Town of Colrain

Municipal Vulnerability Preparedness (MVP) Program

MVP Resiliency Plan

Facilitated by the Franklin Regional Council of Governments
A State-Certified MVP Provider
MVP Resiliency Plan
including the
Summary of Findings from the
Community Resilience Building Workshop
April 2018

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Town of Colrain  
Community Resilience Building Workshop  
Summary of Findings

Overview:
Throughout Franklin County, Massachusetts, communities are experiencing more extreme weather events – especially heavy rains and flooding – along with higher temperatures and other climate-related conditions. These types of conditions are predicted to increase as a result of climate change.

In the face of these and other changes, municipalities have more of a sense of urgency to increase their resilience and adapt to extreme weather events and mounting natural hazards. Relatively recent events in Franklin County, such as Tropical Storm Irene and “Snow-tober”, have reinforced this urgency and compelled communities like the Town of Colrain to proactively plan and mitigate potential risks. This type of planning will reduce the vulnerability of Colrain’s people, infrastructure and natural resources, and will empower Colrain’s officials and citizens alike to take steps to protect themselves and their community.

In the spring of 2018, with funding from the Massachusetts Executive Office of Energy and Environmental Affairs, the Franklin Regional Council of Governments (FRCOG) offered the Town of Colrain technical assistance in completing their Community Resilience Building Workshop to achieve designation as Municipal Vulnerability Preparedness Community or “MVP” Community. As a State-certified MVP Provider, the FRCOG helped Colrain engage in a community-driven process that brought together climate change information and local knowledge to conduct the workshop, whose central objectives were to:

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

This report summarizes the findings of the Town of Colrain’s Community Resilience-Building Workshop.
Community Resilience Building Workshop

Summary of Findings

The Town of Colrain, population 1,682, has conducted a number of planning projects in previous years, including its 2014 Hazard Mitigation Plan, which enabled the Town to identify high priority hazards as well as areas, infrastructure and populations vulnerable to a variety of hazards, and action items to potentially address hazards. Other recent Colrain plans include 2014 Colrain Center Village Master Plan and plans conducted by the FRCOG. FRCOG plans include the 2017 Watershed-Based Plan to Maintain the Health and Improve the Resiliency of the Deerfield River Watershed and a 604b-funded Fluvial Geomorphic and Habitat Assessment for the East Branch of the North River. Some of the recommendations from the Watershed-Based Plan tie in directly with recommendations workshop participants developed. Another plan that is currently underway that includes Colrain is the River Corridor Mapping Project, led by the FRCOG in collaboration with Franklin Conservation District.

In spite of Colrain’s diligence in completing these various planning efforts, there was still a need for the community to conduct a hazard assessment across scales – from individual buildings and bridges to rivers and landscapes, and across sectors – infrastructure, society and environment – looking specifically through the lens of climate change and its likely impacts.

Workshop participants considered climate change impacts most likely to impact Colrain, including rising and extreme air temperatures, extreme weather events, and increased quantity and intensity of precipitation.

The workshop was critical to enabling participants to think about and engage with people from different sectors. People representing public health, planning, fire, emergency management, and others came together to determine the most threatening hazards to the Town of Colrain and to agree upon high priorities and actions to address them.

Top Hazards

Workshop participants discussed a number of hazards that impact Colrain, deliberating on how frequent, how intense and how widespread each hazard has been and could potentially be in the future. Hazards discussed included: dam failures, severe winter storms/ice storms, earthquakes, hurricanes, wind storms/microbursts, tornados, ice jams, floods, wild fires, landslides, droughts, manmade hazards and extreme temperatures. Top hazards identified by the participants are as follows:

- Flooding
- High winds / microbursts
- Drought and associated wild fires
- Winter storm, ice storms and ice jams
In addition to these top hazards, workshop participants said it was important to note that lack of cell phone and/or internet coverage is a hazard in and of itself, and that this issue serves to exacerbate the impacts of Colrain’s top hazards.

**Areas of Concern**

**Infrastructure and buildings:** Buildings, facilities and an uncapped landfill very close to the East Branch of the North River; shelters in floodplains; lack of cell phone and internet service throughout town

**Transportation and flooding:** Many vulnerable bridges and culverts throughout town; vulnerable roads throughout town including on state-owned land; lack public transportation throughout town

**Public sanitation and water:** Need for fire hydrants and ponds in Catamount State Forest; need for sewer and septic in the village center; private wells vulnerable to drought throughout town; instances of deteriorating housing throughout town

**People:** Isolated, hard-to-reach populations throughout town; tick-borne illnesses throughout town

**Ecosystems and natural resources:** Tree maintenance along roads throughout town; eroding riverbanks along the both branches of the North River; invasive plant species, especially along river corridors; farm fields without buffers along both branches of the North River

**Current Concerns & Challenges Presented by Hazards**

Participants in the workshop discussed a number of hazards, both natural and manmade which have impacted the community in recent years. For many, Tropical Storm Irene in 2011 is a bellwether event, demonstrating the extent and severity of the types of extreme weather and increased rain that is predicted to become more frequent in the coming years.

Flooding in particular, fueled by heavy rains, was widespread in Colrain after Irene. Flooding washed out roads, culverts and farm fields throughout Colrain, as shown on the map on page 11. Workshop participants expressed concern about heavy rain events and potential future flooding, saying impacts on bridges, culverts, roads and other infrastructure could be significant.
Participants also discussed the challenges posed to the Town during high wind and microburst events. Given that over 83% of the Town is forested, downed trees during these types of hazards could cause widespread road closures and could take down utility lines throughout Town.

