2019| Municipal Vulnerability Preparedness

North Adams

Community Resilience Building Workshop
Summary of Findings

North Adams

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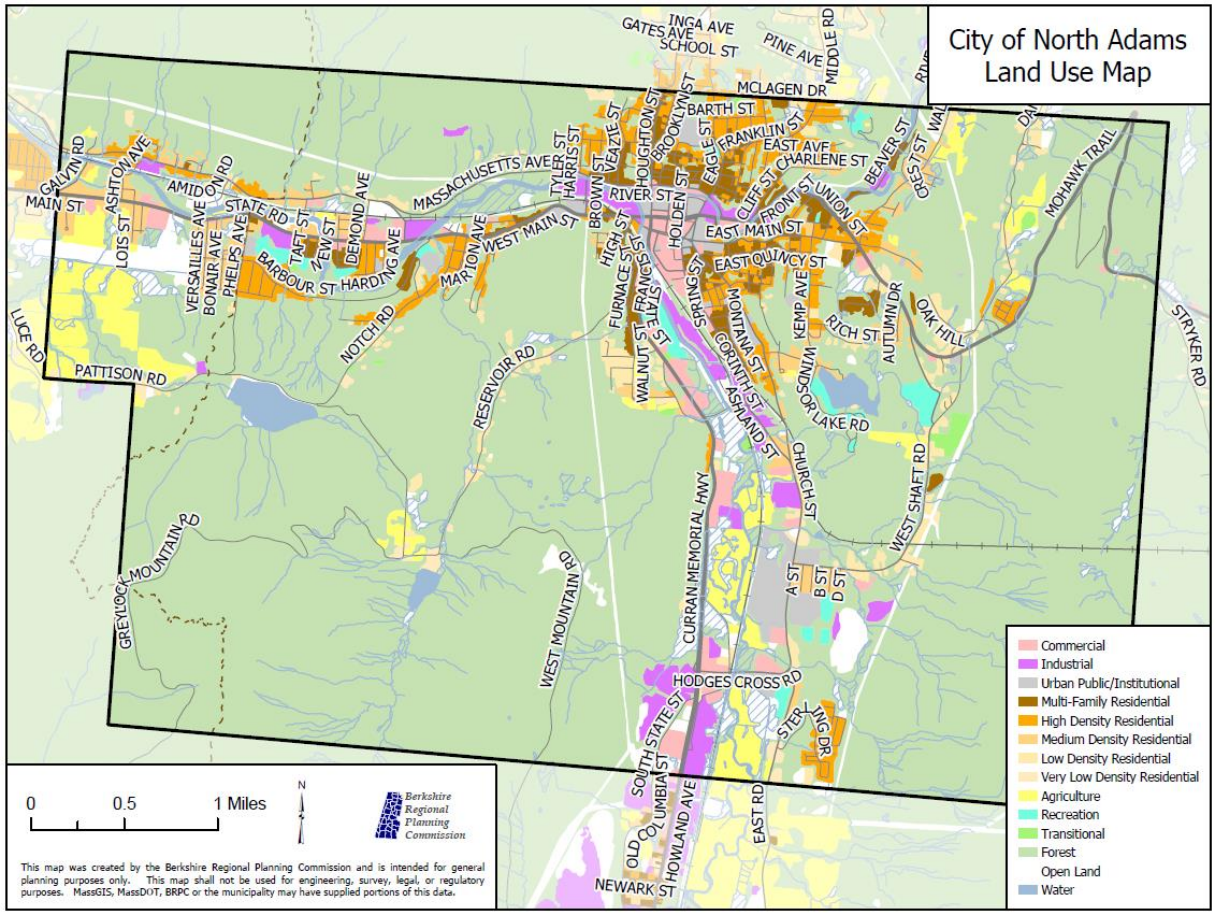
Introduction

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. Responding to this need, the City of North Adams pursued the Municipal Vulnerability Preparedness (MVP) program in conjunction with their hazard mitigation planning process.

The City of North Adams has an estimated population of 13,211[1]. The City's population is slightly younger than the rest of Berkshire County, with a median age of 43.1 versus the 46.5 median for the County. While forest is the dominant land use in North Adams, as is typical for Berkshire County, higher density residential development also has a large footprint along with commercial and industrial land uses. Some agricultural land use can be seen on the outskirts of the City boundary.



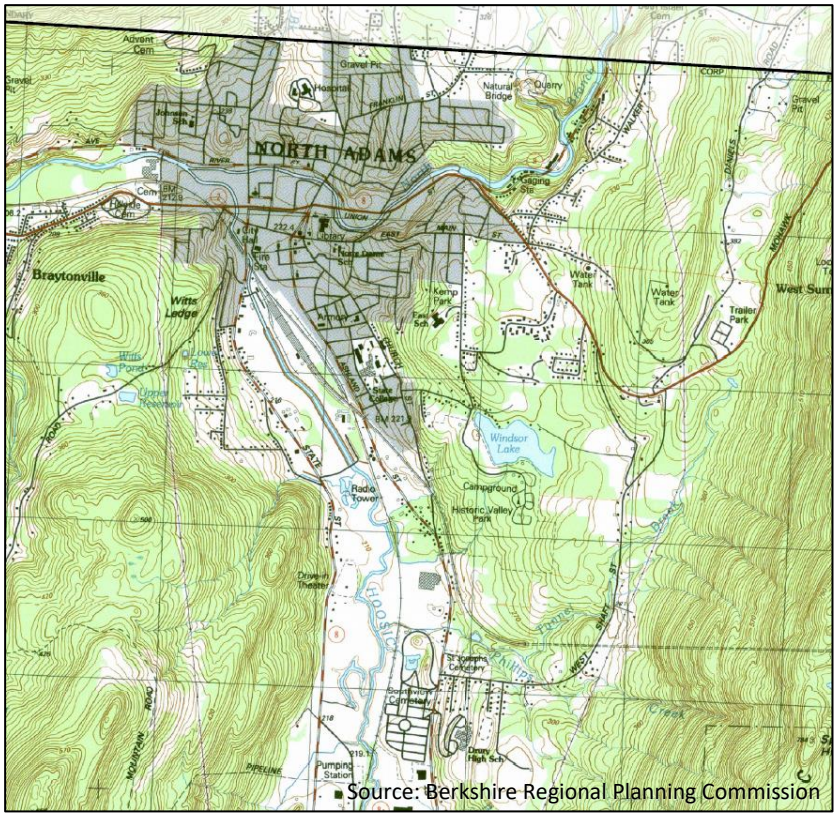
[1] 2017 ACS Demographic and Housing 5-year Estimates accessed on May 20, 2019 from https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF

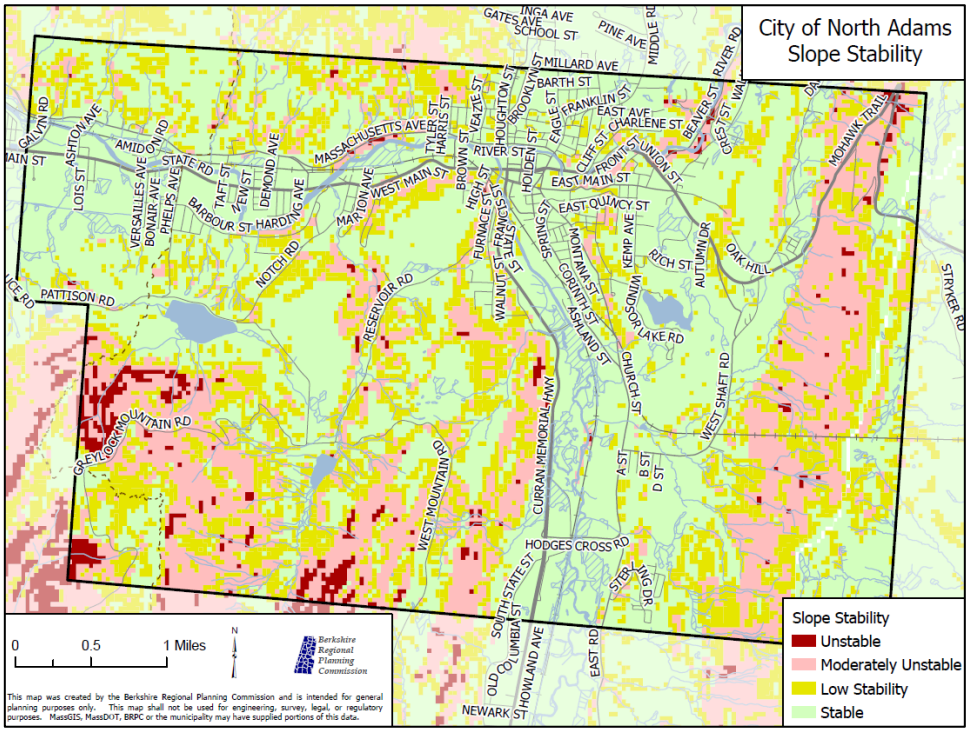
The City of North Adams is positioned in one of the most risk-prone areas in Berkshire County. Situated at the confluence of the North and South Branches of the Hoosic River and between the Taconic Range, the Berkshire Mountains, and the Green Mountains, North Adams is no stranger to flooding. Residential and commercial development and transportation networks have historically been sandwiched into the valleys, which are relatively narrow.

The location also leaves North Adams more vulnerable to landslides. While these slopes are largely undevelopable because of their steepness and lack of stable soils, development occurs at the foothills of the mountains, and disturbance could cause other issues such as dam failure.

Landslides could have a higher probability of occurrence with the greater frequency of extreme precipitation events in the region due to climate change. These are just two hazards North Adams discussed during their MVP Workshop in April 2019.

Central City of North Adams Topography





Community Resilience Building Workshop

During the winter of 2019, North Adams began a joint planning process to create the City's first ever Hazard Mitigation Plan and to develop a MVP Plan. Grants from Federal Emergency Management Agency (FEMA) through the Massachusetts Emergency Management Agency (MEMA) and from the Massachusetts Executive Office of Energy and Environmental Affairs made this comprehensive mitigation and climate change planning process feasible.

The Town formed a Hazard Mitigation / Municipal Vulnerability Preparedness Committee to steer the process. Members of the Committee include municipal department heads and representatives from various town boards and committees from several disciplines, along with representatives of key community stakeholders including the Massachusetts College of Liberal Arts (MCLA) and the Hoosic River Revival (HRR), the local nonprofit with a mission to naturalize the now-armored Hoosic River.

The Town retained the Berkshire Regional Planning Commission, a MVP Provider, to aid them in developing the updated Hazard Mitigation Plan and the MVP Plan. The goal of the Committee's work was to develop a set of Actions for addressing Priority Hazards, using the Community Resilience Building (CRB) Workshop process and methodology as a key stakeholder tool. Approval of the plan by EOEEA will enable the Town to become eligible to apply for funding to implement the various preparedness measures identified through the CRB process.

The Committee held a series of meetings to assemble data on the Town's infrastructure, identify known hazards to residents, including seasonal visitors, and review existing plans, procedures, bylaws and protections already in place. On April 18th, 2019 an all-day Community Resilience-Building Workshop, attended by 29 town officials, residents and other stakeholders, was held at the St. Elizabeth of Hungary Parish City shelter.

The central objective of the workshop was to first review regional weather events from the past and climate change data and projections, then collect local data from attendees, and create a climate-related Natural Hazard Risk Matrix for the Town, including a written Summary Report that:

1. Defined top local natural and climate-related hazards of concern;
2. Identified existing and future strengthen and vulnerabilities;
3. Developed prioritized actions for the Community;
4. Identified immediate opportunities to collaboratively advance actions to increase resilience.

On May 28th, 2019 the City of North Adams presented workshop results to the public in coordination with the City Council meeting. A half hour before the City Council met, completed matrices were presented as posters for the public to review, make notes on, and identify what they saw as local priorities. Several residents attended the session before the City Council meeting, and many more learned about the community strengths, vulnerabilities, and proposed actions during a presentation and Q&A at the City Council meeting. All North Adams City Council meetings are televised to reach a wider and inclusive audience. Following the public session, an article was published in the local newspaper highlighting the integrated planning process.

Methods and Materials

In order to identify vulnerable infrastructure and assets, features within the City were categorized by Infrastructural, Societal, and Environmental. Infrastructural includes municipal infrastructure, housing, utilities, commercial buildings, municipal buildings and operations. Societal is the collective ability to respond – first responders, health services, goods and services. Environmental includes the natural systems that protect, provide services or pose risk.

Once the community features were identified along with location, ownership, and if they were a Vulnerability (V) or Strength (S), the City stakeholders at the workshop could develop initial methods and solutions to improve resiliency. There methods and solutions were then prioritized as High (H), Medium (M), or Low (L) and a time for completion was estimated as Short (S), Long (L), or Ongoing (O). The tool used for action prioritization can be seen in the appendix of this plan.

Findings

Top Hazards

There were three hazards that MVP workshop participants highlighted above the rest - flood, wind, and snow. Flooding concerns included rain, severe storms, fast runoff, and extreme precipitation. Snow hazards encompassed ice storms, snowstorms, and severe winter storms. The other top hazards discussed were fire, drought, landslide, extreme temperatures, and the railroad. These top hazards are the adverse conditions the residents of North Adams have experienced and were negatively affected by the most within their lifetimes or based on local stories and artifacts. Previously to the 2011 tropical storms discussed further throughout this document, Berkshire County has not forgotten the events of New Year's 1948, 1938, 1927, and 1869 that motivated the Hoosic River flood chute construction.


1938 Flood, Ashland Street. Credit Paul W. Marino


1948 Flood, River Street Package Store. Credit Paul W. Marino

In addition to flooding concerns, North Adams residents are concerned about wind, snow, and landslide especially at higher elevations, as well as forest fire and drought. Beaver Street was closed in 2014 due to mudslide concerns[2]. A warranted fear given the history of a mudslide crushing a house and garage on West Main Street after rain and flood in 1936[3].

[2] http://www.iberkshires.com/story/46264/North-Adams-Closes-Beaver-Street-Over-Mudslide-Fears.html
[3] http://www.iberkshires.com/story/13476/Before-the-chutes-Hoosic-floods-raged.html

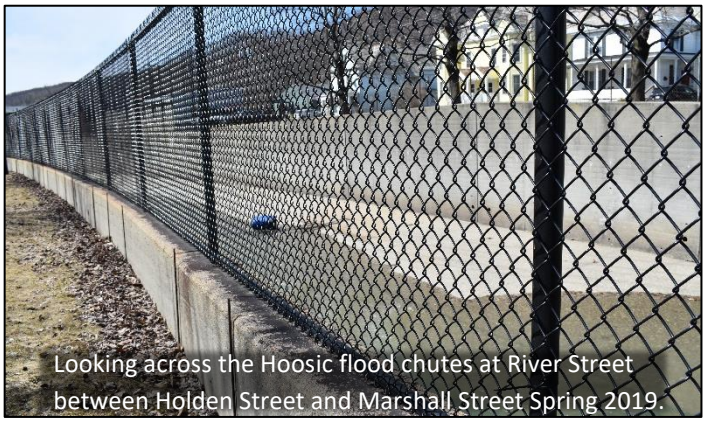
2015 Clarksburg State Forest Fire was put out using Mount Williams reservoir water from North Adams.

Given increasing temperature and evaporation, drought and forest fire concerns are growing. A brush fire in neighboring Clarksburg State Forest in 2015 is suspected to have started with an Appalachian Trail hiker's campfire[4]. Mount Williams Reservoir was used by responders to put out the fire. The Mount Williams Reservoir is the same source of water that was notably low in the 1950s due to drought.

Specific Categories of Concerns and Challenges

Hoosic River & Flood Chutes

The Hoosic River crosses through Massachusetts, Vermont, and New York. While the Hoosic can look like a small stream in the flood chutes that cut through the middle of North Adams, 720 square miles of land drain into the river[5], causing it to grow to a powerful flow of water rapidly. Additionally, the Hoosic North Branch and the Hoosic South Branch converge in downtown North Adams at the old mill building where the major tourist destination, Mass MoCA, is housed. The flood chutes have prevented major flood events since their construction by the Army Corps of Engineers between 1950 and 1961, the expected lifespan was 50 years and they have begun to fail. The City is densely developed around the Hoosic River, and alternatives to the grey infrastructure are a major challenge due to the City's vulnerability to flooding.



Looking across the Hoosic flood chutes at River Street between Holden Street and Marshall Street Spring 2019.

