated Damage in Egremont from Historic Magnitude 5 Earthquake

Building Characteristics	
Estimated total number of buildings	1,489
Estimated total building replacement value (Year 2014 $)	449,000,000
Building Damages	
# of buildings sustaining slight damage	444
# of buildings sustaining moderate damage	227
# of buildings sustaining extensive damage	56
# of buildings completely damaged	13
Population Needs	
# of households displaced	10
# of people seeking public shelter	4
Debris	
Building debris generated (millions of tons)	0.01
# of truckloads to clear building debris (@25 tons/truck)	320
Building-Related Economic Loss	
Income Losses	$8,986,700
Capital Stock Losses	$46,321,300
Total Economic Loss	$56,230,000

Egremont shares a census tract with other communities, so these numbers are for the entire tract and not just the Town.

Table 4-15. Estimated Damage in Egremont from Historic Magnitude 7 Earthquake

Building Characteristics	
Estimated total number of buildings	1,489
Estimated total building replacement value (Year 2014 $)	449,000,000
Building Damages	
# of buildings sustaining slight damage	29
# of buildings sustaining moderate damage	254
# of buildings sustaining extensive damage	421
# of buildings completely damaged	784
Population Needs	
# of households displaced	443
# of people seeking public shelter	203
Debris	
Building debris generated (millions of tons)	0.08
# of truckloads to clear building debris (@25 tons/truck)	3,200
Building-Related Economic Loss	
Income Losses	$62,566,600
Capital Stock Losses	$390,878,400
Total Economic Loss	$484,660,000

Egremont shares a census tract with other communities, so these numbers are for the entire tract and not just the Town.

4.6.2 Landslides

4.6.2.1 Description

Landslides include a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows. Although gravity acting on an over steepened slope is the primary reason for a landslide, there are other contributing factors. These contributing factors can include erosion by rivers or ocean waves over steepened slopes, rock and soil slopes weakened through saturation by snowmelt or heavy rains, earthquake-created stresses that make weak slopes fail, excess weight from accumulation of rain or snow, and stockpiling of rock or ore from waste piles or man-made structures (USGS, 2019b).

4.6.2.2 Severity

Landslide intensity can be measured in terms of destructiveness, as demonstrated by Table 4-16 on the next page.

Table 4-16. Landslide Volume and Velocity

Estimate Volume (m^3)	Expected Landslide Velocity		
	Fast moving (rock fall)	Rapid moving (debris flow)	Slow moving (slide)
<0.001	Slight intensity	--	--
<0.5	Medium intensity	--	--
>0.5	High intensity	---	--

Estimate Volume (m^3)	Expected Landslide Velocity		
	Fast moving (rock fall)	Rapid moving (debris flow)	Slow moving (slide)
<500	High intensity	Slight intensity	--
500-10,000	High intensity	Medium intensity	Slight intensity
10,000 – 50,000	Very high intensity	High intensity	Medium intensity
>500,000	--	Very high intensity	High intensity
>>500,000	--	--	Very high intensity

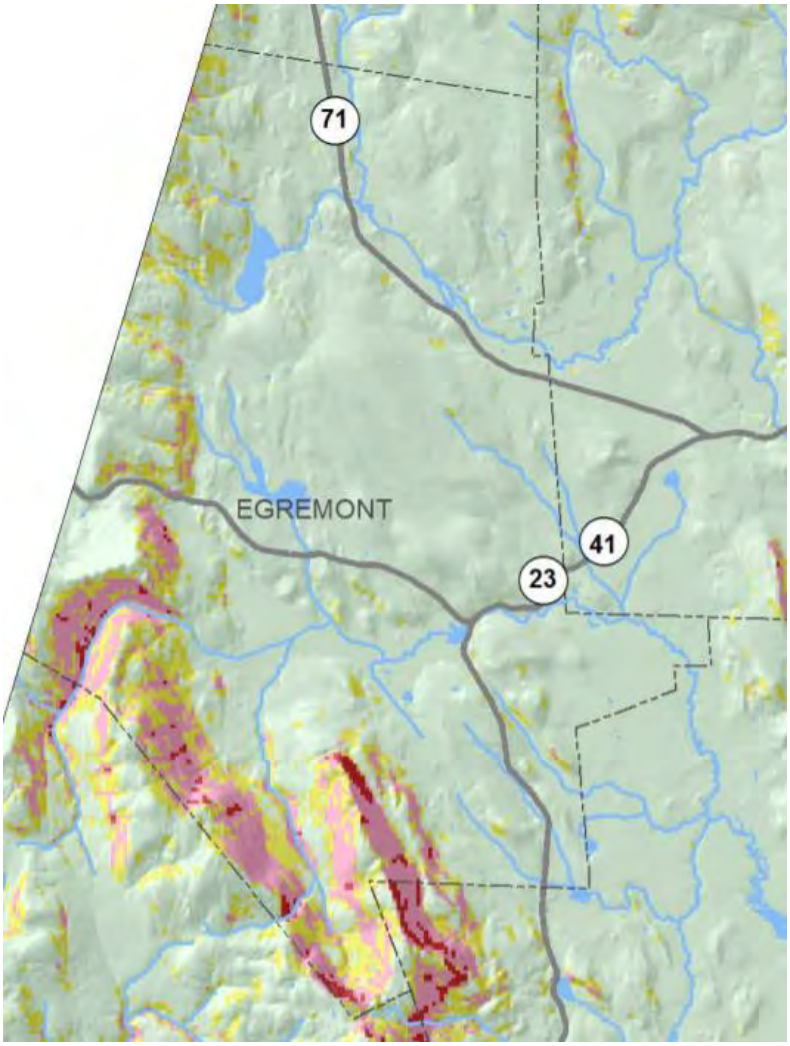
(Cardinali et al., 2002)

4.6.2.3 Probability

Landslides are classified as low frequency events in Egremont. According to the 2013 State Hazard Mitigation Plan, these events occur from once in 50 years to once in 100 years, or one percent to two percent per year.

4.6.2.4 Location

Central, easter, and northern Egremont is classified as stable and therefore having a low risk for landslides. Western Egremont has stable and moderately stable conditions, while southwestern Egremont vary from moderately stable to (Figure 4-7).



Map Color Code	Predicted Stability Zone	Relative Slide Ranking[1]	Stability Index Range[2]	Factor of Safety (FS)[3]	Probability of Instability[4]	Predicted Stability With Parameter Ranges Used in Analysis	Possible Influence of Stabilizing or Destabilizing Factors[5]
	Unstable	High	0	Maximum FS<1	100%	Range cannot model stability	Stabilizing factors required for stability
	Upper Threshold of Instability		0 - 0.5	>50% of FS1	>50%	Optimistic half of range required for stability	Stabilizing factors may be responsible for stability
	Lower Threshold of Instability	Moderate	0.5 - 1	≥50% of FS>1	<50%	Pessimistic half of range required for instability	Destabilizing factors are not required for instability
	Nominally Stable	Low	1 - 1.25	Minimum FS=1	_	Cannot model instability with most conservative parameters specified	Minor destabilizing factors could lead to instability
	Moderately Stable		1.25 - 1.5	Minimum FS=1.25	_	Cannot model instability with most conservative parameters specified	Moderate destabilizing factors are required for instability
	Stable	Very Low	>1.5	Minimum FS=1.5	_	Cannot model instability with most conservative parameters specified	Significant destabilizing factors are required for instability

Figure 4-7. Slope Stability Map of Massachusetts focusing on Egremont

(The Massachusetts Geological Survey, 2013)

4.6.2.5 Historic Occurrences

No significant landslides have been recorded for Egremont or Berkshire County (Appendix B of EEA and EOPSS, 2018).

4.6.2.6 Climate Change

Landslides are most directly linked to the accumulation of soils over thousands of years. However, as rainfall increases in both magnitude and intensity, unstable slopes with saturated soils are at a greater risk of landslides. Prolonged droughts, thunderstorms, and strong winds due to climate change create an environment for brushfires. Losing vegetation due to fire reduces the stability of a slope, and when followed by heavy rain the soils have a more difficult time staying in place if located on a slope. This type of environment feeds landslides and erosion, even in areas that have not previously experienced these hazards.

4.6.2.7 Vulnerability and Risk

Landslides occur throughout the United States, causing an estimated $1 billion in damages and 25-50 deaths each year. Any area composed of very weak or fractured materials resting on a steep slope will likely experience landslides.

Landslides can damage buildings and infrastructure and cause sedimentation of waterbodies. Although the physical cause of many landslides cannot be eliminated, geologic investigations, good engineering practices, and effective enforcement of land-use management regulations can reduce landslide hazards (USGS, 2019b).

4.7 Fire Related Hazards

4.7.1 Description

Egremont is more likely to experience a brushfire compared to a wildfire (or a fire with a large impact area). Brushfires can occur in the vegetative wildland, including grass, shrub, leaf litter, and forested tree fuels. Fires can be caused by natural events such as lightning strike, human activity or in an intentional controlled manner, as in the case of prescribed fire (MEMA and DCR, 2013, 252). Two types of fires may occur in Egremont: interface and intermix. And interface fire occurs where housing is on the vicinity of a large area of dense vegetation, while an intermix fire occurs in areas where housing and vegetation are interspersed.

4.7.2 Severity

Fire severity is influenced by fuel (the type of material), terrain, and weather. Strong winds can exacerbate extreme fire conditions, especially wind events that persist for long periods, or those with significant sustained wind speeds that quickly promote fire spread through the movement of embers or exposure within tree crowns. Fires can spread quickly into developed areas.

4.7.3 Probability

Brush fires are classified as medium frequency events in Egremont. As defined by the 2013 State Hazard Mitigation Plan, brushfires occur between once in five years to once in 50 years (a 2% to 20% chance of occurring per year) across the state.

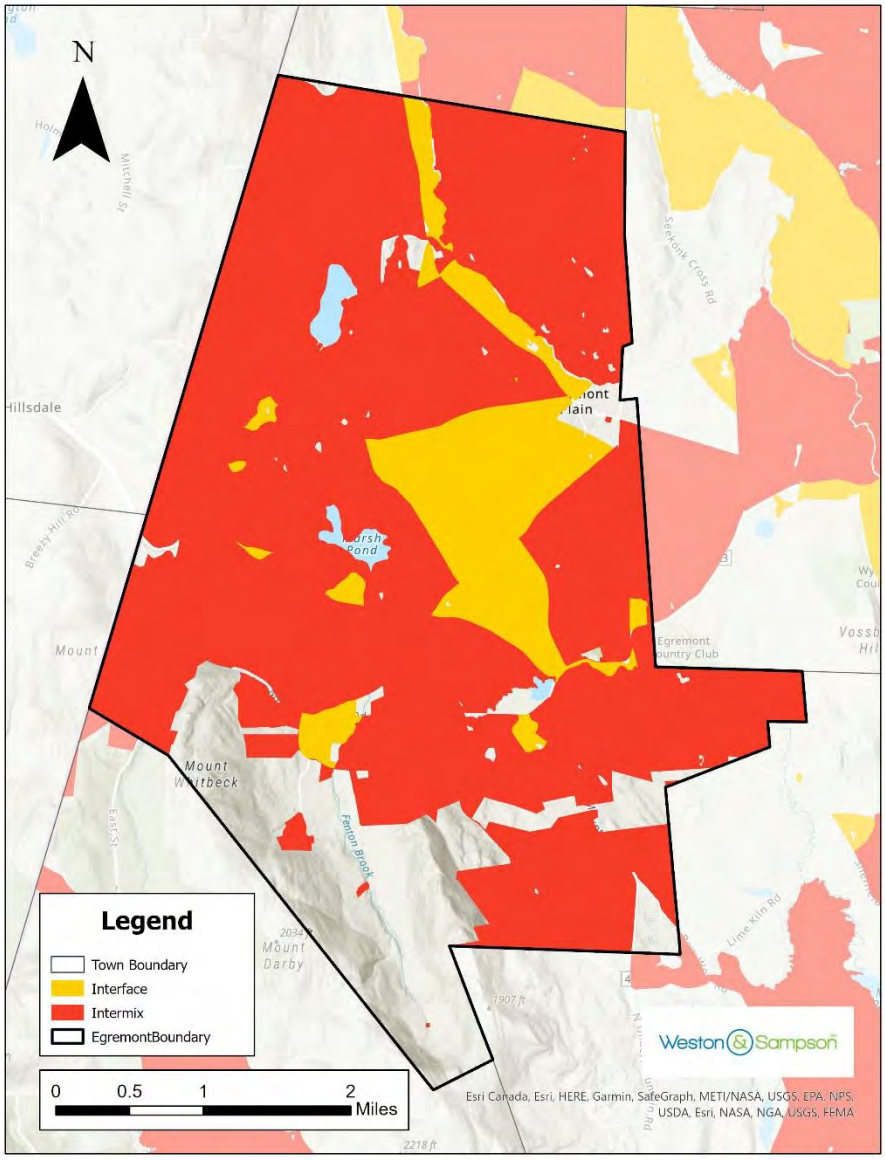
4.7.4 Location

The State Hazard Mitigation and Climate Adaptation Plan (EEA and EOPPS, 2018) states:

> Portions of the Commonwealth susceptible to wildfire, particularly at the urban-wildland interface…, are defined as those in the vicinity of contiguous vegetation, with more than one house per 40 acres and less than 50 percent vegetation, and within 1.5 miles of an area of more than 500 hectares (approximately 202 acres) that is more than 75 percent vegetated."

The areas of Egremont most vulnerable to brush fire are primarily heavily wooded areas and forests directly adjacent to developed areas. Much of the forested land in Egremont is owned by DCR. The majority of Egremont is forested or farmland, and the Town works to manage the forest and build in fire breaks to reduce the spread of brushfires. The Town also maintains access roads. Much of the land in southern Egremont is owned by the state, therefore it is difficult for Egremont to regulate clearing and fire management in these areas. As seen in Figure 4-8, nearly the entire town of Egremont is vulnerable to brushfires, with the exception of a few small areas and the southern corner of town.

Figure 4-8. Wildfire related hazard areas in Egremont



Source: (EEA and EOPSS, 2018), map created by Weston & Sampson

4.7.5 Historic Occurrences

The Egremont Fire Department requires that residents apply for a burn permit when burning brush during the designated burn season. Although the Town of Egremont is heavily forested, the Town has not experienced many brushfires during its lifetime. No brushfires have occurred during the timeframe of the Town's prior HMP.

4.7.6 Climate Change

Brush fires are often caused by lightning strike. A 2014 study found that the frequency of lightning strikes could increase by more than 10% for every degree Celsius of warming (EEA and EOPSS, 2018). This projected increase in lighting strikes will likely result in more naturally ignited brush and wildfires.

4.7.7 Vulnerability and Risk

Brushfires can lead to injury, death, and property damage. All homes or workplaces located in brush fire hazard zones are at risk. The most vulnerable members of this population are those who would be unable to evacuate quickly, including those over the age of 65, households with young children under the age of five, people with mobility limitations, and people with low socioeconomic status (EEA and EOPSS, 2018). Secondary effects from brush fire include contamination of reservoirs, and destroyed power, gas, water, broadband, and oil transmission lines. Brush fires can also contribute to flooding as they strip slopes of vegetation, thereby exposing them to greater amounts of runoff which may cause soil erosion and ultimately increase the likelihood of flooding. Additionally, subsequent rain events can worsen erosion on bare slopes.

4.8 Extreme Temperatures

Massachusetts has four clearly defined seasons. Extreme temperatures are considered outliers, or temperatures that fall outside the typical range for each season. In this section, we are focused on days with extremely cold and hot temperatures. Extreme temperatures can last from an afternoon to a few days. Day and nighttime temperature fluctuations also factor into the overall effects of temperature. For example, when the temperature does not cool off at night during an extreme heat wave, the risk of heat related illnesses is intensified.

NOAA gathers weather data from Copake, New York, directly adjacent to Egremont. The following table shows temperature averages over the latest three-decade at the Copake, NY weather station (NOAA, 2021).

Table 4-17. Seasonal Temperatures Normals in Egremont, MA from 1991-2020

SEASON	MIN TEMP (°F)	AVG TEMP (°F)	MAX TEMP (°F)
Annual	37.3	48.2	59.0
Winter	17.0	26.7	36.4
Summer	57.8	69.2	80.5
Spring	34.1	46.1	58.1
Autumn	40.3	50.7	61.0

(NOAA, 2021)

4.8.1 Extreme Cold

4.8.1.1 Description

Extreme cold is generally defined as an extended period of excessively cold weather. Expose to extreme cold for extended periods of time or without the proper equipment can result in frostbite or hypothermia, and has the potential to be life threatening.

4.8.1.2 Severity

Extremely cold temperatures are measured using the Wind Chill Temperature Index provided by the National Weather Service (NWS). The updated index was implemented in 2001 and helps explain the impact of cold temperatures on unexposed skin. Figure 4-9 below provides more information.

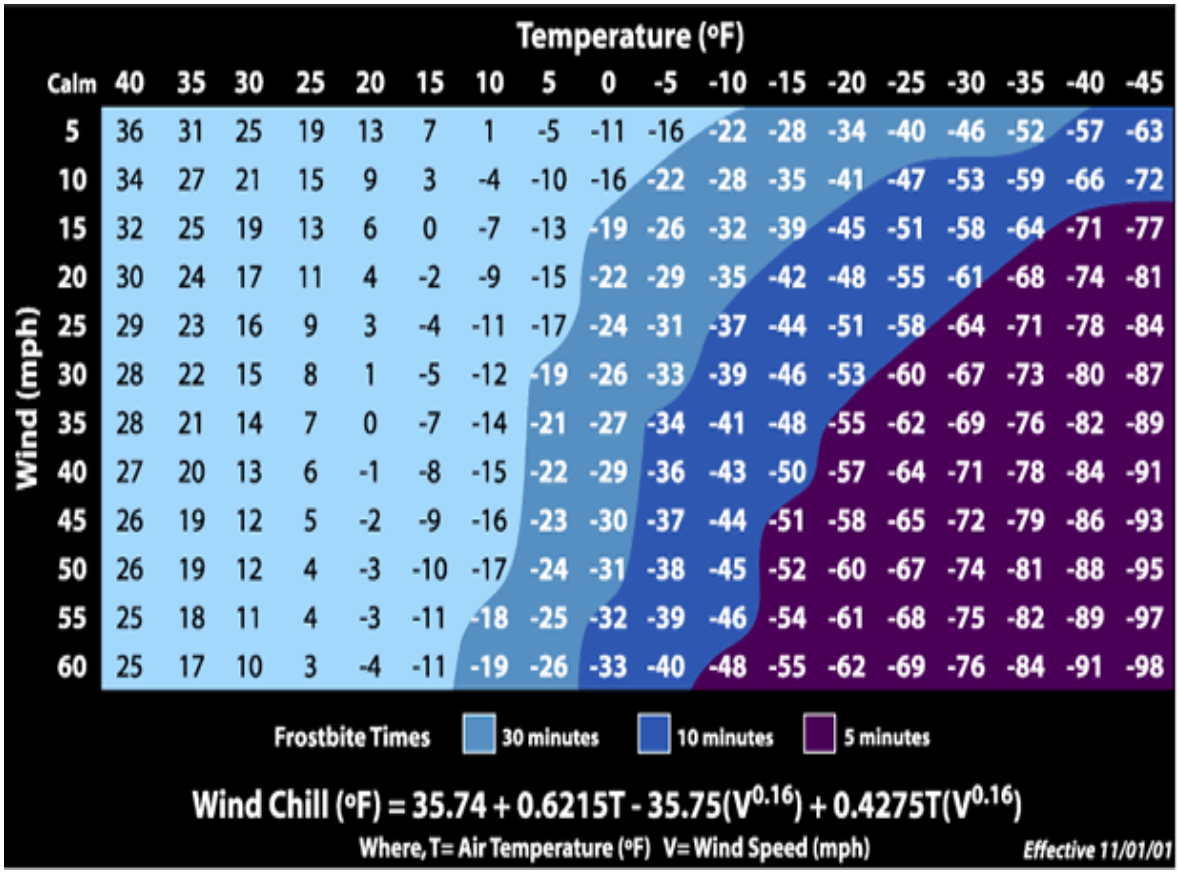


Figure 4-9. Windchill Temperature Index and Frostbite Risk

(NOAA, 2001)

4.8.1.3 Probability

An average of 1.5 extreme cold weather events per year have occurred over the last two decades in Massachusetts. This number could increase due climate change affecting extreme temperatures.

4.8.1.4 Location

Extreme cold temperatures impact large geographic areas and are considered a Town-wide hazard in Egremont. The higher elevation of Egremont compared to the rest of the state means that Egremont experiences colder temperatures, thus an increased risk to extreme cold.

4.8.1.5 Historic Occurrences

NOAA's National Centers for Environmental Information Storm Events Database records data for extreme cold events. Between 2000 and September 2021, Berkshire County experienced 71 extreme cold and wind chill events, which caused no injuries or deaths, and no property damage.

4.8.1.6 Climate Change

It is anticipated that winters will become warmer, but the risks of extreme cold temperatures will continue to pose a risk in Egremont and the surrounding areas.

4.8.1.7 Vulnerability and Risk

During extreme cold, pipes may freeze and burst in many buildings with unreinforced masonry and improperly insulated buildings. Extremely cold temperatures can create dangerous conditions for homeless populations, stranded travelers, and residents without sufficient insulation or heat. Homeless and elderly folks and people with disabilities are often most vulnerable. In Egremont, 28% of the population is over 65 years old and 13% of the population has a disability (US Census Bureau, 2019; US Census Bureau, 2020). Cold weather events can also have significant health impacts such as frostbite and hypothermia. Furthermore, power outages during cold weather may result in inappropriate use of combustion heaters, cooking appliances, and generators in poorly ventilated areas, which can lead to increased risk of carbon monoxide poisoning. Power outages can also disrupt access to well water or communications systems.

4.8.2 Extreme Heat

4.8.2.1 Description

Extreme heat is defined as the maximum temperature reaching above 90°F during the day. July is the hottest month in Egremont, with the temperature averaging 71.4°F from 1991 to 2020 (NOAA, 2021).

4.8.2.2 Severity

The NWS issues a Heat Advisory when the Heat Index (Figure 4-10) is forecast to reach 100-104˚ F for two or more hours (NOAA, n.d.-e). The NWS issues an Excessive Heat Warning if the Heat Index is forecast to reach 105˚F or higher for two or more hours. Heat waves cause more fatalities in the U.S. than the total of all other meteorological events combined. From 1979-2018, excessive heat exposure caused in excess of 11,000 deaths in the United States (NOAA, n.d.-e). During this period, more people in this country died from extreme heat than from hurricanes, lightning, tornadoes, floods, and earthquakes combined.

Temperature (°F)																	
Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136	
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137		
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137			
55	81	84	86	89	93	97	101	106	112	117	124	130	137				
60	82	84	88	91	95	100	105	110	116	123	129	137					
65	82	85	89	93	98	103	108	114	121	128	136						
70	83	86	90	95	100	105	112	119	126	134							
75	84	88	92	97	103	109	116	124	132								
80	84	89	94	100	106	113	121	129									
85	85	90	96	102	110	117	126	135									
90	86	91	98	105	113	122	131										
95	86	93	100	108	117	127											
100	87	95	103	112	121	132											

Category	Heat Index	Health Hazards
Extreme Danger	130 °F – Higher	Heat Stroke or Sunstroke is likely with continued exposure.
Danger	105 °F – 129 °F	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity.
Extreme Caution	90 °F – 105 °F	Sunstroke, muscle cramps, and/or heat exhaustions possible with prolonged exposure and/or physical activity.

Figure 4-10. Heat Index Chart

(NOAA, n.d.-f)

4.8.2.3 Probability

As defined by the 2013 State Hazard Mitigation Plan, these events occur from once in five years to once in 50 years, or a 2% to 20% chance of occurring per year. According to the 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan, between four and five heat waves (two or more consecutive days of 90˚F temperatures or higher) occur annually in Massachusetts.

4.8.2.4 Location

Extreme heat impacts a large geographic area and is a Town-wide hazard in Egremont.

4.8.2.5 Historic Occurrences

NOAA's National Centers for Environmental Information Storm Events Database provides data on excessive heat. Between 2000 and 2021, Berkshire County experienced 26 heat or excessive heat days.

4.8.2.6 Climate Change

Both the average temperature and number of extreme heat days are predicted to increase in future climate conditions. Under these conditions, by the end of the century, Massachusetts's climate could more closely resemble that of Maryland or the Carolinas (refer to Figure 4-11 below).

These changes in temperature would also have a detrimental impact on air quality and public health concerns, including asthma and other respiratory conditions (Frumhoff et al., 2007). Increased temperatures can lead to a longer growing season, which in turn leads to a longer pollen season. Warmer weather can also support the migration of invasive species and lead to an increase in vector-borne diseases. Increasing temperatures can also exacerbate air pollution, which can lead to negative health impacts such as respiratory problems.

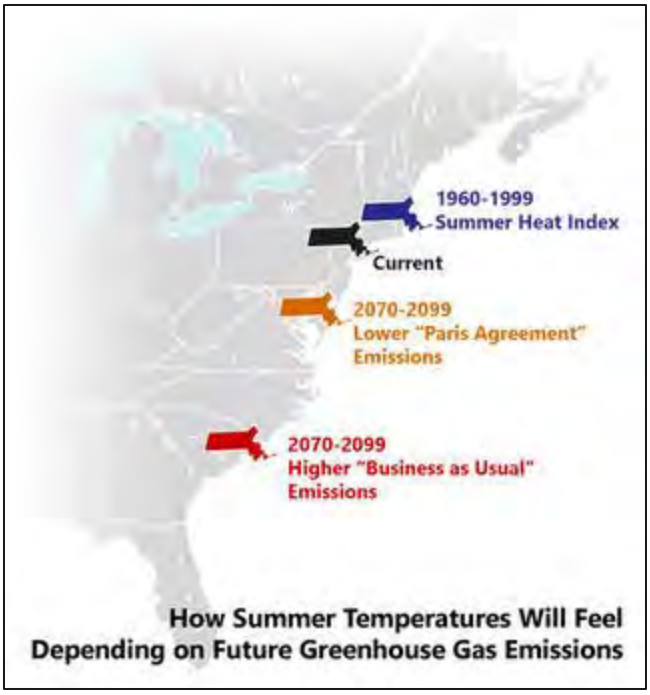


Figure 4-11. Massachusetts Extreme Heat Scenarios.

(Frumhoff et al., 2007)

4.8.2.7 Vulnerability and Risks

Because most heat-related deaths occur during the summer, people should be aware of those at greatest risk and what actions can be taken to prevent a heat-related illness or death. According to the Centers for Disease Control and Prevention, the populations most vulnerable to extreme heat impacts include the following:

- People over the age of 65.
- Children under the age of five.
- Individuals with pre-existing medical conditions that impair heat tolerance.
- Individuals without proper cooling.
- Individuals with respiratory conditions.
- Individuals that overexert themselves during extreme heat events.

The Massachusetts Department of Public Health Bureau of Environmental Health provides a community profile related to public health metrics (MA DPH, 2019). Egremont's largest concern during heat waves is likely to be the high population of older adults (over 65), and those with pre-existing health conditions. Impacts from heat stress can also exacerbate pre-existing respiratory and cardiovascular conditions.

In Egremont, children under five years old make up 2.1% of the population, and 28% are over 65 years old; however, even young, and healthy individuals can succumb to heat if they participate in strenuous physical activities during hot weather. Some behaviors also put people at greater risk, including drinking alcohol, taking part in strenuous outdoor physical activities in hot weather, and taking medications that impair the body's ability to regulate its temperature or that inhibit perspiration (MEMA and DCR, 2013). Homeless individuals are increasingly vulnerable to extreme heat. The capacity of homeless shelters is typically limited.

4.9 Drought

4.9.1 Description

Drought is an extended period of deficient precipitation and occurs in virtually all climatic zones. In Egremont, the annual average rainfall from 1991-2020 was 43.45 inches, equating to between approximately 8.85 and 11.95 inches each season, or between 2.34 and 4.56 inches every month, as shown in table 4-18 (NOAA, 2020).

Table 4-18. Average Rainfall Per Season 1991-2020

SEASON	PRECIP (IN)
Annual	43.45
Winter	8.85
Summer	11.07
Spring	11.95
Autumn	11.58

Two types of droughts are likely to occur in Egremont: flash droughts and prolonged droughts. A flash drought is a rapidly occurring or intensifying drought. They can happen because of low rates of precipitation, often accompanied by high temperatures, winds, and radiation. These conditions together can intensify the climate in an area (NOAA, 2020c). A prolonged drought has a slower evolution and is caused by a long period of dry weather caused by a lack of precipitation. These two types of drought are not differentiated within this section because location is not variable, and historic occurrences are not differentiated. The primary difference between the two drought types is the severity, which is determined on a month-by-month basis.

4.9.2 Severity

According to the Massachusetts Drought Management Plan (EEA and MEMA, 2019), the Drought Management Task Force provides recommendations to the Secretary of Energy & Environmental Affairs about the location and severity of drought in the Commonwealth. The Drought Management Task Force uses seven indices to determine the severity of a drought, such as groundwater levels, stream flow levels, and crop moisture.

Drought severity is categorized into five levels and data is collected and distributed monthly. The end of a drought is determined by precipitation and groundwater levels, since these have the greatest long-term impact on streamflow, water supply, reservoir levels, soil moisture and potential for forest fires (EEA and MEMA, 2019). Table 4-19 on the next page provides more information on drought levels and varying degrees of action.

Table 4-19. Drought Levels

Level	Severity	Action
0	Normal	No action required
1	Mild Drought	Increased assessment, proactive education, communication, and planning
2	Significant Drought	Water restrictions might be appropriate depending on the capacity of each individual water supply system
3	Critical Drought	Many water suppliers may be relying on mandatory conservation measures and preparation for emergency conditions begins
4	Emergency Drought	The Governor may exercise authority to require mandatory water restrictions

4.9.3 Probability

The probability of a drought occurring varies depending on the severity. A mild drought has between a 20-30% frequency, while and emergency drought has a less than 2% frequency. The overall frequency of being in a Drought Watch is eight percent on a monthly basis over the 162-year period of record (EEA and MEMA, 2019).

4.9.4 Location

Drought levels can be declared on a regional, county, or watershed-specific basis. The Massachusetts Drought Management Plan (2019) divides the state into seven regions: Western, Central, Connecticut River Valley, Northeast, Southeast, Cape, and Islands. Egremont is located within the Western Region (EEA and MEMA, 2019).

4.9.5 Historic Occurrences

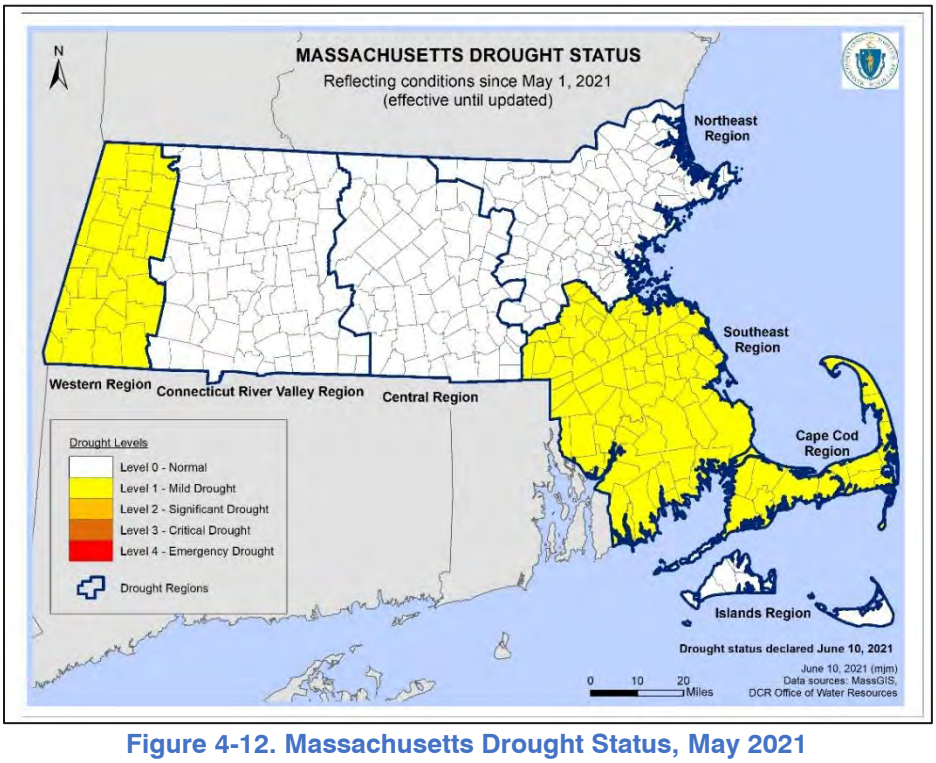


Figure 4-12. Massachusetts Drought Status, May 2021

(DCR, 2021)

Since 2000, the longest duration of drought in Massachusetts lasted from June 2016 until May 2017, for a total of 48 weeks. Figure 4-12 illustrates the most recent drought period in Berkshire County, in May of 2021 when Berkshire County experienced a mild drought. The historical data available for the severity and geographic extent of droughts is not comprehensive, although some data is provided in the Drought Management Plan for the following historical drought occurrences across the state:

- 1879-1883
- 1908-1912
- 1929-1932
- 1939-1944
- 1957-1959
- 1961-1969
- 1980-1983
- 1995
- 1998-1999

The nine-year drought from 1961-1969 is widely considered the most severe drought of record in Massachusetts. The length and severity of this drought forced public water suppliers to implement water-use restriction, and numerous communities utilized emergency water supplies (EEA and MEMA, 2019). More accurate records have been kept since the development of the first Massachusetts Drought Management Plan in 2000 that was developed in response to a period of deficient precipitation that began in 1999.

4.9.6 Climate Change

Under climate change, drought conditions will be exacerbated with projected increasing air temperatures and changes in precipitation. Between 1970 and 2000, the median number of consecutive dry fall days in Massachusetts was 11.4 days. This is in comparison to a projected median of 13.5 consecutive days by the end of the century (EEA, 2018a). The same report also mentions that the occurrence of droughts lasting 1 to 3 months could go up by as much as 75% over existing conditions by the end of the century, under the high emissions scenario in the Northeastern States.

4.9.7 Vulnerability and Risk

Agriculture, water supply, aquatic ecosystems, wildlife, and the economy are vulnerable to the impacts of drought (EEA and EOPSS, 2018). The Town of Egremont's drinking water is supplied primarily by private wells, although 650 people and eight businesses rely on municipal water suppled from Karner Brook by the Egremont Water Department. During a drought, water tables and surface water levels lower and wells do not recharge as quickly, especially for households with shallow wells. A long-term drought could impact Egremont's wetlands, rivers, and streams. Commercial, municipal, and residential water conservation is important during times of drought or low water levels.

Additionally, there is the potential for a severe drought to increase the risk of brush fires. Vegetative fuel for brush fires is more abundant when drought conditions dry out vegetation and make it more susceptible to burning.

5 Existing Mitigation Measures

5.0 EXISTING MITIGATION MEASURES

The Town of Egremont is already undertaking measures to mitigate local hazards. Chapter 5 documents the Town's current operations and discusses potential improvements. FEMA's *Local Mitigation Planning Handbook* categorizes hazard mitigation measures into four types, as displayed in Table 5-1 below (FEMA, 2013). As this chapter will demonstrate, Egremont uses many of these tools.

Table 5-1. FEMA's Types of Mitigation Actions

Measure	Action	Examples
Local Plans and Regulations	These actions include government authorities, policies, or codes that influence the way land and buildings are developed and built.	• Comprehensive plans • Land use ordinances • Subdivision regulations • Development review • Building codes and enforcement • NFIP Community Rating System • Capital improvement programs • Open space preservation • Stormwater management regulations and master plans
Structure and Infrastructure Projects	These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a	• Acquisitions and elevations of structures in flood prone areas • Utility undergrounding

Table 5-1. FEMA's Types of Mitigation Actions

Measure	Action	Examples
	hazard area. This could apply to public or private structures as well as critical facilities and infrastructure. This type of action also involves projects to construct manmade structures to reduce the impact of hazards.	• Structural retrofits • Floodwalls and retaining walls • Detention and retention structures • Culverts
Education and Awareness Programs	These are actions to inform and educate citizens, elected officials, and property owners about hazards and potential mitigation strategies. A greater understanding and awareness of hazards and risk among local officials, stakeholders, and the public is more likely to lead to direct actions.	• Websites with maps and information • Real estate disclosure for properties in the floodplain • Presentations to school groups or neighborhood organizations • Mailings to residents in hazard-prone areas. • Participation in the National Weather Service's StormReady community preparedness program • Participation in Firewise Communities through the National Fire Protection Association's community preparedness program
Natural Systems Protection	These are actions that minimize damage and losses and preserve or restore the functions of natural systems.	• Sediment and erosion control • Stream corridor restoration • Forest management • Conservation easements • Wetland restoration and preservation

(*FEMA*, *2013*)

There are numerous existing natural hazard mitigation measures already in place in Egremont. These were identified through feedback from the Core Team, CRB Workshop participants, interviews with local experts, and additional research by the project team. The hazard mitigation measures outlined below are organized by hazard type, including multi-hazards, floods, dam mitigation, wind, winter weather, drought, fire, extreme temperatures, and geologic hazards. The Town is also involved in sustainability measures that offer public co-benefits that include improved resilience and energy efficiency for municipal buildings.

Existing Multi-Hazard Mitigation Measures

Southern Berkshire Regional Emergency Planning Committee – Under the Emergency Planning and Community Right to Know Act of 1986, communities are required to establish Emergency Planning Committees to develop a response plan for chemical emergencies. Egremont is a part of a regional emergency response committee, which includes Alford, Egremont, Great Barrington, Monterey, Mount Washington, New Marlborough,

Recommended Improvements

Continue to update materials and communicate with regional partners about Hazardous Materials Response Plans.