Although towns in Franklin County have an abundance of rivers and streams – and worry about droughts has typically been low – the drought of 2016 was a reminder of the widespread impacts droughts can have on our region. In addition to impacting the water quality and quantity of rivers, streams and other waterbodies, drought can fuel wildfires. The Town of Colrain is particularly vulnerable, given the high percentage of wooded land in Town. Also, some State-owned land, like that in Catamount State Forest, is hard to get to, especially given the lack of maintenance on State-owned roads.

Participants also talked about impacts from winter storms and ice storms, which are similar to the impacts caused by high wind events. Downed trees and power lines, and road closures could be widespread and could tax the capacity of first responders, the highway department and private citizens.

**Specific Categories of Concerns and Challenges**

**Vulnerability of Colrain’s village center:** Colrain’s village center lies in a valley, alongside the North River. The geographical conditions make for some challenges for the Town. There are currently no shelters located outside the floodplain of the North River in Colrain. Also, bridges and culverts are vulnerable to high flood events. The uncapped landfill is adjacent to a steep slope leading down to the West Branch of the North River. The Fire Department building, which is in need of replacement, cannot expand onto the land occupied by the landfill until the landfill is capped. The Town’s salt shed is also located along this vulnerable stretch of land adjacent the West Branch of the North River.

Additionally, many private septic systems for the over 40 residences in the village center are in failure and, due to the topography, small lot size and surface bedrock, replacing the systems in their current locations is not possible. There may be an opportunity to partner with or otherwise connect with the private company, Barnhardt Manufacturing, which has a wastewater treatment facility. Any recommendations made regarding this issue should include information from the 2014 Colrain Center Village Master Plan and other related studies.

**Safety and well-being of Colrain’s residents:** Colrain is very rural and many residents live in isolated locations. There is unreliable or no cell phone service and internet for some residents. Residents who live alone and who have not opted in to Blackboard Connect do not have reliable access to information concerning emergencies.

Some homes which were flooded during Tropical Storm Irene have not been rehabbed, leaving occupants vulnerable to molds and other substandard housing conditions. It can be difficult for residents to understand what resources are available to them for housing rehab. Also, residents’ private wells may be vulnerable during droughts to decreased water quality and quantity. With increased temperatures predicted, conditions are more favorable for some vector-borne illnesses, such as Lyme disease.
**Funding for needed projects:** Small, rural towns such as Colrain need funding to implement projects to be more resilient in the face of climate change. Funding for a variety of projects is identified in the Community Resilience Building Risk Matrix, including bridge and culvert repairs or replacement, feasibility studies, design and construction for replacing the Fire Department facility and capping the landfill, gravel road repair and other projects.

**Protection of natural resources:** Riverbank erosion and slumping as well as mudslides are a concern along much of the North River and its branches. Colrain’s large expanses of forest could be vulnerable to drought and wildfires, as well as to invasive plant species. Farm fields have been subject to flooding and erosion and some farm fields have had debris deposited on them during floods. Crops have been lost to flooding as well.

**Current Strengths and Assets**
Colrain has a number of strengths and assets, as identified by workshop participants. The top strengths and assets are shown in the following chart:

![COLRAIN'S TOP STRENGTHS](chart.png)

- The Town has taken a proactive response to bridge and culvert replacements
- Close-knit community members look out for one another
- Strong and active volunteer fire and ambulance crews protect the Town
- Forests protect against climate change impacts

A detailed list of strengths and assets identified by workshop participants include:

**Infrastructural strengths and assets:** Several bridges and culverts have been or are slated for repair or replacement, and the Town is pursuing additional funding for more repairs. Colrain’s Fire, Police and EOC facilities are outside of the floodplain and are not vulnerable to flooding. Blackboard Connect serves to provide emergency information to Town residents who participate in the service.
**Strength of Town Services:** Colrain has a strong volunteer fire crew and a strong ambulance crew. The Town Administrator is knowledgeable and is actively pursuing funding on behalf of the Town.

**Societal strengths and assets:** People in Colrain are a close-knit community and most people know each other. People look out for one another.

**Environmental strengths and assets:** Much of Colrain is forested; forests are critical to resilience to climate change impacts including cleaning air and water, increasing stormwater infiltration and decreasing runoff, storing carbon and other important functions.

**Top Recommendations to Improve Resilience**
Infrastructure and facilities were common themes in many of the recommendations to emerge from the workshop, including the top five highest priorities shown below.

1. **Use prioritized list of bridges and culverts to seek funding for bridge and culvert redesign, repair or replacement.**
2. **Procure funding for repair of chronic road issues, including addressing engineering and underlying hydrology and upstream issues.**
3. **Seek funding to conduct a feasibility study and to site, design and/or construct a Fire Department facility.**
4. **Seek funding to conduct feasibility study and to cap the landfill and to stabilize the riverbank along the property.**
5. **Evaluate alternative septic / sewer systems, such as a small package facility for the village or a connection to Barnhardt.**

**Transportation infrastructure** topped the list of highest priority recommendations, with workshop participants agreeing that the repair, maintenance and/or replacement of bridges, culverts and roads were of utmost importance to Colrain’s resilience, particularly related to increased rainfall and increased flooding. Although Colrain has taken positive steps to seek funding, inventory, repair and or replace bridges and culverts, there are still many more bridges and culverts that need attention. Also, as bridges and culverts are replaced, there is an opportunity to utilize LID site planning and stormwater techniques, as called for in the 2017 Watershed-Based Plan. The potential failure of bridges and culverts threatens to cut off communities and important infrastructure during emergencies, while upgrading or replacing them promises to make Colrain more climate change resilient.
With about 45 miles of gravel roads, Colrain’s Highway Department has its hands full trying to keep the roads in good repair. The reality is that some roads need more significant engineering and hydrological work, beyond simple grading or drainage. Additional funding is needed to address the magnitude of the problems with roads in Colrain, including conducting a Rural Roads Assessment to identify road drainage and stormwater management problems and to determine priority projects and BMPs, as recommended in the Watershed-Based Plan.

