Adams, Massachusetts

Community Resilience Building Workshop

June 2018

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Town of Adams

Community Resilience Building Workshop

Summary of Findings

Community Resilience-Building Process Overview

The need for municipalities to increase resilience and adapt to extreme weather events and natural hazards is becoming more evident among the 32 municipalities in Berkshire County, Massachusetts. The town of Adams, MA, located in the northwest region of Massachusetts, has experienced significantly more severe storm events that have flooded, damaged, or in other ways affected critical infrastructure, residences, and natural resources in town.

The town of Adams, located in Northern Berkshire County in the northwest region of the Commonwealth, is a rural town with a densely developed town center. The town is approximately 22.9 square miles and is situated in the valley surrounding the Hoosic River at the eastern base of Mount Greylock, the highest peak in the state of Massachusetts at 3,491 feet above sea level. Adams shares a border with the City of North Adams to the north. Adams also borders the towns of Savoy to the east, Cheshire to the south, and New Ashford and Williamstown to the west. Adams is located approximately 10 miles north of the City of Pittsfield, the commercial hub of the county, 138 miles west from the Capital city of Boston, and approximately 60 miles east of Albany, NY. State Route 8 runs through downtown Adams and is the main development corridor. Adams is located approximately 36 miles north of the Massachusetts Turnpike.

According to the 2010 U.S. Census, 8,110 people reside in the town of Adams, indicating a 4.4% decline since the 2000 Census. Two-hundred and thirty buildings in Adams are located within the 100-year floodplain (BRPC, 2018) and of those, 201 are residential homes. Many of the homes located in the 100-year floodplain are in downtown Adams. Thirty-four properties located in the 100-year floodplain have current flood insurance properties.

In general, the population of Adams, like most of Berkshire County, is aging. In 2010, 18% of the town's population was age 65 or older. An additional 18% of Adams population is under the age of 18. Thirteen percent of residents in the town of Adams under the age of 65 have a disability, according to the 2010 U.S. Census and a total of 10% of the population of Adams lives in poverty. These groups of people represent some of the "vulnerable populations" that may require different approaches by the municipality in terms of emergency preparedness and response, in the event of severe weather emergencies.

In 2011 Hurricane Irene caused significant damage to the Town that is still felt today. It is generally acknowledged that climate change is a reality and will continue to make its presence felt in the future. Regional climate data for western Massachusetts further reinforces this anecdotal evidence. These changing weather patterns have prompted the Town's leadership to take a proactive approach to assessing their vulnerability to severe weather or other natural hazards that have impacted or could impact, the Town, to the extent possible. The Town of Adams' Municipal Vulnerability Preparedness efforts to protect and preserve their community's residents, properties and natural environment, are detailed below.

During the Fall and Winter of 2017-2018, with funding from the Federal Emergency Management Agency (FEMA), the Town of Adams began the planning process to update its expired Multi-Hazard Mitigation plan. The Town of Adam's Hazard Mitigation and Municipal Vulnerability Committee (the Committee) is comprised of municipal department heads and representatives from various town boards and committees that represent several diverse disciplines.

During this same time period, with funding from the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA), and with the Town's Administrator acting a project lead, the town of Adams began to look more closely at natural hazards through the lens of climate change and began to develop strategies to become a more resilient community. The town of Adams hired the Berkshire Regional Planning Commission (BRPC), a state certified Municipal Vulnerability Preparedness (MVP) provider to facilitate the planning process. The Adams Hazard Mitigation and Municipal Vulnerability Committee began the process of engaging residents and other community stakeholders in completing a comprehensive, baseline climate change and natural vulnerability assessment. The goal of the Committee's work was to develop a set of actions for dealing with Priority Hazards, using the Community Resilience Building (CRB) Workshop guide and methodology.

The Committee developed a list of stakeholders who would be valuable in a day-long workshop: those who would provide information and input from a variety of perspectives, including elected

town officials, business owners, town department heads, first responders, residents, and respected elders who, from personal experience, could provide their perspective of changes in Adams through time and/or have served on a town board at some point in time.

On May 11, 2018 the Committee held an all-day Community Resilience-Building Workshop at the Adams Town Hall. The central goal of the workshop was to gather information from participants about the types of natural hazards and severe weather events that have occurred in town, to review the climate change data and projections, collect additional local data from participants, and to create a climate-related Natural Hazard Risk Matrix for the town. As noted in the Workshop Agenda, the objectives of the day were as follows:

1. Define top local natural and climate-related hazards of concern.
2. Identify and map vulnerabilities and strengths to develop infrastructure, societal, and environmental risk profiles for the Community.
3. Develop and prioritize actions that reduce vulnerabilities and reinforce strengths for your community – local organizations, academic institutions, businesses, private citizens, neighborhoods, and community groups.
4. Identify opportunities to advance actions that further reduce the impact of hazards and increase resilience in the Community.

A total of 32 people attended the Adams Hazard Vulnerability Workshop. The workshop began with a presentation on climate change and natural hazards that were identified in the region and Town, as determined by the Committee during their initial work in updating their Hazard Mitigation Plan. An overview of observed changes in weather patterns as well as future climate projections were presented to the attendees at the beginning of the workshop. This presentation served as a base for which the Workshop participants could work and build upon.

Following the climate change and data presentation, the Workshop followed the Community-Resilience Building Workshop format as described in the *Community Resilience Building Workshop Guide.* Attendees split up into four smaller working groups that were preselected to provide diversity in perspectives and experiences at each table. Each small group worked with a facilitator from the Berkshire Regional Planning Commission and developed a Risk Matrix, identifying what they perceived to be the top four hazards that face the community, what they considered to be the strengths and weaknesses of the town in facing those hazards, and actions to lessen the impacts of those hazards and build resiliency in the community. The small groups convened at the end of the day to report their findings to the full group and, as a full group, to choose the highest priorities for actions. The materials from the Workshop are found in Appendix A.

On June 14, 2018, the Committee held an open public forum, inviting town residents and other interested parties to learn about the Committee's work to date, hear the results of the workshop, and to solicit additional public input on major findings. The participants in this

meeting were able to use colorful stickers to indicate which of the Top Recommendations, identified at the Workshop, were most important to them. The highest priority actions as indicated at the follow up meeting are marked by the most stickers.

Top Hazards and Vulnerable Areas of Concern for Adams

During the small group Community Resilience Building Workshop, participants at each of the four groups were asked to name the four Top Priority Hazards that threaten the Town. The results show that flooding was a priority for each of the four groups. Specific events, including Tropical Storm Irene of 2011, that caused severe flooding and damage to the town of Adams was a common thread among discussions of top Priority Hazards at the Workshop in Adams. Wherever possible, identified vulnerable "problem areas" were drawn onto maps for later use by the Town in hazard mitigation planning and budgeting.

Top Hazards are as follows:

- Flooding (listed by 4 groups)
- Snow and Ice (listed by 3 groups)
- Wildfire (listed by 2 groups)
- Wind (listed by 2 groups)
- Extreme Weather (listed by 1 group)

Each group was given a set of large maps that were developed during the hazard mitigation plan update process, including a base large map showing critical facilities, FIRM floodplain areas, and the areas identified by the Committee to be of concern for natural hazards, such as neighborhoods that flood chronically, and areas with vulnerable bridges and culverts.

Other maps at each of the workshop tables included an aerial view showing land uses such as roads, development, and population density, and a map showing zoning in town. Participants were invited and encouraged to draw and write on maps to facilitate their conversation and find exact locations where hazards are present. The geographic areas cited as being of most concern within Adams were the downtown residential areas that flood as well as areas surrounding vital infrastructure for the Town's only water source: the wells located south of town in Cheshire, as well as the vulnerable quality street bridge crossing that carries the town's water main into Adams from the wells in Cheshire. Protecting the town's water supply was one of the highest priorities raised by the participants.

Current Concerns and Challenges Presented by Hazards

As part of the Hazard Mitigation Plan Update, the Committee had identified the following hazards as being of most concern for the Town of Adams:

- Flooding and damages to road system, gas lines, and water lines from undersized or vulnerable culverts/bridges, from severe rain events and increasingly hazardous storms. Hurricane Irene in 2011 was the largest flooding event in recent years, damaging homes, roads, bridges, and displacing people.
- Aging utility and water infrastructure in general.
- Emergency preparedness capacity and capabilities.

Participants of the Workshop agreed that these were the hazards of concern, however, there were additional areas of concern amongst the group, including:

- Need for more education to the vulnerable populations about emergency preparedness – primarily, the for the elderly population.
- Sedimentation cause by previous storms causing flooding and overspill issues with regular rain events.
- Invasive plants and animals compromising natural areas that have been protective to the environment previously.
- Pollution and debris from Specialty Minerals mining operation and disruption of air and water quality from the operation being a risk to public health.

Specific Categories of Concerns and Challenges

Infrastructure and Flooding

Workshop attendees discussed in detail the vulnerable infrastructure, including gas lines, water mains, and roads, bridges, and culverts that have all been affected in recent years by severe flooding events and several storms. The most notable and destructive storm in Adams was Tropical Storm Irene, which hit in 2011. The Fire Department in Adams received a total of 170 calls during Tropical Storm Irene, stretching their capacity past their limits. The hurricane damaged several culverts, bridges, roads, and homes. The tropical storm washed out an entire culvert on Lime Street, for example, where a sink hole formed afterwards. Tropical Storm Irene, in addition to the initial damage that it caused, also caused tributaries from surrounding mountains to change paths, and for flooding patterns, especially in or near downtown Adams, to change. Participants from Adams reported seeing new flooding areas since the storm, especially in downtown residential areas. Particular areas in Adams that have experienced increased flooding are Pine Street and areas around Pine Street Brook, North Summer Street, Fisk Street, forest Pearl Avenue, Russell Field, Columbia Street, Howland Avenue, East Hoosac Street, Friend Street, and Lime Street.

Aging Utility and Water Infrastructure

There are several streams that flow from steeply sloped mountainsides into manmade structures such as stone or concrete lined channels and storm drain systems. The structures are decades old and are beginning to deteriorate. Some seem less able to handle high flow than in the past. As a result, public and private properties are threatened by increased flooding. The Town is aware of the threats but limited resources have hindered study and repair of these structures, which are scattered throughout the Town.

In terms of current infrastructure being vulnerable, the Workshop participants identified several locations where either the age or damage from previous storms to the infrastructure were causing them to be compromised. The Quality Street bridge crossing in Southern Adams, where the water main comes into town from Cheshire, is in very poor condition. The water line itself is also very old and could be broken easily if a large storm event were to occur. The Legion Dam on Fisk Street near downtown Adams has heavy silt built up that causes water to flow around the dam encroaching on roads during heavy rain storms. On the Fisk Street bridge crossing, there is an 80-100 year-old clay sewer pipe that is exposed for approximately 100 feet and is visible through water, where there is a partially collapsed retaining wall visible as well.

Adams main water source is comprised of three wells located in Cheshire. While the well pumps are raised, and two of the pumps are used as back up supplies if maintenance is being performed, the participants were concerned that there were no backup generators to supply electricity to the well pumps in the case of a flood or other event that eliminates regular electrical service to the pumps. If the well pumps were to lose electricity in a flood, the town of Adams would not have any water access until the utility company reinstated electrical service, which could take hours or days.

Emergency Preparedness Capacity and Capabilities

More frequent and severe flooding and heavy rain events in Adams caused the Workshop participants to consider overnight sheltering capabilities, cooling and warming center capabilities. Currently, there is a designated overnight shelter site in Adams located at the Memorial School. The Memorial School has a backup generator for electricity, however, it has not yet been inspected by the building department to assess its suitability as a shelter. In many cases, warming, cooling, and temporary daytime shelters are more frequently needed for shorter term responses to flooding events. One designated center, the Adams Visitor's Center, flooded during the most recent severe ice/rain event on the exterior of the building and into the lobby of the building. In addition, there was damage from the storm that caused concrete to rupture at the entrance of the building and prevented the front door from opening until the area could be grinded down. Participants at the Workshop agreed that there should be several pre-identified alternative warming, cooling, and temporary daytime shelters depending on the specific needs and effects of the disaster.

Communications and Emergency Response

The emergency communications systems in Adams is run through the Berkshire Sheriff's Office located in Cheshire. This emergency communications system sends messages out, as requested by the Adams Emergency Management Director (EMD), to residential landlines in Adams when an alert needs to be issued. In Adams, there is no system set up to deliver emergency notifications to residents' cell phones, email addresses, or other message systems. Residents who are not home to answer their landline, or residents who do not have a landline in their homes will not receive emergency notifications from the town of Adams. The Workshop participants expressed their concerns about this issue, and some were unaware that there was an emergency notification system.

Another barrier to emergency response in Adams is the limited number of Emergency Medical Technicians (EMTs) and Paramedics who provide services in Adams. The Workshop participants discussed the lack of these professionals and discussed ways in which more of these professionals could be attracted to working in Adams. In a large-scale disaster, Adams Ambulence Service would quickly run out of capacity and require mutual aid from surrounding communities.

Pollution from Specialty Minerals Mines

Participants at the workshop discussed in detail their concerns about air and water quality as a result of runoff and airborne dust coming from Specialty Minerals Mines. Most impacts from the dust are to residents living in the north section of Adams, closest to the mines. Evaluations of the health effects of this dust and pollution should be done.

Current Strengths and Assets in Town of Adams

The town of Adams is a tight-knit community where town departments and residents work well together and seek input from each other when opportunities or problems arise. While Tropical Storm Irene caused severe damage in town, Adams departments and community members were able to respond, find shelter for everyone that needed it, and make necessary repairs to get the community back to a "new normal". Despite issues with flooding, large amounts of protected land (a total of 42%) on the east and west sides of the town provide a natural barrier for storm systems and provide valuable recreational opportunities for residents and visitors alike.