Otis, Sandisfield, Sheffield, Stockbridge, Tyringham, and West Stockbridge. In accordance with this legislation, the Town of Egremont has identified locations where hazardous materials are stored, used, and transported. Egremont's Emergency Management includes the Fire Department, Police Department, and Highway Department.	
Comprehensive Emergency Management Plan (CEMP) Egremont has a CEMP that was last updated in 2021. The plan could be moved online. Every community in Massachusetts is required to have a Comprehensive Emergency Management Plan. This plan addresses mitigation, preparedness, response and recovery from a variety of natural and man-made emergencies. Included in this plan is important information regarding flooding, hurricanes, tornadoes, dam failures, earthquakes, and winter storms.	Make CEMP available to staff and neighboring communities.
Structural Mitigation – Structural measures to protect residents and property from the impacts of natural hazards are limited within Berkshire County. However, as the Town's water system includes pipes up to 125 years old, leak detection and upgrades to the system are ongoing, and recent evaluations have indicated that bridges are not in imminent structural danger.	Continue leak detection and water system upgrades. Develop capital improvement plan for water system.
List of Critical Facilities – The list of critical facilities was updated during this planning process.	None at this time.
Regional Support from Surrounding Communities – Egremont has provided and received additional support from surrounding communities, including Great Barrington, Sheffield, Alford, and could access mutual aid from Hillsdale or Copake, NY. Egremont is also part of the Berkshire County Mutual Aid Agreement and with surrounding towns in Berkshire County.	Formalize or document support systems to retain institutional knowledge and increase transparency in case of an emergency when additional support from other departments and municipalities may be needed.
FEMA Deployment – FEMA can deploy vehicles in the case of an emergency.	None at this time.
Emergency Transportation – There are two evacuation routes designated for the Town. The Council on Aging provides transportation to seniors, staffed by a volunteer driver program.	Obtain new van for senior transportation.
Pittsfield Salvation Army Emergency Assistance and Disaster Services – Assistance is offered by Salvation Army Emergency Assistance for families and individuals experiencing financial hardships, including food, clothing, and utility/heating assistance.	Formalize or document as part of support system to increase transparency in case of an

Additionally, Service Unit volunteers act as first responders and assist those impacted by fires, flood and other disasters using mobile kitchen truck, as part of the Salvation Army Disaster Services.	emergency when additional support may be needed.
Certified Emergency Response Team (CERT) – The Town does not have a team of trained volunteers organized by the Fire Department who can be called upon to assist and respond during emergencies. Currently, there are staffing issues and limited resident availability.	Develop strategies to increase the number of volunteers and offer more medical training.
Elder Services of Berkshire County Meals on Wheels – A non-profit organization providing food services to homebound individuals.	None at this time.
Berkshire Medical Reserve Corp – A non-profit organization providing medical care, counseling, and emergency response in Berkshire County.	Work with partner to expand the number of volunteers and offer more medical training.
Emergency Management Training – Fire Department staff have received hazard and emergency management training.	Expand training for more municipal staff.
Emergency Notification System – The Town of Egremont has a mass alert emergency notification system, which provides Town officials the ability to deliver messages to targeted areas or the entire Town or targeted groups quickly through a phone call, text, or email. Residents are reminded annually that they may update their contact information through the Town website. Downed phone lines sometimes disrupt these emergency communications. National Grid also has an opt-in text service to be notified of power outages and updates.	Expand outreach to increase the number of residents receiving alerts and aware of emergency services available.
Wellness Checks – The Town of Egremont Police Department maintains a list of vulnerable households and residents for whom they do wellness checks every day during emergency events. If assistance is needed, the Fire Department responds.	Maintain updated list of vulnerable households.
Emergency Shelters – The Fire Stations and Egremont Town Hall are transfer stations/reception stations that can provide unofficial, temporary warming and cooling. Egremont has an agreement with Bard College at Simon's Rock and with Southern Berkshire School District to use their regional shelters.	Acquire a generator for the Town Hall. Provide emergency preparedness outreach to residents that includes information about shelter locations.
Backup Generators – There are six portable generators at the Fire Station, and a permanent generator is being installed for the Town Hall. Furthermore, there is an existing generator for the Town's	Expand support for private solar backup storage or other low-carbon options to reduce use of

water system that is tested weekly. Most houses in the Town have some source of backup power or power generation, either a generator or solar with battery storage.	generators, which are a carbon source.
Buried Utilities – The Highway Department and the Town's utility providers, National Grid and Verizon, would lead any changes related to burying utility lines.	None at this time.
Permits for Construction – Permits are required from the Building Inspector to ensure the building code is followed, and an online permit system allows for notification of departments with relevant jurisdiction. The Board of Health reviews septic systems. Public Works reviews permits for driveways and road openings. The Fire Department inspects certain aspects of all new construction for fire prevention safety and adherence to the fire code. Conservation Commission reviews permits in their jurisdiction to ensure wetland regulations are met.	Increase cross-department coordination on septic system permits by incorporating into existing online permit review system.
Multi-Department Review of Developments – Depending upon the type of development, extent of construction, and location, multiple departments, including the Planning Board, Building Inspector, Board of Health, Conservation Commission, the Fire Department, and Zoning Board of Appeals (ZBOA) may review site plans prior to approval. Enforcement and fines are authorized in town bylaws. An online system facilitates the permitting review process. Each department uses this system to sign off on the permit, as it is relevant to them.	None at this time.
Massachusetts State Building Code – The Massachusetts State Building Code contains many detailed regulations regarding wind loads, earthquake resistant design, flood-proofing, and snow loads. Staff training is held regularly on building code updates.	None at this time.
Open Space and Recreation Plan (OSRP) 2000–The Town has a wealth of environmentally-significant natural areas, and some of these have been protected for conservation, recreation, and to protect water supplies, among other climate resilient co-benefits. The OSRP aims to maintain, promote use, and increase the number of these spaces.	Update the OSRP with climate resilience, hazard mitigation, and to reflect new floodplain maps.
Zoning Bylaw – Zoning regulates the land use of new and redeveloped parcels. Zoning allows, regulates, or guides landscaping, the siting of small energy systems, environmental performance, and safety standards for various land use types. Zoning can be used as a tool to promote affordable housing, proper communication facilities, and smart development. Zoning bylaws are enforced by the Planning Board or ZBOA. Approved	Evaluate changes needed to account for climate change and environmental concerns, including possible enhancement of the Wetlands Protection Act. Obtain funding to complete a bylaw review.

plans are then referred to the Building Inspector. Notices of special permits go to all boards, and a comment period is opened.

Rules and Regulations for Special Permits, Subdivision, & Site Plan Review – Procedures and guidelines set forth by the Planning Board corresponding to the Subdivision Control Law and Section 6.2 Special Permits of the Zoning Ordinance. Special permits are required for construction of large residential, commercial, institutional, municipal, and industrial developments or expansions. In recent years, there have been fewer than 10 new houses developed each year, and no new commercial development or construction.

Consider incorporating climate resilience into the site plan and subdivision review process through the completion of a climate resilience design guideline or scoring system and/or updating controls to account for climate change-induced flooding.

Invasive Species Management – The Town and local partners work to identify and address invasive species threats and encourage the use of native plant species.

Develop an invasive species management program.

Existing Town-Wide Mitigation for Flood Related Hazards

Egremont employs a number of practices to help minimize potential flooding, reduce impacts from flooding, and proactively maintain existing drainage infrastructure. Existing Town-wide mitigation measures include the following.

Recommended Improvements

Participation in the NFIP – Egremont participates in the National Flood Insurance Program (NFIP) (FEMA, 2022b). The NFIP is a federal program administered by FEMA enabling property owners in participating communities to purchase insurance as a protection against flood losses in exchange for State and community floodplain management regulations that reduce future flood damages. NFIP offers flood insurance to communities that comply with the minimum standards for floodplain management. Egremont participates in the NFIP with zero policies in force as of October 14, 2021 (FEMA, 2021a). FEMA maintains a database on flood insurance policies and claims. This database can be found on the FEMA website.

Continue participation in the National Flood Insurance Program to enable property owners to purchase insurance protection against flood losses and explore participating in the CRS.

The Town complies with the NFIP by enforcing floodplain regulations, maintaining up-to-date floodplain maps, and providing information to property owners and builders regarding floodplains and building requirements.

NFIP uses a Community Rating System (CRS) to award communities that go beyond the minimum standards with lower flood insurance premiums for property owners. The incentives are awarded upon a credit system for various activities. Points are awarded to communities that prepare, adopt, implement, and update a comprehensive flood hazard mitigation plan using a

standard planning process. As of October 2021, Egremont is not currently participating in the CRS Program (FEMA, 2021b).

FEMA FIRMS – Flood Insurance Rate Maps (FIRMs) denote areas of the 100-year and 500-year floodplain, which is used for the NFIP and other regulatory controls. For example, the Building Inspector and the Egremont Conservation Commission enforce a federal law requiring elevation above the 100-year flood level of new and substantially improved residential structures in the floodplain. These floodplains also include wetlands. Egremont's FEMA FIRMs were last updated in 1982 and include FIRM zones A and A1-30. No update has been initiated at the time of report writing.

Explore possibility of FEMA updating Egremont's FIRMs.

Road Upgrades – The Highway Department is responsible for maintaining paved and gravel roads. Gravel roads are regularly maintained to prevent washouts from flooding, and the Town is paving dirt roads most susceptible to washouts, when possible.

Improve drainage for gravel roads and upgrade gravel roads to paved.

Stormwater System Maintenance– The Highway Department regularly clears debris from its storm drains, catch basins, and culverts across the Town. The Town has replaced and repaired several culverts in the last few years to reduce flooding. Stormwater causes erosion on the Town's dirt roads and flooding that can block and damage roadways, which are maintained by the Highway Department. Most culverts are undersized for 50-year flood events under current climate conditions. The Town has not conducted a watershed-wide study of the stormwater system to identify flooding risks and prioritize strategies to improve the system.

The Housatonic Valley Association (HVA) is finalizing a Road Stream Crossing Management Plan for the Town of Egremont to be completed by Spring 2022. The plan will prioritize needed repairs or replacements for stream crossings at bridges and culverts to address flooding and aquatic connectivity. Priority sites from the HVA road stream crossing plan preliminarily include culverts at Blunt Road, Mt. Washington Rd and Karner Brook, Mill Road, Millard Road, and Shun Toll Road.

Finalize stream crossing assessment to inventory and prioritize culvert repair and replacement for aquatic connectivity. Identify needed repair and replacement for stormwater system elements using climate projections and green infrastructure where possible.

Public Education – The Conservation Commission educates the public through a newsletter notice reminding people of regulations that would apply to any construction near a wetland.

Improve stormwater education and expand community outreach about environmental issues.

Maintenance of Public Waterbodies – The Highway Department and community groups help clear debris from culverts and beaver dams, which helps to keep the waterways clean. The Department of Public Works complies with the Army Corps of Engineers Soil

Mitigate erosion in known problem area on Prospect Lake Road and by addressing gravel roads.

Erosion and Sediment Control Guidelines in flood protection areas. Known erosion areas on gravel roads and in areas of Prospect Lake Road specifically are causing water quality degradation. The watershed upstream of Karner Brook, the Town's public water supply, is primarily protected land within the Town of Mt. Washington.	
Massachusetts Stormwater Management Standards and Handbook – Massachusetts administers stormwater standards through provisions of the Wetlands Protection regulations, 310 CMR 10.00 for wetland notices of intent and surface water discharge permits. The local Conservation Commission and Planning Board regulate this at the local level. The Massachusetts Stormwater Handbook provides guidance on how to meet the regulations and manage stormwater pollution.	The Massachusetts Stormwater Handbook is currently being updated by MassDEP. Consider implementing a local stormwater bylaw.
Scenic Mountain Regulations – The Town does not have a Scenic Mountain regulation. Under the Berkshire Scenic Mountain Act (M.G.L. Ch. 131, Sec. 39A), the Town could develop regulations for any land and vegetation clearing or alteration of properties at certain elevations, to protect watershed and scenic qualities enhancing federal/state laws. Only a few locations could be covered by these regulations, which are already protected properties.	None at this time.
Massachusetts Wetlands Protection Act and Local Wetlands Protection – The Commonwealth's Wetlands Protection Act (Chapter 131, Section 40 MGL) regulates the protection of resource areas in and around wetlands, including land subject to flooding. This regulates development and activity within a 100-foot buffer around wetlands, and a 200-foot buffer around riverfront areas. The Wetlands Protection Act is locally enforced by the Conservation Commission.	The conservation commission and bylaw review committee should consider bylaw additions to enhance local wetland protection.
Floodplain Zoning District – The floodplain zoning district includes all development within FIRM zones A and A1-30, including structural and non-structural activities, be in compliance with state building code requirements for construction.	None at this time.
Beaver Management – The Town currently uses trappers as a temporary solution to beaver control. Permanent beaver devices have been evaluated with limited success in finding areas conducive to these devices. The Blunt Road culvert location is especially prone to beaver damming.	Upgrade Blunt Road culvert with new wider crossing.

Existing Dam Mitigation Measures	Recommended Improvements
Dam Rehabilitation and Removal – The Town is working with DCR to address needed repair of Prospect Lake Dam.	Work with the Prospect Lake Dam owner to improve condition.
DCR Dam Safety Regulations and Inspections (2017) – All jurisdictional dams are subject to the Division of Conservation and Recreation's dam safety regulations (302 CMR 10.00). The dams must be inspected regularly, and reports filed with the DCR Office of Dam Safety.	None at this time.
Permits Required for Construction – State law requires a permit for the construction of any dam.	None at this time.
Emergency Action Plans (2017) – DCR requires that all dams classified or reclassified as high hazard potential and significant hazard potential have an Emergency Action Plan.	Obtain Emergency Action Plan from Prospect Lake and Mill Pond Dam owners.

Existing Town-Wide Mitigation for Wind-Related Hazards	Recommended Improvements
Massachusetts State Building Code (Ninth Edition, 2018) – The Town enforces the Massachusetts State Building Code whose provisions are generally adequate to protect against most wind damage. The code's provisions are the most cost-effective mitigation measure against tornados given the extremely low probability of occurrence. If a tornado were to occur, damages would depend on the track of the tornado and would most likely be high due to the prevalence of older construction and the density of development.	None at this time.
Tree Maintenance – The Highway Department, Tree Warden, and National Grid maintain trees to reduce the risk of power outages and damage to powerlines during high wind events. National Grid has increased maintenance, and information is shared between the Town and National Grid regularly and during wind hazard events. The Tree Warden's area of responsibility includes public trees and shrubs, as established by the General Laws of the Commonwealth (Title XIV, Ch. 87, Sec. 2).	Continue relationship between town and National Grid to manage hazardous trees. Develop tree removal plan to prioritize species-level strategies.

Existing Town-Wide Mitigation for Winter-Related Hazards	Recommended Improvements
Snow Plowing and De-icing Operations – The Highway Department provides standard snow plowing operations on Town roads, including salting paved roads and sanding roads. Gravel roads in	Need continued outreach to recruit enough staff or contractors for plowing in big storms. Conduct outreach to

the Town are subject to ice build-up and require additional attention during cold weather.	residents about safe driving practices.
Winter Parking Ban – The Town restricts parking during the winter (Nov. 15 to Apr. 15) to avoid roadway hazards during snow emergencies. Police issue tickets for removal, with towing services deployed if necessary.	None at this time.
Fuel Assistance – Available to renters and homeowners meeting income guidelines through the New England Farm Workers' Council. Greenagers offers a wood bank to households in need.	Expand programs to assist low-income households by providing fuel assistance.

Existing Town-Wide Mitigation for Drought-Related Hazards	Recommended Improvements
Land Acquisitions for Water Supply Protection – The Town and the local land trust have an ongoing program of land acquisition and conservation partnerships that help protect open space and groundwater supplies. Egremont Land Trust owns 11 properties within the Town. Recent acquisitions include Bow Wow Woods (an open space property), conservation restrictions on several properties, and four properties developing Forest Stewardship management plans that advance water supply protection goals.	Continue to purchase land and preserve natural resources through conservation restrictions and partnerships. Implement Forest Stewardship plans.
Water Conservation – The Town has conducted outreach on their website to encourage residents to use water efficiently. An update made in 2021 to a tiered rate structure for water customers also encourages conservation. The groundwater supply in the area has not been studied regarding future conditions. The Green Committee organized a community rain barrel purchase program. Eighty-five Egremont residents have purchased rain barrels for water collection to alleviate well use.	Conduct study of groundwater supply resiliency to future drought.
Public Water System – The Town provides water to a portion of the homes, but the majority of residents obtain drinking water from private wells, which may be vulnerable to drought.	Expand public water system lines to reduce number of homes on groundwater wells.

Existing Town-Wide Mitigation for Fire-Related Hazards	Recommended Improvements
Open Burning Permits Required – The Town allows controlled open burning of agricultural products (not construction or building materials) in accordance with state regulations from January 15 to May 1st. The Town requires a permit, available online through the Berkshire County Burn Permit website.	None at this time.

Review of Construction – The Fire Department and Building Inspector review buildings for proper fire protection systems, alarms, and sprinklers.	None at this time.
Fire Department Services – There are two Fire Stations serving Egremont and Mt. Washington. There is a call-volunteer fire department, and a paid-per-call EMT service. Additionally, the Town has two (2) pumper trucks, dry hydrants, and water pumps that are available for firefighting.	Additional staffing support needed. Helicopter for airlifts.
Statewide Fire Mobilization Plan (Massachusetts Fire and EMS Mobilization Plan, 2018)– The state has a fire mobilization plan for brushfires, and a plan for the Berkshire County Fire District (based in Pittsfield). Egremont is prepared to respond to brushfires smaller than five acres in the event that state resources are unavailable.	None at this time.
Fire Safety Education – Egremont provides public education of fire safety through printed materials (with a packet of information for homeowners) and an online website with further information.	Expand public educational programs on fire safety with support from grant opportunities or regional partners.

Existing Town-Wide Mitigation for Extreme Temperature-Related Hazards	Recommended Improvements
Heating and Cooling Facilities – The Fire Stations and Town Hall can be used as temporary heating or cooling facilities.	Explore other ways to provide refuge to the heat, such as shade features at public properties.

Existing Town-Wide Mitigation for Geologic Hazards	Recommended Improvements
Massachusetts State Building Code – The State Building Code contains a section on designing for earthquake loads (780 CMR 1612.0). Section 1612.1 states that the purpose of these provisions is "to minimize the hazard to life to occupants of all buildings and non-building structures, to increase the expected performance of higher occupancy structures as compared to ordinary structures, and to improve the capability of essential facilities to function during and after an earthquake". This section goes on to state that due to the complexity of seismic design, the criteria presented are the minimum considered to be "prudent and economically justified" for the protection of life safety. The code also states that absolute safety and prevention of damage, even in an earthquake event with a reasonable probability of occurrence, is not economically achievable for most buildings.	None at this time.

Section 1612.2.5 establishes seismic hazard exposure groups and assigns all buildings to one of these groups according to a Table 1612.2.5. Group II includes buildings which have a substantial public hazard due to occupancy or use and Group III are those buildings having essential facilities which are required for post-earthquake recovery, including fire, rescue and police stations, emergency rooms, power-generating facilities, and communications facilities.

Existing Town-Wide Sustainability Measures	Recommended Improvements
Green Communities Program – Egremont is a member of the Green Communities program. Egremont has received funding for energy conservation measures, solar installations, and building upgrades. The Green Committee has also led roadside trash removal projects, a community-wide rain barrel purchase program, and youth sustainability engagement.	Continue to consider Green Communities as a possible funding source for future improvements.
Public Education – Seasonal educational newsletters include guidance on addressing invasive species and pests/ticks, private well testing, winter safety for seniors, promotes the sand for seniors program, and volunteer check-ins.	Expand sustainability education on climate resilience and hazard mitigation topics identified.
Grants and Funding – Several grants have been obtained by the Town to improve energy efficiency, install renewable (solar) energy, update plans, and improve infrastructure, including MassDOT Complete Streets, Community Compact Best Practices Program, Green Communities Grants, and American Rescue Plan Act funds. The Town has some grant writing capacity and is working to develop a strategic grant writing effort. New funding sources within the town include the excise tax instituted on short term rentals, and the cannabis business tax.	Continue to apply for grants to support the implementation of this plan.
Greenagers – Egremont has a valuable local partner in Greenagers, a teen and young adult-focused environmental organization. Greenagers teaches environmental conservation, sustainable farming, and natural resource management. They utilize regenerative farming practices on their farmland and offer educational outreach to other farmers in the area. Greenagers staff and volunteers also assist the town with maintaining and enhancing open space properties, including planting pollinator gardens or with trail maintenance.	Develop additional partnerships with Greenagers for upcoming climate resiliency projects.

Mitigation Capabilities and Local Capacity for Implementation

Under the Massachusetts system of "Home Rule," the Town of Egremont is authorized to adopt and, from time to time amend, a number of local ordinances and regulations that support the Town's capabilities to mitigate natural hazards. These include the General Bylaws, Zoning Bylaws, and

Subdivision Rules and Regulations. Local bylaws may be amended to improve the Town's capabilities, and changes to most regulations simply require a public hearing and a vote of the authorized board or commission. The Town of Egremont has recognized several existing mitigation measures that require implementation or improvements, and has the capacity based on these Home Rule powers within its local boards and departments to address them. The Town also can expand on and improve the existing policies and programs listed above.

6

Status of 2012 Mitigation Plan

6.0 STATUS OF MITIGATION MEASURES FROM THE 2012 PLAN

6.1 Implementation Progress on the Previous Plan

The Town of Egremont has taken steps to implement the 2012 Berkshire County Hazard Mitigation Plan by integrating the findings into the following programmatic areas and plans: implementing projects addressing problematic culverts and trees, hiring a sustainability coordinator and establishing a green committee, evaluating possible bylaw updates, and pursued improvements to Town Hall storm drainage.

The 2012 Berkshire County Hazard Mitigation Plan listed several priority actions items specific to the Town of Egremont. Egremont staff and Core Team members reviewed these previous mitigation measures for completion and to determine if the measures were still a priority if they were not completed. Table 6-1 summarizes the status of the mitigation measures and their priority. The Town completed several mitigation measures from the 2012 plan. Some of the measures have been deleted because they are continuous operation and maintenance procedures and were added into the Town's existing capabilities list in Chapter 5. Some actions were deferred because the Town lacked funding or staff capacity to complete the project. The deferred measures were evaluated based on the Core Team and Egremont staff's assessment of the continued relevance or effectiveness. Projects that remain a priority will be included in priority projects for this plan and presented in Chapter 7.

Table 6-1. Status of Mitigation Measures from the 2012 HMP

Description of Action	Implementation Responsibility	Status
Continue working with DCR to repair Prospect Lake Dam	DCR	Incomplete. Amend to coordinate with state and private owner on next steps for updating Prospect Lake Dam based on current plan and add to list of priorities in Ch. 7.
Continue to work with utility companies to improve proactive tree trimming	Town, Utilities	Incomplete. Coordinate with utility companies to improve proactive tree trimming. Add to list of priorities in Ch. 7.
Continue to pave dirt roads that are prone to flooding and washouts	Town	In progress. Maintenance of paved roads has been the primary focus for the Highway Department, given limited funding resources. Add to list of list of priorities in Ch. 7.
Implement beaver control solutions	Town	Complete. Added to Ch. 5 – Existing Capabilities.

Table 6-1. Status of Mitigation Measures from the 2012 HMP

Description of Action	Implementation Responsibility	Status
Work with Conservation Commission and DEP to improve ability to remove debris from streams where flooding is a concern	Town, DEP	Incomplete. Coordinate with Conservation Commission and DEP to determine best practices on flood reduction debris removal. Add to list of priorities in Ch. 7.
Identify historic structures, businesses, and critical facilities located in hazard-prone areas, including floodplains and dam failure inundation areas.	Town of Egremont, MEMA, Massachusetts Historical Commission	Partially complete: Floodplain review is complete and included in Ch. 5 – Existing Capabilities. Add assessment of dam failure inundation areas to Ch. 7.
Replace culvert on Jug End Road with a larger culvert	Town	Incomplete. Town is seeking funding for culvert improvements. Amend to develop prioritization for culvert replacements and repair and add to Ch. 7.
Install storm drainage system at Town Hall parking lot to alleviate flooding	Town	Incomplete. Amend to coordinate with DPW to design and install storm drainage at the Town Hall. Add to Ch. 7.
Study flooding at the intersection of Jug End Road and Mount Washington Road and implement findings	Town	Incomplete. Amend to study flooding and drainage issues across the town to identify priorities for stormwater system improvements and add to Ch. 7.
Study the hydrology of the Taconic Lane area and implement findings	Town	Incomplete. Amend to study flooding and drainage issues across the town to identify priorities for stormwater system improvements and add to Ch. 7.
Implement a stormwater management bylaw	Town	Incomplete. Amend to evaluate bylaws needed to account for climate change and environmental concerns and add to list of priorities in Ch. 7.

Table 6-1. Status of Mitigation Measures from the 2012 HMP

Description of Action	Implementation Responsibility	Status
Replace culvert on Shun Toll Road west of Route 71	Town	Incomplete. Coordinate with DPW to replace culvert on Shun Toll Road and add to Ch. 7.
Study flooding along Mount Washington Road and implement findings	Town	Incomplete. Amend to study flooding and drainage issues across the town to identify priorities for stormwater system improvements and add to Ch. 7.
Study the Sheffield Road stream crossing and upstream impacts and implement findings	Town	Incomplete. Amend to study flooding and drainage issues across the town to identify priorities for stormwater system improvements and add to Ch. 7.

7

Hazard Mitigation & Climate Adaptation Strategy

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7.0 HAZARD MITIGATION AND CLIMATE ADAPTATION STRATEGY

7.1 Identification of Hazard Mitigation and Climate Adaptation Strategies

The Town developed a list of priority hazard mitigation and climate adaptation strategies through a multi-faceted approach. Strategies were discussed and developed upon review of the:

- Hazard and climate change risk assessment
- Existing measures and the capacity to mitigate and respond to hazardous events
- Economic vulnerabilities and adaptation options
- Progress on the previous plan
- Input from stakeholders

Stakeholders were engaged through Core Team meetings, the CRB Workshop webinars, and the public input session. The full list of action items from the CRB Workshop are available in Appendix C.

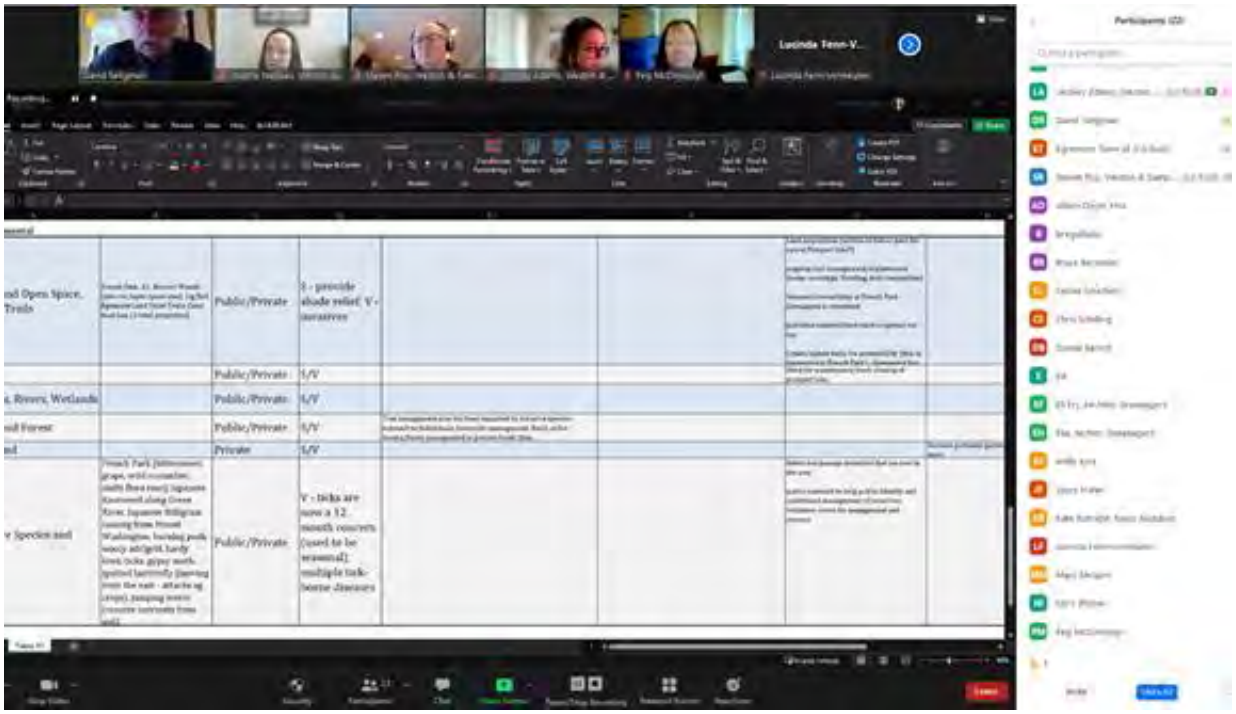

Figure 1. Environmental priority action items were presented during Egremont's Community Resilience Building Webinar

Hazard mitigation strategies often provide protection against more than one natural or climatic hazard. Each mitigation measure is described with its estimated cost, timeframe, and implementation responsibility. These considerations also informed the prioritization of the mitigation measures. A description of the prioritization categories used in Table 7-1 is included below.

Prioritization Categories Used	
Action Item	A description of a hazard mitigation or climate adaptation measure with details, such a specific location, strategy, or technique to be used to work towards fulfilling the general objective. Items brought forward from 2012 HMP are noted with a *.

Prioritization Categories Used

Implementation Responsibility

Most hazard mitigation and climate adaptation measures will require a multi-department approach among Town departments that share responsibility. The governing body of the community ultimately decides responsibility. In addition, some action items require extensive involvement with the Commonwealth of Massachusetts departments or private entities. In those cases, the relevant entities have been listed in addition to a municipal department. Section 7.2 specifically addresses regional collaboration.

Time Frame

The time frames represented below are assigned based on the complexity of the measure, the overall priority of the measure, and generally reflect when the mitigation measure is planned to initiate. The identification of time frames is not meant to prevent a community from actively seeking out and taking advantage of funding opportunities as they arise. Measures are projected out at various time frames in order to acknowledge the Town's limited genera fund, the potential of projects needing to be completed in a chronological order, or to account for other Town projects not included in this plan that may need to be completed first. The time frames are divided into the categories below.

1-5 years (kick-off within the plan's 5-year cycle)
5-10 years (kick-off in the next 5-year cycle of the plan)
10-20 years (kick-off 10-20 years from completion of this plan)
Ongoing (measure has been started and will continue to be active for the foreseeable future)

Estimated Cost

The estimated cost is provided using the breakdown below. All costs are estimates and would need to be updated at the time of design and construction. When applicable, costs have been divided between preliminary assessments and cost of construction.

$: <$10,000
$$: $10,000-$100,000
$$$: $100,000-$250,000
$$$$: $250,000-$500,000
$$$$$: $500,000+

Priority

Designation of high, medium, or low priority was based on overall potential benefits, areas affected, and estimated project costs. A High Priority action is very likely to have political and public support and necessary maintenance can occur following the project, and the costs seem reasonable considering likely benefits from the measure and available funding sources. A Medium Priority action may have political and public support and necessary maintenance has the potential to occur following the project. A Low Priority action may not have political and public support for implementation or the necessary maintenance support following the project.

Prioritization Categories Used

Potential Funding Sources

Sources of funding are identified in Table 7-1 and further summarized in Table 7-2. The "Potential Funding Sources" column in Table 7-1 focuses on projects that would be competitive for each funding source. While acronyms are used in Table 7-1, the full names of potential funding sources can be found in Table 7-2. An additional description of municipal funding is available in Section 7.3.

Table 7-1: Priority Hazard Mitigation and Climate Adaptation Actions

General Objective	Action Item (* is continued from 2012 HMP)	Implementation Responsibility	Time Frame (years)	Estimated Cost	Priority	Potential Funding Sources
INFRASTRUCTURE						
Culverts and Stormwater Drainage	Prioritize and implement upgrades to increase culvert sizing and improve stormwater drainage system for climate resilience.*	• Highway Department • Conservation Commission	1-5	$$$$$	H	Municipal Small Bridge, MVP, PDM, TA, Culvert Replacement
	Study flooding and drainage issues across the town to identify priorities for stormwater system improvements using climate projections and green infrastructure.*	• Highway Department Conservation Commission	1-5	$$	H	MVP, PDM, TA
Electricity and Communication Infrastructure	Seek funding to clear branches and dead/hazardous trees around power lines.	• Tree Warden • National Grid	1-5	$$-$$$	H/M	MVP, PDM, TA
	Assess potential for funding small-scale microgrid and residential backup power.	• National Grid • Town	5-20	$-$$	H	MVP, Green Communities, DOER
Dams	Coordinate with state and private owner on next steps for updating Prospect Lake Dam based on current plan.	• Conservation Commission • Dam Owner	1-5	$-$$$	H	Dam and SeaWall Repair Program

Table 7-1: Priority Hazard Mitigation and Climate Adaptation Actions						
General Objective	**Action Item (* is continued from 2012 HMP)**	**Implementation Responsibility**	**Time Frame (years)**	**Estimated Cost**	**Priority**	**Potential Funding Sources**
Roads	Assess gravel roads and drainage improvements needed for watershed protection and emergency response.	• Highway Department	1-5	$ - study $$$ - implementation	H	PDM, Section 319 Nonpoint Source Program, 604(b)
	Upgrade gravel roads to paved where possible.	• Highway Department	1-5	$$$$$	H	PDM, Section 319 Nonpoint Source Program, 604(b)
COMMUNITY						
Emergency Preparedness, Outreach and Training	Expand frequency and reach of emergency preparedness outreach about emergency services, regional shelters, and alert system. Develop new channels to reach renters and visitors.	• Emergency Department	1-5	$	H	Berkshire Taconic Community Foundation, BRPC District Local Technical Assistance
	Ensure adequate staffing plan for cooling/heating centers for peak visitor numbers, including offering emergency response and medical training for volunteers and municipal staff.	• Emergency Department	1-5	$-$$	H/M	PDM, Berkshire Taconic Community Foundation, BRPC District Local Technical Assistance
Populations at Risk of Isolation	Improve existing transportation assistance and assess additional needs for assisting people with transportation.	Council on Aging	1-5	$	H	TA, Community Transit Grants, Berkshire Taconic Community Foundation, NADTC - Transportation Planning Grant,

Table 7-1: Priority Hazard Mitigation and Climate Adaptation Actions						
General Objective	**Action Item (* is continued from 2012 HMP)**	**Implementation Responsibility**	**Time Frame (years)**	**Estimated Cost**	**Priority**	**Potential Funding Sources**
						BRPC District Local Technical Assistance
	Update and promote awareness of the police checklist of vulnerable households in case of extreme events, who may need check-ins or services.	• **Emergency Department** Police	1-5	$	H	Berkshire Taconic Community Foundation, BRPC District Local Technical Assistance
	Start a buddy system for residents to check on seniors and share resources in event of emergency.	• **Council on Aging** • Emergency Department	1-5	$	H	Berkshire Taconic Community Foundation, BRPC District Local Technical Assistance
Schools and Youth	Engage youth in climate change discussions and activities.	• **Green Committee** • Greenagers	1-5	$	H	MVP
Tourism/ Economy	Expand awareness of a diversity of outdoor activity offerings (with different accessibility levels) through improved promotion through public and private channels.	• **Egremont Land Trust** • French Park Committee • Conservation Commission • Greenagers	1-10	$-$$	H/M	MA Downtown Initiative Grant, MA Travel & Tourism Recovery Grant, MA One Stop for Growth, LAND, PARC Grants
NATURAL RESOURCES						
Agriculture	Encourage the agriculture community to incorporate climate adaptation practices by outreach and making resources available	• **Agricultural Commission** • Greenagers	1-5	$-$$	H	MVP

Table 7-1: Priority Hazard Mitigation and Climate Adaptation Actions						
General Objective	**Action Item (* is continued from 2012 HMP)**	**Implementation Responsibility**	**Time Frame (years)**	**Estimated Cost**	**Priority**	**Potential Funding Sources**
	on climate resilient techniques. Special focus on younger generation of farmers' outlook about climate change.					
Invasive Species	Develop an invasive species management program to detect and manage new invasive plant species.	• Garden Club (Native Species Interest Group)	1-5	$	H	Community Forest Stewardship Program, Habitat Management Grant, Working Forest Initiative
	Increase public outreach to help public identify pests, health risks, and understand and contribute to management of invasive plant species.	• Board of Health	1-5	$	H	Community Forest Stewardship Program, Habitat Management Grant, Working Forest Initiative
	Conduct outreach to residents to address invasive plants threatening to knock down power lines.	• Highway Department • National Grid	1-5	$	H/M	Community Forest Stewardship Program, Habitat Management Grant, Working Forest Initiative
Parks and Open Space, Hiking Trails	Increase trail management and maintenance, trash cleanup, and invasive species removal via funding and partnerships.	• Building and Grounds Department Greenagers	1-5	$-$$	H	MassTrails, Federal Land & Water Conservation Fund, PARC Grants, Community Forest Stewardship Program,

Table 7-1: Priority Hazard Mitigation and Climate Adaptation Actions						
General Objective	**Action Item (* is continued from 2012 HMP)**	**Implementation Responsibility**	**Time Frame (years)**	**Estimated Cost**	**Priority**	**Potential Funding Sources**
						Office on Disability – Self-Evaluation and Transition Planning Grant, AARP Community Challenge Grant, MADOT Shared Streets & Spaces Grant
	Generate plan and funding for open space land acquisition and access improvements with a focus on climate resilience and hazard mitigation (OSRP update) and accessibility.	• Conservation Commission	1-10	$-$$$	H	LAND, Land Use Planning, Community Forest Stewardship Program, Office on Disability – Self-Evaluation and Transition Planning Grant, AARP Community Challenge Grant, MADOT Shared Streets & Spaces Grant
Waterbodies and Wetlands	Work with landowners at Prospect Lake on improving/expanding recreation opportunities, maintenance/trash cleanup, and potential conservation set-asides.	• Conservation Commission	1-5	$	H	MVP, LAND, Federal Land & Water Conservation Fund, 319, 604(b)
	Improve stormwater education, pursue	• Conservation Commission	1-5	$$	H	MVP, 319, 604(b)

Table 7-1: Priority Hazard Mitigation and Climate Adaptation Actions						
General Objective	Action Item (* is continued from 2012 HMP)	Implementation Responsibility	Time Frame (years)	Estimated Cost	Priority	Potential Funding Sources
	partnerships, and develop targeted community outreach for landowners around Prospect Lake and Green River about stormwater management BMPs.					
	Educate public about development impacts on water quality and watershed health.	• Conservation Commission • Water Department • Board of Health	5-10	$$	H	MVP, 319, 604(b)
	Review and update bylaws to manage development in environmentally sensitive areas (e.g. wetlands protection act, conservation restriction overlay district) and address stormwater management in light of climate change.	• Planning Board 1. Conservation Commission	1-5	$$	H/M	Land Use Planning Assistance, MVP
	Work with Conservation Commission and DEP to improve ability to remove debris from streams where flooding is a concern.*	• Conservation Commission • Highway Department	1-20	$$	H/M	PDM

7.2 Regional Partnerships

Mitigating natural hazards is not a strictly local issue. For example, the drainage systems that serve communities are often complex systems of storm drains, roadway infrastructure, pump stations, dams, and other facilities owned and operated by a wide variety of agencies, including Massachusetts Department of Transportation (MassDOT), Massachusetts Emergency Management Association (MEMA), and the Department of Conservation and Recreation (DCR). The planning, construction, operation, and maintenance of these structures are integral to the hazard mitigation and climate adaptation efforts of communities. Much of the state lands in Egremont are maintained by DCR and the Division of Fisheries and Wildlife, and the Town of Holyoke owns land in Westhampton within the drainage area for their water system. The Town will strive to share and obtain vulnerability data in coordination with these agencies. State agencies also operate with budgetary

and staffing constraints, like communities. Similarly to municipalities, they must make decisions about numerous competing priorities. In order to implement many of the mitigation measures identified by the Town, all parties will need to work together towards a mutually beneficial solution.

Egremont also has strong working relationships with the Berkshire Natural Resources Council (BNRC), the Berkshire Regional Planning Commission (BRPC), and the Housatonic Valley Association (HVA), which have supported past projects to address regional issues and solutions. Regional entities will also be key partners in implementing measures from this plan.

7.3 Potential Funding Sources

The identification of funding sources herein is preliminary and actual funding availability varies depending on numerous factors. These factors include, but are not limited to, if a mitigation measure is conceptual or has been studied, evaluated, or designed. In most cases, the measure will require a combination of funding sources. The funding sources identified are not a guarantee that a specific project will be eligible for, or receive, funding. Upon adoption of this plan, the local representatives responsible for implementation should begin to explore potential funding sources in more detail.

Traditional funding sources within the Town of Egremont, such as funding from the operating and capital budgets, may be able to cover some of the costs associated with the action items detailed in Table 7-1. This has been noted as General Fund in the Potential Funding Sources column. State revolving funds and other no- or low-interest loans may also be of interest. There is a great variety of funding available for Massachusetts municipalities, both through the state and federal governments. A full list of funding opportunities can be found on the Community Grant Finder webpage: https://www.mass.gov/lists/community-grant-finder#community-development-. The Community Grant finder provides a streamlined interface where municipalities can easily learn about grant opportunities. Specific funding options related to action items developed by Egremont are listed in Table 7-2 below.

Table 7-2: Potential Funding Sources

Grant	Description	Category	Limitations & Stipulations
604b Grant Program	Water quality assessment and management planning	Environment	None
AARP Community Challenge	Program to make communities livable to people of all ages	Community Development	None
Berkshire Taconic Community Foundation	This foundation awards various of community grants.	Community Development	Nonprofits & Individuals
BRPC District Local Technical Assistance	BRPC staff provides technical assistance to communities.	Community Development	None.
Chapter 90 Program	Reimbursable grants on approved projects	Public Works and Transportation	None
Community Forest Stewardship Grant Program	Funding to establish community forests.	Environment	None

Table 7-2: Potential Funding Sources

Grant	Description	Category	Limitations & Stipulations
Massachusetts Downtown	Community One Stop for Growth grant that offers a range of services and assistance to communities seeking help on how to revitalize their downtowns.	Community Development	None
Community Transit Grant Program	Funding to meet the transportation and mobility needs of seniors and people with disabilities	Public Works and Transportation	Depends on project type
Complete Streets Funding Program	Technical assistance and construction funding	Public Works and Transportation	Eligible communities must pass a Complete Streets Policy and develop a Prioritization Plan
Culvert Replacement Municipal Assistance Grant Program	Grant to replace undersized, perched, and/or degraded culverts located in an area of high ecological value	Environment	None
Dam and Seawall Repair Program	Financial resources to qualified applicants for dam removal or repair projects to enhance, preserve, and protect natural resources and scenic, historic, and aesthetic qualities	Environment	None
Department of Energy Resources (DOER)	The DOER provides grant funding for clean energy-related programs	Energy	None
Emergency Management Performance Grant (EMPG)	Reimbursable grant program to assist local emergency management departments to build and maintain an all-hazards emergency preparedness system	Public Safety	Reimbursable
Federal Land & Water Conservation Fund	Funding for the acquisition, development, and renovation of parks, trails, and conservation areas.	Environment	Municipality must have an Open Space & Recreation Plan
Flood Mitigation Assistance Grant Program (FMA)	Implement cost-effective measures that reduce or eliminate the long-term risk of flood damage	Emergency Management and Planning	For buildings and other structures insured under the National Flood Insurance Program (NFIP).

