Municipal Vulnerability Preparedness Program

Grafton, Millbury and Northbridge, Massachusetts

Community Resilience Building Workshop
Summary of Findings

June 2018

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Grafton-Millbury-Northbridge
Community Resilience Building Workshop

Summary of Findings

Overview

In the nearly two centuries since the completion of the Blackstone Canal in 1828, the Central Massachusetts communities of Grafton, Millbury and Northbridge have benefited from the power of the Blackstone River. The river and canal powered the mills that built the region's wealth, attracted its residents and drove development of its village centers. However, the river has always represented a threat as well as a resource, with devastating region-wide flood events in the 1930s and 1955, and damaging riverine floods as recently as 2005 and 2010. In response to these recent events and to changing risks of other kinds, all three communities have worked diligently to mitigate and adapt to natural hazards and the changing climate that exacerbates them. For example, Grafton recently reviewed its by-laws to assess compatibility with low-impact development (LID); Millbury is working to implement a LID project to improve stormwater management in its town center; and Northbridge just became a designated Green Community.

Governor Charlie Baker signed Executive Order 569 in September of 2016, mandating that the Commonwealth support climate resilience planning at the local level. Soon thereafter in April, 2017, the Municipal Vulnerability Preparedness (MVP) planning grant program was launched by the Executive Office of Energy and Environmental Affairs (EOEEA) to implement the order through completion of local vulnerability assessments and action-oriented resiliency plans using the Community Resilience Building (CRB) workshop framework developed by The Nature

Conservancy. Completion of the CRB process would enable designation of towns as "MVP Communities" and offer preference in future state grants. Grafton, Millbury and Northbridge embraced the chance to jointly plan for climate change, particularly with regard to their 15 miles of shared Blackstone River frontage. On May 22, 2017, with technical assistance from the Central Massachusetts Regional Planning Commission (CMRPC), the towns submitted a joint MVP application to EOEEA. Gary Bechtholdt, Northbridge's Town Planner, was designated as the overall project manager, with local leads in Grafton (Maria Mast, Conservation Agent) and Millbury (Steven Kosiba, Emergency Management Director, later replaced by Planning Director Laurie Connors due to scheduling issues). The application included letters of support from chief executives in each community, plus local government bodies including Community Development and Planning in Northbridge, the Planning Board, Conservation Commission and Emergency Management Agency in Grafton, and Planning and Development in Millbury. External entities offering support included the Blackstone Heritage Corridor, Blackstone River Watershed Association, Blackstone Valley Chamber of Commerce, Blackstone Valley Regional Emergency Planning Committee, CMRPC, and MassAudubon.

On June 8, 2017, Northbridge – the fiscal lead for the grant – was notified that $32,000 had been awarded by EOEEA for joint resiliency planning. In December, following training and certification of MVP providers during the fall, the communities selected CMRPC as their provider, and a contract with CMRPC was executed in January, 2018. CMRPC's team of certified MVP providers included Andrew Loew, Derrick Mathieu, Adam Menard, Trish Settles (lead facilitator), and Hoamy Tran. Stefanie Covino of MassAudubon joined the provider team to aid with the workshops outlined below.

Following preliminary correspondence in January 2018, a joint planning team with representatives from each town met with CMRPC five times during February and March to discuss the MVP process, gather and document regional and local natural hazard and climate information through interviews and data collection, assemble core teams for each town, create stakeholder invitee lists in preparation for the MVP program's workshop requirement, prepare workshop materials, and plan the workshop events. Planning team meetings were held on February 7, February 28, March 6, March 14 and March 22. As one of only two multi-town partnerships in the MVP program, there was little formal guidance for how to approach the workshop requirement. Following discussions with and approval from EOEEA, the planning team elected to hold four workshops: one regional workshop to introduce the MVP program to a combined regional/local stakeholder group and to highlight cross-border hazards and actions, followed by one community-specific workshop in each town to target local hazards and actions.

The workshops' central objectives were to:

- Define top local natural and climate-related hazards of concern;
- Identify existing and future strengths and vulnerabilities;
- Develop prioritized actions for the Community (both regionally and as single towns);
- Identify immediate opportunities to collaborate advance actions to increase resilience.

The regional and the three local workshops and their findings are discussed below in separate sections, using the following outline for each:

- Workshop Summary
- Top Hazards and Vulnerable Areas
- Current Concerns and Challenges Presented by Hazards
- Specific Categories of Concerns and Challenges
- Current Strengths and Assets
- Top Recommendations to Improve Resilience
- MVP Workshop Participants
- Appendix (includes base map, participatory exercise maps, supporting reference maps, presentation slides, and risk matrix)

Regional Workshop
Workshop Summary

The regional workshop was held April 5, 2018 at the South Grafton Community House. Four presentations were made by the provider team; an introduction to the MVP program and process: a summary of climate change projections and impacts using EOEEA's downscaled watershed-level data; a rundown of nature-based solutions to climate change (by MassAudubon); and a snapshot of natural hazards, critical infrastructure and vulnerable populations in the three-town region, based on ongoing (Northbridge, Millbury) or recently completed (Grafton) hazard mitigation planning. The focus of the event was to identify cross-border strengths/vulnerabilities and actions that can be pursued jointly or regionally. In the interest of saving time on this regional event's tight agenda, three hazards were pre-selected by the three-town planning team for discussion at the regional workshop: flooding (all types), winter storms, and drought/wildfire. Following the presentations, attendees broke into four groups of five to seven individuals to work through the CRB program's matrix and mapping exercise, before voting and reporting back to the full group to discuss overall priorities for regional action. Nearly 30 people were in attendance, with an emphasis on regional stakeholders (a full list of participants is included below). Attendees included representatives from each town government and core team (Grafton planning, conservation, and emergency management; Millbury town manager, police and planning; and Northbridge planning, conservation, public works and health), state legislative staff, CMRPC's hazard mitigation/MVP team, CMRPC's transportation and transit staff, the Upper Blackstone Pollution Abatement District, the Blackstone River Coalition, the Blackstone River Watershed Association, the Blackstone Heritage Corridor, Tufts University's Grafton-based veterinary school, MassDEP, the Blackstone Valley Chamber of Commerce, National Grid, and MassAudubon.

Regional Workshop
Top Hazards and Vulnerable Areas

Top Hazards

As noted above, in the interest of saving time on the regional workshop's compressed agenda, three top hazards were pre-selected by the three-town regional planning team based on ongoing/recently completed hazard mitigation planning in the three towns. Another consideration was to include hazards that are evolving due to climate change in the Blackstone Valley. Hazards selected were:

- Flooding (all applicable types: riverine, stormwater runoff, and dam failure)
- Winter storms
- Droughts and wildfires

The four breakout groups were instructed to focus mainly on these hazards, with discussion of other hazards permitted if considered especially important.

Vulnerable Areas

The vulnerabilities listed below were discussed in the workshop's breakout groups.

<u>Neighborhoods</u>

Rockdale (Northbridge), New Village (Northbridge), South Grafton villages (Grafton), Town Center (Millbury); and senior housing complexes (all towns)

<u>Ecosystems</u>

Blackstone River and its tributaries (esp. Ramshorn Brook, Quinsigamond River, West River and Mumford River); Blackstone Canal; toxic river sediments; riverbank slopes and erosion; lakes and ponds; invasive species (in waterways and forests); wetlands; forests; street trees; water supply aquifers; and recreational and conservation lands

<u>Transportation</u>

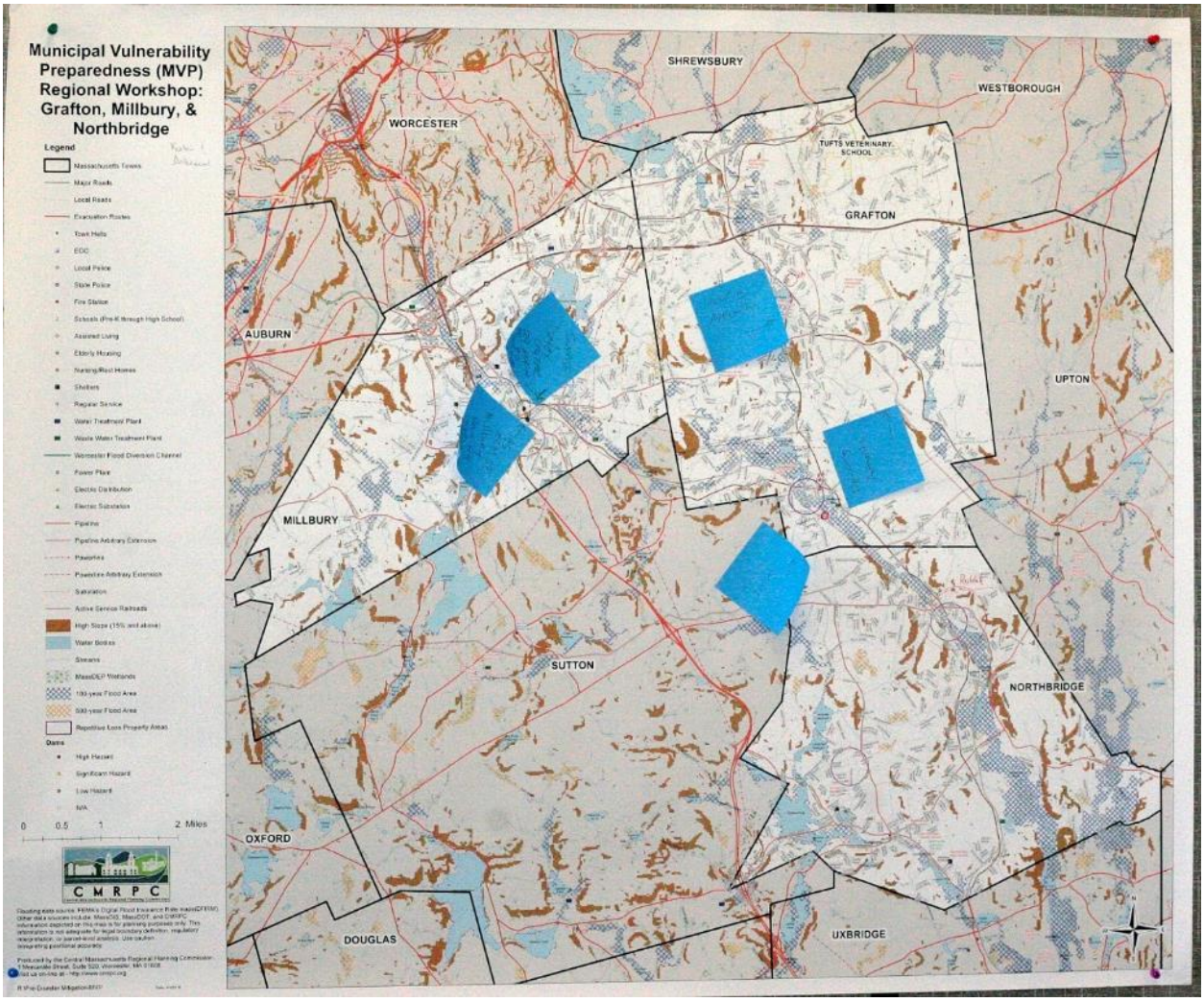
Roads and bridges throughout (esp. state-maintained roads); evacuation routes in flood zones (Rt. 122, Rt. 122a, Rt. 140, others); Providence & Worcester/Grafton & Upton/CSX/MBTA Commuter Rail railroads (esp. bridges over the Blackstone River); Church Street area (Northbridge); police station access road (Millbury); and transit routes (WRTA and senior center shuttles)

<u>Infrastructure (excluding transportation)</u>

Stormwater drainage infrastructure throughout (culverts, storm drains, etc.); dams (esp. Brierly Pond Dam in Millbury, Fisherville Dam in Grafton, and Riverdale and Linwood Pond Dams in Northbridge); above-ground utility lines throughout; and sewer treatment plants and pumps throughout

Facilities

Propane distribution facility on Grafton & Upton Railroad (Grafton); DPW facility (Northbridge); police station (Millbury); Tufts biolab (Grafton); and older private homes in flood-prone lower-income village centers



Regional Workshop
Current Concerns and Challenges Presented by Hazards

In preparation for the regional workshop, the MVP planning team and provider staff reviewed the three towns' hazard mitigation plans to identify relevant natural hazards and related challenges. Additional inquiries were made with local officials whose work is impacted by these hazards. Recent disaster events of concern included frequent major winter storms (as in 2015 and 2018), ice storms (2008), severe rain events (2005, 2010, 2016), tropical storms (Irene, Sandy), extended drought (2015 to 2016), and infestations of invasive and otherwise undesirable species (gypsy moths, aquatic invasives, ticks). These events resulted in a variety of impacts to the area including power outages, riverine and roadway flooding, isolated damage to structures, purchase of backup water supplies, and increased snow removal expenditures.