Water & Sewer

The water and sewer systems in North Adams are aging infrastructure. The exact locations of pipes are unknown, and repair requires shutting down service to many of North Adams' residents. Those affected

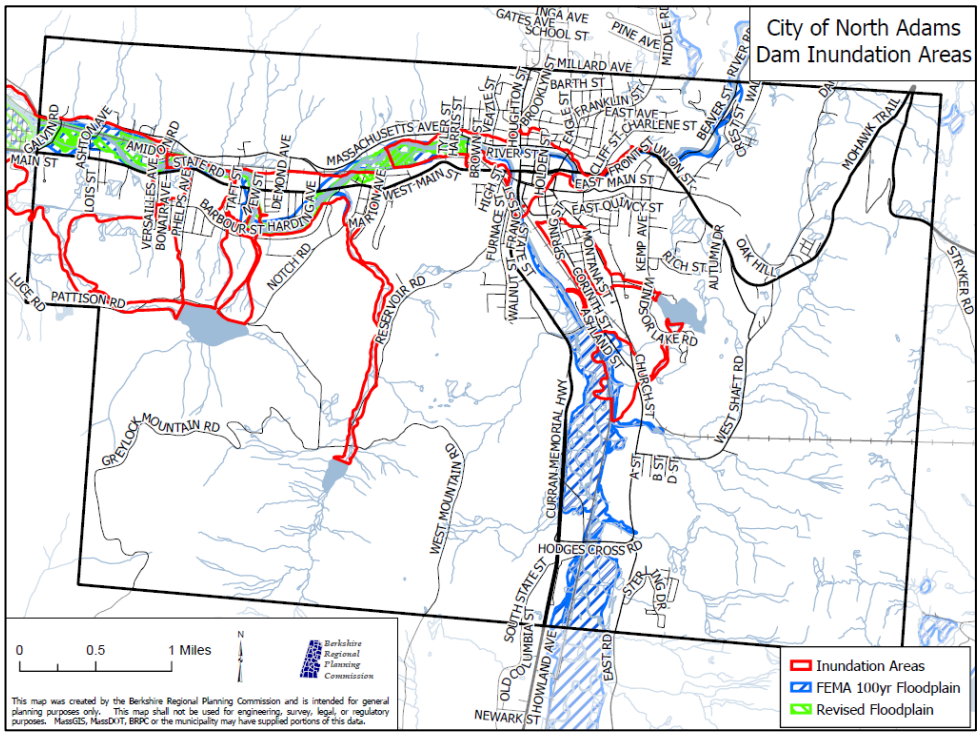
[4] https://www.berkshireeagle.com/stories/clarksburg-state-forest-brush-fire-successfully-knocked-down,326542#top-carousel

[5] http://hoorwa.org/the-river/meet-the-hoosic/

by the inadequacies of the water and sewer system in North Adams would like to see it mapped a monitored to better identify where problems occur, and smaller grids for shutdowns during repairs.

Dams, Reservoirs & Earthen Berms

Dam failure was of concern for North Adams. The City recently had inundation areas mapped to show what areas would be flooded in the case of dam failure. Large storms that breach dams or cause erosion could lead to such a disaster. Much of North Adams would be under water if the large reservoir dams failed as shown on the map.



North Adams uses dams to store water in reservoirs, as well as along the Hoosic River. Earthen berms are also used along the Hoosic River where the flood chutes do not provide protection. Earthen berms are a more natural form of flood mitigation, but they are subject to erosion if not properly engineered or maintained.

Stormwater & Street Flooding

There are particular problem areas for flooding in North Adams. The area around the MCLA campus is widely known for flooding issues. Flooding north of the Hoosic in downtown North Adams is also reported to be an issue. Some flooding comes from the stormwater systems themselves, throwing covers from the manholes as they overflow. Other issues are attributed to undersized culverts. Flooding is due to development in the floodplain, some areas simply flood as part of the natural ebb and flow of the river and tributaries. The City's next steps towards resilience should focus on increasing the capacity to handle the water as intense precipitation events increase in the Northeast.

Emergency Response and Communications

Emergency response is important to North Adams, as reflected in the Northern Berkshire Regional Emergency Management Committee 2015 award from FEMA for community preparedness. Even with their success, emergency responders see a lot of room for improvement. From backup energy sources,

whether in the form of generators or alternative energy, to the need for communication infrastructure redundancy, MVP workshop participants expressed emergency preparedness needs for the community.

Emergency response is a daily activity in North Adams, and a new building to house operations is needed. Currently the North Adams fire department and police department share a building that is both in the natural floodplain of the Hoosic River if the flood chutes were not there and is also congested with traffic.

Bridges & Culverts

MVP workshop participants asked for upsized and maintained culverts and heightened bridges to keep up with the increased flow of water. Currently culverts at Ashland Street, State Street, and River Street cause street flooding. Maintenance of culverts is also needed Bridges over the Hoosic River on Route 2 are nearing the end of their lifespan. Additionally, bioswales and permeable surfaces were recommended during the workshop in order to mitigate some of the stormwater flowing into the system.

Insect-Borne Diseases

With increasing temperatures and rain, the concerns over insect populations have grown, particularly for those insects that carry and transmit diseases to humans such as Lyme's disease from ticks and West Nile form mosquitos. Residents want to avoid spraying harsh chemicals to control insects, but more research is needed on alternatives such as biological control with bats and other animals.

Social Resilience

North Adams is a city with complex social challenges as an urban community in a rural context. The EMS deals with frequent drug overdoses, leading the responders to worry about what would happen in a situation that required sheltering a large population.

Populations are isolated in North Adams, those who cannot afford or are not licensed to drive are isolated due to a lack of public transportation. Where there is bus service, users are forced to wait outdoors for long periods of time in inclement weather including the Berkshire winters. North Adams wishes to improve public transportation in order to provide access and opportunity to its residents, as well as in order to be more prepared for mass evacuation needs.

Wildfire

While North Adams is densely developed downtown, dense forest covers most of North Adams and the surrounding towns. Additionally, the steep slopes have the potential to assist the spread of a forest fire if one occurred. Given the Appalachian Trail that cuts through North Adams, concerns are raised about hikers who may be neglectful with their campfires and propane stoves.

Railway

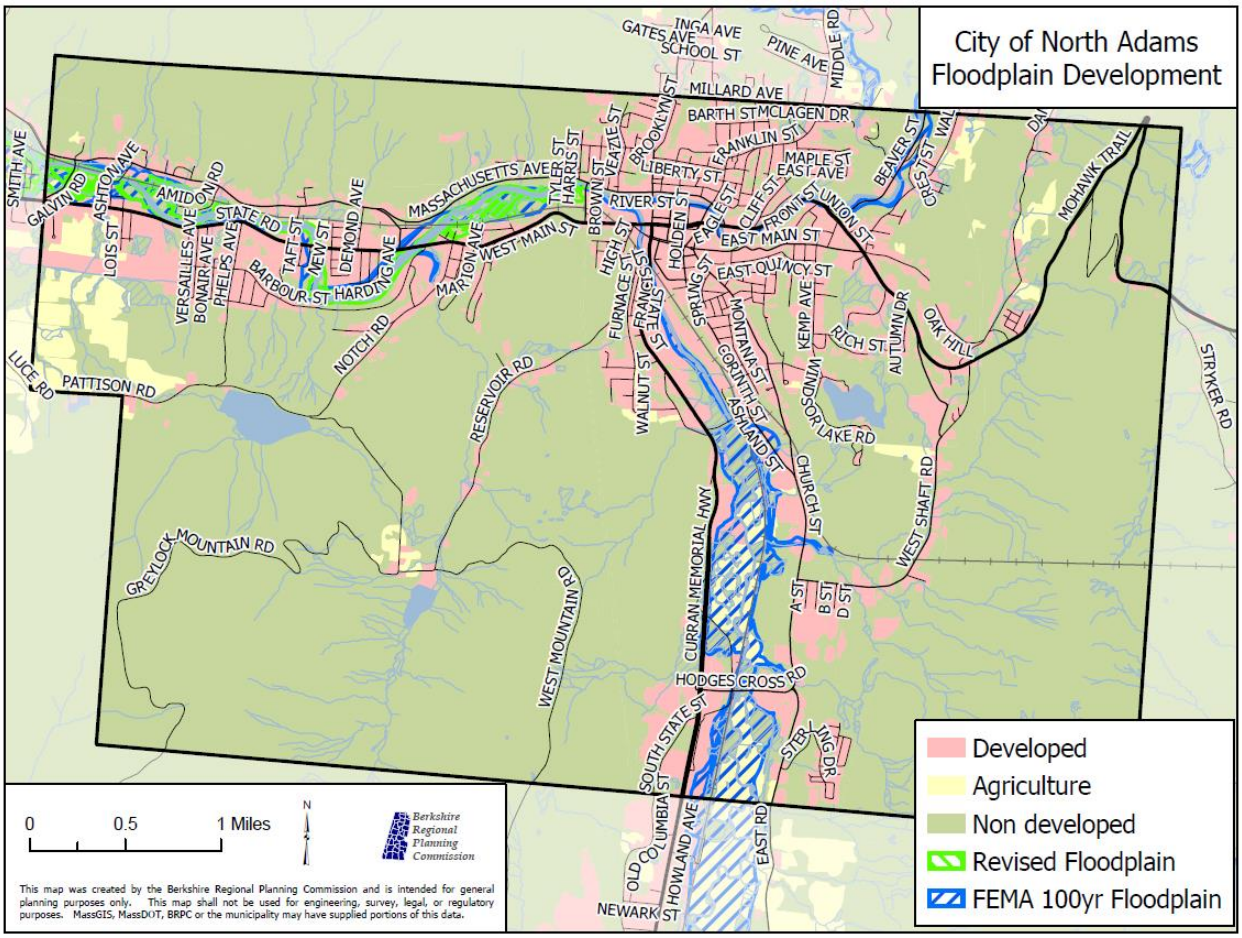
Communication with the railroad companies is a common barrier for communities when addressing issues with the railway. Residents have concerns over the materials transported through the City by the

Pan Am Railway. A coordinated and drilled response to a potential accident may help reduce impact on the surrounding areas and mollify the fears of residents and emergency responders.

Housing

It is common for public housing to be in the floodplain and the most vulnerable locations, and North Adams is no exception. North Adams provides affordable housing in several buildings throughout the City. The elderly population living in public housing would have a difficult time in potential evacuation, and the elderly and low-income residents would have an even harder time bouncing back from disaster. Evacuation could be needed in case of flood or landslide given the hillside location of some housing.

Aside from the concerns related to public housing, North Adams is beginning to see gentrification. MVP participants question is flood history is being revealed to new home buyers. Instead of selling these homes and putting people in harms way, it may be wiser to buy the properties out.



Current Strengths and Assets

The strengths and assets of North Adams highlighted by workshop participants were actions that the City has taken to address hazards and the Northern Berkshire Regional Emergency Planning Committee (REPC). Some strengths or assets were also identified as vulnerabilities, sometimes due to opportunities for improvement, or vulnerability of the asset due to location, as described below.

- The City recently constructed a new bridge on State St. near city hall and participants praised this infrastructure investment as increasing overall resiliency.
- Participants identified the City's dams as both a strength and a vulnerability. While they are vital in retaining water, kept maintained, and provide the residents with drinking water, they do pose a danger if breached.
- Much of the discussion naturally focused on the flood chutes that funnel the Hoosic River through the center of North Adams. The flood chutes are both a strength and a vulnerability because they have protected the City so far, but are in need to repair and replacement.
- The North Adams Fire and Police Station is a strength and asset for the City, providing public safety for residents and visitors. However, as pointed out by workshop participants, the police and fire station share a building located less than 200 feet from the Hoosic River's South Branch at its closest point. In the case of flood chute failure, the fire and police station, a critical facility, has a high level of risk for being inaccessible or even wiped out.
- In neighboring Williamstown during the 2011 Hurricane Irene incident period, the Spruces mobile home park was inundated by Hoosic River flood waters that had traveled through the City of North Adams flood chutes. In 2013, Williamstown received a $6.13 million grant from FEMA to relocate the residents of the mobile home park. This floodplain land is now barred from development, and able to provide the benefits and services of a floodplain for future events[6].
- Participants felt that the electric substation on Brown Street adjacent to the Hoosic River was a strength because the flood chutes have protected it so far.
- Relative to the rural, mountainous Berkshire County and much of Western Massachusetts, the city of North Adams has quick access to resources and services. This means that electric outages will be less severe than rural towns, with quicker restoration times that areas that are more difficult to access. However, the City is not prepared for long-term outages because North Adams only has one generator. Again, this is a case of a community characteristic being both a strength and a vulnerability.
- The REPC sheltering plans increase the resilience of North Adams, however participants advised that there is room for improvement as described later in the document.

[6] http://www.iberkshires.com/story/43579/Williamstown-Awarded-Grant-to-Demolish-Spruces.html accessed 6/12/2019.

- The Mutual aid agreements North Adams has with its neighboring municipalities greatly increases resilience and is a strength.
- Participants emphasized that the strong support for the Emergency Medical Services (EMS) by the City of North Adams is a significant strength, particularly given drug addiction issues in the City.
- More people are moving into North Adams and buying housing stock, which is helping the local economy if homes are kept out of the floodplain.
- The Council on Aging (COA) has an on-call bus and along with serves hot meals along with a local church which improves community resilience.

MVP Workshop participants including EMS responders and the Mayor discussing community strengths and vulnerabilities.

- The Louison House[7] is a local asset that provides assistance to Northern Berkshire families and individuals struggling with homelessness.
- Free lunch is provided for children in Summer, and breakfast all year, which was highlighted as a community asset.
- CodeRED is an emergency communications system utilized by North Adams, which allows for fast messaging when residents need to know to respond to an event in their community.
- Emergency Response Plans and the REPC were repeatedly highlighted as strengths for North Adams.

Areas of Concern

Hazards, and climate change, will have different effects on specific places. Flooding is most likely to affect the low-lying areas on a floodplain for example. Once MVP Workshop participants had identified the top hazards for their community, specific areas of concerns were discussed so that site-specific solutions could be developed. Major categories of concern emerged through the workshop. Areas of concern are organized by these categories below.

Hoosic River & Flood Chutes

- Hoosic River chutes cutting through the City.
- Electric substation adjacent to Hoosic River flood chute on Brown Street.
- Flood chute maintenance particularly around Mass MoCA and Willow Street.
- River Street flooding along the Hoosic River.
- Mills and schools on the edge of the floodplain.

[7] https://louisonhouse.org/

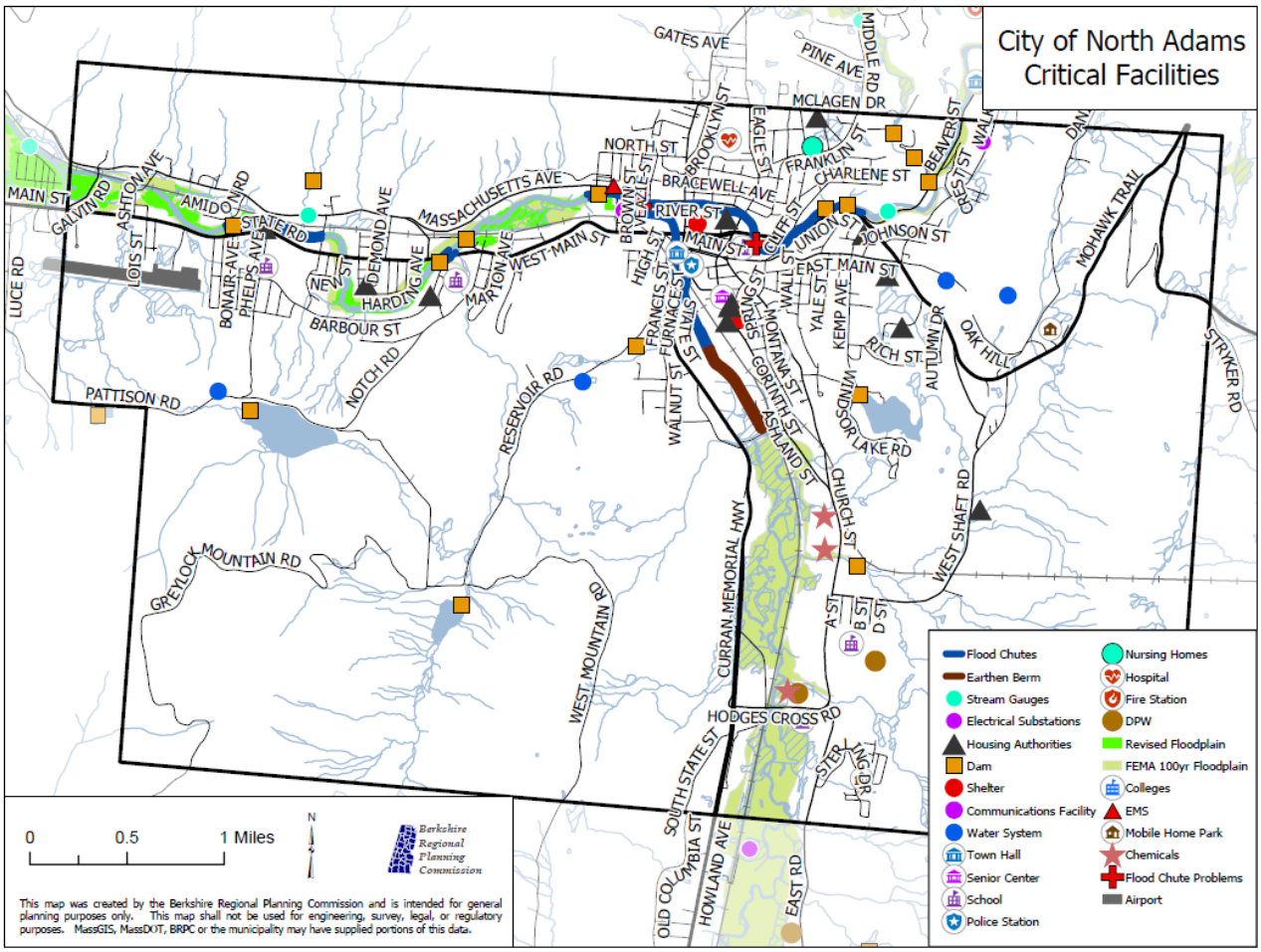
- Hoosic River erosion near State Road.
- Erosion along the Hoosic on the west end.

