Norfolk, Massachusetts

MVP Community Resilience Program

Resilience Building Report

May 2020

DRAFT

SUMMARY OF FINDINGS

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MVP Community Resilience Program

Norfolk, Massachusetts

Resilience Building Report

SUMMARY OF FINDINGS

Prepared by: BETA GROUP, INC.
Prepared for: Town of Norfolk, MA

May 2020

TABLE OF CONTENTS

1.0 Overview 1
1.1 Community Resilience Building Workshop 2
1.1.1 Participants and Planning 2
1.1.2 Workshop Process 3
2.0 Summary of Findings 5
2.1 Current Concerns & Challenges Presented by Hazards and Climate Change 5
2.1.1 Top Hazards Of Concern 5
2.1.2 Important Features Related to Identified Hazards 5
2.2 Strengths and Assets 6
2.3 Future Actions and Resolutions to Improve Community Resilience 7
2.3.1 Prioritizing Actions 7
2.3.2 Highest Priority Actions 9
2.4 Public Listening Session 11
3.0 Next Steps 12
3.1 Continuing with the MVP Program 12
4.0 Citation 12
5.0 Acknowledgements 12

LIST OF APPENDICES

Appendix A: List of Participants
Appendix B: Norfolk CRB Workshop Presentation
Appendix C: Workshop Handouts
Appendix D: Workshop Matrices and Maps
Appendix E: Top Priority Voting Results

1.0 OVERVIEW

The Town of Norfolk is located in Norfolk County in the Charles River Watershed. Norfolk is a rural suburban town whose population is approximately 12,000. The Charles River separates the Towns of Norfolk and Millis and Norfolk and Medfield. The town is home to several rivers and streams that meander across Town which flow to the Charles River including the Stop River, Mill River, Stony Brook and the Cress Brook. A significant portion of the Town is comprised of forestland, forested wetlands and nonforested wetlands. Norfolk is also home to Mass Audobon's Stony Brook Wildlife Sanctuary, a 104-acre sanctuary managed by the Department of Conservation and Recreation.

Over the past several years, the Town has experienced an increasing number of impacts due to climate change. In general, the Town has seen an overall increase in the nature and number of weather-related events including blizzards, nor'easters and severe wind and rain events. These storms have impacted the Town by downing trees and power lines resulting in extensive power outages. Recently, the Town has experienced the impacts from invasive species, including vector borne diseases from mosquitos and invasive plant species. As these problems are anticipated to only worsen as time goes on, the Town sought to address these climate related impacts through the Municipal Vulnerability Preparedness (MVP) Program. The Town procured a $15,000 grant from the Massachusetts Executive Office of Energy and Environmental Affairs to a conduct a Community Resilience Building (CRB) Workshop, as part of the MVP Program.

The MVP Program is a state program designed to provide support for cities and towns in Massachusetts to begin the process of planning for climate change resiliency and implementing priority projects. Involving the municipalities of Massachusetts to address natural hazards being amplified by climate change allows more targeted solutions to these problems. This program is designed to encourage discussion in order to help municipalities identify the vulnerabilities, strengths, and opportunities to take action to reduce risk and build resilience in their communities. Conducting the CRB workshop allows Norfolk to achieve "MVP" designation from the Commonwealth which provides the Town access to funding for action grants.

On March 11, 2020, the Town of Norfolk conducted a CRB workshop to identify and address the Town's vulnerabilities as it relates to the affects of global warming. The objectives of the workshop were as follows:

- Identify the natural and climate related hazards facing the Town
- Identify existing and future community vulnerabilities and strengths
- Develop and prioritize actions for the Community to undertake to combat these hazards

Norfolk partnered with BETA Group, Inc (BETA) as its state-certified MVP Planning grant provider to assist with the process and facilitate the CRB workshop. The core team set goals for the workshop and identified and engaged community members to participate. Inviting members of the municipality to directly address intensifying natural hazards due to climate change creates more targeted solutions to these problems and, encourages the community to take ownership of the ongoing efforts involved in these solutions. This program is designed to foster discussion in order to help municipalities identify the vulnerabilities, strengths, and opportunities to take action to reduce risk and build resilience in their communities.

This report documents the results of the CRB workshop, following the program's framework, for the Town of Norfolk.

1.1 COMMUNITY RESILIENCE BUILDING WORKSHOP

The CRB framework is a system of discussions and note taking developed by The Nature Conservancy and prescribed by the MVP Program. The goal of this workshop was to further investigate the Town's prior planning efforts and resiliency measures and to develop a list of strengths, and priority actions to focus on in the immediate future.

1.1.1 PARTICIPANTS AND PLANNING

Planning began with a meeting between BETA and the Town Planner to identify the core team and participant invite list which was selected with guidance from the CRB Workshop Participant Worksheet. An effort was made to invite participants from several different areas of town involvement in order to have a broad range of perspectives on how climate change would affect the Town. There were 12 participants from the community that attended the workshop representing many different town departments, board and community organizations. Diverse representation was crucial to the success of the program, as the Police noticed different hazards than the Highway department, Board of Health agent, or Town Planner. This diversity of thought and perspective allowed the workshop to be highly informative and an overall success. The workshop invite list and list of participants is attached in **Appendix A**. The core team consisted of Town Planner Richard McCarthy and Interim Department of Public Works Director Barry Lariviere.

The participants were divided in to two groups, distinguished by the colors red and blue, as noted on the maps and matrices. One group consisted of the Town Administrator, the Town Planner, the Emergency Response Director with the Norfolk Police, the Norfolk Facilities Manager, the Sanctuary Director with Mass Audubon's Stony Brook Wildlife Sanctuary and the Town's wiring inspector. The other group consisted of the Public Works Director, a Board of Health Agent, Building Commissioner, Facilities Director with King Philip, a member of the Fire Dept., and a representative from the Charles River Watershed Association. This division allowed the two groups to have different perspectives throughout the workshop. The two groups had some priorities in common, but the diversity in thought also led to a difference in priorities, creating a dynamic discussion throughout the workshop. Throughout the process, both groups could see and appreciate the importance of the other's opinions. In the end the groups were able to identify resiliency opportunities that solved multiple vulnerabilities across departments.

A one-day workshop was held in one day on Wednesday March 11, 2020 at Norfolk Public Library. BETA led this workshop with multiple CRB-trained individuals. They provided an overview of climate change in the area as well as climate observations and projections from the Northeast Climate Science Center research, and implications that these changes will have on Norfolk's infrastructure, society, and environment so participants could have a more informed discussion throughout the rest of the workshop. The presentation is attached in **Appendix B**.

Participants listen to BETA Presentation

1.1.2 Workshop Process

The session began with an overview of the CRB Workshop and the goals of this session and climate change predictions for the Charles River Basin by BETA MVP-Certified facilitator Paul Smith, P.E. Some of the research and projects presented were that precipitation is projected to increase 10%, there will be 22% fewer days below freezing, and up to 4 times as many days over 90° F by 2050. A summary of this information, which was given to participants as a handout, is attached in **Appendix C**. A map of the town overlaid with FEMA flood zones was provided to each small group and a map depicting critical facilities in town was also displayed for reference. These maps can be found in **Appendix D**.

Throughout the Workshop process, BETA facilitators led the participants in discussion, often using some of the "Triggering Questions" identified in the Community Resilience Building workshop Guide. Some questions which proved to be most useful were: What hazards have impacted your community in the past? What hazards are impacting your community currently? Where and how often do these impacts occur? What natural resources are important to your community? What makes this infrastructure vulnerable?

The participants then broke out into their designated small groups for further discussion. Small group discussions began by discussing hazards affecting Norfolk and developing a list of the top four hazards of concern each group felt Norfolk was most impacted by. Groups were made up of a facilitator (a member of the BETA Group team), a scribe/spokesperson, and the workshop participants.

The participants then returned to the larger group to discuss and come to a consensus on the top four hazards moving forward. Ideas were written on a poster sheet during large group discussion which can be found in **Appendix E**. After a discussion of the hazards identified during the small group session, the groups agreed on the top 4 hazards as Wind/Lightning & Severe Storms, Invasive Species, Flooding and Drought.

Once this was decided, the participants returned to their groups to discuss features and add them to the matrix. Again, BETA facilitators asked triggering questions from the CRB workshop guide to facilitate discussion within the groups. The large-scale discussion maps allowed the participates to visualize the flood risk areas as well as identify the locations most impacted by the other three hazards identified as a

priority. This was very helpful in discussion of which features were most important. Participants also identified who owned each feature and categorized it as vulnerability or strength. These matrices can be found in **Appendix D**.

Participants Discuss Important Features

The participants then returned to their small groups to fill in the Risk Matrix by discussing action items that address the hazard and the feature by either posing a solution to a hazard/feature or enhancing the strengths of a feature against a specific hazard identified in the previous session. Some common action items included tree trimming, stormwater infrastructure, and maintaining the Town's rural character. Participants also discussed the availability of long-term sheltering in the event of an emergency that would displace a significant number of residents. Throughout the small group discussions, the BETA facilitators stayed with groups to ask questions to prompt discussion (triggering questions) and provide guidance.

After actions had been identified, the small groups decided whether each action was a high, medium, or low priority and if the time frame was short term, long term, or ongoing action. This prioritization naturally separated the many actions into categories, making it easier to distinguish the most important. Using this information each small group determined their top four or five priority actions to present to the large group.

After both groups had completed the above tasks individually, participants reconvened to discuss and prioritize together in order to come to a consensus on the highest priority actions to be taken across Norfolk. Each group explained their thought process and stated their top four to five actions. A discussion ensued in which the group at large deliberated why some items should or shouldn't be included in the priority actions. The results and any other notable information throughout the process of the workshop are described in the following sections of this report. The sheets where each group contributed their ideas during large group discussion can be found in **Appendix E**.

2.0 Summary of Findings

2.1 Current Concerns & Challenges Presented by Hazards and Climate Change

2.1.1 Top Hazards Of Concern

During the individual group discussion, the following hazards were identified as being most prevalent and/or impactful in the Town of Norfolk and were brought up for discussion in the larger group.

- Wind/Lightning
- Severe Storms/Flooding
- Drought
- Damage from Trees
- Invasive Species
- Fires

Participants Discuss Priority Hazards

The small groups had many of the same concerns in mind while choosing their top natural hazards. Both groups identified severe weather/flooding and invasive species as top priorities affecting Norfolk. Drought was also discussed by both groups and its impact to Norfolk's water supply. Norfolk has experienced several weather-related events in recent years, and these events are expected to increase due to climate change.

The groups also discussed the consequences of severe weather and storms, such as high wind events. Both groups discussed that every road in Town is a "Scenic Roadway", which means that trees are in close proximity to the roadway and aerial power lines throughout town and there are strict tree maintenance requirements in place to maintain the rural character of Norfolk. Recent storm events have caused downed trees and power lines throughout Town. Due to Norfolk's rural location, there is often a slow response from the electric company to address power outages.

Upon discussion as a larger group, it was determined that some hazards are similar in nature and could be grouped together into one category. The groups decided on the following hazards as the top four:

Top Hazards

- **Wind/Lightning/Severe Storms**
- **Invasive Species**
- **Flooding**
- **Drought**

2.1.2 Important Features Related to Identified Hazards

Based on the frequency and severity of the four identified hazards, the groups discussed which areas, communities and systems would be most affected by the occurrence of these hazards. Three categories of town features were discussed: infrastructural, societal and environmental. Below is a list of all the community features the groups identified:

- Infrastructural
  - Stormwater (system, culverts etc.)
  - Roadway Infrastructure
  - Public Water System
  - Communication System
  - Private Wells
  - Septic Systems
  - Electrical Infrastructure
  - Dams
  - Wastewater Treatment Facility
  - Commuter Rail

Participants discuss priority hazards

- Societal
  - Rural Character
  - Government
  - Schools, Libraries, Municipal Buildings – Emergency Centers
  - Emergency Center
  - Strong Community Ties (Bus Depot)
  - Prison (Potential Work Force)
  - Parks and Recreational Facilities and Open Space
  - Emergency Preparedness Plan
  - New Public Safety Regional Dispatch Building
  - Elderly Population and Affordable housing

- Environmental
  - Mass Audubon (Open Space)
  - Trees & Tree Canopy
  - Flood Control (Army Corps)
  - Gypsy Moths and other Invasive Species
  - Vector Borne Illness
  - Water Sources (Recreational)
  - Streams
  - Wetlands
  - Wildlife
  - Charles River
  - Soils and Hazardous Waste Sites

It is important to note that not all these features were considered vulnerabilities. Some of these features are already strong and as the small groups began to think about ranking, maintaining existing strengths was prioritized as much as addressing the largest of existing vulnerabilities.

2.2 Strengths and Assets

Workshop participants noted that the town has strengths in each of the three feature categories: societal, environmental, and infrastructural. Some of the features were noted as both a strength and a vulnerability, for example tree canopies and streams such as the Charles River. In the case of trees, they promote the rural character of the Town and provide extensive shade during the summer months, but

at the same time can be downed during a severe weather event causing power outages. The Charles River offers significant environmental and recreational benefits but is also subject to flooding.

Many participants thought that the rural character of Norfolk, with significant open space, recreational facilities and protected land was a strength. Maintaining open space keeps maintains pervious surfaces helping to reduce the risks of flooding while promoting infiltration and replenishment of groundwater supplies. This is a strength that can be protected through Bylaws, regulations and implementation of open space and master planning. If protections are not considered, then this strength will erode.

The new emergency dispatch center was also considered a strength. This asset allows for a coordinated and centralized command center to oversee an emergency response due to a severe weather emergency. **Appendix D** has a more detailed descriptions of assets and actions for reference.