Table 7-2: Potential Funding Sources

Grant	Description	Category	Limitations & Stipulations
Green Communities Designation and Grant Program	Provides a road map along with financial and technical support to municipalities that pledge to cut municipal energy and meet other criteria	Energy	None
Habitat Management Grant	Provides assistance to private and municipal owners of protected lands to enhance wildlife habitat, while promoting public access for outdoor recreation.	Environment	Land must be conserved.
Hazard Mitigation Grant Program	Provides funding after a disaster to significantly reduce or permanently eliminate future risk to lives and property from natural hazards	Emergency Management and Planning	None
LAND Grant Program	Helps cities and towns acquire land for conservation and passive recreation	Environment	Reimbursement rate: 52-70%
Land Use Planning Assistance Grants	Supports efforts to plan, regulate, and act to conserve and develop land consistent with the Massachusetts' Sustainable Development Principles (from Executive Office of Energy and Environmental Affairs (EEA))	Environment	None
MassTrails Program	Trail protection, construction, and stewardship projects	Environment	None
MassWorks Infrastructure Program	Provides grants to communities to help them prepare for success and contribute to the long-term strength and sustainability of the Commonwealth.	Community Development	None
Municipal Small Bridge Program	Funding for small bridge replacement, preservation, and rehab projects	Public Works and Transportation	Bridges with spans between 10' and 20'
Municipal Vulnerability Preparedness (MVP) Program	Provides support to implement climate change resiliency priority projects	Environment	Requires 25% match of total project costs
NADTC Transportation Planning Grant	Funds planning projects that develop innovations and build community support and commitment for increasing the availability and accessibility of community transportation services for	Public Works and Transportation	Must have received the Getting Ready to Innovate Grant

Table 7-2: Potential Funding Sources

Grant	Description	Category	Limitations & Stipulations
	people with disabilities and older adults.		
Natural Resource Damages Program	Funding for restoration projects. Funding comes from settlements, so it does not follow a set schedule.	Environment	None
Parkland Acquisitions and Renovations for Communities (PARC) Grant	Funding to acquire or develop land for park and outdoor recreation purposes, including renovating existing parks.	Environment	Set asides for small communities
Pre-Disaster Mitigation (PDM) Grant Program	Provides funds for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event	Emergency Management and Planning	None
Public Assistance Program	The state reimburses governments and other applicants for disaster related costs	Public Safety	75% reimbursable
Section 319 Nonpoint Source Program	Grants for technical assistance, education, training, demonstration projects and monitoring of nonpoint source pollution implementation projects.	Transportation, Environment	For communities implementing approved nonpoint source management programs
Self Evaluation & Transition Planning Grant	Support for capital improvements specifically dedicated to improving programmatic access and/or removing barriers encountered by persons with disabilities.	Community Development	None.
Shared Streets and Spaces Grant Program	Supports quick-launch improvements to public health, safe mobility, and strengthened commerce in Massachusetts.	Public Works and Transportation	None
Surface Transportation Block Grant Program (STBG)	Includes funding for bridge projects on any public road and facilities for nonmotorized transportation	Transportation	None
Transportation Alternatives (TA)	Funding for smaller-scale transportation projects such as pedestrian and bicycle facilities, recreational trails, safe routes to school projects, community improvements such as historic preservation and	Transportation	None

Table 7-2: Potential Funding Sources

Grant	Description	Category	Limitations & Stipulations
	vegetation management, and environmental mitigation related to stormwater and habitat connectivity		
Travel and Tourism Recovery Grant Program	Grant dedicated to campaigns and initiatives that increase consumer spending, support local businesses, and advance community recovery efforts to support businesses.	Community Development	None
Working Forest Initiative	Offers programs and services to woodland owners to assist in forest management.	Environment	None

8

Plan Adoption and Maintenance

Photo: Town of Egremont

8.0 PLAN ADOPTION AND MAINTENANCE

8.1 Plan Adoption

The Town of Egremont's 2022 MVP-HMP was adopted by the Select Board on June 28, 2022. See Appendix E for documentation. The plan was approved by FEMA on [*ADD DATE*] for a five-year period that will expire on [*ADD DATE*].

8.2 Plan Implementation

The Core Team will use Table 7.1 as a guide for taking action to mitigate hazards and improve the Town's climate resilience. The time frame, responsible department, and funding mechanisms in Table 7.1 lay out an implementation plan for the Core Team. The Core Team will be held accountable through the tracking mechanisms explained in the following sections. The 2022 MVP-HMP will also inform future planning and budgeting processes.

8.3 Plan Maintenance

8.3.1 Tracking Progress and Updates

FEMA's initial approval of this plan is valid for five years. During that time, the Town will continue to track progress, document hazards, and identify future mitigation efforts. This can be achieved through a combination of two methods:

1. **Meetings:** The Core Team, coordinated by the Select Board-appointed Egremont MVP Project Coordinator, will meet four times a year to monitor plan implementation. The Core Team will be amended as needed but will likely include representatives from the Fire Department, Highway Department, Planning Board, Conservation Commission, Board of Health, Green Committee, Garden Club, Tree Warden, Council on Aging, and Emergency

Management Committee. These meetings will provide an opportunity for regular implementation updates and to identify capital planning needs related to hazard mitigation.

2. Surveys: The coordinator of Core Team will prepare and distribute a survey every year. The survey will be made available to all Core Team members and any other interested local stakeholders. The questions in the survey will reference the tables of existing and proposed action items listed in the MVP-HMP. The survey will assist in determining any necessary changes or revisions to the plan. In addition, it will provide written documentation of status updates, accomplishments, and progress related to the action items listed in the MVP-HMP. The surveys will help document new hazards or problem areas that have been identified since the 2022 MVP-HMP. The information collected through the survey will be used to formulate an update and/or addendum to the plan.

8.3.2 Continuing Public Participation

The adopted plan will be posted on the Town's website with a mechanism for citizen feedback, such as an e-mail address, for questions and comments. The Town will encourage local participation whenever possible during the next five-year planning and implementation cycle. The Core Team will also incorporate engagement into the implementation of the priority action items. All updates to the plan, including implementation progress, will be placed on the Town's website.

8.3.3 Integration of the Plans with Other Planning Initiatives

Upon approval of the Town of Egremont's 2022 MVP-HMP by FEMA, the Core Team will make the plan available to all interested parties and all departments with an implementation responsibility. The group will initiate a discussion with those various departments regarding how the plan can be integrated into their ongoing work. At a minimum, the plan will be reviewed and discussed with the Core Team's departments.

Appropriate sections of the MVP-HMP will be integrated into other plans, policies and documents as those are updated and renewed, including the writing of, or updates to, the Town's Master Plan, Open Space Plan, Comprehensive Emergency Management Plan, and Capital Investment Program. Coordination with the Berkshire Regional Planning Commission and adjacent communities, local organizations, businesses, watershed groups, and state agencies will be required for successful implementation and continued updating.

8.4 Process of Updating

By maintaining the 2022 MVP-HMP as described above, the Town will have a competitive application when applying to FEMA for funding to update the plan. Once the resources have been secured to update the plan, the Core Team will need to determine whether to undertake the update itself or hire a consultant. If the Core Team decides to update the plan itself, the group will need to review the current FEMA hazard mitigation plan guidelines for any change in the requirements. The update to the Town of Egremont's 2022 MVP-HMP will be forwarded to MEMA for review and to FEMA for ultimate approval. The Core Team will begin drafting the full update of the plan in four years. This will help the Town avoid a lapse in its approved plan status and grant eligibility when the current plan expires at the end of year five.

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Appendix A

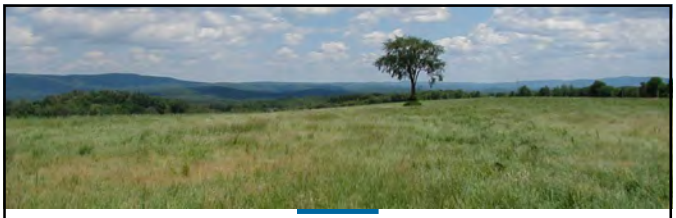
Core Team Materials

Municipal Vulnerability Preparedness Planning Grant and Hazard Mitigation Plan Update

MVP Planning Committee/Core Team Kickoff Meeting #1

Tuesday, September 14, 2021
2:00 pm – 3:00 pm

Attendance	5 minutes
Project Overview • Schedule and scope • Core Team role and decision points • Public engagement approach • Request for information and data sources	20 minutes
Goal Setting Introduction	10 minutes
Community Resilience Building (CRB) Workshop Series Introduction • Tentative Dates and Format • Stakeholder List • Critical Facilities List	20 minutes
Wrap up and next steps	5 minutes



TOWN OF EGREMONT

Core Team Meeting

September 14, 2021

Photo: Town of Egremont Facebook Page

1

1

WELCOME CORE TEAM

ROLE – *MORE ON THIS LATER*

- Confirm framework for process
- Provide data and local expertise
- Participate in and promote the CRB webinars
- Finalize priority actions for the final report

TODAY'S OBJECTIVES

- Review Process
- Discuss Goals
- Plan for CRB Webinars

2

2

MA CLIMATE PROJECTIONS

By end of century:

Changes in precipitation

- 18% increase in consecutive dry days
- 57% increase in days with > 1 in. rainfall
- 7.3 inches additional annual rainfall
- Increase in flooding

Rising temperatures

- 10.8°F increase in average annual temperature
- 42% decrease in days/year with min. temperatures < 32° F
- 1,280% increase in 90-degree days/year

Winter weather

- Overall a decrease in annual snowfall
- Likely to have fewer events with a lot of snow
- Freeze –thaw cycle to change

Regional changes

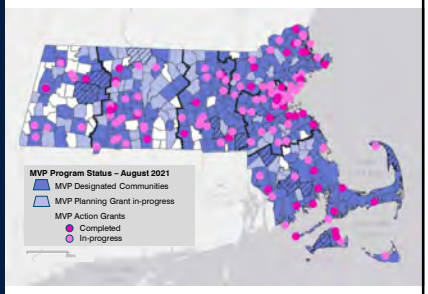
- Increase in frequency and magnitude of hurricanes and nor'easters
- 4-10.5 feet of sea level rise

Source: State Hazard Mitigation and Climate Adaptation Plan, September 2018 / resilientma.org / Northeast Climate Adaptation Science Center

3

MUNICIPAL VULNERABILITY PREPAREDNESS (MVP) PROGRAM

- Improved resilience and preparedness
- Collaboration with stakeholders
- Increased education, planning, and implementation
- Funding for resilience-related actions



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MVP CORE PRINCIPLES

5

MVP PROGRAM

1. MVP Planning Grant

- Define climate hazards
- Identify community vulnerabilities and strengths
- Develop and prioritize adaptation actions
- Receive MVP designation

** We're also updating Egremont's Hazard Mitigation Plan!*

2. MVP Action Grant

- Implement priority adaptation actions identified during the planning process

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PROJECT ADD-ONS

- Hazard Mitigation Plan with MVP Report
- Economic Resilience Component of Plan
  - Describe potential impacts of climate change on sectors
  - Engage business stakeholders
  - Recommendations in Plan
- Two Communication Tools on Climate Resilience Topics
  - Fact Sheet or Social Media Toolkit
  - Brochure

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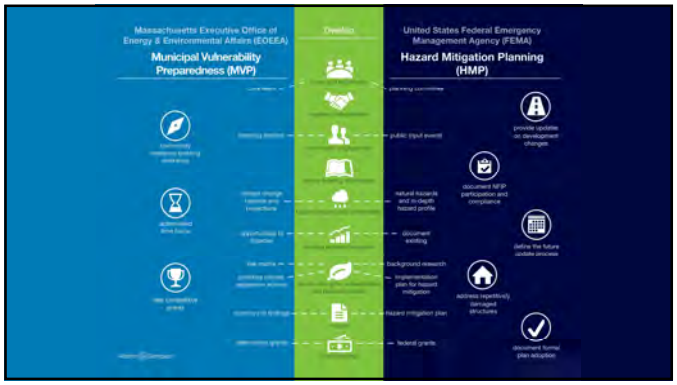
MVP Action Grant Examples

- Assessments
- Outreach & Education
- Redesign & Retrofit Design
- Construction of Resiliency Measures
- Nature-Based Solutions
- Ecological Restoration
- Water Quality & Infiltration
- Flood Protection
- Extreme Heat Mitigation
- Land Acquisition

8



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CORE TEAM INVOLVEMENT

Virtual engagement options include webinars, videos, surveys, social media campaigns, and more!

1. Core Team Kickoff | *Thanks for coming!*
2. Existing Plans | *Seeking input today*
3. Critical Facilities List and Hazard Map | *Seeking input today*
4. Review Goals | *Seeking input today*
5. Community Resilience Building Webinars | *December (tbd)*
6. Finalize Priorities | *February 2022*
7. Public Listening Session and Input | *March 2022*
8. Report | *Due June 2022*

Weston & Sampson

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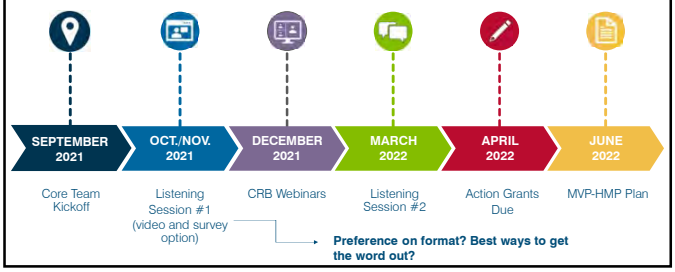
MILESTONE SCHEDULE



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CLIMATE DATA

- Massachusetts Integrated State Hazard Mitigation and Climate Adaptation Plan (2018)
- Massachusetts Climate Change Projections (NECSC, 2018 on resilientma.org)
- Massachusetts Climate Change Adaptation Report (MA EEA, 2011)

APPLICABLE PLANS/INFO

- Berkshire County Hazard Mitigation Plan (2012)
- Town of Egremont Annual Report (2019, 2020)
- Egremont Master Plan (2003)
- Town of Egremont Bylaws (2017)
- Egremont Stream Crossing Prioritization Meeting Notes (2020)

Weston & Sampson

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EGREMONT'S CLIMATE ADAPTATION & HAZARD MITIGATION GOALS

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WEBINAR OUTLINE

WEBINAR OBJECTIVES:

- Identify vulnerabilities and strengths
- Brainstorm projects or action items
- Prioritize projects or action items

TODAY'S DISCUSSION:

- Format
- Dates and Times

Photos: Town of Egremont

Recommended webinar topic areas include:


INFRASTRUCTURE


NATURAL RESOURCES


COMMUNITY

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STAKEHOLDER LIST

See attachment – Draft Stakeholder List (Excel)

Town of Egremont HMP Committee and Municipal Vulnerability Preparedness Planning Workshop Invitees

Group	Name	Organization	Title
Core Team/Planning Committee	Juliette Havis	Board of Health	Director/Town Clerk/Sustainability Coord
Core Team/Planning Committee	William Rose	Board of Health	
Core Team/Planning Committee	Dave R		
Core Team/Planning Committee	Ed McCormack	Emergency Management	Director
Core Team/Planning Committee	Jim Noe	Highway Department	Superintendent
Core Team/Planning Committee	Lucinda Fenn-Vermeulen	Select Board	Vice Chair
Core Team	Bruce Bernstein	Council on Aging	
Core Team	William Brinker	Water Commissioners	Clerk
Core Team	Emily Eyre	Green Committee	Co-Chair
Core Team	Joyce Frater	Conservation Commission	Associate
Board/Committee/Town Staff	George McGurn	Select Board	Chairman
Board/Committee/Town Staff	Francine Groenet	Assessors Office	
Board/Committee/Town Staff	Peg Muskrat	Council on Aging	Coordinator
Board/Committee/Town Staff	Ned Baldwin	Building Department	Commissioner
Board/Committee/Town Staff	David Seligman	Conservation Commission	Chairman
Board/Committee/Town Staff	Mary Braze	Emergency Management	E911 Coordinator
Board/Committee/Town Staff	Chief Joseph Schneider	Egremont Fire Department	Fire Chief
Local Leaders/Organization Reps		Egremont Land Trust	
Local Leaders/Organization Reps	Elizabeth Keen	Indian Line Farm	Owner
Local Leaders/Organization Reps		Turner Farms	
Local Leaders/Organization Reps			
Local Leaders/Organization Reps			
Adjacent Municipalities		Alford	
Adjacent Municipalities		Great Barrington	DPW/Highway Superintendents

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LIFELINES & CRITICAL FACILITIES

Feature Type	Name	Address
SAFETY AND SECURITY		
Emergency Operations Center	Egremont Town Hall	171 Egremont Plain Road
Alternative Emergency Operations Center/EMA	Fire Station #1	175 Egremont Plain Road
	Fire Station #2	88 Main Street
Town Offices/Police	Egremont Town Hall and Police Station	171 Egremont Plain Road
FOOD, WATER, SHELTER		
Agriculture	Turner Farms	11 Phillips Road
	Indian Line Farm	57 Jug End Road
	Wetstone-Bacon-Potts Farm	62 N Undermountain Road
Shelters	Fire Station #2	88 Main Street
	First Congregational Church	55 Main Street
	Fire Station #1	175 Egremont Plain Road
	South Egremont Elementary School	42 Main Street
	Town Hall	171 Egremont Plain Road
Food	Old Egremont Country Store	727 Egremont Plain Road
	Egremont Market	47 MA-22
Food and Fuel Assistance	Berkshire Community Action Council	291 West Street, Pittsfield MA
Food Assistance	Elder Services of Berkshire County Meals on Wheels	877 South Street #4d, Pittsfield, Ma
Water Supply		
Wastewater	Private Septic Systems	Townwide

See attachment – Draft Critical Facilities List

Rebranding by FEMA to Community Lifelines

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THANKS FOR COMING

Next Steps:

- Send feedback and info to W&S
- Listening Session Promotion
- CRB Webinar Series

Photo: Town of Richmond Facebook Page

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Egremont Municipal Vulnerability Program (MVP) Planning Committee
Tuesday, September 14, 2021, 2:00 pm
Held Via Zoom
In Attendance: Will Conklin (part of meeting), Bruce Bernstein, Donna Bersch, Will Brinker, Emily Eyre, Juliette Haas, Ed McCormick, Dave Rejeski
Also Attending: Carrieanne Petrick, MVP Regional Coordinator
Attending from Weston & Sampson: Amanda Kohn, Joanna Nadaeu

1) The meeting got underway at 2:20 pm. As attendance from members present affected the Open Meeting Law quorum requirement, it was agreed that members from Weston & Sampson would only deliver their prepared presentation and the committee would not engage in discussion or any kind of deliberation or vote.

2) Berkshires and Hilltowns MVP Regional Coordinator Carrieanne Petrik spoke to program. She mentioned that the Berkshire and Hilltown region has the least participation in the MVP program. She will be informed of our meeting schedule, advocate to the state on our region's behalf and provide resources along the way.

3) Amanda Kohn and Joanna Nadeau of Weston & Sampson provided an introduction, project overview and timeline, and summarized the goals and deliverables included in the contract. To avoid redundancy, they stated some information needed for this project may already exist in existing documents and plans. Since COVID meeting procedures are still being followed, public engagement may not include in-person meetings but may be a combination of surveys, Zoom meetings and mailers. Best methods to reach Egremont residents and include them in the Community Resilience Building (CRB) workshops will be explored in greater detail at the next meeting.

4) Amanda and Joanna have created a preliminary Stakeholder and Critical Facilities list. Committee members were asked to review these lists and email any updates or corrections to them.

5) A publicity subcommittee should be formed to help with the promotion of the project and write articles for the Egremont newsletter. Emily volunteered to assist with publicity efforts.

6) Future meetings will be kept to Tuesdays at 2:00 pm but will be scheduled not to conflict with the Select Board's meeting to avoid future quorum issues. Tentative dates for the next meeting offered were October 5 or October 12th.

7) Meeting dissolved at 3:35 pm.

Juliette Haas
9/16/2021

Municipal Vulnerability Preparedness
and Hazard Mitigation Planning Process

MVP Planning Committee/Core Team Meeting #2

October 5th, 2:00 PM - Zoom information is on second page

Join Zoom Meeting
https://us06web.zoom.us/j/84060482220?pwd=ME5PV09qWVpaYmU1dVJJbEFQZlhhdz09

Meeting ID: 840 6048 2220
Passcode: 817236
Call in: 1-301-715-8592

AGENDA

Attendance	5 minutes
Goals Confirmation	10 minutes
Critical Facilities List Confirmation	10 minutes
Stakeholder List Confirmation	10 minutes
Public Engagement Process	5 minutes
Confirm CRB Workshop Format	5 minutes
Risk Matrix 1. Pre-select features 2. Pre-select hazards	10 minutes
Wrap Up and Next Steps 1. Develop CRB Workshop Powerpoint and Maps 2. Finalize Agenda 3. Send Invitations	5 minutes


Juliette Haas
Amanda Kohn
W&S Lindsey Adams
fred gordon
Will Conklin (he/his)
Joanna Nadeau - Weston & Sampson (She/hers)
Bruce Bernstein
Jim Noe
davesmac
Patrick Riordan...
Patrick Riordan for Joyce Frater
wbrinker
wbrinker

Egremont Municipal Vulnerability Program (MVP) Planning Committee
Tuesday, October 5, 2021, 2:00 pm
Held Via Zoom
In Attendance: Will Conklin (Chairman), Bruce Bernstein, Donna Bersch, Will Brinker, Emily Eyre (part of meeting), Fred Gordon, Juliette Haas, Jim Noe, Dave Rejeski, Patrick Riordan (sitting in for Joyce Frater)
Also Attending: Carrieanne Petrick, MVP Regional Coordinator (part of meeting)
Attending from Weston & Sampson: Amanda Kohn, Joanna Nadeau, Lindsey Adams

1) Noting the presence of a quorum of the appointed MVP Committee (Conklin, Haas, Noe and Rejeski) Chairman Conklin called the meeting to order at 2:02 pm. Motion made and seconded to approve the agenda (4-0 pass). Motion made and seconded to approve the minutes from the September 14, 2021 meeting (4-0 pass). Members present introduced themselves.

2) Amanda Kohn stated she will be leaving Weston & Sampson in mid-October. Joanna Nadeau will become Weston & Sampson project lead.

3) **Goals** Updated Hazard Mitigation Goals document was reviewed. Question was raised as to the duration of the plan. The plan will address both short term and long term situations and will be written for a 20 year scope with potential updates every five years. Motion made and seconded to approve Goal document (4-0 pass).

4) **Critical Facilities List** Updated Critical Facilities List was reviewed. Question was raised as to available shelters since the previous local shelter (former Congregational Church which is now privately owned) is no longer available. Additions were made including water bodies (Mill Pond/Smiley's Pond, Marsh Pond) and addition of one road (Route 41). With those additions, motion made and seconded to approve Critical Facilities list (4-0 pass).

5) **Stakeholder List** Updated stakeholder list was reviewed for use as outreach list for CRB workshop and other promotion. Motion made and seconded to approve Stakeholder List (4-0 pass).

6) **Public Engagement/Publicity Subcommittee/Project Promotion** Weston & Sampson will supply the committee with a community survey which will collect information from our residents regarding their concerns of climate change (priorities, local vulnerabilities, etc.) The committee discussed ways to get optimal number of responses back reaching representative demographics (seniors, seasonal residents). In addition to posting a link to access the survey online and a possible on-line video game linking the survey, hard copies will be made to reach out to residents who don't use computers. Ad an in the Shopper's Guide was mentioned and to post copies at the Egremont Free Library, Post office, Town Hall, Library. Will Conklin will reach out to Mary McGurn of Mary McGurn Media to see if she can assist with community outreach as she is doing now for April Hill/Greenagers. The survey should be finalized by late October/early November. Juliette will assist with compilation of hard copy surveys to send to Weston & Sampson for analysis with online responses.

7) **Community Resiliency Building (CRB) Workshop** Joanna Nadeau informed the committee of the requirements for the CRB Workshop. This workshop will be facilitated by Weston & Sampson, is typically 6 hours in length if held online, and will be by email invitation to those listed on the approved Stakeholders list. The email will be sent by either Juliette Haas or Will Conklin. Because in-person meetings are still not being held, the committee discussed holding the CRB Workshop as three 2-hour Zoom meetings held on three consecutive days. Tentative dates/times discussed were December 7, 8, 9 or December 14, 15, 16 from 1 – 3pm. Committee will evaluate dates for possible time conflicts. Idea was shared for hosting seniors at Town Hall for screening of virtual public meetings – more relevant to spring meeting.

8) **Risk Matrix** Joanna Nadeau presented a Risk Matrix template that will be used at the CRB workshop, which was divided into features and hazards. Features include Infrastructure (e.g. Water Supply), societal/economic (e.g. Climate Migration, Agriculture, Tourism/Economy), and environmental (e.g. forests). Additions to the Risk Matrix to pre-select priority hazards or features can be added at future meetings as we get closer to the CRB Workshop.

9) **Next Steps/Future Meeting** The Weston & Sampson team will submit a draft survey and other marketing tools in the near future. Juliette Haas felt a committee meeting may be necessary to discuss future publicity methods, ways to publicize the survey, identifying media venues and discuss CRB Workshop format and actual dates and times.

10) The meeting adjourned at 3:32 pm. Date of the next committee meeting to be determined.

Juliette Haas
10/6/2021

Municipal Vulnerability Preparedness
and Hazard Mitigation Planning Process

MVP Planning Committee/Core Team Meeting #3

March 1, 2022 | 2:00-3:00 PM

Join Zoom Meeting
https://us02web.zoom.us/j/89591500719?pwd=Q0dGNUtvdWxWS2ZrdFZYdGZQUmdNZz09

Meeting ID: 895 9150 0719
Passcode: 033028
One tap mobile
+13017158592,,89591500719#,,,,*033028# US (Washington DC)
+13126266799,,89591500719#,,,,*033028# US (Chicago)

Find your local number: https://us02web.zoom.us/u/kb4Be0whcS

AGENDA

Introduction, Adopt Minutes from January 18, 2022 meeting & Status Update — 5 minutes

Report Chapter 5 & 6 Comments — 10 minutes

Action Comments — 15 minutes

Prioritization Comments — 15 minutes

Action and Prioritization Confirmation — 10 minutes

Wrap Up and Next Steps — 5 minutes

1. Listening Session Dates/Agenda/Outreach
2. Implementation Plan (Ch. 8)

Juliette Haas
MVP Project Coordinator
2/14/2022


Egremont Town of
Will Conklin
Joanna Nadeau, Weston & Sampson
Lucinda Fenn-Vermeulen
fred gordon
emilyreye
Jim Nire
Bruce Bernstein
2022-03-01 15:09:02

1:09:49

0:03:37

ID	General Objective	Mitigation Action (* if carried over from 2012 HMP)	Timeframe (1-5 - Short, 5-20 - Long)	Priority (H-High, M-Medium, L-Low)	Responsibility (Town entity; separate: other entities)
R-1	Agriculture	Encourage the agriculture community to incorporate climate adaptation practices by outreach and making resources available on climate resilient techniques. Include special effort to connect with younger generation of farmers on their outlook about climate change	Short	High	Agricultural Commission
R-2	Culverts and Stormwater Drainage	*Prioritize and implement upgrades to increase culvert sizing and improve stormwater drainage system for climate resilience	Short	High	Town
R-3	Culverts and Stormwater Drainage	*Study flooding and drainage issues across the town to identify priorities for stormwater system improvements using climate projections and green infrastructure	Short	High	Highway Department, Conservation Commission
R-4	Culverts and Stormwater Drainage	*Replace culvert on Shun Toll Road west of Route 71	Short	High	Highway Department
R-5	Dams	Coordinate with state and private owner on next steps for updating Prospect Lake Dam based on current plan	Short	High	Conservation Commission; Dam Owner
R-6	Electricity and Communication Infrastructure	Seek funding to clear branches/dead/hazardous trees around power lines	Short	H/M	National Grid
R-7	Electricity and Communication Infrastructure	Assess potential for funding small-scale microgrid and residential backup power	Mid-long term	High	National Grid, Town
R-8	Emergency Preparedness Outreach and Training	Ensure adequate staffing plan for shelters, including peak visitor numbers, including offering emergency response and medical training for volunteers and municipal staff	Short	H/M	Emergency Department/Town

R-9	Emergency Preparedness Outreach and Training	Expand channels for emergency preparedness outreach to renters, visitors and conduct more frequent reminders to residents about emergency services and alert system	Short	High	Emergency Department/Town
R-10	Invasive Species	Outreach to residents to address invasives that are threatening to knock down power lines	Short	H/M	National Grid, Town
R-11	Invasive Species	Develop an invasive species management program to detect and manage new invasive plant species	Short	High	Garden Committee/Native Species Interest Group
R-12	Invasive Species	Increase public outreach to help public identify pests, health risks, and understand and contribute to management of invasive plant species	Short	High	Board of Health
R-13	Parks and Open Space, Hiking Trails	Increase ongoing trail management/maintenance, trash cleanup, and invasive species removal via funding and partnerships with groups like Greenagers	Short	High	Greenagers, Town
R-14	Parks and Open Space, Hiking Trails	Generate plan and funding for open space land acquisition and access improvements with a focus on climate resilience and hazard mitigation (OSRP update) and accessibility	S/M	High	Conservation Commission, Town
R-15	Populations at risk of isolation	Improve existing transportation assistance and assess additional needs for assisting people with transportation	Short	High	Council on Aging
R-16	Populations at risk of isolation	Update and promote awareness of the police checklist of vulnerable households in case of extreme events, who may need check-ins or services.	Short	High	Emergency Department/Town
R-17	Populations at risk of isolation	Start a buddy system for residents to check on seniors and share resources in event of emergency.	Short	High	Town, Council on Aging
R-18	Roads	Assess gravel roads and drainage improvements needed for watershed protection and emergency response. Upgrade gravel roads to paved where possible.	Short	High	Highway Department
R-19	Schools and Youth	Engage youth in climate change discussions and activities	Short	High	Town/Greenagers
R-20	Shelters	Improve current outreach to better educate public about where to go for shelter and assistance in an emergency.	Short	M/H	Town/Emergency Department

R-21	Tourism Economy (including skiing)	Expand awareness through improved promotion through public and private channels of a diversity of outdoor activity offerings (different accessibility levels)	S/M	H/M	Egremont Land Trust, French Park Committee, Conservation Commission, Greenagers
R-22	Waterbodies and Wetlands	Review and update bylaws to manage development in environmentally sensitive areas such as wetlands (e.g. wetlands protection act, conservation restriction overlay district) and address stormwater management issues in light of climate change	Short	H/M	Planning Board, Conservation Commission
R-23	Waterbodies and Wetlands	Work with new landowners at Prospect Lake on improving/expanding recreation opportunities, maintenance/trash cleanup, and potential conservation set-asides	Short	High	Town, Conservation Commission
R-24	Waterbodies and Wetlands	Improve stormwater education, pursue partnerships, and develop targeted community outreach for landowners around Prospect Lake and Green River about stormwater management BMPs	Short	High	Conservation Commission
R-25	Waterbodies and Wetlands	Educate public about development impacts on water quality and watershed health	Medium	High	Conservation Commission
R-26	Waterbodies and Wetlands	*Work with Conservation Commission and DEP to improve ability to remove debris from streams where flooding is a concern	S/L	H/M	Conservation Commission

Egremont Municipal Vulnerability Preparedness (MVP) Planning Committee
Tuesday, March 1, 2022
Held Via Zoom
In Attendance: Will Conklin (Chair), Bruce Bernstein, Donna Bersch, Will Brinker, Emily Eyre, Lucinda Fenn-Vermeulen, Fred Gordon, Juliette Haas (recording). Jim Noe
Also Attending: Joanna Nadeau, Weston & Sampson, Mary McGurn, Carrieanne Petrick, MVP Regional Representative

1) Chairman Will Conklin called the meeting to order at 2:03 pm. The meeting was recorded to Zoom. The minutes from the January 18, 2022 meeting were unanimously approved by committee members present at that meeting.

2) Juliette Haas presented a brief update to the committee regarding the Expression of Interest applications. The committee will be sent an email summary after a listening session with Carrieanne Petrick takes place the following day.

3) Joanna Nadeau spoke to the work that has been performed since the last meeting: individual interviews with TEEM Chair Ed McCormick, BOH Director Juliette Haas, Highway Superintendent Jim Noe, Office Manager Mary Brazie, Building Superintendent Ned Baldwin, Fire Chief Joe Schneider, et. al. and a business focus group meeting which included Betsy Andrus of the Southern Berkshire Chamber of Commerce and Turner Farm representatives Darrel and Rebecca Turner.

4) The committee members added their comments/corrections to Chapter 5 of the Hazard Mitigation Plan. Fred Gordon spoke to the areas of need that were identified in the returned surveys: winter weather, extreme weather event, power outages. The survey will be listed as an Appendix in the final Hazard Mitigation Plan.

5) The committee worked on the draft Action Plan and filled in the missing priority ratings. Lucinda Fenn-Vermeulen felt the format was difficult to follow and understand. Will Brinker spoke to overlaps on action items that are addressed in the town's existing Community Emergency Management Plan (CEMP). Jim Noe felt the chart should start with items that have top priority and infrastructure items that the town has control over. Joanna will work on a new chart with fewer columns which will be sent to the committee for approval.

6) The committee decided on the date and time for the upcoming Community Listening Session: Tuesday March 29th at 5:30 pm. The meeting will be held via Zoom and will last about an hour, allowing time for a short presentation on the project, work done to date and time for public comment. The MVP Publicity Subcommittee was asked to work on outreach to the community to ensure a good attendance at the meeting.

7) Before asking for a motion to adjourn, Will Conklin asked committee members to list their preferred gender identification pronouns in the future. Motion made and seconded to adjourn. Meeting adjourned at 3:10 pm.

