

# **Town of Holliston Municipal Vulnerability Preparedness Program**



## **Community Resilience Building Workshop DRAFT Summary of Findings Report**

**July 2019**

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Prepared for the Town of Holliston, MA  
Prepared by Kim Lundgren Associates, Inc.  
With a grant from the Massachusetts Executive Office of Energy & Environmental Affairs



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# Town of Holliston

## Community Resilience Building Workshop

### Summary of Findings

#### I. Overview

This Summary of Findings Report presents the results from a two-month effort by the Town of Holliston to start the conversation about climate change within the community. In the spring of 2019, Holliston received funds from the Massachusetts Municipal Vulnerability Preparedness (MVP) Program to begin the conversation. The MVP program provides funding for cities and towns in Massachusetts to plan for climate change resilience and implement priority projects. The state awards communities with funding to complete vulnerability assessments and develop action-oriented resilience plans. Communities who complete the MVP program become certified as an MVP community and are eligible for action grant funding. In June 2019, the Town of Holliston convened two workshops where local and regional stakeholders assessed current and future strengths and vulnerabilities and identified potential actions to create a more resilient community. This report summarizes the results of the two workshops and the priority actions developed by the Town's stakeholders.

Changes in climate are becoming more apparent in Holliston in the form of several hazards:

- **Heat:** the Northeastern United States has experienced just over a 1.4°F increase in average annual temperature since the early- to mid-1900s,<sup>1</sup> and the number of hot days in Holliston has been on the rise.
- **Drought:** Holliston (along with the rest of Massachusetts) also experienced the impacts of drought during the latter half of 2016.<sup>2</sup> In October 2016, 52% of the land area in Massachusetts was considered to be in “Exceptional Drought,”<sup>3</sup>
- **Intense Storms:** Another notable change is the increase in the intensity and frequency of rain events. The northeast has already seen a 70% increase in the intensity of rain events from 1958 to 2010.<sup>4</sup>
- **Flooding:** Holliston has experienced 13 flooding events since 1978, and the threat is growing due to projected increases in the number of storm events that could lead to dam and/or stormwater infrastructure failure.

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<sup>1</sup> U.S. Global Change Research Program. 2017. Climate Science Special Report: Fourth National Climate Assessment. Chapter 6. U.S. Global Change Research Program. Retrieved from <https://science2017.globalchange.gov/chapter/6/>

<sup>2</sup> National Oceanic and Atmospheric Administration. Massachusetts. Retrieved from <https://www.drought.gov/drought/states/massachusetts>

<sup>3</sup> National Oceanic and Atmospheric Administration. Massachusetts. Retrieved from <https://www.drought.gov/drought/states/massachusetts>

<sup>4</sup> City of Boston. 2016. Climate Ready Boston. Retrieved from [https://www.boston.gov/sites/default/files/02\\_20161206\\_executivesummary\\_digital.pdf](https://www.boston.gov/sites/default/files/02_20161206_executivesummary_digital.pdf)

Combined, these hazards have sparked a desire within the Town to begin identifying and implementing actions that will enhance local resilience to these existing conditions and projected changes.

Holliston has already taken several steps to combat climate change and protect its natural resources. Over the last several years, the Town has been addressing greenhouse gas emissions and energy use through the Massachusetts Green Communities program. Additionally, Holliston has protected a large amount of open space, with over 1,400 acres currently managed by the Conservation Commission and an associated group of volunteers. The MVP program allows the Town to expand the climate change conversation to resilience and preparing for future impacts.

In May 2019, the Town of Holliston partnered with Kim Lundgren Associates, Inc. (KLA) to design a process that would allow the Town to become an MVP Community. The work described in this report is a crucial step in Holliston's journey to a more resilient future. To complete the work outlined in this report, the Town of Holliston worked with KLA to:

- Create a Core Team comprised of key internal stakeholders;
- Establish goals for the MVP process;
- Conduct research on historic and projected changes and impacts from climate change;
- Determine an initial set of high-priority hazards;
- Collaboratively design two MVP workshops using the Community Resilience Building process;
- Identify and invite key stakeholders to participate in the MVP workshops;
- Host two MVP workshops where:
  - a) the highest priority hazards were confirmed;
  - b) the impacts, strengths, and vulnerabilities to infrastructure, socio-economic systems, and environmental systems were identified;
  - c) a number of adaptation actions were created; and
  - d) a final set of high priority action items were collectively defined and agreed upon by workshop participants; and
- Prepare for and host a listening session to discuss the results from the workshop and solicit feedback from the community.

The cornerstones of this work were the MVP workshops hosted by the Town. The central objectives of these workshops were to:

- Confirm the top local natural and climate-related hazards of concern;
- Identify existing and future strengths and vulnerabilities;
- Develop and prioritize actions for the Town; and
- Identify immediate opportunities to collaboratively advance actions to increase resilience.

The remainder of this report provides greater detail about the MVP process that the Town of Holliston undertook, and the actions identified as high priorities to enhance local and regional resilience. The Town would like to thank the Massachusetts Executive Office of Energy and Environmental Affairs for their financial and technical support for this effort.



## MVP Planning Process

In May 2019, Holliston's Town Administrator worked with KLA to identify individuals to serve on the MVP Core Team. In a meeting on May 16, 2019, eight Core Team members learned about the MVP process and their role, confirmed materials and logistics for the MVP Workshops, brainstormed the top hazards to be discussed at the workshops, and reviewed how Holliston plans to leverage the results of MVP to spur greater community action on climate change. The Core Team also discussed maps generated for the MVP process. The Metropolitan Area Planning Commission generated two new maps showing socio-economic and infrastructural features of the Town, and a previous map generated through the Town's Open Space planning process was used to discuss environmental features. These maps are available in Appendices One, Two, and Three.

The Core Team identified individuals to participate in the two MVP workshops. The Core Team was careful to ensure that invitees represented the diversity of the community, including key Town departments, schools, conservation groups, the Library, the Housing Authority, the Senior Center/Council on Aging, the business association, Veterans' Services, regional organizations, and neighboring MVP communities.

The Board of Selectmen sent invitations to the stakeholders for the MVP workshops for the two, 4-hour workshops, scheduled for June 5, 2019 from 12:00pm to 4:00pm and June 7, 2019 from 9:00am to 1:00pm. In total, approximately 30 individuals were invited to participate in the MVP workshops.

## Community Resilience Building Framework







Sixteen individuals attended the workshops (see list in Appendix Four). At the workshops, participants were split into two teams to walk through the MVP recommended process, which consisted of:

- Confirming climate hazards;
- Identifying community vulnerabilities and strengths;
- Identifying and prioritize community actions; and
- Determining overall priority actions for implementation.

Each team identified their top actions in three categories (infrastructure, socio-economic, and environmental) and presented them to the full group on the second day. One team had a tie between two actions for the top slot in the environmental and socio-economic categories, so eight actions were presented to the full group. Each participant was provided three dot stickers to vote for their top three actions. The highest priority actions from that exercise were:

1. Partner with the Charles River Watershed Association to assess all dams in Holliston to determine the best candidates for removal and ecological restoration (12 votes)
2. Pursue funding to accelerate the water distribution system replacement program (9 votes)
3. Install more air conditioning in schools (8 votes)
4. Create a forest management plan (8 votes)



To engage the larger community in the conversation, the Town hosted a public MVP Listening Session on June 26, 2019. Town staff cast a large net to promote the event, advertising through the Town's webpage and Facebook account, Police and Fire Department social media accounts, and the *Holliston Reporter* website. Holliston Cable Access also posted an announcement on their three TV channels and filmed the event to air to an even wider audience. *The Holliston Reporter* also covered the event. Approximately 26 community members attended the Listening Session. Discussion at the listening session centered around the four hazards identified by the Core Team and MVP stakeholders and what actions to take to be better prepared for these hazards. A number of residents were particularly interested in the potential to identify solutions that supply co-benefits for both adaptation and mitigation. Four custom posters were developed for the listening session, one for each of the top hazards (described in more detail below). Outcomes

and materials from the Listening Session can be found in Appendix Seven.

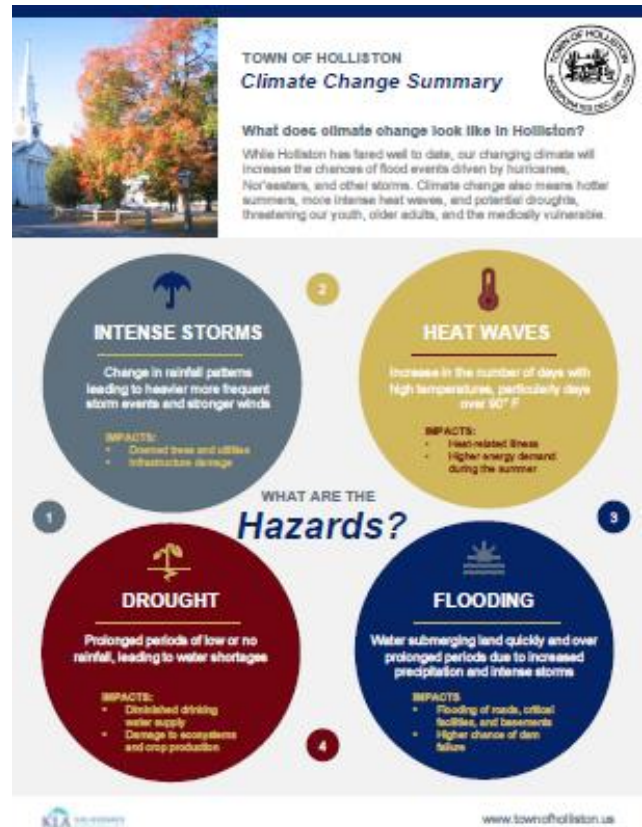
## II. Top Hazards and Vulnerable Areas

Through the MVP workshops, as well as pre-workshop preparation, the Town and the Core Team identified four main hazards that have historically impacted the community and are projected to have notable impacts going forward. The four hazards are:

- Heat waves
- Drought
- Intense storms
- Flooding

Appendix Six provides a summary of the historic trends and projected changes in weather and climate experienced in Holliston. This information was foundational to the MVP process as it helped to establish common ground for the stakeholders and discuss what types of changes and associated impacts to expect going forward.