At the workshop, CMRPC and Mass Audubon staff presented downscaled data on climate change provided by EOEEA and the Northeast Climate Science Center. Projections for the Blackstone River watershed show that by mid-century, annual average temperatures may increase in the range of 3 to 6 degrees from the historical baseline, hot days over 90 degrees may increase 7 to 29 days, days below freezing may fall 18 to 38 days, annual precipitation may increase 1 to 7 inches, yet seasonal drought conditions may become more frequent as precipitation becomes more concentrated in extreme intensity events and winter snowpack is reduced. Some of the challenges of these projected changes – many of which are already being observed – were discussed in a presentation at the workshop focused on specific hazards in the three-town area. Challenges highlighted in the presentations and/or discussed as a group or in the breakout groups included:

- In general, attendees expressed a concern that climate change will exacerbate problems that they are already dealing with and already lack the resources to address comprehensively – flooding and drainage, vulnerable roads, water and sewer capacity and resilience, ecological damage, and vulnerable populations
- Increased precipitation may lead to more frequent and severe flooding, including in areas outside of designated flood zones defined using historical data
- Increased storm intensity may cause more tree damage leading to power outages and road closures, higher peak stream flows requiring new approaches to stormwater management, and increased erosion of stream banks and nearby infrastructure
- More warm days may mean increased need for cooling (but less need for heating), especially among vulnerable groups such as children and seniors
- More frequent and severe droughts may challenge water supplies and increase risks from wildfire as forests are damaged
- Pests and invasive plant and animal species may impact public health through increasing numbers of disease vectors (ticks and mosquitoes) and by damaging key ecosystems such as forests and wetlands, thereby increasing wildfire and flood risks
- Changes to winter storms from regular snows and sustained snowpack to more mixed precipitation and rain with more intensity may require new methods of storm response,

may counterintuitively increase soil freeze depths (risking subsurface infrastructure), and may lead to reduced water availability in spring

- The impacts of these challenges will be differential within the region and each town – for example, historic village centers with deteriorated or under-capacity drainage infrastructure may become more vulnerable to floods, while outlying areas without access to public water supplies may face water shortages and increased fire risk during droughts

Worcester Telegram photo of Blackstone River flooding in Millbury (1955)

Regional Workshop
Specific Categories of Concerns and Challenges

The following topics were identified by workshop attendees as concerns or challenges related to the region's changing climate and natural hazards. While the main orientation of the discussion was toward regional or cross-border topics, a number of more local concerns were also raised.

Infrastructure Topics

Roads and Transportation

One of the principal concerns voiced by workshop participants was the state of roadways and other transportation infrastructure and services, and their vulnerability to worsening hazards. Road closures due to flooding, downed trees and other storm damage can hinder disaster response, evacuation operations and access to shelters and basic services. Within the three towns, a number of primary evacuation routes (Routes 122, 122a and 140, among others) pass through FEMA flood zones, and flood areas are expected to expand as the climate warms. Of particular concern were Routes 122 and 122a in central and southern Grafton, where flooding from the Blackstone River has previously closed roads and water from the Quinsigamond River threatens to do so, isolating the southern end of town from emergency services based to the north. Another area with recurrent flooding is Church Street in Northbridge, which is an evacuation route and one of only two Blackstone River crossings in town. Relocating evacuation routes is a major challenge since most of the area's major roads connect the historic village centers along flood-prone river and brook valleys; the lack of evacuation route signage is another concern for these roads. Many roadways outside of designated flood zones are also impacted by localized flooding caused by deteriorated or undersized drainage structures such as culverts and storm drains. Local budgets are considered inadequate to address the many trouble spots along roadways and to comply with new regulations such as the Mass. stream crossing standards.

Concern about state routes was shared by several officials from all three towns. The state highways (Routes 20, 30, 122, 122a, 140, and 146) are critical evacuation and access routes. Most already suffer from congestion at rush hour and there was concern that even limited flooding would cause further disruption. Of special concern was the condition of state-owned bridges over waterways, many of which are many decades old and which were not designed to withstand the higher flow rates expected in upcoming decades. There was concern about the state not allocating adequate funding to maintain and improve these assets to withstand climate change.

Railroads were another concern. Three railroads operate in the towns: Providence & Worcester Railroad, Grafton & Upton Railroad, and CSX (route shared with MBTA commuter rail). Several local officials expressed concern that toxic or hazardous substances transiting the area were exposed to natural hazards. Of particular concern were the P & W's river crossings, some of which are well over 100 years old and whose abutments were not designed to withstand the higher flow rates expected in upcoming decades. Local officials also noted the prevalence of wildfires along some of the rail routes, which may become a greater concern in future decades as forests

are damaged by pests, stronger storms, and changing temperatures and precipitation, leading to greater combustibility.

Last, there was concern about the impact of climate change and increased hazards on transit. The WRTA operates a bus route through the three towns via flood-prone streets, and local senior centers operate their own services. Attendees noted concerns about using these services for emergency evacuations in the event of a flood or extreme storm.

Drainage and Stormwater Management

Drainage and stormwater management were a major concern among participants. Large areas of all three towns are located within FEMA flood zones, and other parts of the region are prone to flooding because of historic development in low-lying areas and due to deteriorated, outdated, or nonexistent drainage infrastructure. Given the scale of these issues – the towns are responsible for hundreds of culverts, for example – the challenge to upgrade stormwater drainage to meet the needs of a wetter climate was considered substantial. One challenge that applies across town borders is the need to comply with EPA's new MS4 permit, which will introduce a number of stormwater-related requirements in the next few months, many of which will require substantial local investments. Specific locations of concern included many of the evacuation routes (see Roads and Transportation, above), older mill villages along rivers (Rockdale and New Village in Northbridge, the South Grafton villages in Grafton, and the Town Center in Millbury), and dozens of inadequate culverts and storm drains throughout the towns.

Dams and Major Flood Control Structures

The Blackstone Valley is among the most-dammed regions in the country due to its early industrial history that utilized water power. Within the three towns of this MVP partnership, there are 48 dams reported by the state, including four High Hazard dams. 10 dams are town-owned, 3 are state-owned, and the rest are privately owned. Workshop attendees noted a concern for potential dam failures as the intensity of storms and overall precipitation increase and the dams continue to age (especially the historic mill dams). Particular concern was expressed for Brierly Pond Dam in Millbury, Fisherville Dam in Grafton, and Riverdale and Linwood Pond Dams in Northbridge, due to issues with dam condition, unclear or disputed ownership, and/or downstream vulnerabilities. Potential removal of dams was discussed, but some attendees noted that removals would be a challenge because of the presence of historic industrial toxic sediments in many impoundment areas which could be mobilized by restored river flows and more intense storms. Some concern was expressed about the Worcester flood diversion channel, which can

divert flood waters which threaten the city into the Blackstone River just upstream from Millbury Center. The diversion project is owned and manually operated by the City of Worcester but it impacts all communities downstream. For both dams and the flood diversion channel, a major challenge is coordination among the various upstream and downstream communities and other stakeholders throughout the watershed.

Other Infrastructure and Facilities

Aside from transportation and drainage infrastructure, a number of other infrastructure challenges were noted. There was strong concern for electrical lines, almost entirely above-ground in the region, which are vulnerable to storms in both winter and temperate seasons. Power outages present risks to emergency response and recovery, hinder heating and cooling for most residents, and can disrupt the water supply to homes outside of the municipal water service areas, where electrical well pumps are needed.

For the most part, there was less concern about water infrastructure. Water capacity was considered adequate in Grafton (two public districts) and Northbridge (Whitinsville Water Co.). In Millbury (Aquarion Water Co,), the water supply needed to be supplemented substantially by purchase from Worcester during the peak of the 2016 drought. Attendees did express some concern that aquifer protection should be enhanced, and additional water sources be studied in Millbury. There was limited discussion of geographically expanding water service areas to support more resilient growth in outlying parts of the towns that currently lack water service.

Participants had limited concern about sewer infrastructure, primarily limited to treatment plants located in flood zones. Grafton and Northbridge operate their own sewer systems, while Millbury participates in the Upper Blackstone Water Pollution Abatement District with Worcester and several other municipalities. In the long term, attendees felt the plants may need to be raised or relocated to avoid damage from future floods. Another sewer challenge was infiltration from groundwater, which may increase as overall precipitation increases and extreme rainfalls are more common. There was additional concern about septic systems in the outlying areas – their function may be hindered as the groundwater levels change in the future.

Specific facilities of concern included Northbridge's DPW building, which is located in the Mumford River floodplain, and Millbury's police station, where its single access route is susceptible to closure from tree damage.

Societal Topics

Vulnerable Areas and Populations

Participants identified a number of vulnerable neighborhoods and other populations that are of concern as the climate changes. Across the three communities, the greatest concern was for the older mill villages which, because of the historical need for water power, tend to be located along the rivers in or adjacent to flood zones and to have older infrastructure. Specifically, concerns were focused on Rockdale and New Village in Northbridge, the South Grafton villages (Fisherville, Farnumsville and Saundersville), and the Town Center in Millbury. Several of these

neighborhoods have relatively low median household incomes and older housing stock. While they are served by comprehensive infrastructure, in many areas these older engineered solutions are deteriorated and may lack the capacity to meet local needs as the climate changes and risks – especially flooding – increase. Finding funds to improve the resilience of infrastructure in these aging built-up areas was noted as a major challenge.

Another concern and challenge noted several times is the senior population. According to US Census estimate, disproportionately high senior populations are present in Millbury's center, West Millbury, New Village, Rockdale, and other areas. Public safety officials expressed worry that it would be difficult to respond to a major natural disaster given the large numbers of seniors in these neighborhoods and the region in general, many of whom are disabled or who require ready access to medications or medical care. Sheltering capacity was a related concern. In addition, each town has senior housing complexes such as assisted living centers, Housing Authority senior facilities, and 55+ developments. While the vast majority of these sites were not highlighted as particularly vulnerable to hazards, the presence of concentrated vulnerable populations was noted as a challenge for preparedness and disaster response for both the towns and facility operators. Other vulnerable populations (children, the homeless, and pets) were noted to a lesser degree.

Development and Land Use Pattern

A few participants discussed concerns about the development trend in the region and its relation to climate-impacted hazards. The three towns have seen fairly rapid suburban growth in recent decades, especially in Grafton. Between 1971 and 2013, nearly 4,900 acres in the three-town area transitioned from undeveloped uses (mostly farms and forests) to developed uses (mostly single-family housing). Much of this new development occurred in lower-density developments in outlying parts of the communities, often at the fringes of wetlands and flood zones (esp. the 500-year zones) and was intermingled with forests. Town services such as water and sewer are often not available in these areas. As the climate changes and both floods and wildfires become more frequent, these areas may become more vulnerable than older sections of the towns. Managing growth to be more resilient to future hazards was noted as a challenge.

Regulations and Policies

Some attendees were concerned that local and/or state regulations and policies should be strengthened to better protect water resources, especially along rivers, and to foster greater use of low-impact development (LID) methods. There was discussion that some departments in all towns are hesitant to embrace LID projects and policies due mainly to perceived cost disadvantages. This was considered a potential political challenge.

Emergency Communications and Management Capacity

While generally considered a strength, there was some concern about emergency management and communications. Participants felt there could be more effective communication regarding evacuation routes (signage) and that towns could expand on education and outreach programs for vulnerable populations, especially seniors. Some noted that emergency communication systems such as Code Red could be utilized more.

Environmental Topics

Environment and Ecosystems

Several participants noted concerns about the impacts of climate change on the environment. Water and wetland quality was one major concern. As the climate warms and gets wetter, the risks of invasive species, eutrophication, and mobilization of toxic sediments increase. Flooding of nearby industrial and warehouse facilities could also lead to chemical spills. With higher flow rates expected, riverbank erosion was another concern, both for ecological reasons and for potential damage to roads and bridges. More intense droughts could lead to depletion of local aquifers. Forests were another concern, with damage expected from stronger storms, more pests, and more extreme heat and drought. Overall, these changes were seen as threats to both recreational assets and to nature-based capacity to mitigate climate change. A related challenge was seen in permanently conserving critical ecosystems through land purchase or conservation restriction.

Regional Workshop
Current Strengths and Assets

All three communities have long experience managing natural hazards and have developed strengths in many areas. Generally, the current state of infrastructure was considered more of a vulnerability than a strength, with the water and sewer systems and shelters as exceptions. Societal strengths were perceived in local governance, which is well aware of the risks of natural hazards and climate change and has worked to mitigate and adapt in all three towns within the constraints of local budgets. Another social strength noted was the array of social service providers who support the elderly and other at-risk groups. Environmental strengths included priority habitats scattered throughout the region that provide nature-based mitigation, as well as organizations that seek to preserve more of these landscapes.

Specific strengths and assets discussed at the workshop included:

Infrastructure (and Facility) Strengths

- Water system interconnections among the three towns and with other adjacent communities that can be utilized in time of drought
- Extensive water and sewer systems that provide services to a large majority of residents and businesses and that generally have sufficient capacity for continued growth (these are, however, also vulnerable to hazards)
- Emergency shelters in each community
- Generators in place at many key municipal facilities (but not all)
- Capital planning to establish replacement timelines and budgets for some infrastructure items and facilities

Societal Strengths

- Local and regional leadership that is committed to mitigating and adapting to changing natural hazards, though resources are limited
- All three towns are working on or have completed hazard mitigation plan updates and are participating in MVP planning
- Strong and fairly well-equipped public safety organizations that are key participants in natural hazard mitigation and preparedness planning
- Strong social services, including local senior centers as well as community-based organizations and faith-based institutions
- Emergency communications systems such as Code Red
- Local regulatory systems in place that are reasonably effective in some key areas (wetlands protection by-laws, stormwater by-laws)
- Various medical providers in the towns

Environmental Strengths

- Relatively extensive parks and other conservation and recreation lands, including Blackstone River and Canal Heritage State Park, three wildlife management areas, land trust sites, and town parks
- The presence of relatively large forests and wetlands that can respectively help mitigate temperatures and flooding (both are also vulnerabilities, however)
- Watershed-level advocacy groups focused on environmental topics (Blackstone River Watershed Association, Blackstone River Coalition)
- Land trusts that work to permanently conserve additional key properties (Grafton Land Trust, Metacomet Land Trust)

Regional Workshop
Top Recommendations to Improve Resilience

The focus of the regional event was to identify cross-border strengths/vulnerabilities and actions. Therefore, participants were asked to emphasize resilience-building actions that can be pursued jointly or regionally, or which apply to all three communities. Prioritization of the recommendations was achieved through four steps: 1) informal discussion at each breakout table during the workshop; 2) voting using stickers placed on the participant's table's CRB matrix (each attendee was given seven stickers to select his/her top priority actions); 3) report-back from each table to the full audience to discuss and discern consensus priorities; and 4) final review and reconciliation of duplicates at post-workshop core team meetings in each of the three towns.

