TOWN OF MONSON

March 16, 2019

Municipal Vulnerably Preparedness
Community Resiliency Building Workshop

SUMMARY OF FINDINGS

Prepared and Presented by

Pioneer Valley Planning Commission
Daniel Laroche, Town of Monson

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OVERVIEW

The need for municipalities, regional planning organizations, and state and federal agencies to increase resilience and adapt to extreme weather events and mounting natural hazards is strikingly evident in the Pioneer Valley Town of Monson. On June 1, 2011, an F3 tornado, a weather event with wind speeds between 150 and 200 miles per hour that was previously unheard of in this part of the country, raked through the center of Monson leaving a wake of shock and devastation behind. Severe weather events of this magnitude are rare in the Pioneer Valley, but in Monson they will long be a part of the collective public awareness.

Since the tornado, less severe events such as the 2016 drought, extreme cold spells in the winter of 2017-2018, and the October snow storm of 2011 have perhaps struck Monson residents even more than others in New England as forces of a changing climate, reinforcing an urgency and compelling communities to proactively plan and mitigate potential risks through new, community driven means. Ultimately, the leadership demonstrated by Monson's efforts both in recovery from the 2011 tornado, and its participation in the Municipal Vulnerability Preparedness (MVP) Planning Process, will reduce the exposure and vulnerability of its citizens, infrastructure and ecosystems to the future impacts of climate change. Monson's example of steadfast focus and resolve in the face of unthinkable circumstances also contributes to the greater climate resilience, awareness, and preparedness of the entire Pioneer Valley region.

Figure 1. Monson's historic downtown is the center for business, government, and civic life, and also nestled in the Valley of the Chicopee Brook which is a frequent source of flooding. Source: LostNewEngland

Recognizing the importance of both mitigation and adaptation strategies to deal with the challenges of climate change, the Town of Monson used the MVP Planning Grant as an opportunity to build on existing work in the Town, some of which was initiated in the aftermath of the 2011 weather events. The Town is an active participant in the National Flood Insurance Program (NFIP), is a certified Green Community, and boasts proactive zoning districts to protect its natural resources, such as the Water Supply Protection District (overlay) and Floodplain District. Other provisions used by the town to reduce climate vulnerability include its Stormwater Bylaw and Open Space Communities Bylaw, both of which

guide new development practices in ways that will preserve the town's natural resources for future generations. Monson also has a commendable record of land protection in town, and active community preservation and conservation commissions that continually pursue land protection opportunities and grants, and who carefully review proposed developments to assure they do not increase Monson's vulnerability.

In 2018, the Town Administrator and Town Planner worked with the Department Heads Committee to secure a competitive MVP planning grant from the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) to advance a Community Resilience Building workshop under the MVP program. The core directive of the MVP program is to engage community stakeholders to facilitate the education, planning and ultimate implementation of priority climate change adaptation actions. Upon completion of the MVP process the Town will achieve MVP certified community status from EOEEA and become eligible to apply for MVP Action grants and receive preference on select future state grants.

The MVP process builds on the community's Hazard Mitigation planning process and this report provides an overview of the top hazards, current concerns and challenges, strengths, and proposed actions that emerged out of the Community Resilience Building workshops. When implemented, these priority actions will improve the Town of Monson's resilience to natural and climate-related hazards today and in the future.

Figure 2. Workshop participants begin to take their seats around small group tables. Source: PVPC.

COMMUNITY RESILIENCE BUILDING WORKSHOP

The Town of Monson employed a unique "anywhere at any scale", community-driven process known as the Community Resilience Building framework to host two 4-hour workshops on February 20th and 27th, 2019. The list of workshop invitees and workshop content was guided by input from an interdisciplinary core MVP team comprised of Town officials and consultants from the Pioneer Valley Planning Commission. The workshop's central objectives were to:

- Affirm community consensus of the local meaning of extreme weather and local natural and climate-related hazards;
- Identify existing and future vulnerabilities and strengths;
- Develop and prioritize actions for the Town and a broad stakeholder network;
- Identify opportunities for the Town to advance actions to reduce risk and increase resilience.

Approximately 14 participants from Town departments, local boards and committees, public safety and emergency management, community organizations, utility providers and local businesses attended the workshop, which included a combination of large group presentations and small group activities. The day began with an overview of the Town's resilience efforts and experience with severe weather since the tornado presented by the Town Administrator, who previously served as the Town's Emergency Management Director, Mr. Evan Brassard. Following Mr. Brassard, staff from the Pioneer Valley Planning Commission, Monson' selected MVP provider, presented an overview of the workshop process and goals, updating participants on past and ongoing local planning efforts, and presenting new state-provided climate projection data to provide both decision-support and risk visualization. Participants then broke out into three small groups and assumed different participatory roles and responsibilities to engage in a rich dialogue sharing ideas and experiences.

Figure 4. Workshop participants report out. Source: PVPC.

Top Hazards & Vulnerable Areas

Leading up to the workshop, the MVP core planning team identified some of the top ongoing concerns and challenges for the Town of Monson. Because the Town had worked with PVPC in 2016 to update their Hazard Mitigation plan, both the Town and PVPC staff had a solid understanding of how past weather events had affected the community. The new climate data from the Massachusetts Climate Change Clearinghouse (http://www.resilientma.org/mvp), combined with the three-pronged approach of the CRB process---looking at assets and vulnerabilities in 1) infrastructure, 2) the environment, and 3) the population, helped guide the small group work to think broadly about the community's top hazards.

Top Hazards

Monson stakeholders agreed upon a set of four priority hazards to include in the small group risk matrix exercises. These hazards are listed below:

- Flooding
- Severe Storms
- Vector Borne Diseases
- Invasive Species

Areas of Concern

Infrastructure: significantly more flooding, frequent flooding of undersized culverts and ponding on Main St. impacts critical downtown facilities; Chestnut Street flooding, numerous dams throughout town, including two high-hazard dams; lack of maintenance resources for stormwater facilities

Environmental: debris in Chicopee Brook increases flooding; downed trees increase wildland fire risk; increased intensity rainfall events increases erosion of Chicopee Brook; downed trees from 2011 tornado results in increased runoff; invasive species (Japanese knotweed and Gypsy Moth) damaging trees

Societal: extreme temperature fluctuations disproportionately impact elderly and immune-compromised residents; increased risk of ticks and Lyme disease; vulnerable residents are not well connected to emergency communications; Colonial Village Senior housing facility on State St is in flood zone; outreach and education is a challenge

Built Environment: all town functions, including Town Hall, Police Department, and Fire Department, DPW, Senior Center, and Water Department are all located directly in flood zone and lack redundancy

CURRENT CONCERNS & CHALLENGES BY HAZARD

The Town of Monson faces multiple challenges related to the impacts of climate change and natural hazard-related weather events. In recent years, the Town has experienced a series of disruptive and dangerous weather events including the 2011 tornado that resulted in a FEMA Major Disaster Declaration, 2011 October snowstorm and associated wide-spread power outages, and the October 2015 microburst.

Impacts from storms with high winds and/or accumulation from freezing precipitation are exacerbated by increasingly weakened forest and tree health due to influxes of harmful pests in local forests. Unhealthy trees and their limbs are more likely to be brought down by the weight of snow, ice, or water and under the force of wind, increasing the risks of prolonged power outages and hazards to residents and infrastructure. While the tornado in 2011 was the most disruptive event in Monson's recent history, the increased magnitude and intensity of rain and flood events over the course of just a few years has raised awareness of natural hazards and climate change and motivated communities like Monson to comprehensively improve resilience at the individual and municipal level.

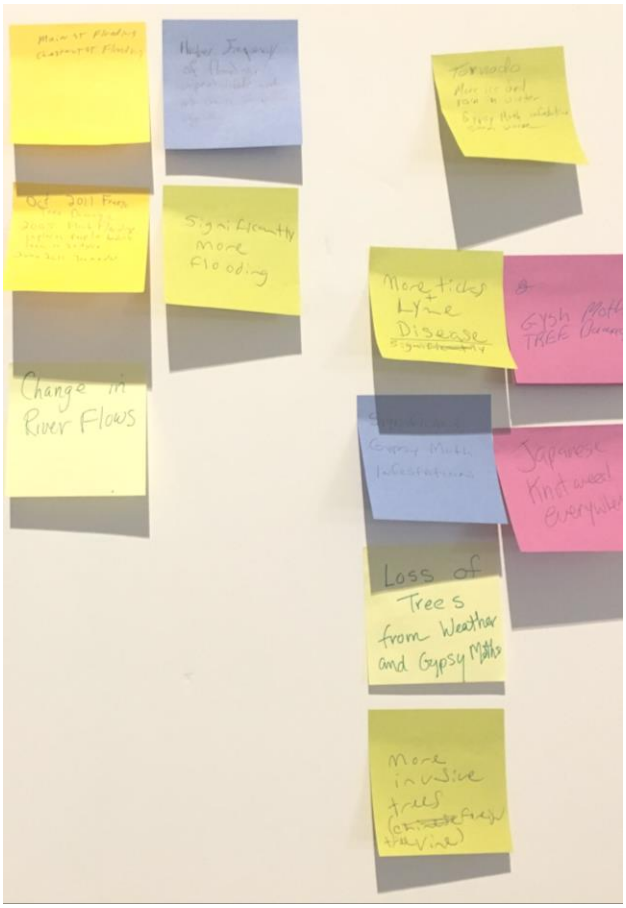


Figure 3. Participants responded to the question "What environmental changes have you observed in Monson?" Source: PVPC

Monson's MVP workshop participants were generally in agreement that the Town and region are experiencing more intense and frequent storm events, the impacts of which affect the daily activities of all residents. There was also a common concern about the challenges of being prepared for future severe weather events, including the ability to shelter residents close to home; the resilience of the primary roadways in the town's transportation network to changing weather, precipitation and temperature fluctuations; the strain on forests and residential tree health from changing weather and new waves of harmful insect species; and the risks associated with myriad critical infrastructure elements located within the floodplain. Furthermore, participants established a common directive to improve the efficiency and efficacy of communication systems throughout town, both in times of emergency and in day-to-day operations.

Specific Categories of Concerns & Challenges

Transportation Infrastructure

The greatest vulnerabilities to the transportation network in Monson are relative to undersized culverts and aging stormwater infrastructure that, in the face of higher intensity precipitation events, are leading to routine flooding and roadway damage.

Participants noted that much of the road network around the town's historic center is vulnerable to flooding because of its proximity to the Chicopee Brook, which is reportedly flooding more frequently than even before. The most frequently cited location of concern was Main Street (Route 32), the town's major north-south evacuation route, where flood conditions could impede the town's ability to evacuate during an emergency. The Route 32 bridge at the Palmer town line is also routinely impacted by flooding. While the majority of Route 32 in town is owned and maintained by MassDOT, the 1.6 mile portion of Route 32 located in the town center where the majority of flood concerns are focused is town-owned and town-maintained.

The Town of Monson worked with the Edward J. Collins Center at UMAS Boston to develop a Capital Improvement Plan (CIP) in 2017. It is now important for the Town to integrate these newly identified infrastructure improvement needs into the Town's CIP to help the community prioritize replacement and repair of transportation elements. Town officials are eager to develop a complete understanding of the nature of the flood problem throughout town – which areas are most vulnerable to projected climate impacts, and what investments would be most effective in reducing vulnerability.

Electrical Distribution System

Electricity is one of the most critical pieces of infrastructure in modern societies, and electrical service outages in Monson can be caused or impacted by flooding and severe storms. Workshop participants would love to see National Grid bury electrical wires but they recognize that this is most likely cost prohibitive for National Grid. The Town does require utility lines to be buried in all new developments. Emergency generators are available at all prioritized municipal buildings and the Town government wants to continue to educate residents about how to shelter in place and when and how to access emergency warming and cooling centers. The experience of the 2011 tornado advanced the Town's understanding of how residents can effectively shelter in place, that is stay in their homes overnight, if they have a place to charge their cell phones, connect with one another and learn news from the Town and help people get warm or cool during the day.