- Adams town department heads and elected officials work exceedingly well together and show mutual commitment to problem solving, innovative projects, and work that increases the resiliency of the community.
- The Senior Center/Adams Visitor's Center is a community hub that provides social connections and resources to residents, and in addition, has also acted as a warming center when needed. This is a unique and vital resource for preparedness and resilience.
- Cooling and warming centers have been used with success (although more pre-designated locations are needed).
- The natural resources in town, including protected lands, provide opportunities for exercise and outdoor recreation and act as a natural storm barrier for the town. Often, storm systems are broken up slightly when crossing the mountains to the east of Adams, perhaps reducing the severity of the storms.
- Current and future planned projects in Adams include Low Impact Development techniques where applicable.
- The flood chutes in town are well maintained by the Department of Public Works in Adams.
- The town updates culverts and other infrastructure when funds are available For example, a culvert on Lime Street was updated in recent years, and a culvert located on Southwick Brook was also updated.

Top Recommendations to Improve Resilience

The participants at the Workshop separated into four smaller groups and completed their matrices. Each group came up with four different Top Recommendations to the town, which were presented to the full Workshop group and then separated into four different categories: Infrastructure, Utility/Water Infrastructure, Emergency Preparedness, and Emergency Response. (See Figure 1)

The most frequently mentioned top priority from the Workshop participants revolved around assessing and evaluating vulnerable bridges, retaining walls, culverts, and dams in town. Assessing and replacing vital water infrastructure was also a top recommendation from participants at the Workshop.

As reflected in the attached Risk Matrices, repetitive flooding of private properties and roads in specific areas of the town and threats to public infrastructure were major concerns raised by each of the small break-out groups. These themes, together with concerns about emergency communications and sheltering, rose to the top when all the groups reconvened at the end of the day to determine the Overall Priority Actions. Because there were so many different areas across Adams that were named by the small groups as specific priority actions, it became apparent that the Town would not be able to afford to address all of these. The full group came to a consensus that it would be most prudent for the Town to conduct an engineering assessment of priority culverts, channels and conveyance systems that are known to be deteriorating or are implicated as causes of flooding. Those infrastructure systems deemed by an engineering firm to be of greatest risk of failure and threats to public safety, or those that should be upsized to reduce flood impacts would be prioritized for design and reconstruction. This central Overall Priority Action was highlighted in red ink at the closing of the workshop.

Infrastructure:

- Conduct assessments of existing culverts for upgrading needs & size requirements & new regulations.
- Asses water flow and runoff in East Hoosac/Jordan and Lime Street areas.
- Study and prioritize culverts.
- Assessments of existing culverts for upgrading needs, size requirements, and new regulations.
- Study condition of private flood chutes to determine town's ability to maintain and repair.
- Study and identify problem areas with undersized pipes.
- Evaluate retaining walls on lower East Hoosac.

Utility/Water Infrastructure

- Study and identify problem areas along aging water and sewer lines. Better communication with water district. Study combining of town and water district.
- Assess vulnerable gas lines near bridges and other problem areas and prioritize projects.
- Assess water main pipes at Quality Street Bridge crossing.

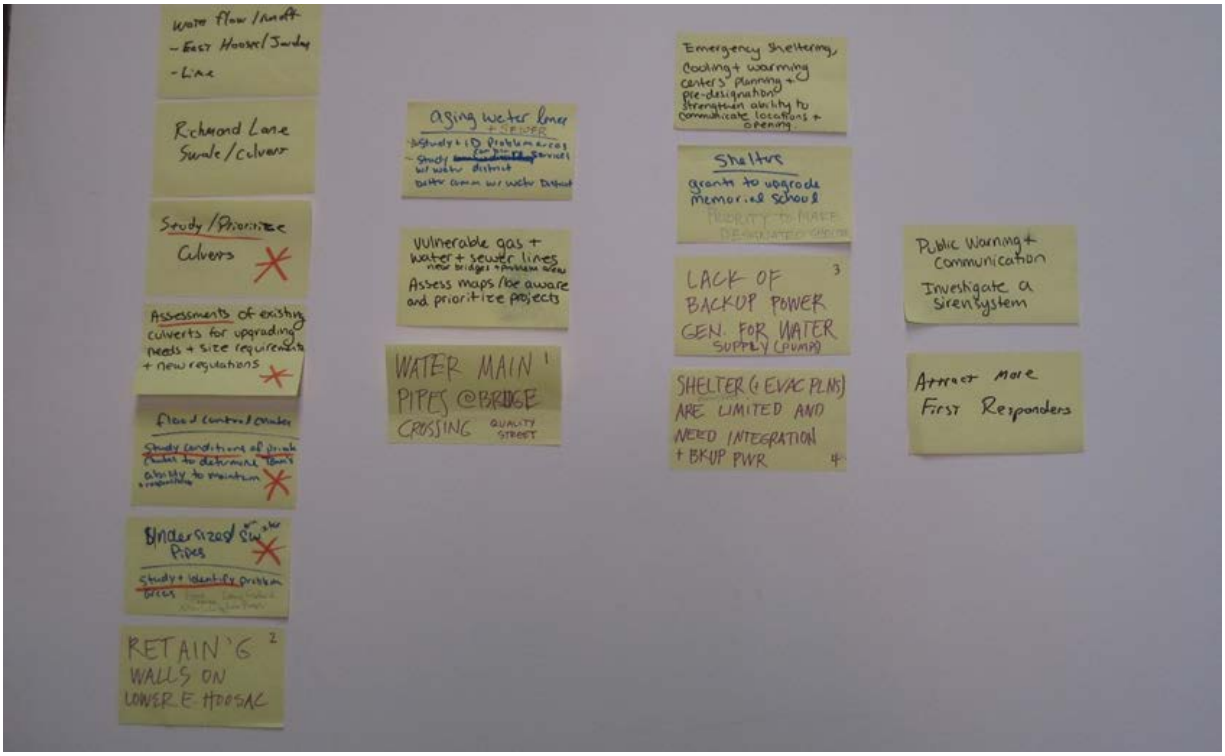
Emergency Preparedness

- Designate more cooling, warming, and emergency overnight sheltering locations.
- Pursue grants to upgrade Memorial School and prioritize this as designated shelter.
- Well pumps that supply water for town do not have backup generators. Prioritize applying to grants or funding generators.
- Update evacuation and sheltering plans; need more integration into town. Designated shelter site (Memorial School) does not have a generator for backup power.
-

Emergency Response

- Expand public emergency notification system, and process for communicating with public. Investigate a siren system.
- Find ways to attract more first responders to the town of Adams.

Fig. 1. Top 16 Priorities from the Workshop – Placed According to Category



High Priority Actions from Matrices

- Pursue CDBG/Green Community Grants to make required upgrades to shelter.
- Create better communication with Water District.
- Study consolidating water district, identify problem pipes.
- Conduct a study to identify and prioritize pipes to be replaced.
- There needs to be better development standards and updated storm water system. Bylaw.
- Study conditions of private chutes to determine Town's ability and responsibility to help maintain.
- Work with owner to remove Fisk Brook dam.
- Study, prioritize, engineer and go after grants to fix culverts.
- Study private property, enlarge box culvert, maintain swale on Richmond Lane, North Summer Street.
- Apply for grants to replace Miller Brook box culverts - already engineered.
- Deepen Lime Street stream to accommodate more water.
- Replace/elevate salt shed in floodplain.
- Create tax incentives to for volunteer EMTs, advertise incentive.
- Work with inspector to address issues and certify proposed overnight shelter.
- Determine if upcoming repair to Florida Mountain 911 Tower fixes problem & includes the response signal.
- Educate public and test reverse 911 (emergency notification) system.
- Educate residents about invasive pests.
- Bridge Condition Assessment; Armor mains on Quality Street Bridge.
- Replace crumbling retaining walls on Miller Brook.
- Shelter plan should be instated, develop plan for pets and long-term sheltering.
- Active Bonding & RFP's for development, consider Greylock Glen use as future shelter.
- Historic brick row housing on Columbia Street should institute emergency plan related to being in floodplain.
- Renew engagement effort with Specialty Minerals – assess hydrology, landslides, air and water quality, and other negative impacts.
- Replace or strengthen Quality Street bridge that brings water main into town. Armoring the pipe could be a temporary fix.
- Gas lines on Pine and Burt streets should be assessed by utility company to prevent damage from flooding events.
- EMD should look into costs and locations to install sirens for emergency alerting system.
- Reduce use of herbicides that damage native plants. Continue removal of invasive species.

Moderate Priority Actions from Matrices

- Continue to pursue funding for Housing Rehabilitation Program.
- Communicate with Housing Authority to develop plan in case of event.
- Expand COA programming to educate residents on hazards and preparedness.
- Update sheltering plan to include Memorial School.
- Update OSRP to keep land protected.
- Update the EMD and drill for evacuations.
- DPW needs to work with Conservation Commission to preemptively clean/maintain chutes.
- Plan to replace old water pipes as money is available, coordinate replacement with road repairs.
- Work with land owners, review easements, to allow access for preventive maintenance by DPW.
- Work on agreement between Berkshire Square (apartment/property owners) and the town to allow sheltering.
- Create a database of elderly and at-risk populations, educate, town census questions, website dissemination.
- Create/Enforce regulations requiring numbers on houses.
- Plan and permit the removal of rocks from streams on East Road.
- Work with mine safety enforcement / DEP on improving communication on issues of concern to town (pollution from Specialty Minerals).
- Replace pipe on Valley Street.
- Gain ownership & Brownfield funding for Crown Vantage Mill, which is vacant and contains hazardous materials.
- Get a generator for the main water source (well pumps in Cheshire).
- Purchase generator for senior center and evaluate needed electrical work.
- Vacant middle school needs rehab, kitchen, HVAC, and code work.
- Assess needed electrical work for Plunkett school to install generator.
- Miller Brook bridge should be scheduled to be cleaned and maintained – filled with silt/debris.
- Retaining wall on East Hoosac Street should be assessed by engineer and rebuilt.
- Lines of communication between town and state entities should be improved regarding road access points for fire rescue on Mt. Greylock. Concrete barriers should be removed and replaced with a locked gate.
- Pre-designate more locations as warming and cooling centers. Create MOUs with host locations.

- Undertake ongoing emergency exercising of shelter locations. Shelter supplies should be inventoried.
- Electrical companies may need to update outdated electrical equipment.
- Signage should be posted where people dump rubbish in downtown swails. Create cleanup efforts as community service.
- Consider using less salt on roads, or using salts that do not have additives that disturb plants and wildlife.
- Be aware of areas with many downed trees as elevated fire risk.
- Planning and conservation boards should investigate usefulness of retention basins for flood-prone areas.

Lower Priority Actions from Matrices

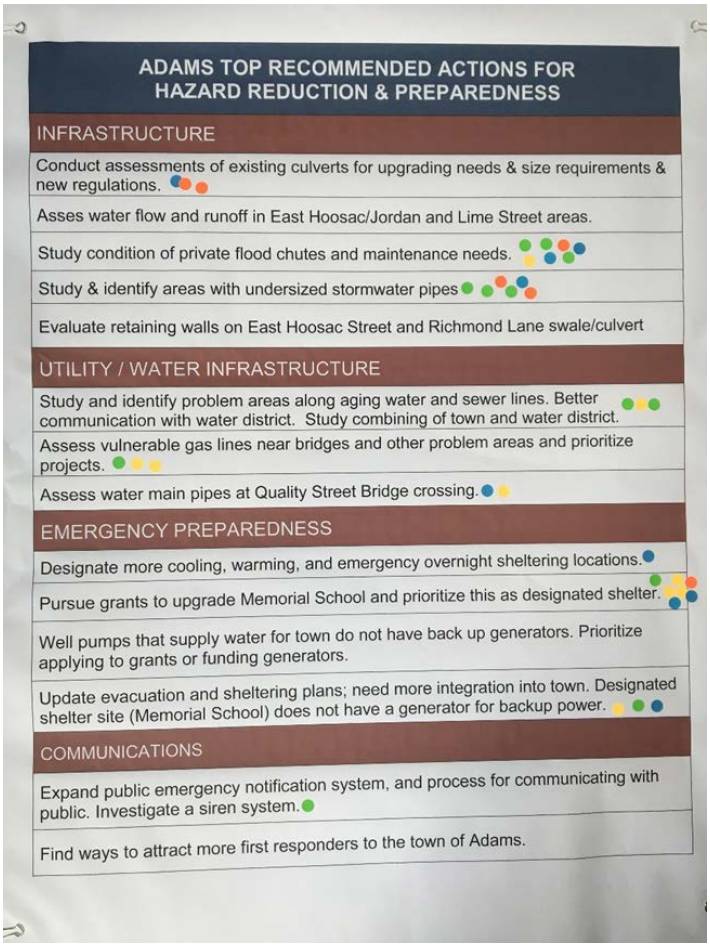
- Create a "Welcome to Adams" packet that includes preparedness tips.
- Study future use of dam and dredge or remove as appropriate.
- Allocate more resources for staffing DPW.
- Allocate more resources to meet required regulations from state and federal governments for water supply.
- Identify hazardous material; formulate response plan for Holland Company.
- Develop town wide evacuation & communication plan.
- Identify impact of Greylock landslide on town.
- Assess flooding at the Historic Berkshire Mill redevelopment.
- Research if there are state incentives for property improvements that mitigate risk.

When the small groups reconvened they brought 16 Top Priorities to the full group for discussion and categorization. The group further tried to identify potential town departments or other agencies that should take the lead to follow through with the actions and where funding could be sought for implementation.

At the public forum held on June 14th, Adams residents provided further input on which projects the Town should prioritize for action. Residents were given different colored stickers and asked to place hem next to the top three actions that they believed the Town should pursue. The actions they were presented with were the Top Priorities from the MVP Workshop, and the draft Action Plan that the committee has drafted for the updated Hazard Mitigation Plan. Materials from the public forum can be found in Appendix B.