A new Fire Department facility also topped the list of highest priority recommendations. This recommendation is essential to the Town being able to respond as quickly as possible to hazards such as increased wildfires due to increased droughts. This recommendation goes hand-in-hand with the recommendation to cap the landfill adjacent to the Fire Department and to stabilize the riverbank. Doing so would provide room to site a new, larger Fire Department facility and would address environmental concerns of leaving the landfill uncapped, including water quality issues. This recommendation was made as part of the Watershed-Based Plan in 2017, which includes performing additional field investigation to assess environmental risk, identifying and characterizing the extent of any impacts that may be present, and determining the need for corrective action. As with the riverbank near the landfill, riverbanks along many parts of the river need assessment and stabilization, as called for in the 2017 Watershed-Based Plan.

Sewer infrastructure replacement rounded out the list of highest priorities for Colrain. In the village of Colrain, homes on Road in particular have septic systems that are failing. The site constraints of these homes prevent homeowners from installing new septic systems. Colrain has been exploring alternatives. Workshop participants agreed that decisions need to be made to address the failing infrastructure, whether this means a small, package sewer system or tying homes into the wastewater treatment facility at Barnhardt Manufacturing. Replacing the failing sewer infrastructure would address infrastructural, societal and
environmental needs in Colrain, and would help the Town be more resilient to increased rainfall and flooding.

A number of other recommendations emerged during the workshop. Some recommendations are far-reaching and/or expensive and others are modest or relatively affordable. Following is the Community Resilience Building Risk Matrix, sorted by sector and priority, which illustrates how many of the recommendations are relevant to more than one top priority hazard. In fact, ten of the 25 recommendations are relevant to all four of the top priority hazards. Because some of the recommendations are similar to ones in the Watershed-Based Plan, the actions in this matrix will also strengthen the Deerfield River’s watershed health, in addition to reducing the vulnerability of the communities that live within the watershed.

Following the matrix is a complete bulleted list of recommendations, sorted by highest priority, moderate priority and lower priority.
## Community Resilience Building Risk Matrix

**H-M-L** priority for action over the **Short** or **Long** term (and **Ongoing**)

**V** = Vulnerability  **S** = Strength

### Top Priority Hazards

<table>
<thead>
<tr>
<th>Features</th>
<th>Location</th>
<th>Ownership</th>
<th>V or S</th>
<th>Recommendations</th>
<th>Flooding</th>
<th>High Winds/Microbursts</th>
<th>Drought/Wildfires</th>
<th>Ice &amp; Winter Storms/Ice Jams</th>
<th>Priority</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infrastructural</td>
<td></td>
<td></td>
<td></td>
<td><strong>Infrasctructural</strong>: <strong>Town</strong> depends upon a large number of bridges and culverts throughout <strong>Town</strong>. Bridge failures could have catastrophic impact on the Town and its residents.</td>
<td>Townwide</td>
<td>Town or state</td>
<td>V</td>
<td>Pursue additional funding for redesigns, repair and/or replacement of bridges and culverts throughout Town, using prioritized list.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>There is not enough state funding for bridge and culvert repair. Funding has not increased adequately to pay for increased regulations related to bridges and culverts.</strong></td>
<td>Townwide</td>
<td>Town or state</td>
<td>V</td>
<td>Contact legislators or other state officials to encourage additional funding of bridge and culvert repairs.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td><strong>Town does not have emergency shelters that are located outside of floodplain.</strong></td>
<td>Townwide</td>
<td>Town</td>
<td>V</td>
<td>Identify shelters outside of the floodplain and obtain funding to equip them as needed.</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Colrain’s Fire Department facility needs to be replaced.</strong></td>
<td>Village</td>
<td>Town</td>
<td>V</td>
<td>Obtain funding to conduct a feasibility study to replace the Fire Department facility.</td>
<td>X</td>
<td>X</td>
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<tr>
<td></td>
<td></td>
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<td></td>
<td><strong>There is an uncapped landfill adjacent the Fire Department and the West Branch of the North River.</strong></td>
<td>Village</td>
<td>Town</td>
<td>V</td>
<td>Obtain funding to cap the landfill and to stabilize the riverbank along the property.</td>
<td>X</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>There is some riverbank instability along the property.</strong></td>
<td>Village</td>
<td>Town</td>
<td>V</td>
<td>Pursue funding for road repairs, including addressing engineering, underlying hydrology and other issues.</td>
<td>X</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>There are issues with declining septic systems. This is causing environmental issues as well as declining property values.</strong></td>
<td>Townwide</td>
<td>Town</td>
<td>V</td>
<td>Partner with the FRCOG to identify upstream sites for debris and mudslide controls to reduce damage to roads.</td>
<td>X</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>There are issues with declining septic systems. This is causing environmental issues as well as declining property values.</strong></td>
<td>Village</td>
<td>Private</td>
<td>V</td>
<td>Evaluate alternative septic / sewer systems, such as a small package facility for the village or a connection to Barnhardt.</td>
<td>X</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>There is significant riverbank instability and erosion.</strong></td>
<td>East Branch of North River</td>
<td>Town / Private</td>
<td>V</td>
<td>Seek funding to implement riverbank stabilization projects as specified in the FRCOG’s geomorphic assessments.</td>
<td>X</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>There is a lack of cell phone and internet coverage.</strong></td>
<td>Townwide</td>
<td>Private</td>
<td>V</td>
<td>Seek funding to conduct a feasibility study for installing a municipal cell phone tower.</td>
<td>X</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>The Greenfield Road hill into the village has been the site of several runaway truck incidents.</strong></td>
<td>Greenfield Road</td>
<td>State</td>
<td>V</td>
<td>Conduct additional assessments and install safety measures as determined in assessment.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Roads in Catamount State Forest are not maintained.</strong></td>
<td>Catamount State Forest</td>
<td>State</td>
<td>V</td>
<td>Contact legislators or other state officials to encourage road maintenance</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Highway Department does not have back-up power.</strong></td>
<td>Village</td>
<td>Town</td>
<td>V</td>
<td>Obtain a grant to establish back-power and a generator.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Colrain’s road salt shed is located on a vulnerable site along the West Branch of the North River.</strong></td>
<td>Village</td>
<td>Town</td>
<td>V</td>
<td>Move salt shed to more stable site.</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>There is a need for more water supplies for fire suppression.</strong></td>
<td>Catamount State Forest</td>
<td>State</td>
<td>V</td>
<td>Secure information on existing fire ponds and update as needed.</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>
### Community Resilience Building Risk Matrix