Communication Networks

In addition to equipment and infrastructure challenges, workshop participants noted a need to increase education about and uptake of existing communication channels that could serve residents during an emergency and for day-to-day announcements. The Town subscribes to Code Red, a reverse 911 system that distributes information to residents who sign up for alerts but of course it only helps those residents who know about it and sign up. Participants also expressed concern over the socially and physically isolated residents, and the need to conduct more outreach to these groups when preparing for a winter storm or during power outages. Participants also noted that the Town website is not currently used to the best of its capability, and that other local communication options such as a town /newsletter should be explored.

Vulnerable Populations

People who do not speak English, people who are struggling financially, the elderly and people who are ill can be especially vulnerable in times of emergency due to linguistic challenges in outreach and perhaps different cultural norms. Low-income residents may lack the financial capacity to evacuate in an emergency or weather disruptions to the local economy and the elderly who live alone may also be challenged to respond to urgent communications from the Town. According to the PVPC data portal 74 people in Monson speak a language other than English at home, 5.6% percent of the population is aged 65 years or older ; 6.8% of the elderly population lives below the poverty line and 11 % of the elderly population lives alone.[1] The greatest concern with this population is isolation during a winter power outage or heat wave. Power outages, especially when concurrent with extreme temperatures, leave the elderly and medically vulnerable populations at extremely high risk. As stated, Monson has a very effective system of cooling and warming centers as well as fully equipped shelters in the event of extended emergency situations. Workshop participants noted a need to identify a local solution for seniors who may find it difficult or undesirable to travel.

[1] https://pioneervalleydata.org/search-by-topic/demographics/)

Pioneer Valley
Monson, Hampden County

Municipal Office

Town Hall
110 Main St.
Monson, MA 01057
Phone: (413) 267-4100
FAX: (413) 267-3726
www.monson-ma.gov

Total Land Area

Total Acres	28,608
Total Sq Miles	45

Source: U.S. Census Bureau

Land Usage (Acres)

Residential	2,131
Commercial	66
Industrial	301
Urban Open/Pu..	322
Transportation	60
Outdoor Recre..	161
Agricultural La..	1,597
Undeveloped L..	23,831
Water	168

Source: Mass GIS

Education Attainment (People age 25+) 2017

Early Ed	35.9%
High School	91.6%
College	26.5%

Source: U.S. Census Bureau

Median Household Income

2017
$78,677

Source: U.S. Census Bureau

Population

Year	
1990	7,776
2000	8,359
2009	9,057
2010	8,565
2011	8,590
2012	8,679
2013	8,724
2014	8,754
2015	8,771
2016	8,783
2017	8,836

Source: U.S. Census Bureau

Population by Race or Ethnicity

	2017
Asian	1.0%
Black	0.9%
Other	0.6%
White	97.5%
Hispanic	1.7%

Source: U.S. Census Bureau

Household Income 2013-2017

$0 - $9,999	1.6%
$10,000 - $14,999	2.3%
$15,000 - $24,999	8.4%
$25,000 - $34,999	7.1%
$35,000 - $49,999	11.6%
$50,000 - $74,000	15.8%
$75,000 - $99,000	20.0%
$100,000 - $149,000	21.1%
$150,000 - $199,999	6.7%
$200,000	5.4%

Source: U.S. Census Bureau

Persons Below Poverty Level

2017
5.6%

Source: U.S. Census Bureau

Percent of Population by Age

	2009	2010	2011	2012	2013	2014	2015
Under 3	2.8%	2.7%	2.6%	2.5%	2.7%	1.8%	1.6%
3 - 4	1.5%	1.7%	1.4%	1.8%	1.4%	1.9%	1.2%
5	2.1%	2.4%	1.8%	1.6%	1.5%	1.1%	0.7%
6 - 11	8.4%	9.0%	8.2%	7.2%	8.5%	7.9%	6.7%
12 - 17	8.1%	6.4%	8.2%	8.6%	6.4%	8.2%	10.0%
18 - 24	8.4%	8.1%	8.2%	7.0%	8.4%	7.0%	6.8%
25 - 34	10.7%	10.3%	9.0%	8.1%	8.8%	7.4%	7.7%
35 - 44	14.4%	14.8%	14.1%	12.2%	12.5%	10.7%	12.1%
45 - 54	19.5%	17.5%	17.8%	20.0%	18.7%	20.0%	20.1%
55 - 59	6.9%	7.0%	7.0%	7.8%	8.0%	9.1%	8.0%
60 - 64	6.2%	6.7%	8.9%	10.1%	9.7%	9.8%	9.6%
65 - 74	6.3%	8.2%	7.6%	8.5%	9.3%	9.3%	10.2%
75+	4.8%	5.2%	5.1%	4.6%	4.2%	6.0%	5.5%

Source: U.S. Census Bureau, Amercican Community Survey

Residents in the Labor Force

	Percent Unemployed	Unemployed	Laborforce
2004	5.2%	244	4,675
2005	4.8%	223	4,690
2006	5.2%	247	4,745
2007	4.9%	232	4,742
2008	5.8%	278	4,820
2009	8.0%	386	4,796
2010	8.7%	409	4,721
2011	7.3%	341	4,661
2012	6.4%	303	4,704
2013	6.6%	312	4,736
2014	6.0%	286	4,802
2015	4.8%	232	4,804

Source: U.S. Bureau of Labor Statistics

Employees 2016	Number	% Total
Accomodation and Food Services	76.0	5.5%
Arts, Entertainment and Recrea..	36.0	2.6%
Construction Industry	304.0	22.0%
Educational Services		
Finance and Insurance		
Health Care and Social Services	102.0	7.4%
Management of Companies and..		
Manufacturing	352.0	25.5%
Professional, Scientific and Tech..	46.0	3.3%
Real Estate, Rental and Leasing		
Retail Trade	115.0	8.3%
Transportation and Warehousing	74.0	5.4%
Utilities Industry		
Waste Management and Remed..	57.0	4.1%
Wholesale Trade	53.0	3.8%

Property Tax Rates

	2017
Taxrate Res	$17.41
Taxrate Comm	$17.41

Source: MA Dept of Revenue

Vehicle Registrations (Autos and Light Trucks)

2015	7,042

Source: MA Dept of Revenue

Prepared by the Pioneer Valley Planning Commission.

WASTEWATER, STORMWATER, AND DRINKING WATER RESOURCES

Roughly 1,300 properties in Monson are served by a town sewer system that carries wastewater to Palmer for treatment and disposal. The sewer system generally follows the location of the municipal water system with the exception of the Paradise Lake area, which has public sewerage but not public water. Workshop participants expressed concern that the town's single wastewater pump station located on Hospital Road is vulnerable to flooding.

The Town is subject to EPA's Municipal Small Storm Sewer System (MS4) regulations, and is required to regulate and manage stormwater runoff for pollution and erosion control. In July of 2018, an updated MS4 permit came into effect with significant additional requirements for controlling the quality and

quantity of stormwater runoff within the town. Concerns about stormwater flooding in the downtown emerged as did concerns about sheet flow off slopes around town.

DAMS

The Massachusetts Emergency Management Agency (MEMA) identifies twenty-six (26) dams in Monson. Of the twenty-six dams in Monson eighteen are classified as *Low Hazard*: Dams located where failure or improper operation may cause minimal property damage to others. Loss of life is not expected. Six dams are categorized as Significant *Hazard*: Dams located where failure or improper operation may cause loss of life and damage to homes, industrial or commercial facilities, secondary highways or railroads or cause interruption of use or service of relatively important facilities. The Zero Manufacturing Company Dam and the Conant Brook Dam are *High Hazard*: Dams located where failure or improper operation will likely cause loss of life and serious damage to homes, industrial or commercial facilities, important public utilities, main highways, or railroads.

The Zero Manufacturing Dam would impact the area around Main Street (Rte 32), specifically the South Monson area. The failure of the Army Corps Conant Brook Dam would release millions of gallons of water down the Conant Brook and result in devastation all along the Chicopee River.

The Massachusetts Department of Conservation and Recreation Office of Dam Safety is the agency responsible for regulating dams in the state (M.G.L. Chapter 253, Section 44 and the implementing regulations 302 CMR 10.00). To be regulated, these dams are in excess of 6 feet in height (regardless of storage capacity) and have more than 15 acre feet of storage capacity (regardless of height). Dams not meeting those criteria are considered “non jurisdictional.” Dam safety regulations enacted in 2005 transferred significant responsibilities for dams from the State of Massachusetts to dam owners, including the responsibility to conduct dam inspections.

CURRENT STRENGTHS & ASSETS

As a result of Monson's broad experience with extreme weather and the impacts of climate change, workshop participants were quick to point out their communities' strengths in responding to the challenges identified above. Reinforcing and expanding upon these strengths and community assets is a common theme to the proposed actions presented later in this report to increase resiliency against the impacts of climate change.

Some of the key strengths discussed included:

- Experience with 2011 tornado
- The towns roads and drainage system
- Highway Department's equipment is up to date
- Robust and connected communication between Police and Fire
- Water storage tanks are well located on high ground
- Limits on new development in floodplain
- The main shelter at the Quarry Hill school is located on high ground and therefore less vulnerable to flooding
- The Town is experienced with sheltering in place
- The Council on Aging has a van to transport seniors
- Medical Reserve Corps is active in the community and experienced after the 2011 tornado
- Board of health is active in MAVEN
- Town has a Tree warden
- Town is 80% forested
- Clean, safe drinking water
- Conant Street and Bliss Street Dams are both a strength and a possible vulnerability
- Communication for outreach: Facebook, website, twitter, phone lines, two way radio, cell reception, broadband
- National Grid and general power lines
- Churches and the strong Faith Community
- Economic status of most residents
- Rugged individualism character—can be both a strength and a vulnerability

TOP RECOMMENDATIONS TO IMPROVE RESILIENCE

Workshop participants identified more than seventy-five actions that the Town of Monson, in collaboration with neighboring municipalities, regional partners and state agencies could take to improve resilience to the impacts of climate change. Towards the end of the workshop, each small group presented its three top priority actions to the large group. These actions were grouped with like actions from other small groups, and then voted on by the large group[2].

The following priority recommendations were developed at the 4 small group tables, and are presented here in no specific order:

- Town-wide assessment of culverts—focusing on conditions (failing, under-sized, etc) with a focus on Main Street because it is an identified trouble spot
- Research and development of a Flood Damage Reduction Plan, with an emphasis on Nature-based solutions
- Assess and improve the Town's Communication Strategy and abilities, with a focus on quickly developing a Town newsletter to establish regular trusted communications between the town government and residents
- Municipal property vulnerability assessment
- Quarry Hill school re-purpose assessment/design to address sheltering and possible Public Safety relocation
- Palmer water connection design and construction

The entire suite of recommendations can be categorized into the following categories:

- Communications, Social Resilience, Prevention, and Education
- Transportation Infrastructure Assessment and Improvement—culverts/bridges
- Stormwater Management and Nature Based Solutions
- Government Management and Coordination

All recommended MVP actions were shared with the public at a public listening session on March 27, 2019. Materials from the Public Listening Session are provided in Appendix E.

A full list of the final recommendations, organized by high, medium, and low priority, is provided below.

[2] The actions with the most votes were to Complete a Flood Damage Reduction Plan and Conduct a Town-wide Culvert Assessment.