At the MVP Workshops, participants discussed the impacts of the four hazards and articulated features they saw as community strengths and vulnerabilities related to these hazards in three categories: environmental, socio-economic, and infrastructural. Each group worked through all three categories, one at a time. Below are all of the features that were identified by the two teams:



### ***Infrastructural Features:***

- Dams (identified by both teams)
- Water distribution system (identified by both teams)
- Roads and drainage (identified by both teams)
- Critical and municipal buildings (identified by both teams)
- Septic system
- Power and utilities
- Communications systems

### ***Socio-Economic Features***

- Children (identified by both teams)
- Seniors (identified by both teams)
- Medically vulnerable (identified by both teams)
- Small businesses (identified by both teams)
- Affordable housing/low-income residents
- Pets

### ***Environmental Features***

- Parks, recreational facilities, and athletic fields (identified by both teams)
- Open Space/Conservation Land (including Town Forest) (identified by both teams)

- Water supply/aquifer
- Farms
- Wetlands
- Tree canopy
- Stormwater management
- Lake Winthrop
- Beavers

Appendix Five includes a matrix with all the information from both teams.

The majority of these features were flagged as being both strengths and vulnerabilities. As such, workshop participants unpacked what makes each of these features strong as well as what makes them vulnerable before identifying actions that enhanced strengths and mitigated vulnerabilities.

### III. Current Concerns and Challenges Presented by Hazards

More details on each of the four identified hazards is provided below, along with a discussion of what concerned MVP Workshop participants about these hazards and their potential impacts on Holliston.

#### ***Intense Storms***

Over the last several decades, the number and intensity of storms has been on the rise. This includes hurricanes, nor'easters, ice storms, and rainstorms. Research shows that these types of storms are likely to become more frequent, intense, and possibly longer in duration in the future.<sup>5</sup> Intense storms can lead to flooding, property damage, and downed trees and power outages, as well as significant economic disruption.

While nearly every feature of the Town could be affected by intense storms, MVP Workshop participants and the Core Team were particularly concerned with impacts to critical facilities; power and utilities; communications systems; small businesses; and populations like seniors, children, and the medically vulnerable. Participants discussed how intense storms could lead to school and business closures and make it harder for seniors and those with health challenges to access medication and other basic necessities. The vulnerability of the utility grid is of particular concern to some stakeholders, with 57 power outage incidents affecting




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<sup>5</sup> MA Climate Change Clearinghouse. 2019. "Changes in Precipitation." Retrieved from <http://resilientma.org/changes/changes-in-precipitation>



six Town buildings since January 2018.<sup>6</sup> Stormwater runoff polluting Holliston's natural features is also a concern related to intense storms.

Notably, workshop participants acknowledged that many community members that are traditionally identified as "vulnerable" have resilience traits and should be leveraged as a resource when tackling climate change issues. For example, seniors have historic knowledge of past emergencies and ways they were addressed that should be discussed so the Town can learn from the past to inform the future. Additionally, the Town's young people may also be able to implement many of the actions identified through the MVP process (e.g., volunteering to aid seniors and others after extreme events).

### ***Flooding***

While Holliston has fared well to date, flooding, driven by increased precipitation, is a serious threat to the Town. Holliston is home to major tributaries of the Charles River, including Beaver Brook, Hopping Brook, Chicken Brook, and Bogastow Brook, along with Lake Winthrop. There are several dams located along these various waterways that could lead to major flooding if a failure were to occur from a storm or other event. Additionally, as indicated in the 2016 Hazard Mitigation Plan (HMP), "many of the Town's flooding problems are related to insufficient or inoperable stormwater and drainage infrastructure, such as culverts and drain pipes that are not large enough to quickly transport flood waters away from Town streets and neighborhoods and toward the nearby wetlands."<sup>7</sup> These combined issues led stakeholders in the MVP workshop to identify flooding as their top concern for the future.



Much like the HMP, MVP Workshop participants brought up the aging water distribution system and dams as top features of concern related to flooding. Currently the Town is replacing one mile of the water distribution system a year, but participants noted that the rate of replacement is too slow to adequately prepare for future impacts of climate change. Additionally, there are several dams (man-made and beaver built) in critical need of improvements or controlled removal to avoid serious flooding that could damage properties or flood critical facilities. The image shows a beaver dam near Mission Springs elderly housing.

Workshop participants also discussed the potential impacts of flooding on vulnerable populations, indicating that it could lead to school closures and inaccessibility to medicine and services for the elderly and those with medical conditions. Officials noted the presence of a number of cesspools in Town that could be impacted by flooding, leading to public health problems. Participants also felt a need for more emergency preparedness planning; they felt that there are not enough adequate emergency shelters in town and that residents' preparedness knowledge is lacking.

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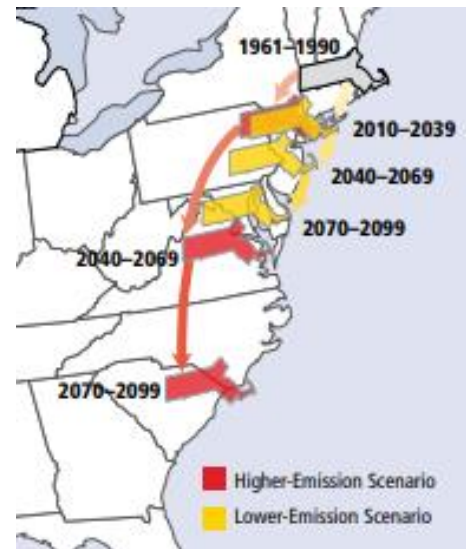
<sup>6</sup> Town of Holliston. 2019. Personal Communication with Chris Meo.

<sup>7</sup> Town of Holliston. 2016. Hazard Mitigation Plan.

Finally, participants, noted that the Town's culverts are aging, undersized, and vulnerable to beaver-induced blockage, leaving them inadequately prepared to deal with an increased amount of precipitation.

### **Heat Waves**

Extreme heat and rising average temperatures are also of concern to the Town and its residents, particularly in regard to vulnerable populations. By mid-century Holliston could see a 4.2° Fahrenheit increase in average annual temperature as compared to the 1971-2000 baseline.<sup>8</sup> We are also projected to see more 'heat waves' defined as three or more days in a row above 90° Fahrenheit. The figure to the right demonstrates this point by showing how Massachusetts' climate may seem more like South Carolina's by the end of the century if greenhouse gas emissions are not significantly reduced.<sup>9</sup> The average number of days per year over 90°F was just 8 from 1971-2000, but by mid-century it could be closer to 30 days. By the end of the century it could reach 46 days.<sup>10</sup> This information led the MVP Core Team and stakeholders to prioritize heat waves as one of the four primary hazards to include in this process.



MVP Workshop stakeholders identified the following groups as being particularly vulnerable to extreme heat: the elderly, youth, those with medical conditions, and low-income individuals who may struggle to pay for cooling needs. Participants noted that air conditioning is only available in certain administrative offices in the schools, creating hot conditions for students and teachers that can lead to unproductive school days. Participants also noted that changing climate conditions are favorable for some invasive species that impact ash and oak trees and other environmental features.

### **Drought**

Even though more annual precipitation is projected overall, it is anticipated to fall in more intense events in the winter and spring rather than in smaller more sporadic events throughout the year. Therefore, there will be longer periods of time that experience no rainfall, especially in the summer and fall, increasing the potential for drought. In October 2016, 52% of the land area in Massachusetts was considered to be in "Exceptional Drought,"<sup>11</sup> and Core Team members and MVP Workshop stakeholders indicated that Holliston felt major impacts from that event. More of these types of events can be expected in the future.

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<sup>8</sup> Northeast Climate Adaptation Science Center. 2019. "Annual Average Temperature for Middlesex County." Resilient MA Datagrapher. MA Climate Change Clearinghouse. Retrieved from <http://resilientma.org/datagrapher/?c=Temp/county/avgt/ANN/25017/>

<sup>9</sup> Confronting Climate Change in the Northeast. 2007. Union of Concerned Scientists. Retrieved from [https://www.ucsusa.org/sites/default/files/legacy/assets/documents/global\\_warming/pdf/confronting-climate-change-in-the-u-s-northeast.pdf](https://www.ucsusa.org/sites/default/files/legacy/assets/documents/global_warming/pdf/confronting-climate-change-in-the-u-s-northeast.pdf)

<sup>10</sup> Northeast Climate Adaptation Science Center. 2019. "Days with Maximum Temperature Above 90°F." Resilient MA Datagrapher. MA Climate Change Clearinghouse. Retrieved from <http://resilientma.org/datagrapher/?c=Temp/county/tx90/ANN/25017/>

<sup>11</sup> National Oceanic and Atmospheric Administration. Massachusetts. Retrieved from <https://www.drought.gov/drought/states/massachusetts>

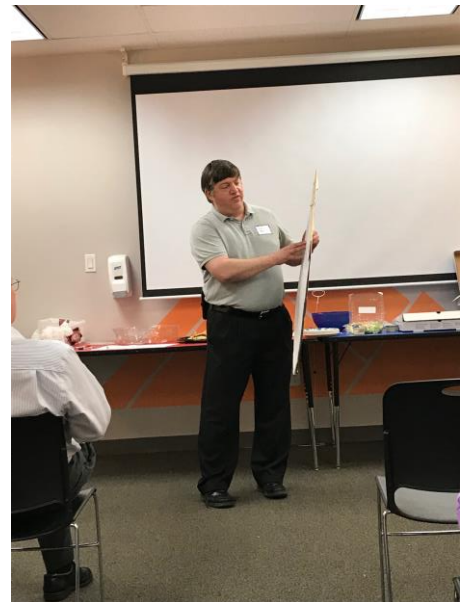
As a town that relies on groundwater for its drinking water supply, Holliston is vulnerable to drought. MVP stakeholders shared concerns that residents in Holliston with wells on their property may have a more significant impact on water supply during times of drought. Finding ways to incentivize hookup to the municipal system (or disincentivize individual wells) was a common theme. Participants also felt that residents need more education on water conservation, as demand has increased over the years. Additionally, many stakeholders are concerned about drier conditions increasing the risk of brush fire in Holliston's extensive amount of conserved land and impacting the health of the Town's wetlands.