The Top Actions that Received the most votes at the meeting were:

1. Study condition of private flood chutes and maintenance needs. (7 votes)
2. Pursue grants to update Memorial School and prioritize this as a designated shelter. (7 votes)
3. Study and identify areas with undersized storm water pipes. (6 votes)
4. Conduct assessments of existing culverts for upgrading needs, size requirements, and new regulations. (3 Votes)
5. Study and identify problem areas along aging water and sewer lines. Better communication with water district. Consider combining of town and water district. (3 votes)
6. Assess vulnerable gas lines near bridges and other problem areas and prioritize projects. (3 votes)
7. Update evacuation and sheltering plans; need more integration into town. (3 votes)



Post-Workshop Implementation

On May 18, 2018 the Town of Adams applied for a MVP Action Grant to focus on adaptation and resilience. The stormwater conveyance system and flood control chutes that channelize the Hoosic River must adapt to the impacts of climate change in order for the Town to be resilient. The Town applied for MVP grant funds to assess, analyze, evaluate and prioritize small stormwater conveyances to understand current conditions, which areas are more susceptible to failure and which areas pose the greatest threat to public safety should they fail. The Town proposed advance the recommendations that result from this process and conceptual designs will be developed for 2-3 of the highest priority sites. The project cost estimate is $75,000. This grant application directly addresses the single highest priority from the MVP Workshop: assessing and prioritizing infrastructure for improvements. The Town applied for and has successfully been awarded a grant for $56,250, with the Town providing $18,750 in matching funds.

Invited Workshop Participant List

Below is a list of people who were invited to participate in the Workshop. Those who are on the Adams Hazard Mitigation Committee are noted in Bold type. Those who participated in the Workshop are noted with an Asterisk*

Name	Affiliation	Workshop Participation
Bill Cyrulik	**Water Dept.**	*
Bob Rumbolt	**Waste Water Treatment**	
Brian Bishop	**Conservation Commission**	*
Bruce Shepley	**Board of Health**	
Butch Parrott	Lan. Planning Bd., Finance Comm., ZBA, Friends of Pontoosuc	
Chris Crews	Builder	*
Christine Hoyt	Select Board	*
Dana Labbee	Waste Water Treatment	
Dave Krzeminski	**Planning Board**	
Dave Rhinemiller	**Planning Board**	
David Bissaillon	**Pro Adams/Smith Bros. McAndrews**	
David Lipinksi	Cons Com	
David Rhodes	**Board of Health**	*
Don Torrico	**Building Commissioner**	*
Donna Cesan	**Town of Adams**	*
Erica Girgenti	**Council on Aging**	*
Eugene Michalenko	Historical Society/Flood area	*
Francie Riley	**Zoning Board**	*
Fred Meczywor	**Prudential Commission and Fire District**	*
Heather Linscott	Greylock Trails	*
Jean Rice	Town of Adams	*
Jeromy Richardson	Resident	
Jim Bush	**Select Board**	*
Jim Fassell	**Cons Com**	
Joanne DeRose	**National Grid**	*
Joe Nowak	**Select Board**	*
John Duval	**Select Board**	*

John Pansecchi	**Fire District**	*
Josh Gregory	Builder	*
Kyle Wilson	DPW/Custodian	*
Larry Clairmont	Notre Dame Food Pantry	
Larry Frederick	Property and Business Owner	*
Linda Reardon, Principal	St. Stanislaus School	
Lisa Gazaille	Planning Board	
Mark Maloy	Adams Outsource	*
Martha Stohlman	Planning Board	
Mike Gleason	Adams Ambulance Service	*
Norman Shutz	Prudential Com	*
Patti Volpi, Director	Adams Housing Authority	
Paul Goyette	Resident	
Peter Hoyt	Board of Health	
Richard Blanchard	Select Board	
Richard Kleiner	Emergency Management	*
Richard Tarsa Jr.	Police Chief	
Robert Tetlow	Berkshire Gas Company	*
Roger Rice	Builder	*
Sandy Moderski	Planning Board	
Steve Blazeijewski	Berkshire Outfitters	
Steve Skrocki	Department of Public Works	*
Steven Beagle	Forest Warden	*
Tammie Shafer	Conservation Commission	
Tim Cota	Department of Public Works	*
Tim Zimba	Adams Fire District	*
Toby Alves	Forest Warden	*
Tom Romaniak	Board of Health	
Tom Satko	Prudential Com	

MVP Service Provider

The Berkshire Regional Planning Commission (BRPC) served as Adams' MVP State-Certified MVP Service Provider.

Name	Affiliation	Attendee
Lauren Gaherty	Senior Planner, Project Manager and Main Workshop Facilitator	*
Allison Egan	Senior Planner, Small Group Leader	*
Mark Maloy	GIS, Data & IT Specialist, Small Group Leader	*
Margaret McDonough	Planner, Small Group Leader	
Will Sikula	Planner, Small Group Leader	*

Citation

Adams Hazard Mitigation and Vulnerability Committee, 2018. *Town of Adams Community Resilience Building Workshop Summary of Findings,* Adams, MA.

Acknowledgements

Funding for the MVP planning process and *Community Resilience Building Workshop Summary of Findings* was provided to the Town of Adams by the Executive Office of Energy and Environmental Affairs.

Many thanks to the Adams Hazard Mitigation and Vulnerability Committee and the residents of Adams for joining together to make the MVP planning process and the Community Resilience Building Workshop a success.

Appendix A – May 11, 2018 Workshop Materials

Workshop Agenda

Key Terms Handout

Powerpoint Presentation

Workshop Maps

Master Matrices

Workshop Posters

Town of Adams
Community Resilience Building Workshop, May 11, 2018

~ Workshop Objectives ~

1) Understand connections between ongoing issues, hazard, and local planning and actions in your Community. Define top hazards.
2) Identify and map vulnerabilities and strengths to develop infrastructure, societal and environmental risk profiles for your Community.
3) Develop and prioritize actions that reduce vulnerabilities and reinforce strengths for your community - local organizations, academic institutions, businesses, private citizens, neighborhoods, and community groups.
4) Identify opportunities to advance actions that further reduce the impact of hazards and increase resilience in your Community.

ACTIVITIES and OBJECTIVES
9:00 a.m. -- Welcome, Workshop Overview, Introductions, Posters *Objective: Workshop purpose*
9:30 a.m. -- Overview Presentation on Hazards and Vulnerability *Objective: Identify risks – What has already been identified? What is the data telling us?*
10:30 a.m. – Small Team Exercise *Objective: List Top 4 Hazards in the Town and List Community Vulnerabilities and Strengths*
Noon – 1:00 p.m. – Lunch! Please View Posters
1:00 p.m. – Reconvene Small Teams – List and Prioritize Actions *Objective: List and Prioritize Actions – Choose Top 4 Actions*
2:00 p.m. – Small Teams Report Out to the Full Group *Objective: Present findings and Prioritization of Top 4 Actions*
2:40 p.m. – Top Priorities *Objective: Collectively Prioritize Central Action List*
3:30 p.m. -- Wrap up and Next Steps

A FEW KEY TERMS FOR TODAY

Natural Hazard – Source of harm or difficulty created by a meteorological, environmental or geological event

Risk – Potential for damage, loss, or other impacts created by the interaction of natural hazards with people, structures, facilities and systems that have value to the community

Vulnerability – Characteristics of people, structures, facilities and systems that make them susceptible to damage from a given hazard

Preparedness – Actions taken to plan, organize, equip, train and exercise to build and sustain the capabilities necessary to prevent, protect against, mitigate the effects of, respond to, and recover from those threats that pose the greatest risk

Mitigation – Sustained actions taken to reduce or eliminate long-term risk to life and property from hazards; *the work done up front to reduce the impacts of a hazard*

100-Year Flood Event – one that has a 1% annual chance of occurring, commonly called 100-yr flood event; this is statistical occurrence only – a town could experience two 100-yr flood events in a short period of time (or conversely not experience any within 100 years or more)

100-Year Floodplain – area of flooding associated with a 1% annual probability of occurrence; the boundary of the 100-yr floodplain is used by many agencies to assign flood risk, including FEMA and the National Flood Insurance Program

Natural Hazard Mitigation and Municipal Vulnerability Preparedness



Town of Adams
May 11, 2018

What is a Hazard Mitigation Plan?

A Mitigation Plan…

- Describes the natural hazards in a community
- Assesses the vulnerability of a community to the identified hazards
- Describes activities that can be done to mitigate the hazards before they occur
- Mitigation Plan is a REQUIREMENT to maintain eligibility for HMGP & PDM funds (Federal Disaster Mitigation Act of 2000)

Municipal Vulnerability Preparedness Program 2017

Why MVP?

- Consider weather pattern observations and climate change projections
- MVP certified communities will have priority status for some state grant opportunities
- MVP grant funds may be more flexible than FEMA for local mitigation projects

State and local partnership to build resiliency to climate change

1. Engage Community
2. Identify CC impacts and hazards
3. Complete assessment of vulnerabilities & strengths
4. Develop and prioritize actions
5. Take Action

A Few Key Terms for Today

Natural Hazard – Source of harm or difficulty created by a meteorological, environmental or geological event

Risk – Potential for damage, loss, or other impacts created by the interaction of natural hazards with people, structures, facilities and systems that have value to the community

Vulnerability – Characteristics of people, structures, facilities and systems that make them susceptible to damage from a given hazard

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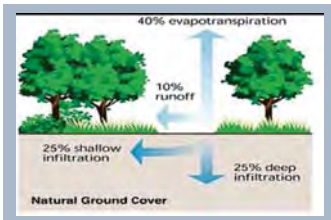
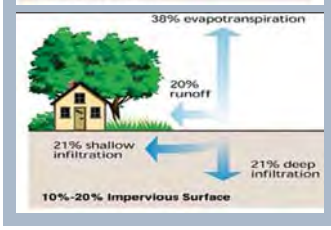
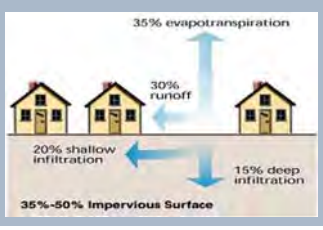


Changes in water patterns:

Impervious Surface = Increased Runoff

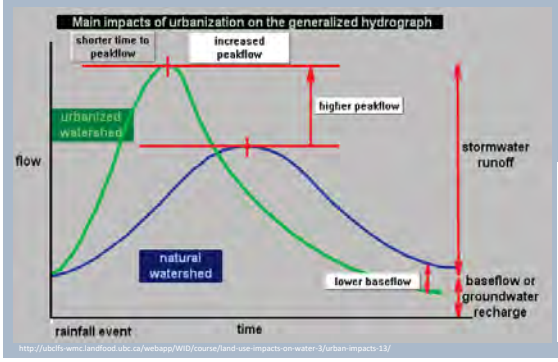




+ Piped runoff =

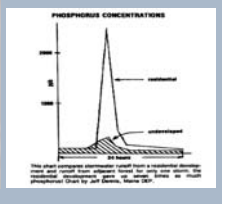


= Quicker, higher peak flow volumes

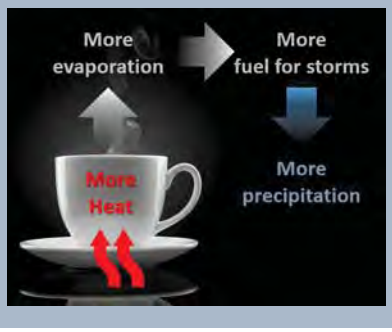


http://ubclfs-wmc.landfood.ubc.ca/webapp/WID/course/land-use-impacts-on-water-3/urban-impacts-13/

(And higher pollutant loads)



And Then There's Climate Change



Key Observed Climate Changes in MA

Temperature: ↑ **2.8°F** since 1895 (7-10°F by 2100)
Berk. temp. up 1.7°F since 1960

Growing Season: ↑ **10 Days** Since 1950

Strong Storms: (heaviest 1% of annual) ↑ **71%** Since 1958

Extreme Heat Days in Hoosic Watershed

	Current		Projected by Mid-Century (2050s)	Projected by End Century (2090s)
Days per year above 90°F	≤1	↑	+ 4 - 17	+ 6 - 50
Days per year above 95°F	0	↑	+ 0 - 5	+ <1 - 11
Degree Cooling Days		↑	+ 4 - 16%	+ 35 – 460%

Observed Number of Warm Nights

- Number of Nights where minimum temp. > 70° F

https://statesummaries.ncics.org/ma

Observed No. Extreme Precip. Events

- Number of Events w/ Precipitation > 2" in 1 day*
  "Stepped Increase" in 1970-80s
  Increase of up to additional 1/5 day mid-century in Hoosic, with summer higher risk*

https://statesummaries.ncics.org/ma

** Different sets of data*

More Extreme Precipitation

71% Observed 1958-2012

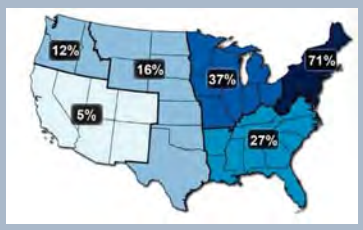
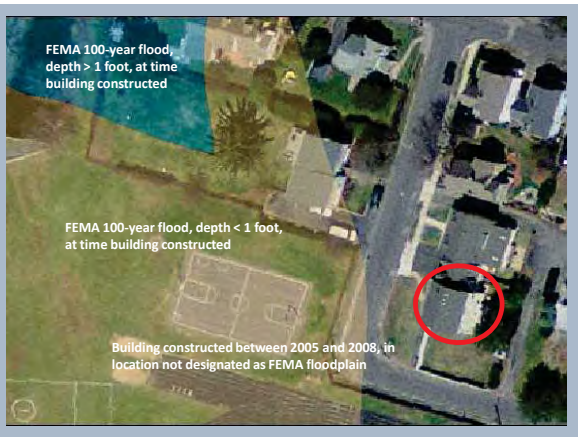



Photo: Ricci, NRCS

Change in 24-hour, 100-year Design Storms (inches)

	NOAA TP-40	NOAA Atlas 14	Change
Boston	6.6	7.8	+1.2"
Worcester	6.5	7.6	+1.1"

Flood-plain Mapping



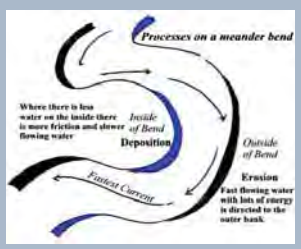
Flood-plain Mapping

Same building, March 2010 flood (approximately 40-year flood)

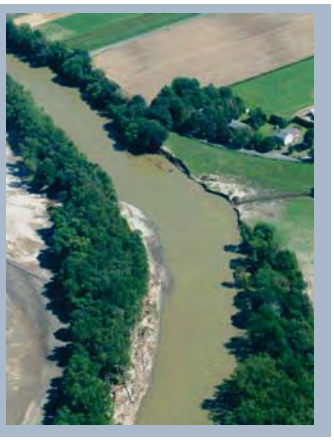
Rivers Move – Give 'em Room

Scour on the outside of meander bends.