HIGH PRIORITY ACTIONS

Category	Action
Communications, Social Resilience, Prevention, and Education	Increase Code Red signups.
	Research, develop, and launch a Town-wide education campaign on all aspects of personal and household resilience
	Look into having a dedicated case worker for the elderly who are not connected to social services and who can maintain a database to address those populations in times of emergency
	Create an education program aimed at well-water users to test their water, particularly for radon, partnering with the banks
	PVPC campaign to increase awareness around ticks and public health, partner with Baystate
	Explore comprehensive strategy to communicate/reach out to residents such as a quarterly town magazine for better communication with residents
	Create program to provide education and resources on vector borne disease (Board of Health)
	Educational programs for residents on invasive species (Conservation Committee)
	Create opt-in program for identifying vulnerable populations and registering for Code Red reverse 911 emergency communications from Town. Collaborate with partners to increase sign-up (senior center, hospitals, etc.)
	Restart past programs to identify vulnerable populations
	Make Senior Center building more storm resilient, including a generator and a policy for how to get people to a safe space in the building
	Continue to pursue age-friendly designation for Town
Government Management and Coordination	An initial assessment of the conversion of the Quarry Hill School into a long-term shelter when the schools consolidate. Create a back-up plan and acquire infrastructure and equipment to move emergency operations and dispatch during emergencies
	Complete an assessment of Monson's ability to connect to Palmer's water supply in the case of an emergency and create design.
	Assess invasive species/vector borne disease potential/risk in flooded/drainage area.
	Maintenance/replacement plan to address invasive species
	Commission Flood Damage Reduction Study

	Monitor/map hazardous materials in flood zone
	Lightning Strike Protection study and implementation
	Create a municipal composting station
	Improve communication/collaboration between state and local Housing Authority
	Work with State Government to review Environmental Regulations for road work improvement to reduce costs and facilitate local solutions
	Work with elected officials and State Government to reduce state and federal mandates that do not include adequate funding to implement the mandates
Stormwater Management and Nature Based Solutions	Continue to conserve land to address the source of flooding.
	Full culvert and stormwater study with recommendations for re-design based on new climate data. Should look at how flooding might impact rail lines and emergency support systems.
	Evaluate/rewrite bylaws regulating culverts on private property
	Prioritize upland stormwater solutions
	Commission Flood Damage Reduction Study
	Monitor/map hazardous materials in flood zone
	Create management plan for maintaining systems in place (water resources/detention basins)
	Develop local policy to assign responsibility for maintenance of Nature Based solutions
Transportation Infrastructure Assessment and Improvement—culverts/bridges	Identify problematic culverts - culvert inventory
	Create culvert replacement plan that prioritized nature-based solutions
	Establish clear standards for design, sizing, and material and collaborate/share with all jurisdictions (highway, municipal)
	Embankment improvement

MEDIUM PRIORITY ACTIONS

Category	Action
Communications, Social Resilience, Prevention, and Education	Look into Monson-based Quabog connector vehicles for emergency use
	Create program to provide easy access to arborists and increase public education around tree health
	Continued partnership with National Grid with a focus on the more rural areas
	Complete an assessment of the feasibility of putting solar on carports
	Train and education municipal staff on new, green, and nature-based solutions
	Improve communication with state, town, developers on forest management and enforcement
	Downtown mosquito control - train municipal staff in mosquito control
	Community education and outreach on importance of forest management
	Continue forest conservation with focus on management near development
	Destigmatize asking for help. Continue programs like locating a health and human services person at the Library
	Destigmatize Senior Center and contact from the town in general
	Identify and then implement plantings that attract dragon-flies to mitigate mosquito problems
Government Management and Coordination	Secure funding to develop an invasive species mitigation/management plan
	Revisions to bylaws and general planning (ERP) with more holistic approach
	Building relocation feasibility study based on flood study results (both public and private property)
	Foster a more customer service approach for town employees

	Initiate regular communication with Army Corps to receive regular updates on Conant Brook Dam
	Consider updating Town Master Plan
	Contract with pre-approved vendors that can augment municipal workforce
	Discuss with State possibility of creating a program, modeled after the MA CEC Solarize program to collectively-purchase tree management services on behalf of businesses and residents
Stormwater Management and Nature Based Solutions	Assess existing stormwater resources for nature based solution potential, beginning with demonstration projects
	Emphasize native plants
	Revisions to bylaws and general planning (ERP) with more holistic approach
Transportation Infrastructure Assessment and Improvement—culverts/bridges	Create infrastructure map and replacement schedule

Low Priority Actions

Category	Action
Communications, Social Resilience, Prevention, and Education	Complete an EV charging station feasibility analysis
	Manage conserved forest land for invasive species, look into using goats/sheep

Action Implementation Design

Once participants voted on the top priority actions, each team was asked to select two actions and begin to develop an implementation plan. For each action, the small groups filled out an Action Implementation Design worksheet, providing information on the lead agency/ department for implementation, the partners that would need to be involved for successful project completion, an estimated cost for the project, known or potential funding sources, and implementation milestones. This exercise was a tool for Monson decision makers to get a head start on the thought process that would be required to apply for a MVP Action Grant. The completed Action Implementation Design worksheets are provided in Appendix C.

Workshop Participants

Approximately fourteen participants from Town departments, committees and boards, and local businesses were in attendance at the MVP workshop.

Marilyn Gorman-Fil	Planning Board Member
Lori Stacy	Director, Council on Aging
Steven Lowell	President, Monson Savings Bank
Liz Manley	Director, Medical Reserve Corp
Ben Murphy	Monson Highway Dept.
John Moran	Building Commissioner, Monson Building Dept.
Lori McCool	Health Agent, Monson Board of Health
Larry McDonald	Chief, Monson Fire Dept.
Stephen Kozloski	Chief, Monson Police Dept.
Evan Brassard	Town Administrator, Town of Monson
Dan Laroche	Town Planner, Town of Monson
Paul DeMaio	Maintenance Coordinator, Town of Monson

Citation

Monson (2019) Community Resilience Building Workshop Summary of Findings. Pioneer Valley Planning Commission. Monson, Massachusetts.

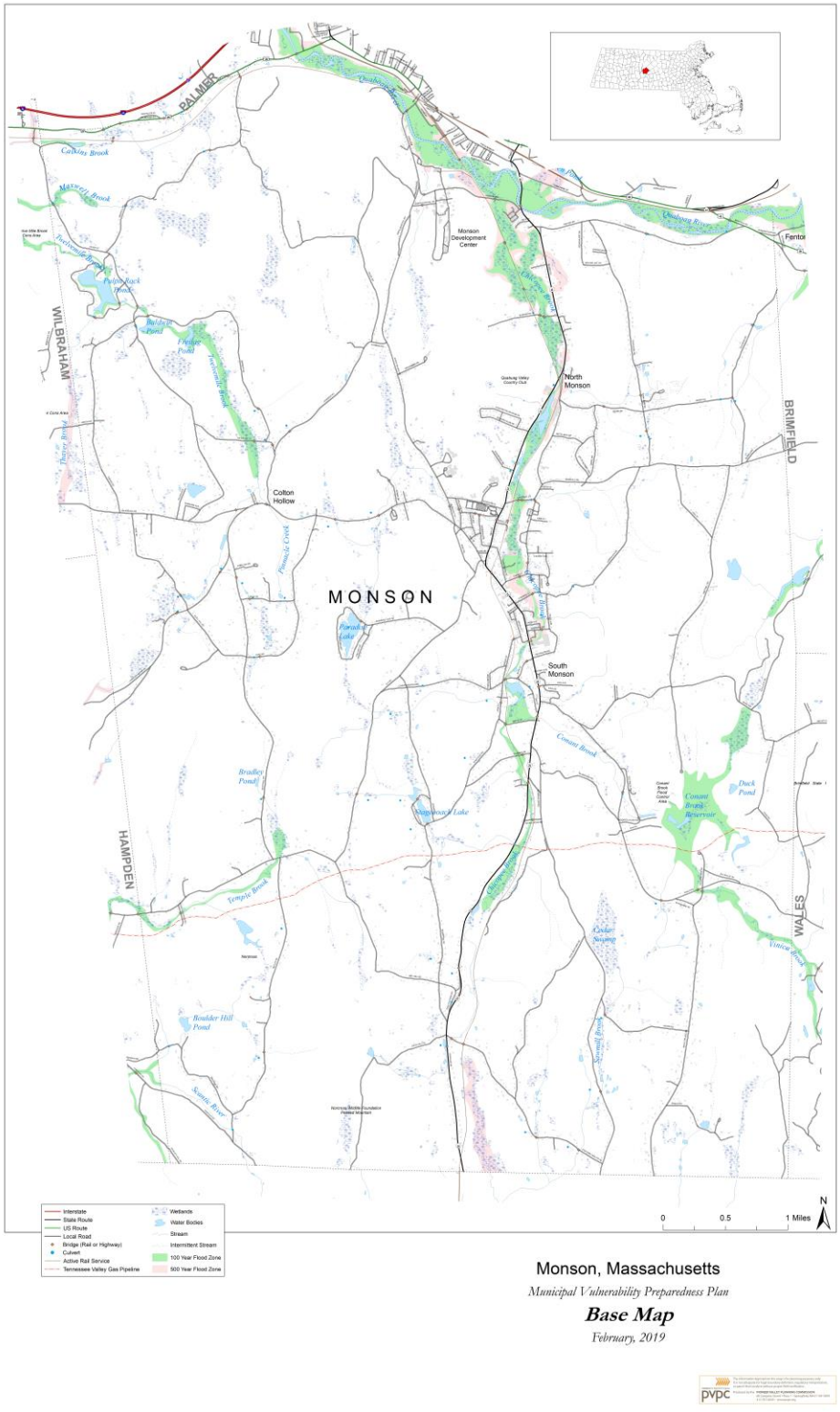
MVP Working Group

- Evan Brassard, Town Administrator
- Dan LaRoche, Town Planner
- Ben Murphy, Highway Department
- John Moran, Building Commissioner
- Larry McDonald, Fire Chief
- Craig Jalbert, Water & Sewer
- Paul DeMaio, Maintenance Coordinator
- John Morrell, Highway Superintendent
- Stephen Kozloski, Police Chief

Acknowledgements

Special thanks to the Town of Monson staff for their participation and providing the facilities to convene. This project was made possible through funding from the Massachusetts Executive Office of Energy and Environmental Affairs.