**H-M-L** priority for action over the **Short** or **Long** term (and **Ongoing**)  
**V** = Vulnerability  
**S** = Strength

<table>
<thead>
<tr>
<th>Features</th>
<th>Location</th>
<th>Ownership</th>
<th>V or S</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infrastructural (cont.)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colrain has a strong volunteer Fire Department and Ambulance crew.</td>
<td>Townwide</td>
<td>Town</td>
<td>S</td>
</tr>
<tr>
<td>Fire, Police and EOC facilities are located outside the floodplain and have back-up power.</td>
<td>Village</td>
<td>Town</td>
<td>S</td>
</tr>
<tr>
<td>Design of internet (fiber) under development and design.</td>
<td>Townwide</td>
<td>Private</td>
<td>S</td>
</tr>
<tr>
<td>With so much of Colrain forested, there are regular issues with downed trees on roads and utility lines. However, communication with Eversource, who maintains trees along utility lines, is good.</td>
<td>Townwide</td>
<td>Town or state</td>
<td>V</td>
</tr>
<tr>
<td>Several bridges and culverts are being repaired / replaced.</td>
<td>Town or state</td>
<td>V/S</td>
<td></td>
</tr>
<tr>
<td>Bridge and culvert inventory is underway.</td>
<td>Townwide</td>
<td>Town or state</td>
<td>S</td>
</tr>
<tr>
<td>Town pursuing grants for infrastructure repair and upgrades, including bridges and culverts.</td>
<td>Townwide</td>
<td>Town</td>
<td>S</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Societal</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The list of vulnerable people in Town is not up to date.</td>
<td>Townwide</td>
<td>Town</td>
<td>V</td>
</tr>
<tr>
<td>Blackboard Connect is an effective tool to keep people informed of emergencies and hazards.</td>
<td>Townwide</td>
<td>Town</td>
<td>S</td>
</tr>
<tr>
<td>Colrain is a close-knit community.</td>
<td>Townwide</td>
<td>Private / Town</td>
<td>S</td>
</tr>
<tr>
<td>Transportation for vulnerable people needed.</td>
<td>Townwide</td>
<td>Private / Town</td>
<td>V</td>
</tr>
<tr>
<td>There are increased incidences of tick-borne illnesses.</td>
<td>Townwide</td>
<td>Private</td>
<td>V</td>
</tr>
<tr>
<td>People who rely upon private wells for drinking water are without water when there is a power outage. Long term droughts may also impact water quality and quantity of private wells.</td>
<td>Townwide</td>
<td>Private</td>
<td>V</td>
</tr>
<tr>
<td>Post disaster loans from FEMA are difficult to navigate.</td>
<td>Townwide</td>
<td>Private</td>
<td>V</td>
</tr>
<tr>
<td>There are some homes in Colrain which did not get repaired or rehabbed after Tropical Storm Irene and that are deteriorating and/or have mold issues. There are also septic systems in failure.</td>
<td>Townwide</td>
<td>Private</td>
<td>V</td>
</tr>
<tr>
<td>Areas of Town can be cut off from ambulance service.</td>
<td>Townwide</td>
<td>Town</td>
<td>V</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recommendations</th>
<th>Flooding</th>
<th>High Winds / Microbursts</th>
<th>Drought</th>
<th>Ice &amp; Winter Storms / Ice Jams</th>
<th>Priority</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Update and maintain vulnerable populations list.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Coordinate/integrate Blackboard Connect with other entities, such as Town officials, LifePath, Council on Aging and first responder.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Use townwide events such as community meals as an opportunity to encourage participation in Blackboard Connect.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Develop neighbor helping neighbor network for groceries, prescriptions and other basic needs.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Encourage household emergency preparedness.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Establish volunteers who are willing to help residents fill out FEMA paperwork and navigate the system.</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Provide education and information on housing rehab loans and funding for septic repair.</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<th>Top Priority Hazards</th>
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<td>Ice &amp; Winter Storms / Ice Jams</td>
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<td>High Winds / Microbursts</td>
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<tr>
<td>Drought</td>
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</table>

www.CommunityResilienceBuilding.org

**Priority**  
**Time**

**Recommendations**

- Coordinate/integrate Blackboard Connect with other entities, such as Town officials, LifePath, Council on Aging and first responder.
- Use townwide events such as community meals as an opportunity to encourage participation in Blackboard Connect.
- Develop neighbor helping neighbor network for groceries, prescriptions and other basic needs.
- Encourage household emergency preparedness.
- Establish volunteers who are willing to help residents fill out FEMA paperwork and navigate the system.
- Provide education and information on housing rehab loans and funding for septic repair.