In general, the regional participants recommended big-picture actions. For infrastructure, the top recommendations involved major upgrades to aging systems such as roadways, dams and stormwater drainage to improve resilience to projected hazards. On the environmental side, land acquisition for conservation was as top recommendation, as was action to address invasive species and toxic river sediments. On the societal topic, there was a strong call for action to help seniors – those living at home as well as those in senior housing complexes – to better prepare and respond to disaster events. While some of the recommended actions could be pursued jointly or regionally, due to the nature of local governance in Massachusetts, most actions would have to be pursued or initiated at the municipal level.

Specifically, the actions recommended at the workshop were:

General Topic	Specific Topic	Action(s)	Priority
Infrastructural	Stormwater Infrastructure & Regulations (MS4)	Inventory/upgrade outdated and undersized culverts and storm drains to provide greater resilience to future flood threats; continue to coordinate regionally (Central. Mass. Stormwater Coalition) and with MassDEP and US EPA on MS4 compliance	High
Infrastructural	Roads & Bridges	Provide sufficient resources (state and local) to maintain and improve resilience of local roadway infrastructure; coordinate with MassDOT and other state agencies to maintain state structures and improve future hazard resilience (esp. to floods)	High

General Topic	Specific Topic	Action(s)	Priority
Infrastructural	Dams	Work with MassODS, dam owners and communities up and down the watershed to develop and implement improvements to dams and other major flood control systems to increase resilience through inspection, planning, operations, and upgrade/removal; where needed, investigate and resolve dam ownership issues	High
Infrastructural	Electrical Infrastructure	Continue and enhance local/private utility tree trimming programs	High
Environmental	Invasive Species	Remove or mitigate species that degrade habitats, accelerate river sedimentation and limit recreational uses (swimming, boating, etc.) in ponds and rivers	High
Environmental	Protection of Open Space & Habitats	Protect additional open space and key habitats useful for hazard mitigation (wetlands, river buffers, etc.) through acquisition/restriction by local and state government and/or land trusts	High
Environmental	Hazardous River Sediments	Pursue assistance from MassDEP, MassDER, and/or US EPA to assess river sediments and mitigation costs with regard to health risks and possible future dam removal along Blackstone River and its tributaries	High
Societal	Senior Population	Develop natural hazard education/outreach program for seniors (could be regional/joint approach) to help them prepare for hazards	High
Societal	Senior Housing Facilities	Work with senior housing facilities to plan for hazards, backup power, evacuation, etc.	High
Societal	Emergency Communications	Continue to utilize Code Red and similar systems to warn population	High

General Topic	Specific Topic	Action(s)	Priority
Infrastructural	Water/Sewer Infrastructure	In the long term, raise or relocate major facilities such as treatment plants and pump stations to improve resilience to flooding	Medium
Infrastructural	Evacuation Routes and Plans	Update evacuation route plans to better account for changing hazards, especially floods; provide better signage for evacuation routes; develop or refine plans to evacuate vulnerable populations and facilities where cars may not be viable	Medium
Infrastructural	Town Facilities	Relocate Northbridge DPW away from flood zone; provide a second access route for Millbury police station, which can be isolated by downed trees; install backup generators at critical facilities that still lack them	Medium
Environmental	Review By-Laws	Review local by-laws to reconsider how zoning (with regard to hazard-prone areas), design standards, wetlands protection, stormwater management (and LID), and aquifer protection are approached; amend by-laws as needed to allow to more resilient development and protection of natural resources	Medium
Societal	Mill Villages	Focus education, mitigation and adaptation efforts in historic mill villages, where many lower-income residents and other vulnerable populations and aging housing are concentrated in flood-prone locations; consider grants for housing rehabilitation in these areas	Medium
Societal	Shelter Capacity and Capability	Review sheltering capacity, locations and capabilities, esp. with regard to vulnerable populations and their needs	Medium
Infrastructural	Water Supply Protection	Protect the water supply through continued acquisition of surrounding properties	Low

General Topic	Specific Topic	Action(s)	Priority
Infrastructural	Municipal Energy Usage	Improve energy efficiency by town buildings and vehicles (Green Community funds may be available)	Low
Infrastructural	Roadway Treatment Options	Review and improve roadway treatment options to prevent contamination of waterways	Low
Infrastructural	Emergency Sirens	Install additional emergency alert sirens, especially along the freight railroad corridors	Low
Infrastructural	Railroads	Continue to coordinate with railroads regarding infrastructure concerns (esp. bridges), hazardous cargoes, and wildfires along the rights of way	Low
Societal	Animals and Hazards	Plan for evacuation and/or sheltering of pets	Low

Regional Workshop
CRB Workshop Participants

Organization	Name	Attended?
Army Corps of Engineers	Christopher Hatfield	
Blackstone Heritage Corridor, Inc.	Megan DiPrete	
Blackstone River Coalition	Peter Coffin	*
Blackstone River Watershed Association/BRC/BHC	Pieter de Jong	*
Blackstone River Watershed Association	Ted Beauvais	*
Blackstone Valley Chamber of Commerce	Jeannie Hebert	*
Blackstone Valley Paddle Club	Cheryl Thompson	
Central MA Regional Public Health Alliance	Philip Leger	
Central MA Regional Stormwater Coalition	John Woodsmall	
Central MA Trout Unlimited	Pete Sterndale	
Central Mass. Red Cross	Kim Goulette	
Chafee Blackstone River Valley National Heritage Corridor (NPS)	Chuck Arning	
CMRPC	Janet Pierce	*
CMRPC Moderators/Presenters	Hoamy Tran	*
CMRPC Moderators/Presenters	Andrew Loew	*
CMRPC Moderators/Presenters	Derrick Mathieu	*
CMRPC Moderators/Presenters	Adam Menard	*
CMRPC Moderators/Presenters	Trish Settles	*
CMRPC Scribes	Leah Stanley	*
CMRPC Scribes	Kortni Wroten	*
CMRPC Scribes	Dan Daniska	*
CMRPC Scribes	Jess Martinez	*
DCR	Melissa Cryan	
DCR Trails	Amanda Lewis	
Division of Ecological Restoration	Beth Lambert	
DOER	Kelly Brown	
Eversource	Thomas McCarthy	
Exec. Office Energy & Environmental Affairs	Katie Theoharides	
Grafton (Conservation)	Maria Mast	*
Grafton (Emergency Management)	Nick Child	*
Grafton (Planning)	Joe Laydon	*

Organization	Name	Attended?
Grafton (Planning)	Rachel Benson	*
Grafton & Upton Railroad	John DeWaele	
Mass Audubon	Ariel Maiorano	*
Mass Audubon (Presenter)	Stefanie Covino	*
Mass. Water Resources Authority	Paul Kirk	
Mass. Water Resources Authority	Geoffrey Beyer	
MassDEP	Judy Schmitz	*
MassDOT-District 3	Barry Lorian	
Metacomet Land Trust	Unk.	
Millbury (EMD/Schools)	Steve Kosiba	
Millbury (Fire)	Rick Hamilton	
Millbury (Planning)	Laurie Connors	*
Millbury (Police)	Donald DeSourcy	*
Millbury (Town Manager)	Dave Marciello	*
National Grid	Kevin Shaughnessy	
National Grid	Andrea Gossage	*
Northbridge (Conservation)	David Pickart	*
Northbridge (DPW - Highway)	Jaimie Luchini	*
Northbridge (DPW - Sewer)	Mark Kuras	
Northbridge (DPW)	James Shuris	
Northbridge (Health)	Jeanne Gniadek	*
Northbridge (Planning)	R Gary Bechtholdt II	*
Northbridge (Planning)	Brian Massey	
Providence & Worcester Railroad	Jared Rishel	
State Representative or Office	David Muradian	
State Representative or Office	Paul Frost	
State Senator or Office	Mke Moore	
State Senator or Office	Ryan Fattman	*
Sutton	Jennifer Hager	
Tufts Department of Public and Environmental Safety	Geoffrey Bartlett	
Tufts Office of Sustainability	Tina Woolston	*
Tufts Veterinary Hospital	Deborah Kochevar	
Tufts Veterinary Hospital	Jean Poteete	*
Upper Blackstone Water Pollution Abatement District	Karla Sangrey	
Upper Blackstone Water Pollution Abatement District	Randy Komssi	*
Whitinsville Water Co.	Randy Swigor	
WRTA	Dave Trabucco	

Organization	Name	Attended?
WRTA	Jonathan Church	
WRTA/CMRPC	Todd Fontanella	*

Regional Workshop
Project Team

Project Team

The following individuals were directly involved in planning and conducting the regional workshop.

Organization	Name	Role
CMRPC	Hoamy Tran	Facilitator/Presenter
CMRPC	Andrew Loew	Facilitator/Presenter
CMRPC	Derrick Mathieu	Facilitator/Presenter
CMRPC	Adam Menard	Facilitator/Presenter
CMRPC	Trish Settles	Lead Facilitator/Presenter
Grafton (Conservation)	Maria Mast	Local Lead/Core Team
Grafton (Emergency Management)	Nick Child	Core Team
Grafton (Planning)	Joe Laydon	Core Team
Grafton (Planning)	Rachel Benson	Core Team
Mass Audubon	Ariel Maiorano	Presenter
Mass Audubon	Stefanie Covino	Presenter
Millbury (EMD/Schools)	Steve Kosiba	Core Team
Millbury (Planning)	Laurie Connors	Local Lead/Core Team
Northbridge (Conservation)	David Pickart	Core Team
Northbridge (Planning)	R Gary Bechtholdt II	Local and Overall Lead/Core Team

Grafton Workshop
Workshop Summary

The Grafton workshop was held April 25, 2018 at Grafton's Town Hall. Four presentations were made by the provider team; an introduction to the MVP program and process: a summary of climate change projections and impacts using EOEEA's downscaled watershed-level data; a rundown of nature-based solutions to climate change (by MassAudubon); and a snapshot of natural hazards, critical infrastructure and vulnerable populations in Grafton, based in part on the Town's recently-completed hazard mitigation plan (approved by FEMA in January 2017) and on outputs of the regional MVP workshop. After discussion among the attendees, the following four hazards were selected for detailed discussion in the breakout exercise: flooding, wind-related hazards, severe cold and winter storms, and heat/drought. Following the presentations, attendees broke into three groups of up to eight participants to work through the Community Resilience Building matrix and mapping exercise, before voting and reporting back to the full group to discuss overall priorities for action. Roughly 30 people were in attendance; a full list of participants is included in Appendix B. Attendees included representatives from Town departments and boards/commissions (Board of Selectmen, Town Administrator, Planning Board and staff, Grafton Emergency Management Agency, Conservation Commission and staff, Fire Department, Building Inspector, Police Department, and Council on Aging), CMRPC's hazard mitigation/MVP team, the Blackstone River Watershed Association, EOEEA's Division of Conservation Services, Tufts University's Grafton-based veterinary school, MassAudubon, and Grafton High School (scribes). A publicized public listening session was scheduled for July 10, 2018 in conjunction with a Board of Selectmen's meeting to discuss MVP results and local and regional recommendations.

Grafton Workshop
Top Hazards and Vulnerable Areas

Top Hazards

Following the presentations, a group discussion was held to determine the top four hazards for breakout groups to focus on in more depth. There was debate about how to categorize hazards, such as tropical storms, that have multiple effects – both flooding and wind damage. Some felt that extreme temperatures should be their own category, but the group was hesitant to remove another topic to allow for temperatures as a stand-alone topic. Another consideration was to include mainly hazards that are evolving due to climate change in the Blackstone Valley. Ultimately, the group elected to categorize the discussion as shown below:

- Flooding (all applicable types: riverine, stormwater runoff, and dam failure)
- Wind-related hazards (tornadoes, wind-related aspects of tropical storms, thunderstorms and other severe weather)
- Winter storms and severe cold
- Drought and severe heat

Vulnerable Areas

The vulnerabilities listed below were discussed in the workshop's breakout groups.

<u>Neighborhoods</u>

The South Grafton villages (Fisherville, Farnumsville, and Saundersville); and senior housing complexes (Housing Authority communities at Forest Lane and Maxwell Drive; Green Acre Estates at Zgonis Drive; Crescent Manor on Crescent Street; likely others)

Ecosystems

Blackstone River and its tributaries (esp. the Quinsigamond River and Miscoe Brook/West River); toxic river sediments in impoundments (especially Fisherville Pond); riverbank erosion (especially at Depot Street and Mill Street); lakes and ponds (especially Lake Quinsigamond, Lake Ripple, Silver Lake, Fisherville Pond and Hovey Pond); invasive species (in waterways and forests); wetlands; forests; street trees; water supply aquifers; and recreational and conservation lands

Transportation

Roads and bridges throughout (esp. state-maintained roads, Pleasant Street, Main Street and Depot Street); evacuation routes passing through flood zones (Rt. 122, Rt. 122a, Rt. 140, Rt. 30, others); and Providence & Worcester/Grafton & Upton/CSX/MBTA Commuter Rail railroads (esp. bridges over the Blackstone River and fire-prone areas along the GURR right of way)

Infrastructure (excluding transportation)

Stormwater drainage infrastructure throughout (culverts, storm drains, etc.); dams (esp. Fisherville Dam and the Town-owned dams); above-ground utility lines throughout; and public water supply sources (esp. Ferry Street wells)

Facilities

New propane distribution facility on Grafton & Upton Railroad; Tufts Veterinary biolab; emergency communications towers (these rely on copper lines); fire stations 2 and 3 (access may be impaired by adjacent flood zones); and school buildings with flat roofs

Populations

Seniors; and the disabled community

Grafton Workshop
Current Concerns and Challenges Presented by Hazards

In preparation for the Grafton workshop, the MVP planning team and provider staff reviewed the Town's hazard mitigation plan to identify relevant natural hazards and related challenges. Additional inquiries were made with local officials whose work is impacted by these hazards. Recent disaster events of concern included frequent major winter storms (as in 2015 and 2018), ice storms (2008), severe rain events (2005, 2010, 2016), tropical storms (Irene, Sandy), extended drought (2015 to 2016), and infestations of invasive and otherwise undesirable species (gypsy moths, aquatic invasives, ticks). These events resulted in a variety of impacts to the town including power outages, riverine and roadway flooding (with some evacuation routes and emergency service access routes impacted), isolated damage to structures, dry wells in outlying parts of town, and increased snow removal expenditures.