#### **IV. Current Strengths and Assets**

When asked what Holliston's greatest strength is, MVP Workshop participants indicated that its people were its greatest asset. Holliston's extensive amount of conserved land and natural features make it no surprise that local natural resources were also identified as a top strength. Participants also identified Holliston's schools and small businesses as features that make the community strong. Leveraging these strengths in adapting to climate change will be key to increasing the overall resilience of the Town into the future.

Other strengths that came up in the MVP Workshops included:

- Seniors
- School age children
- Pets
- Farms
- Recreational facilities
- Municipal buildings
- Critical infrastructure
- Power and utilities
- Communications systems



#### **V. Top Recommendations to Improve Resilience**

The last two steps for the MVP Workshops were to brainstorm possible adaptation actions to address existing or projected vulnerabilities for the features discussed or enhance the aspects that make the feature a strength in the community. This was then followed by a group prioritization of actions to identify which ones the community should take first.

Through this process, MVP Workshop stakeholders identified over 70 possible actions. The following are the top four actions that were collectively identified as priorities for Holliston:

- Partner with the Charles River Watershed Association to assess all dams in Holliston to determine the best candidates for removal and ecological restoration (12 votes)
- Pursue funding to accelerate the water distribution system replacement program (9 votes)
- Install more air conditioning in schools (8 votes)

- Create a forest management plan (8 votes)

Below is the list of top actions presented by each team to the larger group for prioritization, as well as the number of votes cast for each.

#### **Top Infrastructure Actions from Teams**

- Pursue funding to accelerate the water distribution system replacement program (9 votes)
- Partner with the Charles River Watershed Association to assess all dams in Holliston to determine the best candidates for removal and ecological restoration (12 votes)

#### **Top Socio/Economic Actions from Teams**

- Install more air conditioning in schools (8 votes)
- Expand or update current emergency centers (1 vote)
- Develop a community-wide preparedness program, including guidance on what to include in a preparedness kit (3 votes)

#### **Top Environmental Actions from Teams**

- Protect the water supply through zoning, incentivizing hook-up to the municipal system (2 votes)
- Create a forest management plan (8 votes)
- Partner with the State to develop a sustainable beaver eradication program (2 votes)

## **VI. Conclusion and Next Steps**

Holliston is ready to take the next steps to implement these actions and others to make it a model for resilience in Massachusetts. The Town is motivated to seek funding to begin implementing the actions identified in the previous section and expand its portfolio of sustainability and climate action work by developing a Climate Action Plan. The Climate Action Plan would address both adaptation and mitigation actions that the Town can take. Both will be necessary to preserving and enhancing Holliston's way of life in the future. The Town will continue reaching out to diverse community stakeholders to develop and refine this plan of action. It will fold in knowledge gleaned through the MVP process into existing and future planning processes— making it an integral part of each decision, as opposed to an additional component. The Town recognizes that this is necessary to move forward and establish itself as a resilience leader.

## **VII. Acknowledgements**

The Town of Holliston would like to thank all of the following Core Team members that made this project a success:

<b>Name</b>	<b>Title/Affiliation</b>
Michael Cassidy	Fire Chief
Joan Hunter-Brody	350.org
Joan Levinsohn	350.org
Chris Meo	Technology Director
Scott Moles	Health Director/Agent
Sean Reese	Department of Public Works Director



Jeff Ritter  
Rich Rosenberry  
Ryan Clapp

Town Administrator  
350.org  
Conservation Agent

In addition, the Town would like to thank the Massachusetts Executive Office of Energy & Environmental Affairs for the financial support to execute this project.

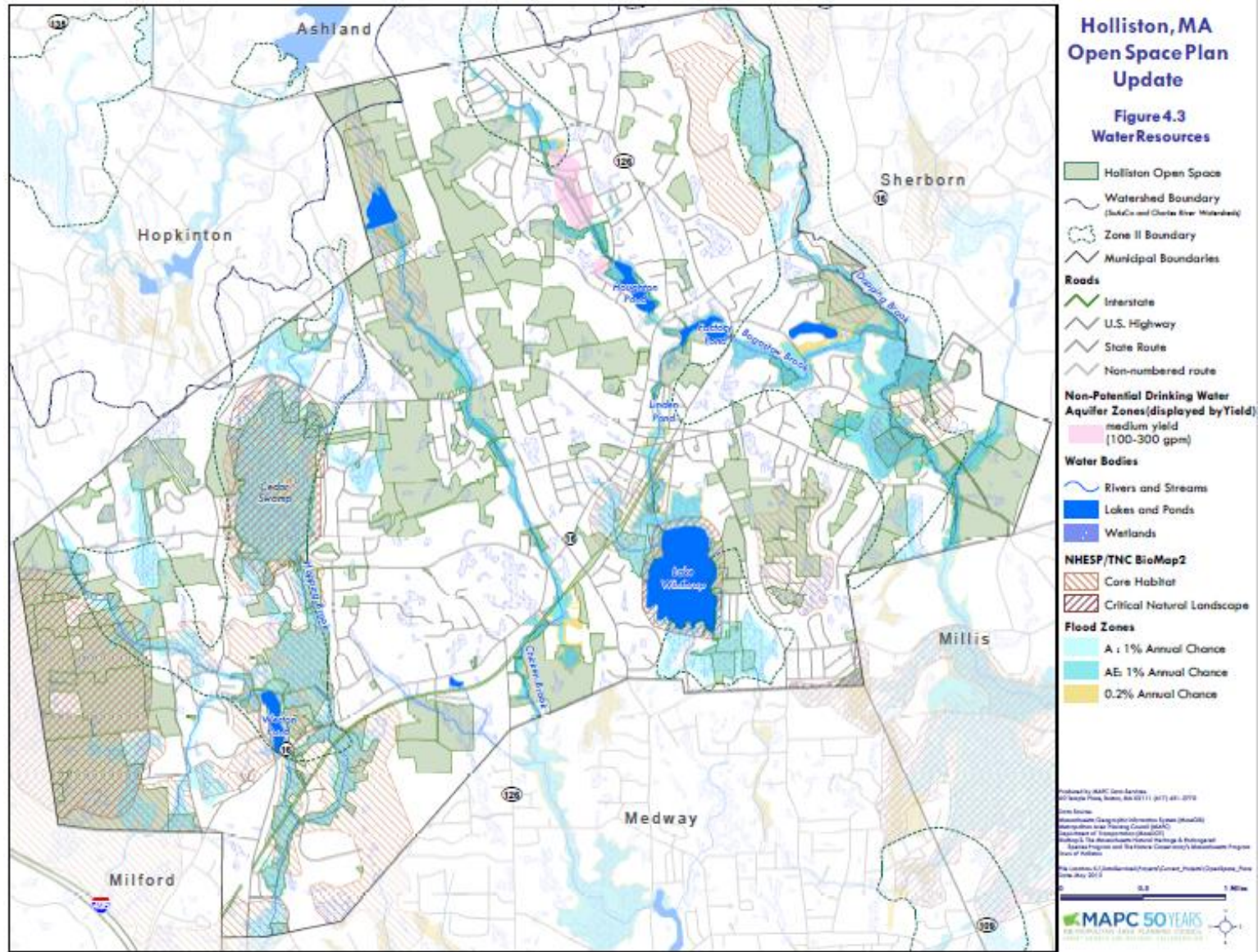
### **Report Citation**

Town of Holliston (2019). Community Resilience Building Workshop Summary of Findings. Holliston, Massachusetts.

