

Plympton, Massachusetts

MVP Community Resilience Program

Resilience Building Report
February 2020



SUMMARY OF FINDINGS



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MVP Community Resilience Program

Plympton, Massachusetts

Resilience Building Report

SUMMARY OF FINDINGS

Prepared by: BETA GROUP, INC.

Prepared for: Town of Plympton, MA

February 2020

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1.0 OVERVIEW

The Town of Plympton is located in the North of Plymouth County in the Taunton River Watershed. Plympton is a mostly rural and largely agricultural town whose population is less than 3,000. The town has a large area of wetlands, many bogs and several water bodies in town, including the Winnetuxet River running through the southwest quadrant of town.

The Town is concerned about a number of hazards and impacts related to climate change. Drought is a hazard for the community that relies solely on private wells for drinking water and pumper trucks for firefighting. Inland flooding is an issue for a number of areas throughout town that have experienced historical flooding over the past 10 years. Loss of power during winter and windstorms are existing problems expected to worsen locally because with extensive forests, rural roadways and the small population, Plympton is often one of the last Towns to have power restored after a storm event. To begin to address these climate related concerns, the Town was awarded a \$20,000 grant from the Massachusetts Executive Office of Energy and Environmental Affairs to conduct Community Resilience Building (CRB) workshops as part of the State's Municipal Vulnerability Preparedness Program (MVP).

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 Plympton to achieve "MVP" designation from the Commonwealth which provides the Town access to funding for action grants.

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

1.1 COMMUNITY RESILIENCE BUILDING WORKSHOP

The CRB framework is a system of discussions and note taking in a workshop format developed by The Nature Conservancy and prescribed by the MVP Program. The goal of the workshop is to further investigate the Town's prior planning efforts and resiliency measures and to develop a list of strengths, as well as priority actions to focus on in the immediate future. To assist with the process and facilitate the workshop, the Town selected BETA Group (BETA) as its state-certified MVP planning grant provider.

The Workshop's central objectives were to:

- Define top local natural and climate-related hazards of concern;
- Identify existing and future strength and vulnerabilities;
- Develop prioritized actions for the Community;
- Identify immediate opportunities to collaboratively advance actions to increase resilience.

1.1.1 PARTICIPANTS AND PLANNING

Planning began with a meeting between BETA and the Town Administrator 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 8 participants who accepted the invitation to participate representing 7 different departments or boards.

Diverse representation was crucial to the success of the program, as the Police noticed different hazards than the Highway department, and the Open Space Committee representative. 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 Administrator Liz Dennehy, Highway Department Superintendent Scott Ripley and Fire Chief Steve Silva.

The participants were divided into two groups, distinguished by the colors yellow and green, as noted on the maps and matrices. One group consisted of emergency response team members and the Town Administrator. The other was made up of representatives of Highway Department, Conservation & Open Space, Council on Aging and Library. This division allowed the two groups to have very different perspectives throughout the workshop. The small groups had very different priorities, creating dynamic large group discussions at the end of the workshop. 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.

The workshop was held in one day on Wednesday October 16, 2019 at Plympton Town Hall. 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 Plympton'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 Taunton River Basin by BETA MVP-Certified facilitators Melissa Recos, P.E. and Kendra Martin, P.E. Some of the research and projects presented were that precipitation is projected to increase 7%, there will be 28% 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**.

The participants then broke out into their designated small groups for further discussion. Small group discussions began by discussing hazards affecting Plympton and developing a list of the top four hazards of concern each group felt Plympton was most impacted by. One group annotated maps to highlight

vulnerable areas, infrastructure, flood zones, and community resources in order to better assess which hazards to prioritize in the Matrix. Groups were made up of a facilitator (a member of the BETA Group team), a scribe/spokesperson, and three other 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**. The groups agreed on the top 4 hazards as Inland Flooding, Severe Weather, Extreme Temperatures and Drought. Once this was decided, the participants returned to their groups to discuss features and add them to the matrix. Looking at the map in conjunction with the four identified hazards allowed the participants to more clearly see 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

During lunch, participants discussed their chosen features. Afterwards, there was a brief continuation of the presentation to remind participants of the action section in the matrix and show some examples. Participants then returned to their groups to fill in the Matrix. Groups discussed action items that address the vulnerability and the feature by either posing a solution to a hazard/feature or enhancing the strengths of a feature against a specific hazard. Some common action items included looking into alternative water supplies, assessing/repairing culverts and bridges, updating zoning bylaws, evaluate emergency management plans and procedures, and upgrade public safety communication. Throughout the small group discussions, the BETA facilitators stayed with groups to ask 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. The participants were very engaged and invested in the actions and proposed solutions to their Town's perceived vulnerabilities; categorizing each action as high, medium or low priority naturally separated the many actions into categories, making it easier to distinguish the most important. Using this information each small group determined their top five or six priority actions to present to the large group.

After all 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 the Town. Each group stated the features they focused on in all three categories as well as their top five

actions. The sheets where each group contributed their ideas during large group discussion can be found in **Appendix E**. A discussion followed 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.

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 Plympton and were brought up for discussion in the larger group.

- Inland Flooding
- Severe Weather
- Drought
- Extreme Temperature
- Severe Winter Storms



Participants Discuss Priority Hazards

The small groups had many of the same concerns in mind while choosing their top natural hazards. There was much discussion around the community's reliance on private wells for drinking water and pumper trucks for firefighting and what natural hazards could cause problems for the aquifers, mainly drought. There is not a back-up water supply so participants expressed great concern for the what would happen if drought impacted the aquifers in the long-term. While there have not been recent incidents of drought to cause concern, participants acknowledged the climate change projections and how devastating it could be to the Town.

Inland flooding was universally thought to be a problem that will only get worse as development occurs in the rural community and intense rainfall increases. Plympton has experienced a number of weather-related events in recent years, and these events are expected to increase due to climate change. Flooding along the Winnetuxet River, and around low-laying areas, especially those near bogs is a major concern.

Severe weather was another major concern for many of the workshop participants, because high winds and snowfall associated with this weather leads to fallen trees and downed power lines. Groups talked about the local impacts that routinely occur due to loss of power during winter and windstorms because of the Town's extensive forests, rural roadways and a limited number of staff to clear these trees. The expectation is that these will become more frequent with climate change and that, due to their small population, they will continue to be at the bottom of the utility company's list for repairs and upgrades to restore power.

It was realized that some of these hazards could be grouped together into one category and so the group decided on the following hazards as the top four:

Top Hazards

- **Inland Flooding**
- **Severe Weather**
- **Drought**
- **Extreme Temperature**

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**
 - o Water Cistern & Other Water Supply
 - o Culverts
 - o Dams
 - o Road Maintenance
 - o Drainage Systems
 - o State and Major Roads
 - o Shelter Facilities
 - o Town Center Campus
 - o Private Roads/Driveways
 - o Bridges
 - o Private Wells & Septic
- **Societal**
 - o Large Elderly Population
 - o Large Landowners/Agriculture
 - o Town Demographic
 - o Rural Character
 - o Zoning Bylaws
 - o Town Staffing
 - o Sheltering Facilities
 - o Emergency Operating Center
 - o Emergency Management Plan
 - o Public Safety Communications
- **Environmental**
 - o Tree Cover
 - o Large Biodiversity
 - o Wetlands
 - o High Ground Water
 - o Retention Ponds/ Reservoir
 - o Water Quality
 - o Sysco
 - o Cranberry Bogs
 - o Forested Area



Participants discuss priority hazards

Plympton, Massachusetts

- o Open Space
- o Farms
- o Winnetuxet River

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, the largest vulnerabilities became the highest priority.

2.1.3 PRIORITIZING ACTIONS

Action items that were identified in small groups and further discussed in the large group to address hazards facing town features are described below. This list identifies general concerns addressing the top four hazard categories facing Plympton and was used to determine the top five priority action items.

- Investigate/Develop Wellhead: Both groups were concerned about the Town's water supply and its ability to produce enough water to support the Town. Because of this, both groups discussed ways to augment their water supply. One group focused on looking for new water supplies, while the other focused on water at the Town Center. There are many side effects of operating on a limited water supply, one of which involved the emergency response team's concern about lack of water in the event of a fire. Also, if the Town needed to shelter its residents during an emergency, would there be enough water in the Town well to support that? These are the questions participants grappled with throughout this workshop.
- Cranberry Bogs: Bogs and the large land ownership of agriculture was a topic of concern, especially considering that the rural character of the Town is integral to its identity according to its residents. It was discussed that the Town would like to continue to support this local agriculture through extension programs and other initiatives, but also in the event that a bog owner would like to sell the farm, the Town would like to be afforded the opportunity to buy some of that land. Selling farms to developers could change the rural character of Plympton and without proper planning this could lead to overdevelopment and a number of associated negative impacts. One group suggested proactively discussing ownership with landowners looking to sell in order to give the Town enough time to budget for this purchase.
- Emergency Management: Both groups discussed at length the importance of developing formal Emergency Management Plans and systems. There were discussions about sheltering capabilities and upgrades, equipment, fire trucks need to access smaller driveways, town-wide emergency communication infrastructure etc.

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 four hazard categories facing Plympton.

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 agriculture/farms and the Town sheltering facilities. In the case of agriculture/farms, they are a strength of the town ecosystem and character but at the same time subject to flooding, and in the event of a land sale make the Town vulnerable to over-development. The Town has a plan and facilities in place for sheltering however they need updating.

Many participants thought that while the roads in town are in need of improvement, one of the assets in Plympton is State ownership of roads. This allows those roads to be used and maintained by the State and accessed by the public; this is especially helpful in larger storm events where the Town must

maintain many local roads. This removes some responsibility from the town. Another strength of the Town is the open space and rural character. Maintaining the open space and forests keeps impervious surfaces and therefore flooding and stormwater pollution down while increasing infiltration to replenish aquifers. 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. **Appendix D** has a more detailed descriptions of assets and actions for reference.

2.3 FUTURE ACTIONS AND RESOLUTIONS TO IMPROVE COMMUNITY RESILIENCE

2.3.1 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.