2.3 Future Actions and Resolutions to Improve Community Resilience

Some of the common action items that were identified in small groups related to the biggest concerns are described below:

- *Stormwater System:* Both groups mentioned the stormwater system as a concern. As projections indicate a significant increase in rainfall intensity and duration, the ability of the existing stormwater system to handle storm events will only worsen. The discussion included the need to complete a condition assessment of all culverts, enact an Operation and Maintenance program, and evaluate the possibility of creating a stormwater utility.
- *Tree Maintenance Program:* During high wind or heavy snowstorm events, downed trees and branches cause major maintenance problems in Town. Tree trimming is extremely important preventative maintenance which the Town would like to encourage power companies to continue to keep up with, as many of these trees are not maintained by the Town. The tree program would also address related concerns regarding tree-affecting diseases which cause more downed trees and limbs. The Town will have to evaluate by-law limitations due to Town road being classified as “Scenic Roadways”.
- *Dams:* Both groups identified dams as a vulnerable asset. Norfolk is home to several dams which could become vulnerable to the effects of global warming. The discussion revolved around completing a study to evaluate the condition and overall necessity of the dams and whether they were needed or could be decommissioned.
- *Emergency Shelter Provisions:* During a severe storm event there is a likelihood that Norfolk residents may be displaced from their homes for a period of time. Both groups discussed the importance of having Town buildings (schools, community buildings etc.) capable of sheltering displaced residents. If existing buildings currently do not have the capacity to shelter residents they should be equipped with the appropriate facilities and equipment necessary to do so.

Some of these items became incorporated into the top five priority action items, while the rest of that list came from more general concerns addressed in the top hazard categories facing Norfolk.

2.3.1 Prioritizing Actions

Participants at the workshop identified several recommended actions to maintain existing strengths, address vulnerabilities, and increase resiliency. The following is a complete list of these recommendations listed by priority but not ranked within the priority category. See **Appendix D:** *Maps and Matrices* for the actions as they relate to hazards and features and whether they pertain to a

strength or vulnerability. In addition, see **Appendix E**: *Top Priority Voting Results* for list of all priority hazards and priority actions.

The high priority actions are as follows:

- Stormwater System (Culverts): Condition Assessment, Identify/survey culverts that need upgrades, Continue Operation and Maintenance Plan Development, evaluate creation of a stormwater utility
- Dams: Condition assessment and evaluate the possibility of decommissioning existing dams
- Rural Character: Implementation of Transfer of Development Rights (TDR) to maintain the rural character of Norfolk
- Schools and Community Buildings (Emergency Centers): Bolster schools and emergency centers with to incorporate sanitation aspects (i.e. showers) to allow for long term occupancy of displaced residents
- Regional Public Communications Center: Maintain as "first class". Incorporate more towns to be part of the existing center
- Mass Audubon (Open Space): Continue funding for grant opportunities to keep in current condition
- Trees: Develop a more aggressive preventative maintenance plan. Identify priority locations and develop a removal/replacement program. Evaluate the need to amend the Town's existing scenic tree by-law
- Flood Control: Complete an audit of equipment for flooding issues. Acquire additional pumps as required
- Roadway Infrastructure: Create an Emergency access/detour plant
- Public Water Supply: Education and Community outreach. Strict enforcement of water use restrictions. Pursue new well locations. Restrict private well usage
- Electrical Infrastructure: Initiate a tree clearing program. Upgrade lightning protection systems and backup power systems
- Vector Borne Diseases and Invasive Species: Continue monitoring of invasive species for reporting. Public outreach program for education
- Streams/Charles River: Replace culverts where required. Complete a hydraulic study of the Charles River (flood model)
- Soils and Hazardous Waste Sites: Develop an inventory of contaminated sites evaluate possible remedies and redevelopment options to existing contaminated sites

The medium priority actions are as follows:

- Government: Creation of a Town wide "Common Top Priority Hazards Strategic Plan"
- Strong Community Ties: Establish memo of agreement with Bus company in time of community need to transport large number of residents
- Prison Workforce: The prison allows soon to be released prisoners to work outside of the prison. Establish a Memo of Agreement to utilize this workforce during an emergency event
- Parks and Recreational Facilities/Open Space: Maintain existing open space, implementation of a forestry plan and an open space transfer program to foster the creation of additional open space
- Lack of a Community Hospital: Create plan for evacuation route including proper signage and agreements with other Town's with the nearest hospitals. Incorporate a triage center at the fire station

- Water Resources: Install improved signage for better protection of existing water resources, continue and improve existing DPH testing of waterbodies, maintain catch basins with direct discharge
- Emergency Preparedness Plan: Continue frequent updates to plan, conduct public outreach regarding plan, create a med flight location plan
- Elderly Population and affordable housing: Conduct public outreach for the elderly population to attend workshops and training
- Wildlife: Develop a pest control management plan. Develop a wildlife control plan (beavers, deer etc.)

The low priority actions are as follows:

- Private Wells/Septic Systems: Evaluate need for water restrictions on private wells during times of drought. Monitoring program for failed septic systems, specifically in areas close to water resources.
- Wastewater Treatment Facility: Continue with wastewater study currently being completed.
- Wetlands: Continue remediation efforts for invasive species removal. Continue to maintain wetlands as a strength in Town
- Communication System: Improve communication with private companies on how to better handle outages
- Commuter Rail: Establish a better line of communication with rail company, specifically as it relates to downed trees on the railroad

2.3.2 Highest Priority Actions

The top actions determined by each small group are listed below. As in other categories there was overlap in the findings and opinions of the groups.

- Condition assessment of existing stormwater system (drains, catch basins, culverts, detention/retention systems etc.). Roads were included as they relate to the conveyance of stormwater and are impacted by deteriorating and failing culverts
- Tree maintenance program
- Contaminated sites
- Water Supply – New Well Location
- Condition Assessment of existing dams
- Maintain existing Regional Communications Center and encourage more Town's to join
- Maintain the rural character/open space. Implementation of transfer of development rights (TDR)
- Public outreach and reporting related to vector borne illnesses and invasive species

After each group presented their proposed top action items there was a large group discussion about the merits of each. Discussion continued on the top overall actions to identify and come to a consensus on which actions were the most practical, feasible and would create the maximum impact against the hazards identified. In general, the participants recognized each action as important to the town and the discussion proceeded to come up with a consensus on the top priority actions to be taken as a result of the Municipal Vulnerability Preparedness Workshop. The results are as follows:

Highest Priority Actions

- **Condition assessment of Dams/Culverts/stormwater systems and roads**

- **Establish a tree maintenance program. Public outreach and reporting related to vector borne illnesses and invasive species to be part of this program**
- **Evaluate existing hazardous waste site in town and the potential for redevelopment**
- **Keep existing Regional Communications Center as "top-notch". Facilitate other town's joining this regional partnership**
- **Maintain the rural character of Norfolk and its existing open space. Implement an open space transfer plan and transfer of development rights (TDR).**

As previously discussed, both groups identified Norfolk's stormwater as a concern related to the impacts of global warming. Therefore, all groups were in agreement that a condition assessment of the existing stormwater system should be completed. This condition assessment was agreed to include drain pipes, catch basins, culverts, dams and roadways as all play a role in the ability to convey stormwater.

Tree management was prioritized due to the recent power outages as a result of downed trees and power lines. All roads in Norfolk are classified as "scenic" meaning that the streets a tree-lined throughout town and existing by-laws make it difficult to complete routine tree maintenance for preventative measure purposes. Additionally, tree affecting invasive species such as gypsy moths, are compounding the issue. A tree maintenance program will effectively address the issue of identifying trees that need to be pruned or removed prior to a severe weather event that would otherwise down the tree and cause a power outage.

Norfolk has a few sites in Town having existing contamination issues. An inventory and assessment of these sites was prioritized so an evaluation can be made as to possible remedies to these sites. The Town could seek redevelopment concepts or the conversion to open space.

The groups also prioritized the recently completed Regional Public Communications Center. The regional center serves as the dispatch center for the Town's of Norfolk, Wrentham, Plainville and Franklin. The center can serve as a command post in the time of a critical emergency, with state-of-the-art communication abilities. Both groups found it important to maintain the "first-class" classification of this building and that attempts should be made to expand the partnership to other abutting towns.

Lastly, both groups valued the rural character that Norfolk provides and the important relationship that maintaining the abundance of open space plays in that role.

Participants Discuss Top Priority Actions

While this document describes much of the discussion that ensued during the CRB workshop there is additional detail in the Appendices. See **Appendix D** for a list of all the actions and assets whether it was considered a strength or vulnerability, and **Appendix E** for list of all priority hazards and priority actions.

2.4 Public Listening Session

Norfolk presented the CRB process and summary of findings during a one-hour public listening session on May 21, 2020. The listening session was done remotely using the Zoom platform due to the ongoing pandemic. The listening session was advertised by the Town and residents and interested parties were encouraged to attend. This provided an opportunity for members of the public to learn about the MVP workshop, ask questions, and provide input. The listening session began with a presentation by Paul Smith, the workshop facilitator from BETA. The presentation described the projected climate change impacts on the region, the MVP process, and the findings of the Norfolk workshop. This incorporated the same presentation given during the workshop with a few additional talking points to summarize results as follows:

- Overview of the Municipal Vulnerability Preparedness Program
- Nature Based Solutions and their role in the Program
- Climate data and projections
- Impacts from Climate Change
- Workshop overview
- Hazards, features and actions identified during the workshop
- Priority Actions developed during the workshop
- The next steps for the Town in the program

The presentation was broadcasted on the Town's public access television station and will be broadcasted multiple times. There were approximately 8 attendees on the Zoom listening session including workshop participants and residents. Some of the specific and concerns included:

- How can residents play a role in the MVP process
- Concern over development, lack of affordable housing and the overall energy required in the development process
- Tree bylaw
- How changes in the Town bylaws to address green energy concepts, development requirements and tree bylaws is an acceptable action grant project
- How action grants are funded (State versus Town requirements)

To address other questions and concerns, BETA emphasized the importance of communication and input from residents in the MVP process. The MVP Action Grant website provides details on previously awarded projects and general guidance on the MVP program. Additional questions and comments can be made until June 10th. All questions and/or comments can be submitted to Paul Smith, Senior Project Manager – BETA Group, Inc at psmith@BETA-inc.com for incorporation in to the final version of this report.

3.0 Next Steps

3.1 Continuing with the MVP Program

Conversations held through the MVP CRB Workshop and listening session highlighted climate related challenges facing Norfolk and enlightened participants and the public to the importance of preparing for and addressing them. Participants identified many short- and long-term strategies for adapting to the changing climate.

The findings will serve as a basis for Norfolk's MVP Action Grant application, providing an opportunity to take the community's ideas and turn them into actions. Priority actions identified during the workshop will also be integrated into local planning efforts to improve the town's resiliency to the effects of climate change.

4.0 Citation

BETA Group (2020, May). MVP Community Resilience Building Workshop Summary of Findings, Norfolk, MA.

5.0 Acknowledgements

Many thanks to the MVP Core Team members and CRB workshop participants. Thank you to the Town of Norfolk for providing and coordinating a space to host the workshop and listening session and for making the workshop a priority for town staff to take part in.

Funding for the CRB workshop was provided through a Massachusetts MVP Planning Grant.

APPENDIX A

List of Participants

Appendix A: List of Participants

CRB Workshop Invite List	
Town Administrator	
All three Selectmen (Carolyne Van Tine, Chris Wider, Kevin Kalkut)	
Fire Chief	
Police Chief	
Director of Public Works	
Town Planner board members (5)	
Facilities Director	
King Philip Schools Facilities Director and Administrator	
Conservation Commission Chair and Members (6)	
Building Commissioner and wiring inspector	
Community Preservation Commissioner	
Design Review Board Manager	
Council on Aging Chair	
Board of Health Chair and Agents (4)	
School Committee member	
Charles River Watershed Association Chair	
Mass Audubon Wildlife Sanctuary Director	
CRB Workshop Attendees	
Name	**Town Department/ Role**
Richard McCarthy	Town Planner - Core Team
Barry Lariviere	DPW Director - Core Team
Koren Kanadian	Norfolk Police
Doug Williams	Mass Audubon
Blyth Robinson	Town Administrator
Peter Diamond	Norfolk Wiring Inspector/Community Preservation Committee
Matt Hafner	Facilities Director
Bob Bullock	Building Commissioner
Joe Zahner	King Philip Facilities
Julie Wood	Charles River Watershed Association
Betsy Fijol	Board of Health
Doug Johnston	Norfolk Fire Department
Facilitation Team - BETA Group	
Name	**Title**
Paul Smith, PE	Project Manager (Lead Facilitator)
Joe McGuire	GIS Analyst (Facilitator)
Jared Linares, PE	Engineer (Facilitator)

APPENDIX B

Norfolk CRB Workshop Presentation

Municipal Vulnerability Program (MVP)

Norfolk, MA

March 11th, 2020

BETA

Welcome and Introductions

- Paul Smith, Senior Project Manager, BETA Group, Inc.
- Jared Linhares, Project Engineer, BETA Group, Inc.
- Joe McGuire, GIS Analyst, BETA Group, Inc.