Deposition on inside of bend



courtesy Carrie Banks, MA Division of Ecological Restoration

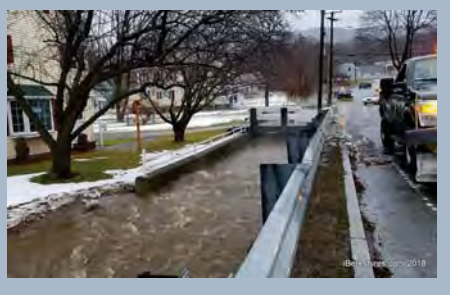


Leave that floodplain open for the Big Event

Winter Weather Changes

Cycles of cold and warm will increase, alter risks

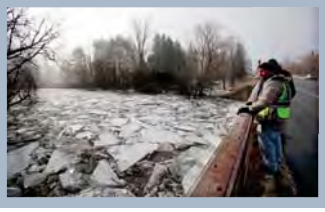
- **Warmer temps:** Less snow pack = altered water regimes and soil moisture
  - Less groundwater recharge = lower baseflow in streams, rivers, reservoirs
  - Loss of snow insulation = increased risk of frozen pipes, drains
  - Dryer spring soils
- More rain-on-snow events
  - Increased runoff, risk of winter floods



Winter Weather Changes

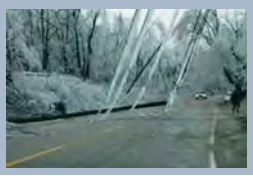
Cycles of cold and warm will increase, alter risks

- **Ice Risks:**
  - Ice storms = potential loss of electricity
  - Ice jams



Ice Storm December 2008

- **Loss of electricity for 1+ million customers**
- **Some for more than 2 weeks**
- **FEMA obligates >$32 million in Mass.**
  - + State costs >$7 million
  - + Municipal costs >$5 million
  - + National Grid claims damages of >$30 million
  - + Small businesses without electricity "lose tens of millions of dollars"*

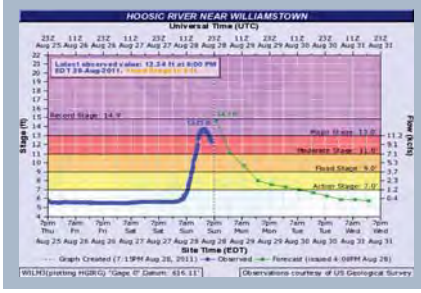


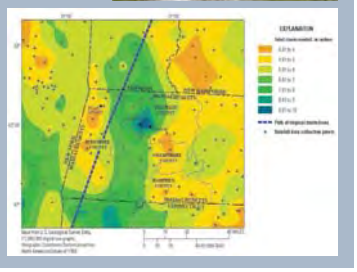
** MA Climate Change Action Plan*

T.S. Irene 2011

- 500,000+ MA residents without electricity
- 6 out of 8 stream gages in Deerfield & Hoosic Rivers reach highest peaks of record
- Calculated as 100-year flood in Hoosic River in Adams
- Dubbed the "costliest Category 1 storm" ($15.8 billion in damages)
- Fed. Disaster: FEMA $5.6 million to MA households, $30 million for MA public assistance
- Fed. Highways: $46 million for roads and bridges, much of it for Rt 2

T.S. Irene and the Hoosic River



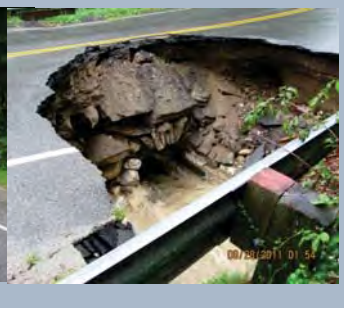


Irene @ Lime, North Summer Sts.

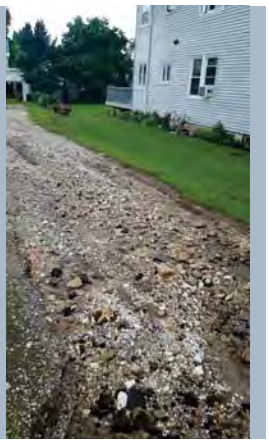
Lime, Davis, Charles Sts.

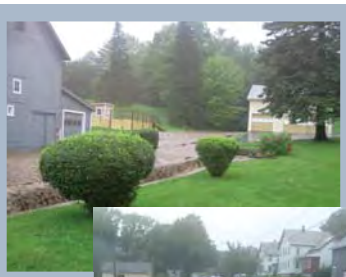
Irene @ Lime, Charles, Davis Streets

Irene @ East Rd.



Irene @ Grant St





Irene @ Friend St. near Burt

Irene @ Rt. 2 and Shelburne Falls

Don't take Water for Granted

- Drought recurrence intervals may shorten
- Due to increased temp. and evaporation
- Lower groundwater recharge
- More water in summer/fall comes in extreme storm events with higher peak flows and more runoff
- Berkshires got off lightly this time

Natural Hazards Evaluated

Hazards Evaluated	
Flood	Tornado
Dam Failure	Extreme Temperature
Hurricane / Tropical Storm	Drought
Nor'easter	Wildland Fire
Snow & Blizzard	Major Urban Fire
Ice Storm	Earthquake
Thunderstorm	Landslide
High Winds	Ice Jam
Beaver Activity	

The Most Deadly Berkshire County Incidents

- **Hoosic River Floods**
  - 1938 -- Adams & North Adams – 2 deaths, many injuries
- **Dam failures**
  - 1886 -- Mud Pond Dam – Lee – 7 deaths
  - 1901 -- Basset/Dean's Dam – Adams – 1 death
  - 1968 -- Lee Lake Dam – Lee 2 deaths
- **Tornadoes**
  - 1973 -- W. Stockbridge – 4 deaths, 36 injured
  - 1995 -- Great Barrington – 3 killed, 24 injured

Outside of T.S. Irene – What is the most injurious or damaging incident that you have had to respond to in Adams or a neighboring town?

Concerns around Adams

- Dense development: floods risk homes and businesses in central areas of town
- Undersized culverts / bridges / conveyances
  - Flooding outside flood zones
- Channel conveyances deteriorating, becoming undersized
  - Near dense residential & commercial buildings
- Drinking water infrastructure risks
  - Basset Reservoir dam
  - Main trunk line on Quality St. Bridge

Assessing Vulnerability in Adams

- Approx. 3 miles of roadway travel through floodplain
- 230 Buildings in the Town are in the 100-yr floodplain (BRPC 2018)
  - 201 are residential homes, many of which are in town center
  - Been 12 flood insurance claims in town since 1978 = $120,000
  - Only one repetitive loss claims (2005, 2011) = $4,862 total
  - Only 34 properties have active flood insurance policies

Buildings in the 100-year Floodplain							
Residential		Commercial		Industrial		Total	
No. Bldgs.	Percent Res. Bldgs.	No. Bldgs.	Percent Com. Bldgs.	No. Bldgs.	Percent Ind. Bldgs.	No. Bldgs.	Percent Total Bldgs.
201	**6.9%**	**19**	**16.4%**	**10**	**29.4%**	**230**	**19.3%**

Assessing Vulnerability in Adams

- Potential damages in FIRM areas from 100-year flood (in millions)*

Residential Property	Res. Contents (50% Prop. Value)	Commercial Property	Com. Contents (100% Prop. Value)	Industrial Property	Ind. Contents (125% Prop. Value)	Total Loss Estimate
$17.1	$8.5	$5.5	$5.5	$3.9	$4.8	$45.4

- HAZUS model est. $107 million in losses (flood chutes not recognized)**
- $670,000 in business interruption
- Up to 592 households (1,417 people) may seek shelter

**Sources: *BRPC , ** HAZUS*

Are you Ready for Electricity Outages?

The energy sector's three major climate change concerns:

1. Flooding (increased precipitation, flooding)
2. Extreme events (hurricanes, snow, ice storms)
3. Increased temperature (demand surge, heat damage to distribution system)

One projection: household summer peak demands increase 3 fold from that of 1960-2000

Are you Ready for Electricity Outages?

- **Do you know where vulnerable populations are that need electricity?**
  - Elderly (19% of Adams pop. 65+ yrs*), disabled
  - Medical needs like oxygen, dialysis
- **Do you know where to bring them for their needed services?**

- **Are you prepared to shelter residents in extreme cold and heat?**

** 2010 census*

Where can we reasonably focus our Mitigation Efforts?

- **Flooding is our prime target**
  - Several hazards result in flooding (hurricanes, thunderstorms, snow, ice jams, dam failure)
  - Severe rain events cause localized flooding
  - Predictable boundaries (but needs adjustment)
  - Relative ease of implementing mitigation measures
  - Focus of grant programs
  - Local bylaws and zoning offer local control

Bronson Brook, Worthington

- 2- 10 foot box culverts washed out in 2003. Road was closed to all traffic.
- Culvert had a history of clogging with debris

Bronson Brook Post Irene

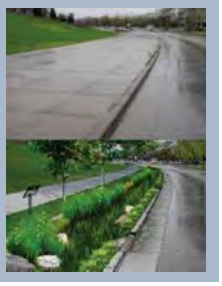
- A channel spanning tree located upstream of this culvert prior to the storm was mobilized and easily passed through this crossing.
- Road remained open and passable.

Examples of Mitigation Activities

- **Structural Projects**
  - Flood-proof, elevate or relocate buildings and infrastructure in floodplain or in flood zones
  - Armor infrastructure on bridges
  - Reduce road pavement widths *(narrowing 2 miles of road by 4' per lane can save $500,000 in reconstruction)*
  - Stream Crossing Standards = 1.2 X bank width
  - Maintain and/or improve drainage systems
    - Can we disconnect or re-route the pipe?

Examples of Mitigation Activities

- **Structural Improvements – Disconnect the Pipe**
  - Bioretention cells, swales, rain gardens, pervious pavers



Examples of Mitigation Activities

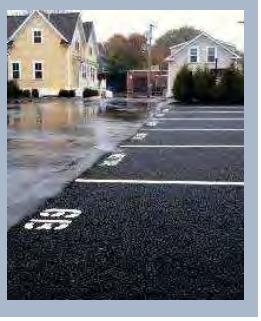
- **Creative Development – Increase Infiltration**
  - Bioretention cells, swales, rain gardens

Photos: Horsley Witten Group, Inc.

Permeable Pavement

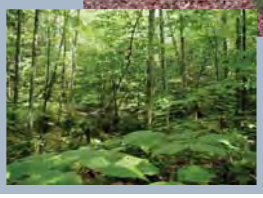
Redevelopment: Parking Lots, Walkways

- Higher initial cost ($12/sf vs $5-7/sf)
- Reduces the amount of land needed for stormwater management
- Can infiltrate as much as 70-80% of annual rainfall
- Can reduce salt use by as much as 75%



Examples of Mitigation Activities

- **Maintain Natural Cover on Building Lots**
  - Minimize disturbance of natural vegetation and soils
  - Maintain natural tree and shrub cover
    - *A mature evergreen intercepts up to 4,000 gal. of water per year*
    - *A mature deciduous tree intercepts 500-2,000 gal/yr*
  - Natural cover especially important in water supply overlay district



Mitigation Policies

Guide Future Development –

- Strictly enforce floodplain bylaws
- Revisit zoning – does the town:
  - *Require that stormwater runoff be retained on site*
  - *Encourage Low Impact Development techniques*
  - *Restrict development on steep slopes*
  - *Have strong water protection overlay*

Ongoing Monitoring

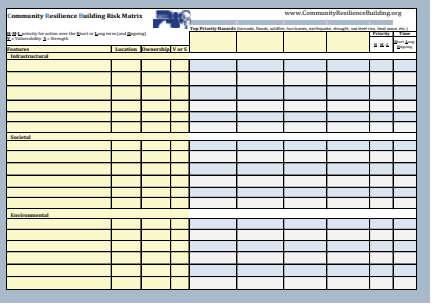
Incorporate New Data for Mitigation, Resilience, Adaptation

- Incorporate new floodplain data and boundaries when available
- Monitor data and climate change projections for infrastructure improvement projects

Now It's Your Turn

Identify the 4 Priority Hazards

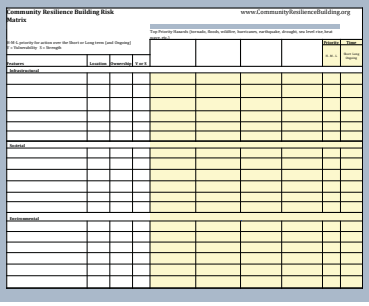
- **Infrastructural:** municipal infrastructure, housing, utilities, commercial bldgs., municipal bldgs. and operations
- **Societal:** collective ability to respond – first responders, health services, goods and services
- **Environmental:** natural systems that protect, provide services or pose risk