- Purchase fire trucks capable of accessing retreat lots, private paths and private roads
- Update emergency evacuation plan
- Establish tree trimming contract with private company
- Develop community well head and backup water supplies
- Reach out to large landowners (bogs) to review future land use
- New septic system and well at Town center Campus
- Upgrade all radio equipment
- New municipal storage building
- Update zoning bylaws and stormwater regulations
- Implement open space plan

After each group presented their proposed top action items there was a large group discussion about the merits of each and process of serious discussion in order to ensure that the top overall actions that the participants prioritized for the Town were not only important, but also feasible and would have maximum impact on the priority hazards listed earlier. In general, the participants recognized each action as important to the town and the discussion proceeded to come up with 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

- **Develop & implement Town Center Campus Plan**
- **Develop community wellhead and backup water supplies**
- **Update zoning bylaws including natural resource design and stormwater regulations**
- **Develop and upgrade town wide radio communications**
- **Implement open space plan**
- **New municipal storage building**

Several of the actions identified create opportunities to invest in Low Impact Development (LID) or Nature Based Solutions to address vulnerabilities. Several people in the workshop were interested in the Town acquiring more open space and modifying zoning and bylaws to ensure smart and sustainable development in Town and to protect water supply. Also, development of a Town Center Campus and a municipal storage building provide an opportunity to incorporate LID stormwater mitigation measures such as roadside swales or rain gardens, permeable pavement, leaching catch basins to restore groundwater, into currently developed areas.



Participants Discuss Top Priority Actions

2.3.2 RECOMMENDED ACTIONS

Participants at the workshop identified a number of recommended actions to 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.

High Priority

- Water Cistern & Other Water: Replace failing cistern; investigate installing dry hydrants
- Private wells/Septic: Protect water from septic leakage; update septic bylaw including land requirement; Develop community wellhead action plan; identify & acquire community well head
- Shelter Facilities: Create Sheltering Plan; Reinforce current facilities; Add resources to current facilities; investigate which resources to add; Maintain supply of emergency Resources (Blankets, Pillows, Water etc)
- Town Center Campus: Upgrade septic system; new well; investigate location for and construct new town hall & fire station; new municipal storage building on Center Street
- Private Roads/Driveways: Purchase fire trucks of appropriate size type to access retreat lots & private paths/ roadways; public awareness campaign to maintain private access for emergency vehicles
- Large Landowners/Agriculture & Rural Character: Develop and update stormwater bylaws especially for re-development; Reach out to Bog Owners to Plan ahead/Continue to coordinate with them; Develop Town Master Plan & look into clean commercial to supplement tax revenue, especially in the event of Bog owner sale of land, Develop and update stormwater bylaws especially for re-development
- Zoning Bylaws: address privately owned water/ culvert systems & dams; update zoning bylaws for residential and natural systems; look into stormwater bylaws
- Town Staffing: Prioritize list of staffing needs
- Elderly Population: Establish handicap accessible vehicle fleet; develop notification system/ communications on available resources; town buildings convert to ADA accessible, Update AC at cooling facilities; replace generators at cooling facilities
- Emergency Operating Center: Establish reliable communications including internet & telecom access; establish more permanent location for EOC; equip facility w/ I.T. equipment

- Public Safety Communications: Develop integrated public safety communication upgrade plan; upgrade radio equipment; reduce dead spots in town
- Wetlands: Identify potential easements/review property lines; maintain existing natural wetlands; Implement open space plan; Identify actions for key wetlands, implement open space plan; Identify actions for key wetlands
- High Ground Water: Implement open space plan; Identify actions for key wetlands, protect water from septic leakage through update bylaw for land requirement; Maintain exiting Natural wetlands; Develop community wellhead action plan; identify & acquire community well head; update septic bylaw
- Retention Ponds/Reservoir: Maintain and evaluate existing ; determine if there is larger capacity in certain reservoirs; determine other actions needed; remove trees from these assets; Develop stormwater management plan and projects; Implement open space plan; Identify actions for key wetlands; Implement open space plan; Identify actions for key wetlands
- Water Quality: Implement open space plan; Identify actions for key wetlands; Develop Town Master Plan & look into clean commercial to supplement tax revenue, especially in the event of Bog owner sale of land; Develop and update stormwater bylaws especially for re-development; Reach out to Bog Owners to Plan ahead/Continue to coordinate with them; Protect water from septic leakage through update bylaw for land requirement; Maintain exiting Natural wetlands; Develop community wellhead action plan; identify & acquire community well head; update septic bylaw
- Forested Areas: Develop vehicle access plan for public safety; become involved with Forest service "Fire safe communities"; investigate appropriate equipment to provide access/ egress for law enforcement, fire & rescues; develop more comprehensive community awareness of high fire days; tree trimming contract w/ private company
- Open Space (Parks & Wetlands): Continue acquisition; update open space bylaw; update open space plan; create open space residential development bylaw; develop mosquito control program; identify land critical to maintaining water quality

Medium Priority

- Culverts: Inventory of Town-owned culverts; Replace, repair & update culverts; Asses/Identify places for new culverts
- Dams: Conduct dam condition assessment on Town-owned Dams; develop dam repair & maintenance program; Identify potential Easements around Rivers; Develop Emergency Action Plan
- State and Major Roads: Continued maintenance; follow pavement management plan; purchase snow removal equipment; install signage
- Bridges and Culverts: Conduct bridge & culvert condition assessment; develop repair & maintenance program
- Large Elderly Population: Emergency & Evacuation Route plan; Continue emergency preparedness; Create Sheltering Plan; Reinforce current facilities; Add resources to current facilities; investigate which resources to add; Maintain supply of emergency Resources (Blankets, Pillows, Water etc.); Continue Public education/outreach - Update to include additional messaging; Investigate senior center/housing location;
- Town Demographic: Develop and update stormwater bylaws especially for re-development; Reach out to Bog Owners to Plan ahead/Continue to coordinate with them; Develop Town

- Master Plan & look into clean commercial to supplement tax revenue, especially in the event of Bog owner sale of land, Develop and update stormwater bylaws especially for re-development
- Sheltering Facilities: Install underground utilities to elementary school; continue lead treatment in water; investigate new water source; upgrade generator at church and make ADA compliant
- Emergency Management Plan: Establish formal, written plan & make available to public; develop local Hazard Mitigation Plan; provide training opportunities to local emergency management officials
- Large Biodiversity: Implement open space plan; Identify actions for key wetlands
- Farms: Continue to support local farms through extension programs & other related initiatives

Low Priority

- Road Maintenance: Road Maintenance Plan; Implement Pavement management Plan; Develop Emergency Evacuation Routes/Plan; Emergency Action Plan
- Drainage Systems: Inventory of Town-owned assets; Replace, repair & update assets; Assess/Identify places for new drainage systems; Update Maintenance Plan; Investigate opportunities to add/improve drainage; Look into Public wellspring - small cost to reduce other waste (e.g. 25cents for a gallon rather than buying plastic)
- Tree Cover: Investigate Scenic Roads Bylaw; Road Maintenance Plan; Implement Pavement management Plan; Develop Emergency Evacuation Routes/Plan; Emergency Action Plan; Implement open Space plan; look into land acquisition
- Sysco: Develop regional response plan (continue)
- Cranberry Bogs: Continue to support local agriculture through extension programs & other related initiatives
- Winnetuxet River: Maintain water ways; purchase land along river for flood areas

2.4 PUBLIC LISTENING SESSION

Plympton presented the CRB process and summary of findings during a one-hour public listening session at Plympton Town Hall on February 3, 2020. 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, ask questions, and provide input. The listening session began with a presentation by Melissa Recos and Mary Beth Irwin, the workshop facilitators from BETA Group. The presentation described impending climate change effects on the region, the MVP process, and the findings of the Plympton 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

There were approximately 25 attendees at the listening session including selectmen, open space committee members, finance committee and school committee members and residents as well as workshop participants including Town Administrator, Police Chief and Conservation & Open Space member. Most of the questions raised in the listening session were focused on the action grant process. Conversations showed great interest and willingness to engage with the process and learn what could be done to advance the cause of their town. Some of the specific concerns included:

- In-kind support and what could qualify
- Whether matching funds for an action grant would be accepted if they were dependent on budget approvals at a future Town Meeting
- Strategy in applying for action grants, apply every year and for multiple projects or be selective as more towns apply
- Examples of successful action grant applications/projects

Additionally, feedback from the listening session included considerable support for two particular recommended actions:

1. Acquisition of land to support the Town's open space plan, conserve natural resources, control development and maintain the towns rural character.
2. The establishment and full equipping of an Emergency Operations Center complete with an adequate sheltering plan and facility and a public safety/municipal storage facility.

These are consistent with the high priority actions identified by the workshop participants and will be pursued further by the Town in its local planning efforts. To address other questions and concerns raised, BETA emphasized the importance of communication with the MVP Regional Coordinator for process guidance and provided links to the MVP Action Grant website and previously awarded action grant summary for additional information.

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 Plympton 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 Plympton'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, February). MVP Community Resilience Building Workshop Summary of Findings, Plympton, MA.

5.0 ACKNOWLEDGEMENTS

Many thanks to the MVP Core Team members and CRB workshop participants. Thank you to the Town of Plympton 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 (Christine Joy, Mark Russo, John Traynor)	
Fire Chief	
Fire Captain	
Police Chief	
Council on Aging Director	
Highway Superintendent	
Library Director	
Zoning Board Chair and Members	
Agricultural Cmte. Member	
Town Properties Committee Chair and Members	
Conservation Commission Chair and Members	
Planning Board Chair and Members	
Board of Health Chair, Members and Agent	
Building Commissioner and Admin. Assistant	
Wage and Personnel Committee Members (2)	
Bylaw Review Committee Members (3)	
Finance Committee Chair and Members	
CRB Workshop Attendees	
Name	Town Department/ Role
Debbie Batson	Library
Matt Clancy	Police Department
Liz Dennehy	Town Administrator/Core Team
Linda Leddy	Conservation Committee & Open Space
Joy Marble	Director of Council on Aging
Scott Ripley	Highway Department/Core Team
Steve Silva	Chief of Fire Department/Core Team
John Sjostedt	Fire Department
Facilitation Team - BETA Group	
Name	Title
Melissa Recos, PE	Project Manager (Lead Facilitator)
Kendra Martin, PE	Engineer (Facilitator)
Mary Beth Irwin	Engineering Designer (Facilitator)



APPENDIX B

- **Plympton CRB Workshop Presentation**

Municipal Vulnerability Program (MVP)

Plympton, MA

October 16th, 2019



Welcome and Introductions

- Melissa Recos, Project Manager, BETA Group, Inc.
- Kendra Martin, Engineer, BETA Group, Inc.
- Mary Beth Irwin, Staff Engineer, 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