Municipal Vulnerability Program Agenda

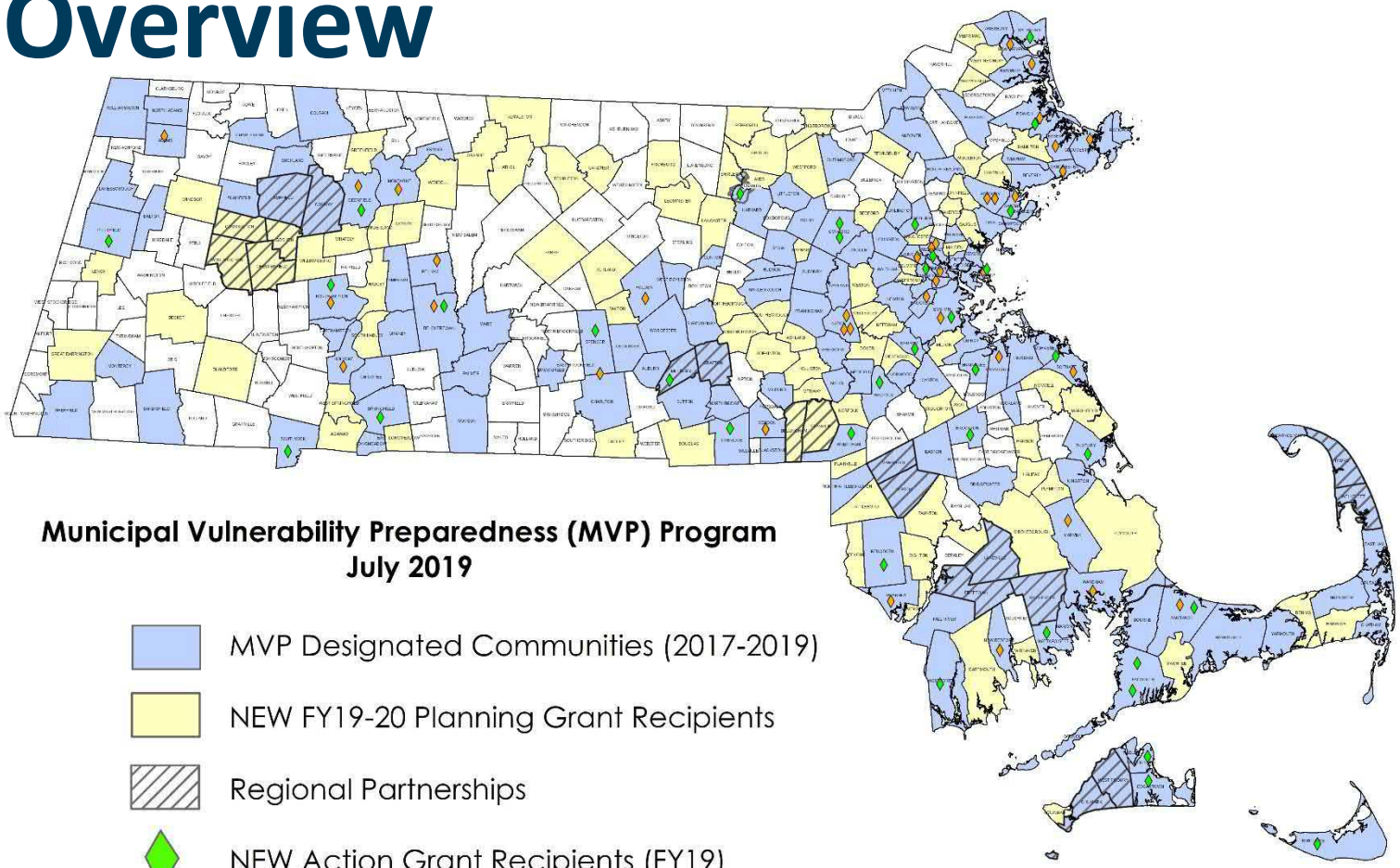
- Program Overview
- Workshop Overview
- Science and Resources Information
- Introduction to Small Team Exercise #1
- Reporting Small Team Findings #1
- Small Team Exercise #2
- Reporting Small Team Findings #2
- Summary Discussion

Program Overview

EXECUTIVE ORDER 569: AN INTEGRATED CLIMATE CHANGE STRATEGY FOR THE COMMONWEALTH 9.16.16

- Reducing greenhouse gas emissions to combat climate change
- Preparing for the impacts of climate change
  - State Adaptation Plan
  - Agency Vulnerability Assessments
  - Municipal Support
  - Climate Coordinators

Program Overview



Municipal Vulnerability Preparedness (MVP) Program
July 2019

- MVP Designated Communities (2017-2019)
- NEW FY19-20 Planning Grant Recipients
- Regional Partnerships
- NEW Action Grant Recipients (FY19)
- Action Grant Recipients (FY18)

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

BETA

Program Overview

Two MVP Grant Opportunities

RFR 1: MVP Planning Grant

RFR 2: MVP Action Grant

Nature Based Solutions

Nature-Based Solutions

Nature-Based Solutions *use* natural systems, *mimic* natural processes, or *work in tandem with* traditional approaches to address natural hazards like flooding, erosion, drought, and heat islands.

Green Infrastructure

Low Impact Development (LID

Nature Based Solutions

Floodwater Detention and Retention Basins

Daylighting Rivers and Streams

Open Space Preservation through Land Acquisition

Green Streets

Flood Friendly Culverts

Regulatory and Policy Approaches to Address Hazards

Massachusetts Observed Climate Changes

Temperature: 2.9°F
Since 1895 (Statewide)

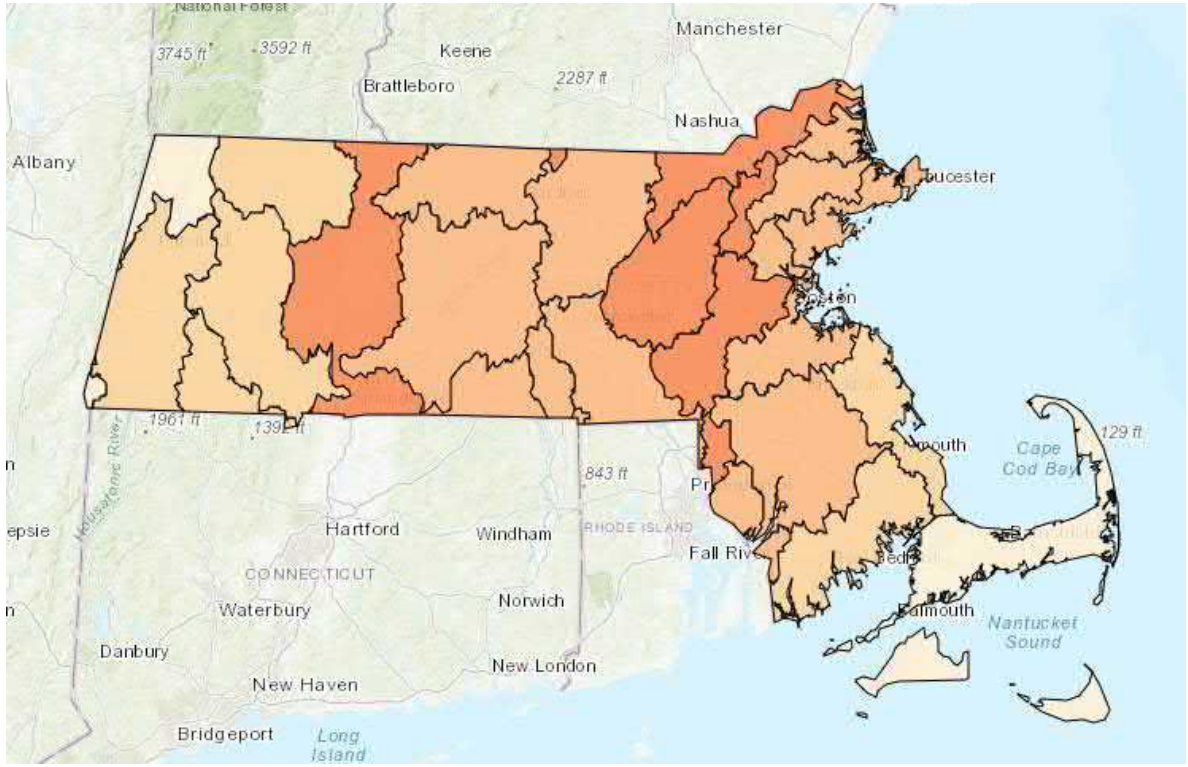
Growing Season: 15 Days
Since 1950

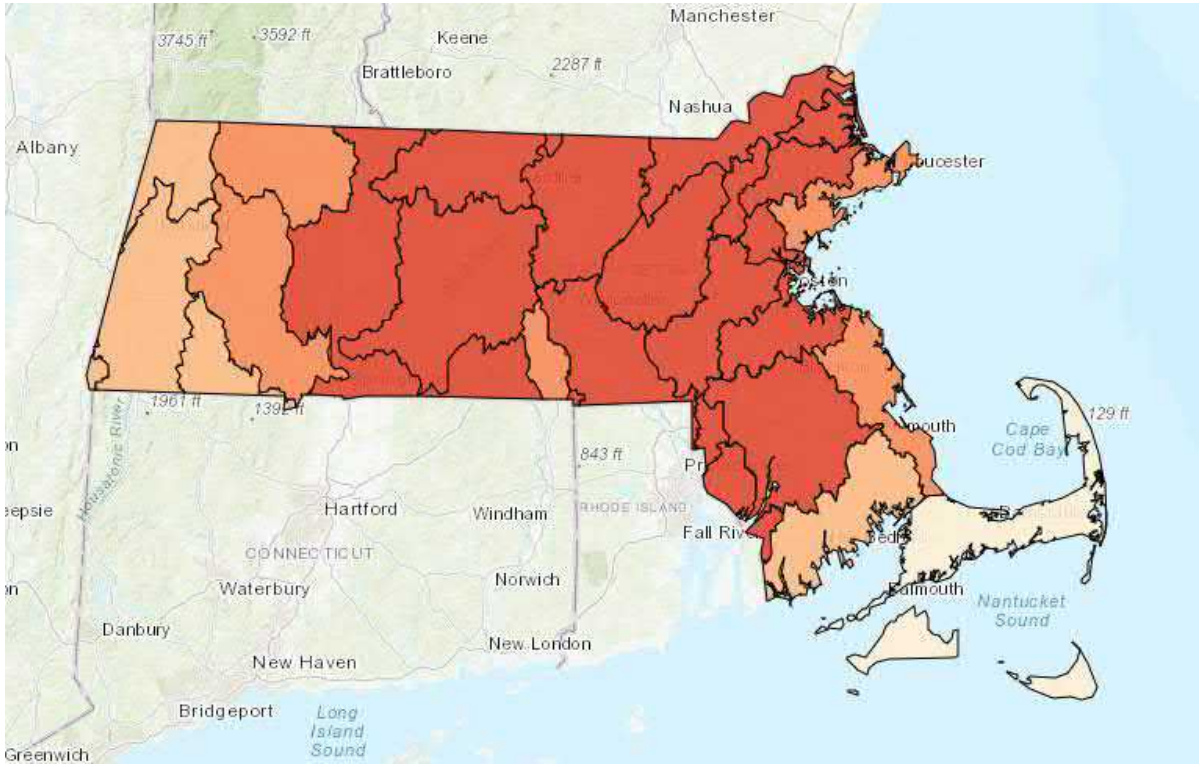
Sea Level Rise: 11 inches
Since 1922 (Boston)