### **Community Resilience Building Workshop Project Team**

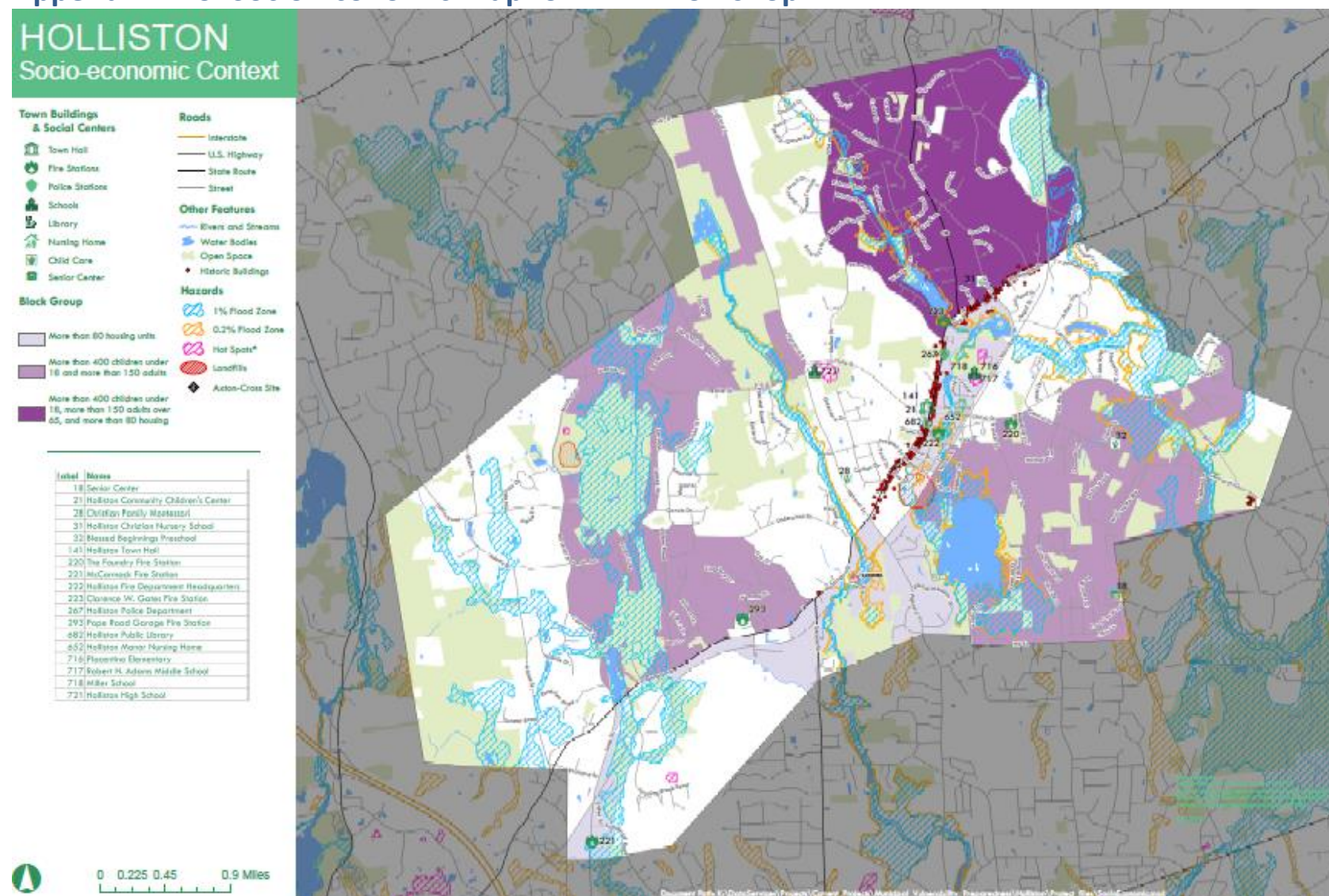
Name	Title	Affiliation
Jeff Ritter	Town Administrator	Town of Holliston
Chris Meo	Technology Director	Town of Holliston
Kim Lundgren	Lead Facilitator	KLA
Kara Runsten	Facilitator	KLA
Angela Cleveland	Listening Session Facilitator	KLA
Maggie Peard	Listening Session Facilitator	KLA

## Appendix One: Environmental Map for MVP Workshop



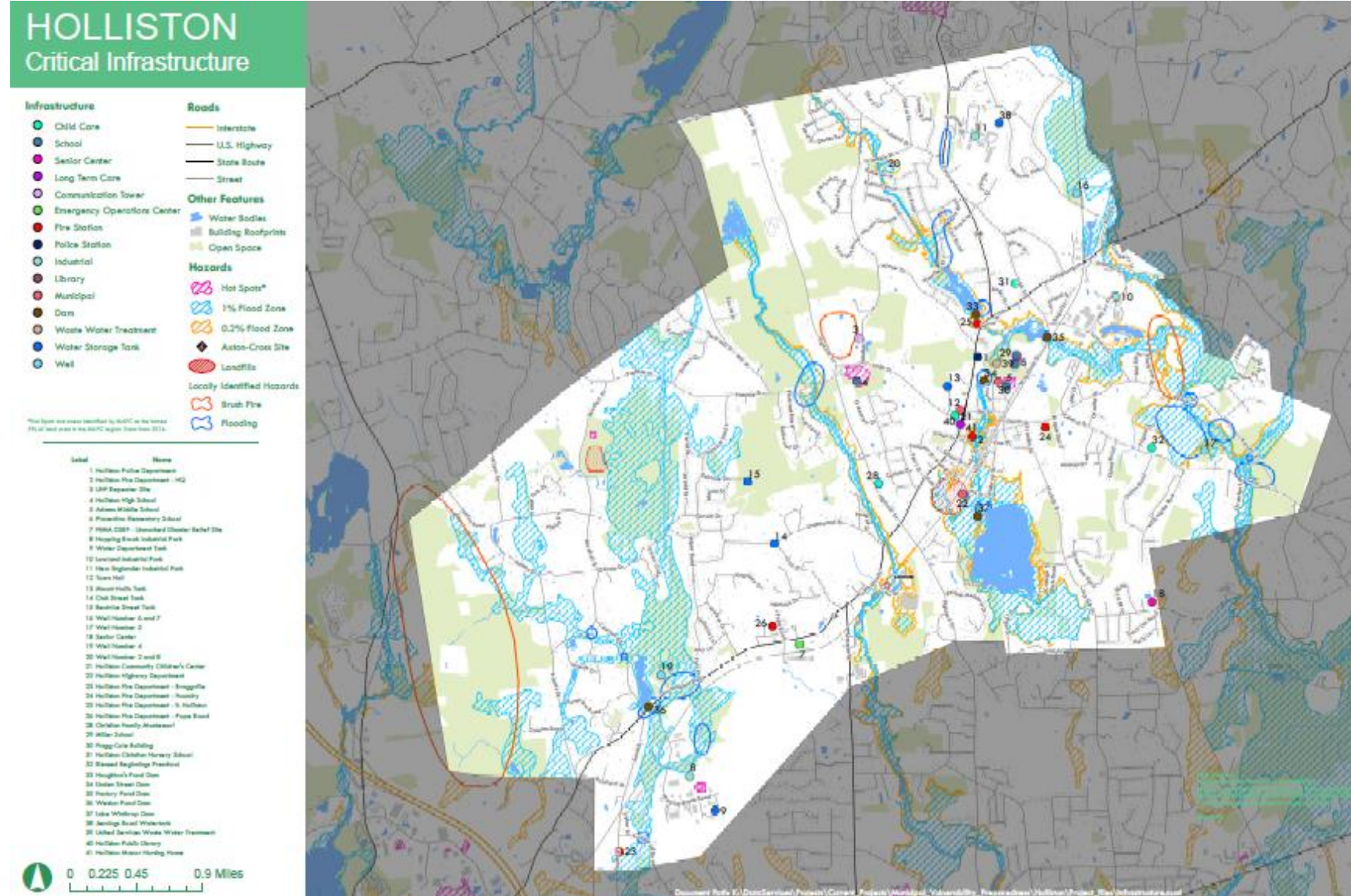


## Appendix Two: Socio-Economic Map for MVP Workshop





## Appendix Three: Infrastructure Map for MVP Workshop





## Appendix Four: MVP Workshop Attendees

Name	Title	Affiliation
<b>Town Lead</b>		
Jeff Ritter	Town Administrator	Town of Holliston
<b>Consulting Team</b>		
Kim Lundgren	Lead Facilitator	KLA
Kara Runsten	Facilitator	KLA
<b>Core Team and Workshop Attendees</b>		
Delilah Bethel	Rita Barron Fellow	Charles River Watershed Association
Keith Buday	Business Manager	Holliston Public Schools
Michael Cassidy	Fire Chief	Town of Holliston Fire/Emergency Management
Ryan Clapp	Conservation Agent	Conservation Commission
Mark Frank	Director of Recreation	Holliston Parks & Recreation
Tina Hein	Board of Selectmen	Town of Holliston
Keegan Hersey	Resident Services Manager	Holliston Housing Authority
Joan Hunter-Brody	Member	350.org
Joan Levinsohn	Member	350.org
Bob Malone	Council on Aging Chair, Library Trustees Chair, Housing Authority State Appointee	Council on Aging, Library Trustees, Housing Authority
Chris Meo	Technology Director	Town of Holliston
Scott Moles	Health Director/Agent	Holliston Board of Health
Sean Reese	Director	Department of Public Works
Rich Rosenberry	Member	350.org
Robert Weidknecht	Chair	Holliston Trails Committee
<b>Workshop Invitees (Did Not Attend)</b>		
Sarah Bateman	Director	Town of Holliston Veteran Services
Chris Canney	Building Inspector	Town of Holliston
Andrew Carini	Co-President	Holliston Business Association
Michael Guzinski	Town Administrator	Town of Millis
Paul Landers	Director	Holliston Housing Authority
Linda Marshall	Director	Holliston Senior Center
Leslie McDonnell	Director	Holliston Public Library
Emily Norton	Executive Director	Charles River Watershed Association
Martin Pillsbury	Environmental Director	Metropolitan Area Planning Council
Karen Sherman	Town Planner	Town of Holliston
Matthew Stone	Police Chief	Town of Holliston
Richard Villani	Town Administrator	Town of Milford
David Williams	Town Administrator	Town of Sherborn
Jaclyn Winer	Program Director	Town of Holliston Youth and Family Services