APPENDIX A: WORKSHOP BASE MAP



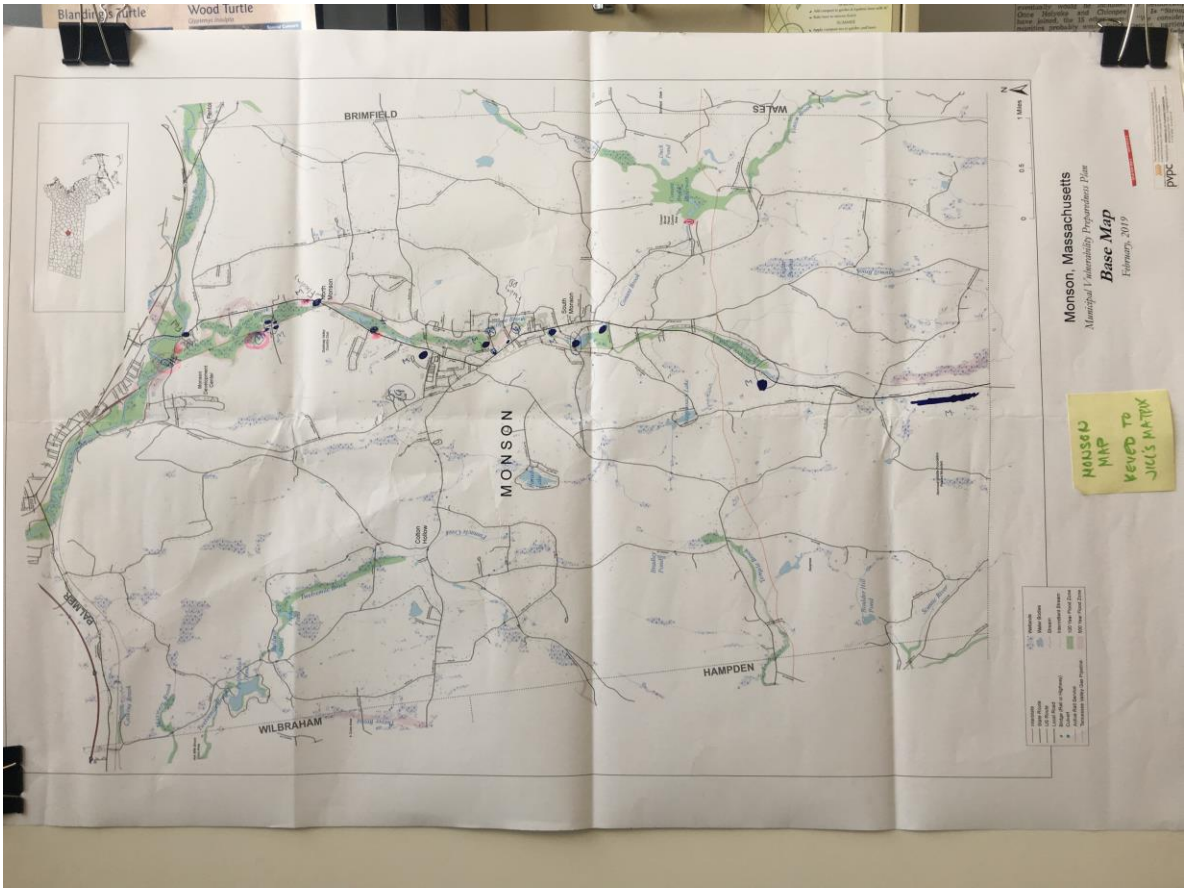
Monson, Massachusetts

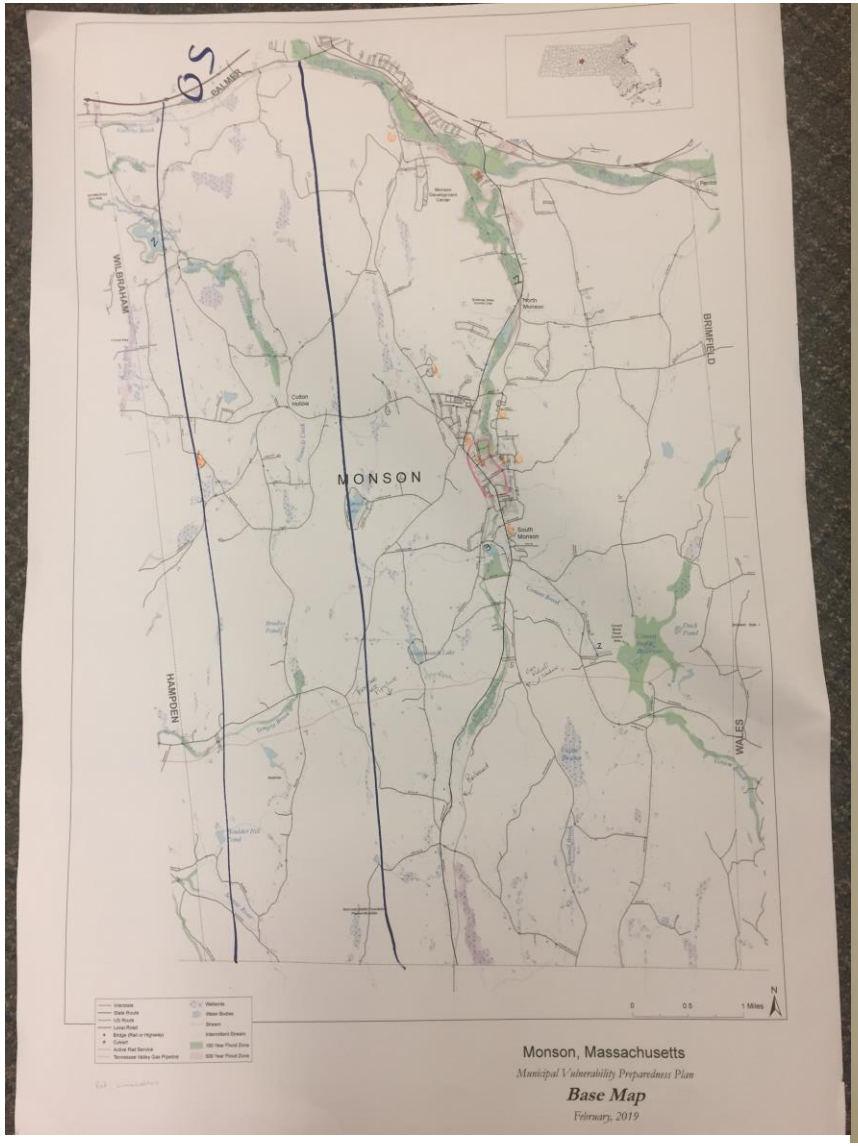
Municipal Vulnerability Preparedness Plan

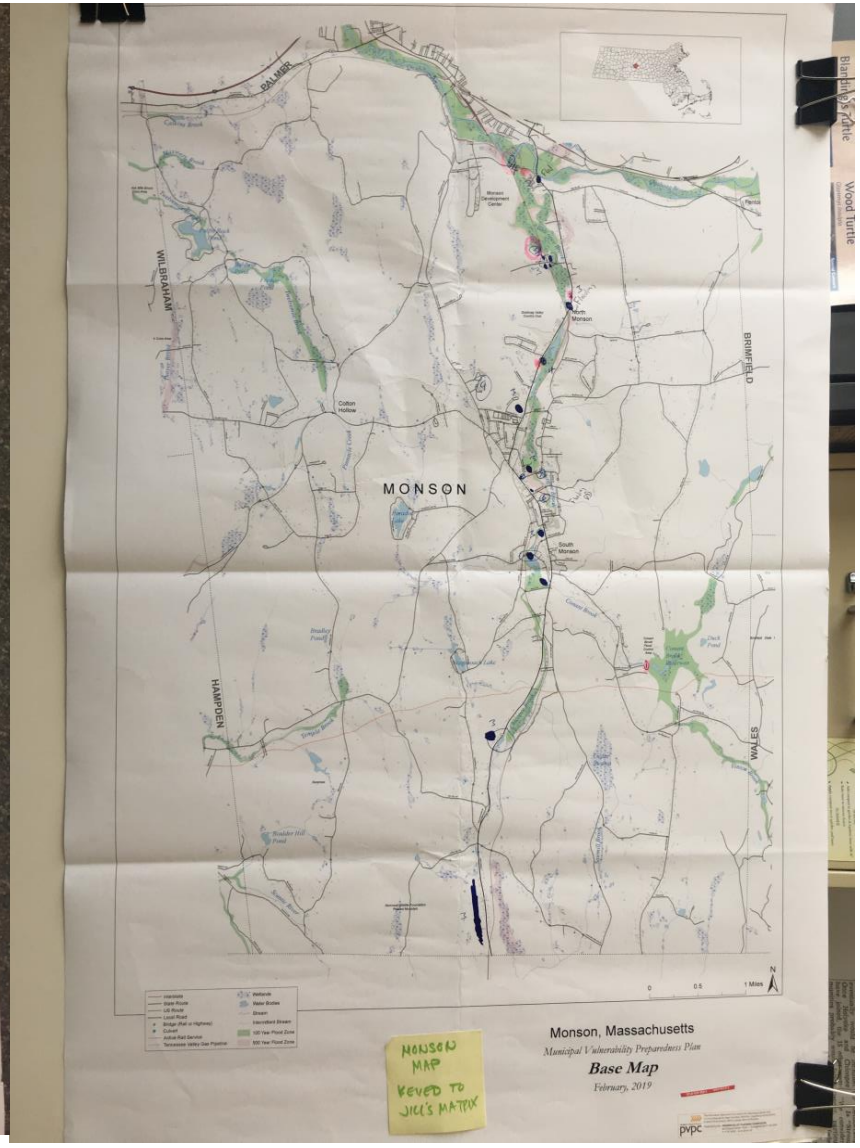
Base Map

February, 2019

APPENDIX B: PARTICIPATORY MAPPING RESULTS




PALMER
WILBRAHAM
MONSON
BRIMFIELD
HAMPDEN
WALES
Cotton Hollow
North Monson
South Monson
Monson, Massachusetts
Municipal Vulnerability Preparedness Plan
Base Map
February, 2019


PALMER
WILBRAHAM
MONSON
BRIMFIELD
HAMPDEN
WALES
Cotton Hollow
North Monson
South Monson
MONSON MAP KEYED TO JILL'S MATRIX
Monson, Massachusetts
Municipal Vulnerability Preparedness Plan
Base Map
February, 2019
pvpc

APPENDIX C: PARTICIPANT HANDOUTS

AGENDA

Monson Municipal Vulnerability Preparedness Workshop

DATE: Wednesday, February 20, 2019 AND Weds, Feb 27

TIME: 8:30a.m. – 12:30p.m.

PLACE: Monson Town Hall

DAY ONE AGENDA

8:30 a.m. **Registration** – breakfast—review resources, maps

9:00 a.m. – 10:30 a.m. **Introductions/Goal of MVP program for Commonwealth and Monson**

Presentation: MVP, Climate Resources, and Priority Hazards

10:30 a.m. – 10:40 a.m. **Break**

10:40 a.m. – 12:00 p.m. **Morning Small Team Workshop**

- Identify Community Vulnerabilities and Strengths
- Rank Community Vulnerabilities and Strengths
- (Time permitting)—start to Identify Community Actions

12:00 – 12:30 **Small Group Report Out**

DAY TWO AGENDA

8:30 a.m. Registration – breakfast – review resources, maps

9:00 a.m. – 10:30 p.m. **Small Team Workshop**

- Identify and Prioritize Community Actions
- Identify Priority and Urgency
- Report Outs

10:30 a.m. – 10:45 am. **Large Group Vote on Top Priorities**

10:45 a.m. – 10:55 a.m. **Break**

10:55-12:00 **Small Team work--Flesh Out Top Priorities**

12:00 – 12:20 **Implementation Design and Final Report Outs**

12:20 p.m. – 12:30 p.m. **Wrap-up and Next Steps—public listening session**

		MONSON	MVP	Participants	
Attend	**Name**	**Title**	**Affiliation**	**Group –Initial here**	**Email**
??1	Richard Smith	Chair	Select Board	Yellow	rsmith@monson-ma.gov
YES1	Marilyn Gorman-Fil	Member	Planning Board	Green ✓ yellow	marilynfil@ymail.com
Only2 27th	Glenn Coburn	Chair	Conservation Commission	purple	gdcolburn@comcast.net
YES3	Audra Staples		Board of Health	yellow	AStaples@monson-ma.gov
YES4	Lori Stacy	Director	Council on Aging	green ✓	lstacy@monson-ma.gov
??3	Peter Cavicchi	District Highway Director	MA DOT	purple	
??4	Don Frydryk		Sherman and Frydryk	green	dfrydryk@shermanfrydryk.com
??5	Donna Bergeron	Executive Director	Monson Housing Authority	yellow	
??6	Denny Jenks	Director of Operations	Eagle Logistics Group LLC	Purple	denny.jenks@eaglelg.com
YES5	Steven Lowell	President	Monson Savings Bank	purple ✓	slowell@monsonsavings.com
??7	Richard J. Anderson Jr	President	Lamcotec	green	
YES6	Liz Manley	Director	Medical Reserve Corp	Purple ✓	elmanley@comcast.net
YES7	Ben Murphy		Monson Highway Dept.	Green ✓	benjaminmurphybm@gmail.com
YES8	John Moran	Building Commissioner	Monson Building Dept.	Yellow ✓	jmoran@monson-ma.gov
YES9	Lori McCool	Health Agent	Monson Board of Health	green ✓	yellowhealthagentmccool@yahoo.com
YES10	Larry McDonald	Fire Chief	Monson Fire Dept.	yellow ✓	monsonfdchief@comcast.net
YES11	Stephen Kozloski	Police Chief	Monson Police Dept.	purple ✓	skozloski@monson-ma.gov
YES12	Craig Jalbert	Water & Sewer Supt.	Monson Water & Sewer Dept.	green	monsonws@monson-ma.gov
YES13	Evan Brassard	Town Administrator	Town of Monson	yellow ✓	ebrassard@monson-ma.gov
YES14	Dan Laroche	Town Planner	Monson Planning Dept	purple ✓	dlaroche@monson-ma.gov
YES15	Paul DeMaio	Maintenance Coordinator	Maintenance Department	yellow ✓	pdemaio@monson-ma.gov
	John Morrell	Highway + Town	Selectman	green ✓	
	Joanne Derose	National Gnd		purple ✓	

Y: 4
P: 5
9: 4

Mason

Municipal Vulnerability Preparedness

Action Implementation Design

COMMUNITY ACTION

Flood Damage Reduction Plan
- Nature Based Solutions
- Identify High Hazard Areas
- Develop action Plan

Lead Implementing Agency/ Department (Emergency Manager, Select Board, DPW, Fire Chief, Finance Committee, Planning Board, etc.)