Juliette S. Haas
DRAFT

Appendix B

Additional Hazard Data

ALFORD
GREAT BARRINGTON
NEW YORK STATE
SHEFFIELD
MOUNT WASHINGTON
N
Tremont Drive
Wolfe
White's Hill Road
Egremont Plain Road
North Egremont WCE
North Egremont WMA
Rowe Road
Hickory Hill Road
Boice Road
Barrett Pond Dam
Barrett Woods West
Pumpkin Hollow Road
Shun Toll Road
Riverside Cemetery
Green River
General Knox Lane
Mill Road
Prospect Lake Dam
Prospect Lake
Second Street
Prospect Lake Road
French Park
Lakeside Drive
Millard Road
Ox Bow Road
Proctor Farm APR
Baldwin Hill Road East West
Baldwin Hill BNRC APR
Blunt Road
EGREMONT LANDFILL
Baldwin Hill Farm APR
Ridge Road
Phillips Road
Conservation Area
Baldwin Hill Road CR
Baldwin Hill Road North South
Town House Hill Road
Hubbard Brook
McGee Road
Creamery Road
South Egremont Cemetery
Delmolino Edward A III APR
Town Park School
Swimming Hole Dam
Pinecrest Cross Road
Sheffield Road
Hillsdale Road
Tyrell Road
Nicholson Road
Fisher Lane
Taconic Lane
Turner Farms
Smiley's Pond Dam
Mill Pond
Mearns Way
Pinecrest Hill Road
Bott Hill Road
Jug End Fen WMA
Jug End Fen WCE
K and L CR
Karner Brook
Mount Washington Road
Partridge Drive
Warner Road
Appalachian Trail Corridor
Kellogg AFT APR
Westover-Bacon-Potts Farm
Indian Line Farm
Egremont Land Trust APR
Karner Brook Cohen CR
Demairo CR
Farm Lane
The Avenue
Jug End Preserve
Jug End State Reservation and WCE
Brookvale Road
Hilltop Road
JUG END STATE RESERVATION DUMP
Guilder Hollow Road
Fenton Brook
Jug End State Reservation
Mount Washington State Forest
Jug End State Reservation and WMA
Mt Darby WCE
Pennyroval CR
Mount Everett State Reservation
Jug End Road
Undermountain Road
Bow Wow Road
Chase APR
Curtiss SLT APR
Ginsberg CR
Cliff CR
Dolomite Ledges WMA
41
23
71

Legend

- Dams
- Fire Stations
- Public Library
- Agriculture
- Campground
- Cemetery
- Grocery Stores
- Health Services
- >1 Critical Facility
- Parks and Open Space
- Post Office
- Emergency Reception Center
- School
- Hazardous Material Site
- Town Hall and Reception/Transport Center
- Police Station, Highway Garage, Shelter, Transfer Station
- Open Space & Conservation/Protected Land
- Landfill

Public Water Supplies
- Community Groundwater Source
- Surface Water Intake
- Non-Community Groundwater Source

MassHistoric Commission Inventory
- National Register of Historic Places
- Preservation Restriction
- National Register of Historic Places
- Preservation Restriction

Transportation
- Ski Lift/Tramway
- Evacuation Routes

Census
- > 25% of population is < 18
- > 25% of population is 65+

FEMA Q3 Flood Zones
- 1% Annual Chance of Flooding (Zones A, AE, AH, AO)
- 0.2% Annual Chance of Flooding (Zone X)

Waterways
- Rivers, Streams, and Brooks
- Marsh/Bog/Wooded Marsh
- Lakes, Ponds, Reservoirs

0 0.5 1
Miles

FIGURE 1

TOWN OF EGREMONT, MASSACHUSETTS

MUNICIPAL VULNERABILITY PREPARDNESS HAZARD AND FEATURE MAP

FEBRUARY 2022 SCALE: NOTED

Weston & Sampson

ALFORD

GREAT BARRINGTON

NEW YORK STATE

SHEFFIELD

MOUNT WASHINGTON

N

Tremont Drive
White's Hill Road
Egremont Plain Road
Rowe Road
Hickory Hill Road
Boice Road
Pumpkin Hollow Road
Shun Toll Road
General Knox Lane
Green River
Mill Road
Lumber Yards
Lumber Yards
Fiber Connect
Mixed Use (Primarily Commercial, Some Residential)
Prospect Lake Campground
Prospect Lake Road
Prospect Lake
Second Street
Lakeside Drive
Millard Road
71
Ox Bow Road
Baldwin Hill Road East West
Blunt Road
Ridge Road
Phillips Road
Baldwin Hill Road North South
Town House Hill Road
Hubbard Brook
Mcgee Road
Creamery Road
Egremont Village Inn
Hubbard Brook
Pinecrest Cross Road
Sheffield Road
Hillsdale Road
Tyrell Road
John Andrews Restaurant
Taconic Lane
Turner Farms Maple Syrup
23
Amanda's Kennel
Mill Pond
Nicholson Road
Fisher Lane
Catamount Ski
Bott Hill Road
Mearns Way
Pinecrest Hill Road
Karner Brook
Indian Line Farm
Mount Washington Road
Partridge Drive
Warner Road
Greenagers Inc
April Hill
41
Farm Lane
The Avenue
Schumacher Society for a New Economics
Blue Rider Horse Farm
Berkshire Masterbuilders Inc
Brookvale Road
Hilltop Road
Guilder Hollow Road
Fenton Brook
Jug End State Reservation
Jug End Road
Undermountain Road
Bow Wow Road

Legend

Egremont Businesses

- Construction & Natural Resources
- Outdoor Recreation & Tourism
- Retail
- Services and Offices

- Construction & Natural Resources
- Farms
- Outdoor Recreation & Tourism
- Retail
- Services and Offices
- Evacuation Routes

Waterways

- Rivers, Streams, and Brooks
- Marsh/Bog/Wooded Marsh
- Lakes, Ponds, Reservoirs

0 0.5 1
Miles

FIGURE 1

TOWN OF EGREMONT, MASSACHUSETTS

EGREMONT BUSINESSES

JUNE 2022 SCALE: NOTED

Weston & Sampson

Path: Q:\projects\EGR\GIS\Projects\EgremontBusinessMap.aprx Layer: Layout Saved: 6/30/2022 3:10:24 PM Plotted: 6/30/2022 3:12:42 PM

ALFORD

GREAT BARRINGTON

NEW YORK STATE

SHEFFIELD

MOUNT WASHINGTON

N

Tremont Drive
White's Hill Road
Egremont Plain Road
Rowe Road
Boice Road
Hickory Hill Road
Pumpkin Hollow Road
Shun Toll Road
General Knox Lane
Green River
71
Mill Road
Prospect Lake
Second Street
Prospect Lake Road
Lakeside Drive
Millard Road
Ox Bow Road
Baldwin Hill Road East West
Blunt Road
Ridge Road
Phillips Road
Town House Hill Road
Hubbard Brook
Mcgee Road
Creamery Road
Baldwin Hill Road North South
Hillsdale Road
Tyrell Road
Taconic Lane
23
Pinecrest Cross Road
Sheffield Road
Nicholson Road
Fisher Lane
Bott Hill Road
Mill Pond
Mearns Way
Pinecrest Hill Road
Karner Brook
Mount Washington Road
Partridge Drive
Warner Road
41
Farm Lane
The Avenue
Undermountain Road
Bow Wow Road
Brookvale Road
Hilltop Road
Gulliver Hollow Road
Fenton Brook
Jug End Road

0 0.5 1
Miles

Legend

Census

- > 25% of population is < 18
- > 25% of population is 65+

Waterways

- Rivers, Streams, and Brooks
- Marsh/Bog/Wooded Marsh
- Lakes, Ponds, Reservoirs

FIGURE 1

TOWN OF EGREMONT, MASSACHUSETTS

CENSUS DEMOGRAPHICS MAP

FEBRUARY 2022 SCALE: NOTED

Weston & Sampson

ALFORD

GREAT BARRINGTON

NEW YORK STATE

SHEFFIELD

MOUNT WASHINGTON

N

Egremont Drive
White's Hill Road
Egremont Plain Road
Rowe Road
Hickory Hill Road
Barce Road
Barrett Pond Dam
Pumpkin Hollow Road
Shun Toll Road
General Knox Lane
Green River
71
Mill Road
Prospect Lake Dam
Prospect Lake
Prospect Lake Road
Second Street
Lakeside Drive
Millard Road
Ox Bow Road
Baldwin Hill Road East West
Blunt Road
Ridge Road
Phillips Road
Hillsdale Road
Tyrell Road
Taconic Lane
23
Nicholson Road
Fisher Lane
Bott Hill Road
Baldwin Hill Road North South
Town House Hill Road
Hubbard Brook
Mcgee Road
Creamery Road
Mill Pond Dam
Mill Pond
Pinecrest Cross Road
Sheffield Road
Mearns Way
Pinecrest Hill Road
Karner Brook
Mount Washington Road
Partridge Drive
Warner Road
41
The Avenue
Farm Lane
Brookvale Road
Hilltop Road
Gulliver Hollow Road
Fenton Brook
Jug End Road
Undermountain Road
Bow Wow Road

0 0.5 1
Miles

Legend

Dams
- Significant Hazard
- N/A

Public Water Supplies
- Community Groundwater Source
- Surface Water Intake
- Non-Community Groundwater Source

Waterways
- Rivers, Streams, and Brooks
- Marsh/Bog/Wooded Marsh
- Lakes, Ponds, Reservoirs

Wellhead Protection Areas
- DEP Approved Zone I
- DEP Approved Zone II
- Interim Wellhead Protection Area

BioMap2
- BioMap2 Core Habitat
- BioMap2 Critical Natural Landscape

FIGURE 1

TOWN OF EGREMONT, MASSACHUSETTS

ENVIRONMENTAL FEATURES MAP

FEBRUARY 2022 SCALE: NOTED

https://www.fema.gov/disasters?field_dv2_state_territory_tribal_value_selective=MA&field_dv2_incident_type_tid=All&field_dv2_declaration_type_value=All&field_dv2_incident_begin_value%5Bvalue%5D%5Bmonth%5D=1&field_dv2_incident_begin_value%5Bvalue%5

Updated on
Jan 2000-Dec 2021

Severe Storm	Tornadoes	Flooding	Severe Winter Storm	Snowstorm	Tropical Storm	Hurricane	Other	Year	Incident Period	Number	Assistance dollars	Type of Assistance	Berkshire
				x				2001	March 05, 2001 - March 07, 2001	EM-3165	$21,065,441	Public Assistance Grant	x
				x				2003	December 06, 2003 - December 07, 2003	EM-3191	35,683,865	Public Assistance Grant	x
x								2003	February 17, 2003 - February 18, 2003	EM-3175	28,844,937	Public Assistance Grant	x
				x				2005	January 22, 2005 - January 23, 2005	EM-3201	49,945,087	Public Assistance Grant	x
x		x						2005	October 07, 2005 - October 16, 2005	DR-1614	$3,640,862 $7,207,478	Individual & Household Program Public Assistance Grant	x
						Katrina		2005	August 29, 2005 - October 01, 2005	EM-3252	$5,854,973	Public Assistance Grant	x
x		x						2007	April 15, 2007 - April 25, 2007	DR-1701	8,293,666	Public Assistance Grant	x
		x	x					2008	December 11, 2008 - December 18, 2008	DR-1813	$49,802,008	Public Assistance Grant	x
			x					2008	December 11, 2008 - December 18, 2008	EM-3296			x
			x	x				2011	January 11, 2011 - January 12, 2011	DR-1959	25,846,401	Public Assistance Grant	x
x				x				2011	October 29, 2011 - October 30, 2011	DR-4051	71,006,602	Public Assistance Grant	x
x								2011	October 29, 2011 - October 30, 2011	EM-3343			x
					Irene			2011	August 27, 2011 - August 29, 2011	DR-4028	$5,559,369 $30,468,685	Individual & Household Program Public Assistance Grant	x
						Sandy		2012	October 27, 2012 - November 08, 2012	EM-3350			x
		x	x	x				2013	February 08, 2013 - February 09, 2013	DR-4110	$65,656,304	Public Assistance Grant	x
							Covid-19	2020	January 20, 2020 and continuing	DR-4496-MA			x
							Covid-19	2020	January 20, 2020 and continuing	EM-3438-MA			x

Hazus: Hurricane Global Risk Report

Region Name: Egremont_HMP

Hurricane Scenario: Probabilistic 100-year Return Period

Print Date: Wednesday, August 25, 2021

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

Table of Contents

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Massachusetts

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 52.83 square miles and contains 1 census tracts. There are over 0 thousand households in the region and a total population of 1,886 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 1 thousand buildings in the region with a total building replacement value (excluding contents) of 449 million dollars (2014 dollars). Approximately 92% of the buildings (and 87% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 1,489 buildings in the region which have an aggregate total replacement value of 449 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

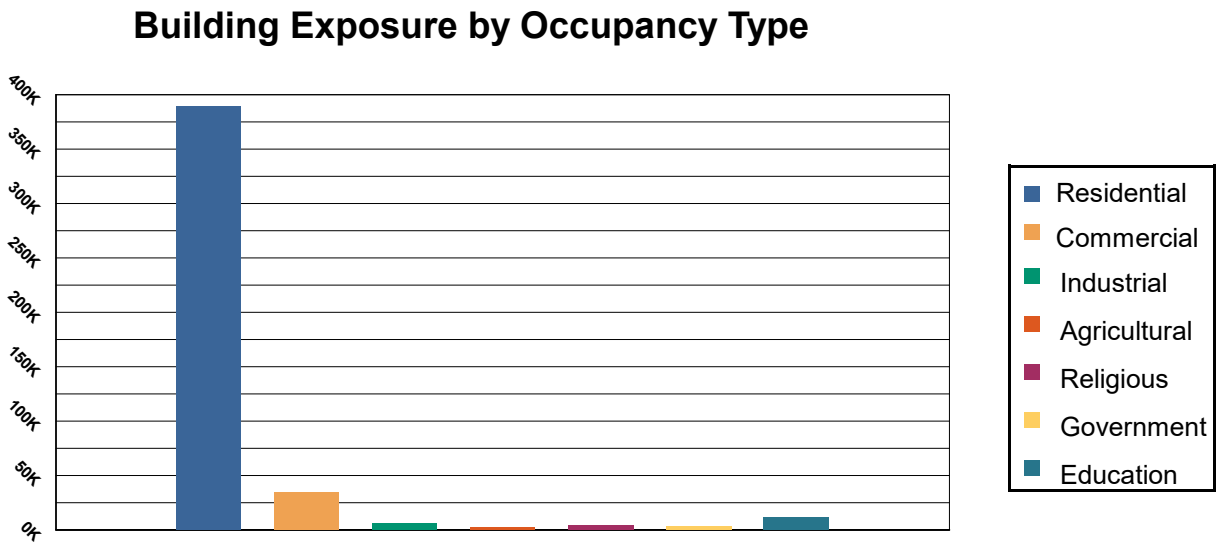


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	388,918	86.55 %
Commercial	34,242	7.62%
Industrial	5,610	1.25%
Agricultural	2,649	0.59%
Religious	3,970	0.88%
Government	2,930	0.65%
Education	11,048	2.46%
Total	**449,367**	**100.00%**

Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds. There are no schools, 1 fire stations, 1 police stations and no emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

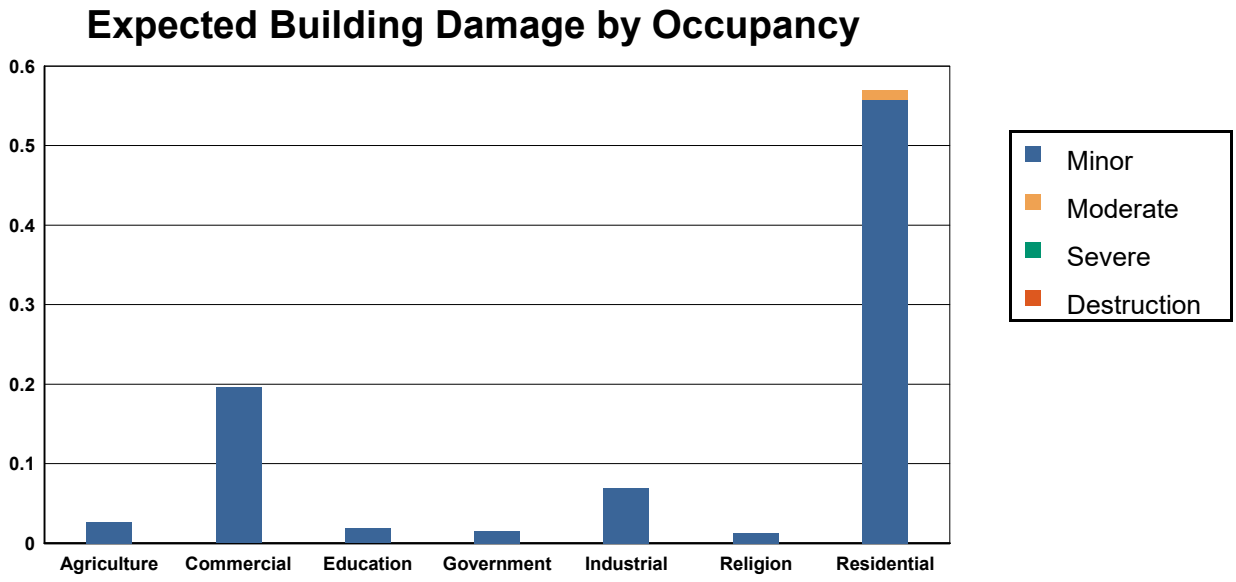


Table 2: Expected Building Damage by Occupancy : 100 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	12.97	99.79	0.03	0.21	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	67.80	99.71	0.20	0.29	0.00	0.00	0.00	0.00	0.00	0.00
Education	5.98	99.69	0.02	0.31	0.00	0.00	0.00	0.00	0.00	0.00
Government	4.98	99.69	0.02	0.31	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	21.93	99.69	0.07	0.31	0.00	0.00	0.00	0.00	0.00	0.00
Religion	5.99	99.79	0.01	0.21	0.00	0.00	0.00	0.00	0.00	0.00
Residential	1,368.43	99.96	0.56	0.04	0.01	0.00	0.00	0.00	0.00	0.00
Total	**1,488.09**		**0.90**		**0.01**		**0.00**		**0.00**	

Table 3: Expected Building Damage by Building Type : 100 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	4	99.61	0	0.39	0	0.00	0	0.00	0	0.00
Masonry	58	99.72	0	0.27	0	0.01	0	0.00	0	0.00
MH	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	50	99.65	0	0.35	0	0.00	0	0.00	0	0.00
Wood	1,319	99.98	0	0.02	0	0.00	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 0 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

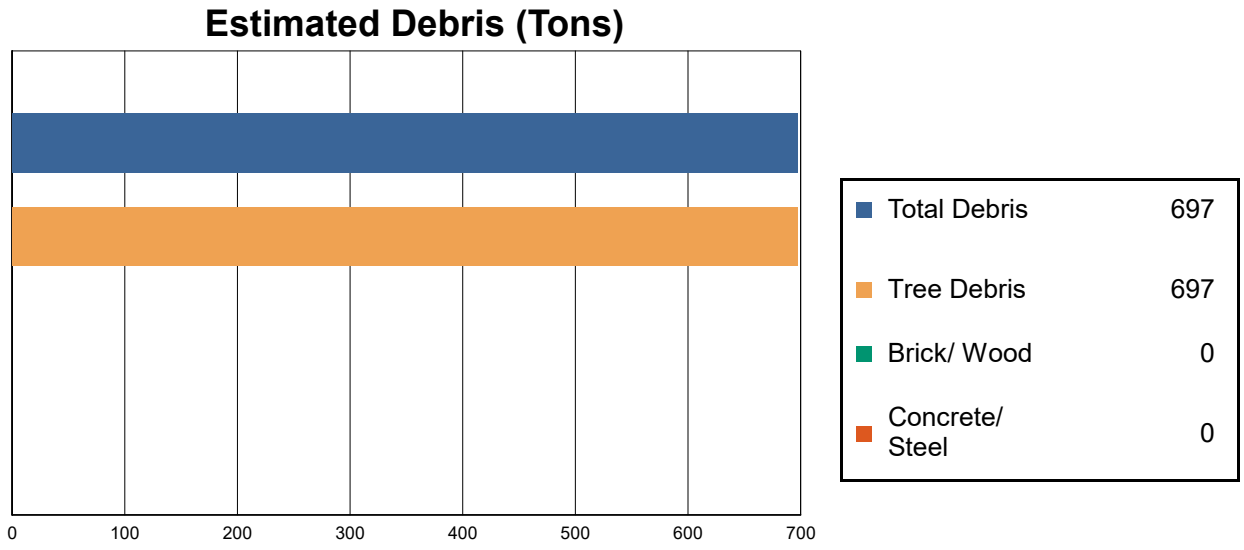
Thematic Map of Essential Facilities with greater than 50% moderate

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	Probability of at Least Moderate Damage > 50%	Probability of Complete Damage > 50%	Expected Loss of Use < 1 day
Fire Stations	1	0	0	1
Police Stations	1	0	0	1

Induced Hurricane Damage

Debris Generation

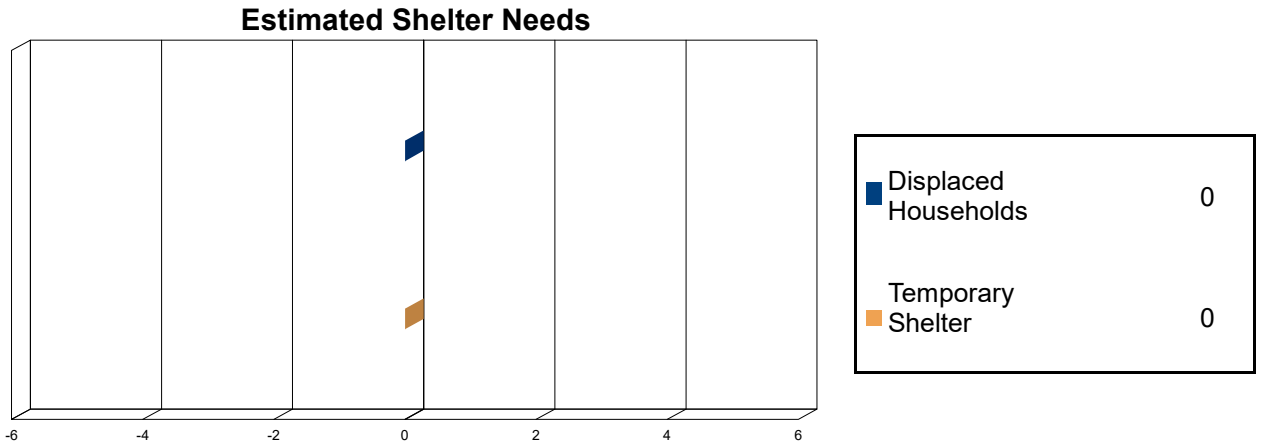


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 697 tons of debris will be generated. Of the total amount, 659 tons (95%) is Other Tree Debris. Of the remaining 38 tons, Brick/Wood comprises 0% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 38 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 1,886) will seek temporary shelter in public shelters.

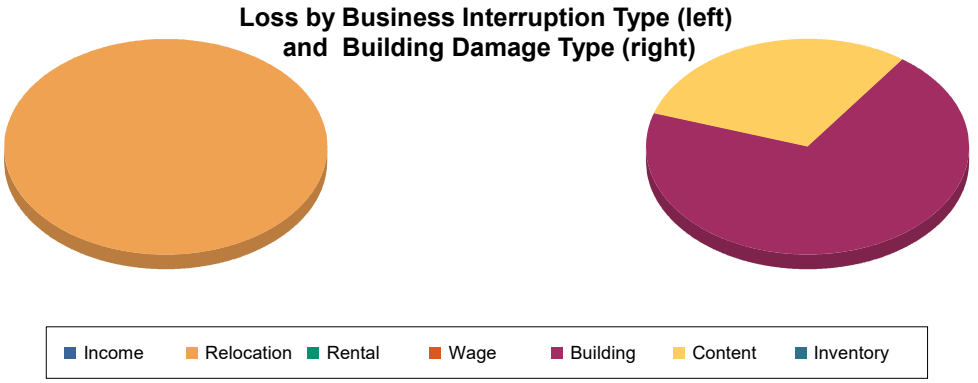
Economic Loss

The total economic loss estimated for the hurricane is 0.3 million dollars, which represents 0.06 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 0 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 98% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.



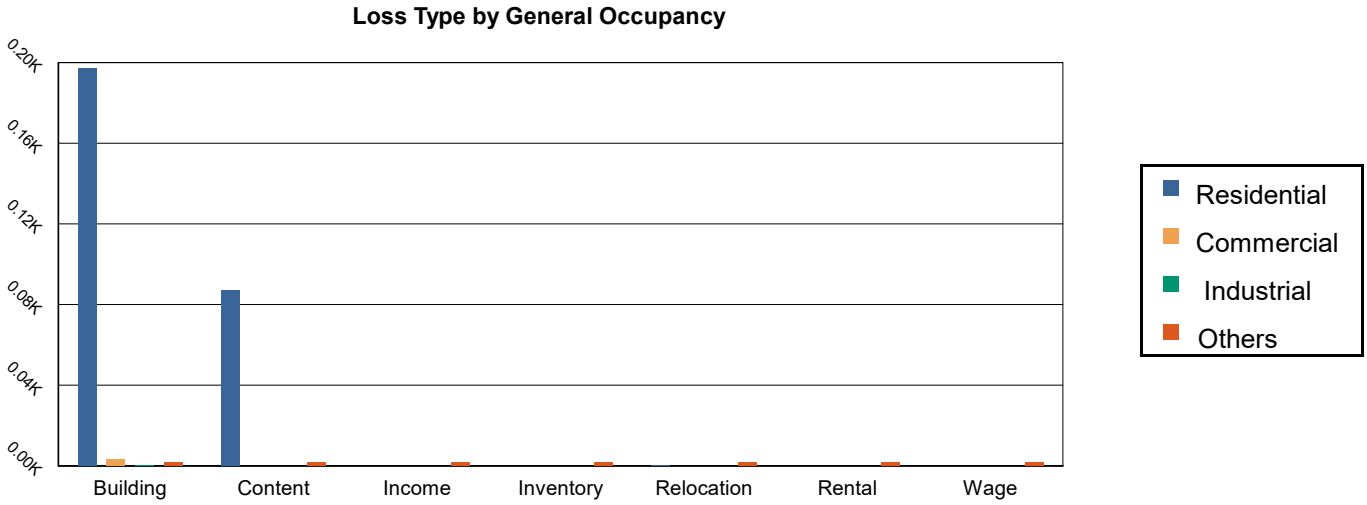


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	197.05	3.42	0.56	1.79	202.83
	Content	87.12	0.00	0.00	0.00	87.12
	Inventory	0.00	0.00	0.00	0.00	0.00
	Subtotal	**284.17**	**3.42**	**0.56**	**1.79**	**289.95**
Business Interruption Loss						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.02	0.00	0.00	0.00	0.02
	Rental	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**0.02**	**0.00**	**0.00**	**0.00**	**0.02**

Total

Total	**284.19**	**3.42**	**0.56**	**1.79**	**289.97**

Appendix A: County Listing for the Region

Massachusetts
- Berkshire

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Massachusetts				
Berkshire	1,886	388,918	60,449	449,367
Total	**1,886**	**388,918**	**60,449**	**449,367**
Study Region Total	**1,886**	**388,918**	**60,449**	**449,367**

Hazus: Hurricane Global Risk Report

Region Name: Egremont_HMP

Hurricane Scenario: Probabilistic 500-year Return Period

Print Date: Wednesday, August 25, 2021

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Hurricane. These results can be improved by using enhanced inventory data.

Table of Contents

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Massachusetts

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 52.83 square miles and contains 1 census tracts. There are over 0 thousand households in the region and a total population of 1,886 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B.

There are an estimated 1 thousand buildings in the region with a total building replacement value (excluding contents) of 449 million dollars (2014 dollars). Approximately 92% of the buildings (and 87% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 1,489 buildings in the region which have an aggregate total replacement value of 449 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

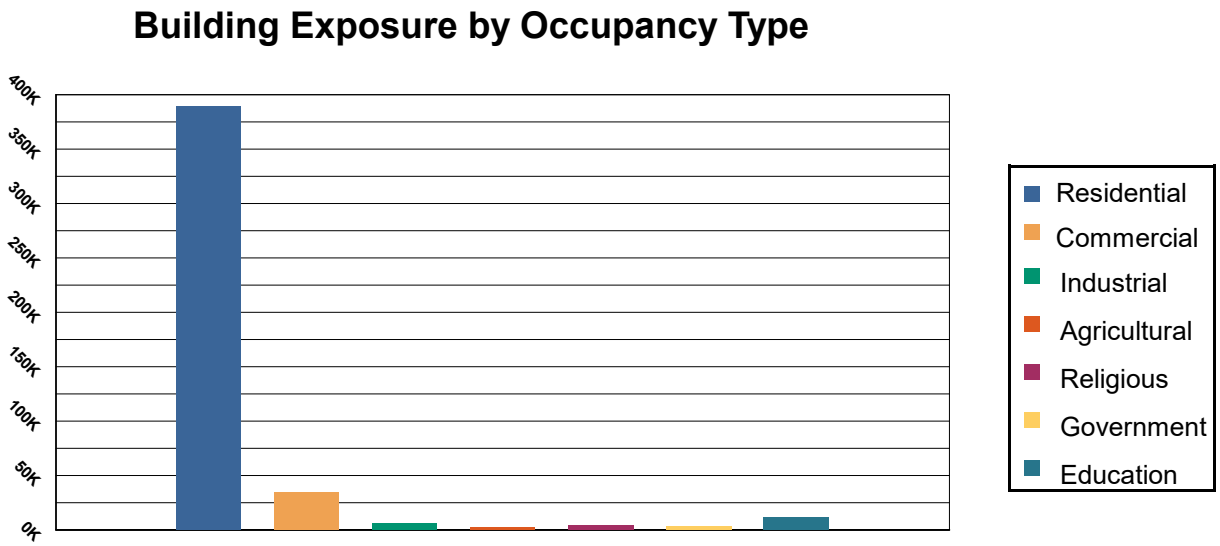


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure ($1000)	Percent of Tot
Residential	388,918	86.55 %
Commercial	34,242	7.62%
Industrial	5,610	1.25%
Agricultural	2,649	0.59%
Religious	3,970	0.88%
Government	2,930	0.65%
Education	11,048	2.46%
Total	**449,367**	**100.00%**

Essential Facility Inventory

For essential facilities, there are no hospitals in the region with a total bed capacity of no beds. There are no schools, 1 fire stations, 1 police stations and no emergency operation facilities.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

Scenario Name:	Probabilistic
Type:	Probabilistic

Building Damage

General Building Stock Damage

Hazus estimates that about 1 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

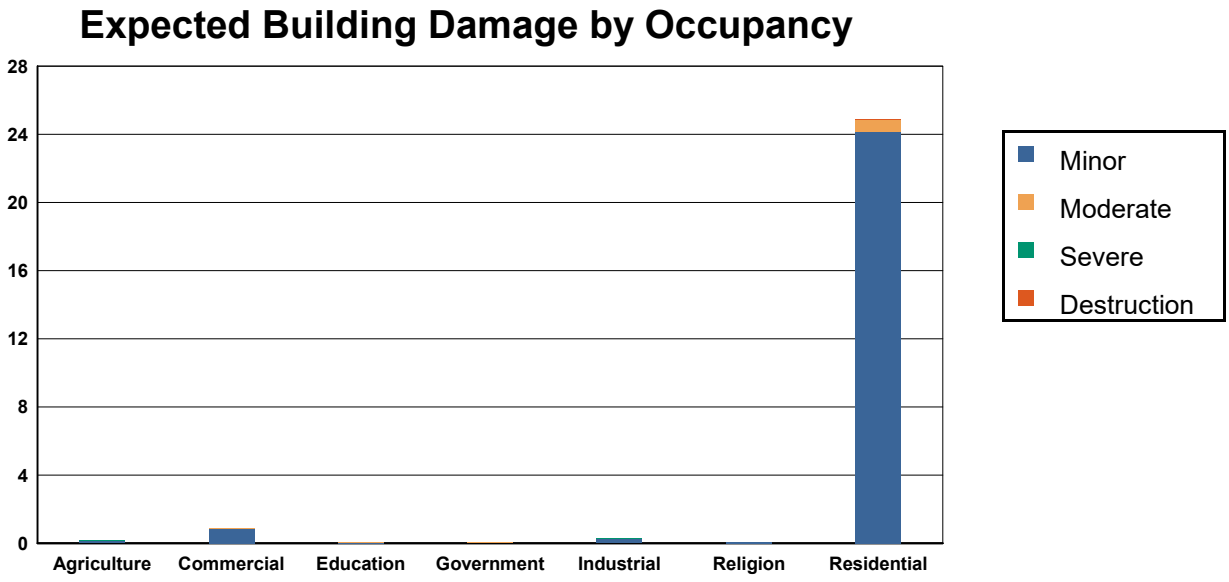


Table 2: Expected Building Damage by Occupancy : 500 - year Event

	None		Minor		Moderate		Severe		Destruction	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	12.81	98.57	0.17	1.29	0.01	0.11	0.00	0.03	0.00	0.00
Commercial	67.11	98.69	0.85	1.24	0.04	0.06	0.00	0.00	0.00	0.00
Education	5.93	98.78	0.07	1.20	0.00	0.01	0.00	0.00	0.00	0.00
Government	4.94	98.82	0.06	1.17	0.00	0.01	0.00	0.00	0.00	0.00
Industrial	21.71	98.70	0.28	1.27	0.01	0.03	0.00	0.00	0.00	0.00
Religion	5.94	99.01	0.06	0.98	0.00	0.01	0.00	0.00	0.00	0.00
Residential	1,344.12	98.18	24.13	1.76	0.75	0.05	0.01	0.00	0.00	0.00
Total	**1,462.56**		**25.61**		**0.81**		**0.01**		**0.00**	

Table 3: Expected Building Damage by Building Type : 500 - year Event

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	4	98.47	0	1.52	0	0.02	0	0.00	0	0.00
Masonry	57	97.94	1	1.85	0	0.20	0	0.01	0	0.00
MH	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	49	98.61	1	1.36	0	0.03	0	0.00	0	0.00
Wood	1,296	98.27	22	1.69	0	0.03	0	0.00	0	0.00

Essential Facility Damage

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 0 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

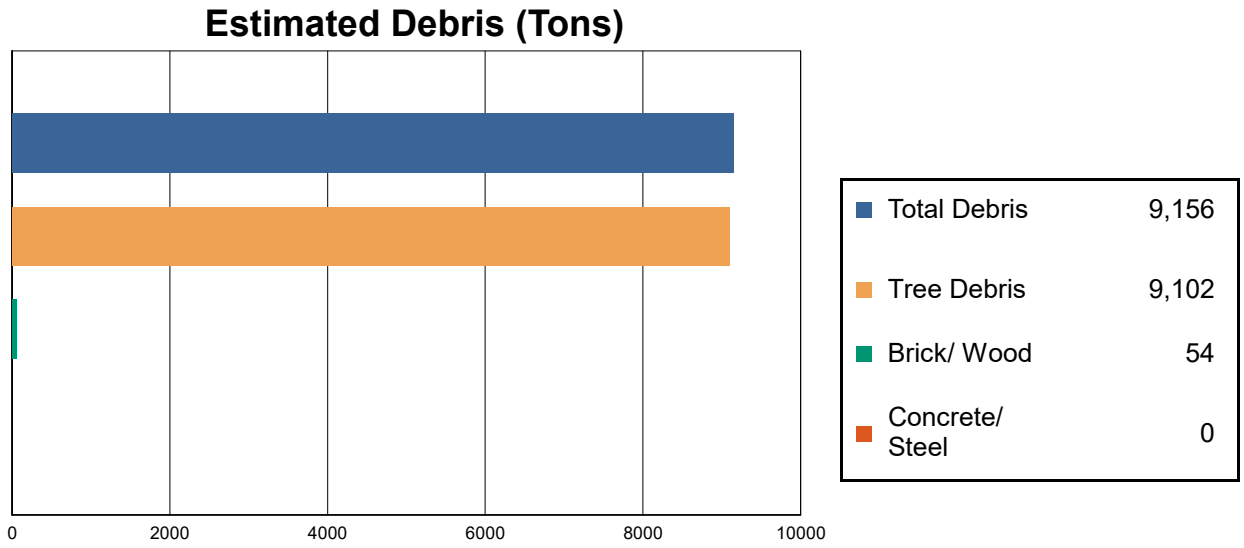
Thematic Map of Essential Facilities with greater than 50% moderate

Table 4: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	Probability of at Least Moderate Damage > 50%	Probability of Complete Damage > 50%	Expected Loss of Use < 1 day
Fire Stations	1	0	0	1
Police Stations	1	0	0	1

Induced Hurricane Damage

Debris Generation

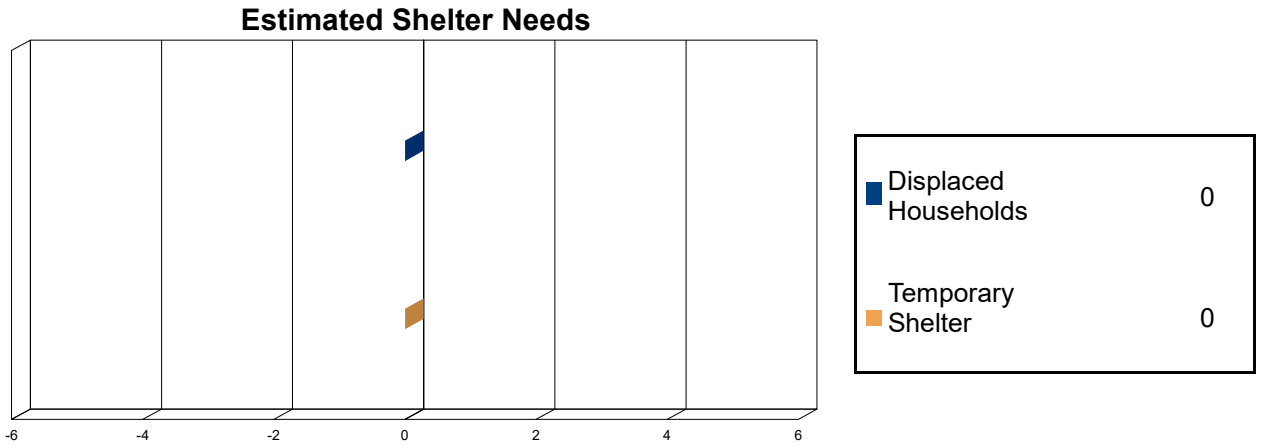


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 9,156 tons of debris will be generated. Of the total amount, 8,603 tons (94%) is Other Tree Debris. Of the remaining 553 tons, Brick/Wood comprises 10% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 2 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 499 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 1,886) will seek temporary shelter in public shelters.

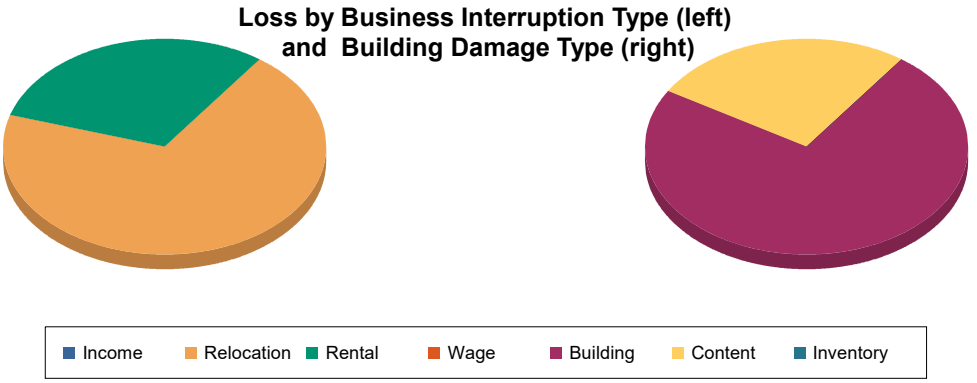
Economic Loss

The total economic loss estimated for the hurricane is 2.0 million dollars, which represents 0.44 % of the total replacement value of the region's buildings.

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 2 million dollars. 1% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 99% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.



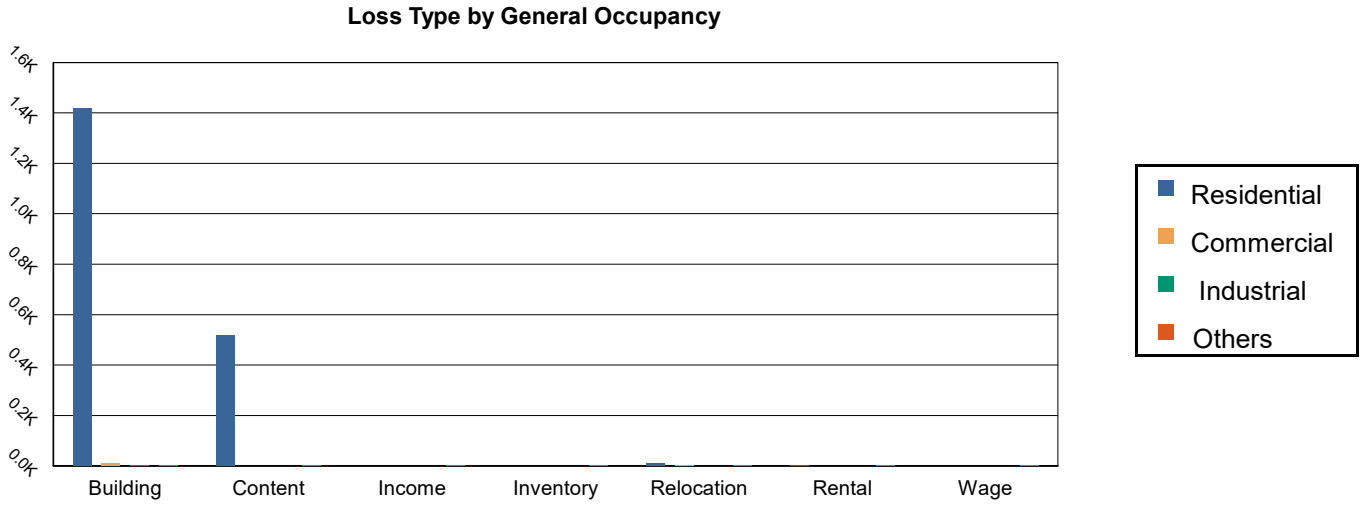


Table 5: Building-Related Economic Loss Estimates

(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Property Damage						
	Building	1,419.17	9.99	1.33	4.55	1,435.03
	Content	517.21	0.00	0.00	0.05	517.26
	Inventory	0.00	0.00	0.00	0.01	0.01
	Subtotal	**1,936.38**	**9.99**	**1.33**	**4.60**	**1,952.30**
Business Interruption Loss						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	8.65	0.12	0.01	0.03	8.81
	Rental	3.82	0.00	0.00	0.00	3.82
	Wage	0.00	0.00	0.00	0.00	0.00
	Subtotal	**12.47**	**0.12**	**0.01**	**0.03**	**12.63**

Total

Total	**1,948.84**	**10.11**	**1.34**	**4.64**	**1,964.93**

Appendix A: County Listing for the Region

Massachusetts
- Berkshire

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Massachusetts				
Berkshire	1,886	388,918	60,449	449,367
Total	**1,886**	**388,918**	**60,449**	**449,367**
Study Region Total	**1,886**	**388,918**	**60,449**	**449,367**

Hazus: Earthquake Global Risk Report

Region Name	Egremont_HMP
Earthquake Scenario:	Earthquake_Mag5
Print Date:	August 25, 2021

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

General Description of the Region

Hazus-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Massachusetts

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 52.81 square miles and contains 1 census tracts. There are over 0 thousand households in the region which has a total population of 1,886 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 1 thousand buildings in the region with a total building replacement value (excluding contents) of 449 (millions of dollars). Approximately 92.00 % of the buildings (and 87.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 282 and 14 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 1 thousand buildings in the region which have an aggregate total replacement value of 449 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 89% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 0 hospitals in the region with a total bed capacity of beds. There are 0 schools, 1 fire stations, 1 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes no hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 296.00 (millions of dollars). This inventory includes over 31.69 miles of highways, 13 bridges, 438.07 miles of pipes.

Table 1: Transportation System Lifeline Inventory

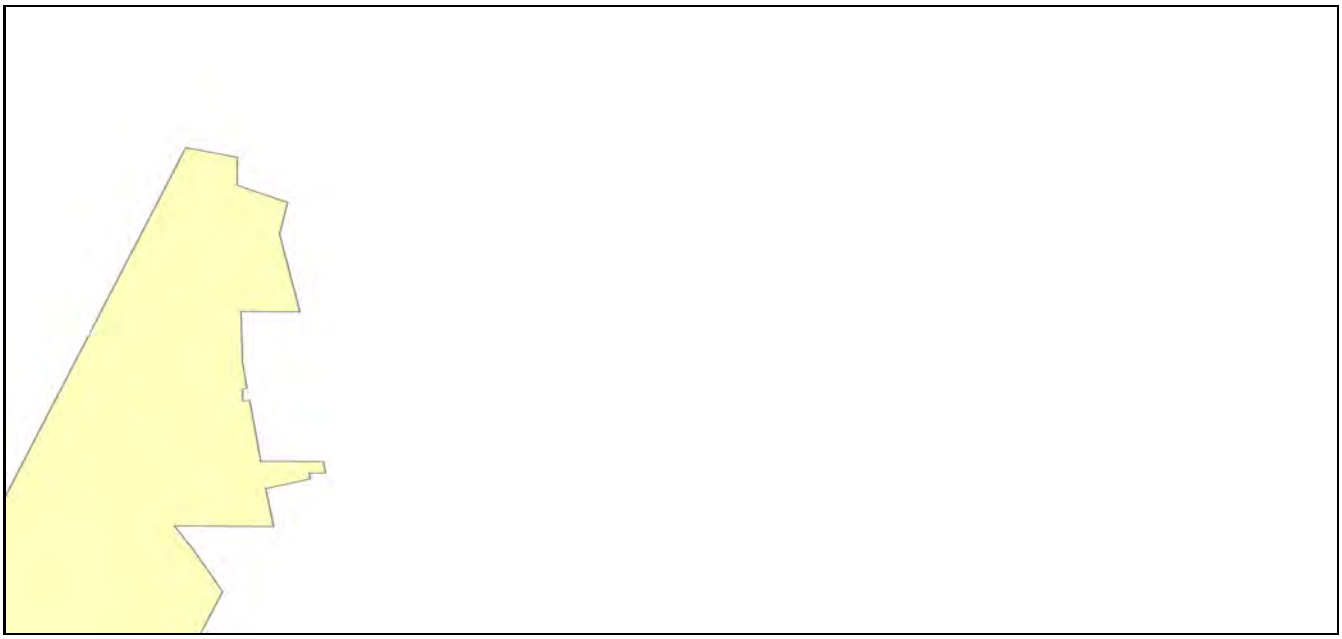
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	13	27.3666
	Segments	9	246.8034
	Tunnels	0	0.0000
		Subtotal	**274.1700**
Railways	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	1	8.7273
	Tunnels	0	0.0000
		Subtotal	**8.7273**
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Bus	Facilities	0	0.0000
		Subtotal	**0.0000**
Ferry	Facilities	0	0.0000
		Subtotal	**0.0000**
Port	Facilities	0	0.0000
		Subtotal	**0.0000**
Airport	Facilities	0	0.0000
	Runways	0	0.0000
		Subtotal	**0.0000**
		Total	**282.90**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	7.0522
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**7.0522**
Waste Water	Distribution Lines	NA	4.2313
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**4.2313**
Natural Gas	Distribution Lines	NA	2.8209
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**2.8209**
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**0.0000**
Electrical Power	Facilities	0	0.0000
		Subtotal	**0.0000**
Communication	Facilities	1	0.1160
		Subtotal	**0.1160**
		Total	**14.20**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.