## Appendix Five: Combined Matrix with Actions from Both Small Teams

(Actions labeled “B” came from the blue small team, “G” from the green small team)

**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

H-M-L priority for action over the Short or Long term (and Ongoing)				Intense Storms		Flooding	Heat Waves	Drought	Priority	Time
V = Vulnerability S = Strength									H - M - L	Short Long Ongoing
Features	Location	Ownership	V or S							
Infrastructural										
Water Distribution System	Town-wide	Town	V	B1. Pursue funding to accelerate replacement program B2. Charge infrastructure fee for those not on the distribution system but who will benefit from improvements				B3. Water conservation education campaign	B1. H B2. H B3. H	B1. O B2. S B3. O
Dams	Multiple	Town	V	B1. Pursue funding to address dam hazard status (e.g., upgrade or remove) B2. Create emergency action plan for all dams					B1. H B2. H	B1. S B2. S
Roads	Town-wide	Town, Private	V	B1. Convene working group on zoning and planning changes to mitigate conflicts (e.g., emergency access v. wanting to restrict paving) B2. Include stormwater and runoff					B1. M B2. M	B1. L/O B2. S
Culverts	Town-wide	Town, Private	V	B1. Create a culvert/beaver management plan B2. Pursue funding to proactively fix culverts B3. Conduct inventory of culverts and prioritize them for improvements by risk					B1. H B2. M B3. M	B1. O B2. O B3. S
Septic System	Town-wide	Private	V	B1. Eliminate cess pools B2. Create a municipal treatment plant					B1. H B2. L	B1. S B2. L
Municipal Buildings	Multiple	Town	V/S	B1. Upgrade municipal buildings for emergency preparedness B2. Require LEED certification for all municipal buildings B3. Change zoning to require solar in new development					B1. H B2. H B3. H	B1. O B2. O B3. O
Power & Utilities	Town-wide	Private	V/S	G1. Work with Eversource to improve tree trimming efforts	G2. Follow up with Eversource on reliability and gas leaks reports, improve communications				G1. H G2. H	G1. O G2. S
Water Supply System	Town-wide	Public, Private	V/S	G1. Need more funding for upgrades				G2. Education program on water conservation	G1. H G2. H	G1. L G2. O
Critical Infrastructure	Town-wide	Public	V/S	G1. Develop a transition plan for Fire Chief and consider FT hires G2. Hire and fund a Facilities Coordinator to be responsible for asset management					G1. L G2. H	G1. L G2. S
Dams	Specific location	Public	V	G1. Partner with CWRRA to assess all dams in Holliston to determine best candidates for removal and ecosystem restoration					G1. H	G1. S
Roads & Drainage	Town-wide	Public, Private	S							
Communications Systems	Town-wide	Public, Private	V/S	G1. Assess opportunities to put all communications systems underground			G2. Improve cellular/wireless infrastructure to improve access		G1. L G2. H	G1. L G2. O

Societal							
School Age Children	Town-wide	Parents & Sch	WS	B1. Supply take home kits for kids needing food assistance during school closures B2. Programming during school closures for working parents	B3. More air conditioning in schools	B1. L B2. M B3. H	B1. O B2. O B3. O
Seniors	Town-wide	N/A	VS	B1. Expansion or updating of current emergency centers to make them prepared and have adequate staffing B2. Create a volunteer team to help seniors and other vulnerable populations during emergencies B3. Educational campaign to make aware of resources and preparation tips (whole community, not just seniors)		B1. H B2. M B3. H B4. M	B1. O B2. S B3. O B4. L
Affordable Housing/Low-Income Residents	Various Locati	N/A	V	B1. Zoning changes to allow for in-law apartments and other housing configurations to meet needs of seniors and vulnerable populations B2. Volunteer team to help distribute food during emergency (from Town's food pantry), perhaps expanding meals on wheels to serve this purpose		B1. H B2. M	B1. S B2. S
Medically Vulnerable	Town-wide	N/A	V	B1. Revisit partnerships and MOUs around lists of vulnerable persons during emergencies (information sharing) B2. Increase inventory of preparedness equipment that can be loaned (e.g., portable generators to run medical devices)		B1. L B2. M	B1. O B2. S
Small Businesses	Town-wide	Private	VS	B1. Outreach to business association on preparedness education and programs B2. Foster relationships between businesses to help each other out in case of emergency		B1. L B2. L	B1. O B2. O
Seniors	Town-wide	N/A	VS	G1. Develop a community-wide preparedness program (guidance on what to include in a preparedness kit, possibly expand the "handy man" safety program) G2. Assess large facilities (e.g., Senior Center, Senior Housing, houses of worship) in town and identify priority locations to play role as longer term shelter (including generators) (Resilience hubs)		G1. H G2. H	G1. S G2. S
Children/Youth/Schools	Town-wide	N/A		G1. Enhance existing communications systems and protocols - maybe add a hotline and neighborhood leaders G2. Enhance wellness programs for youth to reduce vulnerability (e.g., nature-based, cooking)		G1. M G2. M	G1. L G2. O
Disabled & Medically Challenged	Town-wide	N/A	V	G1. Create a program to allow existing or retired medical professionals to help out in an emergency G2. Create a network of solar powered charging stations throughout town G3. Identify private residences with generators		G1. H G2. L G3. L	G1. S G2. L G3. O
Businesses	Town-wide	N/A	VS	G1. Establish a public/private partnership to share equipment and resources		G1. M	G2. O
Pets	Town-wide	N/A	VS	G1. Establish a program to support sheltering of pets-- needed volunteers, equipment, locations		G1. H	G1. O

Environmental							
Water Supply/Aquifer	Multiple	Public, Private	V		B1. Educational campaign about water conservation, anti-pollution, and combatting desire for green lawns B2. Protect water supply through zoning changes-- incentivize connection to municipal system, not wells B3. Controlled growth by charging MWRRA prices	B1. H B2. H B3. L	B1. O B2. S B3. L
Farms	Multiple	Private	VS	B1. Money to protect farmland from selling to developers B2. Educational outreach on resources in case of declared disaster		B1. M B2. H	B1. O B2. O
Open Space/Conservation Land	Multiple	Public	VS	B1. Evaluate which areas might be ripe for expansion of conservation land B2. Create forest management plan with DCR B3. Inventory/mapping of conservation land B4. Hire a sustainability coordinator B5. Proactive cutting of fire lanes in sites at risk of brush fire		B1. M B2. H B3. M B4. M B5. M	B1. O B2. O B3. S/O B4. S B5. O
Wetlands	Multiple	Private	VS	B1. Education to homeowners on need for protection B2. Standing order of conditions for DPW		B1. H B2. H	B1. O B2. S
Recreational Facilities	Multiple	Public, Private	VS	B1. Education about littering		B1. H	B1. O
Tree Canopy	Town-wide	Public, Private	VS	G1. Create policy to require replanting/replacement of cut trees for new development or contribute to a tree fund G2. Conduct a study to understand best species to replace Ash and increase species diversity		G1. M G2. H	G1. S G2. O
Stormwater Management	Town-wide	Town	S	G1. Conduct a tree canopy inventory/assessment G2. Establish a stormwater management fee G3. Create a town-wide rain barrel/garden program G4. Develop and implement an education and PR campaign related to the values of our natural resources and our individual role to protect G5. Become a Tree City USA		G1. L G2. H G3. H G4. H G5. H	G1. L G2. L G3. O G4. S/O G5. S
Parks & Athletic Fields	Specific locati	Private, Rest F	VS	G1. Reassess use, type, and location of athletic fields to take advantage of hydrologic realities	G2. Add more shade features and trees to playground areas	G1. M G2. L	G1. L G2. L
Town Forest & Conservation Land		Public	VS	G1. Develop a management plan for the Town Forest and Conservation Land to address brush fires, invasives, and general maintenance		G1. M	G1. S
Lake Winthrop	Specific locati	Public	VS	G1. Identify and implement best practices to remove phosphorus and invasives from Lake Winthrop and address erosion issues		G1. H	G1. O
Beavers	Specific locati	N/A	V	G1. Partner with the State to develop a sustainable beaver eradication program, including education and new policies		G1. H	G1. L

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	INTENSE STORMS	FLOODING	HEAT WAVES	DROUGHT	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Power + Utilities	townwide	private	V/S	1. Invest with resources to improve fire-trimming efforts	2. Follow up with reports, improve communication		3. Inspect for leaks, leaks, leaks	1.H 2.H	1.O 2.S
Water Supply / Septic	townwide	public/private	S/V	1. Assess funding for upgrades			4. Education program water conservation	3.H 4.H	3.L 4.O
Critical Infrastructure	townwide	public	S/V	1. Develop a transition plan to ensure continuity of service for lines				5.H 5.L	5.L 5.L
Public Safety	Specific locations	Public	V	1. Clear trees or debris that could obstruct view of emergency vehicles				6.H 7.H	6.S 7.S
Roads + Drainage	townwide	public + private	S					8.L	8.L
Communication Systems	townwide	Public/private	S/V	1. Assess opportunities to get all communication systems		4. Improve cellular/Lucas on laptop radios		9.H	9.O
Societal									
Seniors	—	—	—	1. Assess needs of seniors in community				1.H 2.H	1.S 2.S
Children/Youth/Schools	—	—	—	1. Assess needs of children in community				3.H 4.H	3.L 4.O
Disabled + Homeless/Challenged	—	—	—	1. Assess needs of disabled in community				5.H 6.H	5.L 6.S
Businesses	—	—	—	1. Assess needs of businesses in community				7.H 8.H	7.S 8.S
Parks	—	—	—	1. Assess needs of parks in community				9.H	9.O
Environmental									
Tree Canopy	townwide	private	S/V	1. Create policy to require developers to replant trees they cut down				1.H 2.H	1.O 2.S
Stormwater Mgmt	Specific locations throughout public	Private not public	S/V	1. Create a stormwater management plan				3.H 4.H	3.L 4.O
Parks + Athletic Fields	—	—	—	1. Assess needs of parks in community				5.H 6.H	5.L 6.S
Town Forest + Conservation Land	—	—	—	1. Assess needs of town forest in community				7.H 8.H	7.S 8.S
Lake/Wetland	Specific	Public	S/V	1. Identify implement best practices to reduce phosphorus from the lake + address erosion				9.H	9.O
Beavers	Specific	Threat	V	1. Develop eradication program				1.H	1.L