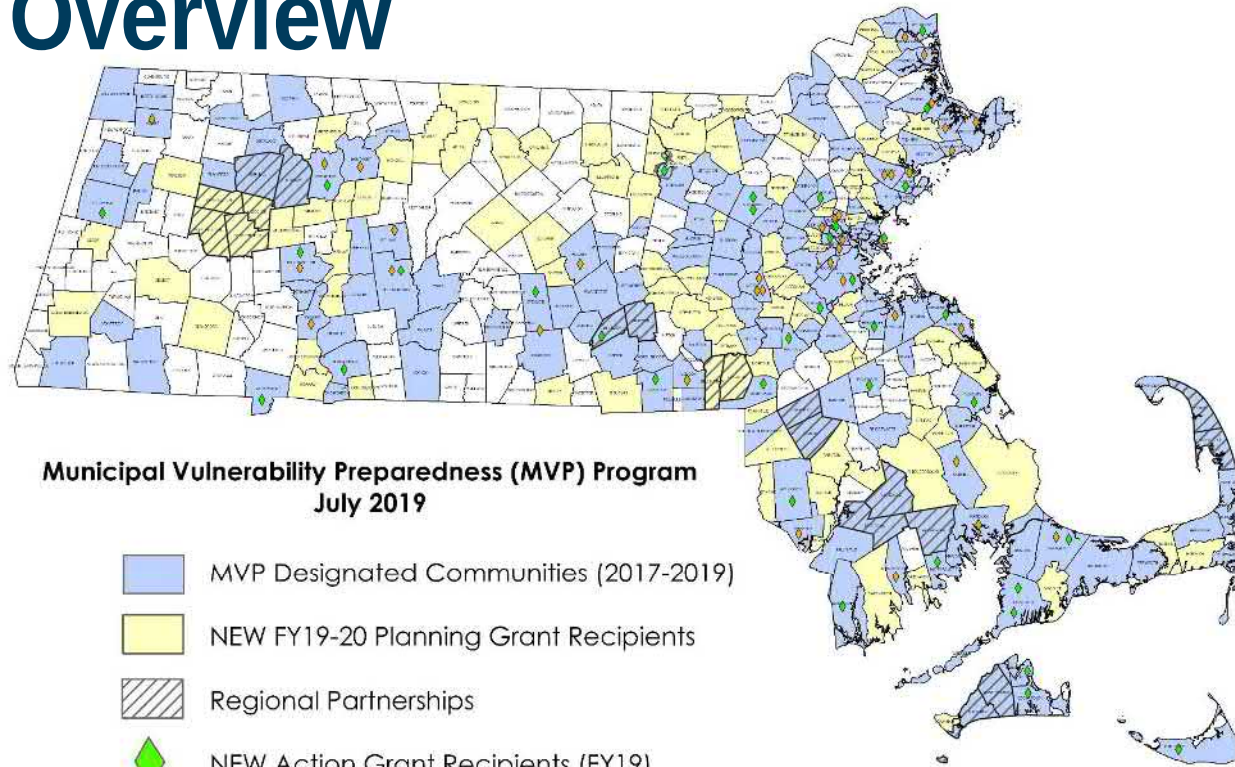
Program Overview

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



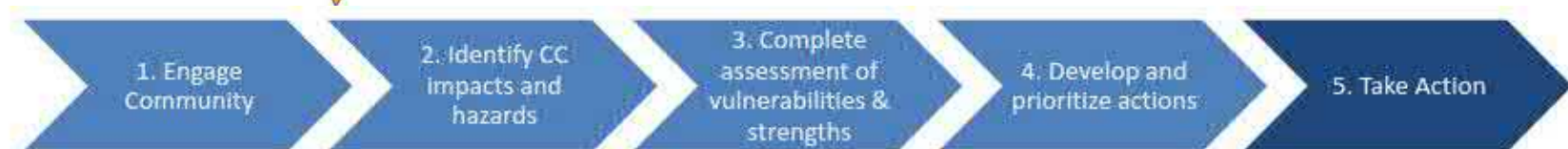
- Reducing greenhouse gas emissions to combat climate change
- Preparing for the impacts of climate change
 - State Adaptation Plan
 - Agency Vulnerability Assessments
 - Municipal Support
 - Climate Coordinators

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)



Program Overview

Two MVP Grant Opportunities



RFR 1: MVP Planning Grant



RFR 2: MVP Action Grant

Nature Based Solutions

Nature-Based

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

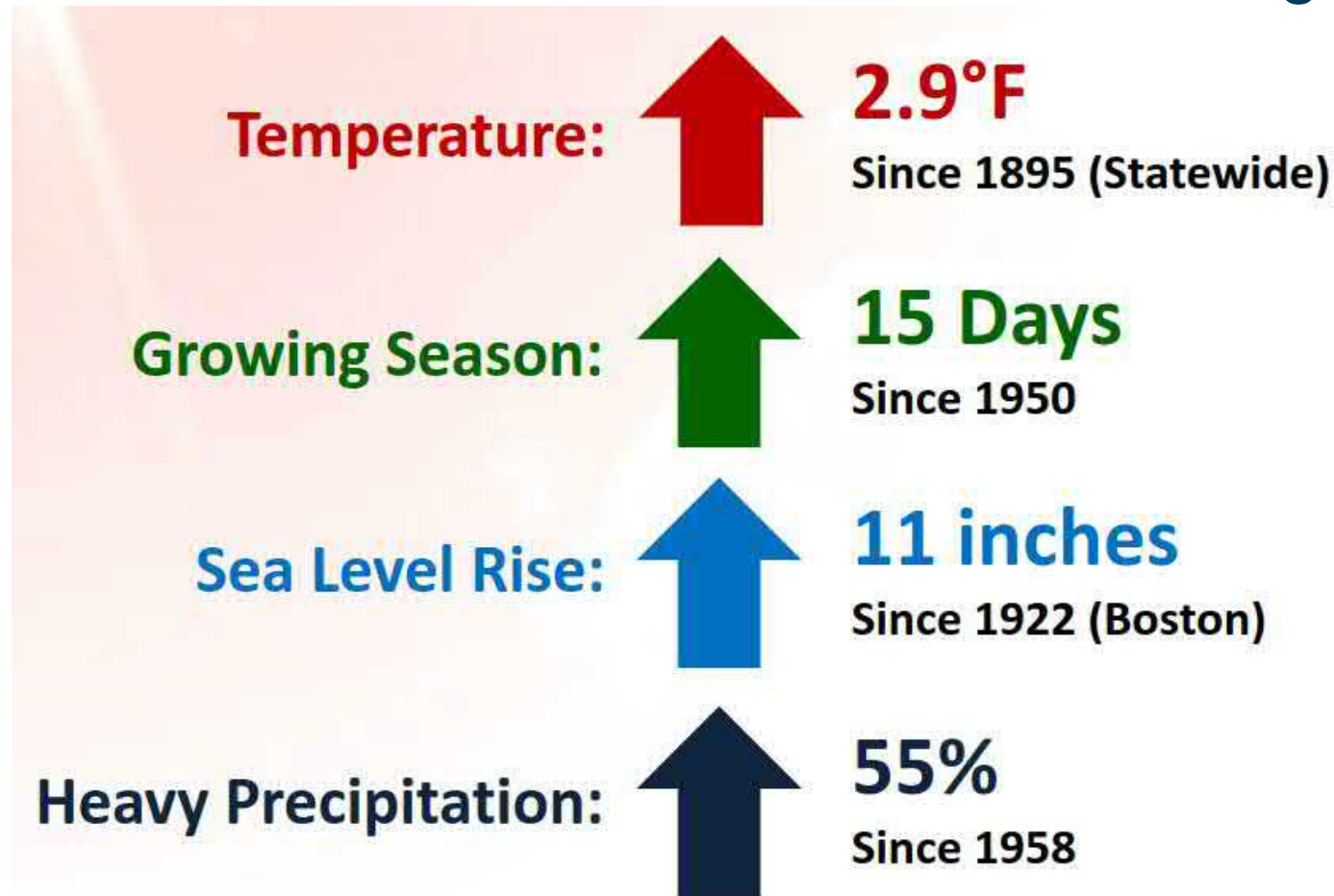


Flood Friendly Culverts



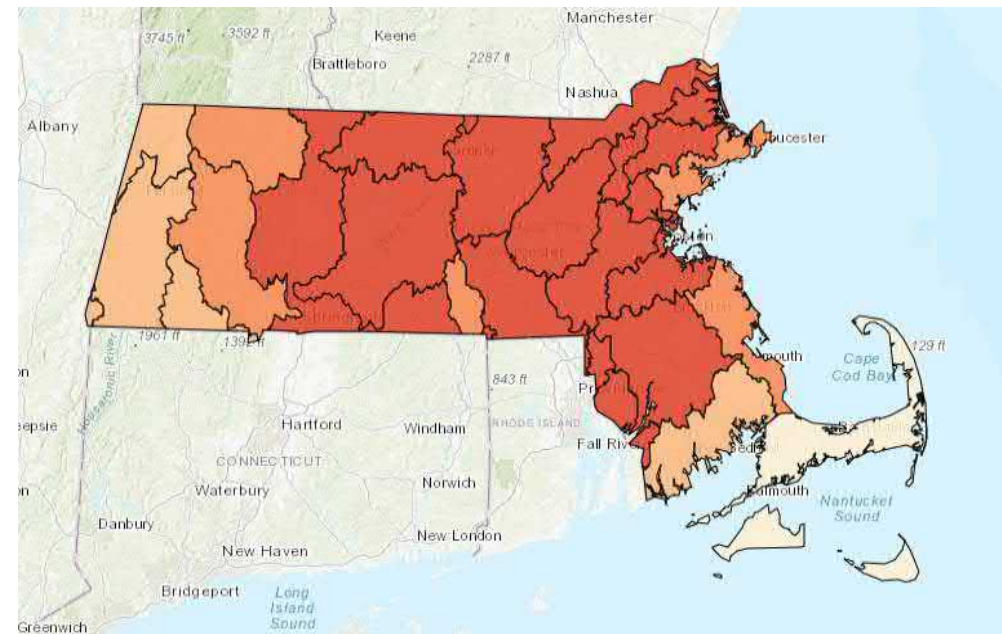
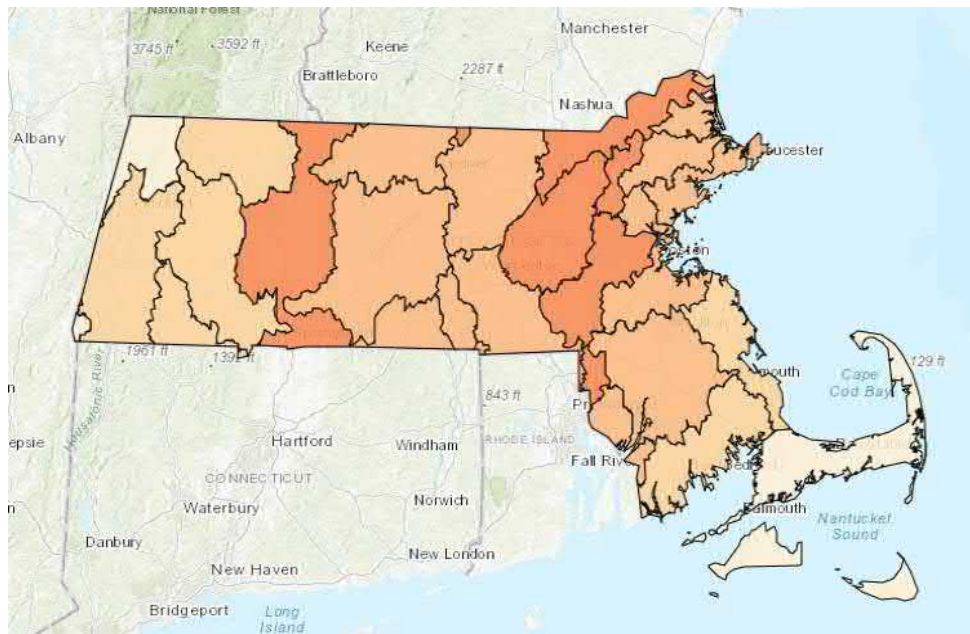
Regulatory and Policy Approaches to Address Hazards