Scenario Name	Earthquake_Mag5
Type of Earthquake	Arbitrary
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	-73.45
Latitude of Epicenter	42.17
Earthquake Magnitude	5.00
Depth (km)	10.00
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	Central & East US (CEUS 2008)

Direct Earthquake Damage

Building Damage

Hazus estimates that about 296 buildings will be at least moderately damaged. This is over 20.00 % of the buildings in the region. There are an estimated 13 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

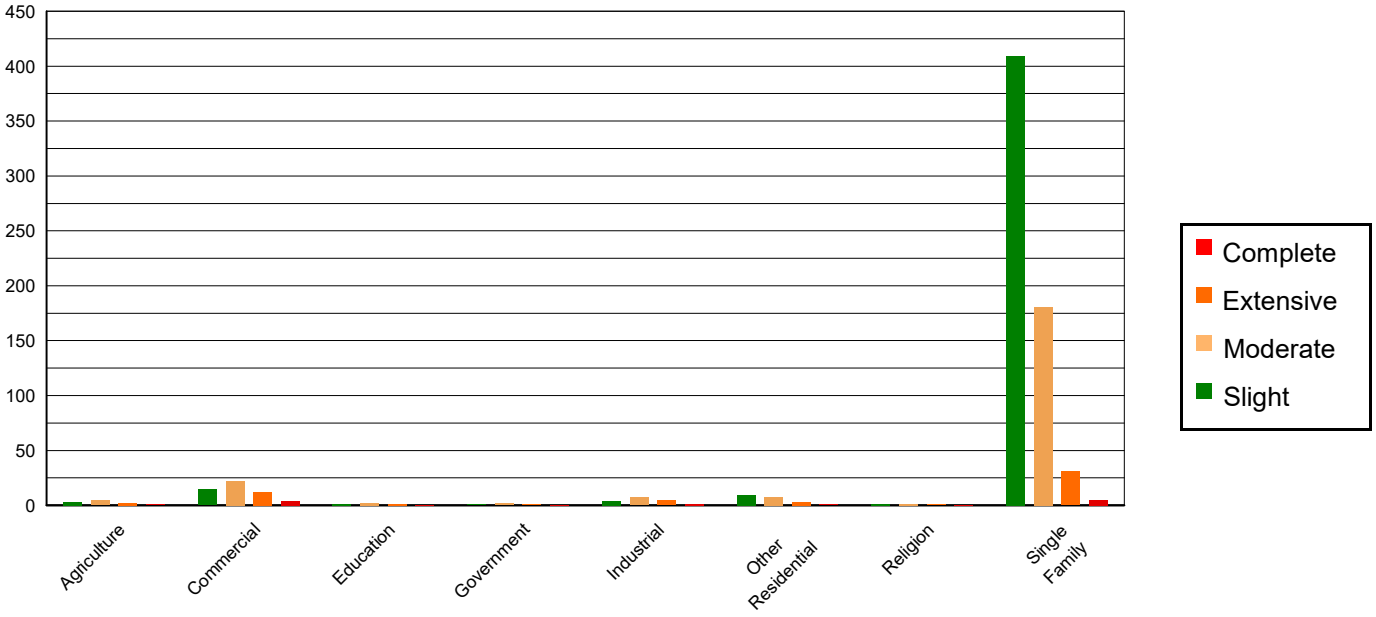


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	2.81	0.38	3.14	0.71	4.35	1.91	2.02	3.59	0.68	5.08
Commercial	15.02	2.01	14.19	3.20	22.28	9.82	12.30	21.92	4.22	31.30
Education	1.39	0.19	1.20	0.27	1.96	0.86	1.09	1.95	0.37	2.71
Government	1.06	0.14	0.93	0.21	1.65	0.73	1.02	1.81	0.34	2.56
Industrial	4.56	0.61	4.09	0.92	7.29	3.21	4.50	8.03	1.55	11.54
Other Residential	15.50	2.07	9.65	2.17	7.50	3.31	3.35	5.97	1.00	7.46
Religion	2.11	0.28	1.42	0.32	1.44	0.63	0.78	1.39	0.26	1.91
Single Family	706.04	94.33	409.43	92.20	180.44	79.52	31.05	55.35	5.04	37.44
Total	**748**		**444**		**227**		**56**		**13**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	710.81	94.97	411.95	92.77	176.61	77.83	24.67	43.97	1.80	13.39
Steel	10.25	1.37	8.82	1.99	18.57	8.18	12.02	21.42	4.30	31.94
Concrete	1.58	0.21	1.39	0.31	3.29	1.45	2.12	3.77	0.65	4.81
Precast	0.59	0.08	0.44	0.10	1.16	0.51	1.18	2.10	0.37	2.77
RM	3.40	0.45	1.68	0.38	3.59	1.58	2.96	5.27	0.55	4.05
URM	21.85	2.92	19.75	4.45	23.70	10.44	13.16	23.46	5.80	43.04
MH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**748**		**444**		**227**		**56**		**13**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had hospital beds available for use. On the day of the earthquake, the model estimates that only hospital beds (%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, % of the beds will be back in service. By 30 days, % will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	0	0	0	0
Schools	0	0	0	0
EOCs	0	0	0	0
PoliceStations	1	1	0	0
FireStations	1	0	0	0

Transportation Lifeline Damage

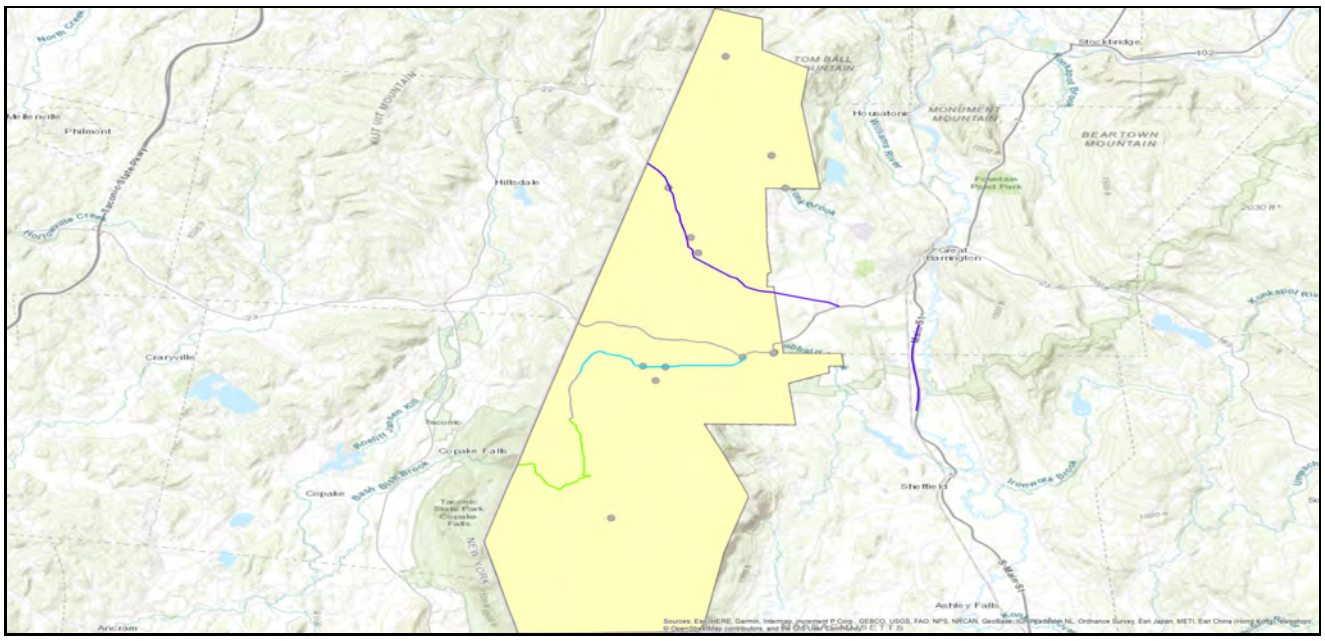


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	9	0	0	9	9
	Bridges	13	0	0	13	13
	Tunnels	0	0	0	0	0
Railways	Segments	1	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	0	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	0	0	0	0	0
	Runways	0	0	0	0	0

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	0	0	0	0	0
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	0	0	0	0	0
Communication	1	1	0	0	1

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	219	58	14
Waste Water	131	29	7
Natural Gas	88	10	2
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	860	0	0	0	0	0
Electric Power		726	485	205	37	1

Induced Earthquake Damage

Fire Following Earthquake

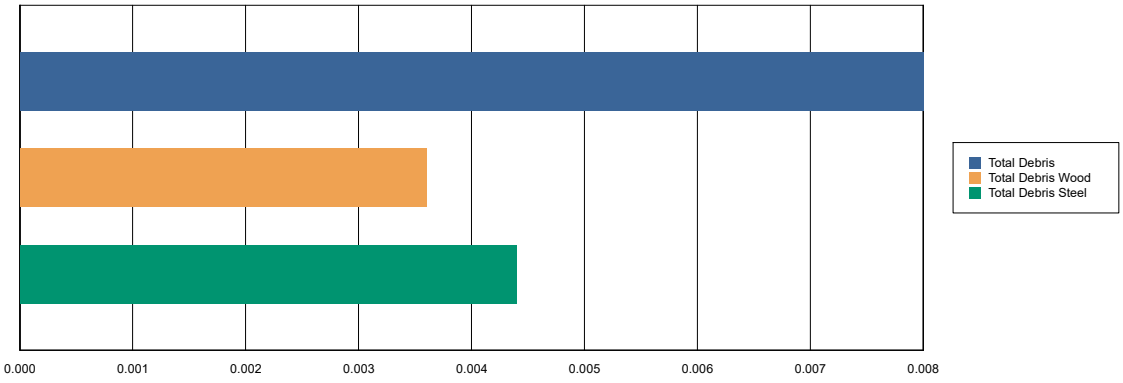
Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 8,000 tons of debris will be generated. Of the total amount, Brick/Wood comprises 45.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 320 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Earthquake Debris (millions of tons)



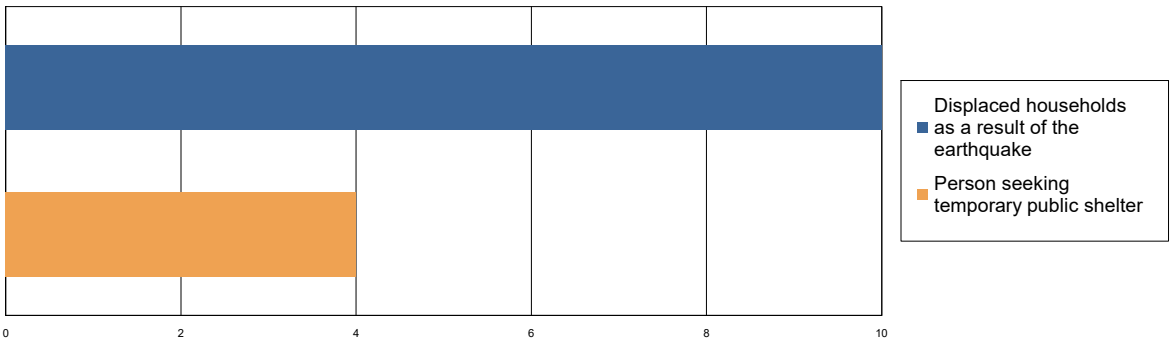
Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
0.00	0.00	0.01	320 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 10 households to be displaced due to the earthquake. Of these, 4 people (out of a total population of 1,886) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter



Displaced households as a result of the earthquake	Persons seeking temporary public shelter
10	4

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	0.13	0.03	0.00	0.01
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.16	0.04	0.01	0.01
	Other-Residential	0.81	0.20	0.03	0.06
	Single Family	2.11	0.36	0.04	0.07
	Total	**3**	**1**	**0**	**0**
2 PM	Commercial	7.82	1.93	0.27	0.52
	Commuting	0.00	0.00	0.00	0.00
	Educational	1.44	0.38	0.06	0.11
	Hotels	0.00	0.00	0.00	0.00
	Industrial	1.21	0.30	0.04	0.08
	Other-Residential	0.21	0.05	0.01	0.01
	Single Family	0.53	0.10	0.01	0.02
	Total	**11**	**3**	**0**	**1**
5 PM	Commercial	5.39	1.34	0.19	0.36
	Commuting	0.01	0.02	0.03	0.01
	Educational	0.20	0.05	0.01	0.02
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.75	0.19	0.03	0.05
	Other-Residential	0.32	0.08	0.01	0.02
	Single Family	0.83	0.15	0.02	0.03
	Total	**8**	**2**	**0**	**0**

Economic Loss

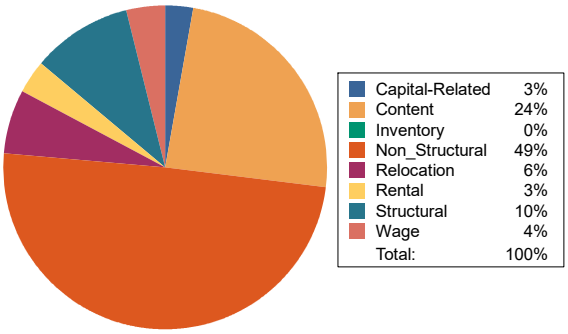
The total economic loss estimated for the earthquake is 56.23 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 55.31 (millions of dollars); 16 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 68 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

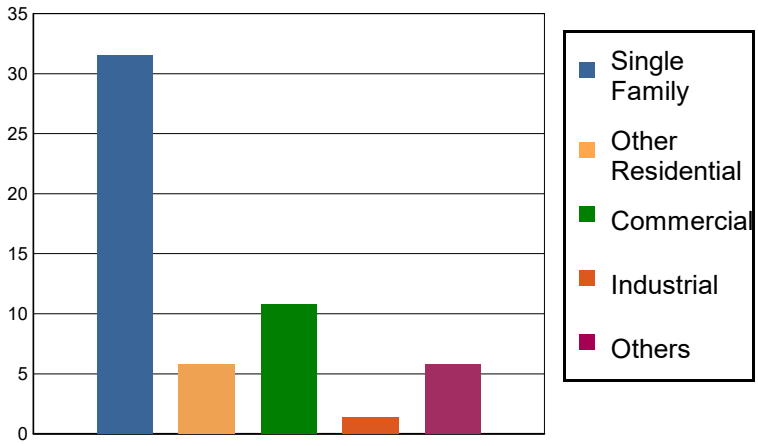


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	0.7019	1.1099	0.0282	0.2923	2.1323
	Capital-Related	0.0000	0.2997	1.1822	0.0157	0.0638	1.5614
	Rental	0.4323	0.7111	0.5936	0.0067	0.0940	1.8377
	Relocation	1.5488	0.1220	0.8459	0.0602	0.8784	3.4553
	Subtotal	**1.9811**	**1.8347**	**3.7316**	**0.1108**	**1.3285**	**8.9867**
Capital Stock Losses							
	Structural	2.9668	0.4699	1.3004	0.1851	0.6786	5.6008
	Non_Structural	17.9589	2.7033	3.7166	0.6365	2.2918	27.3071
	Content	8.6719	0.7963	1.9633	0.3599	1.4909	13.2823
	Inventory	0.0000	0.0000	0.0516	0.0601	0.0194	0.1311
	Subtotal	**29.5976**	**3.9695**	**7.0319**	**1.2416**	**4.4807**	**46.3213**
	Total	**31.58**	**5.80**	**10.76**	**1.35**	**5.81**	**55.31**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	246.8034	0.0000	0.00
	Bridges	27.3666	0.4421	1.62
	Tunnels	0.0000	0.0000	0.00
	Subtotal	**274.1700**	**0.4421**	
Railways	Segments	8.7273	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**8.7273**	**0.0000**	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Bus	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Airport	Facilities	0.0000	0.0000	0.00
	Runways	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**282.90**	**0.44**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Line	7.0522	0.2605	3.69
	Subtotal	**7.0522**	**0.2605**	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Line	4.2313	0.1309	3.09
	Subtotal	**4.2313**	**0.1309**	
Natural Gas	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Line	2.8209	0.0448	1.59
	Subtotal	**2.8209**	**0.0448**	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Electrical Power	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Communication	Facilities	0.1160	0.0382	32.93
	Subtotal	**0.1160**	**0.0382**	
	Total	**14.22**	**0.47**	

Appendix A: County Listing for the Region

Berkshire,MA

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Massachusetts					
	Berkshire	1,886	388	60	449
Total Region		**1,886**	**388**	**60**	**449**

Hazus: Earthquake Global Risk Report

Region Name	Egremont_HMP
Earthquake Scenario:	Earthquake_Mag7
Print Date:	August 25, 2021

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

Table of Contents

General Description of the Region

Hazus-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The earthquake loss estimates provided in this report was based on a region that includes 1 county(ies) from the following state(s):

Massachusetts

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 52.81 square miles and contains 1 census tracts. There are over 0 thousand households in the region which has a total population of 1,886 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 1 thousand buildings in the region with a total building replacement value (excluding contents) of 449 (millions of dollars). Approximately 92.00 % of the buildings (and 87.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 282 and 14 (millions of dollars) , respectively.

Building and Lifeline Inventory

Building Inventory

Hazus estimates that there are 1 thousand buildings in the region which have an aggregate total replacement value of 449 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 89% of the building inventory. The remaining percentage is distributed between the other general building types.

Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 0 hospitals in the region with a total bed capacity of beds. There are 0 schools, 1 fire stations, 1 police stations and 0 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes no hazardous material sites, no military installations and no nuclear power plants.

Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 296.00 (millions of dollars). This inventory includes over 31.69 miles of highways, 13 bridges, 438.07 miles of pipes.

Table 1: Transportation System Lifeline Inventory

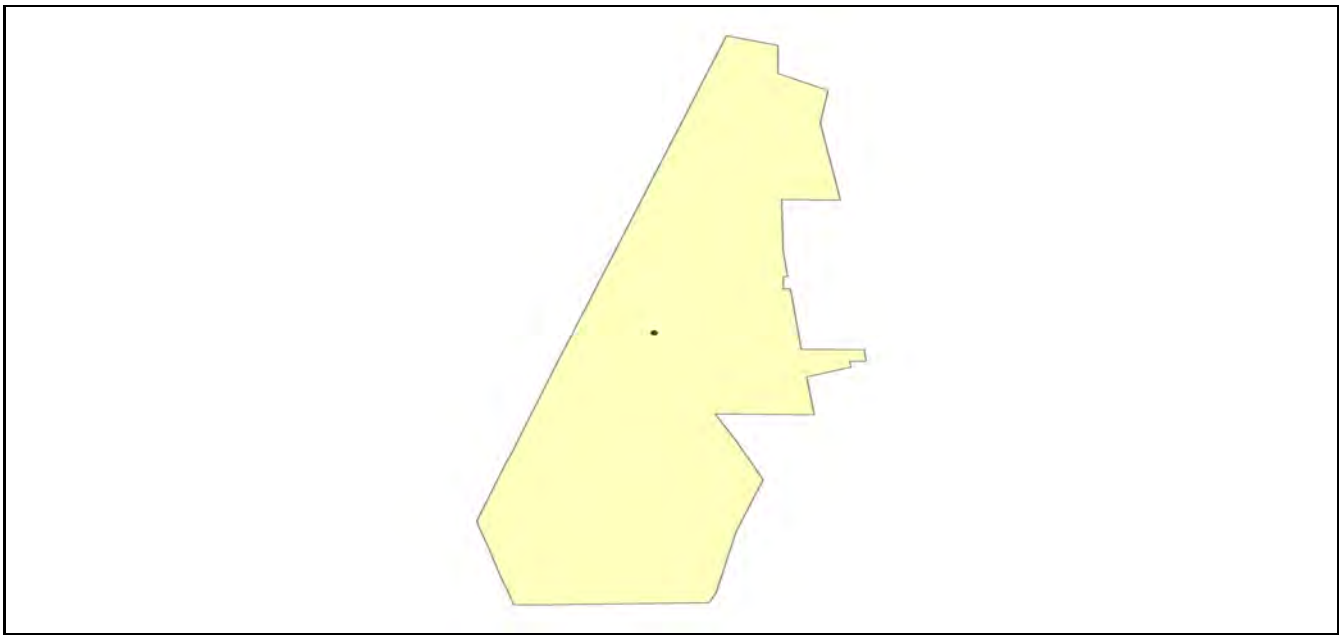
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
Highway	Bridges	13	27.3666
	Segments	9	246.8034
	Tunnels	0	0.0000
		Subtotal	**274.1700**
Railways	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	1	8.7273
	Tunnels	0	0.0000
		Subtotal	**8.7273**
Light Rail	Bridges	0	0.0000
	Facilities	0	0.0000
	Segments	0	0.0000
	Tunnels	0	0.0000
		Subtotal	**0.0000**
Bus	Facilities	0	0.0000
		Subtotal	**0.0000**
Ferry	Facilities	0	0.0000
		Subtotal	**0.0000**
Port	Facilities	0	0.0000
		Subtotal	**0.0000**
Airport	Facilities	0	0.0000
	Runways	0	0.0000
		Subtotal	**0.0000**
		Total	**282.90**

Table 2: Utility System Lifeline Inventory

System	Component	# Locations / Segments	Replacement value (millions of dollars)
Potable Water	Distribution Lines	NA	7.0522
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**7.0522**
Waste Water	Distribution Lines	NA	4.2313
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**4.2313**
Natural Gas	Distribution Lines	NA	2.8209
	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**2.8209**
Oil Systems	Facilities	0	0.0000
	Pipelines	0	0.0000
		Subtotal	**0.0000**
Electrical Power	Facilities	0	0.0000
		Subtotal	**0.0000**
Communication	Facilities	1	0.1160
		Subtotal	**0.1160**
		Total	**14.20**

Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.



Scenario Name	Earthquake_Mag7
Type of Earthquake	Arbitrary
Fault Name	NA
Historical Epicenter ID #	NA
Probabilistic Return Period	NA
Longitude of Epicenter	-73.45
Latitude of Epicenter	42.17
Earthquake Magnitude	7.00
Depth (km)	12.00
Rupture Length (Km)	NA
Rupture Orientation (degrees)	NA
Attenuation Function	Central & East US (CEUS 2008)

Direct Earthquake Damage

Building Damage

Hazus estimates that about 1,458 buildings will be at least moderately damaged. This is over 98.00 % of the buildings in the region. There are an estimated 783 buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

Damage Categories by General Occupancy Type

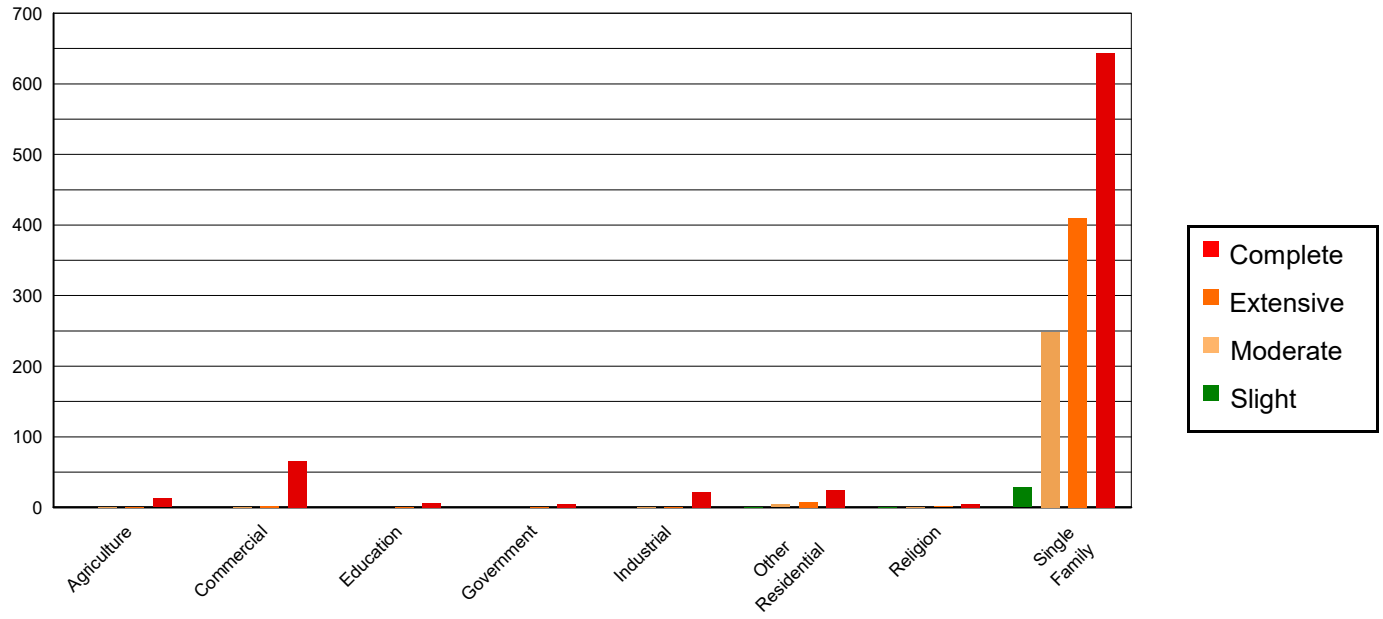


Table 3: Expected Building Damage by Occupancy

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0.00	0.02	0.00	0.01	0.06	0.02	0.67	0.16	12.27	1.57
Commercial	0.00	0.15	0.02	0.06	0.24	0.09	2.29	0.54	65.45	8.35
Education	0.00	0.02	0.00	0.01	0.02	0.01	0.17	0.04	5.81	0.74
Government	0.00	0.01	0.00	0.00	0.01	0.00	0.12	0.03	4.87	0.62
Industrial	0.00	0.05	0.00	0.01	0.05	0.02	0.55	0.13	21.39	2.73
Other Residential	0.03	1.69	0.48	1.67	4.25	1.67	7.23	1.71	25.02	3.19
Religion	0.00	0.18	0.05	0.17	0.44	0.17	0.78	0.18	4.74	0.60
Single Family	1.53	97.89	28.29	98.06	248.52	98.00	409.68	97.20	643.98	82.19
Total	**2**		**29**		**254**		**421**		**784**	

Table 4: Expected Building Damage by Building Type (All Design Levels)

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Wood	1.56	99.71	28.79	99.81	252.98	99.76	417.72	99.11	624.78	79.74
Steel	0.00	0.18	0.00	0.01	0.05	0.02	0.88	0.21	53.02	6.77
Concrete	0.00	0.00	0.00	0.00	0.01	0.00	0.12	0.03	8.90	1.14
Precast	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.01	3.71	0.47
RM	0.00	0.11	0.00	0.01	0.05	0.02	0.15	0.03	11.97	1.53
URM	0.00	0.00	0.05	0.17	0.50	0.20	2.58	0.61	81.13	10.35
MH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**2**		**29**		**254**		**421**		**784**	

*Note:
RM Reinforced Masonry
URM Unreinforced Masonry
MH Manufactured Housing

Essential Facility Damage

Before the earthquake, the region had hospital beds available for use. On the day of the earthquake, the model estimates that only hospital beds (%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, % of the beds will be back in service. By 30 days, % will be operational.

Table 5: Expected Damage to Essential Facilities

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	0	0	0	0
Schools	0	0	0	0
EOCs	0	0	0	0
PoliceStations	1	1	1	0
FireStations	1	1	1	0

Transportation Lifeline Damage

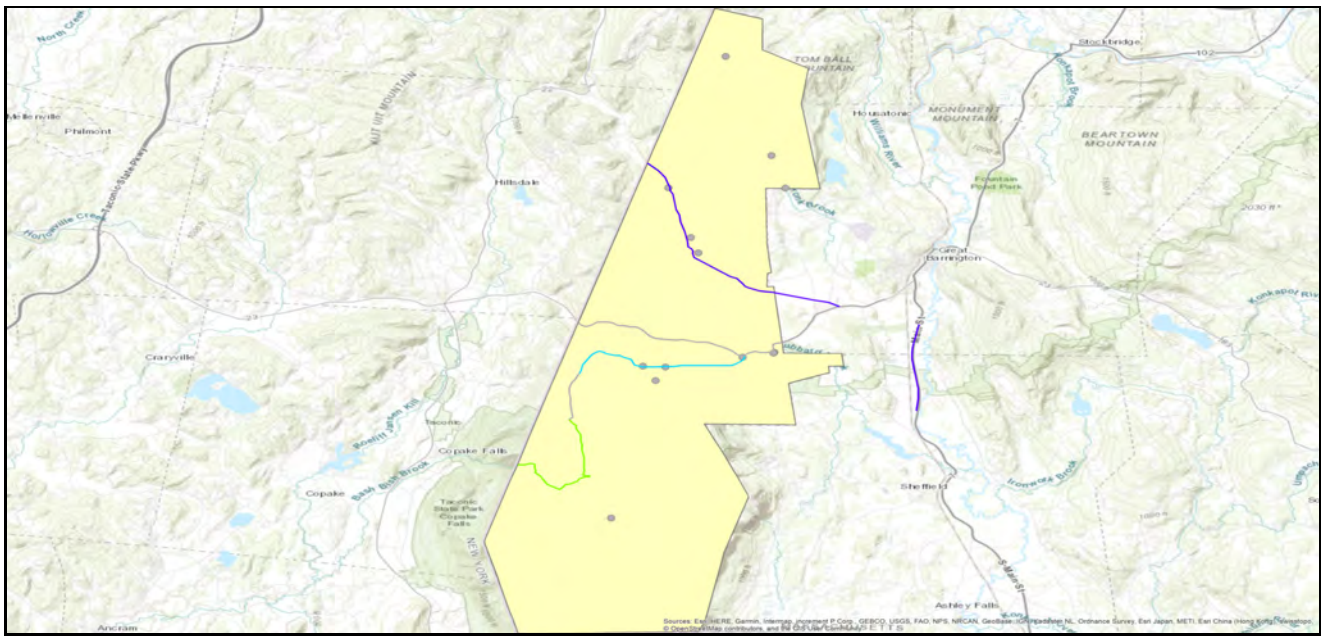


Table 6: Expected Damage to the Transportation Systems

System	Component		Number of Locations			
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	9	0	0	9	9
	Bridges	13	13	12	0	0
	Tunnels	0	0	0	0	0
Railways	Segments	1	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Light Rail	Segments	0	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	0	0	0	0	0
Bus	Facilities	0	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	0	0	0	0	0
Airport	Facilities	0	0	0	0	0
	Runways	0	0	0	0	0

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

Table 7 : Expected Utility System Facility Damage

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	0	0	0	0	0
Waste Water	0	0	0	0	0
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	0	0	0	0	0
Communication	1	1	1	0	0

Table 8 : Expected Utility System Pipeline Damage (Site Specific)

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	219	1896	474
Waste Water	131	952	238
Natural Gas	88	326	82
Oil	0	0	0

Table 9: Expected Potable Water and Electric Power System Performance

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water	860	859	858	855	0	0
Electric Power		829	784	651	279	1

Induced Earthquake Damage

Fire Following Earthquake

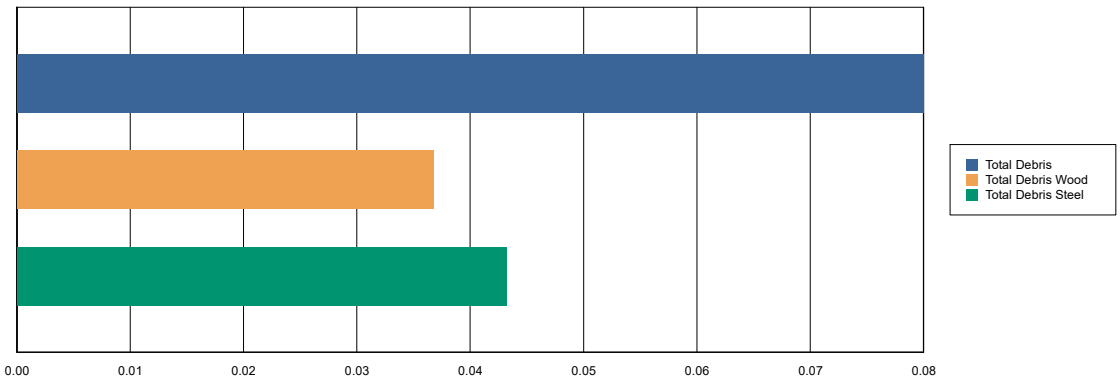
Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about 0.00 sq. mi 0.00 % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 80,000 tons of debris will be generated. Of the total amount, Brick/Wood comprises 46.00% of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require 3,200 truckloads (@25 tons/truck) to remove the debris generated by the earthquake.

Earthquake Debris (millions of tons)



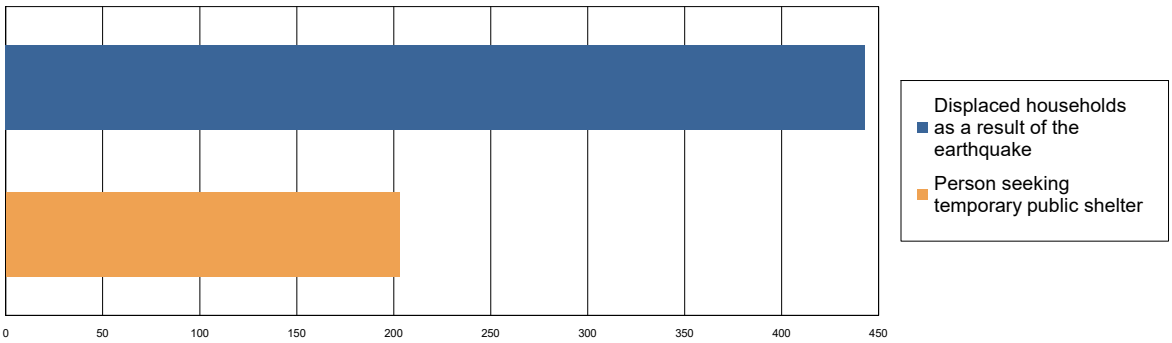
Brick/ Wood	Reinforced Concrete/Steel	Total Debris	Truck Load
0.04	0.04	0.08	3,200 (@25 tons/truck)

Social Impact

Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 443 households to be displaced due to the earthquake. Of these, 203 people (out of a total population of 1,886) will seek temporary shelter in public shelters.

Displaced Households/ Persons Seeking Short Term Public Shelter



Displaced households as a result of the earthquake	Persons seeking temporary public shelter
443	203

Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

Table 10: Casualty Estimates

		Level 1	Level 2	Level 3	Level 4
2 AM	Commercial	1.32	0.42	0.07	0.13
	Commuting	0.00	0.01	0.01	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	1.51	0.49	0.08	0.16
	Other-Residential	10.51	3.25	0.48	0.93
	Single Family	60.32	15.32	1.24	2.17
	Total	**74**	**19**	**2**	**3**
2 PM	Commercial	79.12	25.18	3.99	7.80
	Commuting	0.04	0.12	0.11	0.03
	Educational	13.96	4.65	0.80	1.56
	Hotels	0.00	0.00	0.00	0.00
	Industrial	11.23	3.63	0.59	1.15
	Other-Residential	2.71	0.84	0.13	0.24
	Single Family	15.65	3.99	0.38	0.57
	Total	**123**	**38**	**6**	**11**
5 PM	Commercial	54.75	17.43	2.79	5.36
	Commuting	0.62	2.03	1.97	0.45
	Educational	1.90	0.63	0.11	0.21
	Hotels	0.00	0.00	0.00	0.00
	Industrial	7.02	2.27	0.37	0.72
	Other-Residential	4.21	1.31	0.20	0.37
	Single Family	24.34	6.21	0.59	0.88
	Total	**93**	**30**	**6**	**8**

Economic Loss

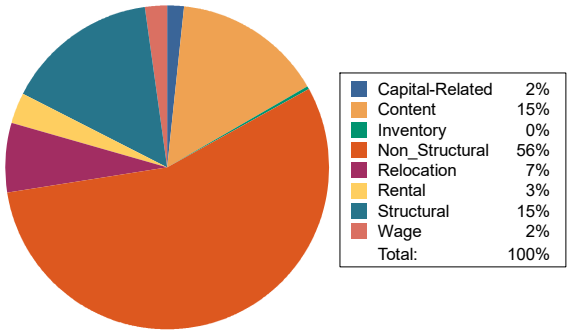
The total economic loss estimated for the earthquake is 484.66 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 453.45 (millions of dollars); 14 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 78 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type ($ millions)



Earthquake Losses by Occupancy Type ($ millions)

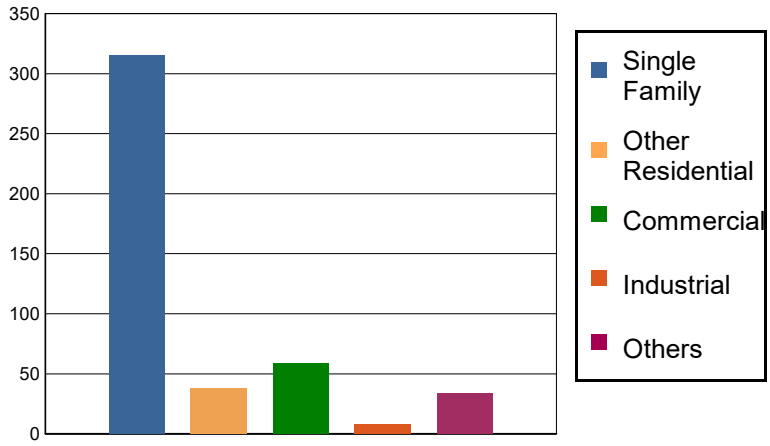


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
Income Losses							
	Wage	0.0000	4.0474	4.7973	0.1449	1.2454	10.2350
	Capital-Related	0.0000	1.7284	5.1975	0.0802	0.3294	7.3355
	Rental	7.1974	3.8899	2.1664	0.0257	0.4380	13.7174
	Relocation	23.5173	0.6863	2.9163	0.1715	3.9873	31.2787
	Subtotal	**30.7147**	**10.3520**	**15.0775**	**0.4223**	**6.0001**	**62.5666**
Capital Stock Losses							
	Structural	55.1012	3.3545	6.6951	0.8676	3.6642	69.6826
	Non_Structural	187.8505	19.9984	24.7537	4.1364	15.1604	251.8994
	Content	41.9759	4.1973	11.6081	2.0863	8.6546	68.5222
	Inventory	0.0000	0.0000	0.3051	0.3496	0.1195	0.7742
	Subtotal	**284.9276**	**27.5502**	**43.3620**	**7.4399**	**27.5987**	**390.8784**
	Total	**315.64**	**37.90**	**58.44**	**7.86**	**33.60**	**453.45**

Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

Table 12: Transportation System Economic Losses
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	246.8034	0.0000	0.00
	Bridges	27.3666	16.8318	61.50
	Tunnels	0.0000	0.0000	0.00
	Subtotal	**274.1700**	**16.8318**	
Railways	Segments	8.7273	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**8.7273**	**0.0000**	
Light Rail	Segments	0.0000	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Bus	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Port	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Airport	Facilities	0.0000	0.0000	0.00
	Runways	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
	Total	**282.90**	**16.83**	

Table 13: Utility System Economic Losses

(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Line	7.0522	8.5325	120.99
	Subtotal	**7.0522**	**8.5325**	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Line	4.2313	4.2861	101.30
	Subtotal	**4.2313**	**4.2861**	
Natural Gas	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Line	2.8209	1.4684	52.05
	Subtotal	**2.8209**	**1.4684**	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Electrical Power	Facilities	0.0000	0.0000	0.00
	Subtotal	**0.0000**	**0.0000**	
Communication	Facilities	0.1160	0.0963	83.02
	Subtotal	**0.1160**	**0.0963**	
	Total	**14.22**	**14.38**	

Appendix A: County Listing for the Region

Berkshire,MA

Appendix B: Regional Population and Building Value Data

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
Massachusetts					
	Berkshire	1,886	388	60	449
Total Region		**1,886**	**388**	**60**	**449**

Appendix C

Workshop Materials

Hazard Mitigation and Municipal Vulnerability Preparedness (HM-MVP) Plan
Community Resilience Building (CRB) Workshop Series

Tuesday, December 14th | 1:00-3:00 PM | Infrastructure Assets
Wednesday, December 15th | 1:00-3:00 PM | Community Resilience
Thursday, December 16th | 1:00-3:00 PM | Natural Resources

Click here to join:
https://us02web.zoom.us/j/84197384323?pwd=Zk5YeVBLakxFTnRwWmZpMzgrQmlTZz09
The workshop series will be held through the online meeting platform Zoom. We are encouraging all participants to join the workshop series through your internet browser. By joining online, you will be able to view the risk matrix that we will be creating as a group in real-time. Alternatively, you may opt to call in via phone for audio and also use an internet browser for visuals.