**Features**

- Colrain has a strong volunteer Fire Department and Ambulance crew.
- Fire, Police and EOC facilities are located outside the floodplain and have back-up power.
- Design of internet (fiber) under development and design.
- With so much of Colrain forested, there are regular issues with downed trees on roads and utility lines. However, communication with Eversource, who maintains trees along utility lines, is good.
- Several bridges and culverts are being repaired / replaced.
- Bridge and culvert inventory is underway.
- Town pursuing grants for infrastructure repair and upgrades, including bridges and culverts.
- Colrain is a close-knit community.
- Transportation for vulnerable people needed.
- There are increased incidences of tick-borne illnesses.
- People who rely upon private wells for drinking water are without water when there is a power outage. Long term droughts may also impact water quality and quantity of private wells.
- Post disaster loans from FEMA are difficult to navigate.
- There are some homes in Colrain which did not get repaired or rehabbed after Tropical Storm Irene and that are deteriorating and/or have mold issues. There are also septic systems in failure.
- Areas of Town can be cut off from ambulance service.
## Community Resilience Building Risk Matrix

**H-M-L** priority for action over the **Short** or **Long** term (and **Ongoing**)

<table>
<thead>
<tr>
<th>V = Vulnerability</th>
<th>S = Strength</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Features</th>
<th>Location</th>
<th>Ownership</th>
<th>V or S</th>
<th>Recommendations</th>
<th>Flooding</th>
<th>High Winds/Microbursts</th>
<th>Drought/Wildfires</th>
<th>Ice &amp; Winter Storms/Ice Jams</th>
<th>Priority</th>
<th>Time</th>
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<tr>
<td><strong>Environmental</strong></td>
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</tr>
<tr>
<td>Japanese knotweed has invaded parts of Town.</td>
<td>Townwide and along river corridors</td>
<td>Private / Town</td>
<td>V</td>
<td>Pursue funding for invasive plant species control and native plant replanting initiatives.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
<td>O</td>
</tr>
<tr>
<td>There are riverbank instabilities and erosion.</td>
<td>West Branch of North River</td>
<td>Private</td>
<td>V</td>
<td>Conduct streambank stabilization projects on both branches of the North River.</td>
<td>X</td>
<td>X</td>
<td>M</td>
<td>O</td>
<td></td>
<td></td>
</tr>
<tr>
<td>River corridor mapping is underway.</td>
<td>Townwide along river corridors</td>
<td>Private / Town</td>
<td>S</td>
<td>Pursue funding to implement river corridor management recommendations.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>H</td>
<td>O</td>
</tr>
<tr>
<td>There has been damage to farm fields from flooding and ice jams.</td>
<td>Along river corridors</td>
<td>Private</td>
<td>V</td>
<td>Investigate funding to support farmers related to farmland erosion, debris and crop loss.</td>
<td>X</td>
<td></td>
<td>X</td>
<td>L</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>Colrain has had ice jams on the North River.</td>
<td>North River</td>
<td>Private / Town</td>
<td>V</td>
<td>Explore options for clearing ice jams.</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>There are maple sugaring operations in Colrain. They are vulnerable to climate change.</td>
<td>Townwide</td>
<td>Private</td>
<td>S/V</td>
<td></td>
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</tr>
<tr>
<td>Farmers have quite a bit of knowledge about programs and resources available to them.</td>
<td>Townwide</td>
<td>Private</td>
<td>S</td>
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</table>
**Other Highest Priority Recommendations**
- Contact legislators or other state officials to encourage additional funding of bridge and culvert repairs.
- Identify shelters outside of the floodplain and obtain funding to equip them as needed.
- Partner with the FRCOG to identify upstream sites for debris and mudslide controls to reduce damage to roads.
- Seek funding to implement riverbank stabilization projects as specified in the FRCOG’s geomorphic assessments.
- Seek funding to conduct a feasibility study for installing a municipal cell phone town.
- Conduct additional assessments as needed of the hill on Greenfield Road and install safety measures as determined in assessment.
- Update and maintain vulnerable populations list.
- Coordinate/integrate Blackboard Connect with other entities, such as Town officials, LifePath, Council on Aging and first responder.
- Use townwide events such as community meals as an opportunity to encourage participation in Blackboard Connect.
- Develop neighbor helping neighbor network for groceries, prescriptions and other basic needs.
- Expand subsidized tick-testing program through UMass.
- Encourage household emergency preparedness.
- Pursue funding for invasive plant species control and native plant replanting initiatives.

**Moderate Priority Recommendations**
- Contact legislators or other state officials to encourage road maintenance
- Obtain a grant to establish back-power and a generator.
- Establish volunteers who are willing to help residents fill out FEMA paperwork and navigate the system.
- Conduct streambank stabilization projects on both branches of the North River.
- Conduct outreach and education with private landowners about streambank stabilization.