Massachusetts Observed Climate Changes



Massachusetts Projected Climate Changes

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



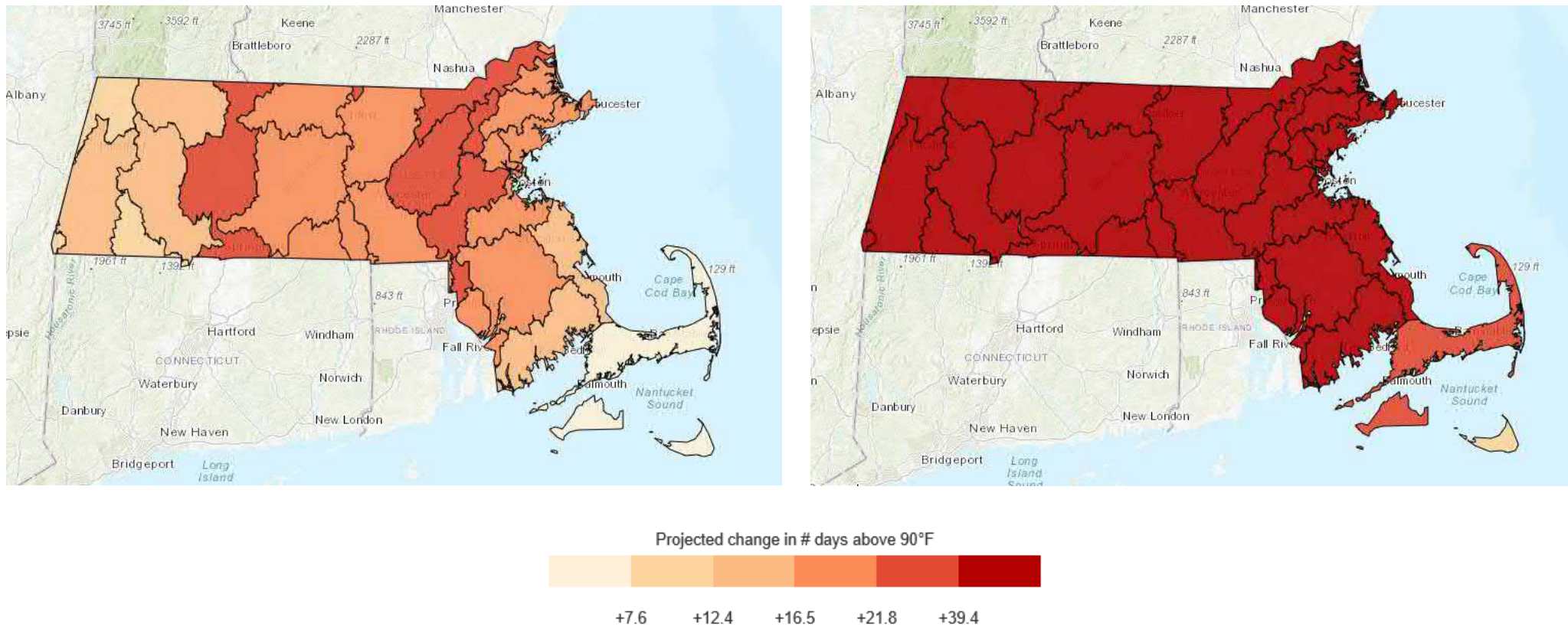
Projected change in # days above 90°F



+7.6 +12.4 +16.5 +21.8 +39.4

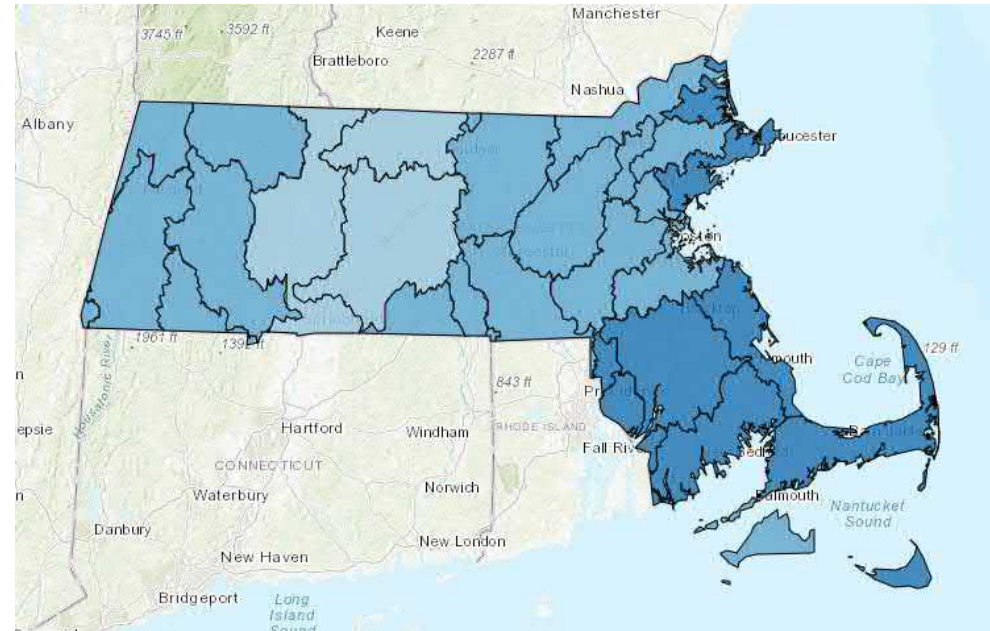
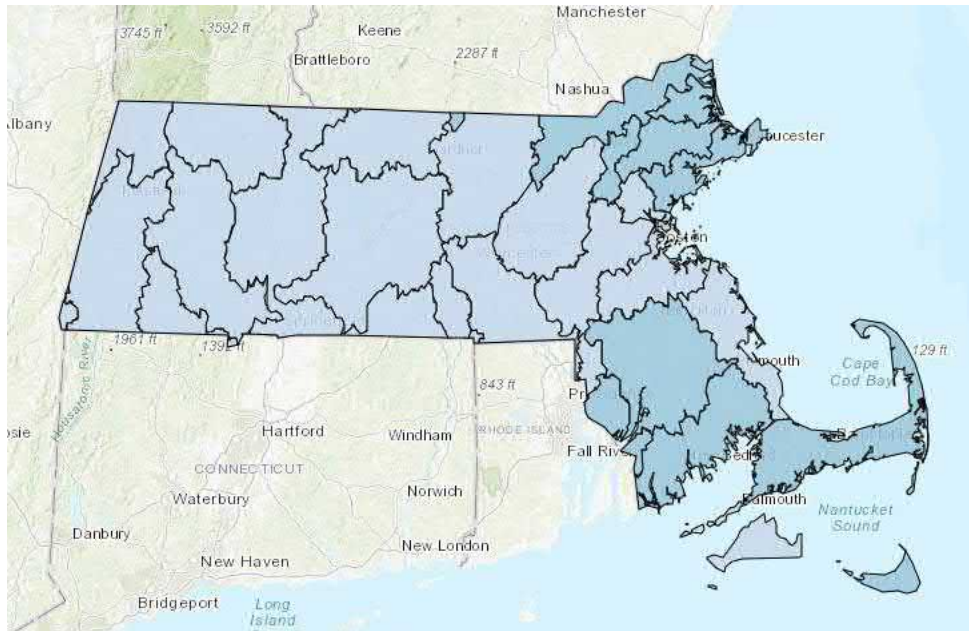
Massachusetts Projected Climate Changes