Town Planner

Partners (Neighboring municipalities, State actors, local non-profits and land trusts, community groups, etc.)

- Army Corps
- Water
- Highway
- Building
- PD
- MFD
- BOS
- EM
- TA

Cost (Dollar estimate, or Low: < $50,000, Medium: $50,000 – $100,000, High: > $100,000)

~~$50,000~~ $100,000 - $150,000

Funding Sources (Capital Improvement Plan, Staff Time, Chapter 90, Hazard Mitigation Grant Program (HMGP), other grants, etc.)

MVP Grant, FEMA, Town GF

Implementation Milestones
Examples:
1. Create and convene a committee to oversee progress;
2. Dissiminate 300 information packets to raise awareness about the initiative;
3. Apply for a grant to fund more robust public outreach, education, and awareness campaign.

1. Establish Committee
2. Develop Scope
3. Hire Consultant
4. Committee Work
5. Public Listening
6. Action Plan

Note: Cost estimates take into account the following resources:
- Town staff time for grant application and administration (at a rate of $25 per hour)
- Consultant design and construction cost (based on estimates for projects obtained from town and general knowledge of previous work in town)
- Town staff time for construction, maintenance, and operation activities (at a rate of $25 per hour)

Monson

Municipal Vulnerability Preparedness

Action Implementation Design

COMMUNITY ACTION

~~Study for evaluation of communication and power Utilities to municipal buildings for lightning and surge protection.~~

Assessment of municipal properties for vulnerability

Lead Implementing Agency/ Department (Emergency Manager, Select Board, DPW, Fire Chief, Finance Committee, Planning Board, etc.)

Board of Selectmen, town administrator

Partners (Neighboring municipalities, State actors, local non-profits and land trusts, community groups, etc.)

Vendors
National Grid

Cost (Dollar estimate, or Low: < $50,000, Medium: $50,000 – $100,000, High: > $100,000)

low

Funding Sources (Capital Improvement Plan, Staff Time, Chapter 90, Hazard Mitigation Grant Program (HMGP), other grants, etc.)

Hazard mitigation, MVP, local dollars, MILA (insurance) → grants, (National Grid? Verizon? Comcast)

Implementation Milestones
Examples:
1. Create and convene a committee to oversee progress;
2. Dissiminate 300 information packets to raise awareness about the initiative;
3. Apply for a grant to fund more robust public outreach, education, and awareness campaign.

1. Form a committee
2. ~~Inter~~ Create Scope of work
3. Hire consultant
4. ~~Finan~~ Find finding
5. Implement

Note: Cost estimates take into account the following resources:
- Town staff time for grant application and administration (at a rate of $25 per hour)
- Consultant design and construction cost (based on estimates for projects obtained from town and general knowledge of previous work in town)
- Town staff time for construction, maintenance, and operation activities (at a rate of $25 per hour)

Monson

Municipal Vulnerability Preparedness

Action Implementation Design

COMMUNITY ACTION

Quarry Hill repurpose assessment/design to address sheltering, public safety relocation

Lead Implementing Agency/ Department (Emergency Manager, Select Board, DPW, Fire Chief, Finance Committee, Planning Board, etc.)

tier 1 (School committee, board of selectmen tier 2 (emergency manager, police, fire, etc.

Partners (Neighboring municipalities, State actors, local non-profits and land trusts, community groups, etc.)

- State for funding
- Electric company, Columbia (National Grid)
- MRC (Medical reserve corps)
- Churches: first church, Methodist, Unitarian, ~~Catholics~~ St. Patricks

Cost (Dollar estimate, or Low: < $50,000, Medium: $50,000 – $100,000, High: > $100,000)

High

Funding Sources (Capital Improvement Plan, Staff Time, Chapter 90, Hazard Mitigation Grant Program (HMGP), other grants, etc.)

Capital Improvement plan, MVP Hazard mitigation, EMPG, State 911 grant
~~Staff time~~

Implementation Milestones

Examples:
1. Create and convene a committee to oversee progress;
2. Dissiminate 300 information packets to raise awareness about the initiative;
3. Apply for a grant to fund more robust public outreach, education, and awareness campaign.

1. Create and convene a committee to create plan, formed by selectmen
2. Agreement made w/ school committee
3. Re-use plan created/feasibility and timeline w/ public outreach
4. ↳ Design
4. Finding plan/apply for grants ~~with A~~

Note: Cost estimates take into account the following resources:
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- Town staff time for construction, maintenance, and operation activities (at a rate of $25 per hour)

Monson

Municipal Vulnerability Preparedness

Action Implementation Design

COMMUNITY ACTION

PALMER WATER CONNECTION DESIGN & CONSTRUCTION

Lead Implementing Agency/ Department (Emergency Manager, Select Board, DPW, Fire Chief, Finance Committee, Planning Board, etc.)

MONSON WATER DEPARTMENT

Partners (Neighboring municipalities, State actors, local non-profits and land trusts, community groups, etc.)

PALMER WATER DISTRICT, MASS DOT, MONSON HIGHWAY, PALMER DPW

Cost (Dollar estimate, or Low: < $50,000, Medium: $50,000 – $100,000, High: > $100,000)

COST CONTINGENT ON PROJECT SCOPE (HIGH > $100,000) ($ 750,000)

Funding Sources (Capital Improvement Plan, Staff Time, Chapter 90, Hazard Mitigation Grant Program (HMGP), other grants, etc.)

MVP, CAPITAL FUNDS, SRF

Implementation Milestones
Examples:
1. Create and convene a committee to oversee progress;
2. Dissiminate 300 information packets to raise awareness about the initiative;
3. Apply for a grant to fund more robust public outreach, education, and awareness campaign.

IF MASS DOT REPAIRS BRIDGE

1. COORDINATE WITH MASS DOT/PALMER
2. FINALIZE DESIGN

IF MASSDOT DOES NOT REPAIR BRIDGE

1. RFP FOR ENGINEERING

Note: Cost estimates take into account the following resources:
- Town staff time for grant application and administration (at a rate of $25 per hour)
- Consultant design and construction cost (based on estimates for projects obtained from town and general knowledge of previous work in town)
- Town staff time for construction, maintenance, and operation activities (at a rate of $25 per hour)

Monson

Municipal Vulnerability Preparedness

Action Implementation Design

COMMUNITY ACTION

Town-wide assessment of culverts - conditions (failing, size-too small) w/ a Focus on Main St. b/c it is a trouble spot identified.

[If failing and/or under-sized, how could nature based solutions mitigate need for expensive fix]

Note 1380 !!! to assess.

Lead Implementing Agency/ Department (Emergency Manager, ~~Select Board, DPW, Fire Chief,~~ Finance Committee, Planning Board, etc.)

Hwy Dept. (not Town Mgr. & Conservation & Town Planner)

Partners (Neighboring municipalities, State actors, local non-profits and land trusts, community groups, etc.)

Town Planner → Town Mgr. & Conservation Commission & ~~Water Dept.~~ Mass DOT, DEP, Sherman? Frederick,

Cost (Dollar estimate, or Low: < $50,000, Medium: $50,000 – $100,000, High: > $100,000)

High (N.$250,000 estimate)

Funding Sources (Capital Improvement Plan, Staff Time, Chapter 90, Hazard Mitigation Grant Program (HMGP), other grants, etc.)

MVP, Ch. 90 HMGP? not sure, Capital Funds. -

Implementation Milestones

Examples:

1. Create and convene a committee to oversee progress;
2. Dissiminate 300 information packets to raise awareness about the initiative;
3. Apply for a grant to fund more robust public outreach, education, and awareness campaign.

1) ~~Develop scope~~ hire ~~at work~~ with local Engineering firm, Sherman? Frederick. to develop scope + cost estimate

2) Bond

3) Hire Consultant, & work w/ them to do Study.

Note: Cost estimates take into account the following resources:

- Town staff time for grant application and administration (at a rate of $25 per hour)
- Consultant design and construction cost (based on estimates for projects obtained from town and general knowledge of previous work in town)
- Town staff time for construction, maintenance, and operation activities (at a rate of $25 per hour)

Monson

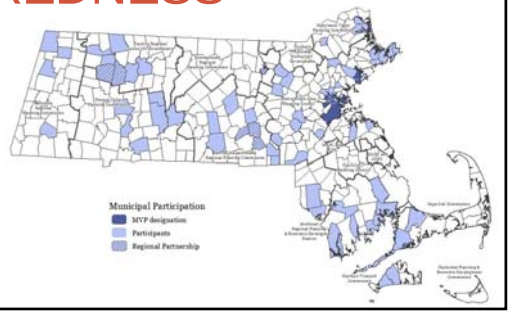
Municipal Vulnerability Preparedness

Action Implementation Design
COMMUNITY ACTION
Develop Communication Strategy - TV - Print - Online
Lead Implementing Agency/ Department (Emergency Manager, Select Board, DPW, Fire Chief, Finance Committee, Planning Board, etc.)
Town Administrator
Partners (Neighboring municipalities, State actors, local non-profits and land trusts, community groups, etc.)
- Private Sector - M-Pact - All Town Departments
Cost (Dollar estimate, or Low: < $50,000, Medium: $50,000 – $100,000, High: > $100,000)
Low < $5000.00 - $10,000.00
Funding Sources (Capital Improvement Plan, Staff Time, Chapter 90, Hazard Mitigation Grant Program (HMGP), other grants, etc.)
Private/Public Partnerships - MVP - GF
Implementation Milestones Examples: 1. Create and convene a committee to oversee progress; 2. Dissiminate 300 information packets to raise awareness about the initiative; 3. Apply for a grant to fund more robust public outreach, education, and awareness campaign.
Print 1. Develop layout 2. Get Content 3. Get Advertisers TV 1. M-Pact 2. Establish guests Online 1. ↑ Presence for each Department 2. Train Staff
Note: Cost estimates take into account the following resources: • Town staff time for grant application and administration (at a rate of $25 per hour) • Consultant design and construction cost (based on estimates for projects obtained from town and general knowledge of previous work in town) • Town staff time for construction, maintenance, and operation activities (at a rate of $25 per hour)

APPENDIX D: MVP WORKSHOP PRESENTATION

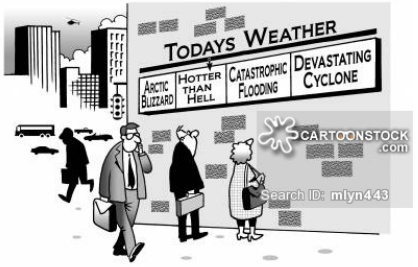
MUNICIPAL VULNERABILITY PREPAREDNESS

Town of
Monson, MA



Introductions

1. Name
2. Your role in / relationship to Monson (staff, board and committee members, business owner, resident, etc.)
3. What you are passionate about—w/ respect to changing climate

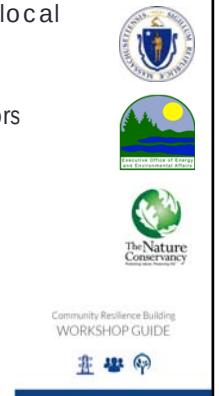


MVP Planning Grant Purpose and Goals

- **Community-led process** that employs local knowledge
- **Mainstream** climate change data
- **Look to communities** as local innovators
- **Coordinate** statewide efforts

Complete workshop – vulnerability assessment and action plan

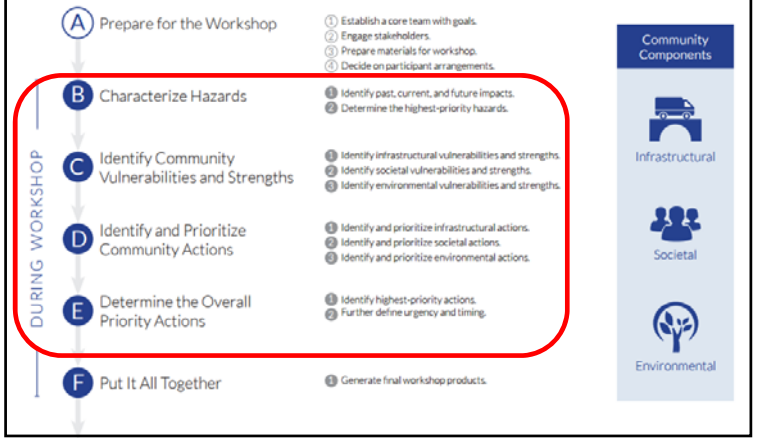
Preference for projects that propose **"Nature based solutions"**



Monson MVP Purpose and Goals

- Share ideas about climate change, impacts, and actions to reduce vulnerabilities
- Become a "MVP "Certified" Community
- Access additional MVP funding to conduct public engagement around sustainability planning!