Water & Sewer

- There is a need for citywide mapping and emergency shut off measures.
- A sewage interceptor line has been exposed by erosion where it crosses the Hoosic River.
- The stormwater system capacity is a concern citywide.

Emergency Response and Communications

- Ambulance access of River Street during a flood.
- Communication towers susceptibility to wind.
- Citywide transportation needs for vulnerable populations.
- MCLA tower dorms vulnerability to mudslide and flood.
- Citywide sheltering and emergency communications.
- Big events at Mass MoCA.
- Chemical storage near MCLA.
- Florida Mountain cell and radio towers on Route 2.
- Fire and Police station downtown.



Dams, Reservoirs & Earthen Berms

- Church Street flooding from Old Sprague dam.
- Risk of failure for dams at Windsor Lake, Eclipse, Mount Williams and Notch Reservoir
- Earthen berm at Versailles Avenue.
- Mount Williams Reservoir was low in the 1950's and drought could cause issues for the reservoir service area.

Stormwater & Street Flooding

- Flooding of streets around MCLA campus including Ashland, Hodges Cross, Oak Hill, and MCLA townhouse basements and runoff from Bradley Street down into MCLA Hoosac parking lot and into the Campus Center.
- Route 8/State Street flooding
- Stormwater system overwhelmed at Brown, Beaver, Houghton, Galvin, and around The Porches.
- Route 2 flooding
- Need to replace storm drainage where necessary, with citywide mapping and monitoring.
- HA George George Propane storage facility on Ashland Street.
- Wash out at Barbour Street along the Hoosic.
- Specialty Minerals has proposed a disposal site at the City's southwest corner in the Town of Adams.

Bridges & Culverts

- Damaged and undersized culverts at Galvin Road, Ashland Street, Houghton Street, Wood Street, Church Street, and Hoosic Street.
- New Street bridge in need of repair.
- Bridge at West Main Street and State Street in need of repair.

Insect or Pest-Borne Diseases

- Citywide increase in mosquito, tick and rat populations.

Social Resilience

- Citywide transportation needs.
- Citywide sheltering needs.

Wildfire

- Citywide forests that surround the dense urban core.

Railway

- Wetlands east of Route 8 where the tracks cut through.
- Concerns with chemicals brought through city on railroad.

Housing

- Riverview and Greylock public housing apartment complexes.
- New home buyers buying homes in the floodplain.

Current Concerns and Challenges Due to Hazards

North Adams frequently experiences flooding, typically in March, summer months, and the end of hurricane season in the fall. The Hoosic River, aging stormwater infrastructure, and undersized culverts are most often blamed for the negative impacts of precipitation or snow and ice thaws. Possibly due to the increased frequency of severe precipitation in the Northeast, the cement flood chutes that funnel the Hoosic River through the City are reported to be near capacity during normal rain events. Manhole covers are thrown off into the streets after water surges through the system This not only causes a safety concern, but also puts a strain on the City's public works and public safety employees.

The last major event to hit North Adams was Tropical Storm Irene, though Tropical Storm Lee a month later also caused significant flooding. Irene was a wake-up call for those who lived and owned property in the floodplain. The Spruces, a mobile home park in neighboring Williamstown on the Hoosic River, was completely inundated by flood waters. Many of the residents of The Spruces were elderly with low and fixed incomes, making recovery even more difficult. FEMA ultimately paid to buy these properties out. In North Adams, the flood chutes were pressed to their limit, several panels collapsing into the paved river due to the pressure and erosion. Several areas of the chutes remain weak today, particularly around Mass MoCA where the North and South Branches of the Hoosic River converge in downtown North Adams.

Top Recommendations to Improve Resilience

The participants of the North Adams MVP Workshop prioritized actions to address severe flooding in the City. The aging stormwater infrastructure leaves North Adams vulnerable to heavy precipitation events. Failure of the City's flood chutes or dams would be catastrophic. Participants expressed that flooding in the streets and around the Hoosic River were major problems. The naturalization and restoration of the Hoosic River is desired by many stakeholders, to create a community asset and effective nature-based infrastructure. However, the flood chutes need to be replaced and strengthened where existing development will not allow for the naturalization of the Hoosic River.

North Adams rests in the valley below their dams and reservoirs. Regular monitoring and maintenance of the dams is required. To be better prepared for flooding from dam or flood chute failure, there needs

to be enhanced community education and emergency response preparedness. Also of importance, participants agreed that drinking water, sewer, and stormwater lines should be mapped using ArcGIS for better monitoring and replacement where necessary.

The following strategies are the top recommendations from highest to lowest priority for improving resilience based on the MVP Workshop and Public Listening Session in North Adams.

Highest Priority

Hoosic River & Flood Chutes


Hoosic River, North Adams

- Conduct engineering study to determine what needs to be done for the flood chutes to last another 50 years and support work with Hoosic River Revival.
- Dredge flood chutes channeling the Hoosic River at Hodges Cross Rd vicinity and downstream; investigate retention/detention mechanisms upstream of flood areas to address MCLA campus and other flooding.
- Create retention basins for the Hoosic River.
- Re-evaluate holding capacity of chutes for severe rain event; consider up- and downstream naturalization as a long-term fix.
- Access funding for addressing the flood chutes;
- Increase frequency of maintenance.
- Redesign and rebuild flood mitigation around Mass MoCA and Willow Street.
- Replace and repair residential and municipal retaining walls as needed.
- City can consider zoning efforts and overlays for improvements and paving in flood prone areas
- Stabilize banks via nature-based solutions for the west end riverbanks.


Donghao Chung, Photo: Keith Schneider

- Increase engagement with Massachusetts Division of Fisheries & Wildlife to determine how to solve issues with the Wood Turtle, an implementation barrier for work on the flood chutes.

Dams, Reservoirs & Earthen Berms

- Yearly inspections and increased maintenance, debris clearing and monitoring to prevent risk of failure at the dams.
- Increase frequency of inspections and maintenance for the earthen berm on Versailles Avenue.
- Hire a beaver trapper, Streamline the process for removal.

Stormwater & Street Flooding

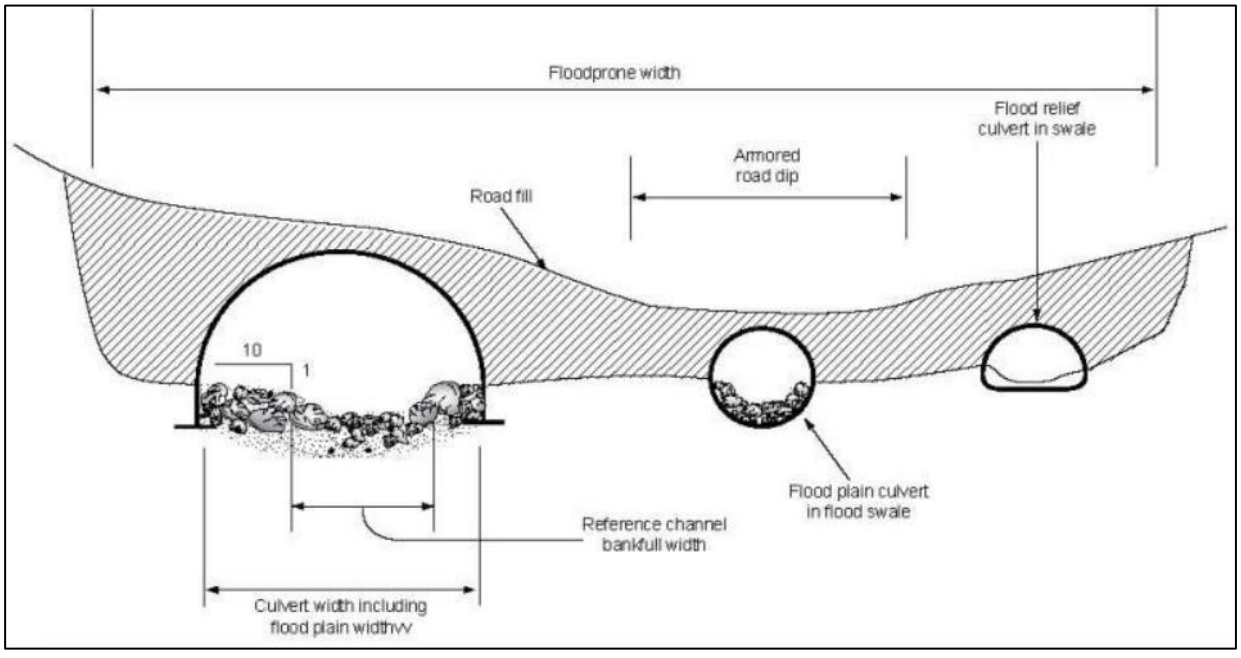
- Storm Drainage - Replace where necessary. Improve mapping & monitoring; digitize records.
- City Public Services should be funded for infrastructure improvements to address storm drain capacity at Brown Street, Beaver Street, Houghton Street, Galvin Street, and near The Porches.
- Survey, engineer, and redesign stormwater management systems, particularly in southwest North Adams.

Water & Sewer

- Digitally map the water system and identify section controls to shut down more efficiently in limited areas for lower impact and to avoid shutting down the whole city.
- Replace water and sewer Lines where necessary and improve mapping & monitoring.
- Conduct studies to determine course of action to stabilize banks where erosion has exposed the sewer interceptor line that crosses the Hoosic River in west North Adams.

Bridges & Culverts

- Replace and upsize culverts at Ashland, State, and River Streets to reduce street flooding.
- Address damaged and undersized culvert by clearing debris and maintenance; replacement and upsizing, and adding bioswales and permeable surfaces.
- Bridges over the Hoosic on Route 2 (Mohawk Trail) east of New Street and on West Main need to be evaluated and replaced. Considerations should be made for temporary alternate route.



Source: Forest Service Stream Simulation Working Group, 2008, Stream Simulation

Emergency Response

- Design new fire and police station downtown and secure funding.
- Establish criteria for establishing new Emergency Operations Center (EOC) so that Ambulance access will not be threatened in severe storm events. Criteria should include no railroad nearby, no flooding, accessible from several routes – former Sullivan School meets all these criteria.
- Need more redundancy for communication towers in areas that are less prone to wind and other risks.
- The City of North Adams needs more generators in addition to the current single generator. MCLA has generators and diesel stored at campus as well as extra shelter capacity. Coordinate so that MCLA could serve as short term emergency option.
- Coordinate and share emergency supplies (ie. Beds) and evacuation between City and MCLA while sheltering populations separately.
- Develop transportation plan with the City and Housing Authority, possibly partnering with private transportation companies. Focus on vulnerable populations: College, Ashland (seniors, disabled), City Housing near the railroad and flood areas that will need evacuating in an emergency.
- Need evacuation map and designated routes. The City should create or identify pick up areas for people, particularly around MCLA Towers and areas of landslide concern.
- Establish a swift water rescue team.
- Policy needed for dealing with meds in shelter; plan for an alternate location or area within shelter for med distribution.

Pests and Insect-Borne Diseases

- Consider bat boxes or houses[8] in the short term, promote responsible chicken raising, educate residents about standing water, checking self for ticks, tick cards. Consider offering tick twisters as a community giveaway.
- Bat and owl box program for downtown area.
- Educate public about public health concerns on the increase in rat population and use of rat poisons, rabies in wild animal populations.
- Increase education on control of insect and pests.
- Allow chickens at residential properties


Photo by BRI/MassWildlife

Social Resilience

- Identify a new downtown location to serve breakfast and find funding and volunteers. Combine efforts with locations that already serve lunch, possibly expanding the food pantry.
- Continue and expand COA on-call bus and hot meals and hot meals at the churches.
- Continue and expand mission of the Louison House.
- Continue and expand lunch program for kids in Summer, breakfast program during year.

[8] https://www.mass.gov/guides/bat-houses

Wildfire

- Forest management improvements.
- Improve management to remove buildup of debris and underbrush and increase harvesting.
- Educate Adirondack Trail users about fire danger and prevention.

Moderate Priority

Hoosic River & Flood Chutes

- Address damage toward the beginning of flood chute where panels need to be replaced by repairing the chute with integrated flood mitigation, particularly tiered floodplain, amphitheater, and other green features that could be used to help absorb water and allow for more vegetation.
- Place riprap along river to prevent further erosion and rebuild State Road.

Emergency Response

- Add back-up receivers at the hospital in order to add redundancy for cell and radio towers and work with National Grid to access Greylock Tower.
- Create evacuation routes and maps for primary & alternate routes; avoid hazard roads that flood; communicate routes to public (possible signage); training/education with follow up site visits for business owners; help owners of flood prone properties.
- Build on experience and success of REPC and maintain plans.
- Increase attendance at Emergency Regional Planning Meetings. Continue agreements to share equipment with neighboring municipalities through Mutual Aid.
- Utilize reverse 911 & social media to broadcast information and advertise using CodeRED.
- Advocate for increased capacity at the hospital.
- Improve signage for entering and departing large events in the City.
- Contract tree removal for around critical infrastructure.

Dams, Reservoirs & Earthen Berms

- Check city emergency plan and add redundancy for the Mt. Williams Reservoir if needed.
- Analyze if energy production by dams is economically viable and will fund maintenance.
- Increase maintenance around dams to clear downed trees.

Insect-Borne Diseases

- In order to address growing mosquito population, install bat boxes on city bldgs. and properties. Consider spraying, but only after testing shows need and then keep track of data.

Stormwater & Street Flooding

- Investigate what work still needs to be done in order to repair Church Street drainage; conduct a study to see if the Old Sprague Dan dam should be removed to prevent flooding. Analyze if flooding of Church Street can be mitigated by slowing or retaining water in the stream channel.

- Investigate & redesign storm drain system; retain/infiltration system on MCLA to accept/hold Bradley St, parking and Towers runoff.
- Request FEMA update the FIRM maps.

Railway

- Maintain and replace Pan Am Railway tracks with design improvements around tracks.
- Improve communications with Pan Am Railways to be better able to respond to issues with hazardous materials transported by the railway.

Social Resilience

- Promote use of public transportation, education, and show benefits of public transport to help justify more funding and buses.
- Major bus stops should all have coverage and possibly heating to encourage more bus use.
- Support new wireless communication tower at MCLA.

Lower Priority

Dams, Reservoirs & Earthen Berms

- Protect the HA George Propane storage facility on Ashland Street, MCLA campus, and surround neighborhoods by regularly inspecting and maintaining the Windsor Lake dams.

Railway

- Create maps & rate each section of RR for access & type of equipment that can go there; coordinate with RR to maintain improve tracks to minimize damage risk.

Stormwater & Street Flooding

- Identify why there is more flooding occurring along route 8 near Bounty Fare and if it is from new development. If caused by development, mitigate runoff in future development, including solar projects. Should be considered in re-evaluation of floodplain boundaries.
- Utilize the closed middle section of Barbour Street for public space that functions as green infrastructure and sophisticated flood prevention, possibly part of the rail trail plan.
- Specialty Minerals has purchased land in N. Adams north of their current site at SW corner of City near Adams town line. The company has environmental practices in place, however environmental regulations need to be enforced.