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



Massachusetts Projected Climate Changes

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



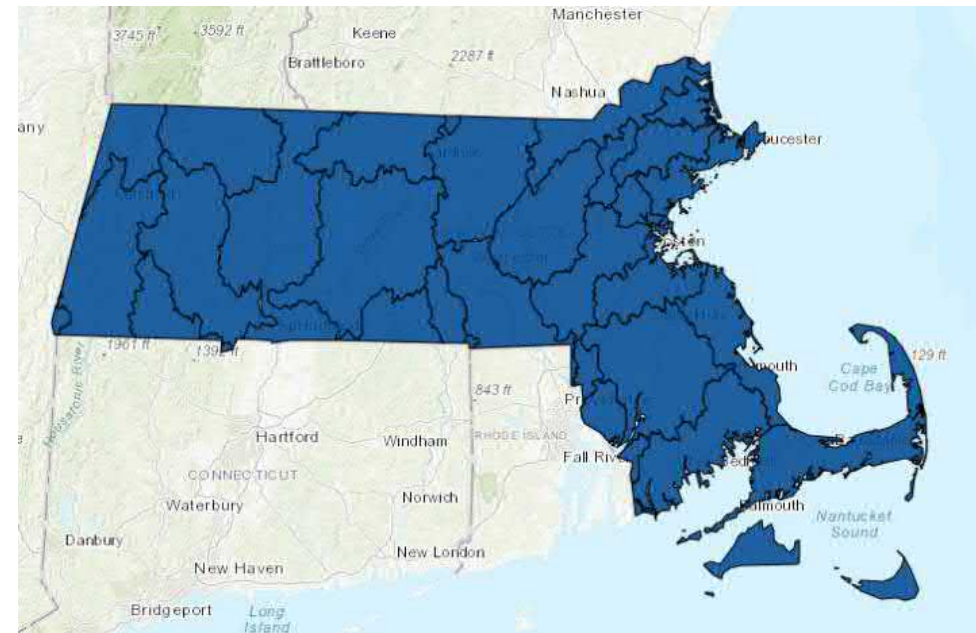
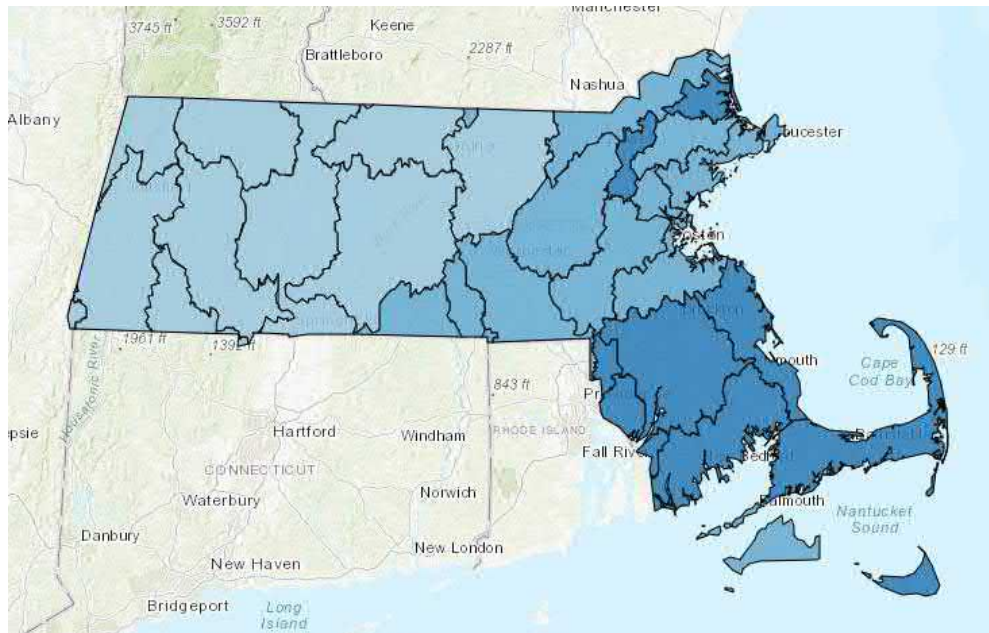
Projected change in # days below 32 °F



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



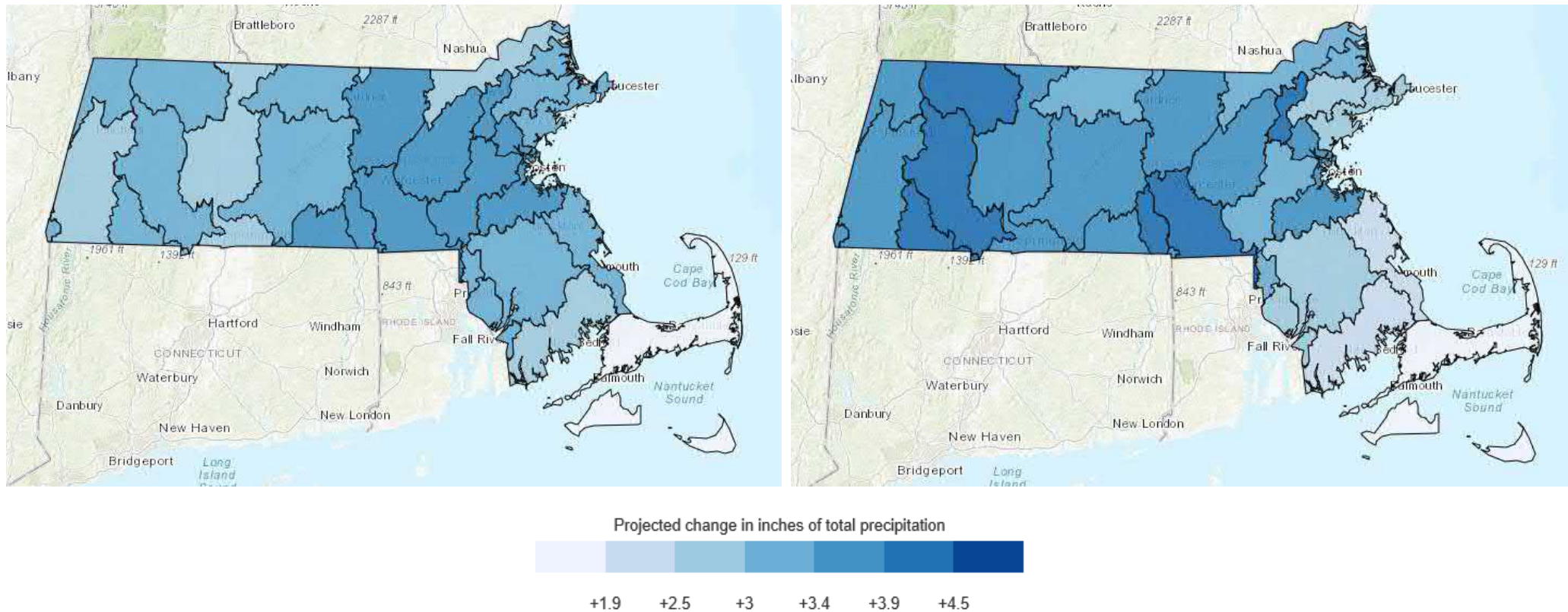
Projected change in # days below 32 °F



-20.6 -25.6 -30.8 -33.9 -47.3

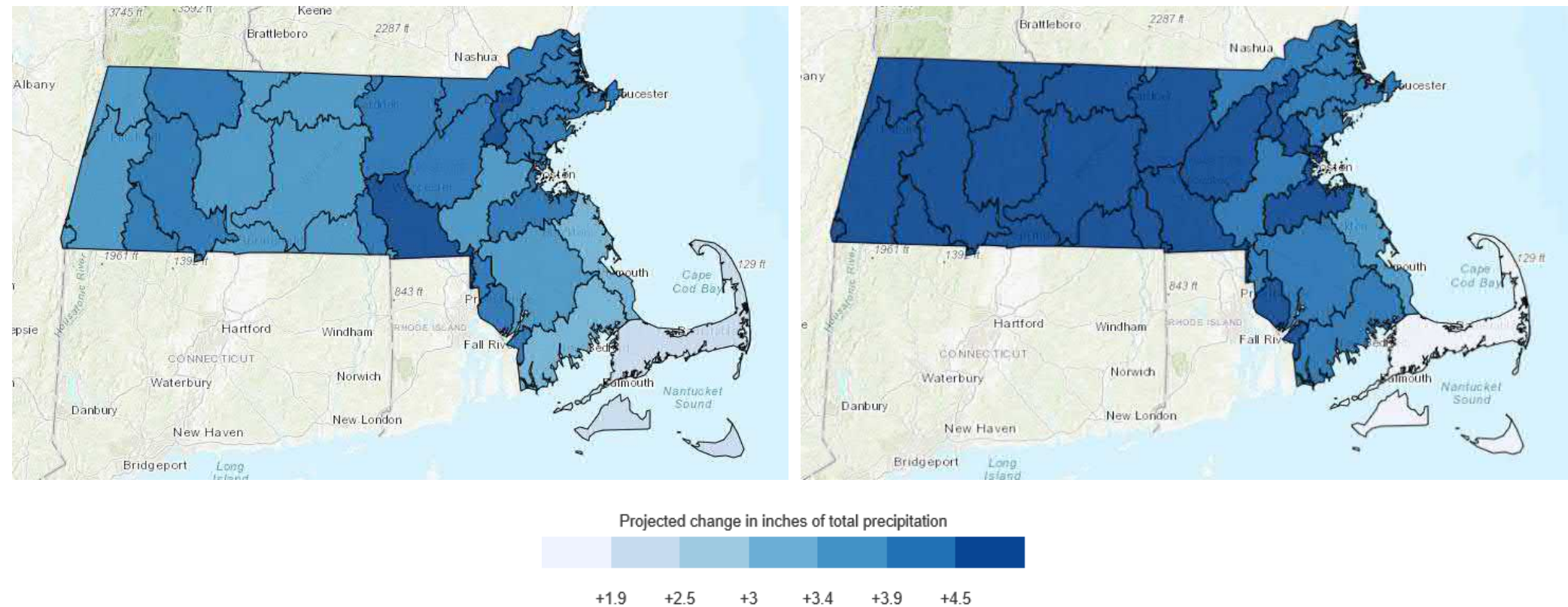
Massachusetts Projected Climate Changes

Change in Inches of Precipitation– 2050 Scenarios



Massachusetts Projected Climate Changes

Change in Inches of Precipitation– 2090 Scenarios



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
Number of days per year with daily Temp > 90°F	5 days	Increase by 7-26 days	Increase by 10-63 days
Number of days per year with daily Temp < 32°F	146 days	Decrease by 19-40 days	Decrease by 24-64 days
Heating degree-days per year (HDD)	6839 Degree-Day °F	Decrease by 773-1627	Decrease by 1033-2533
Cooling degree-days per year (CDD)	457 Degree-Day °F	Increase by 261-689	Increase by 356-1417
Growing degree-days per year (GDD)	2344 Degree-Day °F	Increase by 531-1210	Increase by 702-2347
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
 - Changes to growing seasons
 - Larger demands on energy systems
- Increased Precipitation and Downpour Intensity
 - Increased risk of flooding
 - Water quality impacts
 - Impact on agriculture and natural ecosystems
- Changes to Rain and Snow Patterns
 - Reduced snow cover
 - Potential increase in drought events
 - Impacts to habitats and species

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 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					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.