At the workshop, CMRPC and Mass Audubon staff presented downscaled data on climate change provided by EOEEA and the Northeast Climate Science Center. Projections for the Blackstone River watershed show that by mid-century, annual average temperatures may increase in the range of 3 to 6 degrees from the historical baseline, hot days over 90 degrees may increase 7 to 29 days, days below freezing may fall 18 to 38 days, annual precipitation may increase 1 to 7 inches, yet seasonal drought conditions may become more frequent as precipitation becomes more concentrated in extreme intensity events and winter snowpack is reduced. Some of the challenges of these projected changes – many of which are already being observed – were discussed in a presentation at the workshop focused on specific hazards in the Grafton area. Challenges highlighted in the presentations and/or discussed as a group or in the breakout groups included:

- In general, attendees expressed a concern that climate change will exacerbate problems that they are already dealing with and already lack the resources to address comprehensively – flooding and stormwater management, vulnerable roads, water and sewer capacity and resilience, ecological damage (especially wetlands and riverbanks), and vulnerable populations, all within the context of a rapidly-growing community
- Increased precipitation may lead to more frequent and severe flooding, including in areas outside of designated flood zones defined using historical data – particular in the heavily developed areas just outside the current Quinsigamond and Blackstone River floodplains
- Increased storm intensity may cause more tree damage leading to power outages and road closures, higher peak stream flows requiring new approaches to stormwater management (as will EPA's new MS4 permit), and increased erosion of stream banks and nearby infrastructure
- More hot and warm days may mean increased need for cooling (but less need for heating), especially among vulnerable groups such as children and seniors – this concern was elevated because of the Town's relatively limited formal shelter capacity
- More frequent and severe droughts may challenge water supplies and increase risks from wildfire as forests are damaged – attendees had concern in particular for outlying parts

of town outside of the two public water districts, where growth has accelerated in recent years

- Pests and invasive plant and animal species may impact public health through increasing numbers of disease vectors (ticks and mosquitoes) and by damaging key ecosystems such as forests and wetlands, thereby increasing wildfire and flood risks
- Winter storms continue to be a challenge to Town operations and funding - changes to winter storms from regular snows and sustained snowpack to more mixed precipitation and rain with more intensity may require new methods of storm response, may counterintuitively increase soil freeze depths (risking subsurface infrastructure), and may lead to reduced water availability in spring

Grafton Workshop
Specific Categories of Concerns and Challenges

The following topics were identified by workshop attendees as concerns or challenges related to Grafton's changing climate and natural hazards.

Infrastructure Topics

Drainage and Stormwater Management

Drainage and stormwater management were a major concern among participants. Large areas of Grafton are located within FEMA flood zones, and other parts of town are prone to flooding because of historic development in low-lying areas and due to deteriorated, outdated, or nonexistent drainage infrastructure. There was concern that the part of town that is subject to frequent flooding would increase as the climate changes and storms become more intense. Given the scale of these issues – the Town is responsible for dozens of culverts, for example – the challenge to upgrade stormwater drainage to meet the needs of a wetter climate was considered substantial. Specific locations of concern included many of the evacuation routes (especially Routes 122a and 122, which are flood-prone and connect South Grafton to most emergency services), older mill villages along the rivers (primarily the South Grafton villages along the Blackstone River), and many inadequate culverts and storm drains throughout town. Drainage trouble spots were noted at Folette Street, Stowe Road, Wesson Road and George Hill Road, and some others are highlighted in Grafton's Hazard Mitigation Plan (approved by FEMA in 2017).

Water Supply Network

Grafton's drinking water is provided by two public water districts (Grafton and South Grafton) that together cover most of the town; interconnections are in place with various other providers, providing some redundancy in time of drought or system damage. Residents in outlying parts of town rely on private wells. During the 2015-2016 drought, some residents in some rural areas without connections to the public water supplies had water shortages. There was concern that, as droughts become more frequent and intense, these areas would be more exposed to shortages. There were water use restrictions in the two service areas that helped prevent shortages. A related challenge mentioned by some is that the two districts have separate rules and policies. There was additional concern about the South Grafton water supply, where there is historic industrial groundwater contamination near the Ferry Street public wells that requires active protection through maintenance of the water level at Fisherville Mill; some private wells may also be affected. Water quality and pressure in the Tufts Veterinary School area was also a concern for some. In the long term, some attendees noted concern for major water assets such as pump houses, which may become more exposed to flood damage.

Dams

The Blackstone Valley is among the most-dammed regions in the country due to its early industrial history. Grafton has 12 dams reported by the state, including two High Hazard dams (Fisherville Pond Dam and Pratt Pond Dam). Two dams are town-owned (Lake Ripple and Silver Lake), two are state-owned, and the rest are privately owned. Workshop attendees noted a

concern for potential dam failures as the intensity of storms and overall precipitation increase and the dams continue to age (especially the historic mill dams like Fisherville Pond Dam in South Grafton). Particular concern was expressed for the Fisherville dam, which impounds a large former mill pond. In addition, this dam plays a key role in maintaining appropriate water levels to protect the public water supply from historic industrial contaminants. Potential removal of dams was discussed, but several attendees noted historic industrial toxic sediments which could be mobilized by restored river flows and more intense storms are an obstacle to removal.

Roads and Transportation

Another concern voiced by workshop participants was the state of roadways and other transportation infrastructure and services, and their vulnerability to worsening hazards. Road closures due to flooding, downed trees and other storm damage can hinder disaster response, evacuation operations and access to shelters and basic services. In Grafton, many of the primary evacuation routes (Routes 122, 122a and 140, among others) pass through FEMA flood zones, and flood areas are expected to expand as the climate warms. Route 122a near the Blackstone River has previously been closed due to flooding, isolating the southwest end of town from most local emergency services, which are based to the north. Also of concern was Route 122 in central and southern Grafton, where the adjacent Quinsigamond River and its impoundments could flood the road, potentially limiting emergency access. Relocating evacuation routes is a challenge since most of the major roads connect the historic village centers along flood-prone river and brook valleys. Many roadways outside of designated flood zones are also impacted by localized flooding caused by deteriorated or undersized drainage structures such as culverts and storm drains – these were expected to become even more unsuitable as the climate changes.

Railroads were a notable concern. Three railroads operate in town: the Providence & Worcester Railroad, Grafton & Upton Railroad, and CSX (route shared with MBTA commuter rail). Several

local officials expressed concern that toxic or hazardous substances transiting the area were exposed to natural hazards. Grafton officials also noted the prevalence of wildfires along the rail routes (esp. the GURR), which may become a greater concern in future decades as adjacent forests are damaged by pests, stronger storms, and changing temperatures and precipitation, leading to greater combustibility. A related concern is the GURR's new propane terminal located at 42 Westboro Road, which is immediately adjacent to the FEMA flood zone and is not far downstream from Windle Pond Dam.

Last, there was concern about the impact of climate change and increased hazards on transit. The WRTA operates a bus route through town via flood-prone streets, and the Grafton Senior Center operates a shuttle. Attendees noted concerns about the ability to use these services and school buses for emergency evacuations in the event of a flood or extreme storm.

Other Infrastructure and Facilities

A number of other infrastructure challenges were noted. There was concern for electrical lines, almost entirely above-ground, which are vulnerable to storms in both winter and temperate seasons. Power outages present risks to emergency response and recovery, hinder heating and cooling for most residents, and can disrupt the water supply to homes outside of the public water service areas, where electrical well pumps are needed.

Participants had limited concern about sewer infrastructure, primarily related to the treatment plant's location in the flood zone off Depot Street. The plant has also had issues with snow load roof damage in the past. The sewer main network covers most of the town – some rural areas rely on private septic systems. Some attendees mentioned concerns about long-term septic function in these outlying areas due to uncertainty about groundwater and percolation as the climate changes.

A few other infrastructure/facility concerns were touched on: vulnerability to storms of the current emergency communications towers, which are linked by copper wire and are at wind-exposed hilltop sites; vulnerability of access to two fire stations (#2 and #3) to extreme flood events, due to their locations near flood zones; and vulnerability to snow loads at several schools where roofs are flat (South Grafton Elementary is also potentially flood-prone).

Societal Topics

Vulnerable Areas and Populations

Participants identified a few vulnerable neighborhoods and other populations that are of concern as the climate changes. The greatest concern was for the former mill villages in South Grafton which, because of the historical need for water power, are located close along the Blackstone River. South Grafton is a designated Environmental Justice area due to its large foreign-born population, mainly made up of Asians, though language isolation is not a widespread issue based on available Census data.

Another concern and challenge noted several times is the senior population. Public safety officials expressed worry that it would be difficult to respond to a major natural disaster given the large numbers of seniors in town, many of whom are disabled or who require ready access to medications or medical care. Sheltering capacity was a related concern. Currently, only the Senior Center is a designated as a primary shelter. Officials would like to expand sheltering options to include the High School, which is capable of serving as a primary shelter. In addition, there are several senior housing complexes such as assisted living centers, Housing Authority senior facilities, and 55+ developments including Green Acres/Zgonis Drive, Maxwell Drive, McHale Drive, and Forest Lane. Other vulnerable populations present in large facilities include the DMH, DYS and Job Corps sites. Maxwell Drive and Green Acres were concerns for flooding. While the other sites were not highlighted as particularly vulnerable to hazards, the presence of concentrated vulnerable populations was noted as a challenge for preparedness and disaster response for both the Town and facility operators. Other vulnerable populations (children and pets) were noted to a lesser degree.

Regulations, Plans and Policies

Some attendees were concerned that local and/or state regulations and policies should be strengthened to foster greater use of low-impact development (LID) methods, enhance wetlands protection, and address stormwater. There was a broad call for the Town to incorporate climate change challenges into all of its strategic planning. One gap that was noted was the need for a debris management plan.

Emergency Communications and Management Capacity

While generally considered a strength, there was some concern about emergency management and communications. Some attendees mentioned the Fire Department and its staffing challenges. Most Grafton firefighters are on call. In recent years, the trend has been for firefighters to work outside of town, making it harder to consistently schedule locally available crews. There was also some mention of older equipment that should be replaced. As noted under Infrastructure, the emergency communication towers were considered somewhat vulnerable to storm and wind damage. Participants felt there could be more effective communication and that the Town could expand on education and outreach programs for vulnerable populations, especially seniors. Some noted that emergency communication systems such as Code Red could be utilized more, and outreach made to get others to sign up – currently some 5,000 of 18,000 residents are signed up.

Environmental Topics

Environment and Ecosystems

Several participants noted concerns about the impacts of climate change on the environment. Conservation was perhaps the largest concern. Grafton has been a rapidly growing community for the past few decades, growing from 11,000 population in 1980 to around 18,000 today, with more than 2,100 acres of new development in former farms and forests since 1971. With that growth, participants recognized the challenge of protecting remaining open spaces, particularly critical habitats for nature-based mitigation like wetlands and waterways. Grafton has substantial

areas of both due to the presence of the Blackstone River, Quinsigamond River, West River and smaller tributaries. A number of lakes and ponds are located in town, many created by former mill dams. Participants had several concerns about the condition of these water bodies and the rivers: toxic river and pond sediments, the result of past industrial operations; gradual sedimentation of ponds, especially Lake Ripple; riverbank erosion; and invasive aquatic species that take advantage of warmer conditions. Related to surface water quality, some noted concern with road treatments (salt) that contaminate runoff. Many attendees were eager to prioritize strategies that address these challenges through low-impact development methods, habitat restoration, planting of street trees, and comprehensive open space planning.

Grafton Workshop
Current Strengths and Assets

Grafton has taken proactive steps to address natural hazards and climate change over recent years. Grafton's local Emergency Management Agency is quite active, and it has been involved intimately with hazard mitigation planning and leading the push for a debris management plan. Wetlands conservation has been prioritized through two full-time staff for the Conservation Commission, and the Town has worked with Mass Audubon and CMRPC to review its by-laws for alignment with LID principles. Infrastructure was considered to be a mixture of strengths and vulnerabilities, with the water and sewer systems generally thought of as strong assets, despite some concerns. Societal strengths were perceived in local governance, which is well aware of the risks of natural hazards and climate change and has worked to mitigate and adapt within the constraints of its budget. Another social strength noted was emergency communication. Environmental strengths included widespread wetlands that provide opportunities for nature-based mitigation, as well as active support in the community for continued protection of key open spaces.