Bridges & Culverts

- Replace and increase the height of bridges and size of culverts.
- Purchase temporary bridges to prevent populations from being cut off during storms.
- Continue maintenance and inspections of new bridge on State Street near city hall.

Hoosic River & Flood Chutes

- Maintain protection for the electric substation located right on Hoosic River.

- Support efforts to protect and enhance river system to withstand severe storms and mitigate downstream flooding by furthering analyzing if natural improvements proposed by Hoosic River Revival for the south branch and upstream of City work to reduce flooding.

Emergency Response

- Explore ways to create a city-wide emergency broadcast system.
- Strengthen support by increasing community outreach & adding bilingual professional support/development, especially for EMS.
- Add multilingual capacity to text alert system.
- Update/upgrade the electrical grid.

Housing

- Repair and replace roofing and siding for the Riverview and Greylock public housing.
- Ensure future development and housing on Route 2 at the former Spruces mobile home park site is prevented due to flooding.

Workshop Participants

Workshop Invitees/Attendees*

Name	Affiliation
Allard, Bob*	Hand Radio
Alves, Toby	Town of Adams EMD & FW
Anderson, Dave	First Congregational Church
Augusti, Bruce	MEMA
Badorini, Mike	Holland Company
Barnes, Becky	Dept. of Conservation & Recreation
Barrett, John	MA State Represenative
Beaudreau, John	NAPD
Bernard, Thomas*	City of North Adams
Besaw,Amber	Norhern Berkshire Community Coaltion
Biasin, Justin	MCLA Campus Police
Bienvenue, Gail	MA DPH
Birge, James	MCLA
Blackmer, Lisa	City of North Adams
Bona, Keith	City of North Adams
Boyer, Dave	Town of Williamstown
Breault, Jason	BCSO
Briggs, Shawn	Town of Adams: Police Department
Britton, Lucy	BHS
Brosnan, James	McCann Tech
Building Insp.	Town of Cheshire: Building Dept
Burke, Sharon*	Specialty Minerals
Bushee, Mark	City of North Adams: Health Dept.
Canales, Mike*	City of North Adams
Canata, Andrew	MSP
Carnevale, Pat	MEMA
Charon, Joseph*	NBREPC/NBEMS
Chesbro, Chip	Town of Clarksburg
Clark, Kim	NAPS School Nurse
Cohen, Rebecca	City of North Adams
Colonno, Dan*	MCLA Campus Police
Cozzaglio, Michael*	NAPD
Crockwell, Michelle	BFAIR
Czerwinski, Bob	Central REPC
Dalton, James	MSP
Daniels, Rick	Town of Williamstown

Dearstyne, Tami	Berkshire Transit Management, Inc
DeJesus, Sarah	Tapestry
Derose, Joanne	National Grid
DPW Super.	Town of Cheshire: DPW
Dunlap, Deb	Town of Adams
Egan, Allison*	BRPC
Francesconi, Tom	Town of Cheshire
Furlon, Brad*	Hoosic Water Quality District
Garner, Tim	Town of Cheshire
George, Brice*	H.A. George Gas Company
George, Kyle*	H.A. George Gas Company
Girgenti, Erica	Town of Adams Council on Aging
Gleason, Meghan	Mass MoCA
Gleason, Mike	Adams Ambulance
Gleason, Mike	Town of Florida Fire Chief
Grady, Tom	BCSO
Green, Jay	Town of Adams
Greenwald, Bill	Harriman & West Airport
Griffin, Nick*	North Adams Housing Authority
Hempstead, Kevin*	City of North Adams
Hoch, Jason	Town of Williamstown
Hoyt, Peter	Town of Adams BOH
Hurlburt, Kyle	Town of Clarksburg
Jen Hohn	City of North Adams: Housing
Johnson, Kyle	Town of Williamstown
Jusino, Amalio*	NBREPC/NBEMS
Kennedy, Jeff*	Town of Williamstown
King, John	Osterman Gas Company
King, Maryanne*	City of North Adams: Dispatch
Kleiner, Dick	Town of Adams EMD & FW
LaBonte, Lisa	City of North Adams: Housing
LaForest, Jason*	Hoosic River Revival, City Council
Leinbaugh, Erryn	BHS
Lescarbeau, Timothy	City of North Adams: DPW
Maisonneuve, David*	Savoy VFD
Malkas, Barbara*	NAPS
Maloney, Glenn	NA Chamber of Commerce
Mantello, Nick*	NAFD
Markland, Paul*	City of North Adams Water and Sewer
McKeown, Corinne	Berk. Medical Reserve Corp
McKinney, Carl*	Town of Clarksburg

Meaney, John	NBREPC/NBEMS
Meczywor, Haley	Town of Adams
Meranti, Bill*	City of North Adams: Building Insp.
Meranti, Steve*	NAFD
Monts, Andrew	MCLA Campus Police
Moore, Michael*	City of North Adams: Health Dept.
Morandi, Francis*	NoBARC
Mosher, Tim	Pan Am Railways
Nelson, Michael	MA DPH
Noyes, Mike	Town of Williamstown
O'Grady, Brian	Town of Williamstown COA
Pansecchi, John	Town of Adams Fire Dept.
Parsons, Stacy	NAPS Homeless Education
Pedercini, Craig	Town of Williamstown
Penner, Wendy	NBC Coalition
Pierce, Bruce	Hand Radio
Quinn, Lou Ann	BHS
Rhoads, David	Town of Adams BOH
Romaniak, Tom	Town of Adams Code Enforcement
Shepley, Bruce	Town of Adams
Sherman, Dan	NAPS
Sherman, Laura*	NBEMS
Sinico, Tony	Town of Williamstown
Swistak, Angela*	NB Tranpsort
Swistak, Corey	Town of Cheshire
Tanner, Brian	Town of Adams
Tarsa, Rick	Town of Adams Police Dept.
Tetlow, Robert	Berkshire Gas Company
Town Admin	Town of Cheshire
Urbanowicz, Peter	MCLA Campus Police
Warner, Alison	Town of Williamstown
Wein, Paulette	Mass MoCA
Williams, Mike	Town of Clarksburg
Wood, Jason	NAPD
Ziemba, Mike	Town of Williamstown
Zoita, Albert*	North Adams Police Department

Citation

Berkshire Regional Planning Commission (2019, June). *North Adams Community Resilience Building Workshop Summary of Findings*.

Workshop Project Team

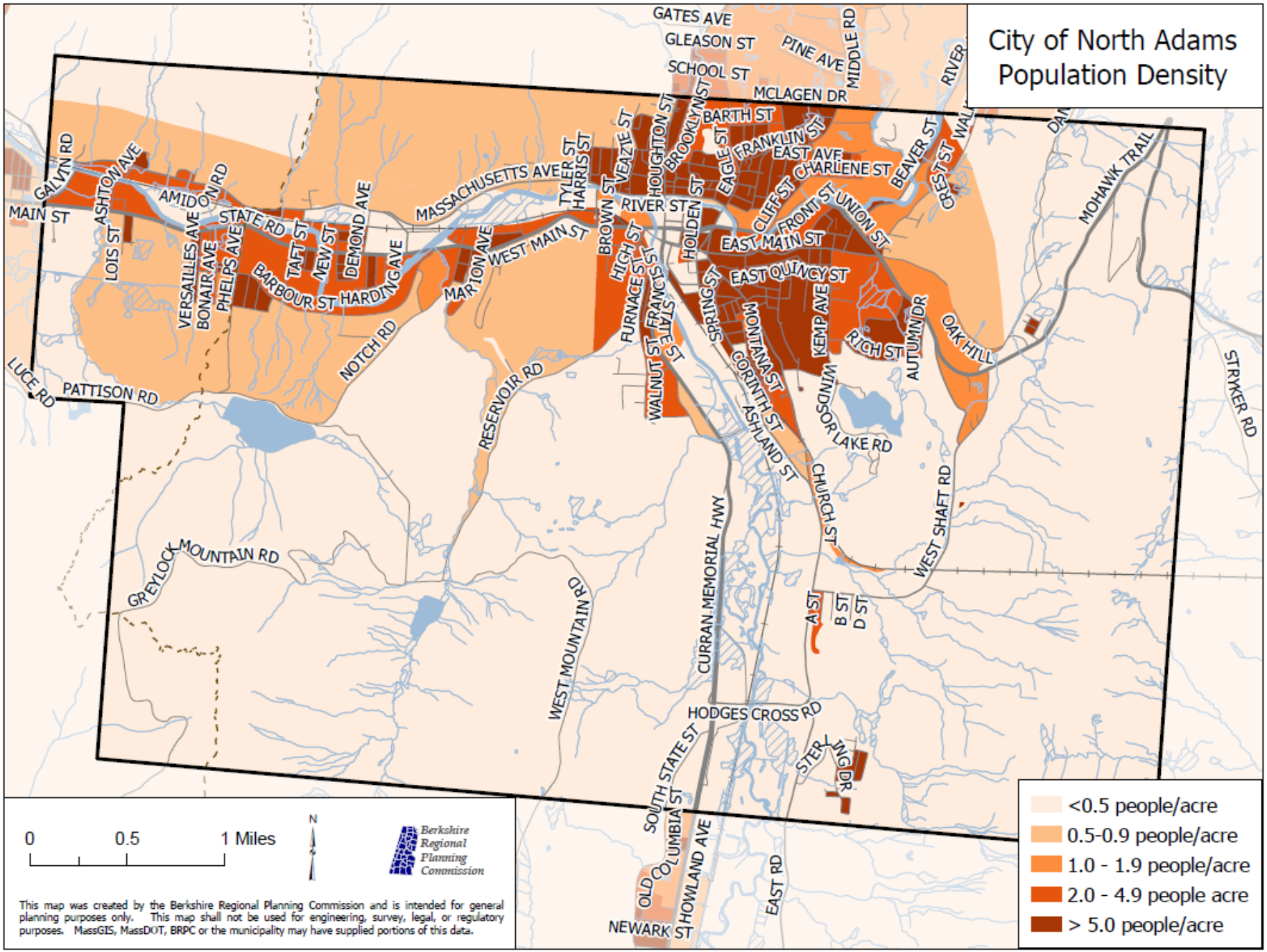
Municipal Vulnerability Preparedness Committee

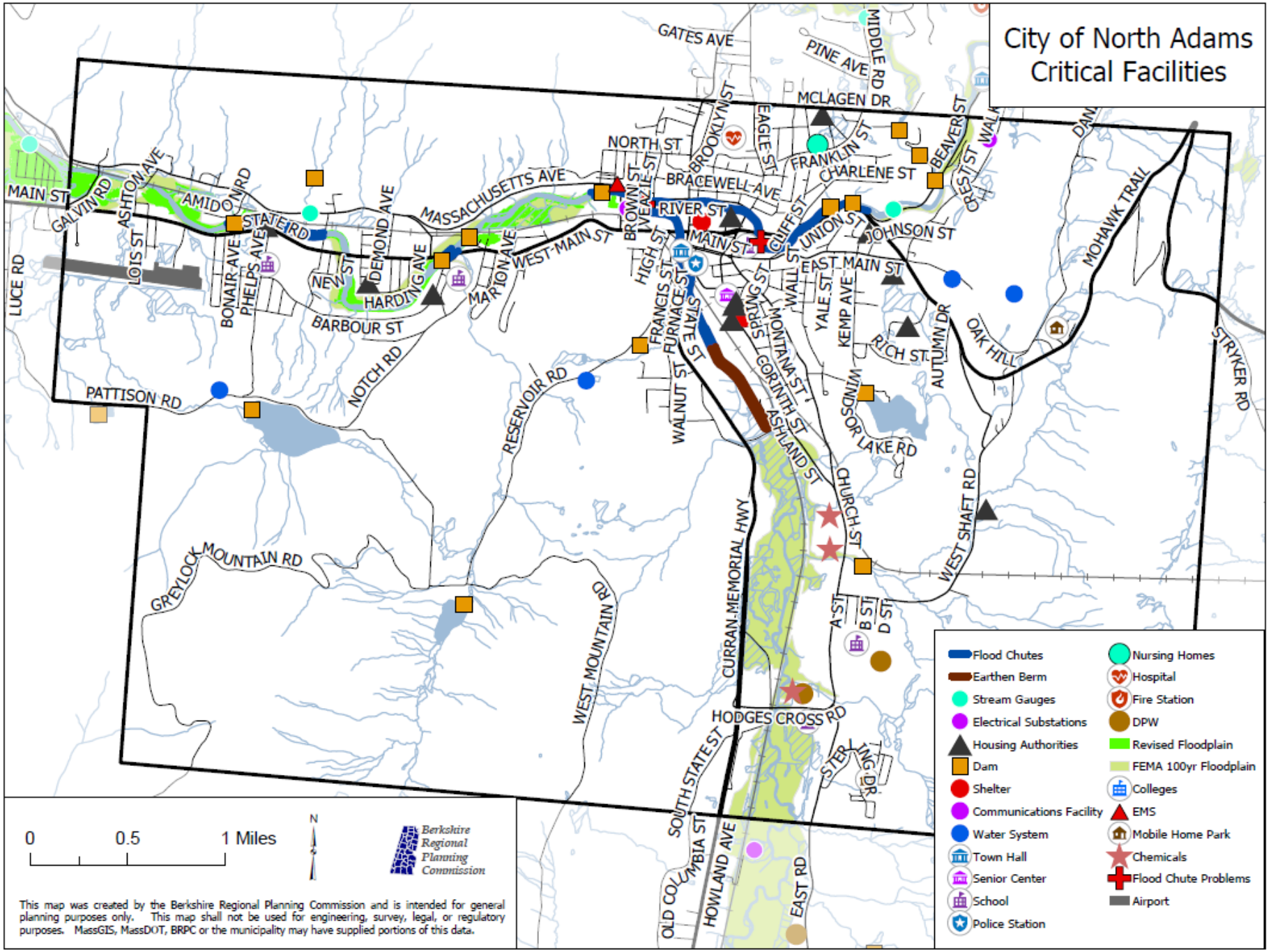
Name	Affiliation	Role
Canales, Michael	City of North Adams, Administrative Officer	Project Coordinator
Colonno, Dan	MCLA Campus Police	Core Team Member
Jusino, Amalio	NBREPC/NBEMS	Core Team Member
Anderson, Dave	First Congregational Church	Core Team Member
Lamb, Sandra	NACOA Director	Core Team Member
LaBonte, Lisa	City of North Adams: Housing	Core Team Member
Lescarbeau, Timothy	City of North Adams: DPW	Core Team Member
Hohn, Jennifer	Executive Director, North Adams Housing Auth.	Core Team Member
Wood, Jason	NAPD	Core Team Member
Meranti, Steve	NAFD	Core Team Member
Flaherty, Bob	North Adams Public Schools	Core Team Member
Moore, Michael	City of North Adams: Health Department	Core Team Member
Bushee, Mark	City of North Adams: Health Department	Core Team Member
Meranti, William	City of North Adams: Building Insp.	Core Team Member
Burnett, Carrie	North Adams Public Schools	Core Team Member
Massa, Caroline	BRPC	Lead Facilitator
Egan, Allison	BRPC	Facilitator
Maloy, Mark	BRPC	Facilitator
McDonough, Peg	BRPC	Facilitator
Feury, Zac	BRPC	Facilitator

Acknowledgements

A special thank you to St. Elizabeth of Hungary Church for providing the space for our MVP Workshop. The MVP planning process would not be possible without the hard work and dedication to community resiliency on the part of all the Core Team Members, project championship from Michael Canales and support from Mayor Thomas Bernard.