Actions and Priorities

List and Prioritize Actions to Address your vulnerabilities

1. **Develop Your Actions**
2. **Prioritize them H-M-L and Time**
3. **Choose the Top 4 Priorities that your think are the greatest risks and should be addressed**
4. **Bring your Top 4 to the Full Group**



We Can Adapt

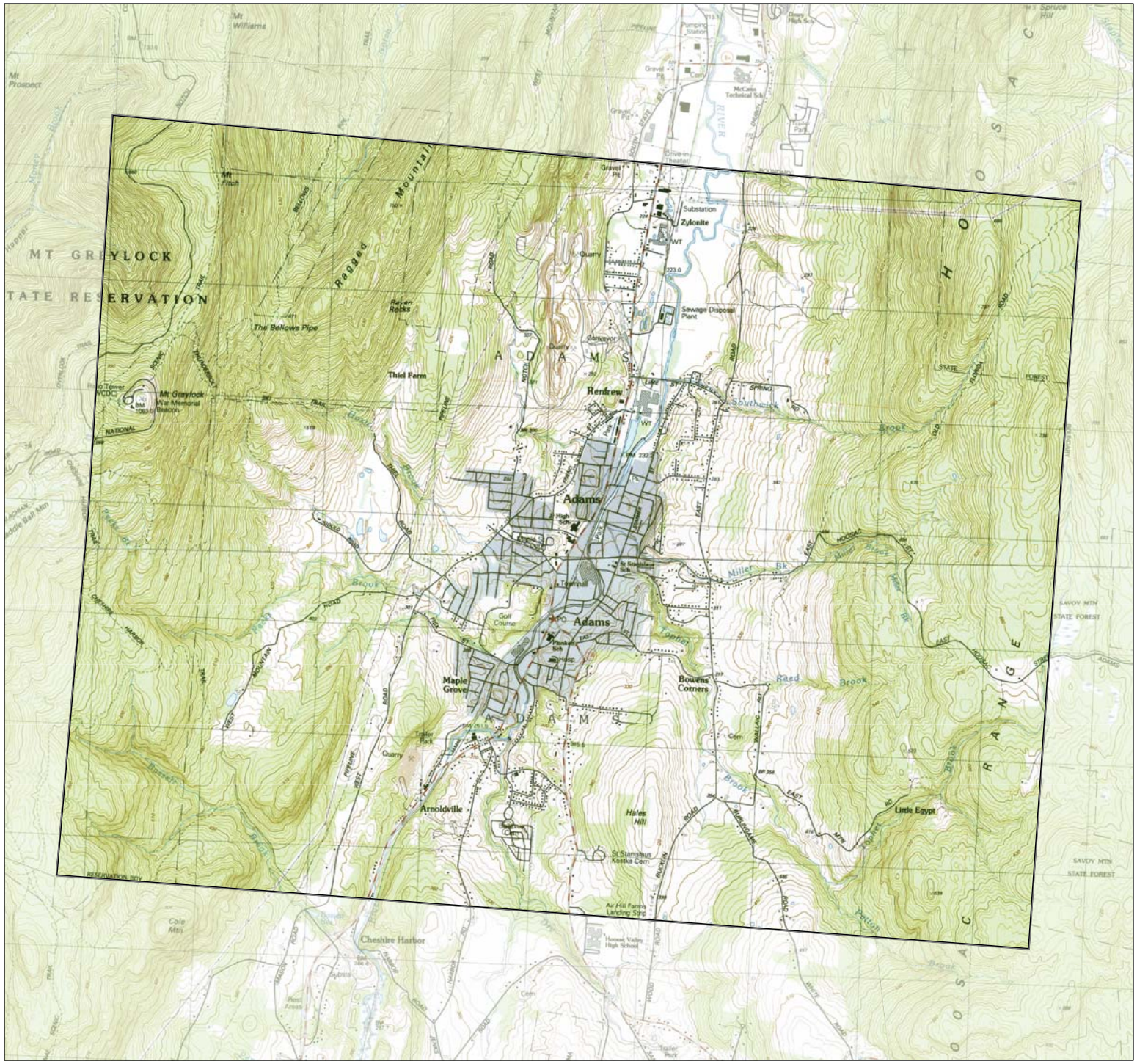
Snowshoe Hare *(Lepus americanus)*

Centuries ago, even decades ago, there would likely be some snow cover in December to provide camouflage for this species.

Picture taken Hoosac Range, Dec. 2012

Massachusetts Emergency Management Agency
NOAA
The Nature Conservancy nature.org
United States Environmental Protection Agency
Horsley Witten Group Sustainable Environmental Solutions
SRPEDD
FEMA
Mass Audubon Protecting the Nature of Massachusetts

Town of Adams
Topographic Map



0 0.5 1 Miles

N

Berkshire Regional Planning Commission

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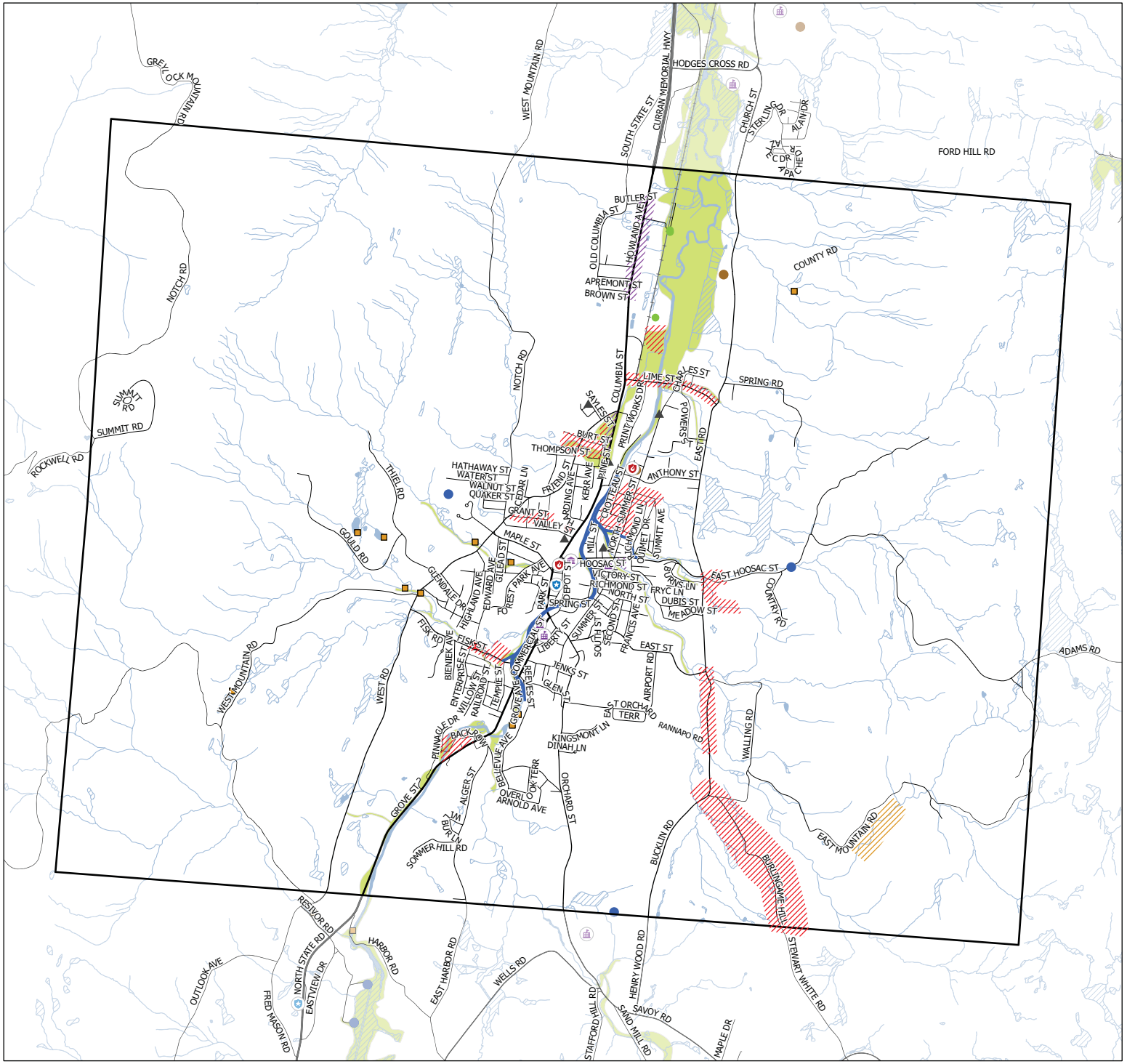
Town of Adams Critical Facilities and Areas of Concern



- Problem areas
- Landslide/Erosion
- Flooding Basements
- FEMA 100yr Floodplain
- Dam
- Dam of Concern
- Channel
- Town Hall
- Fire Station
- Police Station
- DPW
- Shelter
- Senior Center
- School
- Wastewater System
- Water System
- Housing Authorities
- Interstate
- Major Road
- Minor Road
- Local Road
- Railroad
- Stream
- Wetland
- Open Water

0 0.5 1 Miles

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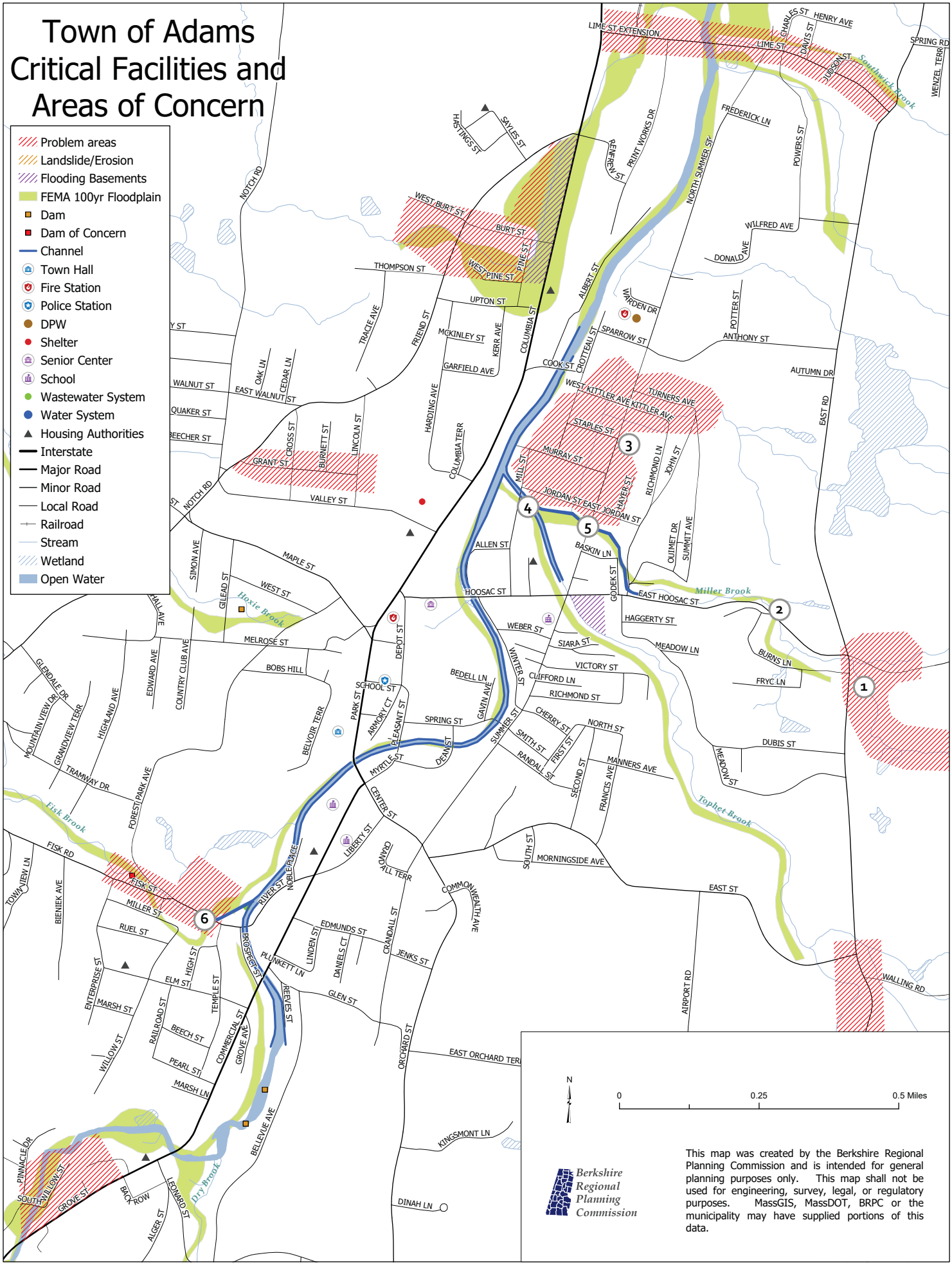