Specific strengths and assets discussed at the workshop included:

Infrastructure (and Facility) Strengths

- Stormwater drainage assets that generally perform adequately for current needs, but which will need improvement for the future
- Extensive roadway network usable for evacuation and emergency response – however, some routes pass through flood-prone locations
- Extensive water and sewer systems that provide services to a large majority of residents and businesses and that generally have sufficient capacity for continued growth (these are, however, also vulnerable to hazards)
- Dams that help manage moderate flood risks (some also present a dam failure risk in extreme scenarios)
- Emergency communications sites that perform well, but may be vulnerable to storms
- Generators in place at many key municipal facilities, most recently at the sewer treatment plant

Societal Strengths

- Local leadership that has demonstrated its commitment to mitigating and adapting to changing natural hazards and its support for emergency preparedness
- By-laws, regulations and policies that generally support climate adaptation and mitigation through habitat preservation and by allowing relatively low-impact development
- Strong and fairly well-equipped public safety organizations that are key participants in natural hazard mitigation and preparedness planning; on-call staffing has been a

challenge for the Fire Department, however; there are also strong mutual aid relationships in place with neighboring communities
- Strong social services, including the Senior Center, community-based organizations and faith-based institutions
- Public emergency communications through Code Red

Environmental Strengths

- Relatively numerous parks and other conservation and recreation lands, including the Deering Wildlife Management Areas, trails at the Tufts Veterinary School, several Grafton Land Trust properties, and Town parks
- The presence of large wetlands that can help mitigate flooding, and a strong Conservation Commission backed by local by-laws to protect these areas (wetlands can also be vulnerabilities, however)
- The Grafton Land Trust, which works closely with the Town and private landowners to conserve key sites

Grafton Workshop
Top Recommendations to Improve Resilience

Prioritization of recommendations was achieved through four steps: 1) informal discussion at each breakout table during the workshop; 2) voting using stickers placed on the participant's table's CRB matrix (each attendee was given five stickers to select his/her top priority actions, with at least one sticker required to be used for each general topic area); 3) report-back from each table to the full audience to discuss and discern consensus priorities; and 4) final review and reconciliation of duplicates at a post-workshop Grafton core team meeting.

For infrastructure, the top recommendations involved major upgrades to aging systems such as stormwater drainage, water supply, dams and public facilities to improve resilience to projected hazards. On the environmental side, land acquisition for conservation was a top recommendation, as was action to address invasive species and toxic river sediments. On the societal topic, there was a strong call for action to help seniors – those living at home as well as those in senior housing complexes – to better prepare and respond to disaster events. Improvements to shelter capacity were also prioritized.

Specifically, the actions recommended at the workshop were:

General Topic	Specific Topic	Action(s)	Priority
Environmental	Protected Open Space	Acquire or otherwise conserve priority undeveloped properties; educate residents about the benefits of open space protection; continue to work with partners such as DCR and the Grafton Land Trust	High
Environmental	Lakes and Ponds	Remove invasives and sediment contaminants; maintain dams; dredge as needed (Lake Ripple); manage beaver population	High
Environmental	Low Impact Development	Promote LID through Town projects and policies	High
Infrastructural	Drainage/Stormwater	Inventory and prioritize assets for upgrade; conduct hydrological studies where needed; replace drainage structures as needed to manage higher future flows; use green techniques where possible; clean catchbasins more; trouble spots include Folette Street, Stowe Road, Wesson Road, and George Hill Road, among many others	High

Infrastructural	Water Supply and Distribution Network	Maintain groundwater level in Fisherville Dam area to prevent contamination at Ferry Street wells; plan for assistance to residents outside water districts during drought; consider water system expansion, esp. in NE part of town, using grant funding (possibly MassWorks); develop drought plan; coordinate standards and actions between the two districts; evaluate resilience of major assets	High
Infrastructural	Emergency Communications Towers	Upgrade copper wire at towers to wireless/fiber; Potter Hill site is susceptible to severe winds	High
Infrastructural	School Buildings	Address flat roofs regarding snow load; access to South Grafton ES from parrts of the neighborhood is at some flood risk, consider improving/relocating in long term	High
Infrastructural	Dams	Coordinate with and clarify ownership to foster dam maintenance; consider removal where possible; continue to maintain and improve Town-owned dams (Lake Ripple, Silver Lake)	High
Societal	Shelter Capacity	Formalize shelter agreement and plan with School District to allow High School to officially serve as 2nd shelter in addition to Senior Center	High
Societal	Senior Population At-Large	Develop evacuation plan tailored to seniors, many of whom are disabled or don't drive - coordinate with WRTA and schools for buses; consider a generator program to enable seniors to shelter in place; develop program for outreach and "life safer" registry	High
Societal	Senior Housing Communities	Coordinate with senior housing operators (incl. Housing Authority) on evacuation plans and outreach/education; facilities include Green Acres/Zgonis Drive, Maxwell Drive, Forest Lane and others	High

Societal	Fire Department	Consider options for expanding/professionalizing the largely on-call department; upgrade equipment and apparatus	High
Societal	Planning and Zoning	Review and revise zoning to help with resilience; incorporate climate into strategic plans	High
Environmental	Road Treatment Methods	Review alternatives to salt treatment	Medium
Infrastructural	Roads and Bridges	Maintain and make more resilient throughout town; review bridges; adjust evacuation routes to avoid flood areas where possible, or improve drainage along roadways; upgrade Route 122a bridge over Blackstone River; also see Drainage/Stormwater item for some specific trouble areas	Medium
Societal	Social Service Facilities	Coordinate with service facilities including group home operators on evacuation plans; facilities include DYS, DMH and Job Corps	Medium
Societal	South Grafton villages	Focus mitigation/adaptation efforts in these designated Environmental Justice areas	Medium
Societal	Code Red	Outreach to add users	Medium
Societal	Debris Management	Develop debris management plan	Medium
Environmental	Open Space and Recreation Plan	Update plan	Low
Environmental	Tufts Veterinary School Lands	Coordinate with Tufts to continue public access to trails	Low
Environmental	Riverbank Erosion	Plan and implement program to stabilize and restore eroded riverbanks; prevent future erosion through buffers; known areas of concern are found at Depot Street and Mill Street	Low
Environmental	Invasive Species	Develop and implement a plan to reduce invasive and pest species' impacts to aquatic and land habitats, including wetlands and forests	Low

Environmental	Street Trees	Update existing tree inventory; maintain and plant new trees in conjunction with public education program; coordinate with National Grid	Low
Environmental	Wetlands	Review wetlands protection by-law with regard to climate concerns; inventory and prioritize wetlands for conservation	Low
Infrastructural	Propane Terminal	Coordinate with owner on evacuation plans; install warning sirens	Low
Infrastructural	Railroads	Coordinate with the railroads (CSX/MBTA, Grafton & Upton, and Providence & Worcester) on right-of way maintenance to prevent wildfires and on hazardous cargoes	Low
Infrastructural	Fire Stations	Assess vulnerability of access to stations 2 and 3, which are adjacent to flood zones	Low
Infrastructural	Electrical Grid	Continue and expand tree-trimming operations in conjunction with National Grid; develop long-term plan to put wires underground	Low
Infrastructural	Wastewater System	Assess resilience of key assets (treatment plant, pumps); consider options for expanding coverage to cover outlying areas now served by private septic systems	Low

Grafton Workshop
CRB Workshop Participants

Organization	Name	Attended?
Blackstone River Watershed Association	Ted Beauvais	*
Board of Health	Phil Ledger	
Board of Health	Nancy Connors	
Board of Selectmen	Jennifer Thomas	*
Board of Selectmen	Brook Padgett	
Board of Selectmen	Bruce Spinney	
Board of Selectmen	Craig Dauphinais	
Board of Selectmen	Sargon Hanna	
Board of Selectmen's Office	Nicole Larson	
Building Department	Robert Berger	
Building Department	Thomas Frederico	*
Building Department	Kevin Gallagher	
CMRPC	Leah Stanley	*
CMRPC	Hailey Firmin	*
CMRPC Moderators/Presenters	Trish Settles	*
CMRPC Moderators/Presenters	Andrew Loew	*
CMRPC Moderators/Presenters	Derrick Mathieu	*
CMRPC Moderators/Presenters	Hoamy Tran	*
CMRPC Moderators/Presenters	Adam Menard	*
Conservation Commission	Sandra Brock	*
Conservation Commission	Scott Conway	*
Conservation Commission	Alicia Bergeron	
Conservation Commission	Nate Jaffer	
Conservation Commission	Patrick Huegel	
Conservation Department	Leah Cameron	*
Conservation Department	Maria Mast	*
Council on Aging	Barbara Connelly	*
Department of Public Works	Brian Szczurko	
Department of Public Works	Paul Cournoyer	*
Department of Public Works	Chris Caron	
EOEEA DCS	Melissa Cryan	*
Fire Department	Steve Charest	*
Fire Department	Cheryl Barker	
Fire Department	Michael Gauthier	
Grafton Emergency Management Agency	Nick Child	*
Grafton High School (scribe)	Hima Shapally	*

Grafton High School (scribe)	Emma Kelly	*
Grafton High School (scribe)	Mikayla Manion	*
Grafton High School (scribe)	Yashvi Gupta	*
Mass Audubon	Stefanie Covino	*
Medical Reserve Corps	Lindsey Fox	
Parks and Cemeteries Department	Philip Johnson	
Planning Board	Dave Robbins	*
Planning Board	Sharon Tidman	
Planning Department	Joe Laydon	*
Planning Department	Rachel Benson	*
Planning Department	Natalia Alward	
Police Department	Normand Crepeau Jr	*
Police Department	Marriane DeVries	
Recreation Department	Jenny Andersen	
Town Administrator	Tim McInerney	*
Town Administrator's Office	Cindy Ide	
Town Administrator's Office	Rebecca Meekins	
Tufts Veterinary School	Jean Poteete	*

Grafton Workshop
Project Team

Project Team
The following individuals were directly involved in planning and conducting Grafton's workshop.

Organization	Name	Role
CMRPC	Hoamy Tran	Facilitator/Presenter
CMRPC	Andrew Loew	Facilitator/Presenter
CMRPC	Derrick Mathieu	Facilitator/Presenter
CMRPC	Adam Menard	Facilitator/Presenter
CMRPC	Trish Settles	Lead Facilitator/Presenter
Grafton (Conservation)	Maria Mast	Local Lead/Core Team
Grafton (Emergency Management)	Nick Child	Core Team
Grafton (Planning)	Joe Laydon	Core Team
Grafton (Health)	Phil Ledger	Core Team
Grafton (Planning)	Rachel Benson	Core Team
Grafton (DPW)	Paul Cournoyer	Core Team
Grafton (Conservation)	Leah Cameron	Core Team
Mass Audubon	Stefanie Covino	Presenter

Millbury Workshop
Workshop Summary

The Town of Millbury's MVP workshop was held May 2, 2018 at the Asa Waters Mansion. Four presentations were made by the provider team; an introduction to the MVP program and process; a summary of climate change projections and impacts using EOEEA's downscaled watershed-level data for the Blackstone River Basin; a rundown of nature-based solutions to climate change (by Mass Audubon); and a snapshot of natural hazards, critical infrastructure and vulnerable populations in Millbury based upon ongoing Natural Hazard Mitigation planning. The focus of the event was to identify town strengths/vulnerabilities and actions that can be pursued in the future. Four hazards were agreed to by the workshop participants, in no particular order the hazards are: Flooding, Winter/Ice Storms, Wildfires/Droughts, and Extreme Temperatures. Following the presentations, attendees broke into three groups of five to seven individuals to work through the CRB program's matrix and mapping exercise before voting and reporting back to the full group to discuss overall priorities. Twenty-three people were in attendance, including representation from town government, the core team, CMRPC staff, business and non-profit groups.

A publicized public listening session was held on June 12, 2018 in conjunction with a Board of Selectmen's meeting to discuss MVP results and local and regional recommendations. There were 17 people in attendance.

Millbury Workshop
Top Hazards and Vulnerable Areas

Top Hazards

Adam Menard, presented climate change data, provided by EOEEA, and discussed hazards that are predicted to be exacerbated by climate change. Andrew Loew then presented material about specific hazards that have impacted Millbury in the past, pulling data from current efforts to update the Town's Hazard Mitigation Plan. Workshop attendees deliberated for approximately fifteen minutes, discussing various hazards Millbury faces and which four to focus. The discussion concentrated around which hazards currently impact the town and which hazards, considering the climate change data, would likely effect the town in the coming decades. The hazards selected were:

- Flooding (all applicable types: riverine, stormwater runoff, and dam failure)
- Winter Storms (including Ice storms)
- Wildfires/Droughts
- Extreme Temperatures

Extreme weather in recent years demonstrate how the various hazards impact the town. There have been numerous flooding events over the years, the Blackstone River and its tributaries have a large impact on stormwater drainage and downstream flooding in Millbury. Winter/Ice Storms, a town wide problem each winter, are expected to be more intense, damaging trees and powerlines and other infrastructure. Wildfires are expected to increase due to the impact of prolonged droughts. The drier forests and wooded areas will be more combustible in drought conditions. Drought will also likely lead to water shortages impacting the entire town whether residents or businesses are on town water or have wells. Extreme temperatures will have an impact on infrastructure and people, especially the elderly and young. The risk of brownouts will increase with higher longer lasting temperatures and health-related illnesses will increase to those most vulnerable. The workshop participants agreed that different hazards affect the town at different times of the year. Flexibility and comprehensive response by town officials is needed to ensure the safety of the citizens in different hazard situations exacerbated by climate change.

Vulnerable Areas

The vulnerabilities listed below were discussed in the workshop's breakout groups.

<u>Infrastructure (Roads & Bridges)</u>

Each of the breakout groups discussed roads and/or bridges at length. A specific location of concern is the bridge along S. Main St. is in poor condition and vulnerable to all hazards that may result in failure, collapse, etc. Road repair/replacement/upgrades are a necessity and are high priority needs with a short-term/ongoing timeline.

<u>Dams</u>

All tables highlighted the Brierly Dam Pond as a local vulnerability that needs further investigation. Ownership status is unclear, and it is adjacent to vulnerable infrastructure including a 55+ community and evacuation routes (see matrix).

Elderly Population

The elderly population, those living in 55+ communities and low-income families are vulnerable, specifically, Brierly Pond Village, the Millbury Housing Authority, Colonial Drive and Pearl Street, and CareOne at Millbury. Emergency response during a crisis will need to be able to respond and assist these populations, some of whom may have mobility issues and medical conditions requiring special care.