Heavy Precipitation: 55%
Since 1958

Massachusetts Projected Climate Changes

Change in # of Days above 90°F – 2050 Scenarios



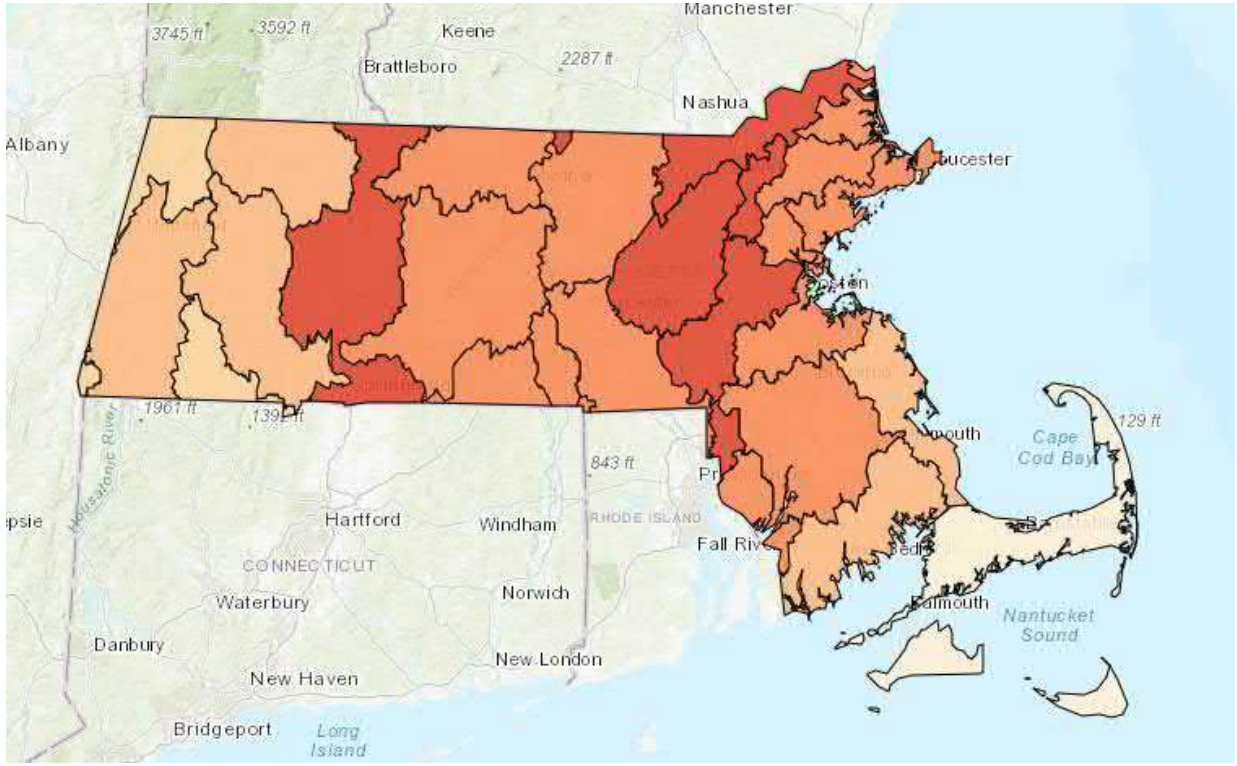


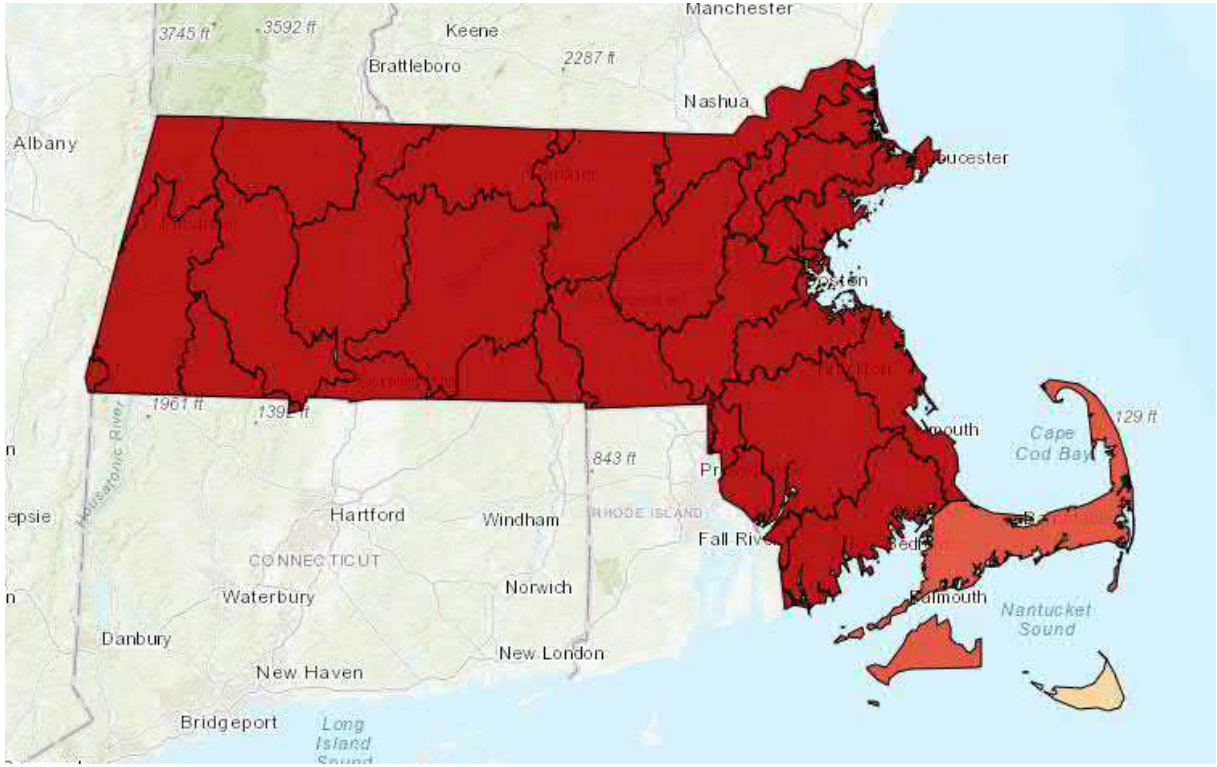
Projected change in # days above 90°F

+7.6 +12.4 +16.5 +21.8 +39.4

Massachusetts Projected Climate Changes

Change in # of Days above 90°F – 2090 Scenarios



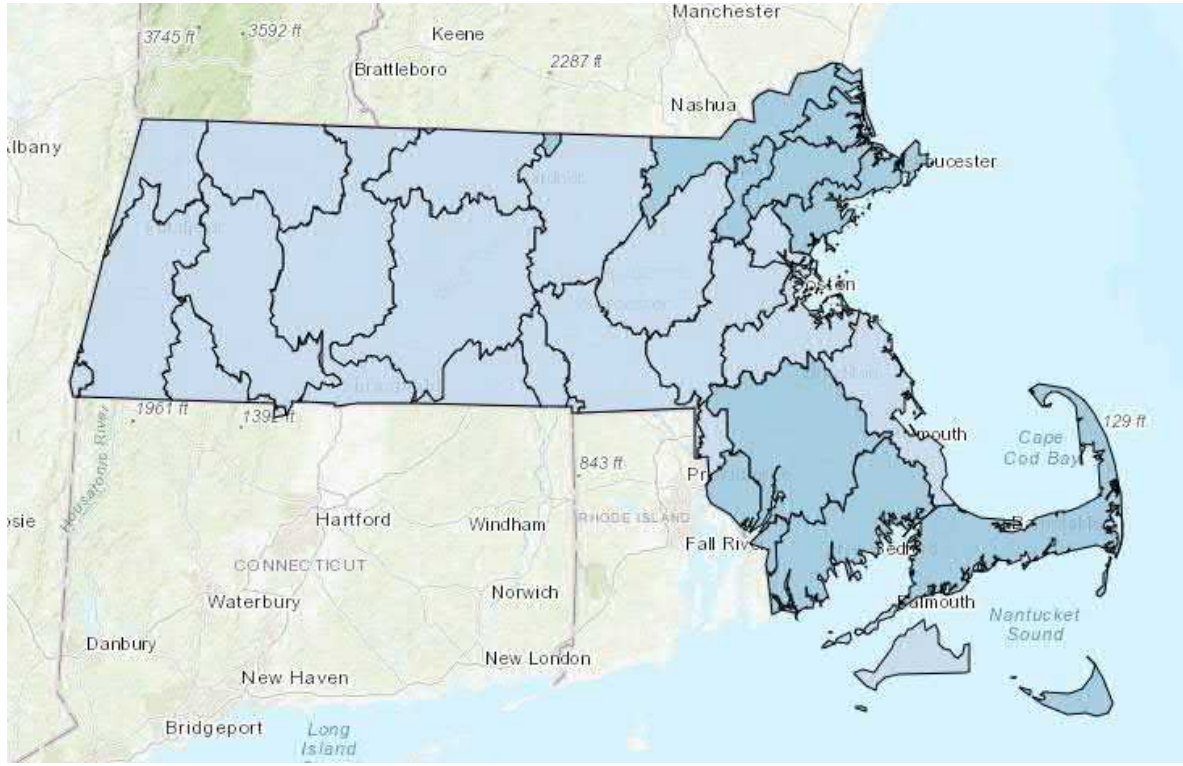


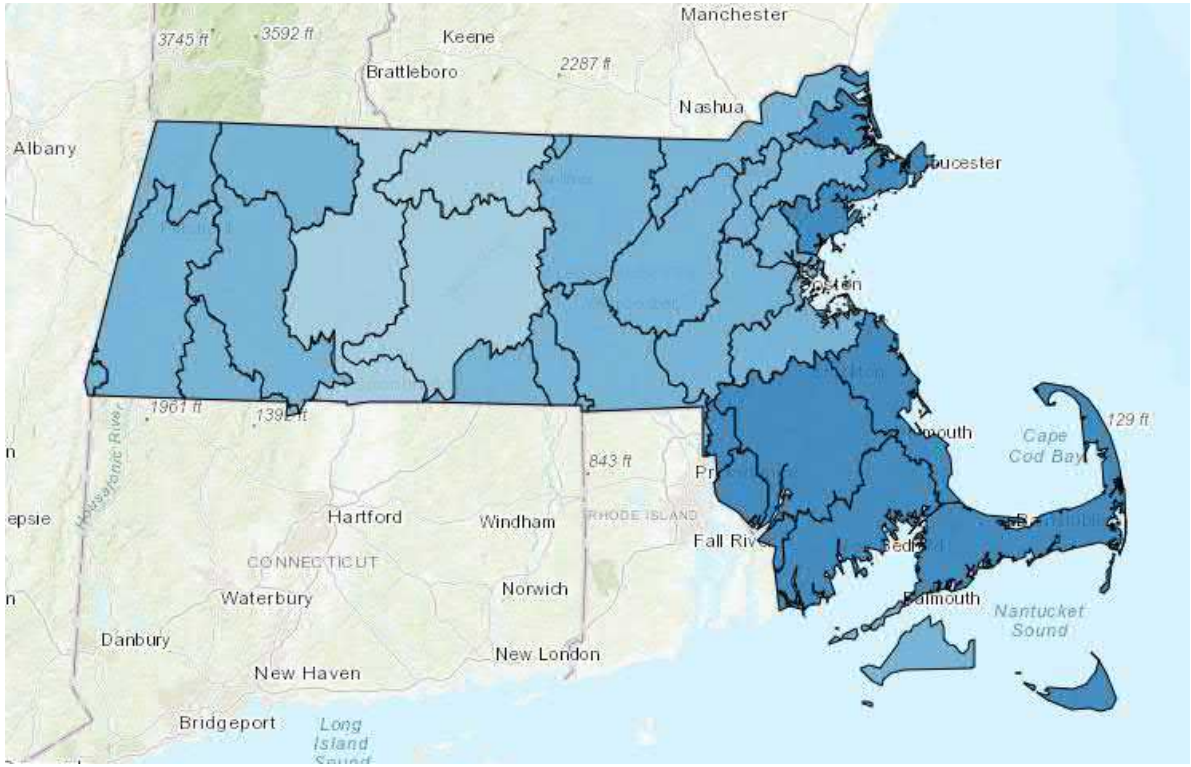
Projected change in # days above 90°F

+7.6 +12.4 +16.5 +21.8 +39.4

Massachusetts Projected Climate Changes

Change in # of Days below 32°F – 2050 Scenarios