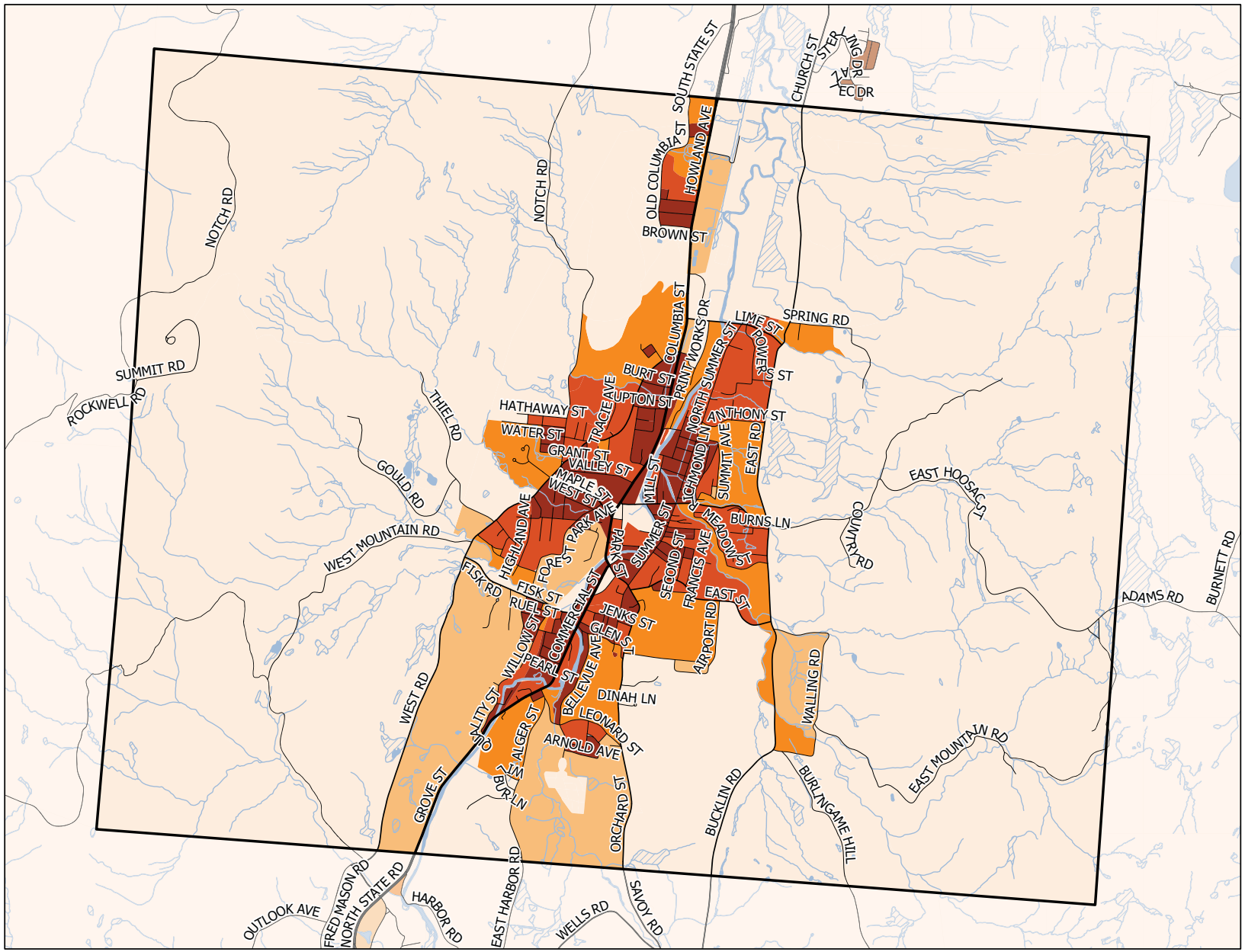

Town of Adams
2010 Population Density

(US Census - Does not include Seasonal Population)

- <0.5 people/acre
- 0.5-0.9 people/acre
- 1.0 - 1.9 people/acre
- 2.0 - 4.9 people acre
- > 5.0 people/acre

0 0.5 1 Miles

N

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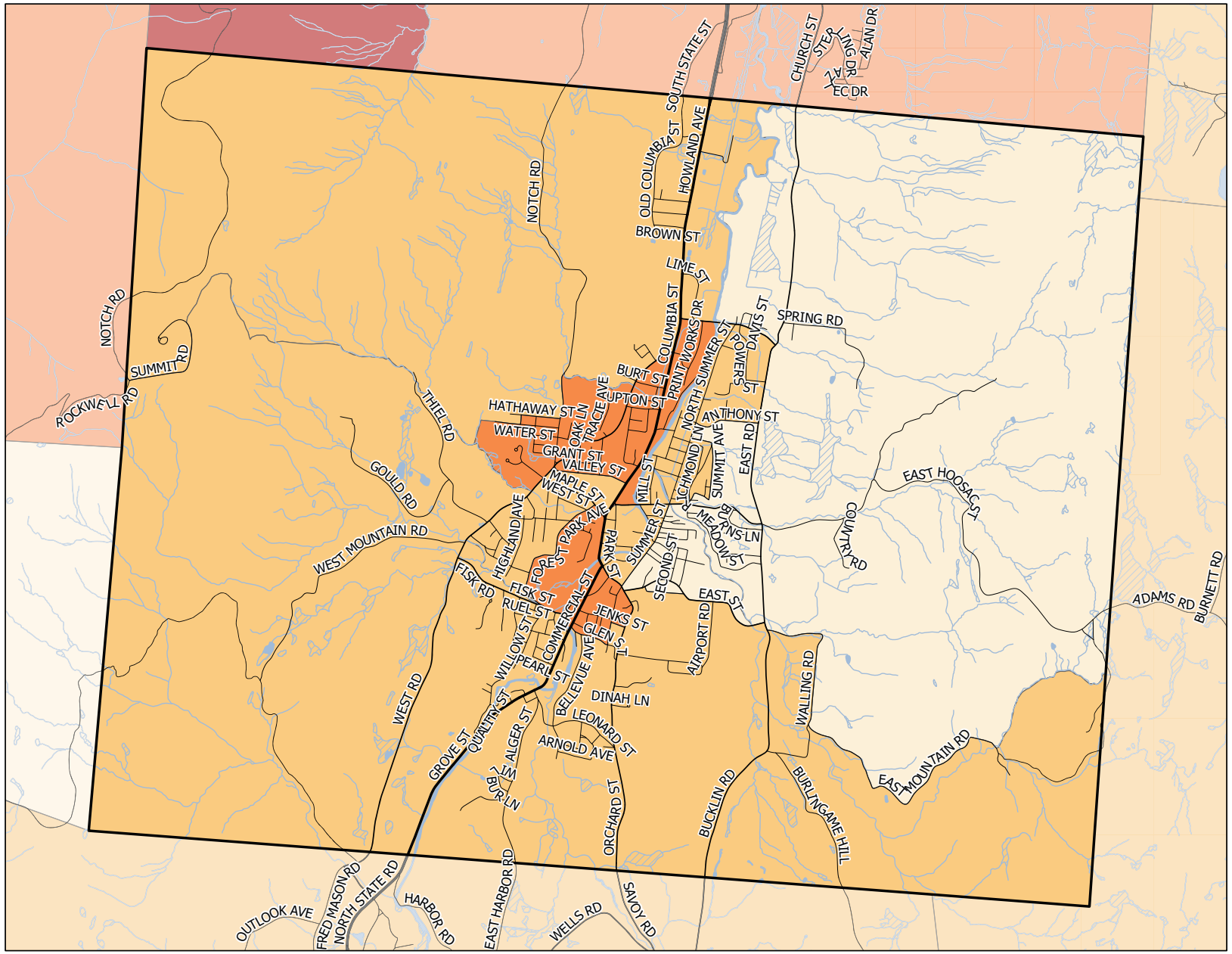

Town of Adams Population Below 200% of Poverty Level

(US Census American Community Survey 2012-2016)

Population Below 200% of Poverty

- ≤150
- 150-250
- 250-500
- 500-750
- 750 or more

N

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Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

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

H-**M**-**L** priority for action over the **S**hort or **L**ong term (and **O**ngoing)

V = Vulnerability **S** = Strength

Features	Location	Ownership	V or S					Priority H - M - L	Time S L O
Infrastructural									
Housing Authority senior housing can support seniors during extreme weather events	Downtown	Housing Autho	S	Communicate with Housing Authority to develop plan in case of event				M	
Aging housing stock creates houing vulnerability for people	Downtown	Private	V	Continue to pursue funding for Housing Rehabilitation Program				M	
Shelters need to be updated and improved	Visitors Center/ Memorial School	Town	V	Pursue CDBG/Green Community Grants to make required upgrades to shelte				H	
Town sewer lines are undersized and aging	Town-Wide	Town	V	Conduct a study to identify and prioritize pipes to be replaced				H	
Town is incorporating rain gardens into design projects	Route 8 Parkir	Town	S						
Town water lines are aging	Town-Wide	Water District	V	Create better communicatio n with Water District	Study consolidating water district, identify problem			H	
Route 8 Hazardous Material Concerns	Route 8	Town	V	Update the EMD and drill for evacuations				M	O
Flood chutes Maintenance and sedimentation	Hoosic River	Town	V/S	DPW needs to work with Conservation Commission to premptively clean/maintain chu				M	L
Basset Brook Dam leaking and sedimentation	Cheshire	Town	V	Study future use of dam and dredge or remove as appropriate				L	L
Fisk Brook Dam	Fisk Brook	Private	V	Work with owner to remove dam				H	M/L
Culvert conditions	Town wide	Town	V	Study, prioritize, engineer and go after grants to fix				H	S/O
Richmond Ln / N. Summer St swale & box culverts too small	Richmond Lane	Town	V	Study private property, enlarge box culvert, maintain swale				H	S
Water supply system is sufficient, but the pipes are old	Town wide	Fire District	V	Plan to replace as money is available, coordinate replacement with road repairs				M/L	L
East Hoosac / Jordan Street -Miller Brook box culverts	Miller Brook	Town	V	Apply for grants to replace - already engineered				H	S
Lime Street Stream/ditch	Lime Street	Town	V	Deepen stream to accommodate more water				H	O
Storm water system works well	Town wide	Town	S						
Salt Shed in Floodplain		Town	V	Replace/elevate				H	O
Stream Crossing Bridge carrying Town Water Main & Gas Main	Quality Street	AFD	V	Bridge Condition; Armor mains				H	Long
Pipe Diameter too small	Valley Street	Town	V	Replace pipe				M	Short
Crown Vantage Mill in flood plain (Vacant, Haz Materials)	Howland/Rte8	Private	V	Gain Ownership & Brownfield Funding				Med	Long
Crumbing retaining walls on Miller Brook	Lower E.Hoosa	DPW	V	Replace				H	Ongoing
Holland Company -- Railroad Siding	Howland/Rte8	Private	V	ID Haz Material; Formulate Response Plan				Low	Ongoing
Lack of Bkup Power for Water Supply	Cheshire wells	AFD	V	Get a Generator				H	Short
Water main carried by vulnerable bridge near Grove/South Willow Stre	Town	Water Dept, Highv	V	Replace or strengthen the bridge. Armoring the pipe could be a temporary fix.				H	O
Miller Brook bridge along East Hoosac Steet filled with silt and debris/r	Town	DPW	V	Bridge area should be scheduled to be cleaned and maintained.				M	O
Retaining wall on East Hoosac Street is being undercut by water	Town	DPW	V	Wall may need to be re-engineered and rebuilt. Ongoing assessments needed.				M	O
Floding on Pine and Burt Streets has potential to affect gas lines	Town/Utilities	Utilities/Town	V	Assessment by engineer and the utility company should be done to prevent damage				H	O
Culvert on Southwick Brook was rebuilt. Lime street culvert was also updated.	Town	DPW/Town	S	Continue maintenance. Continue scheduling improvements to culverts					
Very few access points on Mt. Greylock for fire rescue and fire response. Concrete barriers on Thiel Road are restrictive and would prevent access by large truck or ambulence.	Town/State	Fire/EMD/State/C	V	Lines of communication between town and state entities should be improved. Concr				M	O/S

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat w

H-**M**-**L** priority for action over the **S**hort or **L**ong term (and **O**ngoing)

V = Vulnerability **S** = Strength

Features	Location	Ownership	V or S					Priority H - M - L	Time S Short L Long O Ongoing
Societal									
High % of disabled, homeless, elderly, other vulnerable pop.	Town-Wide	Private	V	Expand COA programming to educate residents on hazards and preparedness				M	
Lack of education by residents on sheltering & preparedness	Town-Wide	Private	V	Expand COA programming to educate residents on hazards and preparedness					
Senior Center is a valuable resource to residents	Downtown	Town	S						
Large transient population makes it difficult to know your neighbors	Downtown	Private	V	Create a "Welcome to Adams" packet that includes preparedness tips				L	
Emergency Plan needs to be updated		Town	V	Update sheltering plan to include Memorial School				M	
First Responders - Not enough volunteers	Town wide	Town/Fire Dist	V	Create tax incentives to volunteer, advertise				H	O
Former Middle School shelter is not certified	TowN Center	Town	V	Work with inspector to address issues and certify				H	O
Access to private land by DPW not allowed until a problem occurs	Town wide	Town/Private	V	Work with land owners, review easements, to allow access for preventive mainte				M	L
DPW staffing is inadequate	Town wide	Town	V	Allocate more resources for staffing				L	O
Water Supply Regulations from state/feds are not financially supported	Adams/Cheshi	Fire District	V	Allocate more resources to meet required regulations				L	O
Berkshire Square can serve as a small shelter for medical issues	Berkshire Squa	Town	S	Work on agreement between Berkshire Square and the town to allow sheltering.				M/L	O
Electrical System is in good shape	Town wide	Eversource	S						
911 Response towers provide inadequate communication	Town wide	Sheriff Dispatch	V	Determine if upcoming repair to Florida Mountain Tower fixes problem & includ				H	O
Reverse 911 lack of knowledge by residents	Town wide	Sheriff Dispatch	V	Educate public and test system				H	L
Elderly and at-risk populations	Town wide	Town	V	Create a database of populations, educate, town census questions, website disser				M	L
Numbers on Houses	Town wide	Residents	V	Create/Enforce regualtions requiring numbers on houses				M	L
Animal rescue/boarding	Town wide	Town	V	establish /train animal rescue teams					
Town Depts work well together; Citizens are supportive			S	Develop town wide evacuation & Communication Plan				L	Ongoing
Vulnerable populations (Seniors)	Various	Adams Housin	V					M	O
Shelter	Sr. Center/Oth	Town	V	Piecemeal; Need Plan for Pets, Long-term Shelter, Reg'l Coordination				H	O
Lack of Backup Power for Senior Center	Sr. Center	Town	V	Purchase generator/ Electrical work?				M	O
VACANT Middle School	Jct. Columbia	Town	V	Building needs rehab, kitchen, HVAC, Code work				M	O
Plunkett - Generator not in use	Rte 8	Town	V	Hook up generator - Electrical?				M	O
Cooling centers have been used with success, but more locations are needed.	Town	EMD	S/V	Pre-designate more locations as cooling centers. MOUs with location should b				M	O
Ability to reach residents using reverse 911, however, communications are done through Sheriff's Office and cannot reach cellphones.	Town	EMD	S/V	Emergency Management Dir. should look into cost of sirens, and possible loca				H	O
Sheltering capacity - able to shelter if needed, but improvements should be made to shelter site.	Town	EMD/Town	S/V	Ongoing exercising and planning is needed. Shelter supplies should be invent				M	O
Electrical outages during either heat or cold events could impact entire population.	Town	EMD/Utilities/T	V	Utility companies need to update systems and equipment.				M	O
High density population in downtown problem areas. Site set back requirements instituted by the Planning Board have helped prevent more develoment from happening in the problem areas.	Town	Planning/Zonir	V/S	State incentives	Low Impact Development Initiatives are needed.			L	L/O
Rubbish and debris removal, trash dumping in swails downtown	Town	DPW/Commur	V	Signage should be pc	Create cleanup community service initiative.			M	O