Stormwater Drainage

Stormwater drainage in Millbury will need to be upgraded and upsized to handle the expected increase in extreme precipitation and stormwater runoff. Locations that have suffered from drainage issues in the past include McCracken Road, Dolan Road, Lincoln Avenue and Sullivan Place.

Dorothy Pond

Dorothy Pond and Little Dorothy Pond are vulnerable from pollution caused by road salt and debris from the Mass Pike. Also, there are concerns about public usage of the Little Dorothy Pond parking area and multi-purpose trail, use of illicit substances, vandalism, arson or accidental fires, and damage to the ecosystem.

Millbury Workshop
Current Concerns and Challenges Presented by Hazards

While preparing for the Millbury workshop the planning team and provider staff reviewed the Town's Hazard Mitigation Plan to identify relevant natural hazards and other challenges. Recent disaster events of concern included frequent major winter storms (as in 2015 and 2018), ice storms (2008), severe rain events (2005, 2010, 2016), tropical storms (Irene, Sandy), extended drought (2015 to 2016), and infestations of invasive and otherwise undesirable species (gypsy moths, aquatic florae, ticks). These events resulted in a variety of impacts to Millbury including power outages, riverine and roadway flooding, isolated damage to structures, and increased snow removal expenditures.

At the workshop, CMRPC and Mass Audubon staff presented downscaled data on climate change provided by EOEEA and the Northeast Climate Science Center. Projections for the Blackstone River watershed show that by mid-century, annual average temperatures may increase in the range of 3 to 6 degrees from the historical baseline, hot days over 90 degrees may increase 7 to 29 days, days below freezing may fall 18 to 38 days, annual precipitation may increase 1 to 7 inches, yet seasonal drought conditions may become more frequent as precipitation becomes more concentrated in extreme intensity events and winter snowpack is reduced. Challenges derived by the predicted changes were discussed in presentations at the workshop specific to Millbury.

- Attendees expressed a concern that climate change will exacerbate problems that they are already dealing with and already lack the resources to address comprehensively – flooding and stormwater management, vulnerable roads, water and sewer capacity, ecological damage (especially wetlands and riverbanks), and vulnerable populations.
- Increased precipitation may lead to more frequent and severe flooding, including in areas outside of designated flood zones defined using historical data, notably in the heavily developed areas adjacent to the Blackstone River, Dorothy Pond and various tributaries.
- Increased storm intensity may cause more tree damage leading to power outages and road closures, higher peak stream flows requiring new approaches to stormwater management (as will EPA's new MS4 permit), and increased erosion of stream banks and nearby infrastructure
- More hot and warm days may mean increased need for cooling (but less need for heating), especially among vulnerable groups such as children and seniors.
- More frequent and severe droughts may challenge water supplies and increase risks from wildfire as hot, dry conditions tend to cause wildfires to burn longer and more intensely
- Pests and invasive plant and animal species may impact public health through increasing numbers of disease vectors (ticks and mosquitoes) and by damaging key ecosystems such as forests and wetlands, thereby increasing wildfire and flood risks
- Winter storms continue to be a challenge to Town operations and funding - changes to the frequency and intensity of winter storms, sustained snowpack, more mixed precipitation and rain may require a shift in storm-response strategy, may

counterintuitively increase soil freeze depths (risking subsurface infrastructure), and may lead to reduced water availability in spring

Millbury Workshop
Specific Categories of Concerns and Challenges

The following topics were identified by workshop attendees as concerns or challenges related to Millbury's changing climate and natural hazards.

Infrastructure Topics

Roads and Bridges

One major concern expressed by the participants of the Millbury workshop was with regard to the roads and bridges throughout the town and their vulnerability to natural hazards. Road closures due to flooding, downed trees and other storm damage can hinder disaster response, evacuation operations and access to shelters and basic services. Residents of Millbury rely on MA-146 and MA-122A to travel north and south, and Grafton Street and W. Main Street and a number of secondary roads to travel east and west. These roads intersect FEMA flood zones to a large extent and the flood zones are expected to increase in size due to the impacts of climate change. If these roads are impacted by flooding and other hazards emergency response, travel within the town and attempts to leave town will be greatly impacted. Bridges are vulnerable town-wide, flooding could cause erosion to river banks and damage the bridges. Many bridges are old and in need of repair or replacement.

Dams

Workshop attendees noted a concern for potential dam failures as the intensity of storms and overall precipitation increase and dams continue to age (especially the historic mill dams). The Blackstone Valley is among the most-dammed regions in the country due to its early industrial history. There are 20 dams in Millbury, including 7 Significant Hazard and 1 High Hazard dams according the state Office of Dam Safety. Particular concern was expressed for Brierly Pond Dam, an earthen dam that is classified as a Significant Hazard dam and on the state list of 100 critical dams. The need to ascertain ownership of this dam so that it can be replaced was a common theme at the workshop breakout sessions. Concern was also expressed about the Worcester flood diversion channel, which diverts flood waters which threaten the City of Worcester into the Blackstone River just upstream from Millbury Center. The diversion project is owned and manually operated by the City of Worcester but it impacts all communities downstream.

Stormwater System & Capacity

Stormwater management was a major concern among participants. Large areas of Millbury are located within FEMA flood zones, and other parts of town are prone to flooding because of historic development in low-lying areas and due to deteriorated, outdated, or nonexistent drainage infrastructure. There was concern that the part of town that is subject to frequent flooding would suffer additional impacts as the climate changes and storms become more intense. While some culverts have been upgraded, others are undersized and unprepared to handle the increased precipitation expected with climate change.

Societal Topics

Vulnerable Areas and Populations

Workshop participants identified several neighborhoods and populations that are of concern due to the effects of climate change. A large concern was regarding older and low income populations, particularly the challenges of responding to these populations in an emergency. Brierly Pond Village is a 55+ community located off Beach Street. The Millbury Housing Authority manages senior housing facilities at Elm Street, as well as low-income family developments on Colonial Drive and Pearl Street. Also, there is the CareOne facility located at Millbury Avenue, which is vulnerable to wildfire due to 8 acres of grassland surrounding the site. Senior housing complexes such as assisted living centers and 55+ developments were seen as a challenge for preparedness and disaster response for both the town and facility operators. Sheltering capacity was a related concern. Child care facilities are also vulnerable, if a facility must be evacuated in an emergency a plan should be developed to relocate the children and caretakers as well as reunite the children with the parents or guardians.

Evacuation Planning

Participants noted the need for evacuation planning and training. Also noted was the need for schools to have emergency response plans, if they do not already exist. Worcester County communities have undertaken evacuation planning, but more focused evacuation planning is necessary. Evacuation route signage is needed as well as public awareness of evacuation procedures. If schools, daycares or other institutions are evacuated a destination for reunification should be predetermined. MA-146 and MA-122A are heavily travel routes; alternate routes should be identified to handle increased traffic load.

Environmental Topics

Wetlands/Waterways

The wetlands and water ways of Millbury are vulnerable to several impacts of climate change. As the climate warms and precipitation increases more intense storms are expected as well as more invasive species and increased sediment disruption. Flooding of nearby structures and mills could cause chemical spills. Severe storms could cause turbulence in the waters that disrupts sediments containing heavy metals. In drought situations, decrease/loss of both groundwater and surface water supplies could yie3ld serious drinking water, habitat and wildlife ramifications as well as loss of recreational opportunities.

Open Space

The protection of open space was a common theme throughout the Millbury Workshop. Preserving this vulnerable resource is of high importance to the town. Intense droughts and extreme temperatures and storms of all types will have a large impact on vegetation, this damage to plant life will then impact all species of animals. Maintaining healthy open space helps limit damage caused by flooding and will be more resilient in times of drought.

Street Trees

Maintenance of trees along streets is an ongoing project for the town. Damage to trees caused by storms could then damage infrastructure such as powerlines, roads and buildings. Inventory and maintenance as well as monitoring for invasive species which could damage trees is an ongoing concern.

Millbury Workshop
Current Strengths and Assets

Millbury has managed natural hazards for many years and has many strengths to handle these challenges. There were a few strengths mentioned by workshop participants regarding infrastructure. Roads were considered strengths as well as vulnerabilities. In Millbury the roads provide connections to surrounding towns and beyond and provide access for emergency responders. Societal strengths include strong volunteer-based organizations which are an asset when support is needed for susceptible groups. Environmental strengths include open space and conservation land.

Infrastructure Strengths

- Emergency Shelter capacity, three are located in the central area of town.
- Housing Authority recently upgraded its emergency generator.
- The Council on Aging/Senior Center is a warming station in emergencies.
- Millbury's operating infrastructure is considered both vulnerable as well as a strength to the town such as roads, bridges, dams, stormwater drainage, sewer systems, and public buildings.

Societal Strengths

- Faith-based organizations and church groups are very active and many have food pantries and can operate as emergency shelters.
- Code RED / Reverse 911 are vital communications tools to alert the public to pending emergency situations.
- Ponds Associations are active addressing weeding and invasive aquatic plant species.
- Communication, particularly with National Grid during severe weather situations.
- Evacuation training & school emergency response.
- Public service announcements through the local cable access channels.

Environmental Strengths

- Dorothy Pond Watershed Association is active in maintaining the quality of the pond and watershed
- Wetlands absorb and store flood waters and runoff.
- Forests around the town absorb stormwater which might otherwise flood parts of town
- Floodplain zones, Millbury actively seeks to limit construction in the floodplain with regulations and bylaws.
- Open Space conservation.

- Wildlife Management protects the balance between people and the flora and faunae in the area.

Millbury Workshop

Top Recommendations to Improve Resilience

Participants in the Millbury Workshop were asked to strategize climate change resiliency actions the town might pursue. Prioritization of the recommendations was achieved through four steps: 1) informal discussion at each breakout table during the workshop; 2) voting using stickers placed on the participant's table's CRB matrix (each attendee was given five stickers to select his/her top priority actions); 3) report-back from each table to the full audience to discuss and discern consensus priorities; and 4) final review and reconciliation of duplicates at post-workshop core team meetings.

The workshop participants generally recommended broad actions. The top infrastructure recommendation was road and bridge repair, upgrade, and maintenance. Dams and stormwater drainage also garnered heavy support for repair, maintenance and upgrade. Recommended environmental actions include protecting lake and ponds, rivers and cleaning contamination. Dorothy Pond, the lesser waters, was noted to protect it from salt and debris runoff as well as some social issues surrounding the public parking area and trails. Recommended societal actions include protecting the elderly population through education and registering individual's om the Code RED system.

Specifically, the actions recommended at the workshop were:

General Topic	Specific Topic	Action(s)	Priority
Infrastructure	Bridges and Roads	Upgrade conditions of the roads and maintain and replace. S. Main Street is in disrepair	High
Infrastructure	Dams and drainage structure	Brierly Pond Dam, an earthen dam, ownership is in question. Conduct study to determine ownership. Repair/replace dam, the integrity of the dam is compromised. Coordinate communication with Worcester Diversion Tunnel personnel.	High
Infrastructure	Stormwater Drainage	New drainage needed at McCracken road and Auburn Road, none currently present. Develop low impact design in the downtown area. Modernize subdivision regulations for cul-de-sac, improve drainage review. Upgrade/upsize culverts	High

		and drainage infrastructure for climate change predicted precipitation events.	
Environmental	Lakes & Ponds, river flooding & contamination	Upgrade/replace faulty culverts. Develop and update to track maintenance and inventory drainage infrastructure	High
Societal	Elderly & Disabled Population	Educate & registration of the population in regards to natural hazards, Coordinate wellness check with COA and emergency responders in case of emergency. Utilize LifeSafe mobile app for safety communication	High
Environmental	Open Space Acquisition, Recreation Parks, Butler Farm	Update Open Space and Recreation Plan	High
Environmental	Dorothy Pond	Mitigate effects of salts and debris from the Mass. Pike. Monitor social concerns (substance use, vandalism, fire)	High
Infrastructural	Town Hall Generator	Replace generator at the Town Hall	Medium
Societal	On-Call Fire Department	Continue Support of the Fire Department	Medium
Societal	Evacuation Planning	Develop emergency response plan for the schools. Mitigate winter storms and flooding events that impact Lower Canal Street/Main Street to MA-146/River Street. Develop evacuation procedures for the Senior Center. Post Evacuation route signage and educate the public regarding evacuations.	Medium
Environmental	Wetlands	Review/update bylaws to improve protection of the wetlands	Medium
Environmental	Forest Stormwater Absorption	Develop a forest management plan and ensure proper management practices take	Medium

		place. Develop an action plan to control invasive species.	
Environmental	Street Trees	Inventory all street trees, ensure trees are cared for and when needed they are replaces. Add street trees where appropriate	Medium
Infrastructure	National Grid Substation	Ensure site is maintained to limit risk from wildfire and flooding	Low
Infrastructure	Water Supplies	Investigate the expansion of Millbury's drinking water supply	Low
Infrastructure	Sewer System	Review regulations, inform the public or regulations and requirements. Maintain sewer system infrastructure.	Low
Societal	Ponds Association	Maintain/expand aquatic weeding program	Low
Societal	Code RED	Maintain current program upgrade and expand by encouraging the public to join	Low
Societal	Children	Develop plan to evacuate daycares, develop agreements to locate evacuees in a safe location	Low

Millbury Workshop
CRB Workshop Participants

Department/Commission/Organization	Name	Attended?
Millbury (Planning)	Laurie Connors	*
Asa Waters Mansion	Paul Routhier	*
Millbury (Police Chief)	Don Desorcy	*
Millbury (EMD)	Steven M. Kosiba	*
Millbury (Town Manager)	Dave Marciello	*
Millbury Baptist Church	Shari Weaver	*
Millbury Baptist Church	Ann Campbell	
Care One at Millbury	Ken Barry	*
Care One at Millbury	Kristine Binette	
CMRPC Moderator/Presenter	Adam Menard	*
Millbury (Selectman)	Mary Krumsiek	*
Millbury Senior Center	Judy O'Connor	
Millbury (Fire Chief)	Rich Hamilton	
DOER	Kelly Brown	
MassDOT-District 3	Barry Lorian	
EEA DCS	Melissa Cryan	*
Providence Worcester Railroad	Charles Hunter	*
Circles Learning Center	Kelleigh Gilfoy	*
Millbury Housing Authority	Carol Smith	
Millbury (Building Inspector)	Paul Stringham	*
National Grid	Kevin Shaughnessy	*
Millbury (Planning Board)	Terry Burke Dotson	*
Millbury DPW Director	Keith Nastasia	
Aquarion Water Company	Fran King	
Millbury Public Schools	Greg Myers	
Millbury Public Schools	Richard Bedard	
Conservation Commission	Don Flynn	
Conservation Commission	Paul DiCicco	
Mass Audubon	Stefanie Covino	*
Central MA Regional Public Health Alliance	Philip Leger	
Scribe (CMRPC)	Kortni Wroten	*
Scribe (Millbury)	Jean Peare	*
Scribe (Millbury)	Julianne Mitchell	*
CMRPC Moderator/Presenter	Derrick Mathieu	*
CMRPC Moderator/Presenter	Hoamy Tran	*
CMRPC Moderator/Presenter	Andrew Loew	*
CMRPC Moderator/Presenter (Lead)	Trish Settles	*

Millbury Workshop

Project Team

Project Team

The following individuals were directly involved in planning and conducting the Millbury workshop.