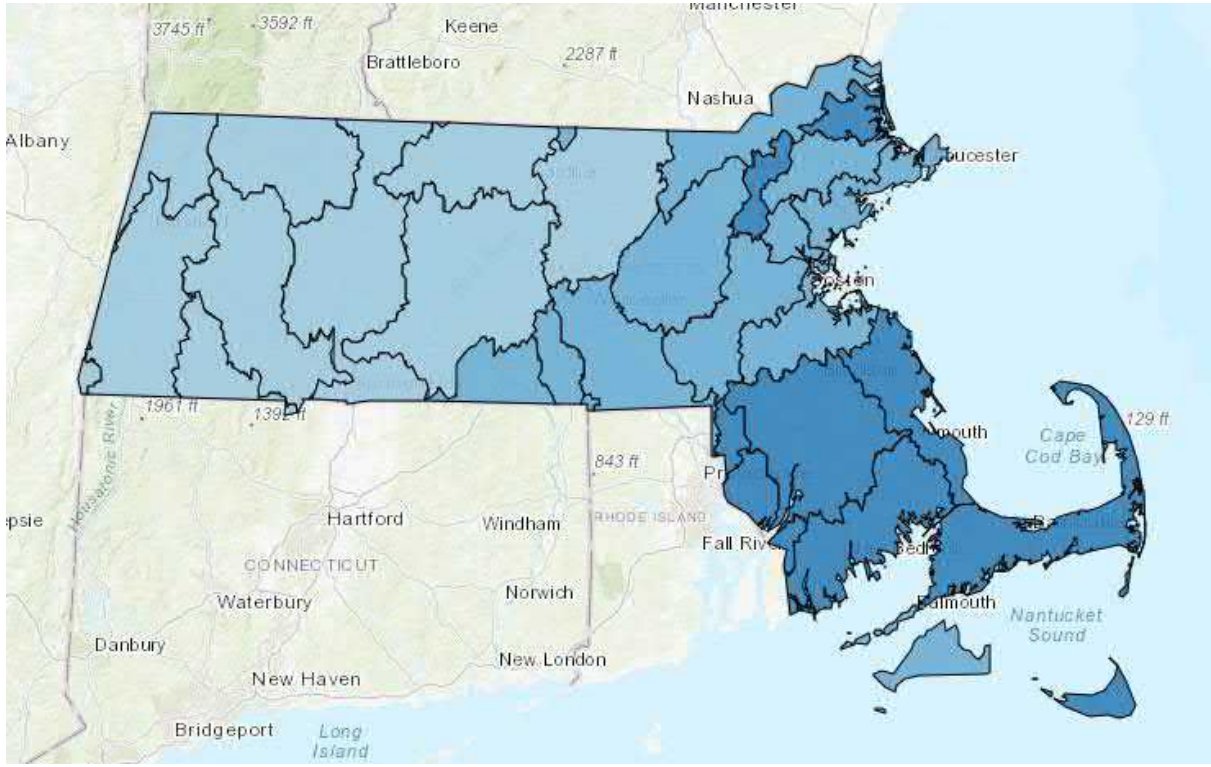


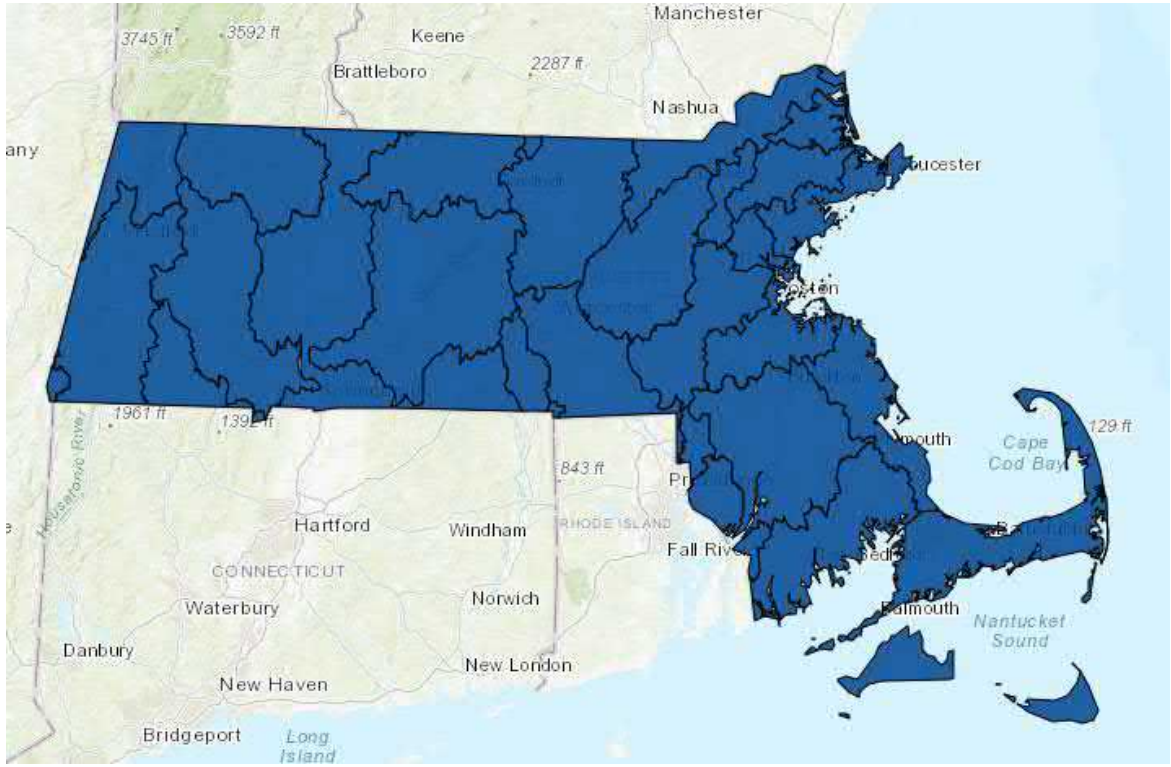
Projected change in # days below 32 °F

-20.6 -25.6 -30.8 -33.9 -47.3

Massachusetts Projected Climate Changes

Change in # of Days below 32°F – 2090 Scenarios



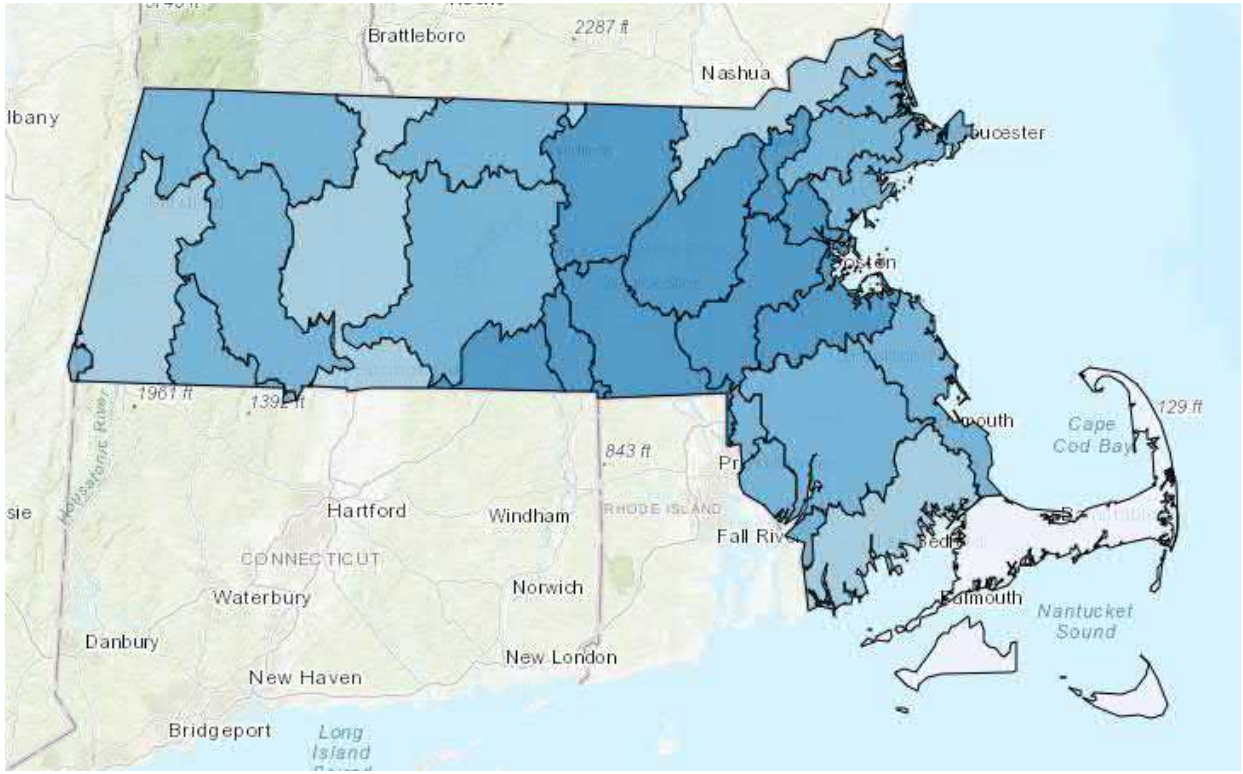


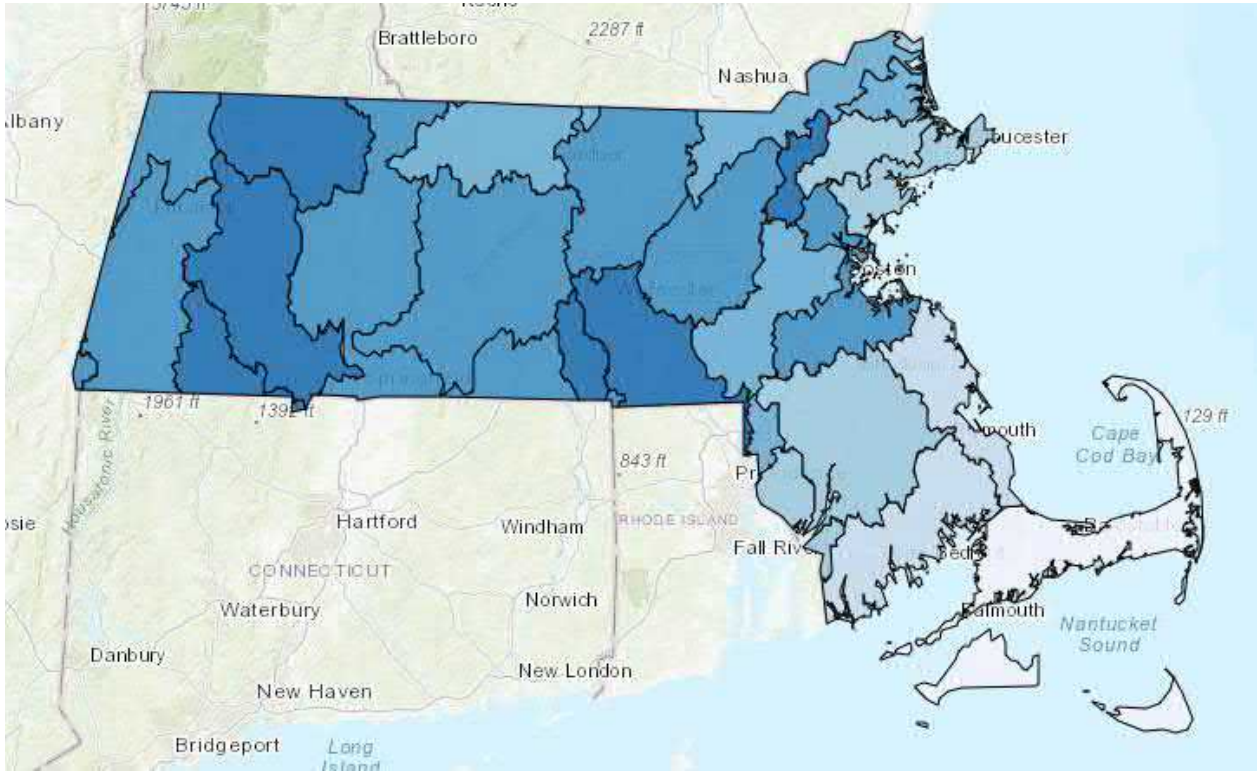
Projected change in # days below 32 °F

-20.6 -25.6 -30.8 -33.9 -47.3

Massachusetts Projected Climate Changes

Change in Inches of Precipitation– 2050 Scenarios



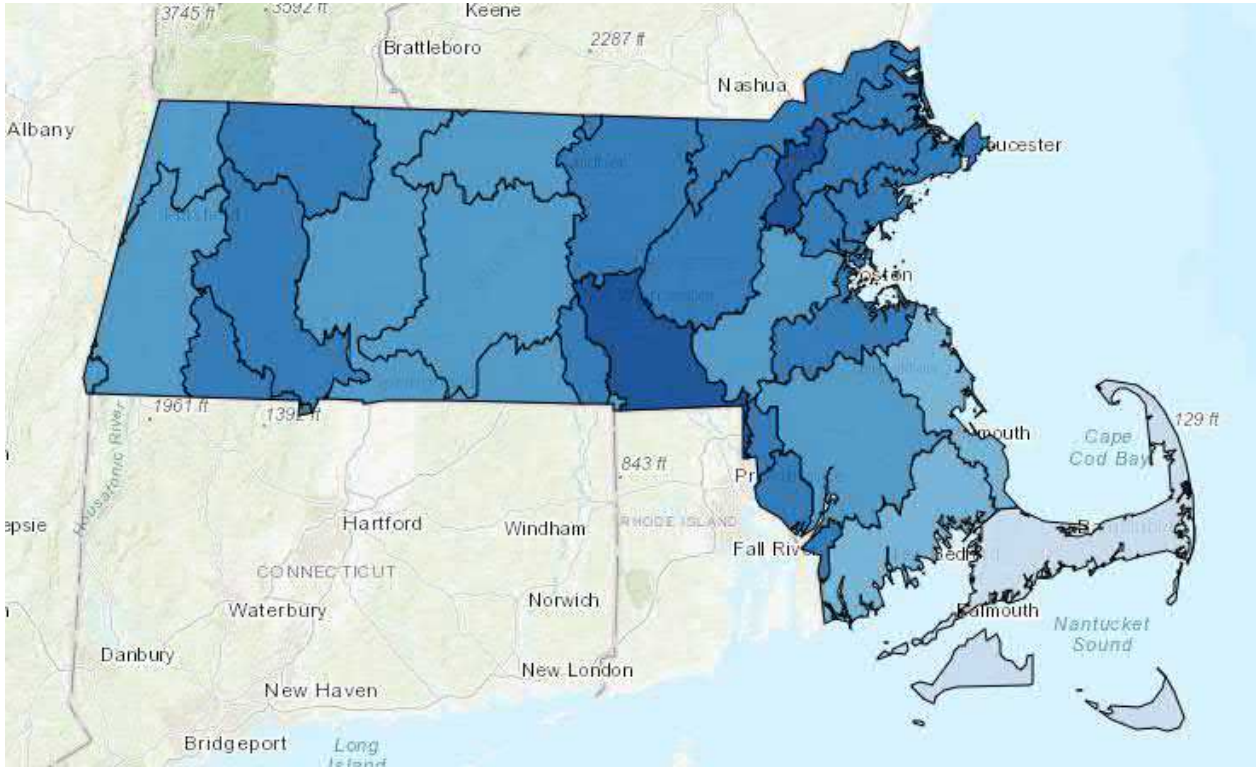


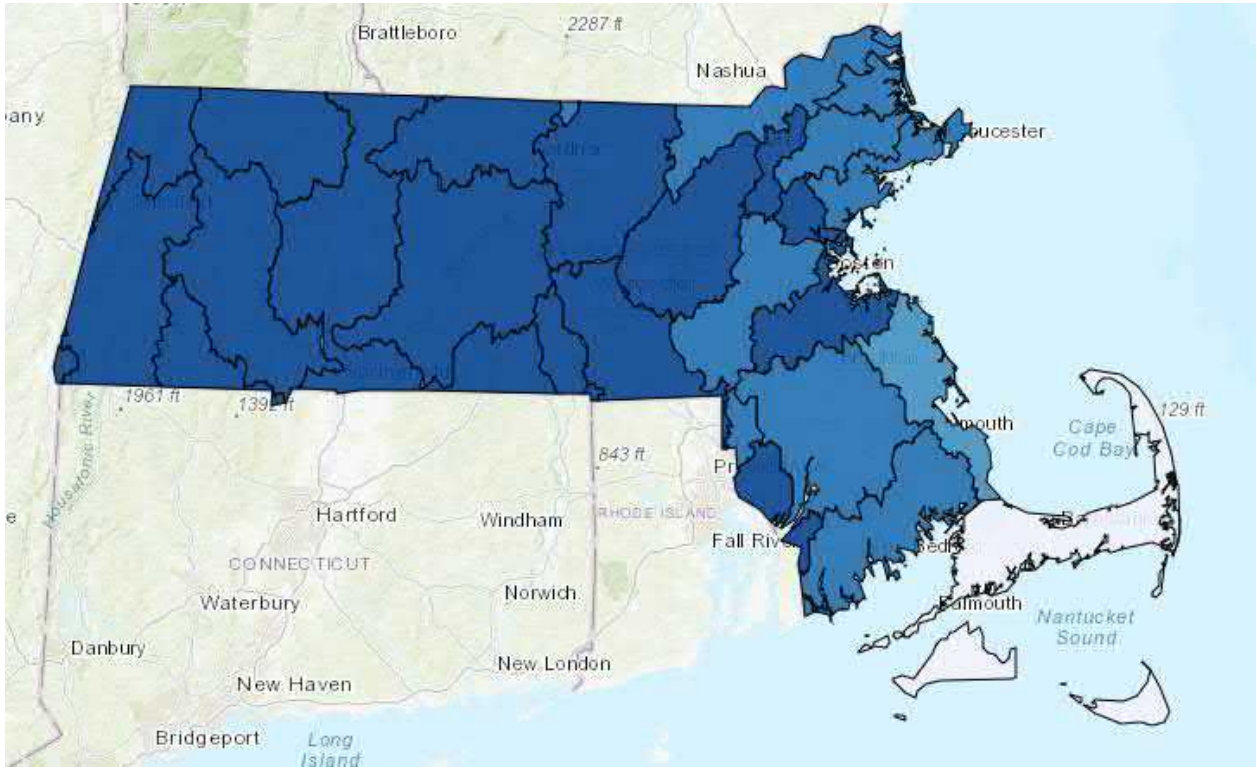
Projected change in inches of total precipitation