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	INTENSE STORMS	FLOODING	HEAT WAVES	DROUGHT	Priority H-M-L	Time Short Long Ongoing
<b>Infrastructural</b>									
Water distribution system	Town-wide	Town	V	Set up for local or statewide emergency response (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				1.H 2.H	1.O 2.S
Dams	Multiple	Town	V	Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				3.H 4.H	3.L 4.O
Roads	Townwide	Town/Private	V	Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				5.H 6.H	5.L 6.S
Coverts	Townwide	Town/Private	V	Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				7.H 8.H	7.S 8.S
Septic System	Townwide	Private	V	Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				9.H	9.O
Municipal Buildings	Multiple	Town	V/S	Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				1.H 2.H	1.O 2.S
<b>Societal</b>									
School age children	Town-wide	Public/Private	V/S	Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				1.H 2.H	1.O 2.S
Seniors	Town-wide	N/A	V/S	Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				3.H 4.H	3.L 4.O
Affordable housing/low-income residents	Locations	Public/Private	V	Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				5.H 6.H	5.L 6.S
Medically vulnerable	Town-wide	N/A	V	Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				7.H 8.H	7.S 8.S
Small businesses	Locations	Private	V/S	Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				9.H	9.O
<b>Environmental</b>									
Water supply/aquifer	Multiple	Public/Private	V	Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				1.H 2.H	1.O 2.S
Farms	Multiple	Private	V/S	Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				3.H 4.H	3.L 4.O
Open Space/conservation land	Multiple	Public	V/S	Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				5.H 6.H	5.L 6.S
Wetlands	Multiple	Public/Private	V/S	Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				7.H 8.H	7.S 8.S
Recreational Facilities	Multiple	Public/Private	V/S	Check for leaks or other issues (H, O) Check for leaks or other issues (H, O) Check for leaks or other issues (H, O)				9.H	9.O



## Appendix Six: Climate Science Summary



### TOWN OF HOLLISTON

## Climate Change Summary



### What does climate change look like in Holliston?

While Holliston has fared well to date, our changing climate will increase the chances of flood events driven by hurricanes, Nor'easters, and other storms. Climate change also means hotter summers, more intense heat waves, and potential droughts, threatening our youth, older adults, and the medically vulnerable.



### INTENSE STORMS

Change in rainfall patterns leading to heavier more frequent storm events and stronger winds

#### IMPACTS:

- Downed trees and utilities
- Infrastructure damage

2



### HEAT WAVES

Increase in the number of days with high temperatures, particularly days over 90° F

#### IMPACTS:

- Heat-related illness
- Higher energy demand during the summer

1

### WHAT ARE THE

## Hazards?

3



### DROUGHT

Prolonged periods of low or no rainfall, leading to water shortages

#### IMPACTS:

- Diminished drinking water supply
- Damage to ecosystems and crop production

4



### FLOODING

Water submerging land quickly and over prolonged periods due to increased precipitation and intense storms

#### IMPACTS

- Flooding of roads, critical facilities, and basements
- Higher chance of dam failure

## WHAT ARE THE

# *Trends and Projected Changes?*



## Intense Storms

**70%**

Increase in the intensity of rain events from 1958 to 2010<sup>1</sup>

### Middlesex County Precipitation Projections<sup>2</sup>

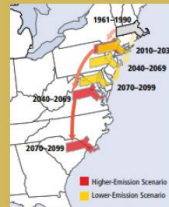
Average Annual Total Precipitation	45.2"	47.5" (+2.3")	48.6" (+3.4")
	Observed Baseline 1971-2000	Mid-Century Projection	End of Century Projection



## Heat Waves

### Middlesex County Heat Projections<sup>3</sup>

Avg # Days > 90° F	8	30	46
Avg # Days < 32° F	145	116	101



Observed Baseline 1971-2000      Mid-Century Projection      End of Century Projection

MA could have the climate of South Carolina by the end of the century without emissions reductions<sup>4</sup>



## Drought

**52%**

Of the land area in Massachusetts was considered to be in "Exceptional Drought" in Oct '16<sup>5</sup>

Holliston relies on **groundwater** as its source of drinking water. Drought could limit available water supply.



## Flooding

**13**

Historic flood events in Holliston since 1978<sup>6</sup>

**\$35.2**  
million

Damage from March 2010 floods in Middlesex County<sup>7</sup>

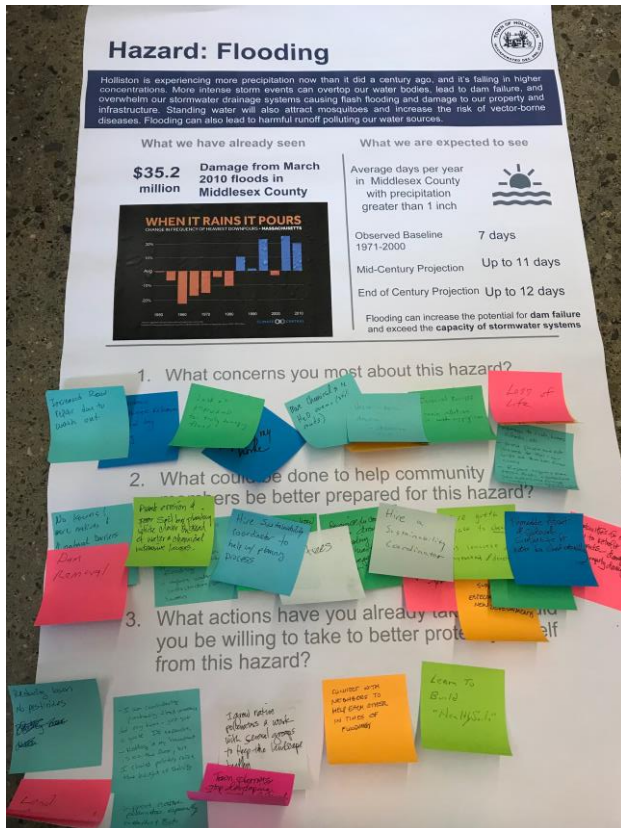
Flooding can increase the potential for **dam failure** and exceed the **capacity of stormwater systems**

1) City of Boston. 2016. Climate Ready Boston; 2) Northeast Climate Adaptation Science Center. Resilient MA Datagrapher. MA Climate Change Clearinghouse; 3) Ibid 4) Confronting Climate Change in the Northeast. 2007. Union of Concerned Scientists 5) NOAA. Massachusetts. Drought.gov; 6) Metropolitan Area Planning Council. 2016. Town of Holliston Hazard Mitigation Plan 7) Ibid



## Appendix Seven: Listening Session Key Outcomes, Poster Images, & Poster Responses

### Key Outcomes



### Flooding

#### Top concerns:

- Harmful runoff polluting lakes, rivers, and water supply
- Damage to homes, schools, and other town infrastructure
- Lack of preparedness of residents, both in the moment and financially after the fact, especially for vulnerable populations

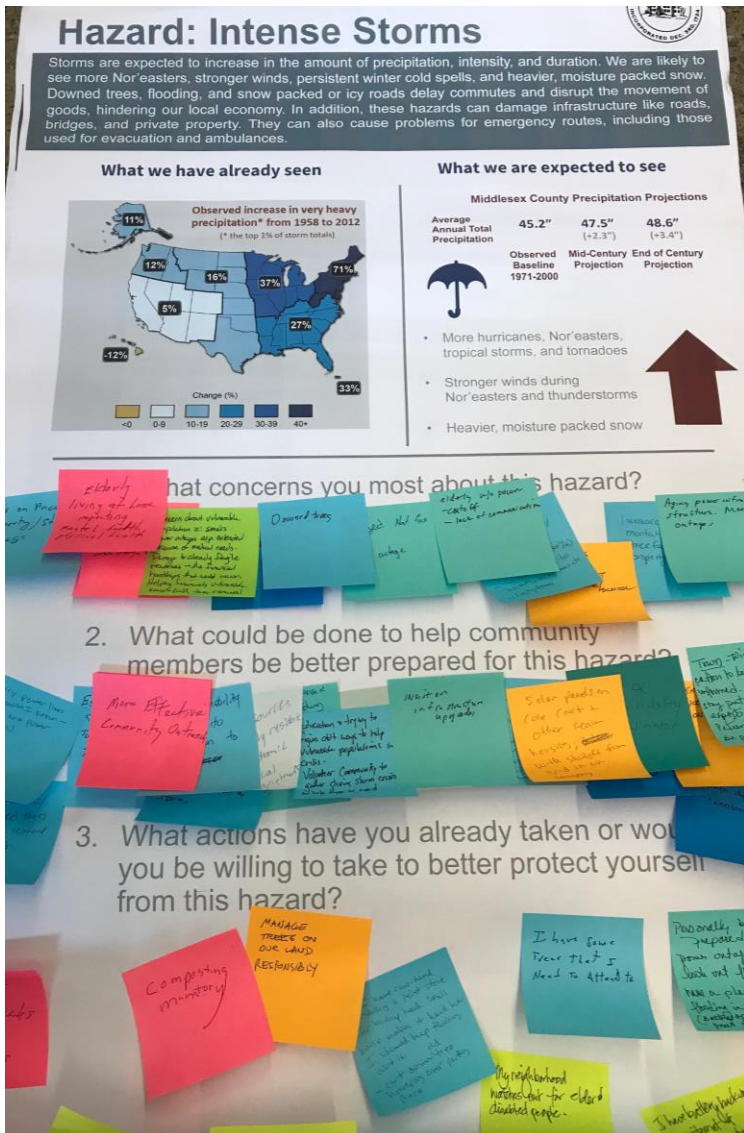
#### Actions to take as a community:

- Plant more trees and native species, and reduce impermeable surfaces and development
- Update aging stormwater infrastructure
- Help for homeowners to retrofit homes to be better prepared for floods and extra support for those living in floodplains
- Education campaign about the connection between flooding and drought and best practices after a flood

#### Personal actions:

- Practice healthy land management: reducing lawns, not using pesticides, promoting healthy soil, supporting native pollinators
- Prepare homes by keeping belongings off the floor in the basement and purchasing flood insurance
- Connect with neighbors to help each other in times of flooding

*Note: An action suggested for each hazard area was to hire a sustainability coordinator to lead climate change planning efforts*



## Intense Storms

### Top concerns:

- Falling trees damaging homes, businesses, cars, other infrastructure, and people
- Increased power outages, and effects on vulnerable populations, such as the elderly and low-income populations

### Actions to take as a community:

- Create a town-wide communication system to send alerts during emergencies
- Prioritize back-up power and shelter for vulnerable populations, especially those with electronic medical devices
- Strengthen energy supply with microgrids, solar, and back-up power
- Create a program to help residents remove/trim trees and replace with hardy, resilient trees and plants

### Personal actions:

- Look out for elderly and disabled residents either informally or through organized volunteer house checks
- Take care of trees on property
- Install back-up generators



## Hazard: Drought

Even though more annual precipitation is projected overall, it is anticipated to fall in more intense events in the winter and spring rather than in smaller more sporadic events throughout the year. Therefore, there will be longer periods of time that experience no rainfall, especially in the summer and fall, increasing the potential for drought. Drought can stress our water supply and impact ecosystems and crop production. The potential for brush fires also increases during drought.

**What we have already seen**

**52%** Of the land area in Massachusetts was considered to be in "Exceptional Drought" in Oct '16

**48 weeks** the longest duration of drought in MA since 2000 (Jun '16-May '17)

**What we are expected to see**

Earlier high spring flows

Longer growing seasons

Shorter periods of snow accumulation

Longer periods of low flows in summer and fall

Holliston relies on groundwater as its source of drinking water. Drought could limit available water supply.

1. What concerns you most about this hazard?
2. What could be done to help community members be better prepared for this hazard?
3. What actions have you already taken or would you be willing to take to better protect yourself from this hazard?

## Hazard: Heat Waves

Annual temperatures and the number of heat waves are rising, which changes how we will experience every season. The nation's leading deadliest type of weather is not hurricanes or tornadoes but heat, and this risk is only expected to grow. Additionally, new temperature patterns have the potential to impact our ecosystems and biodiversity and spread invasive species. We may also see changes in our energy demand required to maintain livable and comfortable temperatures in our homes.

**What we have already seen**

**+1.43° F** Change in temperature in the Northeast comparing the average annual temperature in 1986-2016 to 1901-1960

**What we are expected to see**

Middlesex County	Observed Baseline 1971-2000	Mid-Century Projected Change	End of Century Projection
Average Number Days Below 32° F	145	116	101
Average Number Days Above 90° F	8	30	46

**48° F** Average annual temp 1971-2000

**+4.2° F** Projected change in average annual temp 2020-2049

1. What concerns you most about this hazard?
2. What could be done to help community members be better prepared for this hazard?
3. What actions have you already taken or would you be willing to take to better protect yourself from this hazard?

## Drought

### Top concerns:

- Limited drinking water supply
- Degradation of the town's wetlands
- Increased fire risk

### Actions to take as a community:

- Promote low water landscaping
- Create a forest management plan
- Establish a greywater for non-drinking uses
- Regulate water use through pricing

### Personal actions:

- Use limited/no water on lawns/yards
- Plant native and drought-resistant species
- Use limited/no fertilizers on lawns

## Heat Waves

### Top concerns:

- Increased temperatures impacting health, especially of the elderly, children, medically vulnerable, and low-income residents
- Knowledge that air conditioning has the potential to make climate change worse

### Actions to take as a community:

- Install alternatives to fossil fuel powered air conditioning (e.g., renewable-powered A/C, passive cooling, fans)
- Enhance nature's ability to mitigate heat through more trees and less pavement
- Prepare cooling centers and launch an awareness campaign

### Personal actions:

- Use alternatives to fossil-fuel powered air conditioning for cooling needs and educate others
- Stay indoors during the hottest parts of the day and encourage others to do so
- Design outdoor space in ways that better absorb/handle heat

# Poster Images

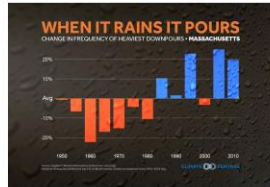
## Hazard: Flooding



Holliston is experiencing more precipitation now than it did a century ago, and it's falling in higher concentrations. More intense storm events can overtop our water bodies, lead to dam failure, and overwhelm our stormwater drainage systems causing flash flooding and damage to our property and infrastructure. Standing water will also attract mosquitoes and increase the risk of vector-borne diseases. Flooding can also lead to harmful runoff polluting our water sources.

### What we have already seen

**\$35.2 million** Damage from March 2010 floods in Middlesex County



### What we are expected to see

Average days per year in Middlesex County with precipitation greater than 1 inch



Observed Baseline 1971-2000

7 days

Mid-Century Projection

Up to 11 days

End of Century Projection

Up to 12 days

Flooding can increase the potential for dam failure and exceed the capacity of stormwater systems

1. What concerns you most about this hazard?

2. What could be done to help community members be better prepared for this hazard?

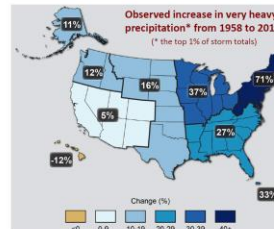
3. What actions have you already taken or would you be willing to take to better protect yourself from this hazard?

## Hazard: Intense Storms



Storms are expected to increase in the amount of precipitation, intensity, and duration. We are likely to see more Nor'easters, stronger winds, persistent winter cold spells, and heavier, moisture packed snow. Downed trees, flooding, and snow packed or icy roads delay commutes and disrupt the movement of goods, hindering our local economy. In addition, these hazards can damage infrastructure like roads, bridges, and private property. They can also cause problems for emergency routes, including those used for evacuation and ambulances.

### What we have already seen



### What we are expected to see

Middlesex County Precipitation Projections			
Average Annual Total Precipitation	45.2"	47.5"	48.6"
	(+2.3")	(+3.4")	
Observed Baseline 1971-2000	Mid-Century Projection	End of Century Projection	



- More hurricanes, Nor'easters, tropical storms, and tornadoes
- Stronger winds during Nor'easters and thunderstorms
- Heavier, moisture packed snow



1. What concerns you most about this hazard?

2. What could be done to help community members be better prepared for this hazard?

3. What actions have you already taken or would you be willing to take to better protect yourself from this hazard?

## Hazard: Drought



Even though more annual precipitation is projected overall, it is anticipated to fall in more intense events in the winter and spring rather than in smaller more sporadic events throughout the year. Therefore, there will be longer periods of time that experience no rainfall, especially in the summer and fall, increasing the potential for drought. Drought can stress our water supply and impact ecosystems and crop production. The potential for brush fires also increases during drought.

### What we have already seen

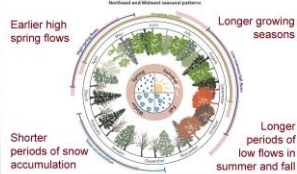
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the longest duration of drought in MA since 2000 (Jun '16- May '17)

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**+1.43° F**

Change in temperature in the Northeast comparing the average annual temperature in 1986-2016 to 1901-1960

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**48° F**

Average annual temp 1971-2000



**+4.2° F**

Projected change in average annual temp 2020-2049

Middlesex County



1. What concerns you most about this hazard?

2. What could be done to help community members be better prepared for this hazard?

3. What actions have you already taken or would you be willing to take to better protect yourself from this hazard?

## List of Poster Answers by Hazard

### Flooding

#### What concerns you most about this hazard?

- Increased road repair due to wash out
- Damage to roads, homes, schools
- Repairs require more fossil fuels and greenhouse gas emissions, toxins released, runoff
- Hazardous substance release caused by flooding
- More chemicals in water areas (off roads)
- Untreated storm runoff into our lakes and streams (fertilizer/nitrogen)
- Chemical runoff--toxin pollution in water supply/river
- Stormwater runoff into Lake Winthrop increasing phosphorus levels and feeding invasive species in the lake
- Lack of preparedness for a truly damaging flood
- Evacuation of residents with no transportation
- Safety of my home
- Most people are not insured for this--can wipe out families financially
- Vector-borne diseases from mosquitoes and ticks
- Loss of life

#### What could be done to help community members be better prepared for this hazard?

- Dam removal
- No lawns, more natives and more natural barrier planting
- Plant trees
- More green space to absorb, less concrete/pavement/development
- Limit paved surfaces, especially in new development
- Permeable street and sidewalk surfaces to let water be shed naturally
- Avoid erosion and poor soil by planting white clover instead of water- and chemical-intensive lawns
- Zoning to minimize hard topping and maximize/preserve wetlands and green spaces which buffer flooding
- Opportunities for older homes to retrofit wet basements to avoid danger of mold and property damage
- Improve water infrastructure/storm sewers
- Hire sustainability coordinator with help with planning process
- Help for people in floodplain with very high insurance required by FEMA
- Education about how to manage after a flood: don't drive into water, don't walk into flooded basements, watch out for drowned wires
- Education about runoff ease in French drains
- Recognize the connection between drought and flooding: dry land and heavy rain leads to damage. Mitigate drought in balance
- Town planners stop developing these poorly designed, tree-killing, non-environmentally sound buildings that also drain the tax base

What actions have you already taken or would you be willing to take to better protect yourself from this hazard?