**Lower Priority Recommendations**
- Move salt shed to more stable site.
- Secure information on existing fire ponds and update as needed.
- Provide education and information on housing rehab loans and funding for septic repair.
- Investigate funding to support farmers related to farmland erosion, debris and crop loss.
- Explore options for clearing ice jams.
CRB Workshop Participants: Department/Commission/Representative:

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Position</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scott Sullivan</td>
<td>Colrain Highway Dept.</td>
<td>Highway Supt.</td>
<td><a href="mailto:scott.sullivan@colrain-ma.gov">scott.sullivan@colrain-ma.gov</a></td>
</tr>
<tr>
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<td>Town Coord.</td>
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<td>Colrain Fire/EMS/Town Office</td>
<td>Fire/EMS/Town Office</td>
<td><a href="mailto:office_clerk@colrain-ma.gov">office_clerk@colrain-ma.gov</a></td>
</tr>
<tr>
<td>Kevin Friend</td>
<td>EMD</td>
<td>EMD</td>
<td><a href="mailto:kfriend@colrain-ma.gov">kfriend@colrain-ma.gov</a></td>
</tr>
<tr>
<td>Kimberly MacPhee</td>
<td>FRCOG</td>
<td>LW/Net Rev Proj. Mgr.</td>
<td><a href="mailto:kmacphee@frcog.org">kmacphee@frcog.org</a></td>
</tr>
<tr>
<td>Mary Chicoine</td>
<td>FRCOG</td>
<td>LW/NAT RES PLANNER</td>
<td>mary@c frcog.org</td>
</tr>
<tr>
<td>Pat Serra</td>
<td>meco</td>
<td>S. Planner</td>
<td>pserra@meco</td>
</tr>
<tr>
<td>Theresa Fitzgerald</td>
<td>Colrain Energy Committee</td>
<td>Member</td>
<td><a href="mailto:tfitzsimmons40e@hotmail.com">tfitzsimmons40e@hotmail.com</a></td>
</tr>
<tr>
<td>David Greaves</td>
<td>RESIDENT</td>
<td></td>
<td><a href="mailto:david.greaves3@gmail.com">david.greaves3@gmail.com</a></td>
</tr>
<tr>
<td>Eleanor Ecklar</td>
<td>Resident/Colrain Energy Committee</td>
<td></td>
<td><a href="mailto:eje227@gmail.com">eje227@gmail.com</a></td>
</tr>
</tbody>
</table>

CRB Workshop Project Team: Organization and Role

**Franklin Regional Council of Governments:**
Mary Chicoine, Project Lead, Principal Contact and Scribe
Kimberly Noake MacPhee, Lead Presenter and Co-facilitator
Patricia Smith, Co-facilitator

**Town of Colrain Project Lead:**
Kevin Fox, Town Coordinator

**Recommended Citation**

**Photo credits:**
- Cover: Downed power line, WMECO
- Cover: Overturned dump truck, Recorder
- Cover: Colrain Fire Department, Colrain Firefighters’ Association

All other photos not cited above were taken by the FRCOG
Appendices

Maps
Exercise Outputs
Workshop Presentation
BASE MAP: Infrastructural and Societal
BASE MAP: Environmental Resources
Colrain, Massachusetts

Environmental Resources
Colrain, Massachusetts

Flood Risked
Gale
100 YR Floodplain
Inundated Zones
Culvert Padding
Environmental
Waterfall
Cape Horn
Delta Command Zone
Largest Mound
Acquisition Area
Zone 1/100
Major Production Area
Permanently Protected State Waters
Tranmission Line
Town Hall
Fire Station
Police Station
Major Road
Stream/Channel
River/Dam
Reservoir
Town Secondary
Building Exposed
EXERCISE OUTPUTS

Top Hazards

- Flooding
- High Wind / Microbursts
- Drought / Fires
- Ice Storms / Winter Storms
- Ice Dams
- Hill
- Runaway Trucks
- Driver Errors / Mechanical Issues
- Power Outages
- No Cell Phone or Internet
- Bridge Failures
- Water Supplies
- Road Damage
- Downed Trees / Lines
- IMPACT

Top Recommendations

- Use Prioritized Bridge & Culvert Study for Grant Proposals
- Procure Funding for Road Repair (including Hydrology Issues)
- Develop Neighbor Helping Neighbor Program
- Evaluate Smaller / Package Sewer System
- Educate Public About Sewer Costs & Burnded Art
- Identify Shelters Outside Floodplain
- Conduct Feasibility Study for New Fire Facility
- Conduct Study to Cap Landfill
- Explore Feasibility of Municipal Cell Tower
- Pursue Funding for Invasive Plants Control
- Update & Maintain Vulnerable People List
- Coordinate Between Blackboard Connect, First Responders, Lifepath
- Use Townwide Events to Get People Know about Blackboard Connect
- Explore Expanded Tick Testing
- Expand School / Public Education @ Ticks & Lyme
- Encourage Household Emergency Preparedness
## Community Resilience Building Risk Matrix

### Lack of Cell Phone & Internet Coverage

**Top Priority Hazards** (tornado, floods, wildfire, hurricanes, earthquakes, drought, sea level rise, heat wave, etc.)

| Priority | H | M | L | Short | Long
|----------|---|---|---|-------|------
| Flooding | ✔ | X |   |       |      |
| High Wind & Microbursts |   |   | X |       |      |
| Drought |   |   |   |       |      |
| Ice & Winter Storms |   |   |   |       |      |
| Ice Dams |   |   |   |       |      |