+1.9 +2.5 +3 +3.4 +3.9 +4.5

Massachusetts Projected Climate Changes

Change in Inches of Precipitation– 2090 Scenarios





Projected change in inches of total precipitation

+1.9 +2.5 +3 +3.4 +3.9 +4.5

Massachusetts Projected Climate Changes

Variable	Observed Value (1971-2000 average)	Change by 2050s	Change by 2090s
Annual average temperature	47.5 °F	Increase by 2.8-6.2 °F	Increase by 3.8-10.8 °F
Days per year with Temp > 90°F	5 days	Increase by 7-26 days	Increase by 10-63 days
Days per year with Temp < 32°F	146 days	Decrease by 19-40 days	Decrease by 24-64 days
Total Precipitation per year	47 inches	Increase by 0.9-6 inches	Increase by 1.2-7.3 inches
Number of days with precip > 1 in	7 days	Increase by 0-3 days	Increase by 1-4 days

Impacts from Climate Change

Increasing Temperatures

- Increase in heat-related illnesses
- Higher ozone levels and poorer air quality
- Changes to growing seasons
  - Algal blooms become larger and more frequent
  - Native species may decline and invasive species move in
  - Warmer winters contribute to increase in vector-borne diseases (Lyme, EEE West Nile)
- Larger demands on energy systems
  - Peaks in power demand during hot summer days can cause outages

Impacts from Climate Change

Increased Precipitation and Downpour Intensity

- Increased risk of flooding
  - Roadway ponding hazards and closures
  - Damage to roadways and infrastructure
  - Basement flooding
  - Increase potential for toxic mold build-up
- Water quality impacts
  - More frequent large rain events degrade habitat and carry soils and nutrients to lakes and waterways (elevated risk for swimming, fishing, drinking)
- Impact on agriculture and natural ecosystems

Impacts from Climate Change

Changes to Rain and Snow Patterns

- Reduced snow cover
- Impacts to habitats and species
- Potential increase in drought events
  - Local water supply shortages
- Extreme weather
  - Safety risks
  - Public service disruptions
  - Power outages
  - Infrastructure sustains more wear and tear

Workshop Overview

- Characterize Hazards
- Identify Community Vulnerabilities and Strengths
- Identify and Prioritize Community Actions
- Determine the Overall Priority Actions
- Develop Comprehensive Summary Products

Workshop Overview

Community Resilience Building Risk Matrix www.CommunityResilienceBuilding.org

H-M-L priority for action over the **S**hort or **L**ong term (and **O**ngoing)
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					Priority H - M - L	Time Short Long Ongoing
Infrastructural									
Societal									
Environmental									

Characterize Hazards

Identify past, current, and future hazards (large team).

Direct participants to make a list of hazards (causes of impacts) that the community has dealt with, currently faces, and anticipates experiencing in the future (i.e., tornados, ice/wind storms, drought, wildfire, tsunamis, sea level rise, landslides, earthquakes, etc.). Utilize the following triggering questions to accelerate dialogue and surface initial agreement on top four hazards.

- What hazards have impacted your community in the past? Where, how often, and in what ways?
- What hazards are impacting your community currently? Where, how often, and in what ways?
- What effects will these hazards/changes have on your community in the future (5, 10, 25 years)?
- What is exposed to hazards and climate threats within your community?
- What have been the impacts to operations and budgets, planning and mitigation efforts?
- Others concerns or considerations related to impacts?

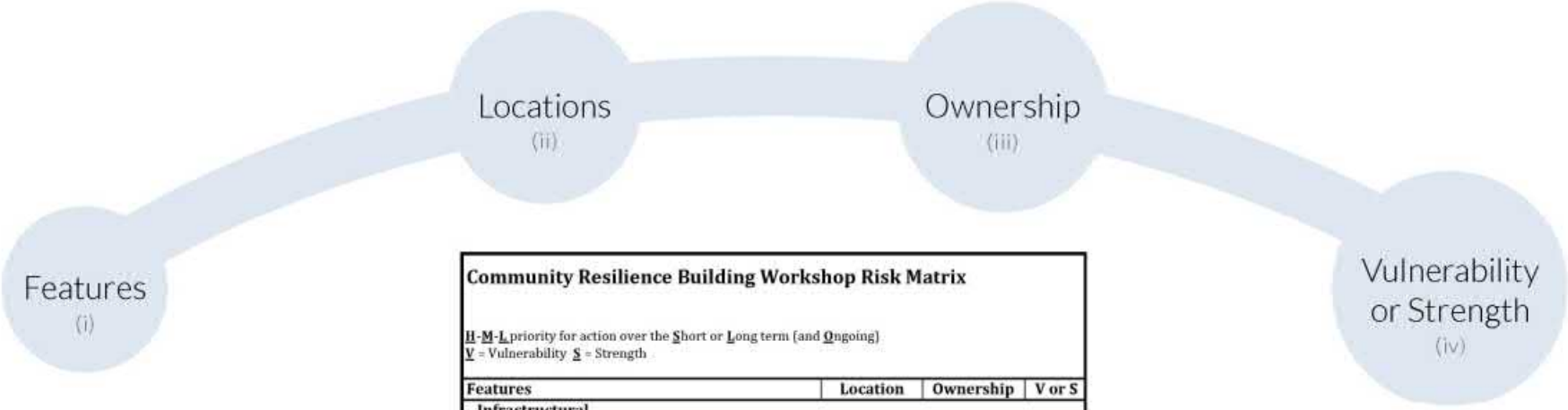
A **Hazard** is like the sun. The **Risk** from that hazard is sunburn. The **Vulnerability** includes the length of **Exposure** of skin to the sun. The **Action** to reduce risk from the hazard is to apply sunscreen or seek shade.

Top to bottom: © Rich Reid/TNC, © Devan King/TNC, © Jay Harrod/TNC

Hazard Characterization

- Inland Flooding
- Tsunami
- Severe Winter Storm
- Drought
- Extreme Temperatures
- Tornadoes
- Landslide
- Wildfires
- Coastal Flooding
- Invasive Species
- Earthquakes
- Coastal Erosion
- Hurricanes/Tropical Storms
- Other Severe Weather (strong wind, extreme precipitation)

Identify Community Vulnerabilities and Strengths



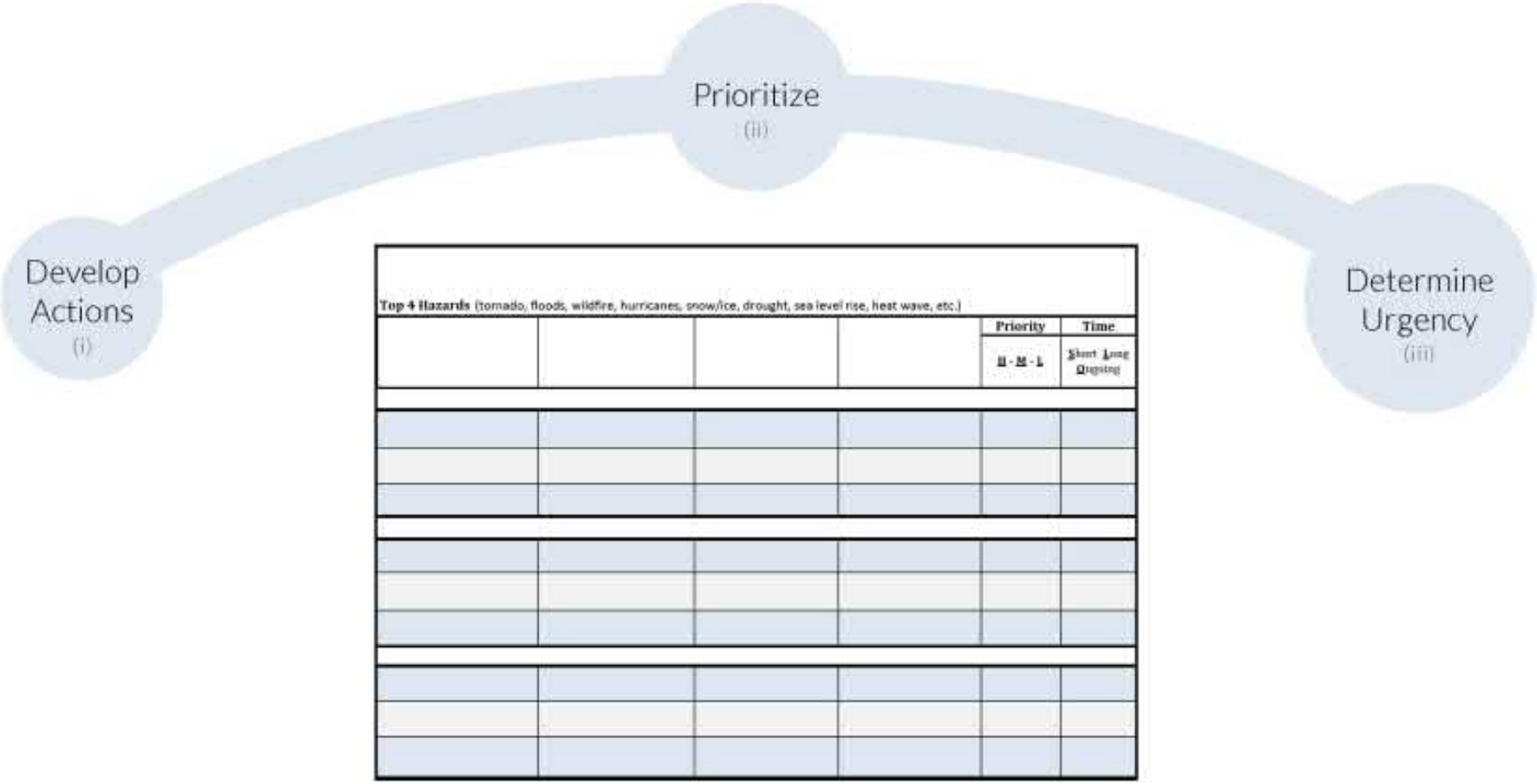
Community Resilience Building Workshop Risk Matrix

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

Features	Location	Ownership	V or S
Infrastructural			
Societal			
Environmental			

Steps C1, C2 and C3 below focus on identifying intrastructural, societal and environmental vulnerabilities and strengths. Each step requires three tasks to complete the Risk Matrix: **(i)** identify features, **(ii)** describe feature locations, **(iii)** identify feature ownership, and **(iv)** identify each feature as a vulnerability or strength, or both.

Develop and Prioritize Actions



Steps D1, D2 and D3 below focus on identifying and prioritizing intrastructural, societal and environmental actions. Each step requires three tasks to complete the Risk Matrix: **(i)** develop actions, **(ii)** prioritize actions (**H**igh, **M**edium, **L**ow), and **(iii)** determine urgency (**O**ngoing, **S**hort-term, **L**ong-term).

Example Actions

Community Resilience Building Workshop Risk Matrix

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

Features	Location	Ownership	V or S	Top 4 Hazards (tornado, floods, wildfire, hurricanes, snow/ice, drought, sea level rise, heat wave, etc.): Coastal Flooding SLR/Storm Surge	Inland Flooding and Rain Events	Ice and Snow	Wind	Priority H - M - L	Time Short Long Ongoing
Infrastructural									
Town Campus	Specific	Town	V	Verify risk from flooding events; Identify alternative locations during peak flooding; Verify maintenance plan annually				H	S
Evacuation Routes - Roads	Town-wide	Town/State	V	Install highly visible signage for evacuation routes; Develop and implement communication program				H	S
Electrical Distribution System	Multiple	CL&P/Town	V	Within floodplain area, establish plan to address protection and long-term relocation of equipment		Upgrade transformers; Maintain power line protection zone (tree trimming)		H	O-L
Dams (inland and coastal)	Multiple	Private	V	Prevent possibility of catastrophic dam failure; Identify and remove dams to minimize downstream flooding due to failure				H	L
Railway and State Bridges	Multiple	Amtrak/State	V	Improve communications between parties; Expand green/grav infrastructure and improve bridge structures; Assess vulnerability and prioritize infrastructure improvement list				M	S
State Roads/Intersections	Town-wide	State/Town	V	Coordinate with DOT, volunteers, public works to improve response; Need signage to warn of flooding risk at critical intersections				M	L
Wharves and Shore Infrastructure	Shore	Town-State-Private	V	Pursue comprehensive shoreline management plan; Establish community dialogue on retaining/relocating infrastructure				L	S
Waste Water Treatment Facility	Specific	Town	V	Conduct alternative siting feasibility study; Relocate to low risk area within next 25 years.				L	L
New Ambulance Center	Specific	Town	S	Continue to support services in budget; Add additional staff and vehicle in next annual cycle					Ongoing
Zoning Regulations (maintain large lot size)	Multiple	Town	S	Current building codes control development in risky areas; Consider additional zoning incentives (TDRs) to reduce risk to residential units					Ongoing

More examples of actions:

- Improved access in high-risk locations
- Reduce housing stock in vulnerable areas
- Prioritize development in low-risk areas
- Integrate future risks in capital improvement plans
- Flood-proof manhole covers
- Secure new generators for critical facilities

When prioritizing, consider factors such as:

- Funding availability and terms
- Agreement on outstanding impacts from recent hazard events
- Necessity for advancing longer term outcomes
- Contribution towards meeting existing local and regional planning objectives

Examples of urgency:

- Current project to install hurricane-proof roof on school is an ongoing **(O)** action.
- Ensuring evacuation procedures are updated annually is considered a short-term **(S)** action.
- Reducing housing stock in high-risk areas, elevating a road, or replacing a bridge are long-term **(L)** actions.