Organization	Name	Role
CMRPC	Hoamy Tran	Facilitator/Presenter
CMRPC	Andrew Loew	Facilitator/Presenter
CMRPC	Adam Menard	Facilitator/Presenter
CMRPC	Derrick Mathieu	Facilitator/Presenter
CMRPC	Trish Settles	Lead Facilitator/Presenter
Millbury (Planning)	Laurie Connors	Core Team
Millbury (Town Manager)	David Marciello	Core Team
Millbury (EMD)	Steven M. Kosiba	Core Team
Millbury (Police)	Donald Desorcy	Core Team
Millbury (Fire)	Richard Hamilton	Core Team
Mass Audubon	Stefanie Covino	Presenter

Northbridge Workshop
Workshop Summary

The Northbridge workshop was held April 19, 2018 at Northbridge's Alternatives Whitin Mill complex. Four presentations were made by the provider team; an introduction to the MVP program and process: a summary of climate change projections and impacts using EOEEA's downscaled watershed-level data; a rundown of nature-based solutions to climate change (by MassAudubon); and a snapshot of natural hazards, critical infrastructure and vulnerable populations in Northbridge, based in part on the Town's current hazard mitigation plan process and on outputs of the regional MVP workshop. After discussion among the attendees, the following four hazards were selected for detailed discussion in the breakout exercise: flooding, winter storms and ice, wildfires and droughts, and extreme temperatures. Following the presentations, attendees broke into three groups of seven to eight individuals to work through the CRB program's matrix and mapping exercise, before voting and reporting back to the full group to discuss overall priorities for local action. There were 26 people were in attendance including representatives from Town departments and boards/commissions (Board of Selectmen, Town Manager, Planning Board and staff, Conservation Commission and staff, Fire Department, Police Department, Department of Public Works, Highway and Sewer, and Board of Health), CMRPC's hazard mitigation/MVP team, the Blackstone River Watershed Association, MassAudubon, The Whitinsville Water Company, Town of Uxbridge (Fire Chief and Finance Committee), and Northbridge High School (scribes).

A publicized public listening session was held on June 11, 2018 in conjunction with a Board of Selectmen's meeting to discuss MVP results and local and regional recommendations. There were 18 people in attendance.

Northbridge Workshop
Top Hazards and Vulnerable Areas

Top Hazards

Following the presentations, a full-group discussion was held for approximately fifteen minutes to determine the top four hazards for breakout groups to further assess solutions around. The discussion concentrated around which hazards currently impact the town and which hazards, considering the climate change data, would likely effect the town in the coming decades. Another consideration was to include hazards that are evolving due to climate change in the Blackstone Valley. The hazards selected were:

- Flooding (all applicable types: riverine, stormwater runoff, and dam failure)
- Winter storms and ice (i.e. ice damage, down powerlines, structural damage, wind)
- Wildfires and droughts
- Extreme temperatures

1955 Flood, Northbridge

2005 Flood, Northbridge

2005 Flood in Rockdale Area

Vulnerable Areas

The vulnerabilities listed below were discussed in the workshop's breakout groups.

<u>Vulnerable Neighborhoods and Populations</u>

There are several neighborhoods in town that pose as vulnerable areas including Rockdale, New Village, Church Street extension, and senior housing complexes including nursing homes and assisted living centers. The New Village includes low-income populations that live in an older housing stock which are significantly vulnerable to emergency events. The Rockdale neighborhood area has historical flooding issues and contains many businesses and town services such as the Rockdale Fire Substation. The Church Street extension is a highly used corridor that is also within a flood zone, often experiencing flooding issues. Emergency response during a crisis will need to be able to respond and assist the vulnerable populations, particularly those living in 55+ communities some of whom may have mobility issues.

Infrastructure (Roads & Bridges)

Each of the breakout groups discussed roads and/or bridges at length, particularly the Church Street extension and its related points. As mentioned above, the Church Street extension not only poses a risk to social groups within the area but the infrastructure of the corridor itself was noted by many participants as vulnerable to all hazards resulting in failure, collapse, etc. Participants identified Church Street as requiring significant assessment and improvements. Bridges are vulnerable town-wide, as flooding could cause erosion or riverbanks and damage the bridges. Many bridges are old and in need of repair or replacement. Specific areas of concern that require repair, replacement, or upgrade include Rockdale Bridge, Sutton St. Bridge, Linwood Bridge (sluiceway that runs under Linwood Avenue by the mill), Church St. Bridge, and the Carpenter Road Causeway Culvert.

Dams

Dams were a common theme throughout the table discussions. There are 16 total dams in Northbridge, of these 2 are Town-owned, 1 is state-owned, and the remaining are owned by private parties therefor the responsibility is broadly shared. The State has designated 5 Significant Hazard dams and 1 High Hazard in town. As the dams age and extreme precipitation events become more common, dams represent an increased flood risk to downstream areas in the event of a dam failure. Participants recognized that if a dam failure were to occur, damage downstream could be severe. Specific concerns were expressed for the historic High Hazard Linwood Pond dam, located upstream of the Uxbridge Center, which has previously had limited failures. Each table identified the Linwood Pond Dam as well as the Riverdale Dam as vulnerabilities that require additional planning and improvements. Participants noted that privately owned dams were less confident in strength, upkeep, and lifespan as compared to state-owned dams.

Stormwater Drainage

Stormwater drainage in Northbridge will need to be upgraded and upsized to handle the expected increase in extreme precipitation and stormwater runoff. As noted, locations that have drainage issues in the past include the Rockdale Neighborhood and Church Street extension.

Open Space (includes forestland)

The protection of open space was a common theme throughout the Northbridge Workshop. Intense droughts and extreme temperatures and storms of all types will have a large impact on vegetation, consequently damaging plant life thereby impacting all species of animals. Maintaining healthy open space help can limit damage caused by flooding and will be more resilient in times of drought. All participants discussed forestland as a major wildfire risk.

Northbridge Workshop
Current Concerns and Challenges Presented by Hazards

The Town of Northbridge is currently working with CMRPC in completing its Hazard Mitigation Plan. In preparation for the Northbridge MVP workshop, the planning team and provider staff reviewed the town's hazard mitigation data to identify relevant natural hazards and related challenges. Additional inquiries were made with local officials whose work is impacted by these hazards. Recent disaster events of concern included frequent major winter storms (as in 2015 and 2018), ice storms (2008), severe rain events (2005, 2010, 2016), tropical storms (Irene, Sandy), extended drought (2015 to 2016), and infestations of invasive and otherwise undesirable species (gypsy moths, invasive aquatics, ticks). These events resulted in a variety of impacts to the area including power outages, riverine and roadway flooding, isolated damage to structures, purchase of backup water supplies, and increased snow removal expenditures.

At the workshop, CMRPC and Mass Audubon staff presented downscaled data on climate change provided by EOEEA and the Northeast Climate Science Center. Projections for the Blackstone River watershed show that by mid-century, annual average temperatures may increase in the range of 3 to 6 degrees from the historical baseline, hot days over 90 degrees may increase 7 to 29 days, days below freezing may fall 18 to 38 days, annual precipitation may increase 1 to 7 inches, yet seasonal drought conditions may become more frequent as precipitation becomes more concentrated in extreme intensity events and winter snowpack is reduced.

Northbridge Workshop
Specific Categories of Concerns and Challenges

The following topics were identified by workshop attendees as concerns or challenges related to Northbridge's changing climate and natural hazards.

Infrastructure Topics

Roads and Bridges

Participants of the Northbridge workshop emphasized the vulnerability of roads and bridges to each of the identified natural hazards. Road closures due to flooding, downed trees and other storm damage can hinder disaster response, evacuation operations and access to shelters and basic services. Particular roadways that were highlight included the Church Street extension, Railroad Street, Hill Street, and Main Street. These roads intersect FEMA flood zones to a large extent and the flood zones are expected to increase in size due to the impacts of climate change. Church Street is a highly used corridor, which poses a high risk for flooding. Hill Street and Main Street were discussed in the context of evacuation planning and were identified as vulnerable areas to flooding and winter storms. There is also a currently inaccessible Road via Purgatory Road. If flooding and other hazards impact these roads, emergency response within the town will be significantly challenging and evacuation route planning will further coordination. Bridges were a predominant theme throughout the workshop. Participants recognized the existing conditions of bridges in town as requiring significant improvements in order to withstand future hazards, such as flooding which can cause erosion or riverbanks thereby damaging the bridges. Many bridges are old and in need of repair or replacement including Rockdale Bridge, Sutton St. Bridge, Linwood Bridge, and the Church St. Bridge that stretches across the Blackstone River.

Drainage and Stormwater Management

Drainage and stormwater management were a major concern among Northbridge participants. There are several significant areas and town facilities that are located within FEMA flood zones or flood plains that have deteriorated, outdated, or nonexistent drainage infrastructure. Areas of concern include the Rockdale Neighborhood (contains Rockdale Fire Substation) and Church Street. Specific facilities of concern included the DPW building and new DPW garage, wells, and parts of the sewage treatment plant which are located in the Mumford River floodplain. Specific locations of concern included many of the evacuation routes (see Roads and Transportation, above), older mill villages along rivers (Rockdale and New Village) and inadequate culverts and storm drains throughout the towns (Carpenter Road Causeway culvert, culverts under the railroad.

Dams

Workshop attendees noted a concern for potential dam failures as the intensity of storms and overall precipitation increase and the dams continue to age (especially the historic mill dams). As previously noted, there are a total of 16 dams in Northbridge, of these 2 are owned by the Town, 1 dam is owned by the state and the remaining are privately-owned according the MA Office of Dam Safety. Particular concern was expressed for the Riverdale Dam, Linwood Pond Dam, and

Swan Pond Dam due to issues with dam condition, unclear or disputed ownership, and/or downstream vulnerabilities. In addition, the Town-owned Riley Pond Dam, located above an electrical substation, and the Castle Hill Dam were noted as containing algae issues. Excess weeds were also identified as problematic at Linwood Pond Dam. Nature-based solutions and potential removal of dams was discussed, although some attendees noted that removals would be a challenge due to the presence of historic industrial toxic sediments in many impoundment areas, which could be mobilized by restored river flows and more intense storms.

Societal Topics

Vulnerable Areas and Populations

Participants identified a number of vulnerable neighborhoods and other populations that are of concern as the climate changes. Participants expressed concern for the older mill villages which, because of the historical need for water power, tend to be located along the rivers in or adjacent to flood zones and. The infrastructure of these villages is also comprised of an older housing stock, which further complicates the overall evacuation and safety of residents during emergency events. Specifically, concerns were focused on Rockdale and New Village in Northbridge, which contains disproportionately high amount of seniors and low-income populations. The emergency management of seniors in town was a common theme among workshop participants. Public safety officials expressed worry that it would be difficult to respond to a major natural disaster given the large numbers of seniors in these neighborhoods many of whom are disabled or who require ready access to medications or medical care. Low-income populations within the New Village are extremely vulnerable to the impacts of natural hazards due to substandard living conditions of the older housing stock. Economic instability was also noted as a challenge to disaster recovery for these populations. Senior housing complexes such as assisted living centers and 55+ developments were seen as a challenge for preparedness and disaster response for both the towns and facility operators. Sheltering capacity was a related concern. There are currently 4 shelters in town, which includes the Senior Center, High School, and churches. There are currently 13 churches in town and 3 are designated for temporary sheltering. Shelter potential was noted at the Rockdale Youth Center. Additional sheltering capacity and proper equipment (i.e. heating, cooling, backup generators, etc.) were identified as priority needs. Other vulnerable populations (children, the homeless, and pets) were noted to a lesser degree.

Public Safety Communication

While generally considered a local strength, participants expressed concern about the current status of emergency management and communications. The current communications system is outdated and has low bandwidth. Participants felt there could be more effective communication regarding emergency response procedures, evacuation routes (signage), and/or warning systems. Education and outreach programs for seniors and low-income populations were identified needs. Some noted that emergency communication systems such as Code RED could be more publicly shared in order to ensure greater resident use.