Appendix A: Base Maps Used for Participatory Mapping Exercise


City of North Adams
Population Density
GATES AVE
GLEASON ST
SCHOOL ST
MCLAGEN DR
PINE AVE
MIDDLE RD
RIVER
BARTH ST
BROOKLYN ST
HOUGHTON ST
VEAZIE ST
TYLER ST
HARRIS ST
EAGLE ST
FRANKLIN ST
EAST AVE
CHARLENE ST
BEAVER ST
CREST ST
MOHAWK TRAIL
GALVIN RD
ASHTON AVE
AMIDON RD
MASSACHUSETTS AVE
MAIN ST
LOIS ST
STATE RD
VERSAILLES AVE
BONAIR AVE
PHELPS AVE
TAFT ST
NEW ST
DEMOND AVE
BARBOUR ST
HARDING AVE
MARION AVE
WEST MAIN ST
BROWN ST
HIGH ST
RIVER ST
HOLDEN ST
CLIFF ST
FRONT ST
UNION ST
EAST MAIN ST
EAST QUINCY ST
FURNACE ST
FRANCIS ST
STATE ST
SPRING ST
MONTANA ST
CORINTH ST
KEMP AVE
RICH ST
AUTUMN DR
OAK HILL
STRYKER RD
LUCE RD
PATTISON RD
NOTCH RD
RESERVOIR RD
WALNUT ST
ASHLAND ST
WINDSOR LAKE RD
CHURCH ST
WEST SHAFT RD
GREYLOCK MOUNTAIN RD
WEST MOUNTAIN RD
CURRAN MEMORIAL HWY
A ST
B ST
D ST
HODGES CROSS RD
SOUTH STATE ST
COLUMBIA ST
OLD
HOWLAND AVE
EAST RD
NEWARK ST
STERLING DR
0
0.5
1 Miles
N
Berkshire Regional Planning Commission
This map was created by the Berkshire Regional Planning Commission and is intended for general planning purposes only. This map shall not be used for engineering, survey, legal, or regulatory purposes. MassGIS, MassDOT, BRPC or the municipality may have supplied portions of this data.
<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



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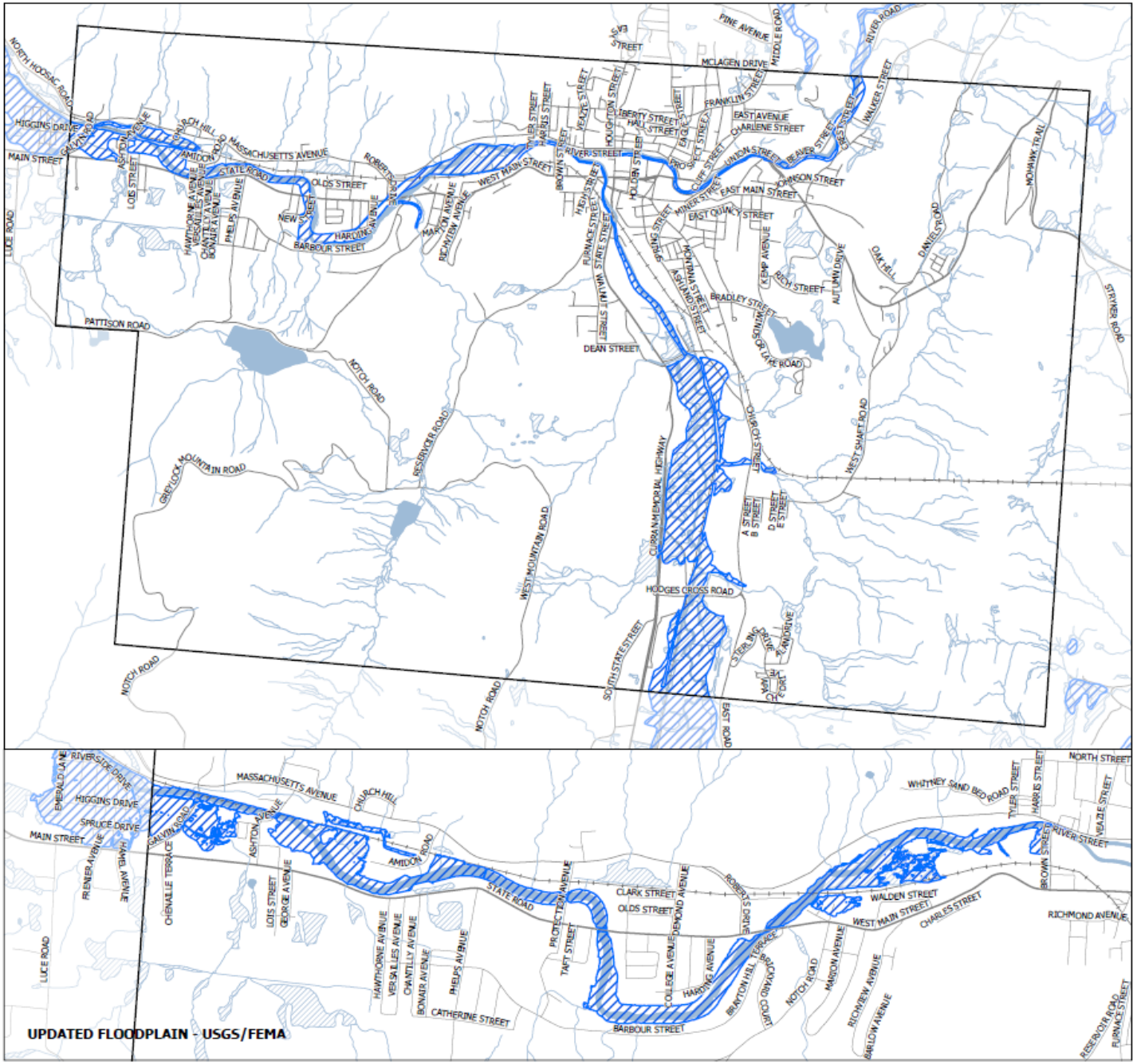
City of North Adams Floodplain



- FEMA 100yr Floodplain
- Major Road
- Minor Road
- Local Road
- Railroad
- Stream
- Wetland
- Open Water

0 0.5 1 Miles

N

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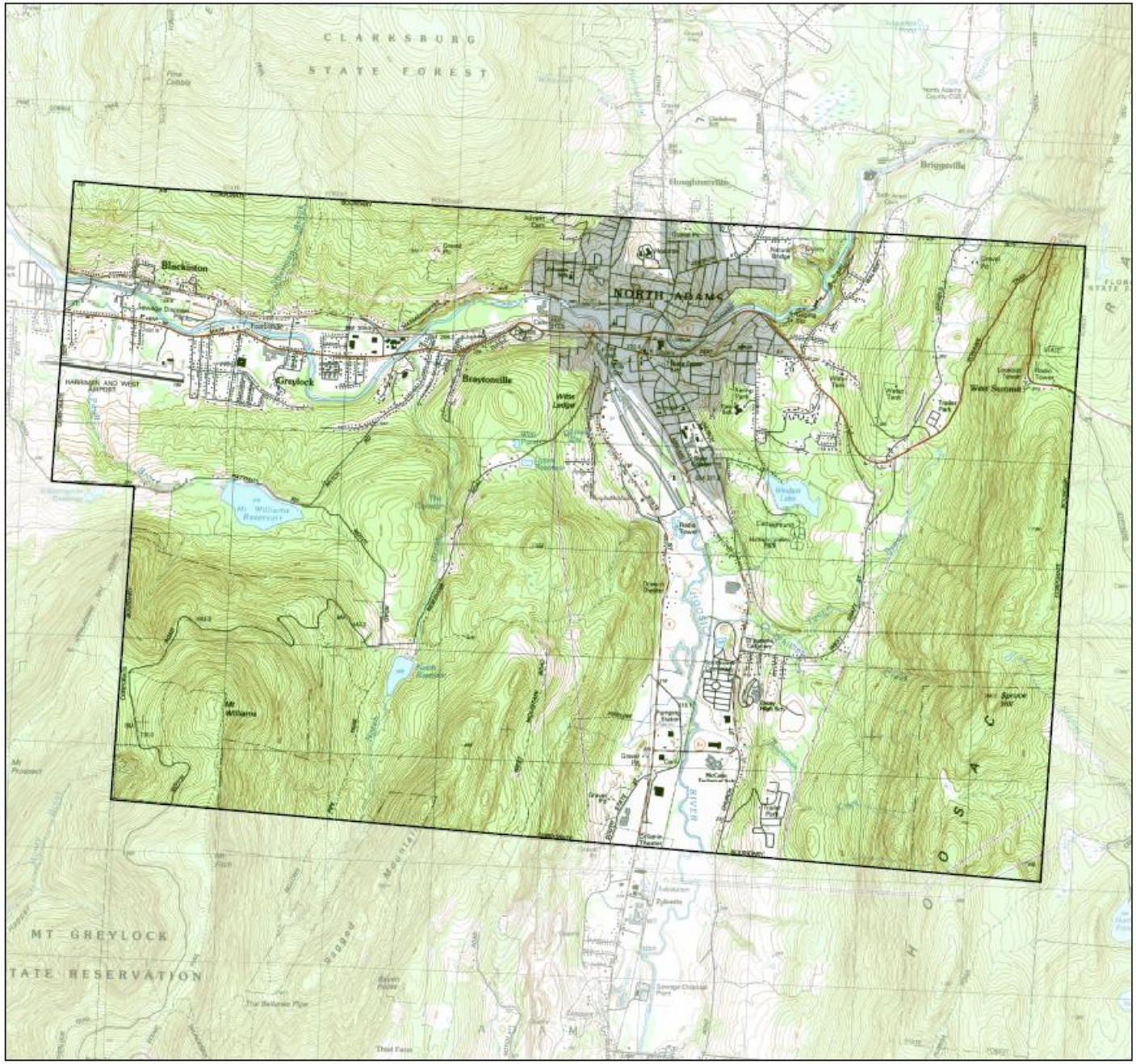
City of North Adams Topographic Map



0 0.5 1 Miles

N

Berkshire Regional Planning Commission

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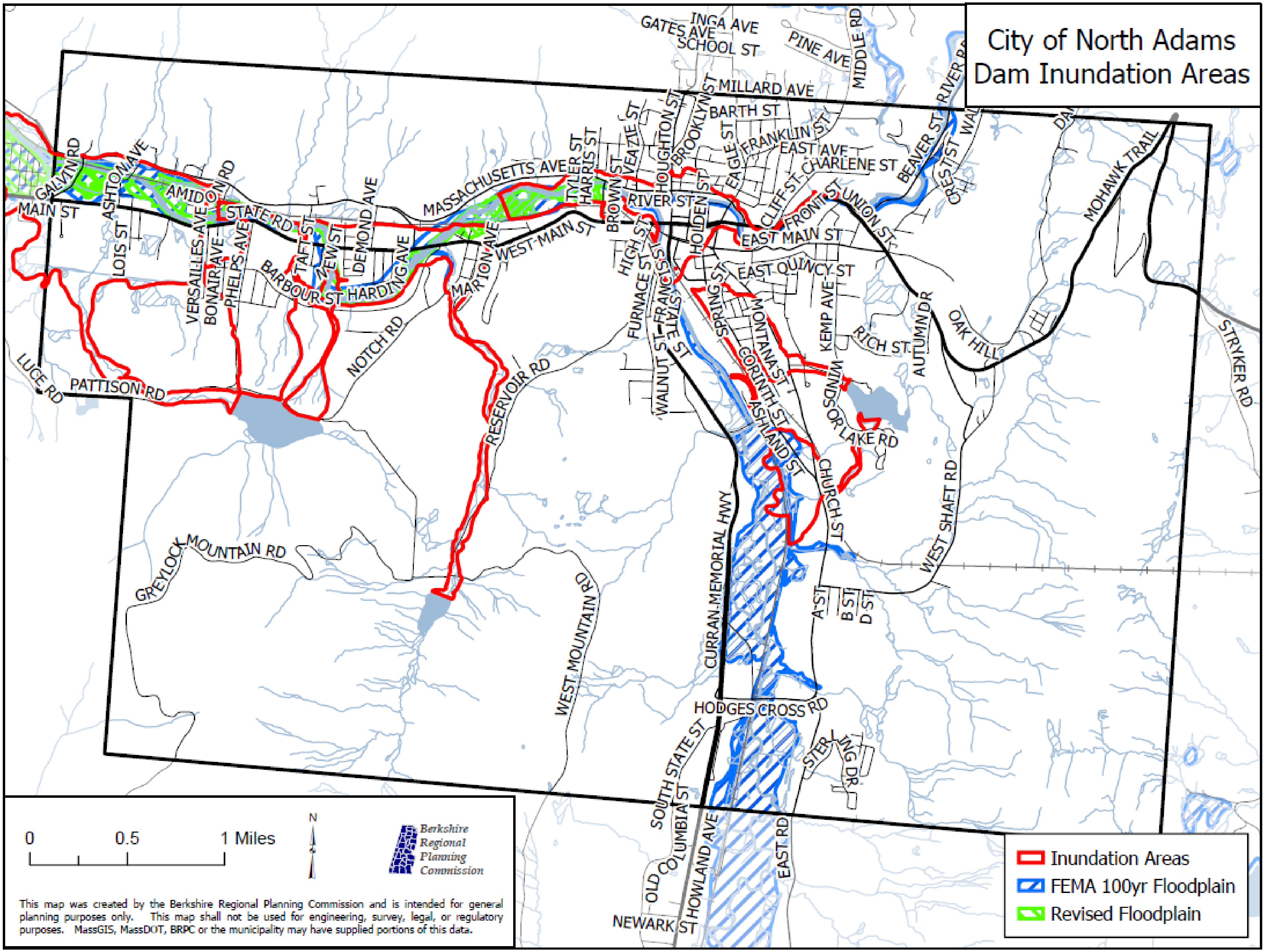

City of North Adams
Dam Inundation Areas
Inundation Areas
FEMA 100yr Floodplain
Revised Floodplain
0
0.5
1 Miles
N
Berkshire Regional Planning Commission
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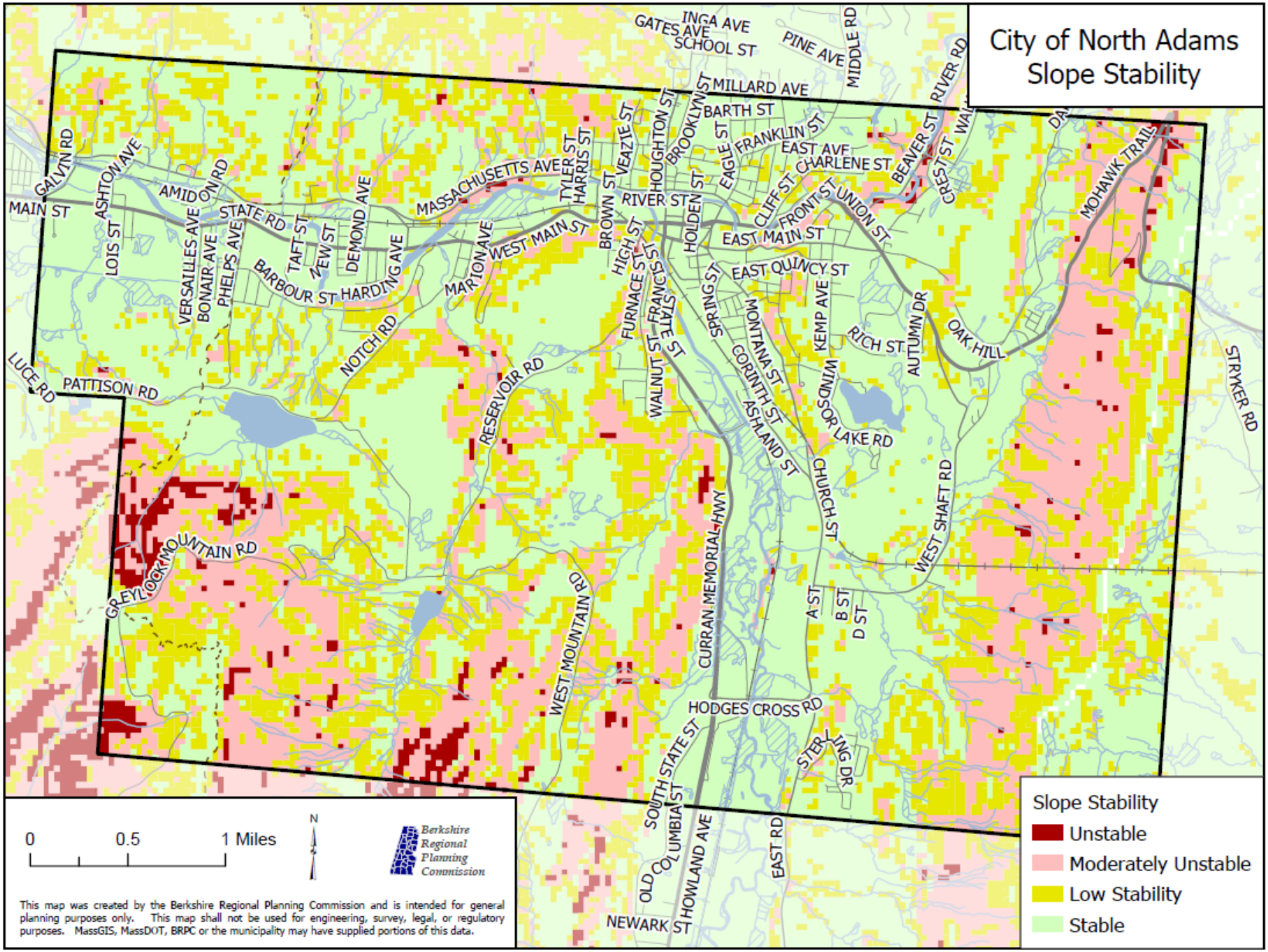
MAIN ST
GALVIN RD
ASHTON AVE
AMIDON RD
LOIS ST
VERSAILLES AVE
BONAIR AVE
PHELPS AVE
STATE RD
TAFT ST
NEW ST
BARBOUR ST
DEMOND AVE
HARDING AVE
MASSACHUSETTS AVE
MARION AVE
WEST MAIN ST
TYLER ST
HARRIS ST
BROWN ST
VEAZIE ST
HOUGHTON ST
BROOKLYN ST
RIVER ST
HOLDEN ST
HIGH ST
FURNACE ST
FRANCIS ST
STATE ST
WALNUT ST
SPRING ST
MONTANA ST
CORINTH ST
ASHLAND ST
CHURCH ST
WINDSOR LAKE RD
KEMP AVE
RICH ST
AUTUMN DR
OAK HILL
EAST QUINCY ST
EAST MAIN ST
FRONT ST
UNION ST
CLIFF ST
EAGLE ST
FRANKLIN ST
EAST AVE
CHARLENE ST
BARTH ST
MILLARD AVE
SCHOOL ST
GATES AVE
INGA AVE
PINE AVE
MIDDLE RD
BEAVER ST
CREST ST
RIVER R
MOHAWK TRAIL
STRYKER RD
WEST SHAFT RD
A ST
B ST
D ST
CURRAN MEMORIAL HWY
HODGES CROSS RD
SOUTH STATE ST
OLD COLUMBIA ST
HOWLAND AVE
NEWARK ST
EAST RD
STERLING DR
WEST MOUNTAIN RD
RESERVOIR RD
NOTCH RD
GREYLOCK MOUNTAIN RD
PATTISON RD
LUCE RD