Wrap-up

- Discuss actions and priorities
- Consensus on top five priority actions
- Questions?
- Next Steps
- Wrap-up

APPENDIX C

Workshop Handouts

IMPROVING COMMUNITIES TOGETHER

Norfolk Municipal Vulnerability Preparedness (MVP) Program Workshop

DEMOGRAPHIC DATA[1]

Parameter	Breakdown
Total Area	15.2 square miles
% of Land Use	Residential = 80% Business/Commercial = 7% State/Not for Profit (Audubon) = 13%
Population	11,900
Age	0-17 = 26% 18-24 = 5% 25-44 = 37% 45-64 = 26% 65+ = 6%
% Below Poverty Line	2%
Race	Asian = 1% Black = 6% White = 88% Other = 5%
Ethnicity	Hispanic = 6% Not Hispanic = 94%
Environmental Justice	0%
% Population Over 65 Living Alone	4.5%
Asthma Emergency Visits	21 (age-adjusted rate per 10,000 people)
Pediatric Asthma Prevalence	7.3% of all children enrolled in grades K-8

[1] Source: MA Dept of Public Health, 2018. MA Environmental Public Health Tracking Community Profile for Norfolk.

IMPROVING COMMUNITIES TOGETHER

Norfolk Municipal Vulnerability Preparedness (MVP) Program Workshop

CHARLES RIVER BASIN CLIMATE CHANGE PROJECTIONS (TEMPERATURE)[1]

SUMMARY OF MODELING RESULTS

- By 2050, average temperatures could increase by 10%. By 2090, average temperatures could increase by 19%.
- Number of days with temperatures +90 °F could increase by 4 times as today by 2050. By 2090, there could be 8 times as many +90 °F than today.
- Number of days with temperatures below freezing could drop by almost 22% by 2050 and almost 40% by 2090.
- Less energy is expected to be spent on heating in the winter, but more energy is expected to be spent on cooling in the summer.

TEMPERATURE PROJECTIONS

Variable	Baseline (1971-2000)	Mid-Century (2050s)	End of Century (2090s)
Average Annual Temperature (°F)	49.38	53.69 – 54.54	54.30 – 58.55
Maximum Annual Temperature (°F)	60.08	63.86 – 65.11	64.91 – 69.01
Minimum Annual Temperature (°F)	38.68	42.56 – 44.00	43.68 – 48.16
Annual Days with Max Temp over 90°F	8.95	29.62 – 38.54	33.83 – 71.16
Annual Days with Min Temp below 32°F	136.36	113.13 – 105.44	104.54 – 81.52
Annual Heating Degree-Days (Base 65°F)	6,328	5,375 – 5,106	5,058 – 4,316
Annual Cooling Degree-Days (Base 65°F)	608	1,055 – 1,255	1,188 – 1,878
Annual Growing Degree-Days	2,651	3,426 – 3,751	3,620 – 4,668

[1] Source: Northeast Climate Science Center, 2018. Massachusetts Climate Change Projections. University of MA Amherst. Published by MA Executive Office of Energy and Environmental Affairs. Available at: http://resilientma.org/data/datamajor-river-basins.

IMPROVING COMMUNITIES TOGETHER

Norfolk Municipal Vulnerability Preparedness (MVP) Program Workshop

CHARLES RIVER BASIN CLIMATE CHANGE PROJECTIONS (PRECIPITATION)[1]

SUMMARY OF MODELING RESULTS

- Average annual precipitation could increase almost 8% by 2050s and 9% by 2090s.
- Greatest increase in precipitation will occur during winter months.
- Greatest increase in consecutive dry days will occur during fall months.

PRECIPITATION PROJECTIONS

Climate Parameter	Baseline (1971-2000)	Mid-Century (2050s)	End of Century (2090s)
Annual Precipitation (inches)	46.55	49.90 – 50.17	50.43 – 50.80
Winter Precipitation (inches)	11.73	12.46 – 12.86	13.27 – 14.19
Spring Precipitation (inches)	11.71	12.58 – 13.25	12.67 – 13.83
Summer Precipitation (inches)	10.90	11.49 – 11.90	11.13 – 11.95
Fall Precipitation (inches)	12.24	12.72 – 12.87	12.29 – 12.31
Annual Days with Precipitation over 1 inch	7.69	9.23 – 9.68	9.51 – 10.22
Annual Days with Precipitation over 2 inches	0.80	1.07 – 1.10	1.10 – 1.17
Annual Days with Precipitation over 4 inches	0.04	0.09	0.06 – 0.10
Annual Consecutive Dry Days	16.92	17.93 – 17.99	17.14 – 18.55

[1] Source: Northeast Climate Science Center, 2018. Massachusetts Climate Change Projections. University of MA Amherst. Published by MA Executive Office of Energy and Environmental Affairs. Available at: http://resilientma.org/data/datamajor-river-basins.

Norfolk Municipal Vulnerability Preparedness (MVP) Program Workshop

EXAMPLES OF STRENGTH AND VULNERABILITIES[1]

INFRASTRUCTURE

Examples of Vulnerabilities:

- Main road floods during storms, blocking emergency response.
- Power outages during heat waves lead to health concerns.
- Wildfire and high winds resulting in supply chain interruptions.
- Sewer pump stations become submerged and inoperable.
- Compromised rail system due to heat-related warping of tracks.

Examples of Strengths:

- Critical road elevated and passable by emergency management
- Hurricane roof installed at school with improved sheltering capacity.
- Hardened utility lines reduce outages due to ice storms.
- Undersized culvert replaced to reduce flooding in key intersection.
- Improvement to communication systems during extreme weather.

SOCIETAL

Examples of Vulnerabilities:

- Senior housing without backup generators during heat waves.
- Residents without access to transportation during hurricane evacuation.
- Household contamination and sewage mobilization during flooding.
- Limited areas of refuge in elementary schools during tornados.

Examples of Strengths:

- Reliable communications protocols across departments for all employees.
- “Neighbor-helping-neighbor” program aligned with emergency operations.
- Well-supported volunteer organizations (fire, ambulance, CERTs).
- Faith-based and civic groups with hazard preparedness plans.

ENVIRONMENTAL

Examples of Vulnerabilities:

- Proliferation of subdivisions in wildfire and flood prone areas.
- Lack of urban tree canopy increasing heat island effect.

Examples of Strengths:

- Forested watersheds maintain drinking water supply during droughts.
- Native, vegetated slopes remain stable after intense 24hr rain events.
- Floodplains provide stormwater storage and downstream flood reduction.

[1] Source: Community Resilience Building Workshop Guide, communityresiliencebuilding.com

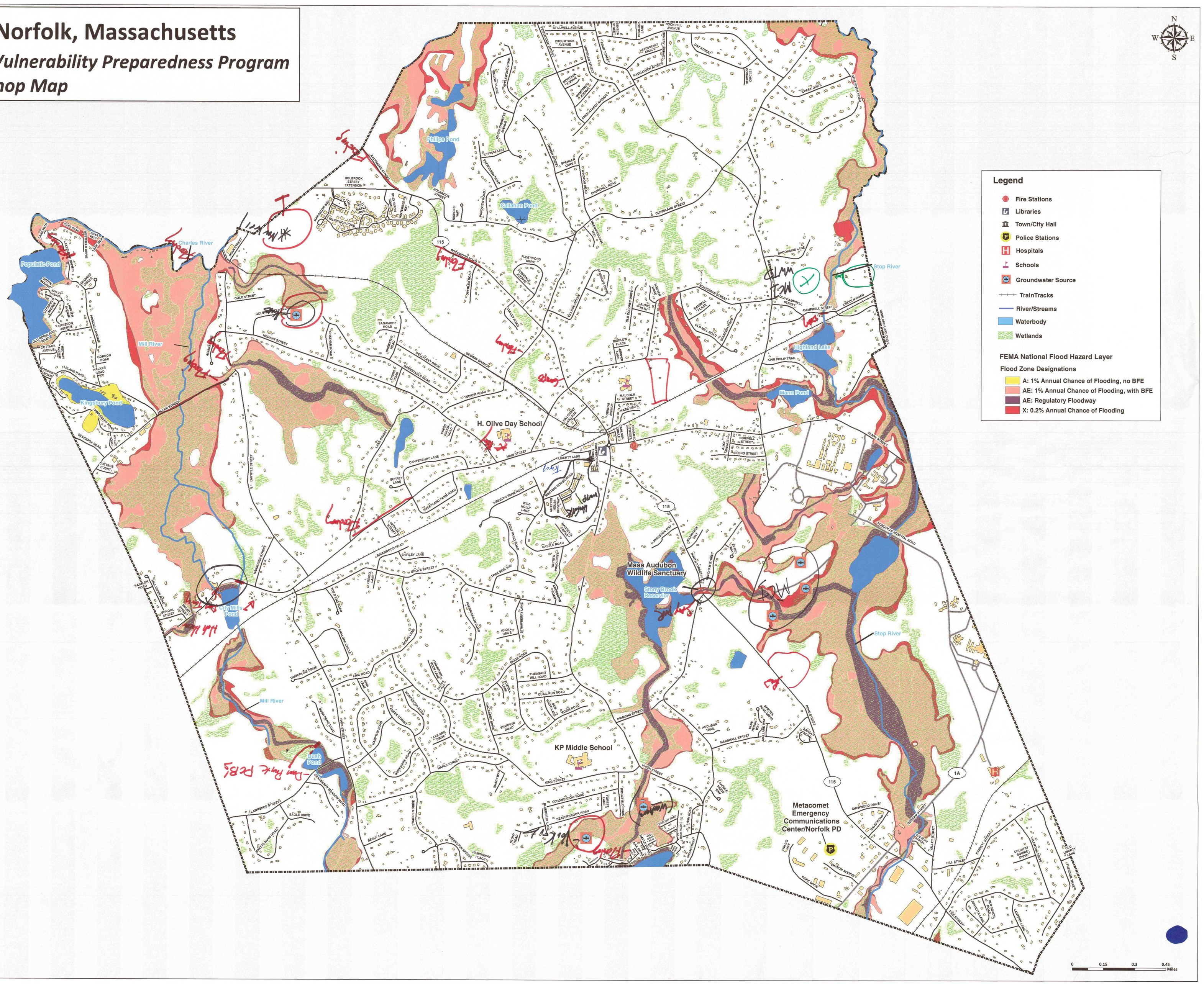
APPENDIX D

Workshop Matrices and Maps

Town of Norfolk, Massachusetts

Municipal Vulnerability Preparedness Program

CRB Workshop Map



BETA

IMPROVING COMMUNITIES TOGETHER

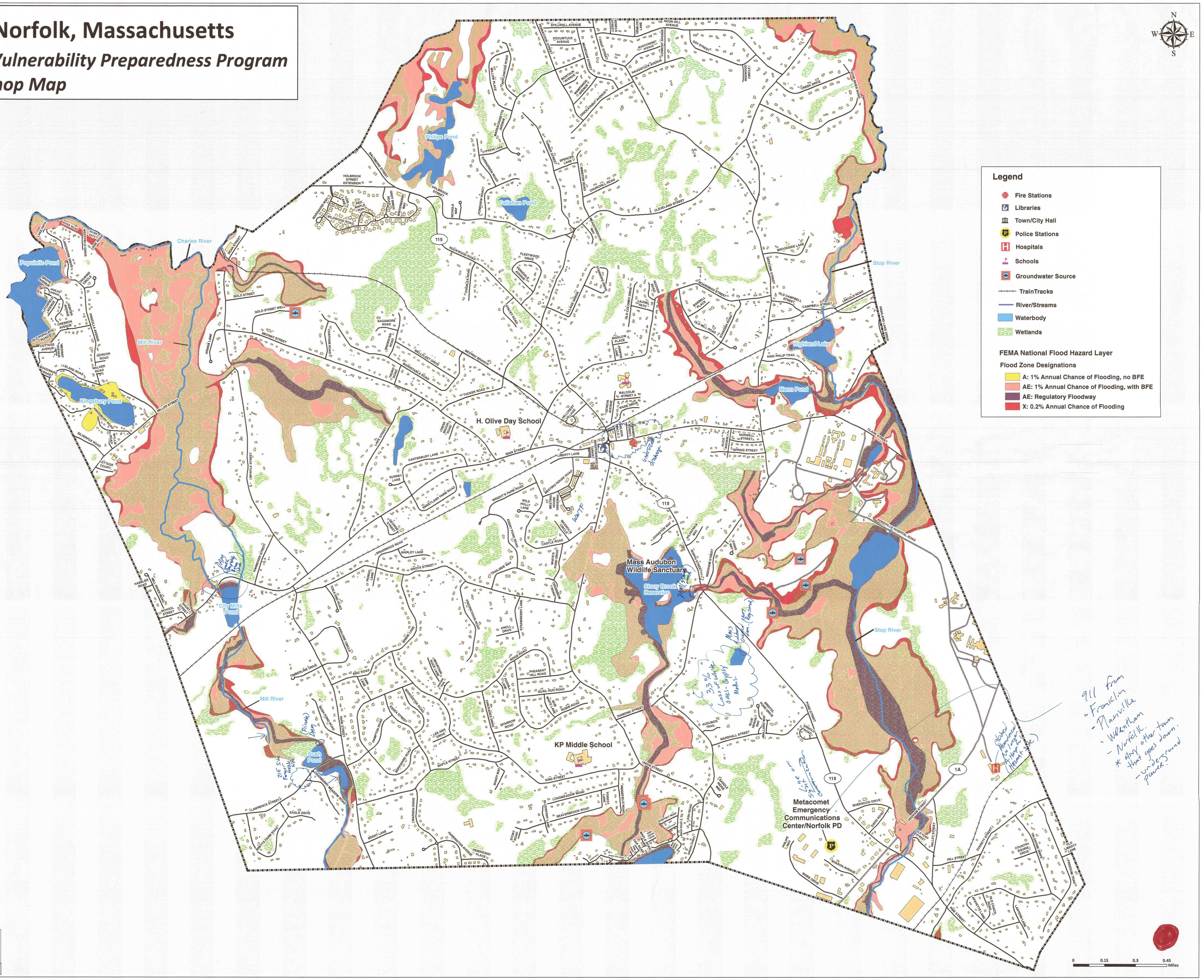
This Map is For Planning Purposes Only.