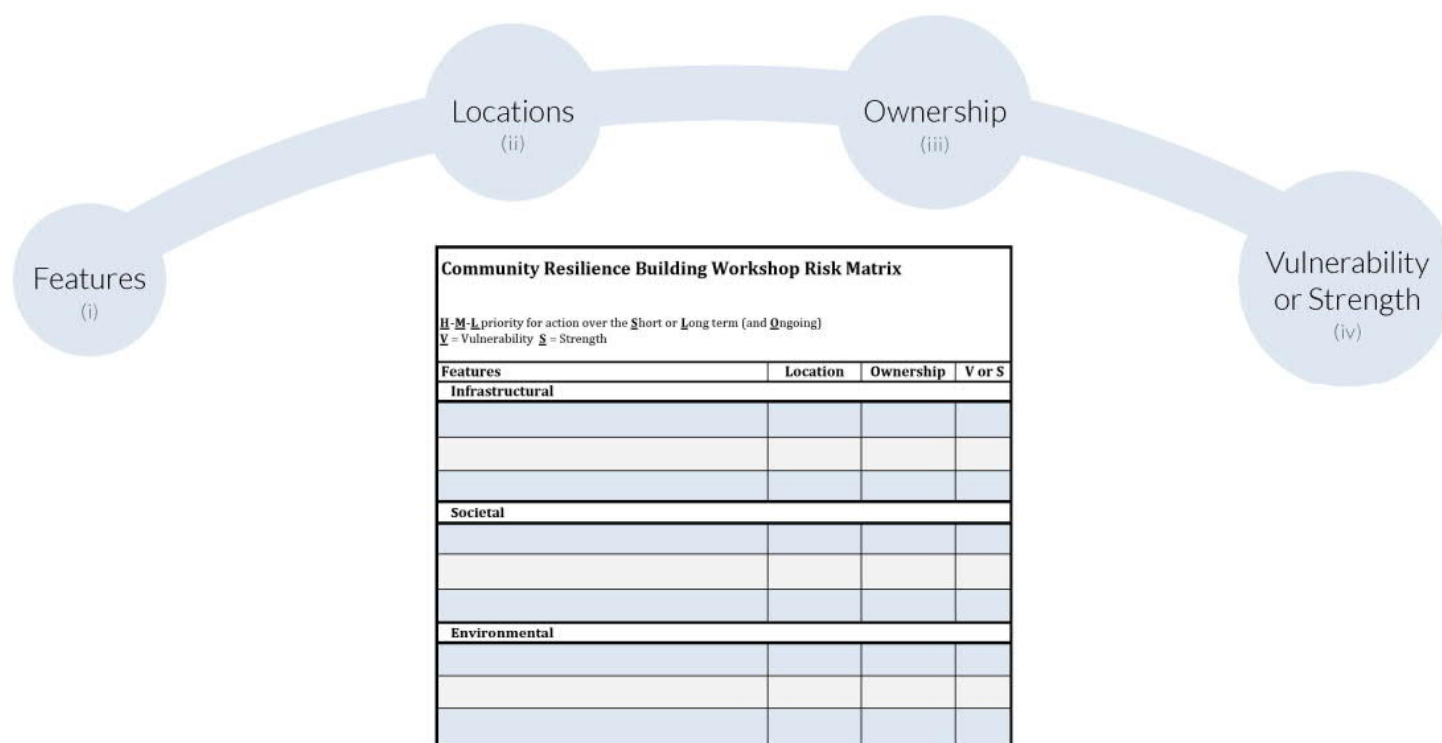


Top to bottom: © Rich Reid/TNC, © Devan King/TNC, © Jay Harrod/TNC

Hazard Characterization

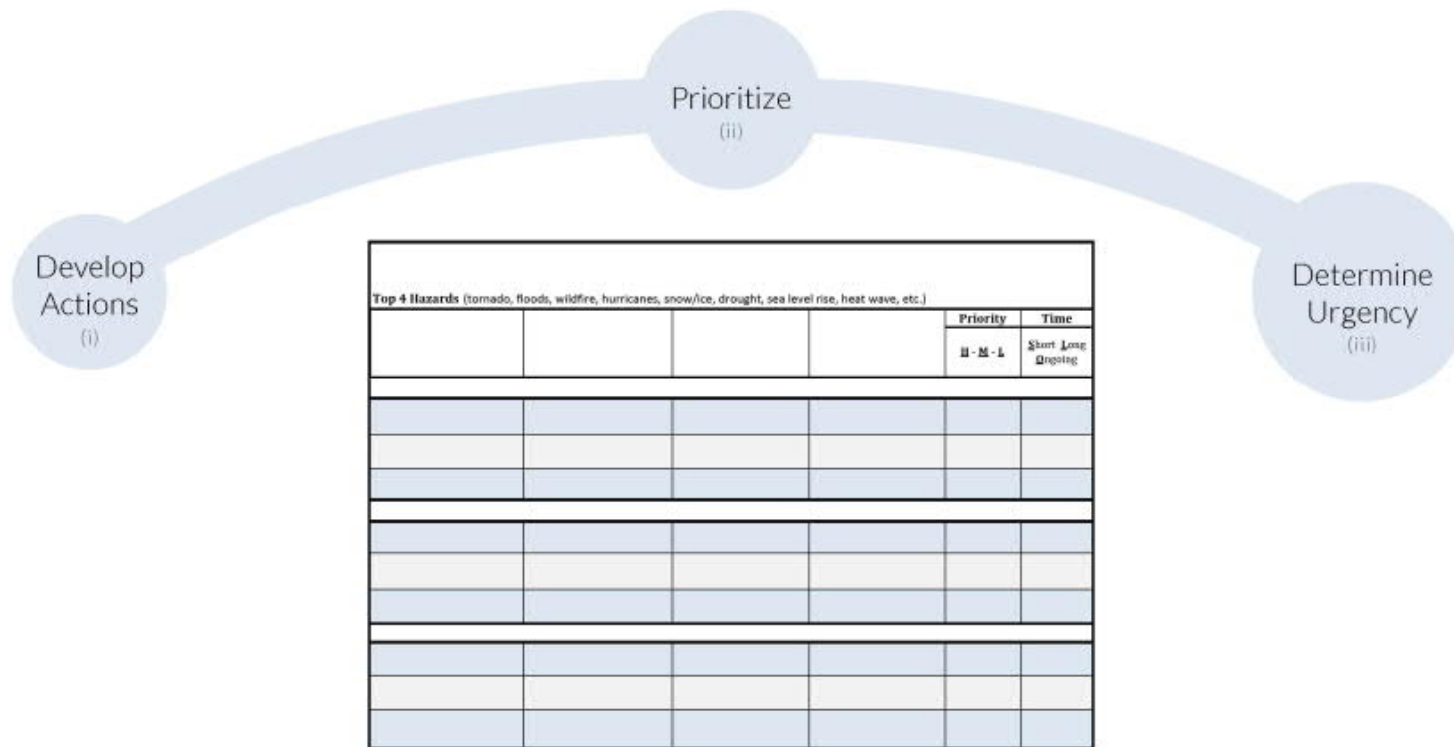
- Inland Flooding
- Tsunami
- Severe Winter Storm
- Drought
- Extreme Temperatures
- Tornadoes
- Landslide
- Wildfires
- Coastal Flooding
- Invasive Species
- Earthquakes
- Coastal Erosion
- Hurricanes/Tropical Storms
- Other Severe Weather (strong wind, extreme precipitation)

Identify Community Vulnerabilities and Strengths



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				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	Time	
Features	Location	Ownership	V or S							
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/gray 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 in 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**

Plympton Municipal Vulnerability Preparedness (MVP) Program Workshop

TAUNTON RIVER BASIN CLIMATE CHANGE PROJECTIONS (PRECIPITATION)¹

SUMMARY OF MODELING RESULTS

- Average annual precipitation could increase almost 7% 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)	47.48	50.04 – 50.69	51.29 – 51.66
Winter Precipitation (inches)	12.13	13.01 – 13.18	13.58 – 14.63
Spring Precipitation (inches)	11.94	12.64 – 13.60	13.06 – 13.82
Summer Precipitation (inches)	10.99	11.02 – 11.86	10.90 – 11.56
Fall Precipitation (inches)	12.42	12.93 – 13.02	12.65 – 12.77
Annual Days with Precipitation over 1 inch	8.23	9.75 – 10.28	10.14 – 11.03
Annual Days with Precipitation over 2 inches	0.90	1.24 – 1.29	1.23 – 1.57
Annual Days with Precipitation over 4 inches	0.03	0.06	0.01 – 0.10
Annual Consecutive Dry Days	17.33	18.02 – 18.58	17.83 – 19.17

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>.

Plympton Municipal Vulnerability Preparedness (MVP) Program Workshop

TAUNTON 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 18%.
- 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 28% by 2050 and almost 49% 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)	49.85	53.61 – 55.02	54.74 – 58.80
Maximum Annual Temperature (°F)	60.27	63.91 – 65.28	65.06 – 69.09
Minimum Annual Temperature (°F)	39.44	43.33 – 44.77	44.46 – 48.62
Annual Days with Max Temp over 90°F	7.44	23.19 – 30.57	28.31 – 60.77
Annual Days with Min Temp below 32°F	129.76	103.09 – 93.51	93.69 – 66.26
Annual Heating Degree-Days (Base 65°F)	6,130	5,129 – 4,867	4,841 – 4,016
Annual Cooling Degree-Days (Base 65°F)	580	967 – 1,148	1,121 – 1,708
Annual Growing Degree-Days	2,622	3,327 – 3,623	3,564 – 4,484

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>.

Plympton Municipal Vulnerability Preparedness (MVP) Program Workshop

DEMOGRAPHIC DATA¹

Parameter	Breakdown
Total Area	15.2 square miles
% of Land Use	Agriculture = 12.8% Forest = 62.7% Open Space = 7.7% Recreation = 0.1% Urban = 14.2% Water = 2.5%
Population	2,829
Age	0-19 = 20% 20-34 = 17% 35-64 = 48% 65+ = 16%
Household Income	<\$40,000 = 17% \$40,000 - \$60,000 = 11% \$60,000+ = 72%
% Below Poverty Line	4%
Race	Asian = 1% Black = 0% White = 97% Other = 2%
Ethnicity	Hispanic = 3% Not Hispanic = 97%
Environmental Justice	0%
% Population Over 65 Living Alone	1.9%
Asthma Emergency Visits	46.8 (age-adjusted rate per 10,000 people)
Pediatric Asthma Prevalence	8.9% of all children enrolled in grades K-8

¹ Source: MA Dept of Public Health, 2018. MA Environmental Public Health Tracking Community Profile for Plympton. Report Created on October 10, 2019.