City of North Adams
Slope Stability
GATES AVE
INGA AVE
SCHOOL ST
PINE AVE
MIDDLE RD
MILLARD AVE
BARTH ST
RIVER RD
BROOKLYN ST
VEAZIE ST
HOUGHTON ST
EAGLE ST
FRANKLIN ST
EAST AVE
CHARLENE ST
BEAVER ST
CREST ST
MOHAWK TRAIL
GALVIN RD
ASHTON AVE
AMIDON RD
MAIN ST
LOIS ST
VERSAILLES AVE
BONAIR AVE
PHELPS AVE
STATE RD
TAFT ST
NEW ST
DEMOND AVE
MASSACHUSETTS AVE
TYLER ST
HARRIS ST
BROWN ST
RIVER ST
HOLDEN ST
CLIFF ST
FRONT ST
UNION ST
EAST MAIN ST
WEST MAIN ST
MARION AVE
BARBOUR ST
HARDING AVE
HIGH ST
FURNACE ST
FRANCIS ST
STATE ST
WALNUT ST
SPRING ST
EAST QUINCY ST
MONTANA ST
CORINTH ST
KEMP AVE
RICH ST
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PATTISON RD
NOTCH RD
RESERVOIR RD
ASHLAND ST
WINDSOR LAKE RD
CHURCH ST
WEST SHAFT RD
GREYLOCK MOUNTAIN RD
WEST MOUNTAIN RD
CURRAN MEMORIAL HWY
A ST
B ST
D ST
HODGES CROSS RD
STERLING DR
SOUTH STATE ST
OLD COLUMBIA ST
HOWLAND AVE
EAST RD
NEWARK ST
0
0.5
1 Miles
N
Berkshire Regional Planning Commission
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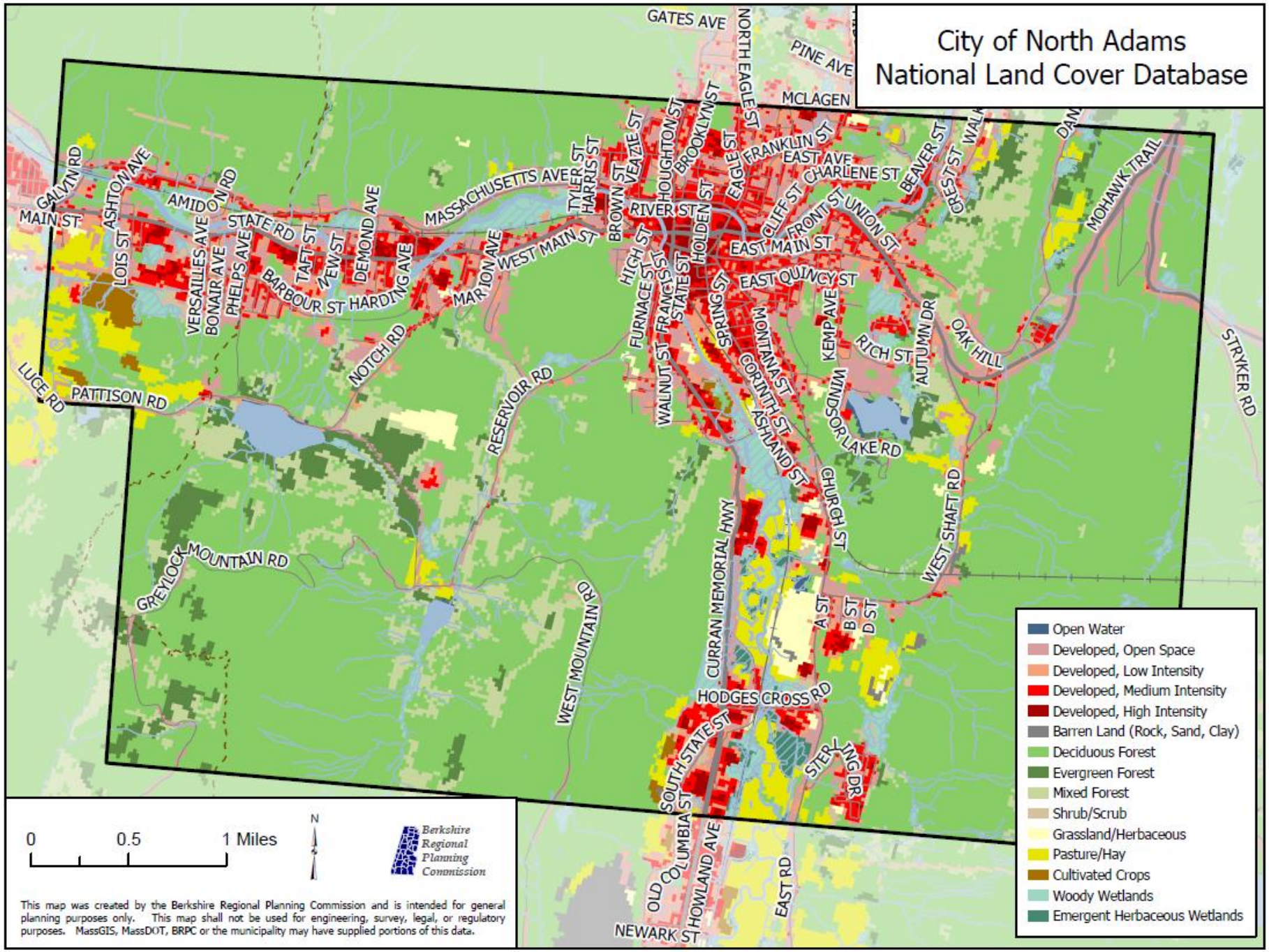
Slope Stability
Unstable
Moderately Unstable
Low Stability
Stable


City of North Adams
National Land Cover Database
GATES AVE
NORTH EAGLE ST
PINE AVE
MCLAGEN
MASSACHUSETTS AVE
MAIN ST
GALVIN RD
ASHTON AVE
AMIDON RD
STATE RD
LOIS ST
VERSAILLES AVE
BONAIR AVE
PHELPS AVE
TAFT ST
NEW ST
DEMOND AVE
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BROWN ST
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CHURCH ST
WEST SHAFT RD
A ST
B ST
D ST
HODGES CROSS RD
SOUTH STATE ST
STERLING DR
OLD COLUMBIA ST
HOWLAND AVE
EAST RD
NEWARK ST
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1 Miles
N
Berkshire Regional Planning Commission
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Open Water
Developed, Open Space
Developed, Low Intensity
Developed, Medium Intensity
Developed, High Intensity
Barren Land (Rock, Sand, Clay)
Deciduous Forest
Evergreen Forest
Mixed Forest
Shrub/Scrub
Grassland/Herbaceous
Pasture/Hay
Cultivated Crops
Woody Wetlands
Emergent Herbaceous Wetlands

Appendix B: PowerPoint Presentation

MUNICIPAL VULNERABILITY PREPAREDNESS FOR NORTH ADAMS

PUBLIC SESSION
MAY 28TH, 2019

GOALS MVP PLANNING

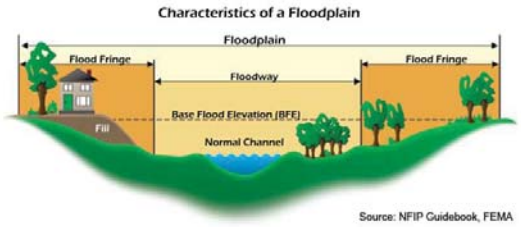
- Understand connections between ongoing community issues, climate change and natural hazards, and local planning and actions in the municipality;
- Understand how climate change will exacerbate or lead to new community issues, hazards and other challenges the municipality faces;
- Identify infrastructural, societal, and environmental vulnerabilities and evaluate strengths that help make the community more resilient to climate change and natural hazards;

GOALS OF MVP PLANNING (CONTINUED)

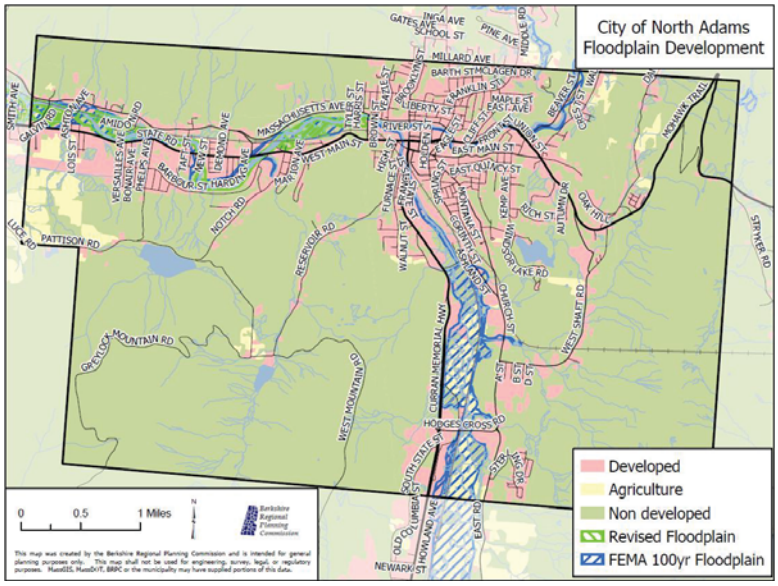
- EXPLORE NATURE-BASED SOLUTIONS TO BUILD RESILIENCY IN THE MUNICIPALITY;
- DEVELOP AND PRIORITIZE ACTIONS AND CLEARLY DELINEATE NEXT STEPS FOR THE MUNICIPALITY, LOCAL ORGANIZATIONS, BUSINESSES, PRIVATE CITIZENS, NEIGHBORHOODS, AND COMMUNITY GROUPS;
- IDENTIFY OPPORTUNITIES FOR THE MUNICIPALITY TO ADVANCE ACTIONS THAT FURTHER REDUCE RISKS AND IMPACTS OF CLIMATE CHANGE AND NATURAL HAZARDS AND INCREASE LOCAL AND REGIONAL RESILIENCE.

CLIMATE CHANGE - MORE THAN SEA LEVEL RISE

WHAT IT COULD LOOK LIKE HERE



WE BUILT IN THE FLOODPLAIN



YOUR HAZARD MITIGATION PLAN

Inland Flooding	Severe Winter Storms	Droughts	Changing in Average Temperature	Extreme Temperatures
Tornadoes	High Wind	Landslides	Wildfires	Hurricanes/ Tropical Storms
Other Severe Weather	Invasive Species	Earthquakes	Dam Failure	Railroad

HAZARD MITIGATION PLANNING

IDENTIFY AND PRIORITIZE NATURAL HAZARDS

EXAMINE THE POTENTIAL IMPACTS ON PEOPLE, ENVIRONMENT, AND BUILT INFRASTRUCTURE

DEVELOP STRATEGIES TO PREVENT OR MINIMIZE THOSE IMPACTS

WHAT IS HAPPENING NOW?

CHANGES IN PRECIPITATION AND TEMPERATURE

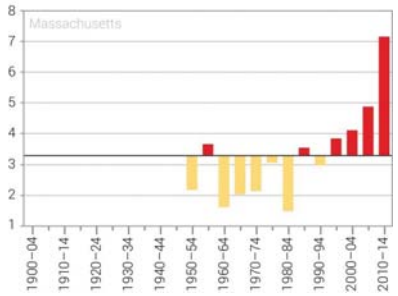
IN NORTH ADAMS

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

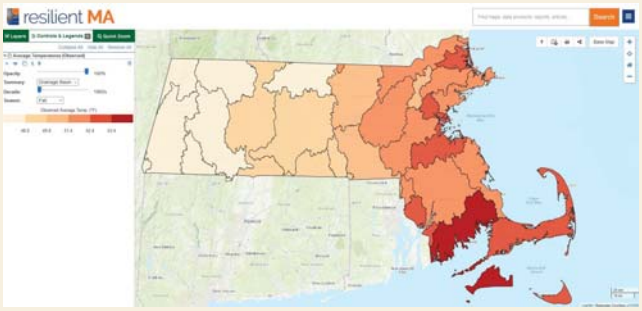
Growing Season: 10 Days
Since 1950

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

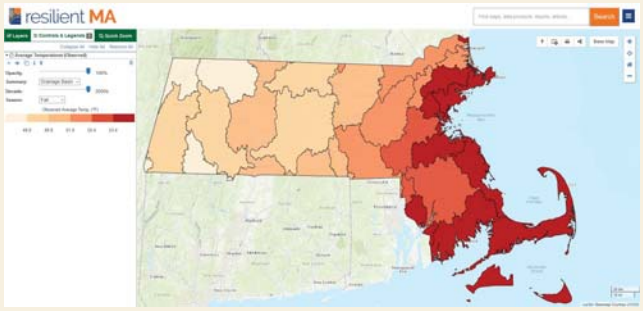
OF NIGHTS WHERE MINIMUM TEMPERATURE GREATER THAN 70°F



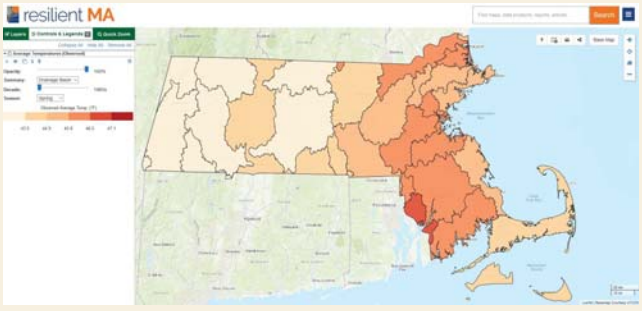
OBSERVED AVERAGE TEMPERATURE FALL 1960S



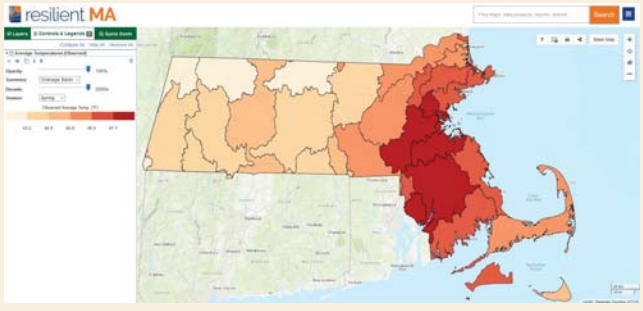
OBSERVED AVERAGE TEMPERATURE FALL 2000S



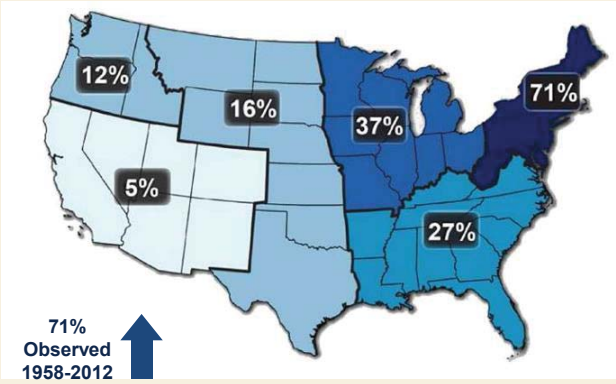
OBSERVED AVERAGE TEMPERATURE SPRING 1960S