### Features

<table>
<thead>
<tr>
<th>Features</th>
<th>Location</th>
<th>Ownership</th>
<th>V or S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Several Bridges Being Replaced</td>
<td></td>
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<td>S</td>
</tr>
<tr>
<td>Bridge &amp; Culvert Inventory Underway</td>
<td></td>
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<tr>
<td>Town Pursuing Grants for Infrastructure</td>
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<tr>
<td>Water Supplies for Fire Suppression</td>
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<td>S</td>
</tr>
<tr>
<td>Large Number of Bridges</td>
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<td>S</td>
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<tr>
<td>Widescure Road Damage</td>
<td></td>
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<td>S</td>
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<tr>
<td>Downed Trees / Linet</td>
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<td>S</td>
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<tr>
<td>Sewer Issues</td>
<td></td>
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<tr>
<td>Strong Volunteer Fire Dept</td>
<td></td>
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<tr>
<td>Strong Emergency Crew</td>
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<tr>
<td>Fire Police Out of Department EOC</td>
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<td>S</td>
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<tr>
<td>Highway Dept - No Back-up Power</td>
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<tr>
<td>Shelter</td>
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<tr>
<td>Emergency Fire Facility</td>
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<tr>
<td>Uncapped Landfill - Cannot Use</td>
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<td>S</td>
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<tr>
<td>Cell Phone &amp; Internet</td>
<td></td>
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<tr>
<td>Hill Jackson Nursery</td>
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</tbody>
</table>

### Other Measures

- **Evaluate Existing/Alternative Parking Facilities for People:** Evaluate current parking facilities for people and consider alternative options.
- **Enhance Coastal Resiliency:** Enhance coastal infrastructure to protect against future storms.
- **Inventory of Bridges:** Develop a comprehensive inventory of bridges in the area.
- **Seismic Evaluation:** Conduct a seismic evaluation of existing structures.
- **Fire Protection:** Implement fire protection measures to mitigate fire risks.
- **Sewer System Improvements:** Implement improvements to the sewer system to prevent flooding.
- **Road and Bridge Repairs:** Prioritize repairs for roads and bridges to improve resilience.
- **Emergency Shelters:** Establish emergency shelters to accommodate displaced populations.
- **Community Engagement:** Engage the community in resilience planning and decision-making processes.
- **Technology Solutions:** Explore the use of technology to improve communication and response during emergencies.
- **Land Use Planning:** Implement land use planning that aligns with resilience objectives.
- **Public Awareness:** Increase public awareness about resilience measures and emergency preparedness.

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**Community Resilience Building Risk Matrix**

## Natural Resources Infrastructure

**Community Resilience Building Risk Matrix**

<table>
<thead>
<tr>
<th>Features</th>
<th>Location</th>
<th>Ownership</th>
<th>V or S</th>
<th>Priority</th>
<th>Time</th>
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<tbody>
<tr>
<td><strong>Knot Weed</strong></td>
<td>Throughout</td>
<td></td>
<td>V</td>
<td>M</td>
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<tr>
<td><strong>River Corridor Mapping</strong></td>
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<tr>
<td><strong>Farm Field</strong></td>
<td>S/V</td>
<td>L</td>
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<tr>
<td><strong>Ice Dams in River</strong></td>
<td>V</td>
<td>L</td>
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</tr>
<tr>
<td><strong>West Branch River Bank Instability &amp; Flooding</strong></td>
<td>V</td>
<td>L</td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Trees &amp; Forestry/Map Sources</strong></td>
<td>S/V</td>
<td>M</td>
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</tbody>
</table>

**Lack of Cell Phone & Internet Coverage**

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, flood wave, etc.)

<table>
<thead>
<tr>
<th>Hazards</th>
<th>Priority</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flooding</td>
<td></td>
<td></td>
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<tr>
<td>High Wind &amp; Microbursts</td>
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<tr>
<td>Drought &amp; Fire</td>
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<tr>
<td>Ice &amp; Winter Storms</td>
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</tbody>
</table>

**Matters**

- **Pursue funding for invasive species control and replanting.**
- **Investigate funding for farmer support related to farmland erosion & debris deposits.**
- **Explore options for clearing ice dams.**
- **Conduct streambank stabilization projects on west and east branches.**
- **Outreach to private landowners for streambank stabilization.**

**Notes**

- M = Long
- L = Medium
- H = High
- S = Short
### Community Resilience Building Risk Matrix

**General**
- **Access to Ambulance Service**
- **Vulnerable Populations**
- **Blackboard Connect**
- **Close Knit Community**
- **Emergency Services & Highway Dept.**
- **Transportation for Vulnerable People Needed**
- **Increased Ticks/Lyme**
- **Private Wells - Loss of Electricity**
- **Water During Drought**
- **Post Disaster Loans (Penn)**
- **Environmental**
  - **Post Disaster Human Deterioration**
  - **V/Us & Her Private**
- **Lack of Cell Phone & Internet Coverage**

**Top Priority Hazards**
- **Floods**
- **High Wind & Microbursts**
- **Drought & Fires**
- **Ice & Winter Storms**

**Priority**
- **H** = High
- **M** = Medium
- **L** = Low

**Time**
- **S** = Short
- **M** = Medium
- **L** = Long

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**Features**
- **Location**
- **Ownership**
- **V or S**

<table>
<thead>
<tr>
<th>Features</th>
<th>Location</th>
<th>Ownership</th>
<th>V or S</th>
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<tbody>
<tr>
<td><strong>Access to Ambulance Service</strong></td>
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<tr>
<td><strong>Vulnerable Populations</strong></td>
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<td>Special</td>
<td>V</td>
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<tr>
<td><strong>Blackboard Connect</strong></td>
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<td>Private</td>
<td>S</td>
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<tr>
<td><strong>Close Knit Community</strong></td>
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<td>S</td>
</tr>
<tr>
<td><strong>Emergency Services &amp; Highway Dept.</strong></td>
<td></td>
<td></td>
<td>S</td>
</tr>
<tr>
<td><strong>Transportation for Vulnerable People Needed</strong></td>
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<td></td>
<td>V</td>
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<tr>
<td><strong>Increased Ticks/Lyme</strong></td>
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<td>V</td>
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<tr>
<td><strong>Private Wells - Loss of Electricity</strong></td>
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<td>Loss</td>
<td>V</td>
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<tr>
<td><strong>Water During Drought</strong></td>
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<td></td>
<td>V</td>
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<tr>
<td><strong>Post Disaster Loans (Penn)</strong></td>
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<td>V/S</td>
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</table>