Plympton Municipal Vulnerability Preparedness (MVP) Program Workshop

EXAMPLES OF STRENGTH AND VULNERABILITIES¹

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

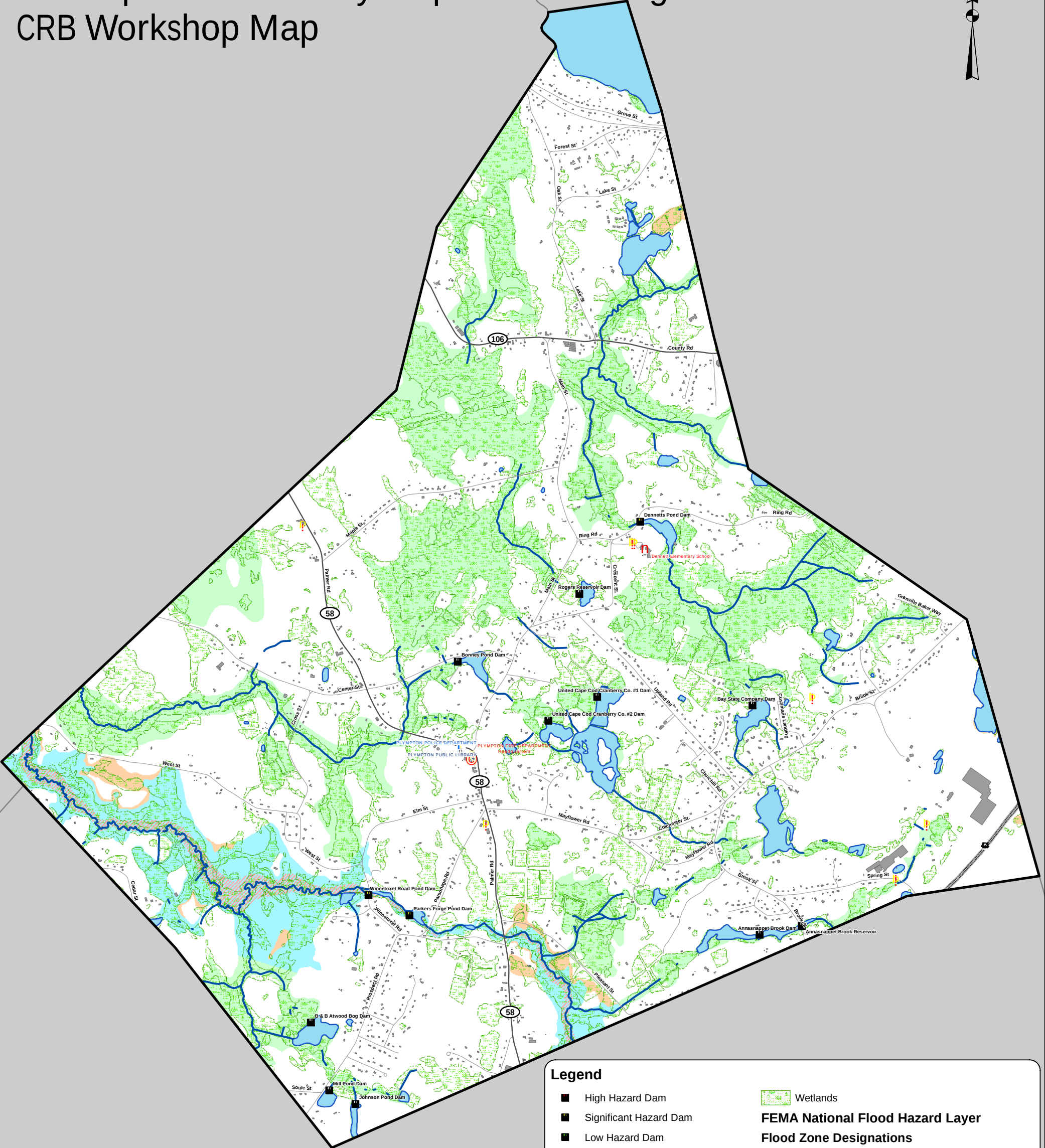
APPENDIX D

- **Workshop Matrices and Maps**

Town of Plympton, Massachusetts

Municipal Vulnerability Preparedness Program

CRB Workshop Map



Legend

- High Hazard Dam
 - Significant Hazard Dam
 - Low Hazard Dam
 - Private Dam
 - Ⓢ Fire Stations
 - Ⓛ Libraries
 - Ⓜ Town and City Halls
 - Ⓛ Local Police
 - Ⓛ State Police
 - Ⓛ County Sheriff
 - Ⓜ Public School
 - Ⓜ Private School
 - Ⓜ Charter School
 - Ⓜ Special Education School
 - Ⓜ Community Groundwater Source
 - Ⓜ Surface Water Intake
 - Ⓜ Non-Community Groundwater Source
 - Ⓜ Emergency Surface Water
 - Ⓜ Waterbody
 - River/ Stream
- Wetlands

FEMA National Flood Hazard Layer

Flood Zone Designations

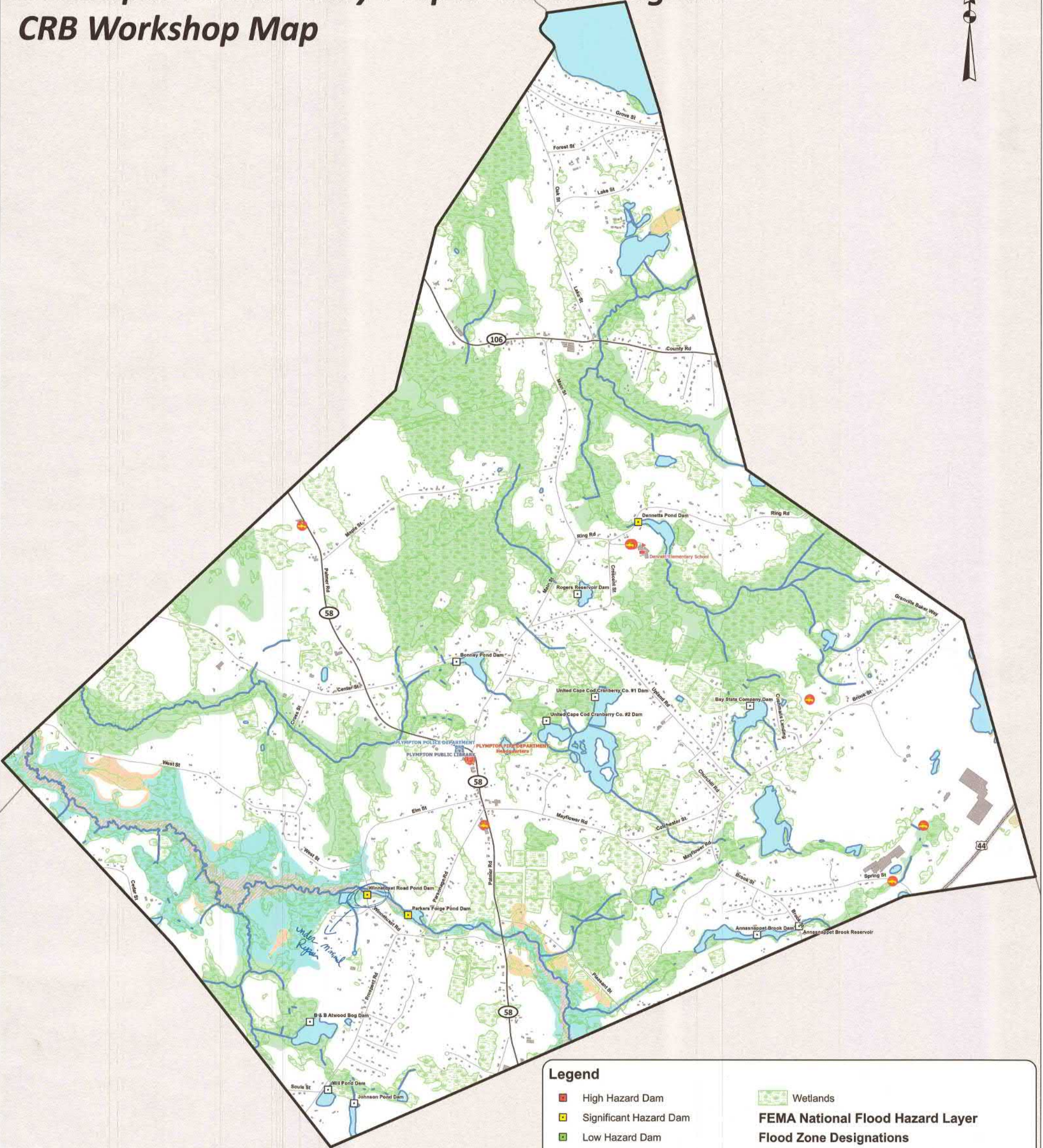
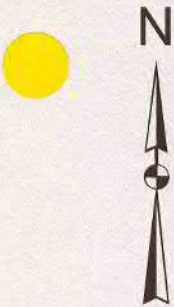
 - A: 1% Annual Chance of Flooding, no BFE
 - AE: 1% Annual Chance of Flooding, with BFE
 - AE: Regulatory Floodway
 - AH: 1% Annual Chance of 1-3ft Ponding, with BFE
 - AO: 1% Annual Chance of 1-3ft Sheet Flow Flooding
 - VE: High Risk Coastal Area
 - D: Possible But Undetermined Hazard
 - X: 0.2% Annual Chance of Flooding
 - X: 1% Drainage Area < 1 Sq. Mi.
 - X: Reduced Flood Risk due to Levee
 - Area Not Included
 - Area with no DFIRM - Paper FIRMs in Effect



Town of Plympton, Massachusetts

Municipal Vulnerability Preparedness Program

CRB Workshop Map



Legend

- High Hazard Dam
- Significant Hazard Dam
- Low Hazard Dam
- Private Dam
- Fire Stations
- Libraries
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Wetlands

FEMA National Flood Hazard Layer

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- X: Reduced Flood Risk due to Levee
- Area Not Included
- Area with no DFIRM - Paper FIRMs in Effect



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.)