Outline of Workshop



Agenda

	Time	Activity
Day 1	9:00 a.m.	Introductions, Climate Resources, and Priority Hazards
	10:30 a.m.	Break
	10:40 a.m.	Small Team: ID/Map Community Vulnerabilities and Strengths
	11:30 a.m.	Small Team: Identify and Prioritize Community Actions
	12:00 p.m.	Lunch and Report Out
Day 2	8:30 a.m.	Small Team: Identify and Prioritize Community Actions (Cont.)
	9:00 a.m.	Small Team: Identify Priority and Urgency
	10:30 a.m.	Report Outs
	10:45 a.m.	Break
	11:30 a.m.	Vote on Top Priorities Implementation Design Exercise
	12:00 p.m.	Lunch, Wrap-up and Next Steps

Activity #1: What changes have you seen in the natural environment over the course of your lifetime?

Example: My street floods once or twice per year now, and it never did in the past

Example: Asian beetle and EAB destroyed the ash trees in town

Example: Early thaws followed by late cold snaps have damaged fruit yields

Fill out sticky note, and add to board

Changes in Monson's Environment

- 2011 tornado -
- Post tornado: loss of tree cover, erosion, debris in Chicopee Brook increases flooding risk & downed trees increase wildland fire risk
- Oct 2011 snowstorm – extended power outage, blocked roads
- Aug 2012 Thunderstorm - Bebe Rd washout, Chestnut St flooding
- Oct 2012 Superstorm Sandy – tree & wind damage & localized flooding
- July 2015 Thunderstorm – flooding of undersized culverts and ponding on Main St.
- October 2015 Microburst – Silver St & Thayer Rd, trees down, power loss, road closed

Concerns and Challenges

2016 Hazard Mitigation Plan--#1 Hazard = Earthquake
#2 Hazard = Flooding

26 Dams throughout town – 18 low hazard
-- 6 significant hazard

2 High Hazard :

- Zero Mfg Co – impact Main St/ So Monson
- Conant Brook (Army Corps) – "*devastation all along Chicopee River" Built after destructive 1955 Flood*

Monson's Assets & Features

Beautiful & convenient location, good soil and clean water
Historically-Valleys, slopes constrained dev
Current- steady population growth

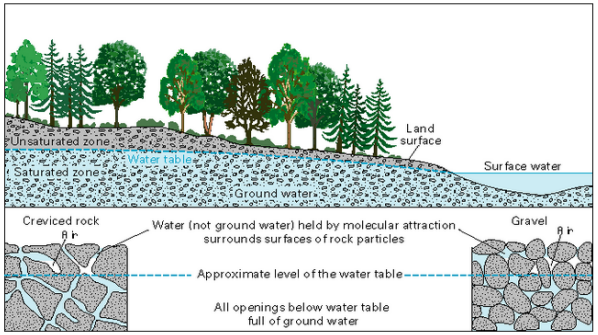
Monson's Assets and Features

- Learned from Tornado & demonstrated Resilience
- Tree re-planting
- Record of land protection
- Active community preservation and conservation commissions
- Leader – Green Communities—reducing muni energy use
- Engaged with Commonwealth, PVPC, etc to maximize Resources, Funding etc to Community:
  - Community Compact—Capital Planning & Maximizing Energy Efficiency & Renewables

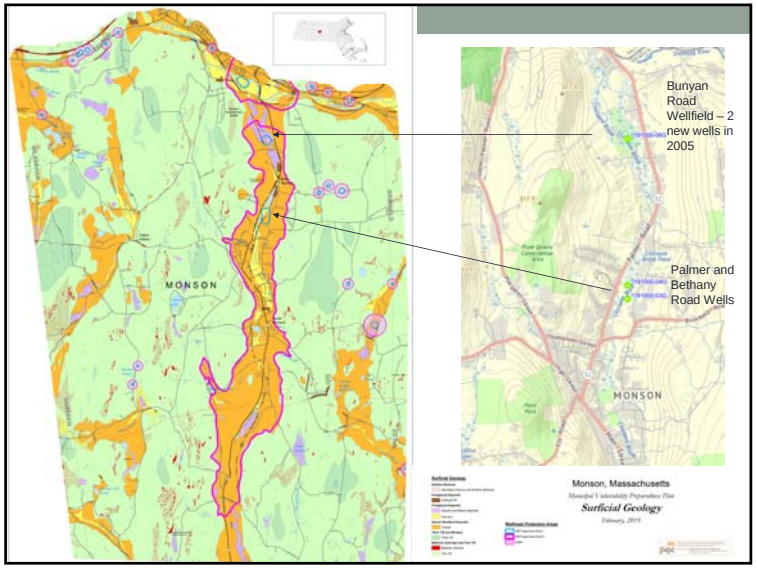
Drinking water

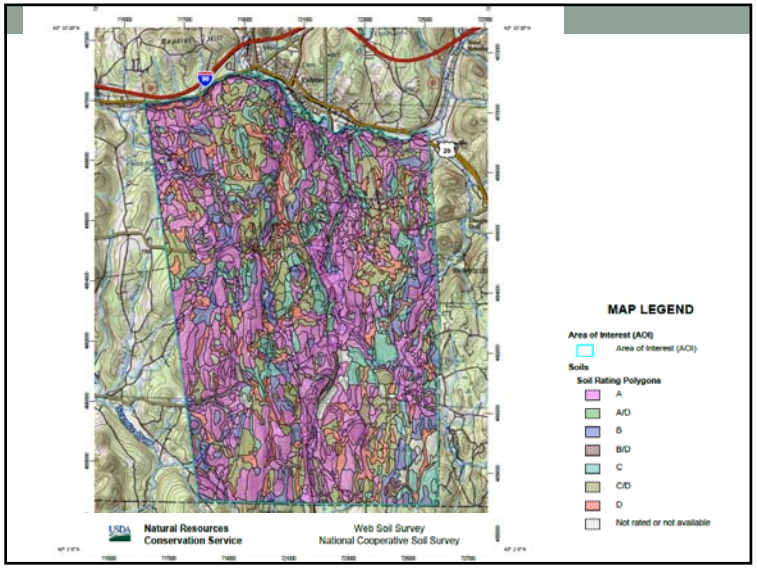
Three characteristics that shape nature of supply

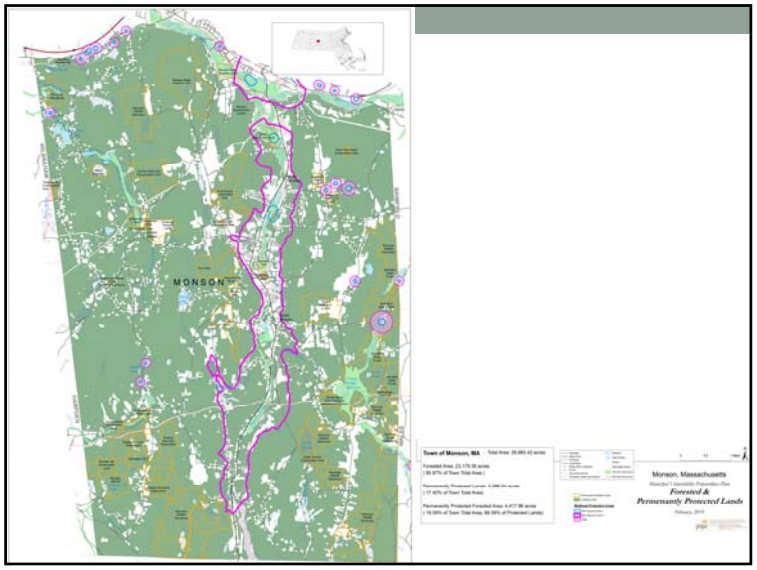
- Geology
- Soils
- Land use/forest cover



https://water.usgs.gov/edu/earthgwaquifer.html







What do we know about drinking water?

- Fortunate geology that enables Monson to pull 100% of its drinking water supply from groundwater;
- About 47% of population is served by public water supply; the rest by private wells (OSRP 2006)
- High susceptibility of drinking water supply system to contamination based on land uses (SWPP 2006), including septic systems, road salt, herbicide spraying
-

Stormwater

Source: P. Gambarini

- Ties to drinking water – important to soak up the rain for recharge
- Need to tend to storm system to ensure that in good condition

Permit elements that may help w/ resilience

- New development standards (LID / nature based solutions)
- Mapping of municipal storm system and inspections of outfalls and interconnections
- More frequent cleaning of catch basins

Massachusetts Green High Performance Computing Center, Holyoke

Global Climate Trends

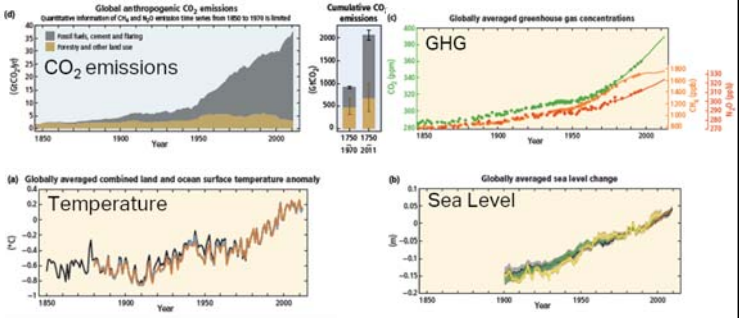
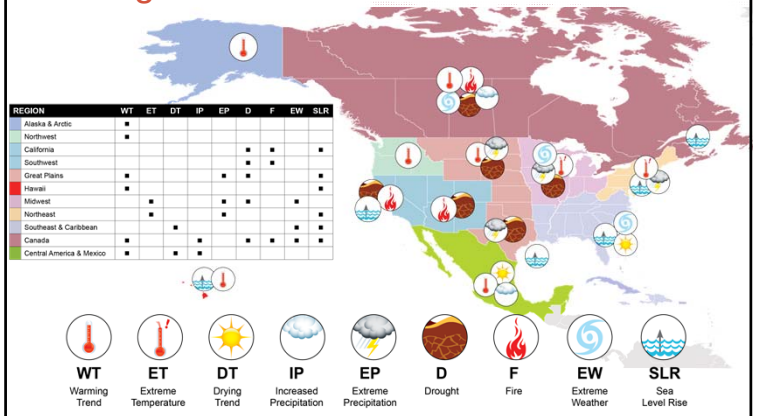


Image: IPCC 2014

- 14 of 15 hottest recorded years since 2000
- July, August 2016, then July 2017 – hottest months on record