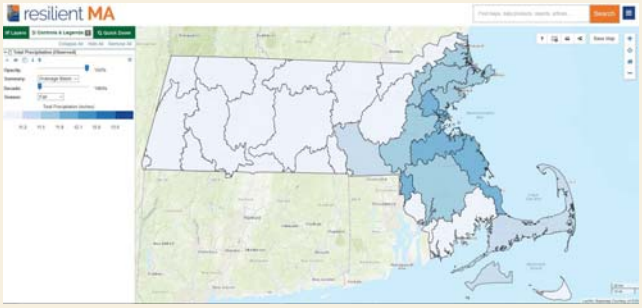
OBSERVED AVERAGE TEMPERATURE SPRING 2000S



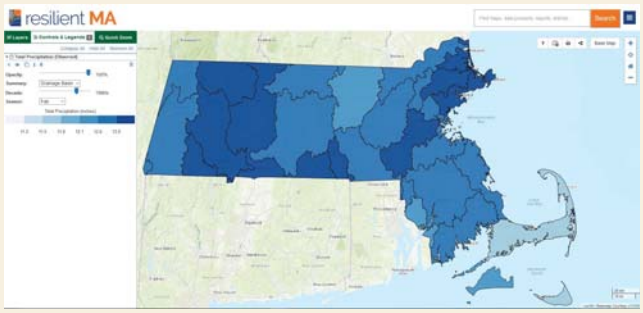
INCREASE IN EXTREME PRECIPITATION



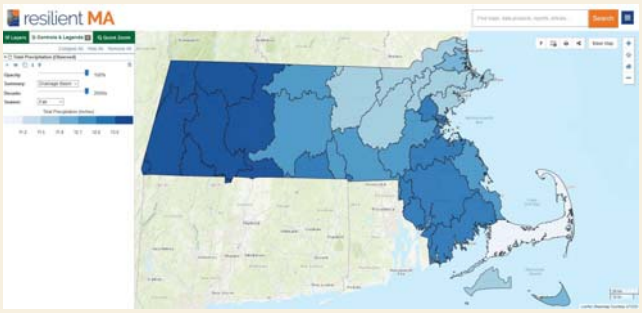
OBSERVED TOTAL PRECIPITATION FALL 1960S

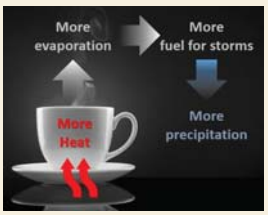


OBSERVED TOTAL PRECIPITATION FALL 1990S



OBSERVED TOTAL PRECIPITATION FALL 2000S





IT IS MORE THAN FLOODING

CLIMATE CHANGE INCREASES
THE NUMBER AND GEOGRAPHIC RANGE OF DISEASE-CARRYING

INSECTS AND TICKS

Climate change poses many risks to human health. Some health impacts of climate change are already being felt in the United States. We need to safeguard our communities by protecting people's health, wellbeing, and quality of life from climate change impacts. Many communities are already taking steps to address these public health issues and reduce the risk of harm.

BACKGROUND

When we burn fossil fuels, such as coal and gas, we release carbon dioxide (CO_2). CO_2 builds up in the atmosphere and causes Earth's temperature to rise, much like a blanket traps in heat. This extra trapped heat disrupts many of the interconnected systems in our environment.

One way climate change might affect human health is by increasing the risk of vector-borne diseases. A vector is any organism – such as fleas, ticks, or mosquitoes – that can transmit a pathogen, or infectious agent, from one host to another. Because warmer average temperatures can mean longer warm seasons, earlier spring seasons, shorter and milder winters, and hotter summers, conditions might become more hospitable for many carriers of vector-borne diseases.

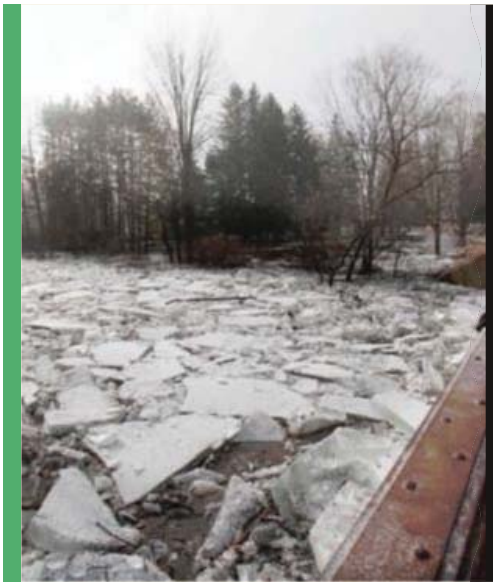
Invasive and Pest Insects in Berkshire County Threatening Forest Health

Insect	Origin	Host Trees	DCR-Management Approach
Gypsy Moth	Introduced (Invasive)	Oaks, other deciduous species	Discovered in 1869, the current management approach relies on natural population controls- naturally abundant virus and fungus populations regulate gypsy moth population cycles.
Hemlock Woolly Adelgid	Introduced (Invasive)	Eastern hemlock	Discovered in 1989, two biocontrol species, Pseudoscymnus tsugae and Laricobius nigrinus, have been released in MA to limited establishment success.
Southern Pine Beetle	Native	Pitch pine	Population densities are being monitored through annual trapping. The impacts of climate change could significantly alter southern pine beetle generation periods and devastate pitch pine stands.
Emerald Ash Borer	Introduced (Invasive)	All ash species	Discovered in 2012, three biocontrol species, Tetrastichus planipennisi, Spathius galinae, and Oobius agrili, have successfully been released in MA. Continued releases are planned.
White Pine Needlecast	Native	Eastern white pines	White pine defoliation is being monitored across the state. Needlecast has been identified to be caused by multiple fungal pathogens; the most prevalent agent in Massachusetts is Lecanosticta acicola.

INCREASED INSECT SURVIVAL

DESPITE THE INCREASED PRECIPITATION, IT IS DRIER DUE TO INCREASED TEMPERATURE AND EVAPORATION

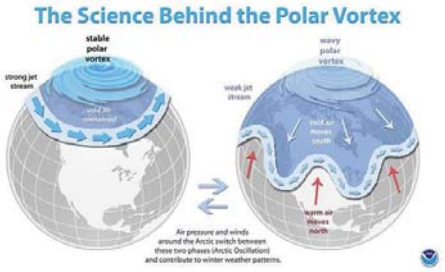
DROUGHT AND DRY CONDITIONS CAN LEAD TO FOREST FIRE AND WATER SHORTAGE



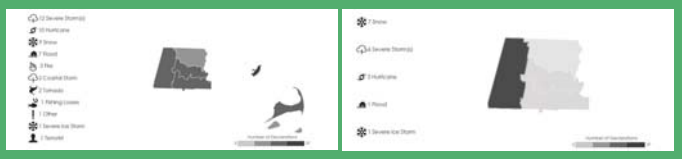
WINTER WEATHER CHANGES

- Ice Jams
- Rain on snow = flooding
- Rain on frozen ground = flooding
- Warmer ground temperatures allow ticks to survive the winter
- Decreased snow pack for gradual groundwater recharge
- Rain followed by freezing temperatures leading to dangerous road conditions

SNOW IN APRIL?

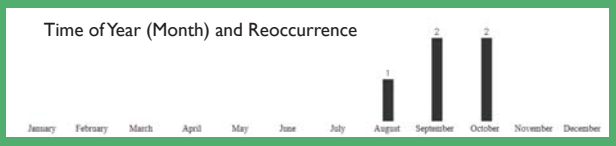


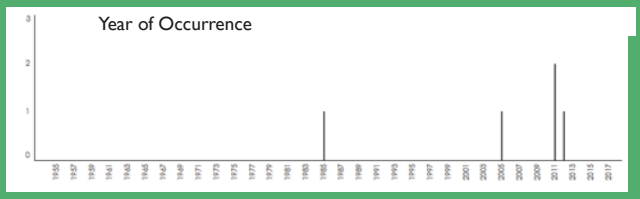
49 DECLARED DISASTERS IN MASSACHUSETTS SINCE 1953



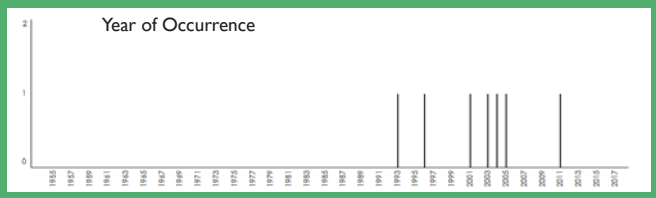
20 DECLARED DISASTERS IN BERKSHIRE COUNTY SINCE 1953

HURRICANES IN BERKSHIRE COUNTY

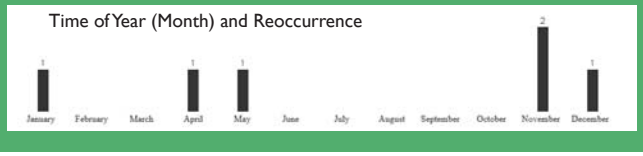




SNOW DECLARATIONS IN BERKSHIRE COUNTY



SEVERE STORM DECLARATIONS IN BERKSHIRE COUNTY

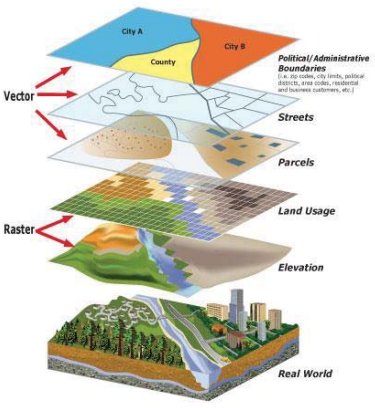


BEEN THERE DONE THAT

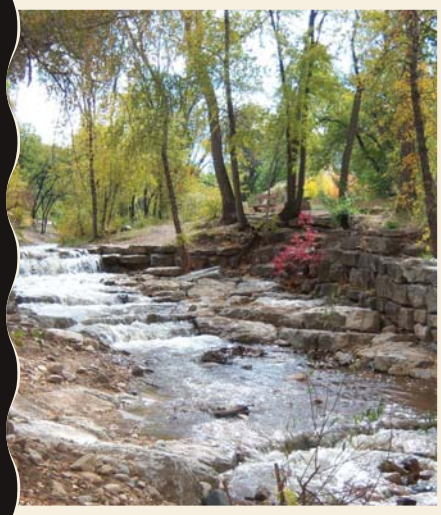
THE ARMY CORPS OF ENGINEERS (USACE) DID THIS ALL OVER THE COUNTRY

WHAT ARE OUR OPTIONS?

ZONING TO GUIDE SMART DEVELOPMENT



PERMEABLE PAVEMENT



STREAM DAYLIGHTING

The Tujunga Wash Greenway recreates a historic streambed in Los Angeles. The concrete flood channel (left, beyond the trail) remains in place to handle water from large storms.

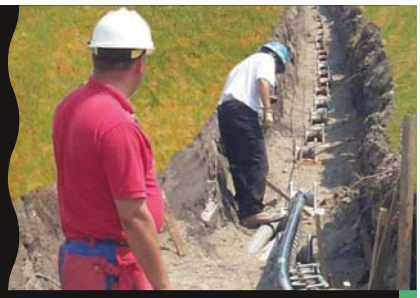
STORMWATER RETENTION PARKS

THIS PARK CAN HOLD TWO MILLION GALLONS OF STORMWATER

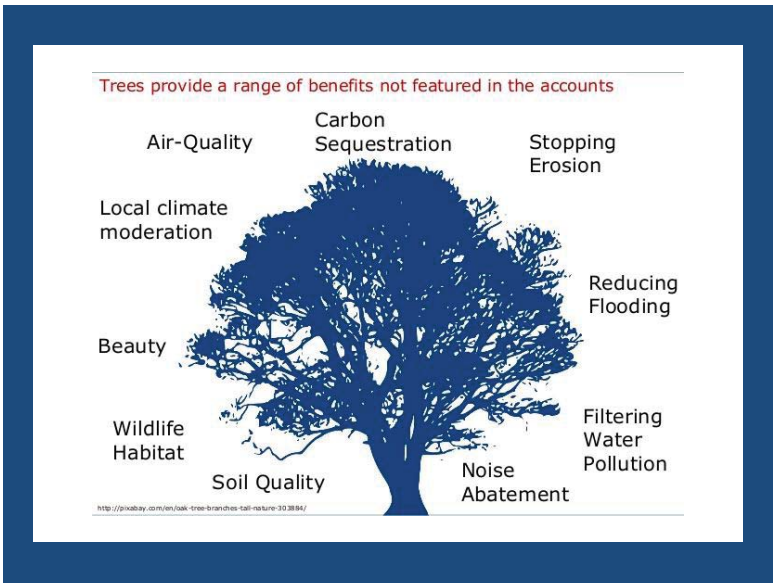
BIOSWALES… THEY CAN GO ANYWHERE

LETS NOT FORGET THE OTHER HAZARDS

BURY THE POWERLINES



LIVING FENCES TO MITIGATE WIND AND DRIFTING SNOW



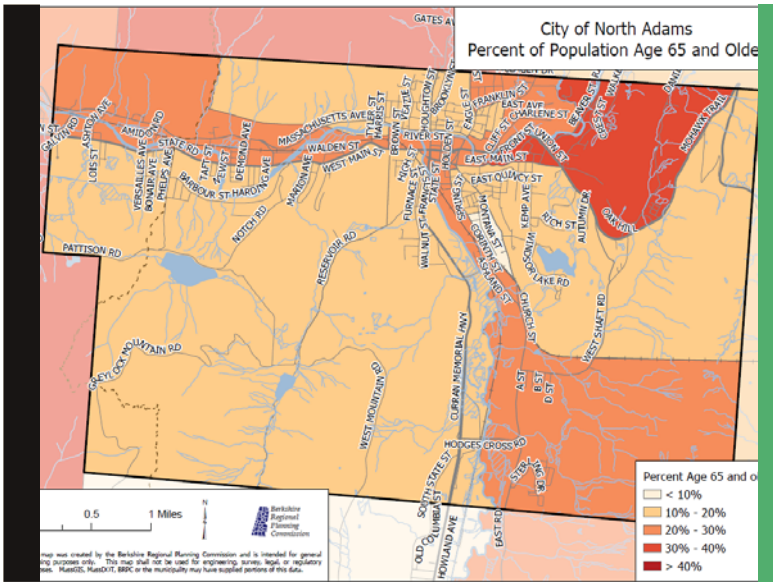
FEMA TOOLS FOR EVALUATING ECOSYSTEM SERVICES

- Benefit-Cost Analysis Tools for Drought, Ecosystem Services, and Post-Wildfire Mitigation for Hazard Mitigation Assistance
- Ecosystem Service Benefits Calculator
- Aquifer Storage and Recovery Benefit Cost Analysis Calculator Tool
- Supplemental Guidance for Conducting a Benefit Cost Analysis for Floodplain and Stream Restoration Projects

COMMUNITY NETWORKS ARE KEY TO RESILIENCE

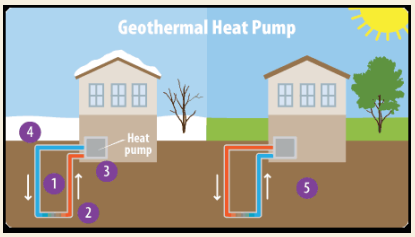
COMMUNICATION

- How can we inform community members on hazards and ways to stay safe?
- How will we check on our most vulnerable populations in hazardous conditions?
- How will we come together to recover from a disaster event to be stronger for next time?