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

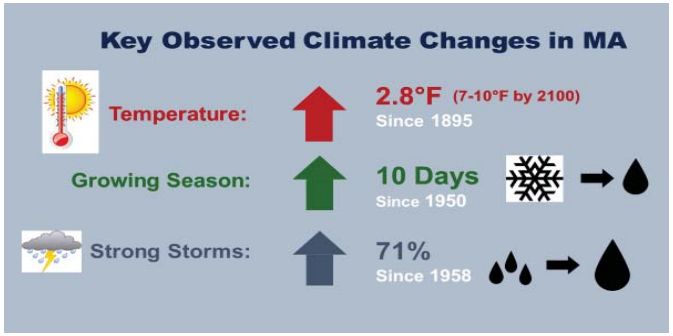
H-M-L priority for action over the Short or Long term (and Ongoing)

V = Vulnerability S = Strength

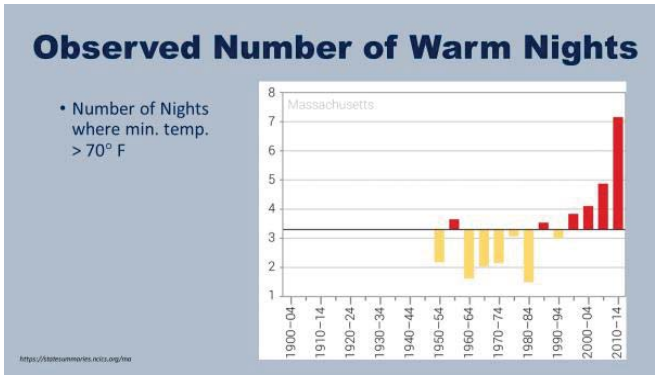
Features	Location	Ownership	V or S					Priority H - M - L	Time Short Long Ongoi
Environmental									
Topography has steep slopes and narrow valleys	Town-Wide		V	Better development standards and updated stormwater main. Bylaw				H	S
Ground Water rumbling underneath residences	Birch Street	Private	V	Better development standards and updated stormwater main. Bylaw				H	S
Landowners altering drainage	East Road	Private	V	Better development standards and updated stormwater main. Bylaw				H	S
Greylock Glen	Gould Road		S						
42% of town is protected land	Town-Wide		S	Update OSRP to keep land protected				M	S
Flood control chutes		Private & T	S	Study condition of private chutes,determine Town's responsibility				H	
Streams on East Road have been filled with rocks	East Road	Town	V	Plan and permit the removal of rocks				M/L	L
Forest Cover	East and Wes	Town/Stat	S						
Invasive pests	Forests	Town/Stat	V	Educate residents about invasives				H	O
Specialty Minerals water and air quality concerns	North end of	Private	V	Work with mine safety enforecement / DEP on improving communication				M	L
Greylock Glen	Mt. Greylock	Leased by T	S	Active Bonding & RFP's for development (future shelter?)				H	O
Greylock landslide* (see photo)	Mt. Greylock	State	V	ID impact on Town if any				L	L
Historic Berkshire Mill redevelopment in Floodplain	5-7 Hoosic St	Private	V	Flooding - Rain volume issue				L	O
Historic Brick Row Housing	Columbia St	Private	V	Floodplain - Emergency plan?				H	O
Specialty Minerals, Hydrology, Landslide, Air, Water, Negative impacts	Rte 8	Private	V	Renew Engagement Effort - Loam & Seed and Watering, etc.				H	O
Protected areas and vernal ponds	Town/State	Conservati	V	Education on importance of preservation, areas should be protected				L	O
Overuse of road salts during ice/winter weather	Town/State	DPW/Cons	V	Consider using less salts/salts that do not have other additives				M	S
Downed trees in heavily forested land proides fuel for fire if wild firebroke out	Town/State	State/Cons	V	Be aware and record/deal with high fuel areas.				M	O
Retention basins may help alleviate flooding	Town	DPW/Town	V	Planning and Conservation boards should discuss				M	O
Cold water fisheries are warming, causing invasive plant and animal species to take over	Town/Conse	Town/State	V	Reduce herbicides that damage native plants. Remove invasive species.				H	O

CLIMATE CHANGE OBSERVATIONS

The Basics for the Berkshires

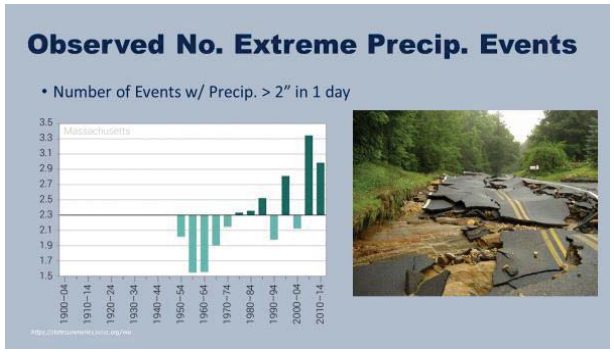


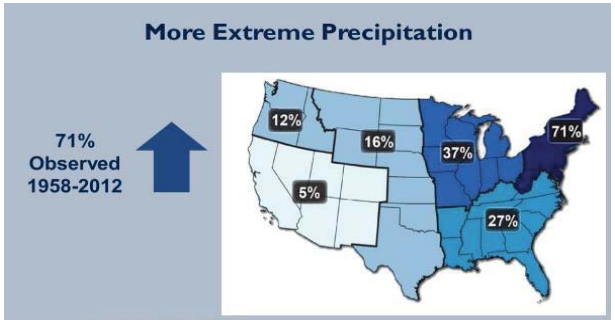
- **Warmer Temperatures** –
  - More evaporation, less soil moisture, increased risk for fire, drought, human health risks (particularly for elderly, other vulnerable pops.)
  - Greater temp. increases in winter
    - Less snow, but still cycles of freezing temperatures = infrastructure vulnerability
    - Rain-on-Snow = more overland winter flooding, ice jams
  - Increased temps. = increased heat stress for people, livestock, wildlife
  - Great evening temps. = inability for people and homes to cool down and "catch up" to normal temps.
  - Increased risk of thunderstorms and other severe rain events
  - New and expanding pests: ticks, mosquitos, forest and crops
  - Increased growing season
    - Pros: new farming opportunities
    - Cons: increased allergen season and increased potency



Precipitation Trends

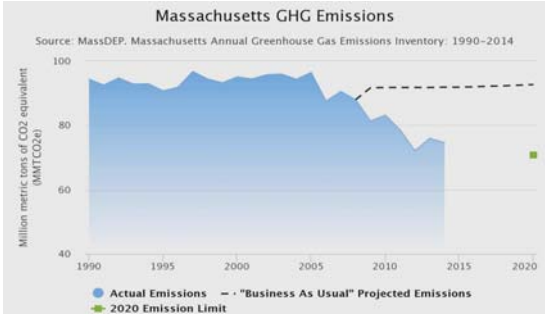
- **Increase in Extreme Rain Events** = increased risks and damages to municipal infrastructure
- **Engineering Standards** -- engineers now directed to use new data sets that include post-1970s precipitation data





MA Energy Reduction – Success

MA GHG Emissions dropped 21% while Gross State Product increased 70% in same time period



Reconsider Floodplain Development

Berkshire County floodplain maps are from the 1980s

- **Urban Infill Example**
  new residential building on corner lot, outside of 100-yr floodplain

- **New FEMA floodplain Study**
  new building now inside floodplain recharge

- **Same building**
  March 2010 flood
  (approx. 40-year flood)

A Last Thought

Pity the Snowshoe Hare
December 2012

Its instinct is to sit still when danger approaches, thinking it blends in with its surroundings .

Centuries ago, even decades ago, there would likely be some snow cover to provide camouflage for this species.

Humans have the ability to adapt, unlike our hare.

TROPICAL STORM IRENE: an inland storm of reference for the Berkshires

The Basics

- Tropical Storm (39-73 mph) hit the Berkshires August 28-29
- Eye of the storm travels over Berkshires approx. winds of ~50 mph
- “Catastrophic floods” in NYS and New England, with rain totals of 5”-10” in Western Mass., 7”-10”+ in VT and NYS; this rain fell on already saturated soils from previous rainstorm events
- Devastating flash flooding across mountain valleys ranking second worst in history; entire villages in Catskills uninhabitable and VT residents stranded for days by washed out bridges and roads; 500,000+ MA residents without electricity
- 6 out of 8 stream gages in Deerfield & Hoosic Rivers reach highest peaks of record
- Calculated as >100-year but <500-year flood in Hoosic River
- 50-year storm (2% chance flood event) in central Berkshire County
- Roads washed out, bridges damaged or washed out across many towns in Berkshire County; Rt. 2 is closed for 3 ½ months for repairs
- Dubbed the “costliest Category 1 storm” ($15.8 billion in damages)
- Fed. Disaster DR 4028: FEMA $5.6 million to households, $30 million for public assistance
- Fed. Highways: $46 million for roads and bridges, cost $23 million o repair 6 miles of Rt 2

Rain Totals

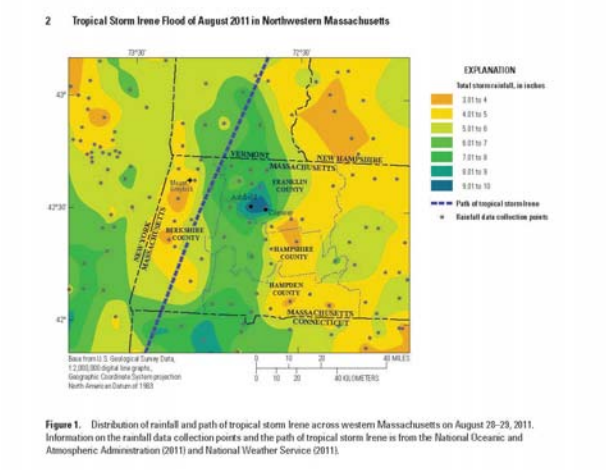
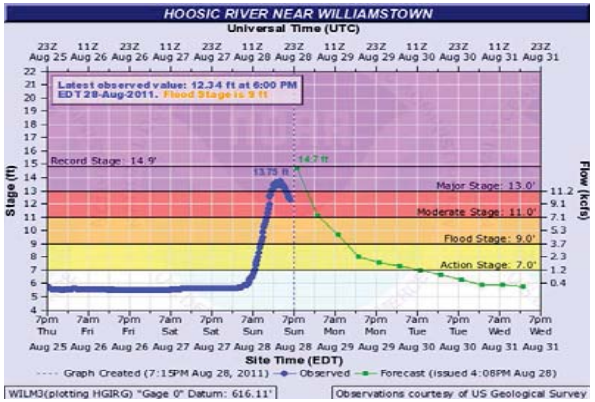


Figure 1. Distribution of rainfall and path of tropical storm Irene across western Massachusetts on August 28–29, 2011. Information on the rainfall data collection points and the path of tropical storm Irene is from the National Oceanic and Atmospheric Administration (2011) and National Weather Service (2011).

Raging Rivers and Streams



T.S. Irene estimated to be near or more than the 100-yr storm along the Hoosic River

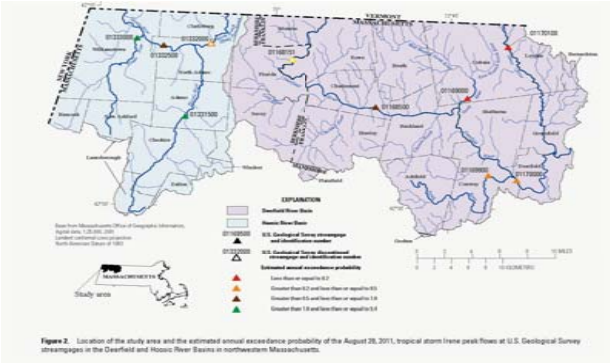


Figure 2. Location of the study area and the estimated annual exceedance probability of the August 28, 2011, tropical storm Irene peak flows at U.S. Geological Survey streamgages in the Deerfield and Hoosic River Basins in northwestern Massachusetts.

Shelburne Falls

Deerfield River in Shelburne Falls flowed at 30,000 cubic feet per second – 40 times normal flow

Left – Bridge of Flowers during storm and under normal conditions.