- Reducing lawn, no pesticides
- I grow native pollinators and work with several groups to keep the landscape healthy
- Land management, volunteer work
- Learn to build “Healthy Soils”
- Support native pollinators, especially bees and bats
- Purchasing flood insurance for home
- Shelving in basement to keep everything off the floor in case of flooding
- Connect with neighbors to help each other in times of flooding

## **Intense Storms**

What concerns you most about this hazard?

- Downed trees
- Trees falling on cars, houses, people
- Wind damage to homes, businesses, etc.
- Losing trees
- Increased tree mortality
- Falling trees damaging housing/infrastructure
- Storm damage from trees on private property
- Hazards to power, gas, water, drainage system
- Power failure
- Damaged natural gas lines
- Aging power infrastructure, more outages
- Power outage
- Power outages
- Power loss
- Losing heat in winter (especially for elderly)
- Mental and physical health of the elderly living at home
- Elderly without power: cutoff, lack of communication
- Concern about vulnerable populations (i.e. seniors) during extended power outages because of medical needs
- Damage to already fragile residents and the financial hardships that would incur
- Economic impact of lost work/school

What could be done to help community members be better prepared for this hazard?

- Bury power lines
- Replace downed/damaged trees with hardy, resilient with trees/plants
- Establish a fund to help homeowners to trim trees
- Community program to assist homeowners with removal of trees that could cause problems if knocked over by storms
- Temporary power sources for elderly residents with elderly medical equipment
- Shelter for vulnerable people with backup heat/power systems
- Register cell numbers for texting in an emergency



- Town-wide alerts through apps (i.e. Nextdoor)
- Town-wide communication to keep residents informed
- Preparedness education: be ready with water and medication
- Education and trying to figure out ways to help vulnerable populations in crisis
- Volunteer community to gather during storm crises to help those in need
- More effective community outreach
- Hire sustainability coordinator to help with plan
- Hire a sustainability coordinator
- Insist on infrastructure upgrades
- Decentralized energy
- Micro-grids/dispersed grids
- Battery storage during outage for own home
- Help residents/business electrify heat/AC
- Solar panels on Cole court and other senior housing with shutoff from grid in an emergency
- Change laws/regulations to allow solar businesses/homes to separate from power grid in an emergency, allowing continuity of solar power when grid is disrupted
- We should all reduce our carbon footprint

What actions have you already taken or would you be willing to take to better protect yourself from this hazard?

- Volunteer home checks/wellness checks
- Mandating composting
- Manage trees on my land responsibly
- Considering installing a pellet stove
- Cut down old trees hovering over parking spot
- Attend to old trees
- Neighborhood watches out for elderly and disabled residents
- Personally prepared for power outages, look out for others, have a plan for flooding in the house
- Battery backups for internet and battery generator for basement pump

## **Drought**

What concerns you most about this hazard?

- Available drinking water
- Shortage of drinking water if we encounter severe drought
- Wetlands get destroyed and compromised
- Shortage of fresh, clean drinking water
- Risk to agriculture
- Risk to pollinators
- Risk to human health
- Fire risk
- Forest fire
- Preservation of wetlands
- Water scarcity, increased water cost

- Wetland habitat being degraded

What could be done to help community members be better prepared for this hazard?

- Start limited water use now
- Forest management
- Educate the public about how invasive plants are carried into the woods and spread by birds and kill the healthy natives that keep the forests healthy
- Low water gardens, use oyas
- Decrease lawns, increase yard meadows
- Encourage the farms in our town. They can provide local food supplies when national monoculture is threatened
- Outlaw installed sprinkler systems
- Promote low water landscaping
- Educate/incentivize/encourage dry scaping rather than lawns
- Raise prices on town water after some reasonable level of use
- Forest land management
- Reduce fire hazard
- Improve aquifers
- Encourage/educate on rain barrels (provide them?)
- Two-pipe water system with pure (drinkable) and less pure (for flushing, laundry) water
- Regulate/educate to keep toxins out of our wells
- Water filtration systems
- Public education/training re: water conservation, pricing to encourage this
- Native tree planting program in heat islands
- Grey water program so we are not flushing our drinking water down the toilet
- Hire a sustainability coordinator
- Zoning/new building regulations requiring water efficiency
- Plan for delivering drinking water to residents with no transportation

What actions have you already taken or would you be willing to take to better protect yourself from this hazard?

- Assist in forest land management
- Highway department-- plant white clover lawns, not thirsty, maintenance heavy grass
- Allow people to separate grey and brown water. Change this in the Board of Health.
- Learn to build "healthy soils"
- Don't waste pristine water on lawns, gardens, and car washes. Use greywater for those areas (dish water, laundry water). Use sparingly in the heat of the day.
- No Poland Spring water in public buildings. They are draining aquifers around the country
- Hire a sustainability coordinator to help with planning process
- Enforce water rationing in the summer and dry spells
- No water lawn
- Limited watering
- Plant natives- less water
- Use oyas for gardening

- Open space preservation- with grants from CPC
- Public education about all these issues
- Lawns to be naturalized with wildflowers
- Educate the public about how nitrogen heavy lawn fertilizers wash into the water table and cause damaging weeds in the lake
- Our lawn is never watered
- I use zero toxins on my lawn and garden
- Get a rain barrel or cistern
- I water by handheld hose only, flowers but never the lawn
- Stop using weed killers on town properties
- Keeping wells clean
- Plants for drought should be part of the landscape and provide shade too
- Expand MWRTA and make places for bikes and pedestrians
- Do not design for single occupancy vehicles
- Composting

## **Heat Waves**

### What concerns you most about this hazard?

- Elderly who live alone
- Longer heat waves and families without A/C- health hazard
- Health impacts and economic loss due to closed schools from heat
- Adding more A/C and making things worse
- Elderly residents' health in heat is a concern
- Tropical diseases spreading northward
- Hazards to elderly/small children/sick people
- The fact that the most obvious mitigation (A/C) actually makes it worse (Devil's bargain)
- Health risk for elderly, especially those without access to A/C
- Worsening the crisis via more A/C and flights to cooler climates
- People who still water even with water ban
- Concerns about safety and well-being of vulnerable citizens especially the elderly who continue to age in place. Many have limited funds for things like A/C and are somewhat isolated
- Increased risk of heat-related health risks to children at recreational programming
- Stress on native plants
- Impact on low-income
- Elderly will have problems
- Increased energy use from A/C powered by natural gas
- Increased health issues
- Health concerns
- Education
- Elderly, heat strokes, workers outside and in physical labor
- Heat illnesses for young and old
- Increased need for water for hydration
- Sufficient cool areas



What could be done to help community members be better prepared for this hazard?

- Hire sustainability coordinator to be part of town planning
- Long breaks at peak heat, think siesta
- Cooling stations/shelters for vulnerable people
- A/C powered by renewables (only)
- Fans
- Green building codes
- Trees/shade
- Building code requirements re: renewable-powered A/C
- Education about xeriscaping
- Hire a sustainability coordinator
- Do not cool buildings- municipal/residential when no one is home
- A/C alternates
- Swamp coolers?
- Passive cooling
- Solar, wind power
- Permeable street and sidewalk surfaces, not asphalt/concrete
- Public communication about shelters and/or other alternatives
- Solar A/C units
- Electric heat pumps
- Stronger building codes- require solar/wind options
- Micro grids- local solar- rooftop
- Parking lot solar to reduce heat islands
- Handouts to make residents accountable for being prepared
- Store water
- Cool houses by drawing shades, fans
- No fossil fuel air conditioning
- Windows that open
- Mini splits with solar power
- Solar batteries
- Differential electricity pricing to encourage off-hours use for non-critical functions (e.g., laundry)
- Consider closing school on hottest days (better option than fossil-fuel powered A/C)
- Solar on all buildings

What actions have you already taken or would you be willing to take to better protect yourself from this hazard?

- Keep buildings warm in summer not freezing cold to minimize the body's response to heat
- Education on zero scaping and ways to cool naturally
- Education regarding water use and more severe regulations around that
- Prepare more of our municipal buildings to be "cooling stations"
- Windows open at night, closed with shades drawn in the daytime
- I use solar powered fans rather than A/C
- 100% renewable electricity

- Plant trees for shade
- I start early on hot days and rest at midday, like my southern friends
- Less lawn that needs water
- 100% clean energy offsets
- No A/C
- Off peak energy uses
- Holliston should hire a sustainability coordinator sooner rather than later
- Limited A/C use
- Closing up the house during the day and shutting blinds to keep heat out but opening at night to allow cooling
- Have installed cooling efforts in our house shades, fans, passive
- Store water for an unexpected power failure
- Stay out of heat in the middle of the day, encourage others to do so too
- Plant trees
- Compost
- Turn up the thermostat
- Minimal A/C use