SIMPLE ACTIONS FOR YOUR HOME OR BUSINESS

GEOTHERMAL – OFF THE GRID OPTION



INSECT AND TICK CONTROL

YOUR LOCAL KNOWLEDGE, PRIORITIES, AND IDEAS

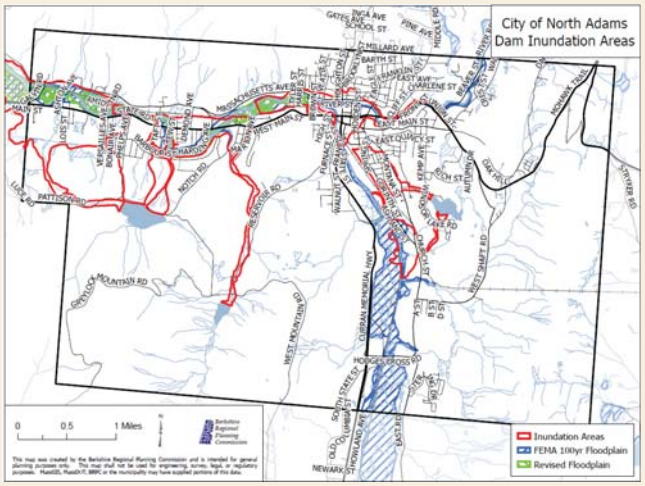
Each group's top 4 hazards

Community Resilience Building Risk Matrix www.Commun

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

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthqu

Features	Location	Ownership	V or S			
Infrastructural						
Societal						
Environmental						

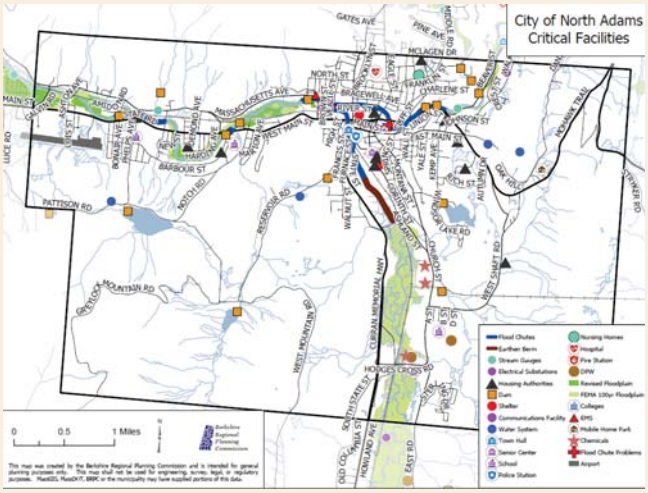


"FEATURES"

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



WORKSHOP RESULTS

- Top Hazards
  - There were three hazards that MVP workshop participants highlighted above the rest - flood, wind, and snow.
  - Flooding concerns included rain, severe storms, fast runoff, and extreme precipitation. Snow hazards encompassed ice storms, snowstorms, and severe winter storms.
  - The other top hazards discussed were fire, drought, landslide, extreme temperatures, and the railroad.

WORKSHOP RESULTS

- REPC is the a huge strength for North Adams
- Top Vulnerabilities
  - Bridges and culverts in need of repair or replacement
  - Flooding of roads around the MCLA campus
  - Water infrastructure : mapping and smaller grids for emergency shutoffs needed
  - Stormwater water system capacity
  - Flood chutes at the end of their life
  - Communication towers

NEXT STEPS

- Identify funding sources
  - MEMA/ FEMA
  - EOEEA
    - MVP
    - Planning Assistance grants
  - Army Corps
  - National Fish and Wildlife Foundation
  - City budget
  - Public-private partnerships

FOCUSED STUDIES AND ENGINEERING

- Hydrologic and hydraulic studies (H&H)
- Culvert assessments
- Modeling of diversion options
- Planning
- Cost benefit analysis
- And others

Appendix C: Completed CRB Matrices

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

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

Features	Location	Ownership	V or S	FLOOD	SNOW	WIND	DROUGHT	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Flooding of roads and MCLA campus - Ashland, Hodges Cross Oak Hill Rds, MCLA townhouse basements	MCLA Campus	City, MCLA	V	Dredge river at Hodges Cross Rd vicinity and downstream; investigate retention/detention mechanisms upstream of flood areas				H	S
Water shutoffs of large areas of city during water main breaks; need to improve shutoffs to limited areas only where needed	citywide	City Public Works	V	GIS city pipe system; identify sections, controls, to be able to shut off area limited to area of work				H	S
Railroad runs through large wetland - can't access for emergency response (such as derailment, chemical spill)	wetlands east of Rt 8	RR, City, REPC	V	Create maps & rate each section of RR for access & type of equipment that can go there; coordinate with RR to maintain improve tracks to minimize damage risk				L	L
Chemical storage at DPW and other sites in floodplain; establish evacuation routes - especially for college	Old State St, Ashland St	City, Private owners, REPC	V	Create evacuation routes and maps for primary & alternate routes; avoid hazard roads that flood; communicate routes to public (possible signage); training/education with follow up site visits for business owners; help owners of flood prone properties				M	O
Revise floodplain boundaries to show current flood areas and conditions	Rt 8 near Bounty Fare	City, MEMA, MassDOT	V	Identify why more flooding occurring here - from new development? If development caused, mitigate runoff in future development, including solar projects; re-evaluate floodplain boundaries				L	L
Storm drain systems flood and manhole covers pop off - even in 30 minute burst storms (not even 100 yr event)	Brown, Beaver, Houghton, Galvin, The Porches	City	V	City Public Works to identify, prioritize infrastructure improvements				H	S
Maintain flood chutes! Work well but fill up near top more often - well below 100-yr event level; filling up more often consistently with severe storm data	concrete chutes	City, Army Corp of Engineers	S	Re-evaluate holding capacity of chutes for severe rain event; consider up- and downstream naturalization as long-term fix				H	S
Mt. Williams Reservoir overflows into Paull Brook; good Spruces population relocated	Rt 2, Spruces flood	City, MassDOT	S	Good that Rt 2 culvert fixed and Spruces homeowners out of flood zone				L	O
Old Sprague dam allows Church St to flood	Church St	City, dam owner	V	Check with City to see if work already done to repair street drainage; conduct study to see if dam should be removed; Possible mitigation to stream flooding might be slowing				M	L
Runoff from Bradley St down into MCLA Hoosac parking lot and into Campus Center	Bradley St, MCLS	City, MCLA	V	Investigate & redesign storm drain system; retain/infiltration system on MCLA to accept/hold Bradley St, parking and Towers runoff				H	S
Flood Chutes	MoCA; Willow St	City	V	Access funding; increase frequency of maintenance; redesign/rebuild				H	L
Street Flooding	Ashland St; State St; River St	City	V	Replace and upsize culverts.				H	O
Damaged & undersized Culverts	Galvin Rd; Ashland St; Houghton St; Wood St; Church St; Hoosic St	City	V	Debris clearing & maintenance; replacement & upsizing. Bioswales and permeable surfaces.				H	O
Dams: Risk of Failure	Windsor Lake; Eclipse; WMS & Notch Res.	City	V	Yearly inspections and increased maintenance and monitoring.	Maintenance & debris clearing.			H	L

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

Features	Location	Ownership	V or S	FLOOD	SNOW	WIND	DROUGHT	Priority H-M-L	Time Short Long Ongoing
Storm Drainage	Citywide	City	V	Replace where necessary. Improve mapping & monitoring; digitize records.				H	L
Water & Sewer Line	Citywide	City	V	Replace where necessary. Improve mapping & monitoring; digitize records.				H	L
Interceptor Line	West End	City	V	Erosion has exposed the line. Conduct studies to determine course of action to stabilize banks				H	O
Flood Control--Earthen Berm	Versailles Ave	City	V	Increase frequency of inspections & maintenance				H	L
Pan-Am SPFLD Term Railway--Stream-crossing bridge	Throughout City	Pan-Am	V	Improve communications w/Pan-Am				M	O
Mills and Schools (critical infrastructure in Floodplain)	Floodplain	City	V	Culvert replacement/upsizing	Update/upgrade electrical grid			L	O
Riverview & Greylock Apartments	Floodplain	City Public Housing Authority	V		Repair/replace roofing & siding			L	O
HA George Propane Storage Facility	Ashland Street	HA George	V	Regular inspections/maintenance of Windsor Lake Dams				L	O
Cell & Radio Towers	Rt 2 (Florida Mtn)	ATT/Verizon	V		Add receivers at hospital for backup location. Work with National Grid to access Greylock Tower.			M	L
New street bridge needs major repair	New Street	State	V	Bridge needs to be evaluated, replaced. Considerations should be made for temporary alternate route.				H	L
Bridge on West Main/State in need of repair	West Main	State	V	Bridge needs to be evaluated, replaced. Considerations should be made for temporary alternate route.				H	L
Damage toward beginning of flood chute, chute panels need to be replaced	Near Mass MoCA	City	V	Needs to be repair, consider tiered floodplain, amphitheater, and other green features that could be used to help absorb water. Plant more vegetation.				M/L	L
New bridge on state St. near city hall	State St.	State	S	Continue maintenance and inspections				L	L
Barbour Street completely washed out	Barbour Street	City	V	Road is split in two, would be a good place for walking/green infrastructure, more sophisticated flood prevention, maybe part of rail trail plan.				L	L
Windsor pond would drastically flood if dam broke	Flood inundation area	City	V	Continue inspections and maintenance				M	L/O
Mt. Williams Reservoir was low during drought in 1950's	Service area	City	V	Check city emergency plan and add process for redundancy if needed.				M	S
Capacity of the Hoosic River	Citywide	City	V	Dredge river and chutes, Create retention basins				H	S & L
Dams	Citywide	City	V & S	Repair and maintain dams, Make economically viable through turbines				M	OL
Flood chutes	Citywide	City / USACE	V & S	Conduct engineering study to determine what needs to be done to last another 50 years Support work with Hoosic River Revival				H	SL
Residential and Municipal retaining walls	Citywide	Private and municipal	V	Replace and repair retaining walls as needed				H/M/L	L
Outdated FEMA maps	Citywide	FEMA	V	Request FEMA update the FIRM maps				M	S
Hoosic River eroding near State Road	City (west)	City	V	Place Rip-Rap along river, and rebuild road				M	L
PanAM	Rail tracks	PanAm	V	Maintain and replace tracks, Design improvements around tracks				M	L
Fire and Police Station	Downtown	City	V & S	Design new station and secure funding				H	O
Stormwater	Citywide (mostly Southwest)	City	V	Survey, Engineer, Redesign				H	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	FLOOD	SNOW	WIND	Priority H-M-L	Time Short Long Ongoing
Societal								
Ambulance access threatened in severe storm events	off River St	REPC, City	V	Establish criteria for establishing new Emergency Operations Center (EOC): no RR near by, no flooding, accessible from several routes - Sullivan School meets all these criteria			H	S
Electric substation located right on Hoosic River	Brown St.	Nat'l Grid, REPC	S	Flood chutes saved it so far			L	L
Water main breaks result in shut off water across city or wide area; crews can't find the break and section shut offs/controls	Citywide	City Public Works	V	GPS the system and identify section controls to shut down more efficiently for less impacts; avoid shutting down whole city			H	O
Severe wind threat to communication towers	Locations in N. County	REPC, MEMA	V		Need more redundancy in areas that are less prone to wind and other risks		H	S
Electric outages less severe than rural towns, but City not prepared for long-term outage - only has 1 generator	Citywide	REPC	S/V	City needs more generators; MCLA has generators at campus and extra shelter capacity and has diesel stored; could serve as short term emergency option			H	S
Mosquitos - more than in the past	Citywide	NA Bd Health	V	Install bat boxes on city bldgs. and properties; consider spraying but only after testing shows need and then keep track of data			M	O
Vulnerable populations: College, Ashland (seniors, disabled), City Housing near RR & flood areas - these need evacuating	Various areas	City, REPC	V	Develop transportation plan with City, Housing Auth., private transportation companies			H	S
Landslide concern behind MCLA Towers; water rushes down site & street - concern during TS Irene where sandbags used	MCLA Towers Dorm	MCLA, City	V	Need evacuation map & routes; create or identify pick up areas for people			H	S
REPC Sheltering - St Elizabeth no ADA showers, no generator	Citywide	REPC	S/V	Plan for City and College to house their own populations, but coordinate/share resources for a win/win response; College did have to evac. Residents & REPC provided beds & supplies			H	S
REPC has experience in opening EOCs; recognized as #1 emergency planners in U.S. with $0 budget; got award in D.C.	Citywide	REPC	S	Build on experience and success of REPC			M	O
No swift water rescue team in Berkshire, VT, NY	Region	REPC, MEMA, MA Fire Service	V	Establish a swift water rescue team			H	S
Addiction population & others with health issues need meds in shelter	REPC, medical community	REPC	V	Policy needed for dealing with meds in shelter; alternate location or area within shelter for med distribution			H	S
Mutual Aid (Agencies/Municipalities/Volunteers)	No Borders	All	S	Increase attendance at Emergency Regional Planning Meetings. Share equipment with neighboring municipalities.			M	O
Code Red	Baptist Church	N/A	V	Utilize reverse 911 & social media to broadcast information.			M	O
Sirens	N/A	N/A	V	Currently no system in place; explore ways to create a city-wide emergency broadcast system.			L	O
Strong Support	Citywide	City	S	Strengthen support by increasing community outreach & adding bilingual professional support/development, especially for EMS.			L	O

Societal continued...

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

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

Features	Location	Ownership	V or S	FLOOD	SNOW	WIND	Priority H-M-L	Time Short Long Ongoing
Text Alert	Citywide	City	V	Add multilingual capacity to text alert system.			L	O
More people are moving into North Adams and buying housing stock	Citywide	City	S	City/Gov't can consider zoning efforts and overlays for improvements and paving in flood prone areas			M/H	L/O
Lack of sufficient public transportation, will be greater need in future years	Citywide	City/State	V	Promote use of public transportation, education, and show benefits of public transport to help justify more funding and buses.			M	L
People wait for bus outside for long periods of time in bad weather	Citywide	City/State	V	Major bus stops should all have coverage and possibly heating to encourage more bus use.			M	S
No breakfast program for homeless people/economically disadvantaged	Citywide	City	V	Need to identify new location to serve breakfast funding sources/volunteer issues. This location should be downtown. Combine efforts with locations that already serve lunch, maybe expand the food pantry.			H	O
COA has on-call bus and serves hot meals, church serve hot meals	Citywide	City	S	Continue efforts and expand as needed			H	O
Louison House	Adams, North Adams	City	S	Continue efforts and expand as needed			H	O
Lunch program for kids in Summer, breakfast program during year	Citywide	City	S	Continue efforts and expand as needed			H	O
Populations get cut off from the rest of the city during storms	City	City	V	Increase height of bridges and size of culverts, Purchase temporary bridges			L, M	L
Code Red	City	City	S	Get the word out on using Code RED			M	O
Emergency Response Plans and the REPC	City	City	S	Continue participating in the REPC and maintain plans			H	O
Wireless Communications	City	City	V	Support new tower at MCLA			M	O
Hospital	City	BHS	V	Advocate for increased capacity			M	O
Big Events	MASS MoCA	MoCA/ City	V	Improve signage for entering and departing events			M	S

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	FLOOD	SNOW	WIND	OTHER	Priority H-M-L	Time Short Long Ongoing
Environmental									
Specialty Minerals has purchased land in N. Adams north of their current site	SW corner of City/Adams town line	City permitting authorities, planners, Spec Minerals	S/V	Company has environmental practices in place; enforce environmental regulations & require mitigation to reduce flooding				L	L
Can natural improvements proposed by Hoosic River Revival south/upstream of City work to reduce flooding?	Main Stem Hoosic River	City, Hoosic River Revival, USACE	V	Support efforts to protect and enhance river system to withstand severe storms and mitigate downstream flooding				L	L
Transport of Hazardous Materials via Railroad	Throughout City & Floodplain	Pan AM	V	Increase engagement with Pan AM				M	O
Downed Timber near Critical Infrastructure	Reservoirs	City	V	Increase maintenance around dams.	Contract tree removal in critical places.			M	O
Erosion	West End River Banks	City	V	Stabilize banks via nature-based solutions.				H	O
Wood turtles Endangered Habitat	West End of Hoosic River	City	V	Increase engagement w/appropriate agency to determine how to solve issues.				L	O
More ticks and tickborne illnesses	Citywide	City	V	Consider bat boxes in the short term, promote responsible chicken raising, educate residents about standing water, checking self for ticks, tick cards. Consider offering tick twisters as a community giveaway.				M/H	S
Positive tests for West Nile Virus	Citywide	City	V	Consider bat boxes in the short term, promote responsible chicken raising, educate residents about standing water, checking self for ticks, tick cards. Consider offering tick twisters as a community giveaway.				M/H	S
Increase in rat population and use of rat poisons, rabies in wild animal populations	Citywide	City	V	Bat and owl box program for downtown area. Educate public about public health concerns.				M/H	S
Insufficient active forest management	Citywide	State	V	Forest management improvements.				M/H	L
Beavers	City	City	V	Hire trapper, Streamline the process for removal				H	S
Buildup of debris, underbrush	Clarksburg SF	DCR	V	Improve management and increase harvesting, Educate AT users about fire danger				H	O
Crows	Citywide / Brown St	City / National Grid	V				Increase hunting Increase use of sonic deterrents	L	O
Insect and wildlife pests	City	DCR / Private / City	V				Increase education on control Allow chickens at residential properties	H	O