**Lack of Cell Phone & Internet Coverage**
- **Update and Maintain Vulnerable Populations List**
- **Coordinate Blackboard Connect, Town & Lifepath, Council on Aging, First Responders**
- **Use Townwide Events & Weekly Newsletters to Let People Know About This Service**

---

**Priority**
- **H** = High
- **M** = Medium
- **L** = Low

**Time**
- **S** = Short
- **M** = Medium
- **L** = Long
Community Resilience Building Workshop

Higher Temperatures
Change in Observed Number of Extreme Heat Days (>90 degrees)

Heat Waves
- Number of days >90° are predicted to increase.
- By 2050, 6 to 25 more days
- By 2100, 9 to 60 more days

Massachusetts’ Changing Climate

Goal for Building Resilience to a Changing Climate:
- Protect life, property, natural resources and the economy

Workshop Process and Outcomes

Build Resilience and Preparedness - for more frequent and intense weather events
- Improve pre-event planning, response & recovery, and long-term actions
- A prepared and resilient town will be able to maintain functions, protect its residents, and emerge stronger and better prepared for future storm events and a changing climate.

Workshop Process and Outcomes

- Review natural hazard background information to provide context for all participants
- Identify and map vulnerabilities and strengths:
  - Infrastructure
  - Societal
  - Natural resources
- Develop and prioritize actions and clearly delineated next steps

Heavy Precipitation

Observed Annual Precipitation

Heavy Precipitation

Predictions
- By the end of the century, our area could have 5 additional days of rainstorms that dump over 1 inch of rain.
WORKSHOP PRESENTATION (CONT.)

**Extreme Weather Events**
- Tropical storms
- Tornadoes
- Thunderstorms
- Snow storms
- Drought

The frequency, intensity, duration and geographic extent of these extreme storms is likely to increase.

**Colrain Multi-Hazard Mitigation Plan 2014**
- Inventoried historic hazard events – frequency, magnitude and damages
- Vulnerability assessment for flooding was prepared based on damages from past events and location in 100-year floodplain
- Prioritized all hazards and included action items for each hazard

**2014 Multi-Hazard Mitigation Plan**
Hazard ID & Vulnerability Assessment

<table>
<thead>
<tr>
<th>Potential Hazards Identified for Colrain</th>
<th>Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storm Failure</td>
<td></td>
</tr>
<tr>
<td>Severe Winter Storms/Ice Storm</td>
<td></td>
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<tr>
<td>Earthquake</td>
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<tr>
<td>Hurricane</td>
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<tr>
<td>Wildfires, Wildfires, etc.</td>
<td></td>
</tr>
<tr>
<td>Tornado</td>
<td></td>
</tr>
<tr>
<td>Ice Jam</td>
<td></td>
</tr>
<tr>
<td>Flood</td>
<td></td>
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<tr>
<td>Wild Fire/Brush Fire</td>
<td></td>
</tr>
<tr>
<td>Landslide</td>
<td></td>
</tr>
<tr>
<td>Drought</td>
<td></td>
</tr>
</tbody>
</table>

A changing climate is exposing us to greater risk.

**Infrastructure**

- Roads
- Power grid
- Drinking Water
- Wastewater Treatment
- Communications
- Housing
- Emergency Response
- Schools

**Vulnerabilities**
- Increase in Precipitation and Extreme Storm Events
- Damages from flooding, Wind Storms, Snow/Ice Storms

**Expected Impacts from Higher Temperatures**

**Infrastructure**

**Energy**
- Increased demand will strain energy infrastructure
- Disrupt service (potential for widespread brownouts or blackouts)

**Transportation**
- More frequent maintenance required to address:
  - deterioration of asphalt roads
  - buckle railroad tracks
  - thermal expansion of bridges

**Societal (Colrain Residents)**

**What is it?**
- Availability of health care services
- Access to lifelines (food/water, emergency response personnel, etc.)
- Support networks that connect and maintain the supply of goods and services to vulnerable populations

**Vulnerabilities**
- Vulnerable populations
  - Elderly
  - Low/moderate income
  - Special needs
  - Languages spoken
WORKSHOP PRESENTATION (CONT.)

Effects of Climate Change on Town Residents (societal)

A changing climate is exposing us to greater risk.

- Heat-Related Illness and Death
- Danger from Storms & Flooding
- Insect-Borne Diseases
- Allergies & Pollen
- Waterborne Disease & Algal Blooms
- Vulnerable populations
- Shelters & services

Environment

A changing climate is exposing us to greater risk.

Natural Resources
- East & West Branch North River
- Coldwater streams
- Forests
- Floodplains
- Habitat
- Wetlands
- Aquifers
- Farm land

Vulnerabilities
- Flooding
- Erosion
- Impacts to water quality and quantity
- Loss of species diversity
- Invasive pests and plants
- Wetland soils become less absorptive
- More stormwater runoff, less groundwater recharge

Workshop Agenda

- Identify Past, Current and Future Hazards
- Determine Top Priority Hazards
  - Which 4 hazards pose the greatest threat to the town currently and in the future?
- Brainstorm resiliency actions for infrastructure, Societal and Environmental vulnerabilities.
  - Examples:
    - Upgrade culverts, flood proof drinking water supplies
    - Evacuation drils and extreme weather communications protocols to protect vulnerable populations
    - Protect wetlands and floodplains to improve flood resiliency
- Determine top priority Resiliency Actions for Colrain