Below – Bridge Street bridge – critical link to town

The Spruces, Williamstown

- Building and health inspectors declare 75% of homes uninhabitable
- If >50% of home value is damaged, current building codes must be met
- If FEMA funds used to repair or replace homes it must be elevated 6’–10’ above floodplain elevation + additional 2’ clearance; this requires that some homes to be placed 12’ above ground level
- Residents in all 225 mobile home units permanently displaced

Route 2 and Green River Dam

Left: Historic covered bridge in Greenfield damaged by dam failure upstream

Right, below: Rt. 2 road collapse and landslide along Cold River in Florida & Charlemont

Dalton – 50-year storm

Evacuations at Pomeroy Manor and risks to water, sewer, gas lines on Main St Bridge

OPPORTUNITIES TO REDUCE RISK – LAND DEVELOPMENT TECHNIQUES

Land Use Policies

Guide Future Development

- Strictly enforce floodplain bylaws and wetlands protection to maintain flood storage resiliency
- Revisit zoning – does the town:
  - *Require that stormwater runoff be retained on site*
  - *Encourage Low Impact Development techniques that minimize land disturbance and maximizes the site's natural landscape*
  - *Concentrate development and maintain open natural landscapes for connectivity*
  - *Restrict development on steep slopes*

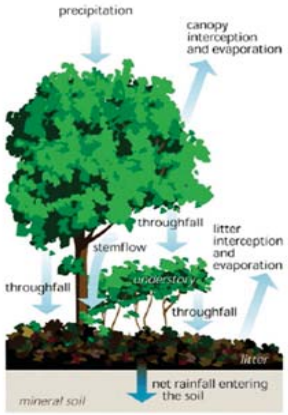
Incorporate New Data for Mitigation, Resilience, Adaptation

- Incorporate new floodplain boundaries when available – new floodplain data is available for the Hoosic River
- Monitor data and climate change projections

Develop Carefully

Maintain the Natural Landscape

- A mature deciduous tree intercepts 500-2,000 gallons of water per year.
- A mature evergreen intercepts up to 4,000 gallons / yr.
- Root systems of trees and understory hold soil in place.
- Natural cover is particularly important on steep slopes, such as those that surround the town center.



Disconnect the Pipe

- **Reduce the amount of hard, impervious surface areas like homes, parking lots and buildings**
- **Capture the runoff that IS created rather than pipe it into a storm drain system – which discharges into the nearest waterway (accelerated, higher peak flows)**

Left: Reduce pavement, capture runoff in rain gardens, biorentention cells

Below:

Capture roof runoff in rain gardens

Infiltrate More - Pervious Pavers and Pavement

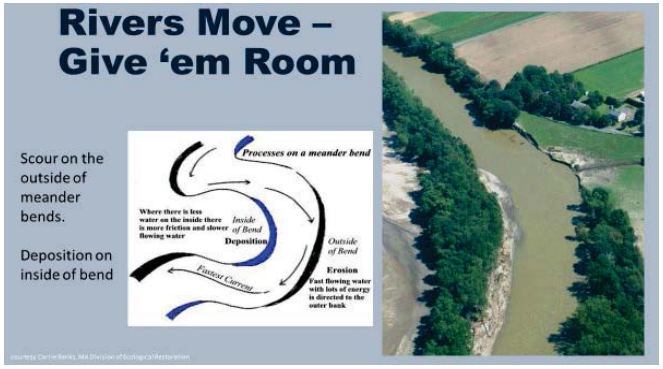
Pavers allow infiltration while providing structure for cars

Pervious Pavement for Parking and Walkways

- Higher initial cost, but:
- Reduces land needed for retention ponds and other management
- Can infiltrate as much at 70-80% of rainfall
- Can reduce salt use by up to 75%
- Not for use where sand is applied in winter

OPPORTUNITIES TO REDUCE RISK

Water Movement



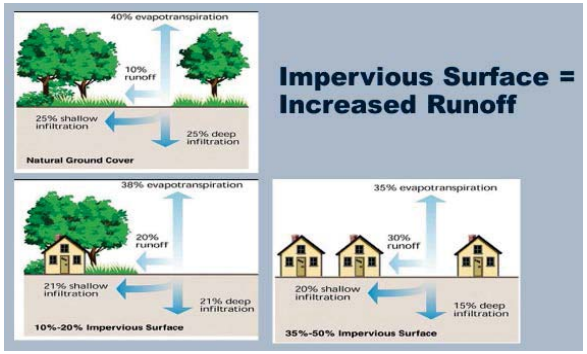
Above: Housatonic River at New Lenox Rd, Lenox

Right:

Sediment deposition dur to flood waters in floodplain area

Water Movement Altered

Impervious surfaces like buildings, road and parking lots = increased surface runoff and less ground infiltration

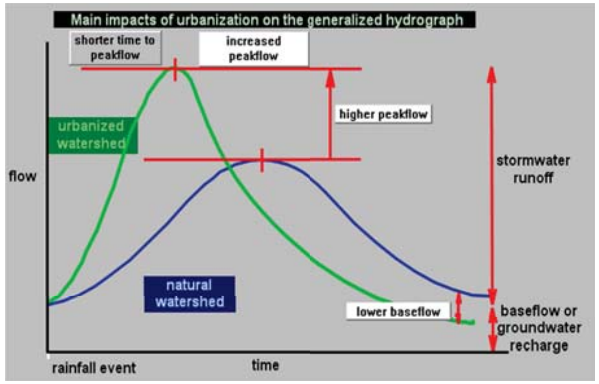


More Frequent Flood Impacts and Less Groundwater Recharge

Greater surface runoff leads to accelerated and higher peak stream and river flows = more severe flooding.

It can also lead to stream base flow and groundwater recharge.

This could lead to more frequent well failures, especially during drought conditions – see below.



Why Focus on Flood Risks?

- **Flood events and recurrence intervals calculated (even if they need to be adjusted)**
- **Floodplain boundaries delineated (even if they need to be adjusted)**
- **Benefits of keeping development out of floodplains well documented**
- **Predicting large storm events and warning times are fairly reliable**
- **Mitigation techniques are feasible and benefits tangible**
- **Engineering standards can adapt – see below.**

Change in 24-hour, 100-year Design Storms (inches)

	NOAA TP-40	NOAA Atlas 14	Change
Boston	6.6	7.8	+1.2"
Worcester	6.5	7.6	+1.1"

Bridges and Culvert Improvements

Bronson Brook, Worthington

Left:

- *Box culvert washed out in 2003, closing road to all traffic.*
- *Had a history of clogging with debris.*

Left:

- *Post-T.S. Irene*
- *Channel-spanning tree was mobilized above this bridge, but passed through this upgraded design.*
- *Road remained open and passable.*

Appendix B – June 14, 2018 Public Forum Materials

PowerPoint Presentation

MVP Top Actions Poster with Voting Results

Natural Hazard Mitigation and Municipal Vulnerability Preparedness



Town of Adams
June 14, 2018

What Are We Evaluating?

Hazard Mitigation Plan –

- Describes activities that can be done to mitigate the hazards before they occur
- Mitigation Plan is a requirement to maintain eligibility for some FEMA funds

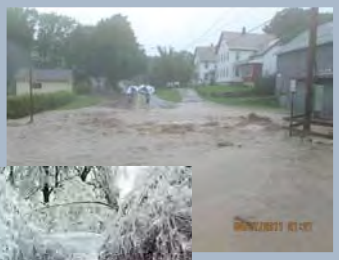
Municipal Vulnerability Preparedness & Workshop

- Consider weather pattern observations and climate change projections
- MVP certified communities will have priority status for some state grants

Shout out to those on the HM Committee & Attendees!

Natural Hazards Evaluated for Adams

Hazards Evaluated	
Flood	Tornado
Dam Failure	Extreme Temperature
Hurricane / Tropical Storm	Drought
Nor'easter	Wildland Fire
Snow & Blizzard	Major Urban Fire
Ice Storm	Earthquake
Thunderstorm	Landslide
High Winds	Ice Jam
Beaver Activity	




Key Observed Climate Changes in MA

Strong Storms: ↑ **71%** Since 1958

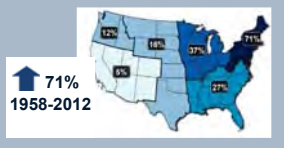
Growing Season: ↑ **10 Days** Since 1950

Temperature: ↑ **2.8°F since 1895** (7-10°F by 2100)
Berk. temp. up 1.7°F since 1960

Observed No. Extreme Precip. Events

- Number of Events w/ Precipitation > 2" in 1 day
  "Stepped Increase" in 1970-80s, and continues

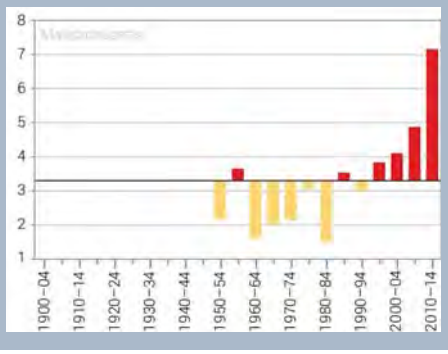
https://statesummaries.ncics.org/ma



Observed Number of Warm Nights

Observed In MA:
Number of nights where minimum temp. > 70° F in MA*

Projected In Berkshires:
Day temps. > 90° F increase from 2 per year to 27 by 2090**



* https://statesummaries.ncics.org/ma
** MA Climate Change Clearinghouse

Winter Weather Changes

Cycles of cold and warm will increase, alter risks

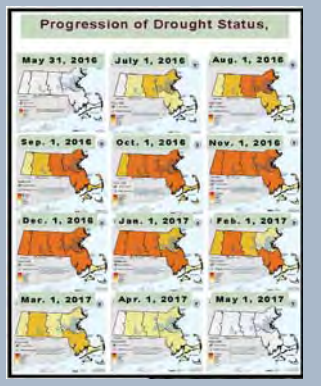
- **Warmer temps:** Less snow pack = altered water regimes and soil moisture
  - **More rain-on-snow events** = Increased runoff, risk of winter floods
  - **More Ice Storms** = 2008: >1 million w/out power
  - **More Ice Jams** = damage to infastructure
  - **Less groundwater recharge** = lower baseflow in streams, rivers, reservoirs
  - **Loss of snow insulation** = freeze/thaw = increased risk of frozen pipes, drains
  - **Dryer spring soils**

T.S. Irene 2011

- >100+ year flood in Hoosic River
- 500,000+ MA residents w/out electricity
- Dubbed the "costliest Category 1 storm" ($15.8 billion in damages)

Don't take Water for Granted

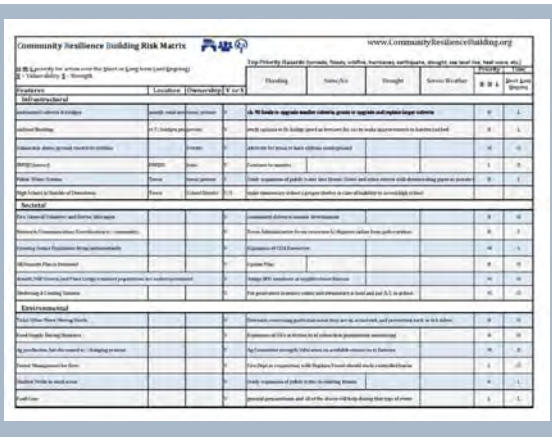
- Drought cycles due to increased temperatures and evaporation
- Lower groundwater recharge
- More water in summer/fall in extreme storm events with higher, earlier peak flows and more runoff
- Berkshires got off lightly 2016-17



Where in Town are Areas of Most Conern?

MVP Workshop May 11th

- Town officials
- Residents
- Businesses
- 4 Tables
- 74 Actions
- 16 Top Priorities
- Thank you attendees!



ADAMS TOP RECOMMENDED ACTIONS FOR HAZARD REDUCTION & PREPAREDNESS
INFRASTRUCTURE
Conduct assessments of existing culverts for upgrading needs & size requirements & new regulations.
Asses water flow and runoff in East Hoosac/Jordan and Lime Street areas.
Study condition of private flood chutes and maintenance needs.
Study & identify areas with undersized stormwater pipes.
Evaluate retaining walls on East Hoosac Street and Richmond Lane swale/culvert
UTILITY / WATER INFRASTRUCTURE
Study and identify problem areas along aging water and sewer lines. Better communication with water district. Study combining of town and water district.
Assess vulnerable gas lines near bridges and other problem areas and prioritize projects.
Assess water main pipes at Quality Street Bridge crossing.

ADAMS TOP RECOMMENDED ACTIONS FOR HAZARD REDUCTION & PREPAREDNESS
EMERGENCY PREPAREDNESS
Designate more cooling, warming, and emergency overnight sheltering locations.
Pursue grants to upgrade Memorial School and prioritize this as designated shelter.
Well pumps that supply water for town do not have back up generators. Prioritize applying to grants or funding generators.
Update evacuation and sheltering plans; need more integration into town. Designated shelter site (Memorial School) does not have a generator for backup power.
COMMUNICATIONS
Expand public emergency notification system, and process for communicating with public. Investigate a siren system.
Find ways to attract more first responders to the town of Adams.

Workshop Themes

- **Flooding and Vulnerable Infrastructure**
  - Many channeled streams and conveyances
  - Utilities also at risk – consider armoring
  - Several sites named across town
- **Emergency Preparedness**
  - Secure properly equipped shelter
  - Involve town departments in this effort
  - Improve emergency notification system for clear messaging

Full Group Consensus

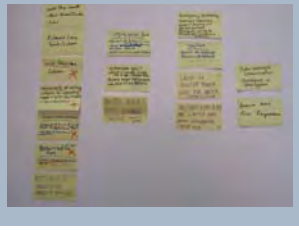
- **Need to be more proactive rather than crisis management**
- **Need to Assess and Prioritize**
  - Too many channels, culverts and pipes to afford to fix them all
- **Quality Street bridge – water main to whole town**
- **Wildfires – top hazard listed but didn't make final top actions**

Success!

- **Town has been awarded a MVP Action Grant**
- **Assess the channels, culverts and pipes where flooding threatens property or infrastructure**
  - Condition
  - Vulnerability to failure
  - Threat to public safety and property
  - Ability to reduce threats
- **Engineering for the top 2-3 sites**
- **Requested $56,000**

Now it's Your Turn!

Help town officials, first responders and fellow residents prioritize the most important actions



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