Date Issued: March 11, 2020

Town of Norfolk, Massachusetts

Municipal Vulnerability Preparedness Program

CRB Workshop Map



911 from
- Franklin
- Plainville
- Wrentham
- Norfolk.
* Any other town that goes down:
- underground power.

BETA
IMPROVING COMMUNITIES TOGETHER

This Map is For Planning Purposes Only.
Date Issued: March 11, 2020

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.com

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	Wind/Lightning Severe Storms	Invasive Species	Flooding	Drought	Priority H-M-L	Time Short Long Ongoing
Infrastructural									
Stormwater (system, culverts, etc.)	Town/~~Private~~ wide	Town/ Private	V		Continue O&M Plan Development	*inventory/condition assessment.	Stormwater Utility.	H	O
Roadway Infrastructure	Town wide	Town/State Private	V	Emergency Access/Detour Plan.		Backup pumps for roadway flooding		H	O
Public Water Supply	Spruce, Gold Holbrook	Town	V/S	(Public notices, etc)	Strict enforcement of water use restrictions *		Pursue new well locations for new development.	H	O
Private wells/Septic Systems	Town wide	Private	V/S				Restrict private water supply use	L	O
Electrical infrastructure	Town wide	Private	V	*Tree clearing program; upgrade backup power	upgrade lightning protection systems			H	O
Dams	Town wide	Town (1) Private (3)	V		Dam repair/removal study for private.	investigate other funding sources for private		M	O
Wastewater Treatment Facility	Town wide	Town (1) Private (2)	S	Continue WW study currently being performed.				L	O
Societal	Town wide								
Schools, Library, community centers, (municipal Buildings)	Bordman, ~~Marh~~, King	Town/ Regional	S	Capacity Analysis & Duration Study.	Cooling system upgrades/installations.		Green infrastructure projects	H	O
Prison	Town wide	State (4)	V	Funding/Legislation;	Political outreach			L	L
Parks and Rec Facilities, open space, Rec. Programs	Town wide	Town/ State	S		Removal, prevention, mitigation Plan	Forestry Plan	Open space transfer program (continue)	M	S
Emergency Preparedness Plan	Town	Town	S	Continue frequent updates to Plan	Public outreach about Plan	Med Flight Location Plan		M	S/O
New Public Safety/Regional Dispatch Building	Sharon Ave	Town/Reg.	S					H	O
Elderly Population/Affordable Housing	Town wide	State/ Private	V	Public outreach for elderly population to attend workshops, training				M	O
Environmental									
Trees	Town wide	Private/ Town	V/S	identify priority locations and develop removal plan.	* develop more aggressive preventative maintenance plan		maintenance of SW basin plantings.	H	O
Streams	Town wide	Town	V/S			Repair/replace culverts.	operation & maintence plan for culverts.	H	O
Wetlands	Town wide	Town	V/S		Continue remediation efforts for invasive removal.	maintain wetlands as strength		L	O
Wildlife	Town wide	Town	V/S	Develop pest control/ management plan.		Develop wildlife control plan (beavers, deers, etc)		M	O
Charles River	Town wide	Town	V/S			Hydraulic study/ Flood model.		H	S
Soils/	Town wide	Town	V/S	*Develop inventory of contaminated sites (Brownfields, etc.)				H	S
Hazardous waste sites	~~Town wide~~	~~Town~~	~~V~~						

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.com

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	Wind / Severe Storms / Lightning	Invasive Species	Flooding / ~~[illegible]~~	Drought	Priority H - M - L	Time Short Long Ongoing
Infrastructural									
Dams	-Mill City River -~~[illegible]~~ Bristol Lake -Bush Pond	Private Public & State	V	-Investigation / Study -Decomissioning				H	O
Culverts / Stormwater / Roads	Townwide	Public / State	V			-Condition Assessment		H	O
Water System	-Prison -Kingsbury Pond	Public	V			-Management -Public Outreach		M	O
Communication System	Townwide	Public	V/S	More Communication	-Tree Maintenance Program			L	O
Electrical / Facilities	Townwide	Public / Private	V/S	with Private Companies on how to handle Outages	-Amendment to Scenic Tree By-Law			L	O
Commuter Rail	Townwide	State	S	-Town needs to continue to put in place open	-Tree Maintenance Program communication w/ rail	company	-Bi-Annual Tree inventory / Replacement Program	L	O
Societal									
Rural Character	Townwide		S	-Implementation of TDR				H	O
Government	Townwide / State		V	-~~[illegible]~~ Creation of a Townwide "Common Top Priority Hazards / Strategic Plan"				M	S
Schools -> Emergency Centers	Townwide		S	-Bolster schools & Emergency Centers to incorporate sanitation aspects i.e. - showers				H	L
* Emergency Center	Townwide / Surrounding Towns / State	Public	S *	-Incorporate more towns to be apart of existing center				H	O
Strong Community Ties (Bus Depot)	Townwide / Surrounding Towns	Public	S	-Potential for established Memo of Agreement				M	O
Prison Workforce for clean-up	Townwide / Surrounding Towns		S					M	O
Environmental Lack of Hospital	Townwide		V	-Plan in place for evacuation route w/ proper signage and agreement w/ towns to nearest hospital	-incorporate triage center at fire station				
Mass Audubon -> Open Space	Townwide	Public / ~~[illegible]~~ State	S	-Continue funding for grant opportunities to keep in current condition				H	O
Tree Canopy	Townwide	Public / Private	V/S	-Tree maintenance program /		Bi-Annual Tree Inventory / Replacement Program		H	S
Flood Control -> Army Core of Engineers			S	-Audit of equipment for Flooding issues / inventory				H	~~[illegible]~~ S
Gypsy Moths / Variable Milfoil Water chestnut.	Townwide	Public / Private	V		-Continued Monitoring of invasive species for reporting				
Vector Borne illness	Townwide	Public	V		-Public outreach ~~for~~ program for education				
Water Sources -> ~~Reco~~ Recreational	Townwide	Public / STATE	S			-Signage Posting for warning purpose -DPH test water bodies / fish		M	O

>H/O

-Maintaing Priority catch basins w/ direct discharge

Appendix D: Final Risk Matrix

Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

H-**M**-**L** priority for action over the **S**hort
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	Wind/Severe Storms/Lightning	Flooding	Invasive Species	Drought	Priority H - M - L	Time Short Long Ongoing
Infrastructural									
Dams	Town-wide	Town & Private	V	Conduct Dam Condition assessment, repair or decommission existing dams				H	O
Stormwater System (Culverts, Roads etc.)	Town-wide	Town, State & Private	V	Conduct an inventory of stormwater infrastructure and condition assessment. Continue development of an Operation and Maintenance Plan. Evaluate the benefits of creating a stormwater utility.				H	O
Public Water Supply	Town	Town	V&S				Increase distribution of public notices, stricter enforcement of water use restrictions, pursue new well locations , restrict private water supply use	H	O
Communication Systems	Town-wide	Town	V&S	More communication with private companies on how to better handle power outages				L	O
Electrical Infrastructure	Town-wide	Town & Private	V&S	More communication with private companies on how to better handle power outages, initiate a tree clearing program, evaluate backup power supplies, upgrade lightning protection systems,				H	O
Commuter Rail	Town-wide	State	S	Town needs to continue to put in place open communication with rail company				L	O
Private Wells/Septics	Town-wide	Private	V&S				Evaluate need for water use restrictionsn on private wells during times of drought. Monitoring program for failed septic systems, specifically in areas close to water resources	L	O
Wastewater Treatment Facility	Town-wide	Town & Private	S	Continue wastewater treatment study currently being performed				L	O
Societal									
Rural Character	Town-wide	Town	S	Implementation of Transfer of Development Rights (TDR)				H	O
Government	Town-wide/ State	Town	V	Creation of a Townwide "Common Top Priority Hazards/Strategic Plan"				M	S
Schools/Community Buildings - Emergency Centers	Town-wide	Town/Regional	S	Bolster schools and other available municiple buildings to service as emergency centerst. Incorporate required facilities such as showers etc.				H	L
New Public Safety Regional Communications Center	Town-wide	Town/Regional	S	Incorporate more towns to be part of the new regional dispatch and communications center. Maintain as a "top notch" facility				H	O
Strong Community Ties (Bus Depot)	Town-wide	Town	S	Strong community ties create the potential to establish a memo of agreement between the town and private entities, such as the Bus Depot. The bus company could be utilized to assist in the transport of displaced individuals				M	O
Prison Workforce	Town-wide	State	S	Strong community ties create the potential to establish a memo of agreement between the town and other entities, such as the Prison. Prisoners that are set to be released often complete work in the community prior to being released. There's the possibilit that these individuals could be utilized during an emergency.				M	O
Parks and Recreational Facilities, Open Space, Rec. Programs	Town-wide	Town/State	S	Maintain existing open space, implementation of a forestry plan, implement an open space transfer program to foster the creation of additonal open space				M	S
Emerency Preparedness Plan	Multiple	Town	S	Continually update plan. Complete public outreach regarding the plan so that residents are award of the plan, evaluate a med flight location plan to address the lack of an in-town hospital				M	S & O
Elderly Population	N/A	State/Private	V	Public outreach to elderly population to attend workshops and training				M	O
Lack of Hospital	Town-wide/State	Town	V	Create plan for evacuation route including proper signage and agreements with other Town's with nearest hospital. Incorporate a triage center at fire station				M	O
Environmental									
Mass Audubon/Open Space	Town-wide	Town/State	V&S	Continue funding for grant opportunities to keep these lands in their current condition				H	O
Tree Canopy	Town-wide	Town & Private	V&S	Implement a tree maintenance program and bi-annual tree inventory and replacement program. Identify priority locations and develop a tree removal/replacement program. Maintenance of stormwater basin plantings. Evaluate modifying Town's scenic roadway bylaw				H	S
Flood Control - Army Corps	Town-wide	Federal	S		Complete an audit of availabile equipment to address flooding issues			H	S
Invasive Species - Gypsy moths, variable milfoil, water chestnut	Town-wide	Town & Private	V			Continued monitoring and reporting of invasive species, increase public awareness initiatives		H	O
Vector Borne Illness	Town-wide	Town	V	Increase public awareness notifications				H	O
Water Resources - Recreation	Town-wide	Town & State	S	Improve signage posting including signs for warning purposes, continue DPH testing of waterbodies, implementation of O&M				M	O
Streams	Town-wide	Town/State	V&S	Investigate, repair and replace existing drainage culverts requiring replacement. Create an Operation and Maintenance Plan for culverts				H	O
Wetlands	Town-wide	Town	V&S	Continue remediation efforts for the removal of invasive species. Maintain wetlands as a strength of the community				L	O
Wildlife	Town-wide	Town	V&S	Develop a pest control management plan. Develop a wildlife control plan to address issues with beavers, deer etc.				M	O
Charles River	Town-wide	Town	V & S	Complete a hydraulic study/flood model of the Charles River				H	S
Contaminated Sites	Town-wide	Town/Private	V	Develop an invetory of contaminated sites. Evaluate possible remedies and redevelopment options to existing contaminated sites				H	S

APPENDIX E

Top Priority Voting Results

HAZARDS

- WIND ✓
- FLOODING ✓
- TREES
- INVASIVE SPECIES ✓

✓ WIND / Severe Storms
Lightning

✓ Drought – Dead Trees

✓ Gypsy Moths / INVASIVE Species

→ Brush Fires

- WIND / Severe Storms
- INVASIVE Species
- Flooding / Drought
- Drought

FEATURES

INFRASTRUCTURAL

- DAMS
- Culverts | Stormwater | Roads
- Water System
- Communication system
- Electrical Facilities
- Commuter RAIL

- DAMS
- Stormwater (Culverts etc.)
- Private wells / Septic systems.
- Public water supply
- Elect. Infrastructure
- WW treatment Facility
- Road INFRASTRUCTURE

Societal

- Rural character
- Government
- Schools | Emergency shelters | Centers
- Strong Community ties (Metacomet Bus Depot)
- Prison workforce

- School, libraries, Comm. Buildings
- Prison
- PARKS & Rec. FACILITIES
- Emergency Preparedness Plan
- New Public Safety Building
- Elderly Pop. / Housing

ENV

- Open SPACE (MASS Audubon)
- Tree Canopy
- Flood Control (Army Corps)
- Gypsy Moths (Plants As well)
- VECTOR Born illness
- Water bodies (Recreation)

- Trees
- Streams
- Wetlands
- Wildlife
- Charles River
- Soils
- HAZ. WASTE Sites.

Top Actions

- Dams | Culverts | Stormwater | Roads ✓ 1
- Tree Maint. Program ✓ 2
  - * elect. system
- Emergency Center 4
  - · Keep As "Top Notch"
  - · encourage more towns
- Rural Character / Open Space - TDR 5
- Vector Born illnesses | Invasive Species 2
  - · Public Outreach & Reporting

Top Actions

- Stormwater (system, Culverts, etc.) ✓
- Trees (Clearing & Maint. Program) ✓
- Contaminated sites (3)
- Water Supply - New well location ✗