Environmental Topics

Open Space (includes forestland)

The protection of open space was a common theme throughout the Northbridge Workshop. Participants highlighted the limited amount of protected open space owned by Northbridge, recognizing that the Division of Conservation Services primarily own the conservation lands in town. Private open space lands were discussed at each table as extremely vulnerable to wildfire and droughts. Forestland was noted as high risk to wildfires, particularly those nearby the Shining Rock Farms area. A related challenge was seen in permanently conserving critical ecosystems through land purchase or conservation restriction.

Street Trees

Although tree maintenance in town was generally perceived to be adequate, participants recognized the damage that street trees could cause due winter storms. Participants noted that additional planning and upkeep including inventory, trimming, and planting.

Invasive Species

Invasive species such as mosquitos, gypsy moths, pests and ticks were noted by participants as threats to local ecosystems and pose a health concern.

Northbridge Workshop
Current Strengths and Assets

Northbridge has managed natural hazards for many years and has many strengths to handle these challenges. There were a few strengths mentioned by workshop participants regarding infrastructure. Generally, the current state of infrastructure was considered more of a vulnerability than a strength, with the water and sewer systems and shelters as exceptions. Societal strengths in Northbridge included various social service providers who support the elderly and other at-risk groups, as well as the Code RED system. Environmental strengths included the town's Open Space and Recreation Plan Update, and the wide presence of local committees and boards tasks with managing the Northbridge's ecosystems in different capacities. Specific strengths and assets discussed at the workshop included:

Infrastructure Strengths

- Fire Department recently increased its staffing capacity and emergency response has been strong, as compared to other communities which may depend on volunteer staff
- Most town buildings are modern and code compliant. The Fire Department conducts inspections every 3 months to ensure compliance.
- The Town and The Whitinsville Water Company have maintained a working relationship to ensure adequate water infrastructure
- Railroad maintenance is adequate
- Existing shelter capacity is adequate
- Current zoning bylaws

Societal Strengths

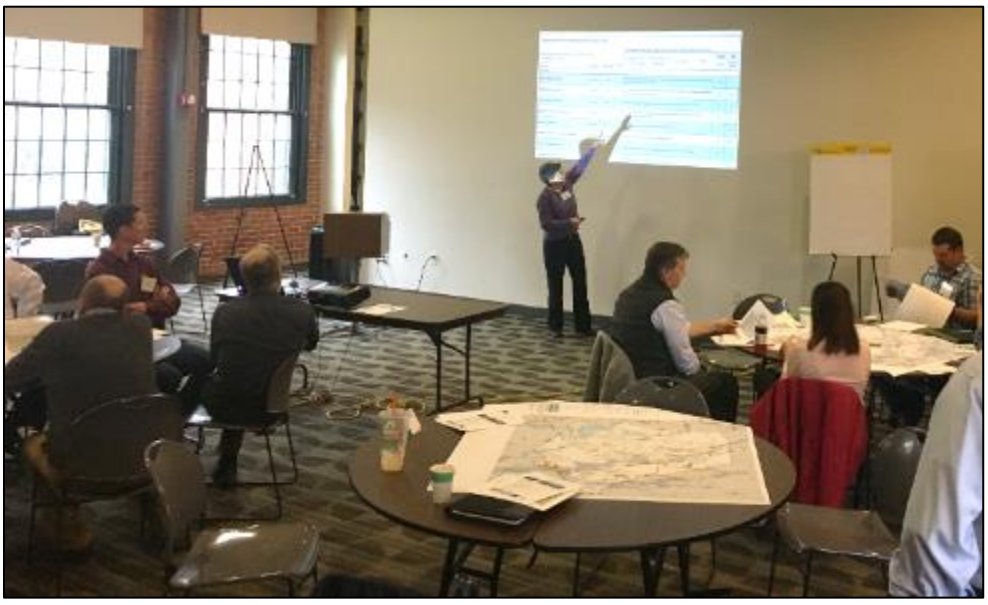
- Strong social services, including the Senior Center and local nursing homes/care facilities
- Non-profit groups and community-based organizations such as Alternatives Unlimited at 60 Douglas Road, and the Whitinsville Community Center at 60 Main Street can provide temporary shelter and local resources in the event of an emergency
- Faith based organizations and church groups are very active and many have food pantries and can operate as temporary emergency shelters
- Strong local presence of volunteer groups
- Code RED / Reverse 911 are vital communications tools to alert the public to pending emergency situations
- Warning Systems provided by public schools

Environmental Strengths

- During the time of the local workshop, the Community Preservation Act (CPA) was identified as a strategy for open space preservation. Following the workshop, the town passed the CPA thereby providing a means to conservation activities
- Currently the town is updating its Open Space and Recreation Plan (OSRP) which will outline a course of direction for land conservation activities
- Wide presence of local committees and boards tasks with managing the natural resources and ecosystems, which would be identified in the OSRP
- Wetlands absorb and store flood waters and run off
- Forests around the town absorb stormwater which might otherwise flood parts of town
- Areas that were historically known for wildfires in town have been developed which limit the wildfire risk

Northbridge Workshop
Top Recommendations to Improve Resilience

Participants at the Northbridge Workshop were asked to identify resilience-building actions that can be pursued by the town to address concerns and challenges. Prioritization of the recommendations was achieved through four steps: 1) informal discussion at each breakout table during the workshop; 2) voting using stickers placed on the participant's table's CRB matrix (each attendee was given five stickers to select his/her top priority actions); 3) report-back from each table to the full audience to discuss and discern consensus priorities; and 4) final review and reconciliation of duplicates at a post-workshop core team meeting.



In general, the Northbridge participants recommended big-picture actions. For infrastructure, the top recommendations involved further assessment of priority bridges and culverts as well as improvement upgrades roadways, dams, and stormwater drainage systems to improve resilience to projected hazards. Climate adaptation actions to consider for dams can include maintenance and replacement, as well as dam removal in some situations. Recommended environmental actions include increased planning and coordination with the state, town acquisition of open space resources, as well as increased outreach on conservation programs to residents. Green infrastructure projects were also recommended for the Blackstone River/Canal. Recommended societal actions include coordinating the protection and safety of the elderly population, low-income population, and other vulnerable groups through outreach and education. Other top societal recommendations include upgrading the current public safety communication system to a higher bandwidth, and increased enrollment of the Code RED system.

Specifically, the actions recommended at the workshop were:

General Topic	Specific Topic	Action(s)	Priority
Infrastructure	Bridges and Culverts	Rebuild, replace, upgrade fault or deteriorating bridges i.e. Rockdale Bridge, Sutton St. Bridge, Linwood Bridge, Church St. Bridge; Capitol planning and pursue state funding; Upgrade/upsize culverts and drainage infrastructure for climate change predicted precipitation events;	High
Infrastructure	Church Street extension	Upgrade roadway conditions, particularly the Church Street extension; Evacuation route planning; Reverse 911; install traffic message board signs of flood prone corridors	High
Infrastructure	Facilities and town services within floodplain	Relocate vulnerable facilities and services i.e. Rockdale Fire substation and DPW facilities; Revise local stormwater bylaw	High
Infrastructure	Dams	Coordinate with private owners of priority dams; coordinate with Dam Safety Office and Division of Ecological Restoration for state enforcement if needed	High
Environmental	Open Space	Complete Open Space and Recreation Plan Update and act on identified OSR priority areas; ConCom to acquire more land	High
Environmental	Riverbank Erosion and River Sediments	Relocate roads; Dredge Blackstone River/Canal; Initiate green infrastructure project. Participants recognized that it would difficult to dredge the Blackstone River if there are any heavy metals and noted that reinforcing or stabilizing the river banks is more possible and could limit erosion.	High

Societal	Rockdale Neighborhood	Establish formal emergency response procedures that align with Code RED upgrade; Relocate vulnerable groups; Perform outreach, education, and training	High
Societal	New Village Neighborhood	Establish formal emergency response procedures that align with Code RED upgrade; Relocate vulnerable groups; Perform outreach, education, and training	High
Societal	Public Safety Communications (includes Code RED)	Upgrade communications system to high bandwidth; Use Town gatherings for greater enrollment	High
Infrastructure	Stormwater Drainage Regulations	Continue to coordinate MS4 compliance Inventory assets;	Medium
Infrastructure	Bridges	Conduct an engineering study and pursue state funding of Linwood Bridge to reconstruct the deck	Medium
Infrastructure	Culverts	Conduct engineering study of Carpenter Causeway Culvert	Medium
Environmental	Wetlands	Review/update bylaws to improve protection of the wetlands	Medium
Environmental	Forestland	Develop a forest management plan and ensure proper management practices take place. Develop an action plan to control invasive species i.e. mosquitos, gypsy moths, ticks, and pests	Medium
Environmental	Street Trees	Inventory all street trees, ensure trees are cared for and when needed they are replaces. Plant street trees where appropriate. Maintain tree trimming	Medium
Infrastructure	Tree Maintenance with National Grid	Coordinate activities with National Grid	Low
Environment	Invasive Species	Plant removal program	Low
Social	Sewer System	Review regulations, inform the public or regulations and requirements. Maintain sewer system infrastructure.	Low

Northbridge Workshop
CRB Workshop Participants

Department/Commission/Organization	Name	Attended?
Town Planner	Gary Bechtholdt	*
Conservation Agent	David Pickart	*
Town Manager	Adam Gaudette	*
DPW Director	James Shuris	*
Highway Superintendent	Jamie Luchini	*
Sewer Superintendent	Mark Kuras	*
Health Administator	Jeanne Gniadek	*
Fire Dept. Chief	David White	*
Police Dept. Chief	Walter Warchol	
Planning Board Chair	Brian Massey	
MassAudubon	Stefanie Covino	*
MassAudubon	Ariel Maiorano	*
Building Inspector	James Sheehan	*
Blackstone Chamber of Commerce	Jeannie Hebert	
Blackstone Chamber of Commerce	Julia Juskavitch	
Blackstone Heritage Corridor	Megan DiPrete	
Blackstone River Coalition	Peter Coffin	*
Blackstone River Watershed Association	Pieter de Jong	*
Blackstone River Watershed Association	Ted Beauvais	
Uxbridge Finance Committee	Susan Franz	*
Uxbridge Fire Dept. Chief	William Kessler	*
Blackstone River Valley National Heritage Corridor	Rep. John H. Chafee	
Whitin Machine Works	Len Jolles	
Whitin Mill (Alternatives Unlimited, Inc.)	Dennis Rice	
Whitinsville Water Company	Randy Swigor	*
Linwood Mill	Bill Giannopoulos	
Linwood Mill	Patty Giannopoulos	
Riverdale Mill	James Knott Jr.	
Rockdale Mill	[Owner]	
Cotton Mill	[Owner]	
Foppema Farm	Kenneth Foppema	
Krolls Farm	[Owner]	
Szerlag Farm	[Owner]	
Scribe	Gretchen Pickart	*
Scribe	Heather Janson	*
Scribe	Amelia Satlon	*
CMRPC	Devin Clarke	*
CMRPC-WRTA	Chelsey Pousland	*
CMRPC Facilitator/Presenter	Hoamy Tran	*
CMRPC Facilitator/Presenter	Andrew Loew	*
CMRPC Facilitator/Presenter	Derrick Mathieu	*
CMRPC Facilitator/Presenter	Adam Menard	*
CMRPC Facilitator/Presenter (Lead)	Trish Settles	*

Northbridge Workshop
Project Team

Project Team
The following individuals were directly involved in planning and conducting the Northbridge workshop.

Organization	Name	Role
CMRPC	Hoamy Tran	Facilitator/Presenter
CMRPC	Andrew Loew	Facilitator/Presenter
CMRPC	Derrick Mathieu	Facilitator/Presenter
CMRPC	Adam Menard	Facilitator/Presenter
CMRPC	Trish Settles	Lead Facilitator/Presenter
Northbridge (Planning)	Gary Bechtholdt	Local and Overall Lead/Core Team
Northbridge (Conservation)	David Pickart	Core Team
Northbridge (DPW - Highway)	Jamie Luchini	Core Team
Northbridge (Health)	Jeanne Gniadek	Core Team
Mass Audubon	Ariel Maiorano	Presenter
Mass Audubon	Stefanie Covino	Presenter

Acknowledgements

The MVP workshops and summary of finding report were made possible by the commitment of many individuals and organizations. In total, staff and officials from the three municipalities devoted more than 140 hours of staff time as an in-kind match (see Appendix A for a summary table of time committed by the regional leadership team). Leadership was provided by a team made up of key officials in each of the three towns: R. Gary Bechtholdt II (overall MVP lead) and David Pickart in Northbridge, Maria Mast (local lead) and Joe Laydon in Grafton, and Laurie Connors (local lead) and Steve Kosiba in Millbury. Additional local officials participated significantly as core team members including Nick Child, Phil Ledger, Rachel Benson, Paul Cournoyer, and Leah Cameron in Grafton; Jaimie Luchini and Jeanne Gniadek in Northbridge; and David Marciello, Richard Hamilton and Donald Desorcy in Millbury; the many other local officials who participated in the workshops or in planning meetings are mentioned in their respective local chapters.

Support from the staff at the four workshop venues was also much appreciated: the South Grafton Community House (regional workshop), Singh Performance Center at Alternatives (Northbridge), Grafton Town Hall (Grafton), and Asa Waters Mansion (Millbury). The Blackstone Valley Chamber of Commerce generously donated lunch for the Northbridge workshop.

Volunteer scribes who greatly aided with the table discussions and matrices included students from Grafton High School (Hima Shapally, Emma Kelly, Mikayla Manion and Yashvi Gupta), volunteers from the Millbury Senior Center (Jean Peare and Julianne Mitchell), students from Northbridge High School (Heather Janson and Amelia Satlon) and Northbridge volunteer Gretchen Pickart.

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