We do not recommend only joining the meeting for audio (with your phone). However, we are sending materials in advance for you to view if you call in and can't join on an internet connection.

We will join the meeting fifteen minutes early to try to help resolve any technology issues. Please email Lindsey Adams, adamsl@wseinc.com, if you have barriers to participation or other concerns. We have step-by-step instructions on how to join a Zoom meeting on the following page.

AGENDA

Welcome and Introductions	10 minutes
MVP Program Overview	10 minutes
Overview of Hazards and Climate Change Data	15 minutes
Risk Matrix Confirmation	15 minutes
Climate Adaptation Strategies	10 minutes
Action Items	40 minutes
Prioritization	15 minutes
Wrap Up and Next Steps	5 minutes

ZOOM INSTRUCTIONS

Option 1 – Join with Direct Link

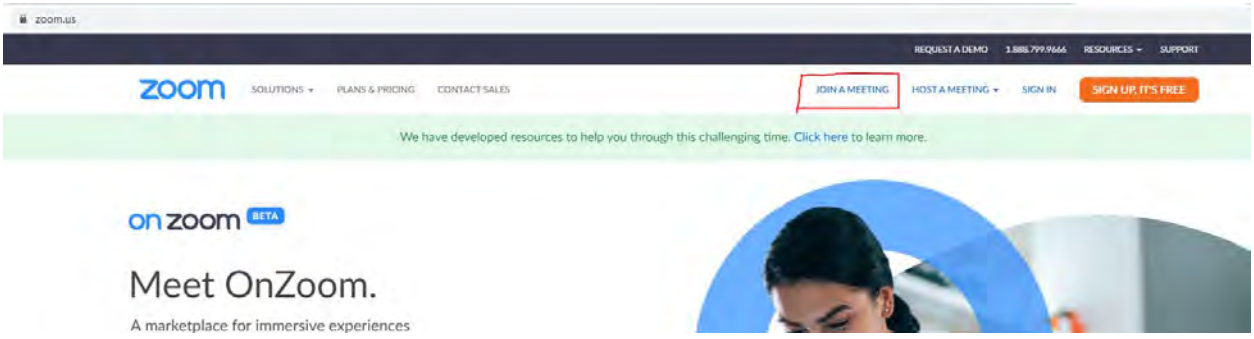
To join via computer or smartphone:

- Click on the link:
  - https://us02web.zoom.us/j/84197384323?pwd=Zk5YeVBLakxFTnRwWmZpMzgrQmlTZz09
- Follow on-screen instructions
- Enter your full name under participant

Option 2 – Join on the Website or App

To join via computer or smartphone:

- Type "Zoom.us" into a web browser
- Click "join a meeting" (*marked by a red box below*)



- Enter the Meeting ID: 841 9738 4323
- Enter Passcode: 284951
- Follow on-screen instructions
- Enter your full name under participant

Option 3 – Join Online for Visuals and with Phone for Audio

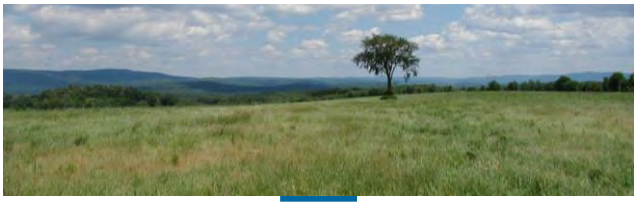
- Join visually using the methods described in Option 1 and Option 2 above
- Call in using phone by dialing: 1-929-205-6099
- Enter the Meeting ID: 841 9738 4323
- Enter Passcode: 284951

Stakeholders Invited to Attend Egremont's Community Resilience Building Workshops

Attended	Name	Affiliation	Title
Core Team/Planning Committee			
X	Juliette Haas	Board of Health	Director/Town Clerk/ Sustainability Coordinator
X	Bruce Bernstein	Council on Aging	Chair
	Dave Rejeski	Resident	
X	Donna Bersch	Planning Board	Former Member
X	Ed McCormick	Emergency Management	Director
X	Emily Eyre	Green Committee	Co-Chair
X	Frederick Gordon	Housing Committee	Member
X	Jim Noe	Highway Department	Superintendent
X	Joyce Frater	Conservation Commission	Associate
X	Lucinda Fenn-Vermeulen	Select Board	Vice Chair
	Will Conklin	Greenagers	Director
X	William Brinker	Egremont Water Department	Clerk
Board/Committee/Town Staff			
	Jennifer Brown	Agricultural Commission	Member
	Francine Groener	Assessors Office	Member
	Charles Ogden	Board of Health	Chairman
	Ned Baldwin	Building Department	Inspector/Zoning Officer
X	Mary McGurn	Bylaw Review Committee	Chairwoman
X	David Seligman	Conservation Commission	Chairman
	Peg Muskrat	Council on Aging	Coordinator
	Chief Joseph Schneider	Egremont Fire Department	Fire Chief
	Lesliann Furcht	Egremont Free Library	Librarian
	Rebecca Turner	Egremont Historical Commission	Chair
X	James Nicoll Cooper	Egremont Historical Commission	
	Chief Jason LaForest	Egremont Police Department	Police Chief
	Poly Lanoue	Egremont Water Department	Commission Chair
	James Golden	Egremont Fire Department	Captain
	Laura Allen	Finance Committee	Chair
	James Olmstead	Fire Department	Constable/Deputy Chief/Tree Warden
	Pat Konecky	Green Committee	Co-Chair
	Jared Kelly	Planning Board	Chair
X	Stephen Lyle	Planning Board	
	George McGurn	Select Board	Chairman
	Marjorie Wexler	Green Committee	Member
X	Peg McDonough	Town of Egremont	ARPA Administrator
Local Leaders/Organizations/Businesses			
X	Mary C	Egremont Resident	
X	Eileen Vining	Egremont Resident	
X	Cecilie MacPherson	Greenagers	Sustainable Agriculture Coordinator
X	Eli Fry	Greenagers	Trails Manager
X	Elia del Molino	Greenagers	Conservation Director
X	Chris Schilling	Greenagers	Land Stewardship Coordinator
	Andre Gordon	41 Main Street Antiques	Owner
	Christine Sierau	Blue Rider Horse Farm	President
	Catherine Kane	Brookside Quilts	Owner
	Rich Edwards	Catamount Aerial Adventure Park	Manager
	Rich Edwards	Catamount Ski Area/Mountain Resort	Manager

	Margaret Muskrat	Egremont Land Trust	President
	Nick Keene	Egremont Village Inn	Managing Owner
	Elizabeth Keen	Indian Line Farm	Owner
	Robert Kronenberg & Robbie Bogard	Inn at Sweet Water Farm	Proprieters
	Dan Smith	John Andrews Restaurant	Owner
	Lucinda Vermeulen	Kenver Sports Store	President
	Danielle Emlaw	Mom's Café/Country Market	Co-owner
	Terry Moore	Old Mill Restaurant	Owner
	Oskar Hallig	Only in My Dreams Events	Co-owner
	Jim Palmatier	Prospect Lake Park	Owner
	Miranda Hoiser	Salisbury Bank	Branch Manager
	Dan Thomas	South Egremont Spirit Shop	Co-owner
	Carla/Paul Turner	Turner Farms (Syrup)	Owners
	Ari Zorn	Zorn Core Fitness/Devine	Owner
	Heidi Zorn	Zorn Family Chiropractic/Devine	Owner
Adjacent Municipalities			
	Peggy Rae Henden-Wilson	Alford	SelectBoard/Town Clerk
	Jeanne Mettler	Copake	Supervisor
	Christopher Rembold	Great Barrington	Director of Planning & Development
	Sean T. VanDeusen	Great Barrington	DPW Superintendent
	Brian Tobin	Mount Washington	Selectboard Member, Acting Police Chief
	Jim Lovejoy	Mt. Washington	Selectboard
	Rhonda Labombard	Sheffield	Town Administrator
State and Regional			
	Jim Pelletier	Appalachian Mountain Club Berkshires	
	Cosmo Catalano	Appalachian Mountain Club Berkshires	
	Adam Galambos	Berkshire Conservation District	Chair
	Margaret Moulton	Berkshire Grown	Executive Director
	Jenny Hansell	Berkshire Natural Resources Council	Director of Stewardship
	Anuja Koirala	Berkshire Regional Planning Commission	RCC Chair
	Melissa Provencher	Berkshire Regional Planning Commission	Program Manager, Energy and Environment
	Sarah Vallieres	Berkshire Regional Transit Authority	
		DCR	West Regional Office
X	Carrieanne Petrik	EEA	MVP Coordinator
	Mary Hurley	MA Governor's Council	Governor's Councilor, 8th District
X	Becky Cushing GOP	Mass Audubon	Regional Director
	Smitty Pignatelli	Massachusetts House of Representatives	4th Berkshire District
	Adam G. Hinds	Massachusetts Senate	State Representative
	Catherine Skiba	MassDEP	
X	Francisca Heming	MassDOT, Highway District 1	District Highway Director
	Jeff Zukowski	MEMA	Hazard Mitigation Planner
X	Thomas Croteau	National Grid	Energy Efficiency Specialist
	Charlie Baker	Office of the Governor	Governor
	Mary Brazie	South Berkshire Chamber of Commerce	Egremont Representative

X	Beth Regulbuto	Southern Berkshire Regional School District	Superintendent of Schools
	Tracy Lind	The Appalachian Trail Conservancy	Southern NE Coordinator
	John Fulop	The Community Land Trust in the Southern Berkshires	President
	Angela Sirois Patel	The Nature Conservancy (MA Chapter)	Western MA Field Office
	Brian Cruey	The Trustees of Reservation	Regional Director
	Richard Neal	US House of Representatives	MA Representative, 1st District
	Edward Markey	US Senate	MA Senator
	Elizabeth Warren	US Senate	MA Senator



TOWN OF EGREMONT

Community Resilience Building Workshop

December 14 – Infrastructure | December 15 | December 16

Weston & Sampson

Photo: Town of Egremont Facebook Page

1

1

WHO'S IN THE ZOOM?

Please introduce yourself in the chat!

Thank you to our elected officials and Core Team members for joining us

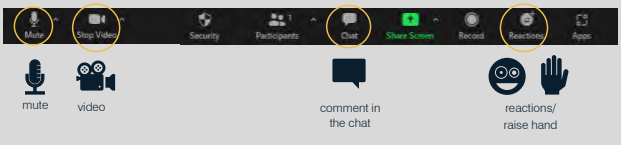
JOANNA NADEAU
RESILIENCY PLANNER

STEVE ROY
SENIOR TECHNICAL ADVISOR

LINDSEY ADAMS
RESILIENCY ENGINEER

2

ZOOM TIPS



JOINING VIA PHONE?
Use *9 to raise hand to ask for audio / video permission to ask questions or provide comments.

3

3

GROUND RULES AND ETIQUETTE

- Help stay on schedule
- Be present/leave technology outside
- One speaker at a time
- Pause for others to unmute
- Assume positive intent
- Be solution and project focused
- Be respectful
- Think big!

This meeting is being recorded. Messages in the chat may also be saved and published.

4

WHY WE'RE HERE

Climate change projections for end of century:

Changes in precipitation

- 18% increase in consecutive dry days
- 57% increase in days with > 1 in. rainfall
- 7.3 inches additional annual rainfall
- Increase in flooding

Rising temperatures

- 10.8°F increase in average annual temperature
- 42% decrease in days/year with min. temperatures < 32° F
- 1,280% increase in 90-degree days/year

Winter weather

- Overall a decrease in annual snowfall
- Likely to have fewer events with a lot of snow
- Freeze –thaw cycle to change

Regional changes

- Increase in frequency and magnitude of hurricanes and nor'easters
- 4-10.5 feet of sea level rise

Source: State Hazard Mitigation and Climate Adaptation Plan, September 2018 / resilientma.org / Northeast Climate Adaptation Science Center

5

WHAT IS NATURAL HAZARD MITIGATION?

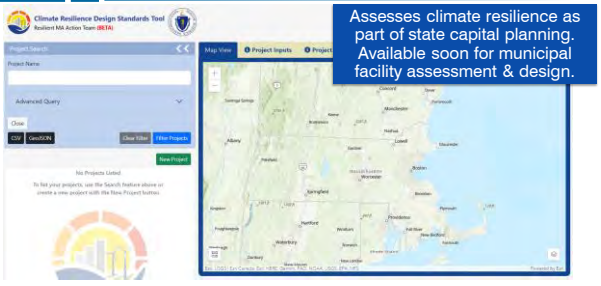
The effort to reduce impacts from natural hazards such as flooding, extreme temperatures, and winter weather…

…through planning, policy, education, infrastructure projects, and more.

Climate adaptation: preparing for projected changes in weather patterns

6

RMAT RESILIENT DESIGN STANDARDS



7

MUNICIPAL VULNERABILITY PREPAREDNESS (MVP) PROGRAM

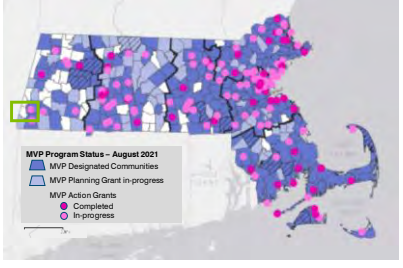
10

2 PHASES OF MVP

You are here!

1. MVP Planning Grant
- Define climate hazards
- Identify community vulnerabilities and strengths
- Develop and prioritize adaptation actions
- Receive MVP designation

2. MVP Action Grant
- Implement priority adaptation actions identified during the planning process



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11

MVP ACTION GRANT EXAMPLES

- Assessments
- Outreach & Education
- Redesign & Retrofit Design
- Construction of Resiliency Measures
- Nature-Based Solutions
- Ecological Restoration
- Water Quality & Infiltration
- Flood Protection
- Extreme Heat Mitigation
- Land Acquisition

12

MILESTONE SCHEDULE

13

WEBINAR OUTLINE

WEBINAR OBJECTIVES:
- Identify vulnerabilities and strengths
- Brainstorm projects or action items
- Prioritize projects or action items

PRESENTATION:
- Overview of the MVP and HMP Programs
- Historic and Future Climate Change Impacts
- Questions/Discussion

Photos: Town of Barnstable

15

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Webinar topic areas:

CLIMATE DATA

- Massachusetts Climate Change Projections (NECSC, 2021 on resilientma.org)
- Massachusetts Integrated State Hazard Mitigation and Climate Adaptation Plan (2018)
- Massachusetts Climate Change Adaptation Report (MA EEA, 2011)

APPLICABLE PLANS/INFO

- Berkshire County Hazard Mitigation Plan (2012)
- Town of Egremont Annual Report (2019, 2020)
- Egremont Master Plan (2003)
- Town of Egremont Bylaws (2017)
- Egremont Stream Crossing Prioritization Meeting Notes (2020)

Weston & Sampson

16

16

LIFELINES & CRITICAL FACILITIES

Feature Type	Name	Address
SAFETY AND SECURITY		
Emergency Operations Center	Egremont Town Hall	171 Egremont Plain Road
Alternative Emergency Operations Center/Fire	Fire Station #1	175 Egremont Plain Road
	Fire Station #2	36 Main Street
Town Offices/Police	Egremont Town Hall and Police Station	171 Egremont Plain Road
FOOD, WATER, SHELTER		
Agriculture	Turner Farms	11 Phillips Road
	Indian Line Farm	57 Jug End Road
	Weisbrod-Bacon-Potts Farm	62 N Undermountain Road
Shelters	Fire Station #2	36 Main Street
	First Congregational Church	50 Main Street
	Fire Station #1	175 Egremont Plain Road
	South Egremont Elementary School	42 Main Street
	Town Hall	171 Egremont Plain Road
Food	Old Egremont Country Store	223 Egremont Plain Road
	Egremont Market	47 MA-23
Food and Fuel Assistance	Berkshire Community Action Council	592 West Street, Pittsfield, MA
Food Assistance	Elder Services of Berkshire County Meals on Wheels	877 South Street Rte, Pittsfield, MA
Water Supply		
Wastewater	Private Septic Systems	Town-wide

See attachment – Draft Critical Facilities List

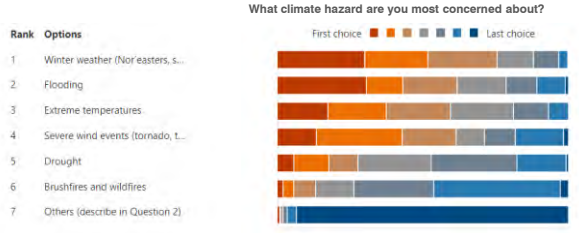
Rebranding by FEMA to Community Lifelines

17

17

Public Survey Results

tinyurl.com/EgremontMVPSurvey



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18

WINTER STORMS

- The blizzard of 2013 left nearly **400,000 Massachusetts residents without power.**[1]
- "Heavy blizzards are among the **most costly and disruptive** weather events for Massachusetts communities."[2]
- Snowpack likely to **decrease annually,** but snowfall will occur with **heavy intensity**
- Extended power outages, cost of snow removal, repairing damages, and loss of business can have a **severe economic impact.**
- **The elderly and infirmed** are populations of particular concern during these events

Graphic: Town of Egremont

1. Resilient MA Climate Change Clearinghouse for the Commonwealth, "Extreme Weather," 2019
2. "Massachusetts State Hazard Mitigation and Adaptation Plan," 2018, P4-226

20

20

HURRICANES AND NOR'EASTERS

Upward trend in North Atlantic hurricane activity since 1970

2012: Hurricane Sandy
2017: Hurricane Jose
2018: Hurricane Florence
2019: Hurricane Dorian
2020: Hurricane Isaias
2021: Hurricane Henri

Nor'easters along the Atlantic coast are increasing in frequency and intensity

March 2, 2018: Winter Storm Riley
March 8, 2018: Winter Storm Quinn
March 13, 2018: Winter Storm Skylar
January 16, 2021: Winter Storm Uri
February 1, 2021: Winter Storm Orlena

Sources: Climate Science Special Report, Fourth National Climate Assessment (NCA4), Volume prepared by the U.S. Global Change Research Program (USGCRP); National Oceanic Atmospheric Administration (NOAA). 2021. Storm Events Database. National Centers for Environmental Information. Berkshire County

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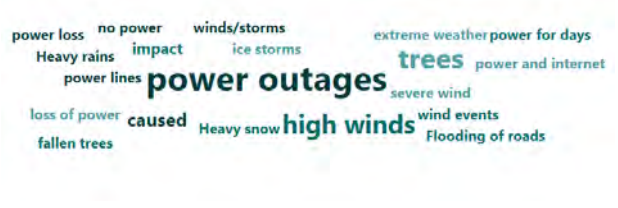
Public Survey Results

tinyurl.com/EgremontMVP Survey

How have these hazards impacted you or your community?



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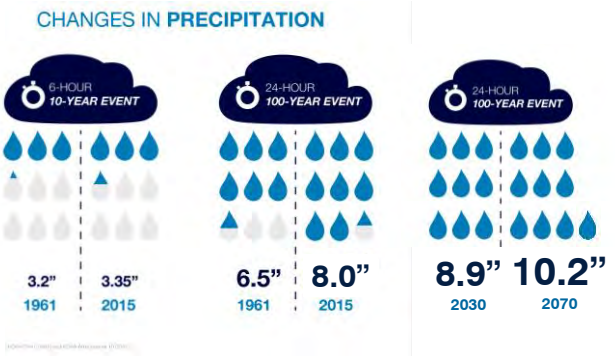


24

Flood Prone Areas

- Boice Road and Rowe Road at intersection with Green River
- Locust Hill Road in Great Barrington causes flooding in Green River upstream
- Shun Toll Road west of Route 71
- Karner Brook and Sheffield Road
- Mount Washington Road (Karner)

Updated in 1985 for Egremont

PRECIPITATION DURING HEAVY EVENTS IN THE NORTHEAST INCREASED BY MORE THAN 70% BETWEEN 1958-2010

"By 2050, Massachusetts could experience the current 100-year riverine flood every two to three years on average"

25

OTHER TYPES OF FLOODING

STORMWATER:

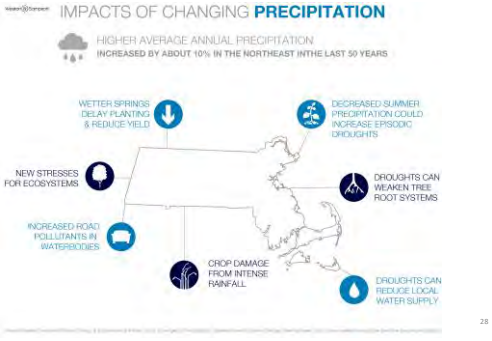
- Poor drainage
- High amounts of impervious surface
- Undersized culverts

- Jug End Road – culvert is undersized
- Residential area downhill side of Jug End Road is affected by stormwater runoff
- Town Hall parking lot collects stormwater flooding
- Shun Toll Road west of Route 71- undersized culvert

BEAVER ACTIVITY

- Marsh Pond, Jug End Road, Mill Pond

26



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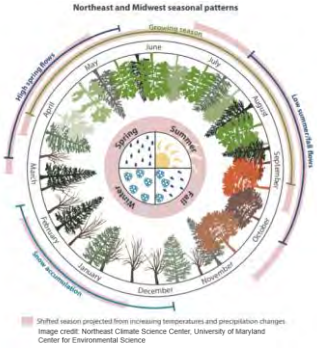


A level one, "mild drought" was declared in Berkshire County from March to May, 2021.

The occurrence of droughts lasting 1 to 3 months could go up by as much as 75% over existing conditions by the end of the century, under the high emissions scenario.

What was the drought response in 2021?

29

EXTREME TEMPERATURES

WARMER ANNUAL AIR TEMPERATURES
UP 0.5°F PER DECADE SINCE 1970, ON AVERAGE

WARMER WINTERS
UP 1.3°F PER DECADE SINCE 1970, ON AVERAGE

30

EXTREME TEMPERATURES

1	10	22
2005 OBSERVED ANNUAL AVERAGE	MID-CENTURY PROJECTED ANNUAL AVERAGE	END-OF-CENTURY PROJECTED ANNUAL AVERAGE

DAYS WITH TEMPERATURES ABOVE 90°F

170	148	123
2005 OBSERVED ANNUAL AVERAGE	MID-CENTURY PROJECTED ANNUAL AVERAGE	END-OF-CENTURY PROJECTED ANNUAL AVERAGE

DAYS WITH TEMPERATURES BELOW 32°F

31

IMPACTS OF **RISING TEMPERATURES**

WARMER ANNUAL AIR TEMPERATURES
UP 0.5°F PER DECADE SINCE 1970, ON AVERAGE

WARMER WINTERS
UP 1.3°F PER DECADE SINCE 1970, ON AVERAGE

32

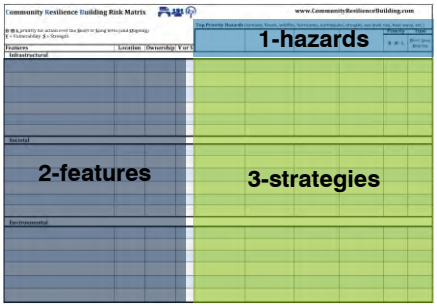
Any questions
about climate hazards?

33

RISK MATRIX

34

RISK MATRIX



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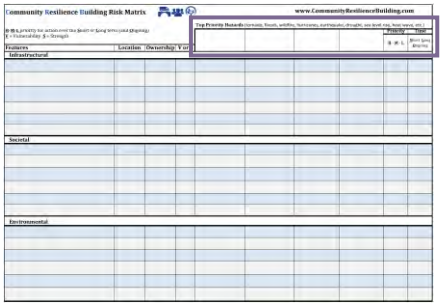
RISK MATRIX: HAZARDS



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CLIMATE HAZARDS IN EGREMONT

37

RISK MATRIX: FEATURES

38

RISK MATRIX: FEATURES

FEATURES	LOCATION	OWNERSHIP	VULNERABILITY OR STRENGTH
Infrastructural	Town wide	State	Vulnerability
Societal	Multi- vs. Single-neighborhood	Town	Strength
Economic	Specific location	Private	Both
Environmental		Shared	

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INFRASTRUCTURAL FEATURES

Electrical and Communications Infrastructure

Emergency Services

Photo: Town of Egremont

Roadways

Photo: Town of Egremont

Wastewater Treatment and Collection

Photo: New England Public Media

Water Supply

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INFRASTRUCTURAL FEATURES

- Water supply – wells and public system
- Septic systems
- Communications network and infrastructure
- Dams
- Culverts and bridges
- Roadways
- Electrical Infrastructure (power lines) – National Grid
- Emergency shelters

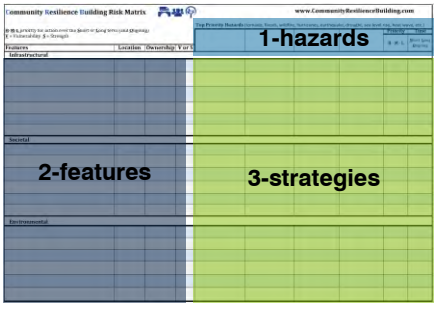
43

ADAPTATION STRATEGIES: INFRASTRUCTURE

Photo: McGuire Media

44

RISK MATRIX



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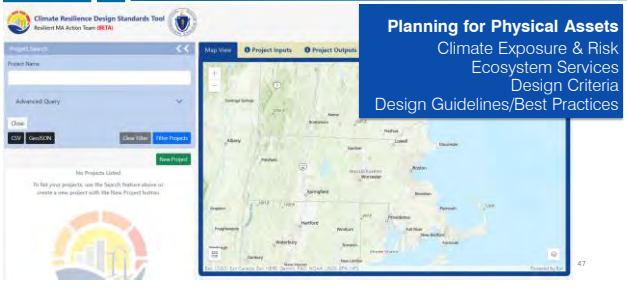
ADAPTATION STRATEGY TYPES

46

46

RESILIENT DESIGN STANDARDS (RMAT)



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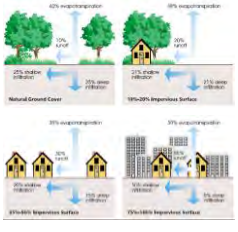
STORMWATER STRATEGIES

DETENTION
RETENTION
CONVEYANCE



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LOW IMPACT DEVELOPMENT (LID)

Bioretention
Rain Gardens
Tree Box Filters
Permeable Pavement

49

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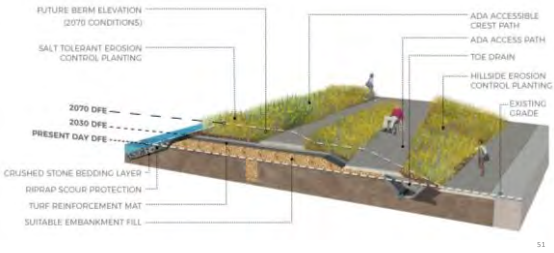
VEGETATED BERM



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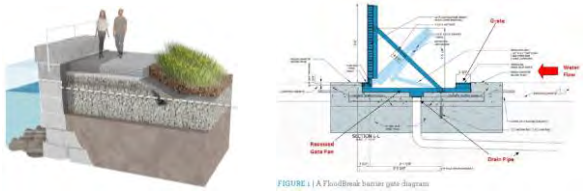
FLOOD WALLS | DEPLOYABLE BARRIERS



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CULVERT WIDENING TO IMPROVE HABITAT & FLOW

54

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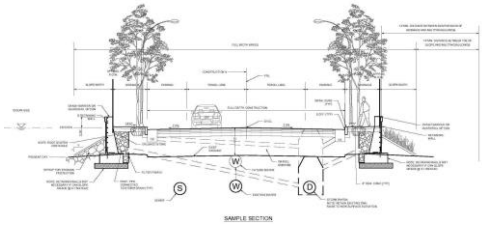
RAISED ROADWAYS



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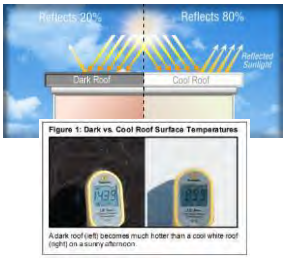
LOCAL BUSINESSES OR FACILITIES

56

56

ROOF STRATEGIES



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RENEWABLE ENERGY/MICRO-GRIDS

58

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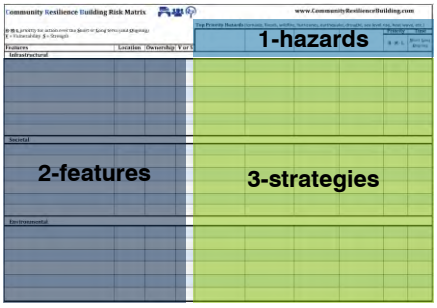
RE-EVALUATE LOCAL REGULATIONS & POLICIES

59

59

RISK MATRIX



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slido

What priority level is this action?

Start presenting to display the poll results on this slide.

61

61

slido

Would this be a short term or long term action?

Start presenting to display the poll results on this slide.

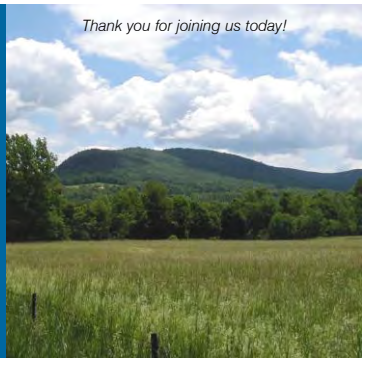
62

62

NEXT STEPS

Join tomorrow's webinar!

- December 15: Community Assets & Economy
- December 16: Natural Resources



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TOWN OF EGREMONT

Community Resilience Building Workshop

December 14 | ***December 15 – Community Assets*** | December 16

Photo: Town of Egremont Facebook Page

1

1

WHO'S IN THE ZOOM?

Thank you to our elected officials and Core Team members for joining us

JOANNA NADEAU
RESILIENCY PLANNER

STEVE ROY
SENIOR TECHNICAL ADVISOR

ALEX GASPAR
ENVIRONMENTAL SCIENTIST

2

GROUND RULES AND ETIQUETTE

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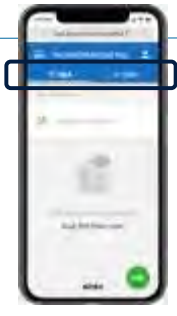
3

JOIN US ON SLIDO!

1. Open a web browser
2. Type in slido.com
3. Enter code: **EGREMONT**



You can move between the Q&A tab and the polls tab!

5

slido

What is one thing you learned yesterday?

Start presenting to display the poll results on this slide.

6

6

WEBINAR OUTLINE

WEBINAR OBJECTIVES:

- Identify vulnerabilities and strengths
- Brainstorm projects or action items
- Prioritize projects or action items

PRESENTATION:

- Quick Overview
- Adaptation Strategies
- Questions/DIscussion

Photos: Town of Egremont

Webinar topic areas:

INFRASTRUCTURE

COMMUNITY

NATURAL RESOURCES

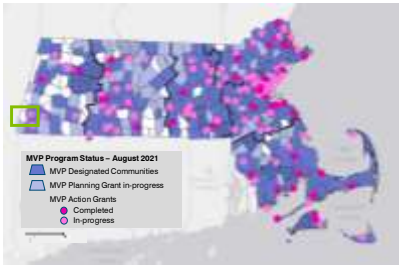
7

2 PHASES OF MVP

You are here!

1. MVP Planning Grant
- Define climate hazards
- Identify community vulnerabilities and strengths
- Develop and prioritize adaptation actions
- Receive MVP designation

2. MVP Action Grant
- Implement priority adaptation actions identified during the planning process



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MVP ACTION GRANT EXAMPLES

- Assessments
- Outreach & Education
- Redesign & Retrofit Design
- Construction of Resiliency Measures
- Nature-Based Solutions
- Ecological Restoration
- Water Quality & Infiltration
- Flood Protection
- Extreme Heat Mitigation
- Land Acquisition

11

WHY WE'RE HERE

Climate change projections for end of century:

Changes in precipitation
- 18% increase in consecutive dry days
- 57% increase in days with > 1 in. rainfall
- 7.3 inches additional annual rainfall
- Increase in flooding

Rising temperatures
- 10.8°F increase in average annual temperature
- 42% decrease in days/year with min. temperatures < 32° F
- 1,280% increase in 90-degree days/year

Winter weather
- Overall a decrease in annual snowfall
- Likely to have fewer events with a lot of snow
- Freeze –thaw cycle to change

Regional changes
- Increase in frequency and magnitude of hurricanes and nor'easters
- 4-10.5 feet of sea level rise

Source: State Hazard Mitigation and Climate Adaptation Plan, September 2018 / resilientma.org / Northeast Climate Adaptation Science Center

16

WHAT IS NATURAL HAZARD MITIGATION?

The effort to reduce impacts from natural hazards such as flooding, extreme temperatures, and winter weather…

…through planning, policy, education, infrastructure projects, and more.

Climate adaptation: preparing for projected changes in weather patterns

EVERY $1 SPENT ON MITIGATION

SAVES $6 ON DISASTER RECOVERY

17

CLIMATE ADAPTATION OR CLIMATE MITIGATION?

18

WINTER STORMS

- The blizzard of 2013 left nearly **400,000 Massachusetts residents without power.**[1]
- "Heavy blizzards are among the **most costly and disruptive** weather events for Massachusetts communities."[2]
- Snowpack likely to **decrease annually,** but snowfall will occur with **heavy intensity**
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Graphic: Town of Egremont

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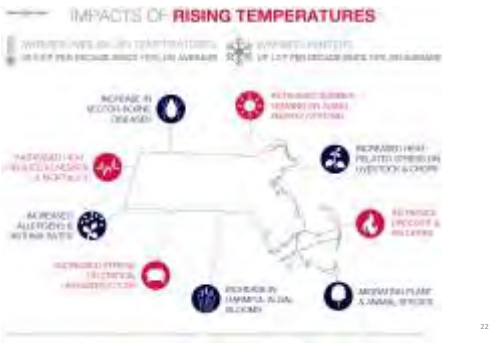

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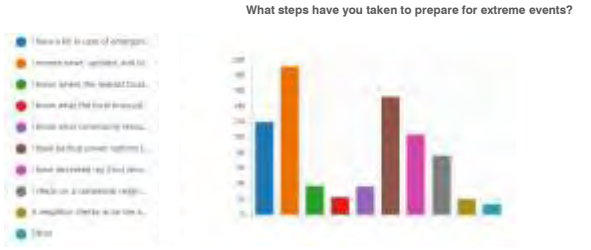
Preliminary Public Survey Results



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RISK MATRIX

Photo: Town of Egremont

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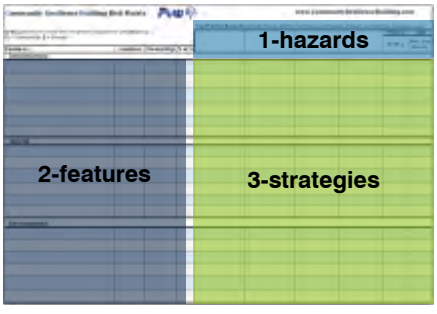
RISK MATRIX



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CLIMATE HAZARDS IN EGREMONT

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RISK MATRIX: FEATURES

FEATURES	LOCATION	OWNERSHIP	VULNERABILITY OR STRENGTH
Infrastructural	Town wide	State	Vulnerability
Societal	Multi- vs. Single-neighborhood	Town	Strength
Economic	Specific location	Private	Both
Environmental		Shared	

29

29

SOCIETAL FEATURES

Population	Egremont	Massachusetts
2018	1,380	6,902,149
2010	1,372	6,547,790
Age		
Under 18 years	17%	19.8%
65+ years	**27.9%**	16.5%
Economics		
Median household income, 2014-2018	$71,528	$77,378
Persons in poverty	5%	10.0%
Additional Information		
Bachelor's degree or higher:	42.4%	42.9%
With a disability	12.6%	7.9%
Language other than English spoken at home	6.3%	23.6%

U.S. Census Bureau, 2019

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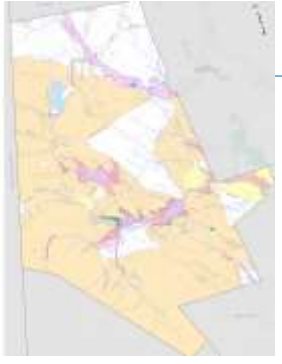
POPULATION > 65



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KEY BUSINESS SECTORS

36

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SOCIETAL FEATURES

- Agriculture
- Tourism
- Historic Villages and buildings
- Senior population
- Emergency Shelters
- Schools
- Climate Migration
- Health Department

Photo on right: Indian Line Farm

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ADAPTATION STRATEGIES: COMMUNITY RESILIENCE

Photo: Town of Egremont

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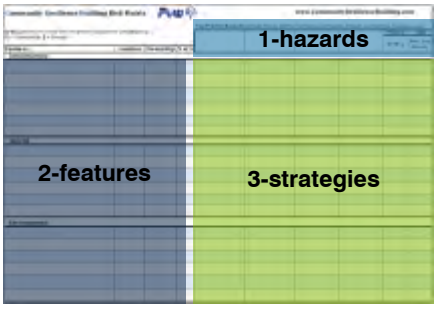
RISK MATRIX



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CHILDCARE

KNOWLEDGE

TRANSPORTATION

FOOD

TRANSLATION

TECHNOLOGY

REDUCE BARRIERS TO PARTICIPATION

40

WORK WITH VOLUNTEERS

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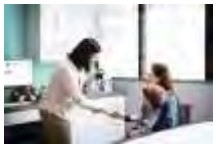
PUBLIC HEALTH



- Wellness checks
- Database of residents at risk of isolation
- Community Emergency Response Teams (CERT)
- Mobile markets
- Housing upgrades and investment

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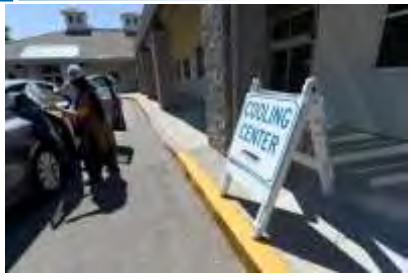
HOUSEHOLD PREPAREDNESS

43

SHELTERS, HEATING AND COOLING CENTERS



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DIVERSIFY BUSINESS OFFERINGS

45

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DOWNTOWN/VILLAGE REVITALIZATION

46

46

RENEWABLE ENERGY/MICRO-GRIDS

47

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ADDITIONAL ADAPTATION STRATEGIES

49

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What priority level is this action?

Start presenting to display the poll results on this slide.

50

50

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Would this be a short term or long term action?

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51

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NEXT STEPS

Join tomorrow's webinar!