High Level Overview of Climate Change Trends in North America



Information adapted from NCA (2013) and IPCC AR5 (2014)

U.S. $ Billion Disasters

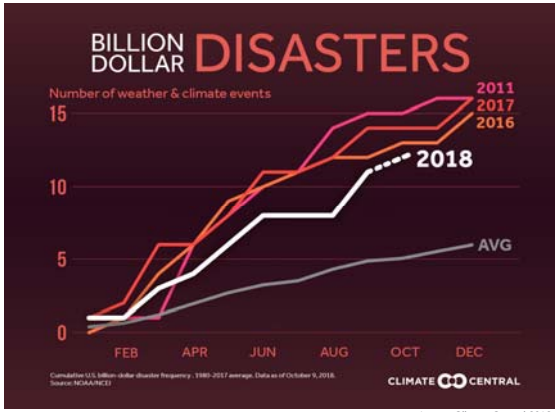


Image: Climate Central 2018

U.S. Stats

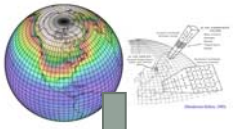
2017 - 16 billion $ disasters, tying 2011

2018 – 11 billion $ disasters as of early November, excluding CA wildfires and Hurricane Michael

MA Climate Projections

- Statewide projections comprised of county-and basin-level information

Global Climate Models (GCMs)



Latest, state of the art climate model simulations (CMIPS) used in the IPCC report (2013)

Model Selection
Rigorous assessment of model performance and projections

Karmalkar et al., *under review*

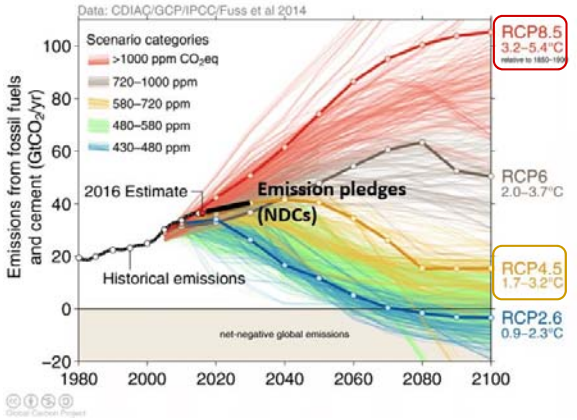
Daily data for MA at 6-km resolution

DOWNSCALED MODEL DATA

Statistical Downscaling

Pierce et al., 2014

Emission Scenarios



Chicopee River Basin Climate Projections

By 2100

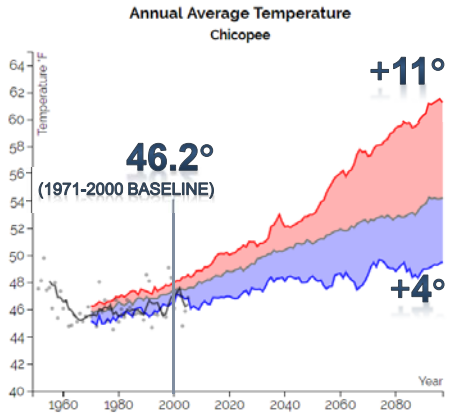
- Increase (↑) in:
  - Average temperatures
  - Min and max temperatures
  - # of days with temps over 90, 95, and 100
  - Cooling degree days (65 and above)
  - Winter precipitation
  - Frequency of heavy precipitation (winter)
- Decrease (↓) in:
  - # of days below 32 and 0
  - # of heating degree days (65 and below)
  - Fall precipitation (potential)

Average Temperatures

- ↑ in annual and seasonal average, max., and min. temps
- Summer highs may ↑ 9% by 2050, up to 17% 2100
- Fall highs may ↑ 12% by 2050, up to 20% 2100

Impacts

- Rain v. snow
- Ecosystem viability
- Consecutive dry days
- Drought and fire

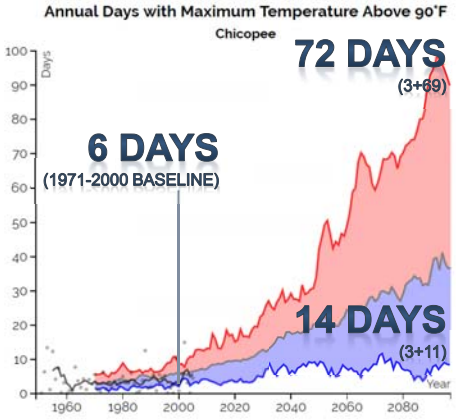


Extreme Temperatures

- By 2100, up to +56 days above 90 in summer, +9 days above 90 in fall.
- Major jump w/ high emissions scenarios

Impacts

- Heat impacts vulnerable pops.
- ↑ in cooling degree days

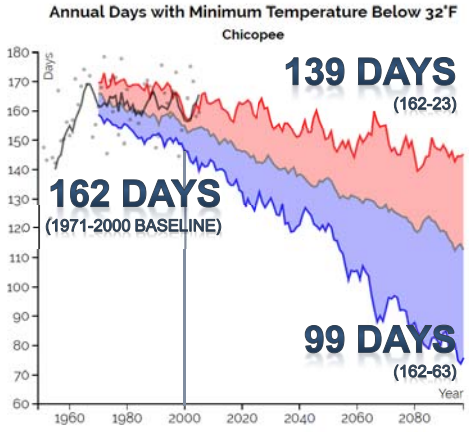


Cold Temperatures

- Fewer days below 32° and 0°
- ↓ in 32° days by 2050 projected in fall and spring
- ↑ length of frost-free season

Impacts

- Pests and insects
- Vegetative growing season
- Maintenance costs

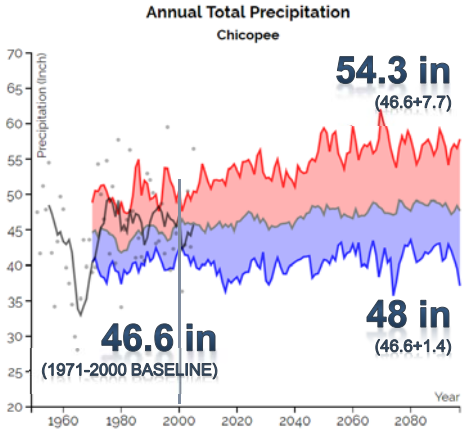


Precipitation

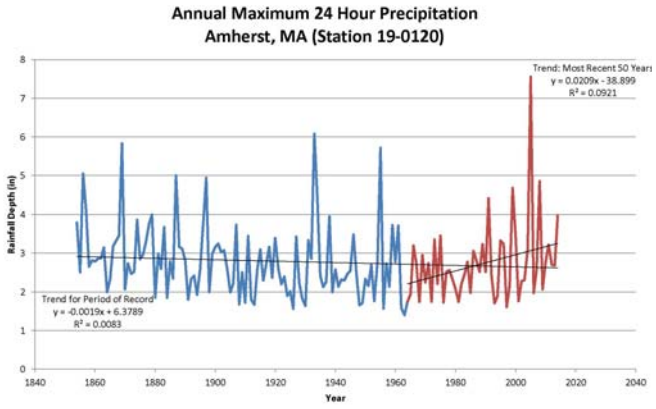
- Annual total precipitation ↑ 1.3 – 6.2” by 2050
- Greatest ↑ in spring and winter

Impacts

- Winter rain
- Reduced snow cover and ice melt



Historical Trend: Maximum Precipitation



Source: Linnean Solutions

Precipitation >1”

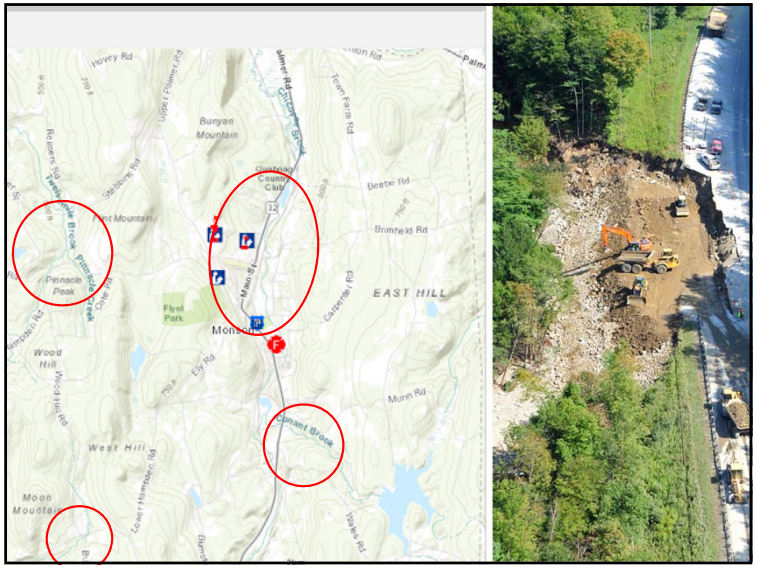
Extreme Precipitation > 1" (Projected)

- Annual ↑ 1.51 days by 2050
- Greatest ↑ in spring and winter

Impacts

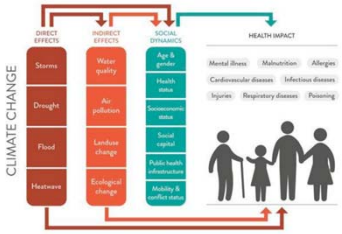
- Water quality
- Flood risk
- Erosion
- Stormwater infrastructure

Chicopee Basin					
		Projected change in # Days with precipitation > 1"			
Season	Baseline (days)	2030s	2050s	2070s	2090s
Annual	6.46	+0.83	+1.51	+1.84	+1.73
Fall	2.04	+0.3	+0.42	+0.4	+0.26
Spring	1.39	+0.14	+0.33	+0.53	+0.57
Summer	1.9	+0.24	+0.34	+0.28	+0.28
Winter	1.11	+0.24	+0.41	+0.69	+0.82



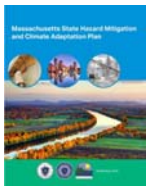
Who and what is especially vulnerable?

- Challenges
  - More extreme storm events/precipitation
  - More and longer heat waves
  - More summer drought
- Vulnerable populations
  - Under 5 and over 65 years old
  - Low income
  - Disabled and chronic illness
  - Limited English speakers
  - Socially or physically isolated
  - Agricultural community
- Other vulnerable assets – transportation infrastructure/culverts, drinking water, forests, biodiversity



Taking Action

Climate Action and Clean Energy Plan (2014)
A plan to guide actions in response to climate-change and its impacts. Offers strategies for local and regional actors to reduce GHG emissions and protect communities from climate-related damage.



Massachusetts State Hazard Mitigation & Climate Adaptation Plan (2018)
Comprehensively integrates climate change impacts and adaptation strategies with hazard mitigation planning.

Deerfield River Watershed Climate Change Vulnerability Assessment Pilot Project (2018)
Develops protocols for assessing the present and future extreme flood vulnerability of culverts to be incorporated as part of decision making process

Activity #2: What does **Climate Vulnerability Preparedness** Look Like to You?

Examples:

"Able to weather disasters and long-term emergencies with joy, grace, and safety."

"Having water and heat available during all weather events."

"Sharing resources with others in my community. Communication."

"Prepare for the unprecedented."

Fill out sticky note, and add to board

Past Planning

- Tornado Recovery Plan and Visioning
- 2004 Master Plan and tornado recovery update 2012
- 2006 Drinking Water Source Protection Plan
- OSRP up to date ➔2021
- Hazard Mitigation Plan 2016 - 2021

Past and Ongoing Actions

- Rebuilt after Tornado
- Updated Zoning bylaw in 2014 to direct new dev where infrastructure exists and encourage low impact dev & reduce impervious surface (parking lots)
- Preliminary culvert inventory
- Mapped inundation zones for possible dam breach

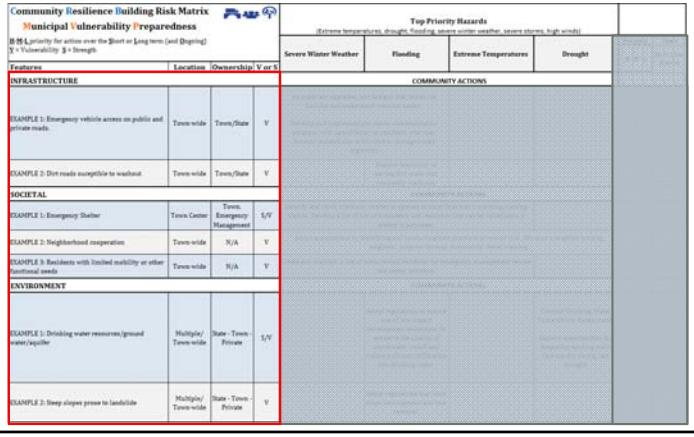
MVP and Nature-Based Solutions

- The sustainable management and use of nature for tackling challenges such as climate change, water and food security, biodiversity protection, human health, and disaster risk management.
- Provides co-benefits for people and nature

Nature-Based Solutions: Examples

- Maintaining healthy, resilient forests will help them continue their critical function of carbon sequestration.
  - Using controlled burns to reinstitute natural fire regime
  - Monitor for early detection and removal of invasive plant species
  - Maintaining species- and age-diverse forest
- Flood and fish friendly culverts protect infrastructure and aquatic habitat
- Rain gardens to reduce localized flooding and recharge aquifer

Risk Matrix Exercise



Community Resilience Building Risk Matrix
Municipal Vulnerability Preparedness

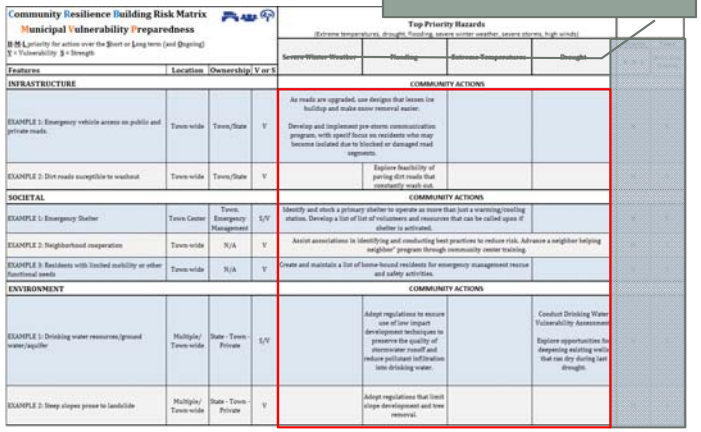
H-M-L priority for action over the Short or Long term (and Ongoing)
V = Vulnerability $ = Strength

Top Priority Hazards
(Extreme temperatures, drought, flooding, severe winter weather, severe storms, high winds)

Features	Location	Ownership	V or $	Severe Winter Weather	Flooding	Extreme Temperatures	Drought
INFRASTRUCTURE				COMMUNITY ACTIONS			
EXAMPLE 1: Emergency vehicle access on public and private roads.	Town-wide	Town/State	V				
EXAMPLE 2: Dirt roads susceptible to washout	Town-wide	Town/State	V				
SOCIETAL							
EXAMPLE 1: Emergency Shelter	Town Center	Town, Emergency Management	$/V				
EXAMPLE 2: Neighborhood cooperation	Town-wide	N/A	V				
EXAMPLE 3: Residents with limited mobility or other functional needs	Town-wide	N/A	V				
ENVIRONMENT							
EXAMPLE 1: Drinking water resources/ground water/aquifer	Multiple/ Town-wide	State - Town - Private	$/V				
EXAMPLE 2: Steep slopes prone to landslide	Multiple/ Town-wide	State - Town - Private	V				

Risk Matrix Exercise

Top Hazards for Monson:
1. Severe Winter Weather
2. Severe Storms and Hurricanes
3. Flooding
4. Extreme Heat



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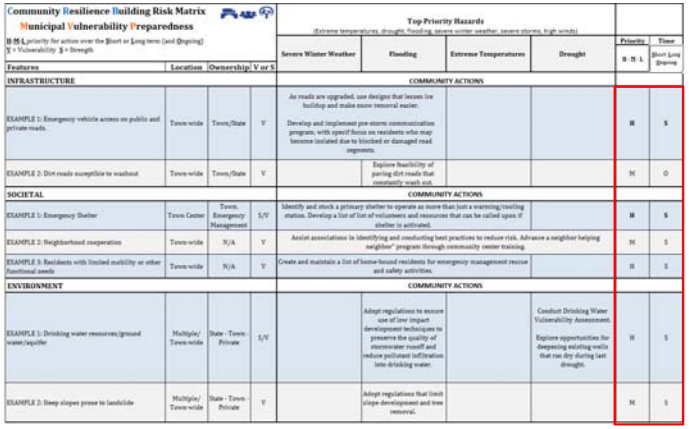
Features	Location	Ownership	V or $	Severe Winter Weather	Flooding	Extreme Temperatures	Drought
INFRASTRUCTURE				COMMUNITY ACTIONS			
EXAMPLE 1: Emergency vehicle access on public and private roads.	Town-wide	Town/State	V	As roads are upgraded, use designs that lessen ice buildup and make snow removal easier. Develop and implement pre-storm communication program, with specif focus on residents who may become isolated due to blocked or damaged road segments.			
EXAMPLE 2: Dirt roads susceptible to washout	Town-wide	Town/State	V		Explore feasibility of paving dirt roads that constantly wash out.		
SOCIETAL				COMMUNITY ACTIONS			
EXAMPLE 1: Emergency Shelter	Town Center	Town, Emergency Management	$/V	Identify and stock a primary shelter to operate as more than just a warming/cooling station. Develop a list of list of volunteers and resources that can be called upon if shelter is activated.			
EXAMPLE 2: Neighborhood cooperation	Town-wide	N/A	V	Assist associations in identifying and conducting best practices to reduce risk. Advance a neighbor helping neighbor" program through community center training.			
EXAMPLE 3: Residents with limited mobility or other functional needs	Town-wide	N/A	V	Create and maintain a list of home-bound residents for emergency management rescue and safety activities.			
ENVIRONMENT				COMMUNITY ACTIONS			
EXAMPLE 1: Drinking water resources/ground water/aquifer	Multiple/ Town-wide	State - Town - Private	$/V		Adopt regulations to ensure use of low impact development techniques to preserve the quality of stormwater runoff and reduce pollutant infiltration into drinking water.		Conduct Drinking Water Vulnerability Assessment. Explore opportunities for deepening existing wells that ran dry during last drought.
EXAMPLE 2: Steep slopes prone to landslide	Multiple/ Town-wide	State - Town - Private	V		Adopt regulations that limit slope development and tree removal.		

Risk Matrix Exercise



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V = Vulnerability $ = Strength

Top Priority Hazards
(Extreme temperatures, drought, flooding, severe winter weather, severe storms, high winds)

Features	Location	Ownership	V or $	Severe Winter Weather	Flooding	Extreme Temperatures	Drought	Priority H-M-L	Time Short Long Ongoing
INFRASTRUCTURE				COMMUNITY ACTIONS					
EXAMPLE 1: Emergency vehicle access on public and private roads.	Town-wide	Town/State	V	As roads are upgraded, use designs that lessen ice buildup and make snow removal easier. Develop and implement pre-storm communication program, with specif focus on residents who may become isolated due to blocked or damaged road segments.				H	S
EXAMPLE 2: Dirt roads susceptible to washout	Town-wide	Town/State	V		Explore feasibility of paving dirt roads that constantly wash out.			M	O
SOCIETAL				COMMUNITY ACTIONS					
EXAMPLE 1: Emergency Shelter	Town Center	Town, Emergency Management	$/V	Identify and stock a primary shelter to operate as more than just a warming/cooling station. Develop a list of list of volunteers and resources that can be called upon if shelter is activated.				H	S
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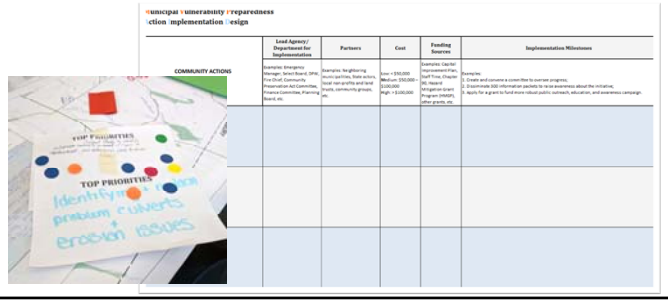
EXAMPLE 3: Residents with limited mobility or other functional needs	Town-wide	N/A	V	Create and maintain a list of home-bound residents for emergency management rescue and safety activities.				H	S
ENVIRONMENT				COMMUNITY ACTIONS					
EXAMPLE 1: Drinking water resources/ground water/aquifer	Multiple/ Town-wide	State - Town - Private	$/V		Adopt regulations to ensure use of low impact development techniques to preserve the quality of stormwater runoff and reduce pollutant infiltration into drinking water.		Conduct Drinking Water Vulnerability Assessment. Explore opportunities for deepening existing wells that ran dry during last drought.	H	S
EXAMPLE 2: Steep slopes prone to landslide	Multiple/ Town-wide	State - Town - Private	V		Adopt regulations that limit slope development and tree removal.			M	S

After Risk Matrices are Complete…

- Turn in Priority Cards
- Report Outs
- Dot Voting
- Implementation Exercise and Report Outs



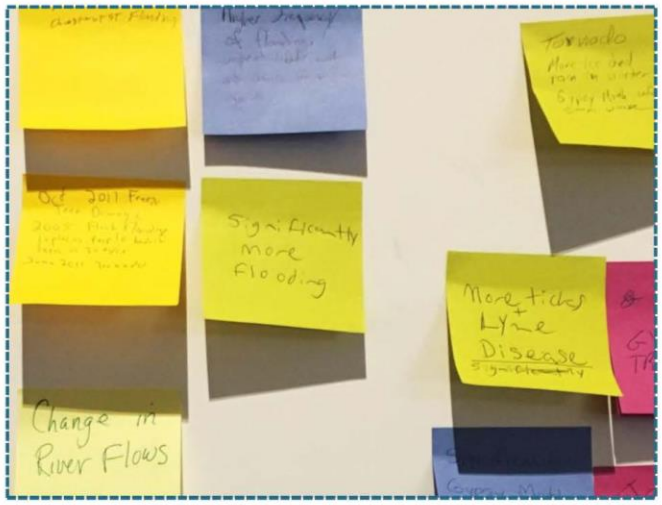
Data and maps available during workshop

- Resources for today
  - Maps
    - Basemap – for mapping exersize
    - Critical Facilities and (Past) Hazard Area Map
    - Surficial geology
    - Soils
    - Forest cover
  - Downscaled climate projections (on computer)
  - 2016 HMP

Any Questions?

APPENDIX E: PUBLIC LISTENING SESSION

FLYER



DAY, DATE, TIME

MONSON MUNICIPAL VULNERABILITY PREPAREDNESS (MVP)

The public meeting and listening session will include a presentation on the outcomes of the recent Municipal Vulnerability Preparedness workshop.

Would you like to learn about CLIMATE CHANGE VULNERABILITY PREPAREDNESS in Monson?

Monson has a grant to prepare for climate change impacts, build community resilience, and receive designation as a Climate Change Municipal Vulnerability Preparedness (MVP) municipality.

Join us for a PUBLIC LISTENING SESSION to learn more and share your ideas.

We look forward to seeing you!

TOWN OF MONSON
Venue, Address

Wednesday
March 27 7:00 pm
https://monson-ma.gov/

NOTES

The Public Listening Session was attended by four members of the public and the town building inspector. Also in attendance were the following MVP team members:

- Evan Brassard, Town Administrator
- Dan LaRoche, Town Planner
- Catherine Ratte, PVPC