- December 16: Natural Resources

Photo: Town of Egremont

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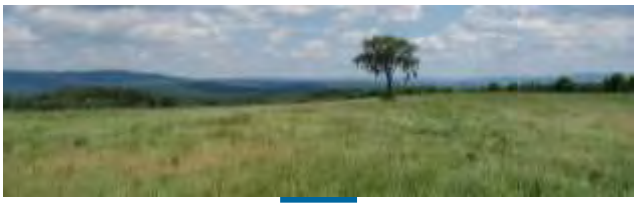

TOWN OF EGREMONT

Community Resilience Building Workshop

December 14 | December 15 | ***December 16 – Natural Resources***

Photo: Town of Egremont Facebook Page

1

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STEVE ROY
SENIOR TECHNICAL ADVISOR

LINDSEY ADAMS
RESILIENCY ENGINEER

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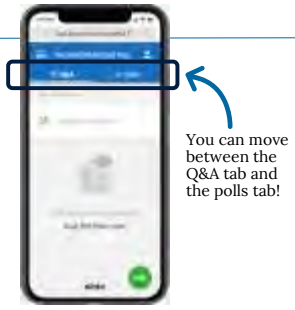

You can move between the Q&A tab and the polls tab!

3

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Did you attend previous sessions of Egremont's CRB workshop (Tuesday or yesterday)?

ⓘ Start presenting to display the poll results on this slide.

4

GROUND RULES AND ETIQUETTE

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- Be present/leave technology outside
- One speaker at a time
- Pause for others to unmute
- Assume positive intent
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Photos: Town of Egremont

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COMMUNITY

NATURAL RESOURCES

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- 10.8°F increase in average annual temperature
- 42% decrease in days/year with min. temperatures < 32° F
- 1,280% increase in 90-degree days/year

Winter weather
- Overall a decrease in annual snowfall
- Likely to have fewer events with a lot of snow
- Freeze–thaw cycle to change

Regional changes
- Increase in frequency and magnitude of hurricanes and nor'easters
- 4-10.5 feet of sea level rise

Source: State Hazard Mitigation and Climate Adaptation Plan, September 2018 / resilientma.org / Northeast Climate Adaptation Science Center

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WHAT IS NATURAL HAZARD MITIGATION?

The effort to reduce impacts from natural hazards such as flooding, extreme temperatures, and winter weather…

…through planning, policy, education, infrastructure projects, and more.

Climate adaptation: preparing for projected changes in weather patterns

EVERY $1 SPENT ON MITIGATION

SAVES $6 ON DISASTER RECOVERY

9

2 PHASES OF MVP

You are here!

1. MVP Planning Grant
- Define climate hazards
- Identify community vulnerabilities and strengths
- Develop and prioritize adaptation actions
- Receive MVP designation

2. MVP Action Grant
- Implement priority adaptation actions identified during the planning process

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MVP ACTION GRANT EXAMPLES

- Assessments
- Outreach & Education
- Redesign & Retrofit Design
- Construction of Resiliency Measures
- Nature-Based Solutions
- Ecological Restoration
- Water Quality & Infiltration
- Flood Protection
- Extreme Heat Mitigation
- Land Acquisition

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MILESTONE SCHEDULE

SEPTEMBER 2021	OCT./NOV. 2021	DECEMBER 2021	MARCH 2022	APRIL 2022	JUNE 2022
Core Team Kickoff	Listening Session #1	CRB Webinars	Listening Session #2	Action Grants Due	MVP-HMP Plan

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EXTREME TEMPERATURES

WARMER ANNUAL AIR TEMPERATURES
UP 0.5°F PER DECADE SINCE 1970, ON AVERAGE

WARMER WINTERS
UP 1.3°F PER DECADE SINCE 1970, ON AVERAGE

Source: ResilientMA.org, "Rising Temperatures," 2017

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RISK MATRIX

Photo: Town of Egremont

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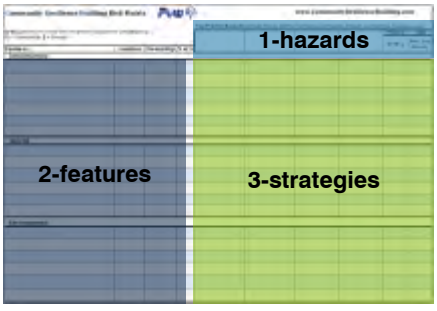
RISK MATRIX



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CLIMATE HAZARDS IN EGREMONT

- Winter weather (Nor'easters, ice storms, snowstorms, blizzards)
- Extreme Temperatures
- Flooding
- Drought

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RISK MATRIX: FEATURES

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RISK MATRIX: FEATURES

FEATURES	LOCATION	OWNERSHIP	VULNERABILITY OR STRENGTH
Infrastructural	Town wide	State	Vulnerability
Societal	Multi- vs. Single-neighborhood	Town	Strength
Economic	Specific location	Private	Both
Environmental		Shared	

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ENVIRONMENTAL FEATURES

- Open Spaces and Trails
- Parks
- Ponds
- Wetlands & Rivers
- Trees and Forests
- Agriculture/Farmland
- Invasive Species/Pests
- Wildlife
- Landfill

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ENVIRONMENTAL FEATURES

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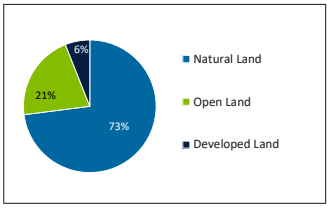
LAND USE



- Primarily residential
- Small retail businesses
- Commercial orchards
- Small farms

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ADAPTATION STRATEGIES: NATURAL RESOURCES

Photo: Town of Egremont

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ADAPTATION STRATEGY TYPES

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LOCAL REGULATIONS & POLICIES

EVALUATE EXISTING
- Zoning Bylaw (Floodplain Overlay District)
- Town Stormwater and Wetland Bylaws/Standards
- Right to Farm
- Stretch Energy Code

ADOPT NEW
- Protection (Tree, Water Supply, Groundwater)
- Limiting Requirements (Impervious Surfaces)
- Allowances (Green Roofs)
- Incentives (Fee Waivers)
- Business Districts

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LAND ACQUISITION

As part of an MVP Action Grant, Mattapoisett purchased 120 acres of forest, streams, freshwater wetlands, and coastal salt marsh as conservation land to prevent development in vulnerable areas

Image from EOEAA, 2019

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REMOVAL OF INVASIVE SPECIES

Invasive Japanese Knotweed in Arlington, MA

37

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FOREST/PESTS MANAGEMENT

Tree species, placement, and maintenance recommendations by W&S for Ravena, NY

38

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WETLAND RESTORATION & PROTECTION

Wetlands in Troy, New York

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REMEDIATE CONTAMINATED SITES

Medfield State Hospital, Remediation along the Charles River

40

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BANK RESTORATION & STABILIZATION


Live Crib Wall


Vegetated Retaining Wall


Joint Planting


Gabions

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VEGETATED BERM

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LOW IMPACT DEVELOPMENT (LID)

Bioretention
Rain Gardens
Tree Box Filters
Permeable Pavement

43

43

EDUCATION, OUTREACH, SIGNAGE

44

44

NEXT STEPS

Stay Tuned for Updates
- Draft Plan (Mar/Apr)

Photo: Town of Egremont

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Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-**M**-**L** **H**igh, **M**edium, or **L**ow priority for action over the **S**hort or **L**ong term
V = Vulnerability **S** = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Severe snow/windstorms	Floods	Extreme temperatures	Drought	Priority H - M - L	Time S hort L ong
Infrastructural									
Water Supply/Drinking Water Wells	Key critical points in public supply (~200 residents on public supply), private wells throughout town	Private/Public	S, V- unknown vulnerability of private wells to drought	Subsidize local backup power or handpumps for private wells	Evaluate flood protection options for private wells affected by contaminants carried through stormwater runoff	Conduct a drinking water vulnerability assessment with focus on private wells (depth, capacity, replacement/alternative sources/backup plans including on-site catchment systems for irrigation) and community-wide backup water options (e.g. community cistern, barrels of water at fire annex) Community engagement and education on water resilience to help residents understand water usage (lawns)		Local power: M/L Flood Protection: M Drought Resistance/Drinking Water Assessment: M	Local Power: L Flood Protection: L Drought Resistance/Drinking Water Assessment: L
Electrical infrastructure (power lines)	Key locations throughout town	National Grid	V	Assess potential for small-scale microgrid and residential backup power Feasibility study of community power sources, including consideration of emissions impacts (hydropower, turbines, etc). Seek funding to expand community solar (e.g. BBB). Expand availability of emergency wood sources. Seek funding to clear branches/dead/hazardous trees around power lines		Outreach to residents to protect trees from invasives that are dying next to power lines		Microgrid: H Alternate power sources: H/M Tree clearing: H/M	Microgrid: Mid-long term Alternate power sources: L Tree clearing: S
Communications infrastructure	80%-100% fiberoptics coverage (utility poles)	Private	S-many venues, V if grid goes down	Increase free public wifi coverage, and seek opportunities to power community wifi by solar				resilient public wifi: H/M	resilient public wifi: S
Roads	Throughout town	Town	V		Assessment of gravel roads including drainage on these roads and risks to watershed and access/emergency response (10 miles through town)			gravel road assessment: H	gravel road assessment: S
Culverts/bridges	Key locations throughout town	Town	V	Conduct assessment of streams, stormwater drainage, and risks of bridge washouts to address sizing, structural integrity for future climate risks Prioritize and implement upgrades to increase culvert sizing (currently ditches, undersized culverts, old bridges) for climate resilience Update bylaws to consider regulatory methods (e.g. zoning) to prevent impacts from future construction on stormwater drainage/storage				stormwater system assessment: H bylaw update: H/M	stormwater system assessment: S bylaw update: S
Emergency shelters	Fire House (south village, north egremont) Town Hall: Temporary shelter Regional, long term shelters (Simons Rock, Southern Berkshire School)	Town	V - no overnight emergency shelters in town, only temporary services); S - Fire house has an annex building that could be used for emergency shelter items (food, blankets, etc)	Improve current outreach to better educate public about where to go for shelter and assistance in an emergency.				M/H	S
Dams	Throughout town	Private/Public	V	Coordinate with state and private owner on next steps for updating Prospect Lake Dam based on current plan				H	S

Societal/Economic								
Agriculture	Throughout town	Private	S-food(Front Lawn food program, Indian Line Farm), jobs V-changing growing season	Engage the agriculture community in discussion about climate adaptation resources available (including how to diversify farming practices/use climate resilient techniques). Include special effort to connect with younger generation of farmers on their outlook about climate change			H	S
Tourism Economy (including skiing)	ski areas, outdoor businesses, town park, appalachian trail, state forest/trails, Prospect Lake	Private	S - outdoor activities are growing V-less snow for winter rec	Expand and diversify outdoor activity offerings (not dependent on snow) through increased funding (e.g. for pickleball court), identifying and acquisition of property (e.g. Bow Wow Woods), better access (e.g. Prospect Lake improvements)	Identify opportunities to enhance recreation while combatting climate change/flooding/increased usage impacts on natural resources (e.g. install stormwater swale at park)		diversify outdoor activities funding and access - H/M idenfity oppourtinies to enhance recreation while combatting climate change - M	diversify outdoor activities through funding and access - S/M idenfity oppourtinies to enhance recreation while combatting climate change- L
Historic Districts and Buildings	Villages	Public/Private		Prospect Lake Dam - will impact historic district if it breaks?			see item above in Infrastructure	see item above in Infrastructure
Populations at risk of isolation		Private	V- no public transporation	Improve existing transportation assistance and assess additional needs for assisting people with transportation (via council on aging; those without cars, etc.)	Update the police check-in program to regularly maintain a list of vulnerable households in case of extreme events, who may need check-ins or services. Develop a buddy system for residents to check on seniors.		improving/developing existing transporation support - H update check-in program - H	improving/developing existing transporation support - S update the check-in program system - S
Resilience and Preparedness Outreach and Training	Throughout town	Public	S-existing outreach/website, opt-in emergency alert system V- less of a system for renters/visitors; 140 new residents last year	Improve outreach by expanding channels for emergency preparedness outreach to reach renters, visitors and more frequent reminders to residents	Ensuring adequate staffing plan for shelters		improve emergency preparedness outreach - H shelter staffing plan - H/M	improve emergency preparedness outreach - S shelter staffing plan - S
Schools and Youth	SE Village	public	S-haven for children; transfer/warming site, next to fire station V if closed	Engage youth in climate change discussions in partnership with Greenagers (headquarters could be a beneficial resource)			improving youth engagement - H	improving youth engagement - S
Climate Migration			S- economic development opportunities; V-affordable housing, staff capacity, emergency preparedness, pressure to develop	Affordable housing, other capacity questions?				

Environmental									
Parks and Open Space, Hiking Trails	French Park, AT, Bow Wow Woods, Jug End, Egremont Land Trust Trails	Public/Private	S - natural areas can provide shade relief; V - invasives; increased usage leads to trail compaction, flooding risks	Increase ongoing trail management/maintenance (e.g. Seasonal stewardship at French Park, trash cleanup at Prospect Lake; water crossings, flooding, trail compaction) via funding and partnerships with groups like Greenagers Create/update more trails for accessibility Generate plan and funding for open space land acquisition - via OSRP update? Better publicize underutilized trails to spread out recreational use impacts				Trail Management/ Stewardship: H Accessible Trails: M Land acquisition: H Publicize trails: M	Trail Management/Stewardship: L Accessible Trail: L Land acquisition: short-medium underutilized trails: med-long
Lake, Ponds, River	Prospect Lake; Green River	Public/Private	S - opportunity for recreation; V - trash/land impacts on lake	Work with new landowners at Prospect Lake on improving/expanding recreation opportunities; better maintenance/trash cleanup; land acquisition, conservation restriction, etc. Work with DCR/Fish and Game on their property at PL to improve boat access and maintenance for safe use (the sediment depth makes it inaccessible - no constructed launch) Develop outreach program for landowners around Prospect Lake and Green River about stormwater management BMPs (pursue partnerships with private landowners, education on infiltration, alternatives to and impacts from fertilizers, etc)		Stabilize banks of Green River with nature-based solutions		Work with PL landowners: H DCR Land: Medium Prospect lake outreach: High Green River bank stabilization: medium	Work with PL landowners: Short DCR land: long Prospect lake outreach: short Green River bank stabilization: long
Streams, Wetlands	Throughout town	Public/Private	S/V	In coordination with upcoming bylaw review, update bylaws to restrict development in environmentally sensitive areas (e.g. via conservation restriction overlay district) and address stormwater management issues not addressed by homeowner education Educate public about development impacts				Review/update bylaws: High/med Development impact ediucation: high	Review/update bylaws: short Development impact education: medium
Trees and Forest	Throughout town	Public/Private	S/V	Implement tree management plan to address trees impacted by invasive species and fire risk, including landowner outreach program, townwide management, and coordination with neighboring communities		As part of bylaw review and update process, explore strategies for tree preservation ordinances		Tree management plan - medium Tree preservation: medium	Tree management Plan: med-long Tree preservation: long
Agricultural system		Private	S/V		[Impacts of farms on watershed worsened by droughts or floods?]		Increase pollinator gardens throughout town through public education and demonstration plantings (on town property?)	medium	long

Invasive Species and Pests	French Park, Green River, areas around Mount Washington, wooded areas, farmland, private garden areas	Public/Private	V - ticks are year round concern (used to be seasonal), multiple tick-borne diseases, (see longer list of pests/invasives)	Detect and manage new invasive plant species that enter the area Increase public outreach to help public identify pests, health risks, and understand and contribute to management of invasive plant species Obtain volunteer crews for management and removal of invasive plant species	emerging invasives: high public engagement: high invasive removal crews	emerging invasives: short public education: short

General Objective	Mitigation Action	Timeframe (1-5 - Short, 5-20 - Long)	Priority (M-Medium, L-Low)
Agriculture	Increase pollinator gardens throughout town through public education and demonstration	5-20	M
Agriculture	Prevent fertilizer runoff through demonstration and training of preventive management techniques	1-5	M
Climate Migration	Work with regional partners to develop affordable housing strategies and workforce development	5-20	L
Culverts and Stormwater Drainage	Evaluate flood protection options for private wells affected by contaminants carried through stormwater runoff	5-20	M
Culverts and Stormwater Drainage	Upgrade Blunt Road culvert with new wider crossing	5-20	M
Drinking Water	Conduct a drinking water vulnerability assessment with focus on private wells and community-wide water as part of a water supply capital	5-20	M
Drinking Water	Community engagement and resident education on water resilience	5-20	M
Electricity and Communication Infrastructure	Feasibility study of community power sources, private backup power including handpumps for private wells, with a focus on low-carbon options	5-20	M/L
Emergency Preparedness Outreach and Training	Build and document connections with regional emergency services for when additional support may be needed.	1-5	M
Emergency Preparedness Outreach and Training	Expand public educational programs on fire safety with support from grant opportunities or regional partners.	5-20	L
Emergency Preparedness Outreach and Training	Expand sustainability education on climate resilience and hazard mitigation topics identified.	5-20	L
Food Security (supply, delivery, and local	Develop additional partnerships with Greenagers for upcoming climate resiliency projects.	5-20	M
Food Security (supply, delivery, and local	Increase awareness and support for open space/farmland preservation (APR, Ch. 61A)	1-5	M
Forests	Develop tree management plan for trees impacted by invasive species, fire risk, and threatening utility lines	3-20	M
Forests	As part of bylaw review and update process, explore strategies for tree preservation ordinances	5-20	M
Future Development, Regulatory Tools, and Planning	Continue to apply for grants to support the implementation of this plan.	5-20	M

Future Development, Regulatory Tools, and Planning	Incorporate climate resilience into the site plan and subdivision review process through the completion of a climate resilience design guideline or scoring system and/or updating controls to account for climate change-induced flooding.	5-20	L
Future Development, Regulatory Tools, and Planning	Request that FEMA update Egremont's flood maps (FIRMs).	5-20	L
Local Businesses	Continue to consider Green Communities as a possible funding source for future improvements.	5-20	L
Municipal Buildings and Services (Police, Fire, Highway Department)	Need continued outreach to recruit enough staff or contractors for plowing in big storms. Conduct outreach to residents about safe driving practices.	5-20	L
Municipal Buildings and Services (Police, Fire, Highway Department)	Additional staffing support needed. Helicopter for airlifts.	5-20	L
Culverts and Stormwater Drainage	*Install storm drainage system at Town Hall parking lot to alleviate flooding	1-5	M
Parks and Open Space, Hiking Trails	Create/update more trails with accessibility enhancements	5-20	M
Parks and Open Space, Hiking Trails	Improve awareness of underutilized trails and recreation areas	3-20	M
Parks and Open Spaces	Continue to purchase land and preserve natural resources through conservation restrictions and partnerships. Implement Forest Stewardship plans.	3-20	L
Public Water Supply	Expand public water system lines to reduce number of homes on groundwater wells.	5-20	M
Residents with Barriers to Preparing or Adapting (could include low income residents)	Expand programs to assist low-income households by providing fuel assistance.	5-20	L
Residents with Barriers to Preparing or Adapting (could include low income residents)	Explore other ways to provide refuge to the heat, such as shade features at public properties.	5-20	L
Tourism Economy (including skiing)	Identify opportunities to incorporate green infrastructure into recreation areas	5-20	M
Waterbodies and Wetlands	Work with DCR/Fish and Game to improve boat access and maintenance on Prospect Lake property	5-20	M
Waterbodies and Wetlands	Stabilize banks of Green River with nature-based solutions	5-20	M

Appendix D

Public Engagement

Egremont MVP Survey

Initial Summary of Survey Results and Public Comments

Introduction

The Town of Egremont was awarded a Municipal Vulnerability Preparedness (MVP) Planning Grant to improve the Town's resilience to climate change and to mitigate natural hazards. The MVP Program aims to provide technical and financial support for cities and towns across the Commonwealth to plan for, and mitigate the impacts from, climate change. As part of the virtual Public Listening Session, the project team shared a survey with the community to collect public feedback related to climate hazards, strengths, vulnerabilities, and priority adaptation action items. Key information related to the results of this survey are summarized below:

- The survey was accessible on the Microsoft Forms website from November 1-December 14, 2021.
- A link to the online survey was shared on November 1, 2021 through the following means:
    - Posted on the Town's social media pages
    - Posted on the Town's webpage
    - Printed in the local Shopper's Guide
    - Shared in an email blast to the town's residents and the project stakeholder list
    - Mailed to Town residents
    - Distributed at central locations
- The project team received 320 online and hardcopy responses.

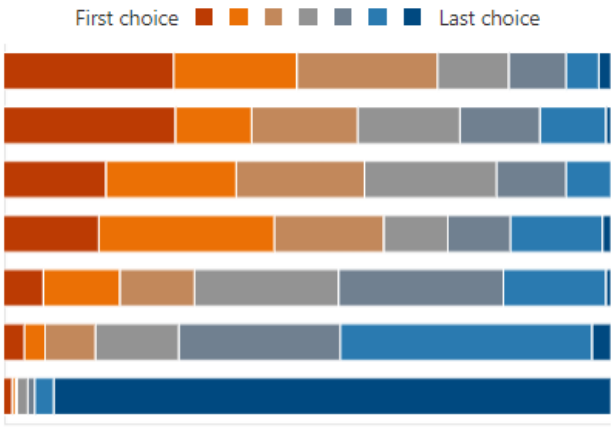
The following summary provides an overview of the survey responses, along with initial findings and recommendations for using this information. A spreadsheet of short-answer responses from survey participants, along with a copy of the original survey, are included as attachments to this document.

DRAFT

Survey Results

What hazard are you most concerned about?

Rank	Options
1	Winter weather (Nor'easters, s...
2	Flooding
3	Extreme temperatures
4	Severe wind events (tornado, t...
5	Drought
6	Brushfires and wildfires
7	Others (describe in Question 2)

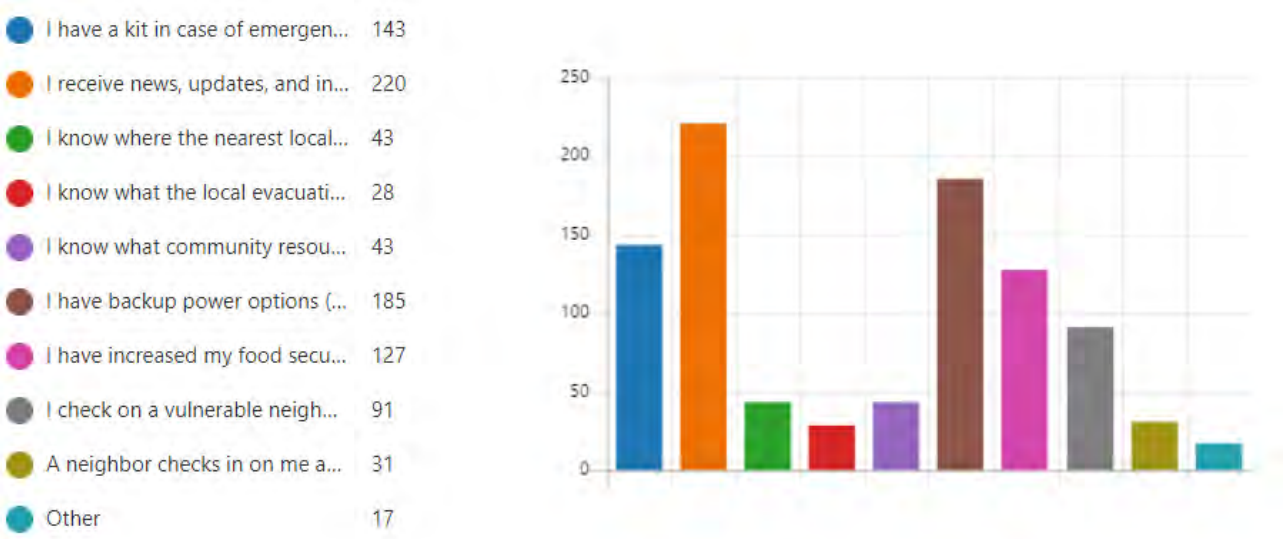


Survey results suggest that winter weather (Nor'easters, snowstorms, blizzards, ice storms), flooding, extreme temperatures, and severe wind events (tornado, thunderstorms, hurricane) are the hazards of most concern.

- Drought, brushfires, and wildfires are hazards of secondary concern
- Other hazards identified included water pollution, wetland loss and erosion, mosquitoes and invasive species, and air pollution from forest fires

DRAFT

What steps have you taken to prepare for extreme events?

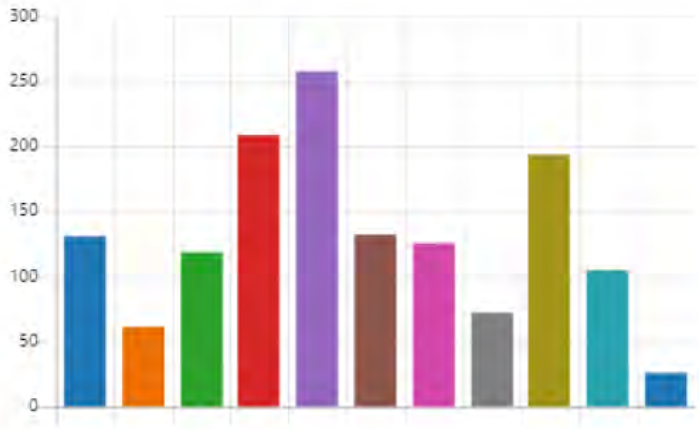


I have a kit in case of emergencies (which may include food, water, flashlights, batteries, and other supplies)
I receive news, updates, and information about emergency preparedness in Egremont
I know where the nearest local shelter is
I know what the local evacuation routes are
I know what community resources or support is available to me
I have backup power options (generator, solar panels, extra firewood)
I have increased my food security with a garden or stockpiling nonperishable foods
I check on a vulnerable neighbor and help them with food, snow removal, or other support during an extreme event
A neighbor checks in on me and helps with food, snow removal, or other support during an extreme event

DRAFT

What are some of Egremont's greatest strengths?

Water supply and infrastructur...	131
Wastewater infrastructure (sep...	62
Emergency facilities, including...	119
Communications infrastructur...	209
Natural features, including op...	258
Public facilities, including the l...	132
Public support systems, includ...	125
Transportation infrastructure, i...	72
Agriculture, including local far...	194
Local businesses	105
Other	26

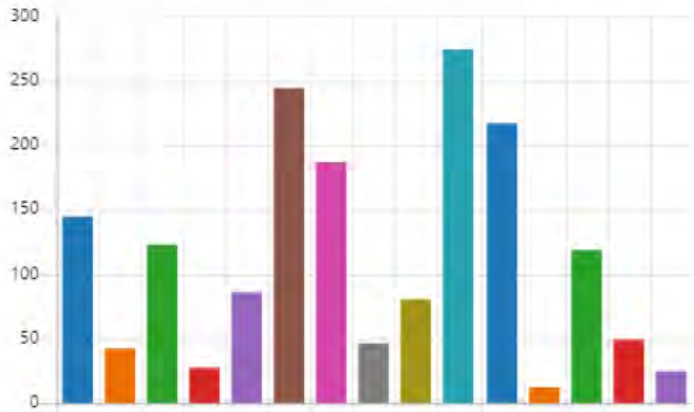


Water supply and infrastructure (Egremont Water Department and drinking water wells)
Wastewater infrastructure (septic systems)
Emergency facilities, including shelters and the Fire Station
Communications infrastructure, including the Town's Emergency Notification System
Natural features, including open space, trails, trees, ponds, wetlands, streams, and fisheries
Public facilities, including the library and schools
Public support systems, including Meals on Wheels and The People's Pantry
Transportation infrastructure, including roads and bridges
Agriculture, including local farms
Local businesses

DRAFT

What are some of Egremont's greatest vulnerabilities?

Culverts, undersized drainage ...	144
Impacts from beavers, includi...	42
Vulnerable populations, includ...	123
Potential dam failure	27
Erosion of land surrounding b...	86
Increased public health hazar...	244
Invasive species, crop disease, ...	187
New development in hazard-p...	46
Private drinking water wells	81
Power outages due to extrem...	274
Communications/Phone outa...	217
Spills along transportation rou...	12
Degradation or loss of priority...	119
Public water supply	49
Other	25

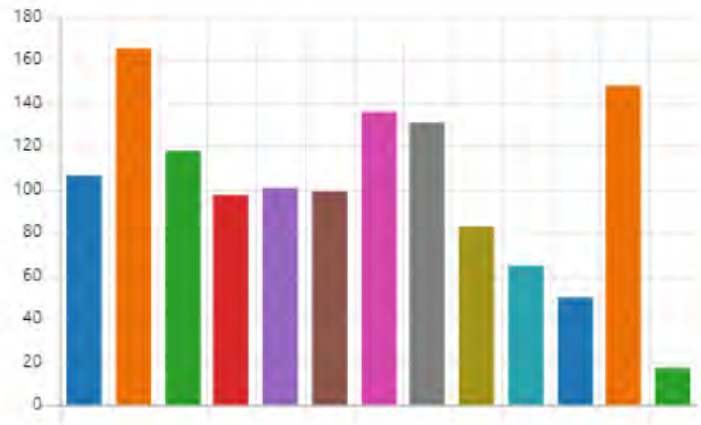


Culverts, undersized drainage infrastructure, impervious surfaces, and stormwater runoff
Impacts from beavers, including flooding, damage to electrical or gas generation equipment, and water quality concerns
Vulnerable populations, including identifying shelter capacity, meeting medical needs, and reaching at-risk residents
Potential dam failure
Erosion of land surrounding bridges and roadways
Increased public health hazards posed by climate change, including ticks, mosquitos, and asthma
Invasive species, crop disease, and pest infestations
New development in hazard-prone areas
Private drinking water wells
Power outages due to extreme wind or winter weather events
Communications/Phone outages due to extreme wind or winter weather events
Spills along transportation routes, including freight trains
Degradation or loss of priority natural areas and core wildlife habitat
Public water supply

DRAFT

What is most important for Egremont's natural hazard mitigation and climate resilience strategies?

Pursuing data or studies show...	106
Assessing and redesigning crit...	165
Planning to address invasive s...	118
Educating the public on hazar...	97
Developing plans and actions ...	101
Updating bylaws and regulati...	99
Identifying needs for public fa...	136
Developing a tree and forest ...	131
Strategic planning to identify ...	83
Assessing watershed protectio...	65
Conducting a town-wide wate...	50
Investigating opportunities for...	148
Other	17

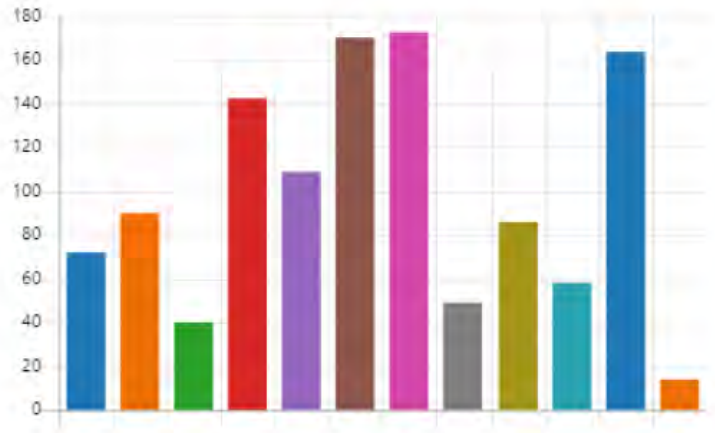


Pursuing data or studies showing the projected impacts of future climate hazards in Egremont, such as updated flood maps
Assessing and redesigning critical infrastructure including roads, bridges, and culverts to improve stormwater management and prepare for future hazards
Planning to address invasive species and their impacts on natural resources
Educating the public on hazard impacts and emergency preparedness
Developing plans and actions to protect habitat corridors and reduce development in hazard-prone areas
Updating bylaws and regulations to incorporate climate change considerations
Identifying needs for public facilities and services to better support vulnerable residents during an extreme event, such as emergency shelters and backup power
Developing a tree and forest management plan in partnership with utility companies to manage potential hazardous areas and preserve forests
Strategic planning to identify how regional agriculture can be resilient to natural hazards and climate change
Assessing watershed protection opportunities and developing regional partnerships to improve water quality
Conducting a town-wide water supply analysis
Investigating opportunities for renewable energy

DRAFT

How would you like to receive information about climate change risks and resiliency projects in Egremont?

Interactive online webinars	72
Pre-recorded videos posted o...	90
Online surveys	40
PDFs available online, includin...	142
Printed media shared via mail,...	109
Information posted to the Tow...	170
Google group/Egremont Post...	173
Through social media, includi...	49
Through the newsletters and ...	86
In-person events	58
Through the town's quarterly ...	164
Other	14



Summary of short-answer responses:

How have these hazards impacted you impacted you or your community? Memories of climate hazards could include flooding of local roads, heat waves, heavy snowfalls or ice storms, high winds, drought conditions, business and school disruptions, and more.

- Power outages appear to be the greatest concern to Egremont residents. 100 out of 315 responses cite this hazard. Windstorms and winter storms (ice storms, snowstorm, Nor'easters) and associated damages to trees also appear to have a great impact on the residents of Egremont. 49 respondents mentioned fallen trees. The next commonly mentioned hazard was flooded, muddy, and impassable roads, due to heavy precipitation.

We recognize that there are overlaps in preparing for, and responding to, any challenge in our community. We are interested in documenting the community experience of COVID-19 in Egremont. What worked well, and what could improve?

- Many of the responses stated they thought Egremont officials did a good job communicating COVID-19 related information to its residents. In addition, many residents thought the mask mandates were effective. However, several residents noted that they wished it was easier get a vaccine for COVID-19 in the Town. A few residents also wished that it was easier to get a test in Egremont or that more rapid tests were available.

Are there any additional comments or questions that you would like to share with the project team?

- Many residents noted the danger of invasive species such as the Emerald Ash Borer to the community. There was also concern for the growing population and the Town's ability to keep up with these needs for water supply, land for development, and emergency response. Participants emphasized local vulnerabilities and the need for resources for senior populations. In addition, some residents believe the Town's website platform should be updated. A small number of participants expressed they believe that climate risks are over exaggerated or nonexistent and objected to government regulation. Other responses recommended sharing more information with the community about climate change predictions, impacts, and strengths and vulnerabilities considered in this plan.

Key Findings & Next Steps

As the bar graphs indicate, severe storms, including windstorms, winter storms, and heavy precipitation leading to flooding are the main concerns for residents. These storms can lead to power outages and washed-out roads. Power outages, communications outages, drainage infrastructure, loss of natural areas and species, and increased public health hazards due to climate change are among the Town's top vulnerabilities. Conversely, natural features were identified as the Town's greatest strength.

According to participants, climate adaption measures should primarily focus on assessing and redesigning critical infrastructure and investigating opportunities for renewable energy. Many participants also highlighted that the Town should identify needs for public facilities and services to better support vulnerable residents during an extreme event. Participants indicated that they would like to receive additional information on climate change and resiliency through the Town's Google group/Egremont Posts/ Egremont Neighbor Net and information posted on the Town's website.

Recommended next steps include:

- Addressing climate hazards such as winter weather, severe wind events, and flooding
- Pursuing funding for climate adaptation projects to:
    - Assess and redesign critical infrastructure
    - Investigate opportunities for renewable energy
    - Identify needs for public facilities and services that serve residents and visitors in emergencies
    - Develop a tree and forest management plan
    - Create a plan to address invasive species
- Continuing education and outreach to the community about climate change impacts and adaptation strategies.
- Use the email addresses collected to send out additional updates related to climate initiatives in Egremont. Additionally, the next public meeting should be advertised via email to respondents who shared their contact information.

Attachments

- Attachment A: Egremont Survey
- Attachment B: Short Answer Responses Spreadsheet

DRAFT

Egremont Hazard Mitigation and Municipal Vulnerability Preparedness (HM-MVP) Survey

Hello! We hope you are doing well, and thank you for taking our survey.

Climate change has the potential to impact our economy, how we support our community's health and vulnerable residents, how we build our infrastructure, and how we protect our natural resources. Your voice represents a unique perspective from the Egremont community, and by taking this survey you will help us prepare for a more resilient future. Before taking the survey, we invite you to watch a short video at tinyurl.com/EgremontHMPvideo (http://tinyurl.com/EgremontHMPvideo).

The survey will be open until Tuesday, November 30. Please only submit one survey per person; multiple people can submit per household. This planning process is just getting started, so stay tuned for more information and upcoming opportunities for participation by checking the Town's website at https://www.egremont-ma.gov/ (https://www.egremont-ma.gov/).

If you have additional input, questions, or barriers to participating, please contact Juliette Haas (Town of Egremont) at 413-528-0182 x 22 or jhaas@egremont-ma.gov (mailto:jhaas@egremont-ma.gov).

This project is funded by the Commonwealth's Municipal Vulnerability Preparedness grant prorgram, which provides technical and financial support for cities and towns across the Commonwealth to plan for, and mitigate the impacts from, climate change. Learn more about the MVP program here: https://www.mass.gov/municipal-vulnerability-preparedness-mvp-program (https://www.mass.gov/municipal-vulnerability-preparedness-mvp-program)

Survey Questions

What climate hazard are you most concerned about impacting Egremont? Please rank the following options from most concerning (at the top of the list) to least concerning (at the bottom of the list)

Flooding

Extreme temperatures

Winter weather (Nor'easters, snowstorms, blizzards, ice storms)

Drought

Brushfires and wildfires

Severe wind events (tornado, thunderstorms, hurricane)

Others (describe in Question 2)

How have these hazards impacted you or your community? Memories of climate hazards could include flooding of local roads, heat waves, heavy snowfall or ice storms, high winds, drought conditions, business and school disruptions, and more.



What steps have you taken to prepare for extreme events? Check all that apply.

- [ ] I have a kit in case of emergencies (which may include food, water, flashlights, batteries, and other supplies)
- [ ] I receive news, updates, and information about emergency preparedness in Egremont
- [ ] I know where the nearest local shelter is
- [ ] I know what the local evacuation routes are
- [ ] I know what community resources or support is available to me
- [ ] I have backup power options (generator, solar panels, extra firewood)
- [ ] I have increased my food security with a garden or stockpiling nonperishable foods
- [ ] I check on a vulnerable neighbor and help them with food, snow removal, or other support during an extreme event
- [ ] A neighbor checks in on me and helps with food, snow removal, or other support during an extreme event
- [ ]

Other

What are some of Egremont's greatest strengths? Check all that apply.


- [ ] Water supply and infrastructure (Egremont Water Department and drinking water wells)
- [ ] Wastewater infrastructure (septic systems)
- [ ] Emergency facilities, including shelters and the Fire Station
- [ ] Communications infrastructure, including the Town's Emergency Notification System
- [ ] Natural features, including open space, trails, trees, ponds, wetlands, streams, and fisheries
- [ ] Public facilities, including the library and schools
- [ ] Public support systems, including Meals on Wheels and The People's Pantry
- [ ] Transportation infrastructure, including roads and bridges
- [ ] Agriculture, including local farms
- [ ] Local businesses
- [ ]

Other

5

What are some of Egremont's greatest vulnerabilities? Check all that apply.

- [ ] Culverts, undersized drainage infrastructure, impervious surfaces, and stormwater runoff
- [ ] Impacts from beavers, including flooding, damage to electrical or gas generation equipment, and water quality concerns
- [ ] Vulnerable populations, including identifying shelter capacity, meeting medical needs, and reaching at-risk residents
- [ ] Potential dam failure
- [ ] Erosion of land surrounding bridges and roadways
- [ ] Increased public health hazards posed by climate change, including ticks, mosquitos, and asthma
- [ ] Invasive species, crop disease, and pest infestations
- [ ] New development in hazard-prone areas
- [ ] Private drinking water wells
- [ ] Power outages due to extreme wind or winter weather events
- [ ] Communications/Phone outages due to extreme wind or winter weather events
- [ ] Spills along transportation routes, including freight trains
- [ ] Degradation or loss of priority natural areas and core wildlife habitat
- [ ] Public water supply
- [ ]

Other

6

What do you think Egremont's top priorities should be for mitigating natural hazards and building climate resilience? Please select your top three actions.

- [ ] Pursuing data or studies showing the projected impacts of future climate hazards in Egremont, such as updated flood maps
- [ ] Assessing and redesigning critical infrastructure including roads, bridges, and culverts to improve stormwater management and prepare for future hazards
- [ ] Planning to address invasive species and their impacts on natural resources
- [ ] Educating the public on hazard impacts and emergency preparedness
- [ ] Developing plans and actions to protect habitat corridors and reduce development in hazard-prone areas
- [ ] Updating bylaws and regulations to incorporate climate change considerations
- [ ] Identifying needs for public facilities and services to better support vulnerable residents during an extreme event, such as emergency shelters and backup power
- [ ] Developing a tree and forest management plan in partnership with utility companies to manage potential hazardous areas and preserve forests
- [ ] Strategic planning to identify how regional agriculture can be resilient to natural hazards and climate change
- [ ] Assessing watershed protection opportunities and developing regional partnerships to improve water quality
- [ ] Conducting a town-wide water supply analysis
- [ ] Investigating opportunities for renewable energy
- [ ]

Other

We recognize that there are overlaps in preparing for, and responding to, any challenge in our community. We are interested in documenting the community experience of COVID-19 in Egremont. What worked well, and what could improve?

How would you like to receive information about climate change risks and resiliency projects in Egremont? Check all that apply.

- [ ] Interactive online webinars
- [ ] Pre-recorded videos posted online
- [ ] Online surveys
- [ ] PDFs available online, including informational fact sheets and reports
- [ ] Printed media shared via mail, including informational fact sheets and flyers
- [ ] Information posted to the Town of Egremont website
- [ ] Google group/Egremont Posts/Egremont Neighbor Net
- [ ] Through social media, including Facebook
- [ ] Through the newsletters and meetings of local groups and regional organizations
- [ ] In-person events
- [ ] Through the town's quarterly newsletter
- [ ] Other

9

Are there any additional comments or questions that you would like to share with the project team?

10

Thank you for completing Section #1 of our survey. Please go to the next page to answer a few questions about your connection to Egremont in Section #2.

If you are interested in receiving additional updates related to climate or planning initiatives in Egremont, please enter your name and email below.

Optional Demographic Questions

The following questions are not required. However, by answering these demographic questions, you will help us assess if our survey has broad participation.

11

Please tell us about your connection to Egremont by selecting all that apply:

- [ ] I rent a home or apartment in Egremont
- [ ] I own a home in Egremont
- [ ] I work in Egremont
- [ ] I own a business in Egremont
- [ ]

Other

12

Please select your age range:

- ◯ Under 18 years old
- ◯ 18-35
- ◯ 36-55
- ◯ 56-65
- ◯ 66-75
- ◯ Over 75

13

How would you describe yourself?

- ◯ White
- ◯ Black or African-American
- ◯ American Indian or Alaskan Native
- ◯ Asian
- ◯ Native Hawaiian or other Pacific Islander
- ◯ Multiple races
- ◯ Other

14

Are you of Hispanic, Latino, or of Spanish origin?

- ◯ Yes
- ◯ No

15

How did you hear about this survey?

- ◯ Facebook
- ◯ Eblast
- ◯ Egremont Forum
- ◯ Egremont Post/Google Group
- ◯ Other

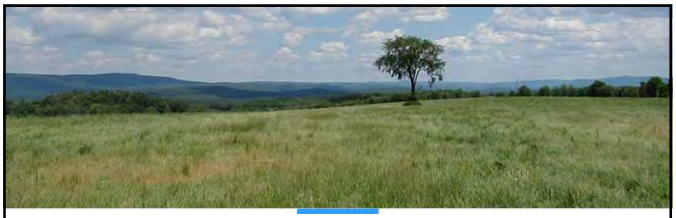
This content is neither created nor endorsed by Microsoft. The data you submit will be sent to the form owner.

Microsoft Forms

Are there any additional comments or questions that you would like to share with the project team?
Affordable access to land needed to draw people who live and work in town ; full time neighbors equals security
All new ideas for restrictions and regulations must be carefully vetted for consequences and unintended consequences. 179 acres of Baldwin Hill farm were protected, including 40A forests with a forestry plan in Chapter 61,61A and the APR program.
Any opportunity for clinics or session on the tick born illness for both people and pets. Risk assessment, protocols, seasonality, hot spots
Any plan will need to be funded if it is to do more than sit on a shelf. The resilience effort should focus on the financing and the implementation of the individual actions it proposes, individually, as a fundamental function of the plan.
As residents living near Marsh Pond, we hope that this pond, which seems to be taken over by vegetation, is included in any environmental/habitat studies and and action.
Best of luck with this forward-thinking endeavor. What we have is so precious, and we must work together to stay safe.
Climate change has been here since the begining of time and will continue to change. Dinosaurs became extinct at the end of the Cretaceous period, approximately 65 million years ago, after living on Earth for about 165 million years. The Ice Age occured between 2.4 and 2.1 billion years ago. Trying to blame everything on global warming is ridiculous. We were energy independent and now have to rely on other Countries for our supply! Solar is a good secondary source but we still need fossil fuel as the sun isn't out every day to produce enough energy. We don' need blackouts or brownouts like California. Electric cars with lithium batteries are more toxic to the envroment as the chemicals inside will never decompose and will only pollute the soil around it. It takes more tha 100 for metal part of batteries to decompose. So much for the enviroment!!
Climate change risks are very exaggerated
Economic and community development need to be part of 'vulnerability'. A small town like EGR needs to help grow small businesses, create programming for different age groups (elders and younger) and think wholistically about the future of the community. The predominance of older adults can be a hindrance to "future focused" planning. Outreach to younger ages for this effort is important.
Egremont has a population that skews older and at the same time affordable housing for young people and people performing vital services is limited. After the population increase tied to Covid, it became harder to find workers to fix things This seems like a key vulnerability. I think the town would benefit from an active effort to better integrate and support working-age people.
Egremont PWD and emergency response teams, periodically drive around the township, to visually inspect roads, tree and low lining flooding conditions. Make improvements before hand ahead of pending storms.
Egremont should always be prepared for severe weather events. Serious scientists agree that climate change has not made severe weather events more common; only the media has done that. This questionnaire promotes fear mongering.

Egremont taxes are high. There's no reason to buy a very expensive police car (high gas consumption) There could be an unmarked car. Use money to plant trees and cut vines. Too many large homes that consume lots of energy. The money from the grant should be used for client change. Look at how many trees have died over the last decades due to invasive vines. (think Baldwin Hill where all 4 roads have trees dying and choking).
Expanded hours at the transfer station to accomodate weekend homeowners. The reduction on Saturday was not appreciated and going a little later on Sunday would help. Getting reduced electric bills for ev charging at night would encourage more ev purchases and getting a charging station in the village would be helpful, especially in emergencies. It also would encourage more sales at local businesses.
For the most vulnerable residents, is an alternative power supply initiative being considered? Some way to help them get back-up power? Is it possible to forecast the tier #1, #2, etc, vulnerabilities of roads, bridges, culverts, etc.?
Getting some people's attention RE all this will be difficult as there appear to be deniers in our midst. They represent one of the biggest challenges in this endeavor. Probably the best tool in this regard is facts, science-based, clear. Not necessarily info to try to convince people about climate change but to show them, here is what is happening - different from the past.
Honestly, I wish I knew more to be able better answer these questions.
I am very concerned that with the huge increase in population and the decrease in snowfall levels that water will become short supply. There needs to be a study that will show how much water our town has both reservoir and underground supply and how much development our water can support. There is no town plan for future construction or how many people our resources can support.
I appreciate Egremont’s proactive approach to looking at climate change and sustainability.
I need fiber Connect for info
I would very much like to see those areas that the various town departments feel represent opportunities and vulnerabilities.
I'd like to see the results of this survey widely circulated and available
I'm hopeful Egremont can quickly come up with some sort of plan that makes sense and put it into play quickly. We are running out of time to deal with climate degradation and talk, without action, is not acceptable.
I'm not really informed enough so some of my answers may not be valid
Improve the local blacktop roads. Enforce speed limits on local back roads
In many questions I could have checked many more boxes. I did not want to give more impact to my responses
Lessen forest fire risks from increase in woodlands and trail use-keep brush cleared from trail areas
Many choices in the survey referred to information I am not privy to or aware of. I will not choose to support our drinking water supply if I live in North Egremont and am not aware of it’s vulnerability. Is there erosion around our bridges? How much do Bylaws have to do with climate change? Why would it matter to have a butterfly garden when there’s a power outage? The overview of our current town scape has not been presented in a way that make these questions meaningful. I hope you get the information you’re looking for in this survey.
Need increased services due to rapidly increasing population (ambulance, emergency/medical) Need better forest management, eliminating brush and slash piled next to trails to lessen fire damage with increase in inexperienced and possibly careless hikers

One of Egremont's vulnerable groups is our aging population. I hope they will be addressed fully.
Please pave more roads.
Proper protection of habitat, forests is my highest priority in prevention of worsening of climate change. Please protect them. If we don't, we are constantly playing catch-up, putting Band-Aids on the larger issue. Please consult with experts in regenerative and holistic and native practices in healing/protecting our environment. The typical approach na a dept of public works isn't knowledgeable enough- can even be damaging to the environment
Public shelters during tornado's ad other extreme events- a pdf showing where each neighborhood out to seek help if needed.
Speeders and failure to stop at signs
Thank goodness for Fiber Connect- more tree trimming to avoid loosing internet service during storms
The main threat to the quality of life in Egremont is the rapidly increasing traffic flow on all town roads, but especially Route 23. The Route 23 problem is most acute in the South Egremont village, but very very serious across the entire length through town. One aspect of the problem is the great increase in the movement of very large trucks (log carriers, tankers, construction vehicles, etc). They do NOT observe speed limits anywhere, including in the village. The town has made NO discernible effort to force these trucks to slow down, even in the village. I have NEVER seen the Egremont Police Department pull over and ticket any truck in the village or elsewhere. The frequency of the police watching for speeders is practically zero.
The town needs to be sure—as with this survey—that everyone gets the same information, the same treatment, the same say. Access to info/services has sometimes been difficult for people who haven't grown up here or have been here a mere couple of decades. The negativity towards "newcomers" and second-homeowners has got to stop.
Things like this survey are part of what makes Egremont such a nice community!
This is a great town to live and work in. Let's keep it that way
Town website needs improving to make access to information less impenetrable
Trees- we probably need more and more care because of ash tree die off- Emerald Ash Borer
Use good common sense in all of your decisions
We live off of Marsh Pond, and hope that it is included in any environmental assessments.
We're lucky to have pro-active Town Board members and especially Juliette Haas for her commitment.
Would like to see more renewable energy projects for the town and its residents, especially exploring solar micro-grids.



TOWN OF EGREMONT

Municipal Vulnerability Preparedness (MVP)
and Hazard Mitigation Plan (HMP)
Public Listening Session
March 29, 2022

1

Welcome Juliette Haas, MVP Project Coordinator

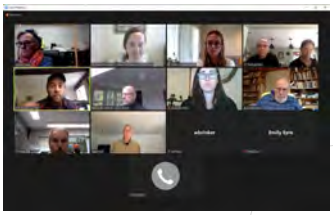
Juliette Haas
Town Clerk
Board of Health, Director
Sustainability Coordinator

- Past sustainability projects on behalf of the town
  - 2008 ARRA $145,000 grant recipient
  - 2016 Designated Green Community (received $160,000 in grant funds to date)
  - 2020 Leading by Example Recipient

Please introduce yourself in the chat!

2

The Egremont MVP Planning Committee



- January 2021 – Formation of MVP Planning Committee
- August 2021 - Contracted Weston & Sampson as Egremont's MVP Certified Provider to assist with updating the 2012 Hazard Mitigation Plan and begin process of identifying climate related vulnerabilities

3

3

Welcome MVP and Weston & Sampson

MVP

Carrieanne Petrik
MVP Regional Representative

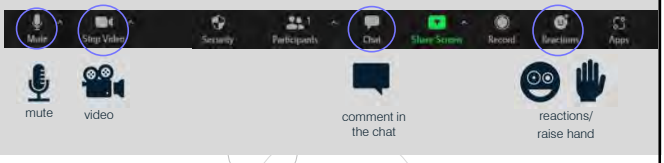
Joanna Nadeau, AICP
Resiliency Planner

Weston & Sampson

4

4

ZOOM TIPS



mute
video
comment in the chat
reactions/ raise hand

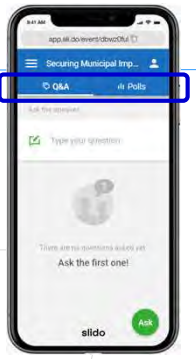
JOINING VIA PHONE?
Use *9 to raise hand to ask for audio / video permission to ask questions or provide comments.

5

5

Open a web browser
Type in slido.com
Enter code: EgreHMP

Joining as a participant? Enter code here



You can move between the Q&A tab and the polls tab!

6

6

slido

What is your favorite thing about living in Egremont?

ⓘ Start presenting to display the poll results on this slide.

7

7

WEBINAR OUTLINE

- Overview of MVP and HMP
- Overview of Climate Change
- Strengths and Vulnerabilities
- Priority Action Items
- Next Steps

Tell us what you think of the plan on our **online form!**

Photo: Town of Egremont

8

MVP & HMP OVERVIEW

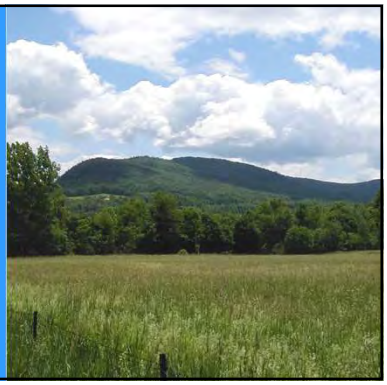


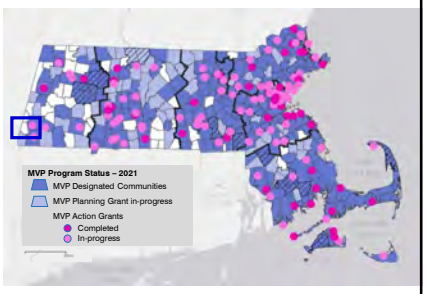
Photo: Town of Egremont

9

You are here!

2 PHASES OF MVP

1. MVP Planning Grant
   - Define climate hazards
   - Identify community vulnerabilities and strengths
   - Develop and prioritize adaptation actions
   - Receive MVP designation
2. MVP Action Grant
   - Implement priority adaptation actions identified during the planning process



Weston & Sampson

10

MVP ACTION GRANT EXAMPLES

- Assessments
- Outreach & Education
- Redesign & Retrofit Design
- Construction of Resiliency Measures
- Nature-Based Solutions
- Ecological Restoration
- Water Quality & Infiltration
- Flood Protection
- Extreme Heat Mitigation
- Land Acquisition

11

MILESTONE SCHEDULE

SEPTEMBER 2021	OCT./NOV. 2021	DECEMBER 2021	MARCH 2022	MAY 2022	JUNE 2022
Core Team Kickoff	Listening Session #1	CRB Webinars	Listening Session #2	Action Grants Due	MVP-HMP Plan

12

COMMUNITY RESILIENCE BUILDING WORKSHOP

Focused on Four Hazards

Identified:
- Vulnerabilities
- Strengths
- Priority Action Items

Across Three Categories:
- Infrastructure
- Societal
- Environmental

13

13

Any questions
about the MVP program or the hazard mitigation planning process?

14

14

CLIMATE HAZARDS

15

15

WHY WE'RE HERE

Climate change projections for end of century:

Changes in precipitation	Rising temperatures
• 18% increase in consecutive dry days • 57% increase in days with > 1 in. rainfall • 7.3 inches additional annual rainfall • Increase in flooding	• 10.8°F increase in average annual temperature • 42% decrease in days/year with min. temperatures < 32° F • 1,280% increase in 90-degree days/year
Winter weather	**Regional changes**
• Overall a decrease in annual snowfall • Likely to have fewer events with a lot of snow • Freeze –thaw cycle to change	• Increase in frequency and magnitude of hurricanes and nor'easters • 4-10.5 feet of sea level rise

Source: State Hazard Mitigation and Climate Adaptation Plan, September 2018 / resilientma.org / Northeast Climate Adaptation Science Center

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16

TOP CLIMATE HAZARDS IN EGREMONT

- Winter weather (Nor'easters, ice storms, snowstorms, blizzards)
- Extreme Temperatures
- Flooding
- Drought

17

17

Public Survey Results

tinyurl.com/EgremontMVP Survey

How have these hazards impacted you or your community?

power loss, no power, winds/storms, extreme weather, power for days, Heavy rains, impact, ice storms, trees, power and internet, power lines, power outages, severe wind, loss of power, caused, Heavy snow, high winds, wind events, Flooding of roads, fallen trees

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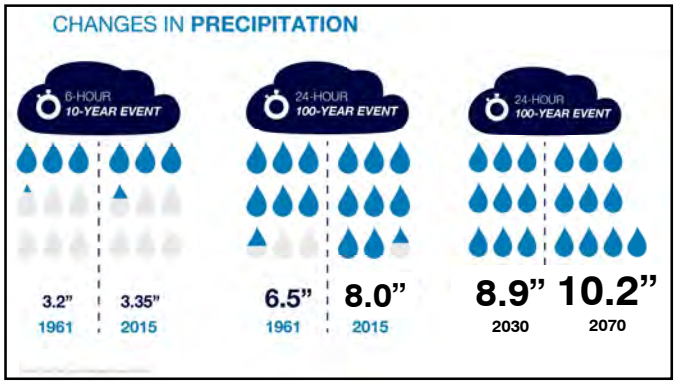

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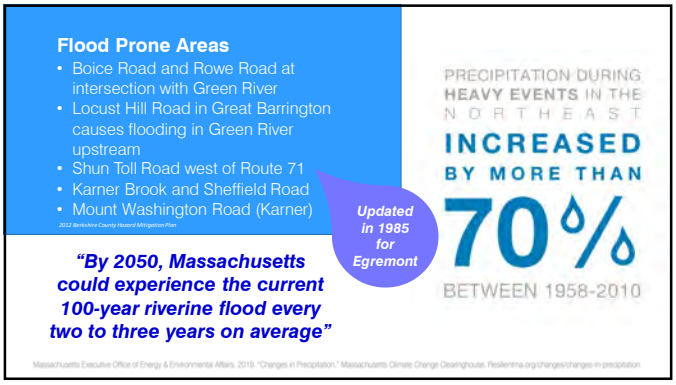

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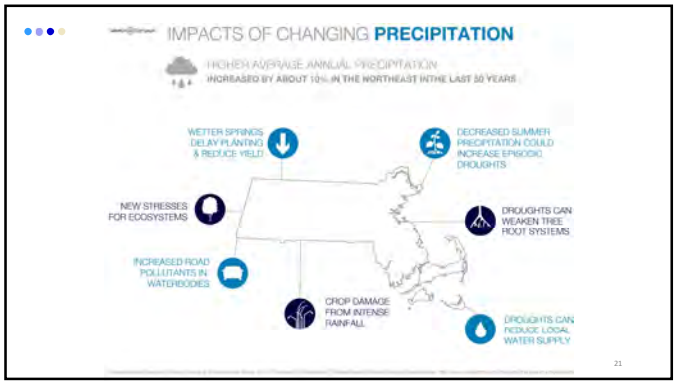

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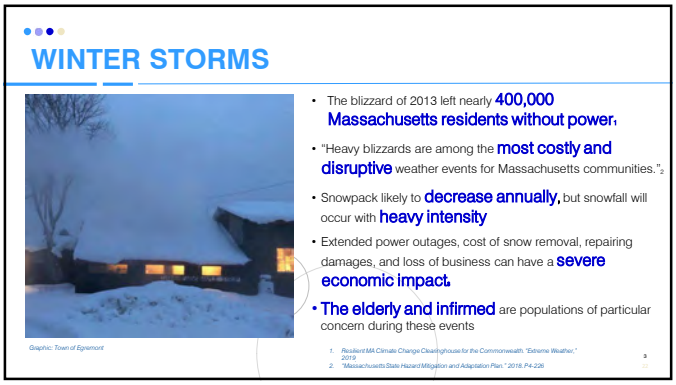

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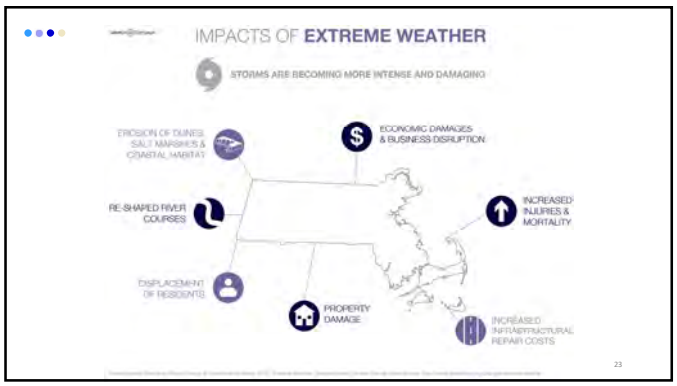

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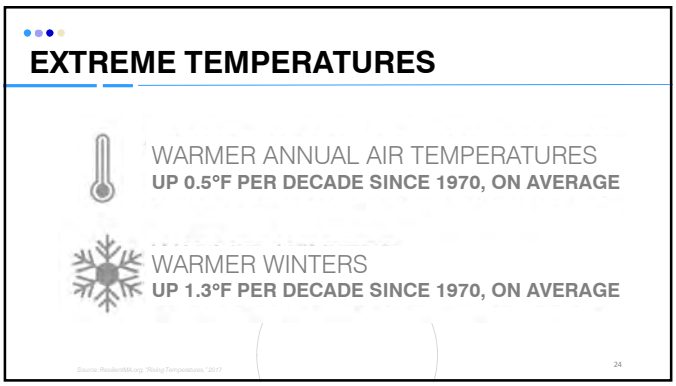

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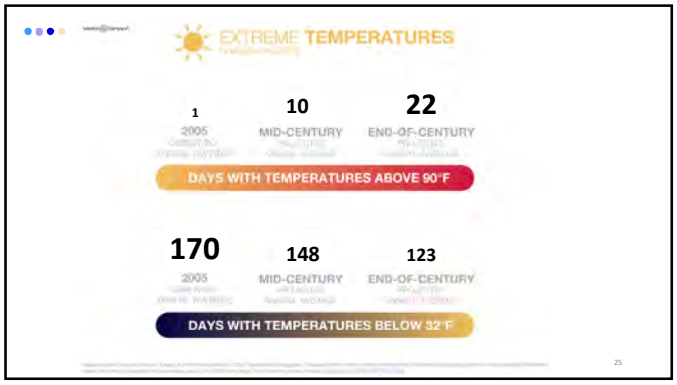

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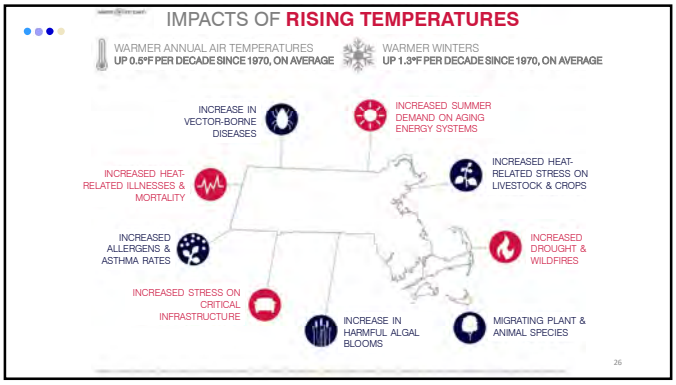

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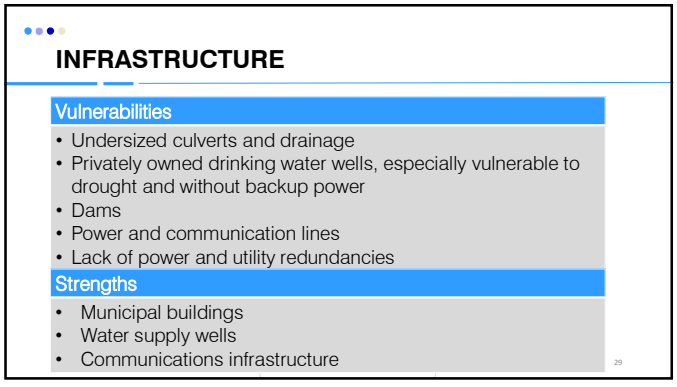

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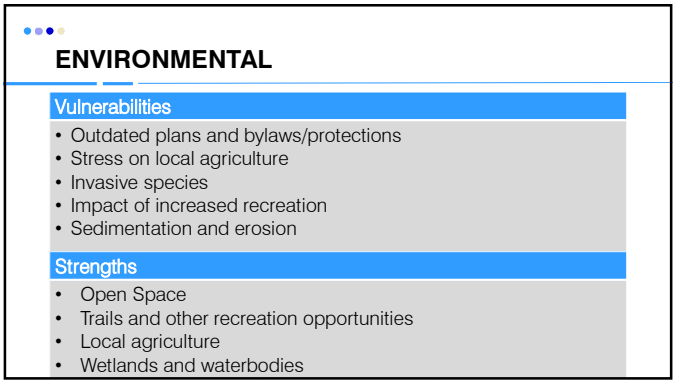

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SOCIETAL FEATURES

Population	Egremont	Massachusetts
2018	1,380	6,902,149
2010	1,372	6,547,790
Age		
Under 18 years	17%	19.8%
65+ years	27.9%	16.5%
Economics		
Median household income, 2014-2018	$71,528	$77,378
Persons in poverty	5%	10.0%
Additional Information		
Bachelor's degree or higher:	42.4%	42.9%
With a disability	12.6%	7.9%
Language other than English spoken at home	6.3%	23.6%

Census Bureau

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SOCIETY

Vulnerabilities

- No public transportation
- Vector-borne diseases
- People with possible barriers to mobility and building resilience
- Communication channels with visitors/renters
- Historic district (at risk of dam failure)?
- Lack of affordable housing

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SOCIETY

Strengths

- Communications systems (Reverse 911 and emergency communication)
- Emergency services
- Transportation services
- Neighbor relationships

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What do you view as Egremont's top vulnerabilities (to natural hazards or climate change)?

ⓘ Start presenting to display the poll results on this slide.

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What do you view as Egremont's top strengths, especially in preparing for and responding to climate change and natural hazards?

ⓘ Start presenting to display the poll results on this slide.

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HAZARD MITIGATION & CLIMATE ADAPTATION STRATEGIES

Photos by Town of Egremont

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EXISTING HAZARD PROTECTION

- Southern Berkshire Regional Emergency Planning Committee
- Berkshire Medical Reserve Corp
- Emergency shelters
- Backup generators
- Open Space and Recreation Plan 2000
- Comprehensive Emergency Management Plan
- Participation in the National Flood Insurance Program (NFIP)
- Stormwater System maintenance, including repairing and replacing culverts
- Tree maintenance
- Land acquisition
- Beaver management
- Snow plowing and removal guidelines
- Green Communities Program

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HIGH PRIORITIES: INFRASTRUCTURE

- Culverts and Stormwater Drainage:
  - Prioritize and implement upgrades to **increase culvert sizing and improve stormwater drainage system for climate resilience.**
  - **Study flooding and drainage issues** across the town to identify priorities for stormwater system improvements using climate projections and green infrastructure
  - **Replace culvert** on Shun Toll Road west of Route 71

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HIGH PRIORITIES: INFRASTRUCTURE

- Roads
  - **Assess gravel roads** and drainage improvements needed for watershed protection and emergency response. **Upgrade gravel roads to paved where possible.**
- Electricity and Communication Structure:
  - **Seek funding** to clear branches and dead/hazardous trees around power lines.
  - **Assess potential** for funding small-scale microgrid and residential backup power.

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What project ideas do you think are the highest priorities (Infrastructure)?

ⓘ Start presenting to display the poll results on this slide.

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HIGH PRIORITIES: COMMUNITY

- Emergency Preparedness, Outreach and Training:
  - **Expand frequency and reach of emergency preparedness outreach** about emergency services, regional shelters, and alert system. Develop new channels to reach renters and visitors.
  - **Ensure adequate staffing plan** for cooling/heating centers for peak visitor numbers, including offering emergency response and medical training for volunteers and municipal staff.
- Schools and Youth:
  - **Engage youth** in climate change discussions and activities.

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HIGH PRIORITIES: COMMUNITY

- Populations at Risk of Isolation:
  - **Improve existing transportation** assistance and assess additional needs for assisting people with transportation.
  - Update and promote awareness of the **police checklist of vulnerable households for check-ins** in case of extreme events.
  - **Start a buddy system** for residents to check on seniors and share resources in event of emergency.
- Tourism/Economy:
  - **Expand awareness and access to a diversity of outdoor activity offerings** (with different accessibility levels) through improved promotion through public and private channels.

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What project ideas do you think are the highest priorities (Community)?

ⓘ Start presenting to display the poll results on this slide.

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HIGH PRIORITIES: ENVIRONMENT

- Agriculture:
  - Encourage the agriculture community to **incorporate climate adaptation practices by outreach and making resources available on climate resilient techniques.** Make special effort to connect with younger farmers.
- Invasive Species:
  - Develop an **invasive species management program** to detect and manage new invasive plant species.
  - **Increase public outreach** to help public identify pests, health risks, and understand and contribute to management of invasive plant species.
  - Outreach to residents to **address invasive plants that are threatening to knock down power lines.**

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HIGH PRIORITIES: ENVIRONMENT

- Parks and Open Space, Hiking Trails:
  - **Increase trail management and maintenance**, trash cleanup, and invasive species removal via funding and partnerships.
  - **Generate plan and funding** for open space land acquisition and access improvements with a focus on climate resilience and hazard mitigation (OSRP update) and accessibility.

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HIGH PRIORITIES: ENVIRONMENT

- Waterbodies and Wetlands:
  - Improve **stormwater education through partnerships and targeted community outreach for landowners** about stormwater management BMPs (Prospect Lake and Green River).
  - **Educate public about development impacts on water quality and watershed health**.
  - **Review and update bylaws** to manage development in environmentally sensitive areas and address stormwater management in light of climate change.
  - Work with Conservation Commission and DEP to **improve ability to remove debris from streams** where flooding is a concern.

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What project ideas do you think are the highest priorities (Environment)?

ⓘ Start presenting to display the poll results on this slide.

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Questions?

or comments

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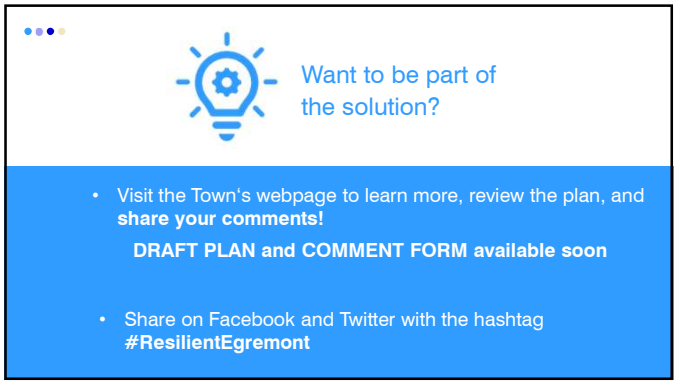
Want to be part of the solution?
• Visit the Town's webpage to learn more, review the plan, and **share your comments!**
DRAFT PLAN and COMMENT FORM available soon
• Share on Facebook and Twitter with the hashtag **#ResilientEgremont**

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Please share your email address here to receive future project updates.
Start presenting to display the poll results on this slide.
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slido
Audience Q&A Session
Start presenting to display the audience questions on this slide.
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Table of contents

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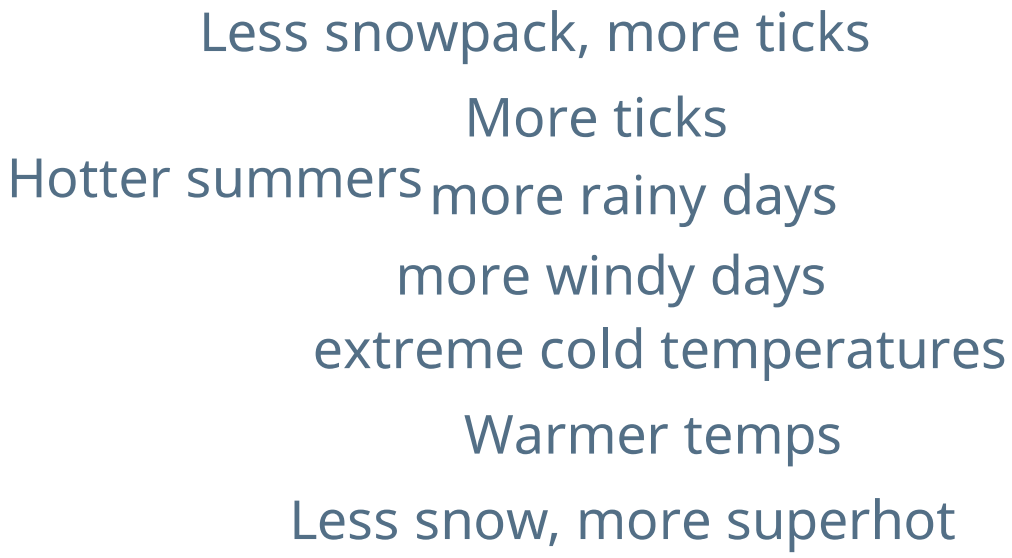
Wordcloud poll

What changes to climate have you observed? 0 1 0



Wordcloud poll

What do you view as Egremont's top vulnerabilities (to natural hazards or climate change)?

0 1 2

Wordcloud poll

What do you view as Egremont's top strengths, especially in preparing for and responding to climate change and natural hazards)?

0 1 1

Ranking poll

What project ideas do you think are the highest priorities (Infrastructure)?
(1/2)

1. Prioritize and implement upgrades to increase culvert sizing and improve stormwater drainage system. 4.47
2. Study flooding and drainage issues across the town to identify priorities for stormwater system improvements 4.33
3. Assess and upgrade gravel roads and drainage improvements for watershed protection and emergency response. 3.47
4. Seek funding to clear branches and dead/hazardous trees around power lines. 3.27

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Ranking poll

What project ideas do you think are the highest priorities (Infrastructure)?
(2/2)

5. Assess potential for funding small-scale microgrid and residential backup power. 3.00
6. Replace culvert on Shun Toll Road west of Route 71 1.80

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Ranking poll

What project ideas do you think are the highest priorities (Community)?

0 1 6

(1/2)

1. Expand frequency and reach of emergency preparedness outreach. Develop new channels to reach renters and visitors.
5.69

2. Assess and improve transportation assistance.
4.75

3. Update and promote awareness of the police checklist of vulnerable households for check-ins in case of extreme events.
3.75

4. Start a buddy system for residents to check on seniors and share resources in event of emergency.
3.50

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Ranking poll

What project ideas do you think are the highest priorities (Community)?

0 1 6

(2/2)

5. Ensure adequate staffing plan for cooling/heating centers for peak visitor numbers, including offering emergency response and medical training.
3.38

6. Engage youth in climate change discussions and activities.
2.50

7. Expand awareness and access to a diversity of outdoor activity offerings through improved promotion.
1.81

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Ranking poll

What project ideas do you think are the highest priorities (Environment)?

(1/3)

1. Develop an invasive species management program to detect and manage new invasive plant species.
   7.39
2. Encourage the agriculture community to incorporate climate adaptation practices. Make special effort to connect with younger farmers.
   6.31
3. Increase public outreach to help public identify pests, health risks, and contribute to management of invasive plant species.
   6.08
4. Improve stormwater education through partnerships and targeted community outreach for landowners about stormwater management BMPs (Prospect Lake and Green River).
   5.54

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Ranking poll

What project ideas do you think are the highest priorities (Environment)?

(2/3)

5. Educate public about development impacts on water quality and watershed health.
   5.08
6. Generate plan and funding for open space land acquisition and access improvements with a focus on climate resilience, hazard mitigation (OSRP update), and accessibility.
   5.00
7. Work with Conservation Commission and DEP to improve ability to remove debris from streams where flooding is a concern.
   4.62
8. Outreach to residents to address invasive plants that are threatening to knock down power lines.
   4.15

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Ranking poll

What project ideas do you think are the highest priorities (Environment)? 0 1 3
(3/3)

9. Review and update bylaws to manage development in environmentally sensitive areas and manage stormwater in light of climate change. 3.77

10. Increase trail management and maintenance, trash cleanup, and invasive species removal via funding and partnerships. 3.31

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Wordcloud poll

What is your favorite thing about living in Egremont? 0 1 4

Natural beauty
The people.
The tree on Baldwin Hill Rd
Beauty and the people
Mountains
Scenery
The rivers seasonal change Space

Natural environment

Community

Community and Natural Environment

Egremont Municipal Preparedness Planning Committee
Business Stakeholders Meeting
Via Zoom
February 10, 2022 6:00 pm
In Attendance: Darrell Turner (Turner Farms), Rebecca Turner, Betsy Andrus (Southern Berkshire Chamber of Commerce), Juliette Haas (MVP Committee/recording), Joanna Nadeau (Weston & Sampson), Carrieanne Petrick (MVP Regional Rep)
Invited but not Attending: Elizabeth Keen (Indian Line Farm), Will Conklin (Greenagers), Rich Edward (Catamount), Carla Turner (Turner Maple Syrup),Tracy Lind (Appalachian Trial Comm), Elia del Molino (Greenagers)

1) **Meeting Opens** Juliette Haas opened the Egremont MVP Business Stakeholder meeting at 6:05 pm. A short introduction took place. Carrieanne Petrick spoke to the principals of the MVP programs and how communities can benefit from Action Grant funded projects.

2) **Risks and/or impacts of climate change to the business community** Darrell Turner spoke to his 4th generation dairy farm with 650 acres and 120 milking cows. He also owns and operates a malt house and other family members own and operate Turner Farms Maple Syrup. He spoke to how climate affects his farm: reduction in feed to animals (corn and hay), excessive rain is tough on equipment and machinery, loss of farmland. Climate migration/increase in population leads to loss of farmland and increased conflict/lack of education about agriculture. Betsy Andrus spoke to the affects warmer winters is having on local ski resorts (shorter skiing season, less natural snow, harder to make snow, increase power demand to make snow) and the ripple effect on local businesses (shops/restaurants/hotels). Climate migration/increase in population leads to higher housing values and taxes putting pressure on farms, recreational areas, and businesses. She spoke of her concern about maintenance to open spaces which need regular clearing.

3) **Climate adaptation measures** Turner Farms practices low till measures to reduce soil compaction and heavy crop rotation to reduce use of soil additives and enhance drainage. Betsy spoke to the development of a rental housing database for the work force.

4) **Future helpful adaption measures**
   Increase food access
   Land conservation/Agricultural Preservation Restrictions (APR)
   Maintain roads and culverts to address field erosion and fertilizer runoff
   Education/awareness among farmland owners about options like 61A (tax relief)
   Education/awareness about benefits of preserving farmland (for watershed, carbon mitigation)
   More access to affordable farmland
   Education/awareness of Right to Farm designation to avoid farmer/nonfarmer conflicts
   Continue to explore affordable housing options
   Education/awareness on invasives

5) **Conclusion of meeting 7:30 pm.**

Juliette Haas
Recording

Appendix E

Plan Adoption

[TEMPLATE]
<TOWN LETTERHEAD>

CERTIFICATE OF ADOPTION
SELECTBOARD
TOWN OF EGREMONT, MASSACHUSETTS

A RESOLUTION ADOPTING THE *TOWN OF EGREMONT 2022 MUNICIPAL VULNERABILITY PREPAREDNESS - HAZARD MITIGATION PLAN*

WHEREAS, the Town of Egremont established a Committee to prepare the *Town of Egremont 2022 Municipal Vulnerability Preparedness - Hazard Mitigation Plan*; and

WHEREAS, the *Town of Egremont 2022 Municipal Vulnerability Preparedness - Hazard Mitigation Plan* contains several potential future projects to mitigate potential impacts from natural hazards as well as climate change in the Town of Egremont, and

WHEREAS, the public provided input through one duly-noticed public listening session on March 29, 2022 and an online survey, advertised through the Town website, email, social media, Shopper's Guide, Egremont Post, mailed to residents, and shared at the Transfer Station, and

WHEREAS, the Town of Egremont authorizes responsible departments and/or agencies to execute their responsibilities demonstrated in the plan, and

NOW, THEREFORE BE IT RESOLVED that the Town of Egremont Selectboard adopts the *Town of Egremont 2022 Municipal Vulnerability Preparedness - Hazard Mitigation Plan*, in accordance with M.G.L. 40 §4 or the charter and bylaws of the Town of Egremont.

ADOPTED AND SIGNED (this Date).

Name(s)

Title(s)

Appendix F

FEMA Approval