				Severe Weather	Inland Flooding	Drought	Extreme Temps	Priority H - M - L	Time Short Long Ongoing
Features	Location	Ownership	V or S						
Infrastructural									
* Water Cistern + other water supply	multiple	town/private	V			Replace failing cistern; investigate installing dry hydrants		H	S
Dams	multiple	town/private	V	Conduct dam condition assessment; develop dam repair + maintenance program				L	S+O
State + Major Roads	town-wide	state/town	S	Continued maintenance; follow pavement management plan; purchase snow removal equipment; install signage				M	O
Bridges + Culverts	town-wide	town/private	V	Conduct bridge + culvert condition assessment; develop repair repair + maintenance program				M	O
* Town Center Campus	town center	town	V	Upgrade septic system; new well; investigate location for and construct new town hall + fire station; new municipal storage building on Center Street				H	S+O
* Private Roads/Drive ways	town-wide	private	V	Purchase fire trucks of appropriate size + type to access retreat lots + private paths/roadways; Public awareness campaign to maintain private access for emergency vehicles				H	S
Societal									
* Elderly Population	town-wide	private	V	Establish handicap accessible vehicle fleet; develop notification system/communications on available resources; town buildings convert to ADA accessible			Update AC at cooling facilities; replace generators at cooling facilities	H	O
Sheltering Facilities	multiple	town/private	V+S	Install underground utilities to elementary school; continue lead treatment in water; investigate new water source; upgrade generator at church and make ADA compliant				M	S+O
* Emergency Operating Center	N/A	town	V	Establish reliable communications including internet + telecom access; establish more permanent location for EOC; equip facility w/ IT equipment				H	S
Emergency Management Plan	town-wide	town	V+S	Establish formal, written plan + make available to public; develop local Hazard Mitigation Plan; provide training opportunities to local emergency management officials				M	L+O
* Reverse 911 Code Red Public Safety Communications	town-wide/regional	town/private	V+S	Develop integrated public safety communication upgrade plan; upgrade radio equipment; reduce dead spots in town				H	S+O
Environmental									
Baldwin River Sysco	Spring Street	private	V+S	Develop regional response plan (continue)				L	O
Cranberry Bogs	town-wide	private		Continue to support local agriculture through extension programs + other related initiatives				L	O
* Forested Areas	town-wide	town/private	V+S	Develop vehicle access plan for public safety; become "Fire Safe Communities"; investigate appropriate equipment to provide access/egress for law enforcement, fire + rescue; develop more comprehensive community awareness of high fire days; tree trimming contract w/ private company		involved with Forest Service "Fire Safe Communities"; investigate appropriate equipment to provide access/egress for law enforcement, fire + rescue; develop more comprehensive community awareness of high fire days; tree trimming contract w/ private company		H	S+O
* Open Space (Parks + Wetlands)	town-wide	town/private	V+S	Continue acquisition; update open space bylaw; update development bylaw; develop mosquito control program; quality		open space plan; create open space residential identify land critical to maintaining water		H	O
Farms	town-wide	private	V+S	Continue to support local farms through extension programs + other related initiatives				M	O
Winnetuxet River	multiple	town/private	V+S	Maintain water ways; purchase land along river for flood areas				L	L



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.)

H-M-L priority for action over the Short or Long term (and Ongoing)				SEVERE WEATHER	INLAND FLOODING	DROUGHT	EXTREME TEMPERATURE	Priority	Time
V = Vulnerability S = Strength								H - M - L	Short Long Ongoing
Features	Location	Ownership	V or S						
Infrastructural									
CULVERTS	TOWN WIDE	TOWN	V		• inventory of Town owned • Replace/Repair & Upgrade • Assess/Identify Places for New Culverts			M	L-O
DAMS	↓	TOWN & PRIVATE	↓		• Study Done on Dam/Assess - Town Owned • IDENTIFY Potential Emergencies around Dam • Emergency Action Plan			M	↓
ROAD MAINTENANCE		TOWN			• ROAD MAINTENANCE PLAN • Implement Pipe ment Management Plan • Emergency Routes • TREE MAINTENANCE /REMOVAL IF NEEDED			L	↓
DRAINAGE SYSTEMS						• PROTECT WATER FROM SEPTIC leakage through update Bylaw for land Requirements	• DEVELOP COMMUNITY WELLHEAD ACTION PLAN • IDENTIFY & ACQUIRE COMMUNITY WELL HEAD • UPDATE SEPTIC BYLAW		L
PRIVATE WELLS /SEPTIC	↓	PRIVATE	↓		COPY FROM & update maintenance plan CULVERT • Investigate septic system to help drainage	• look into Public well spring 4251 for a gallon per hour from Bay Physics		H	S-O
SHELTER FACILITIES	DENNETT	TOWN	↓	• Create Sheltering Plan • Reinforce current facilities to current facilities • Add resources • Supply • Investigate which resources to add • Supply				H	↓
Societal									
LARGE ELDERLY POPULATION	TOWN WIDE	PRIVATE	V	See shelter Emergency	• Evacuation Plan • Continue Emergency Preparedness	• Public Outreach/Education • Investigate services around having local shelter • Reach out to Bay County Planning • Continue emergency • Educating/outreach • Robo Call • add ramps to vehicles	• Shelter - Transportation for the Elderly • Publicize information on Safety	M	O
LARGE LAND OWNERS/AGRICULTURE	↓	PRIVATE	V&S		• Develop/update Stormwater Bylaws especially for Re-development • Reach out to Bay County Planning			H	S-O
TOWN DEMOGRAPHIC	↓	PRIVATE	V&S		SEE ELDERLY	DEVELOP TOWN MASTER PLAN & look into clean community to Supplement Tax Revenue		M	↓
ZONING BYLAWS	↓	TOWN	V		ADDRESS PRIVATELY OWNED WATER/CULVERT SYSTEMS/DAMS • Develop/Update Stormwater Bylaws for Residential & Natural Systems			H	↓
TOWN STAFFING	↓	↓	V			• Privatize list of staffing needs		H	O
RURAL CHARACTER	↓	PRIVATE	S		SEE			H	S-O
Environmental									
TREE COVER	TOWN WIDE	TOWN & PRIVATE	V&S	• implement Open Space Plan to add trees • look into land acquisition	look into Stormwater Bylaw & See Roads			L	L-O
LARGE BIODIVERSITY	↓	↓	S		IDENTIFY ACTIONS FOR key wetlands			M	S-O
WETLANDS	↓	↓	V&S		IDENTIFY Potential Ecosystems/Recover Property • Maintain existing Natural Wetlands			H	S-O
HIGH GROUND WATER	↓	↓	V			SEE PRIVATE WELL • Maintain		H	L-O
RETENTION PONDS/RESERVOIR	↓	↓	V&S	• maintain/develop • Remove trees	• Evaluate & determine if should be removed • determine if necessary • determine if necessary	• develop Stormwater Management Plan		H	↓
WATER QUALITY	↓	↓	V		SEE Rural Character	SEE PRIVATE WELL • Maintain existing Natural Wetlands		H	S-O

Appendix D: Final Risk Matrix

Community Resilience Building Risk Matrix				www.CommunityResilienceBuilding.org								
H-M-L priority for action over the Short or Long V = Vulnerability S = Strength				Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)					Priority	Time		
				Severe Weather		Inland Flooding		Drought		Extreme Temps		H - M - L
Features	Location	Ownership	V or S									
Infrastructural												
Culverts	Town-wide	Town	V		Inventory of Town-owned culverts; Replace, repair & update culverts; Asses/Identify places for new culverts				M	L&O		
Dams	Town-wide	Town & Private	V	Study done on Dams assessed Town-owned Dams; Identify potential Easements around Rivers; Develop Emergency Action Plan					M	L&O		
Road Maintenance	Town-wide	Town	V	Road Maintenance Plan; Implement Pavement management Plan; Develop Emergency Evacuation Routes/Plan; Emergency Action Plan					L	L&O		
Drainage Systems	Town-wide	Town	V		Inventory of Town-owned assets; Replace, repair & update assets; Asses/Identify places for new drainage systems; Update Maintenance Plan; Investigate opportunities to add/improve drainage		Look into Public wellspring - small cost to reduce other waste (e.g. 25cents for a gallon rather than buying plastic)		L	L&O		
Water Cistern & Other Water Supply	Multiple	Town & Private	V		Replace failing cistern; investigate installing dry hydrants					H	S	
Dams	Multiple	Town & Private	V	Conduct dam condition assessment; develop dam repair & maintenance program					L	S&O		
State & Major Roads	Town-wide		S	Continued maintenance; follow pavement management plan; purchase snow removal equipment; install signage					M	O		
Bridges and Culverts	Town-wide		V	Conduct bridge & culvert condition assessment; develop repair & maintenance program					M	O		
Private wells/Septic	Town-wide	Private	V		Protect water from septic leakage through update bylaw for land requirement		Develop community wellhead action plan; identify &acquire community well head; update septic bylaw		H	S&O		
Shelter Facilities	Dennett	Town	V	Create Sheltering Plan; Reinforce current facilities; Add resources to current facilities; investigate which resources to add; Maintain supply of emergency Resources (Blankets, Pillows, Water etc.)				Create Sheltering Plan; Reinforce current facilities; Add resources to current facilities; investigate which resources to add; Maintain supply of emergency Resources (Blankets, Pillows, Water etc.)	H	S&O		
Town Center Campus	Town Center	Town	V	Upgrade septic system; new well; investigate location for and construct new town hall & fire station; new municipal storage building on center street							H	S&O
Private Roads/Driveways	Town-wide	Private	V	Purchase fire trucks of appropriate size type to access retreat lots & private paths/ roadways; public awareness campaign to maintain private access for emergency vehicles							H	S&O
Societal												
Large Elderly Population	Town-wide	Private	V	Emergency &Evacuation Route plan; Continue emergency preparedness; Create Sheltering Plan; Reinforce current facilities; Add resources to current facilities; investigate which resources to add; Maintain supply of emergency Resources (Blankets, Pillows, Water etc.) ; Continue Public education/outreach - Update to include additional messaging; Investigate senior center/housing location;					M	O		
Large Land Owners/Agriculture	Town-wide	Private	V&S		Develop and update stormwater bylaws especially for re-development; Reach out to Bog Owners to Plan ahead/Continue to coordinate with them				H	S&O		
Town Demographic	Town-wide	Private	V&S	Develop and update stormwater bylaws especially for re-development; Reach out to Bog Owners to Plan ahead/Continue to coordinate with them; Develop Town Master Plan & look into clean commercial to supplement tax revenue, especially in the event of Bog owner sale of land							M	S&O
Zoning Bylaws	Town-wide	Town	V		address privately owned water/ culvert systems & dams; update zoning bylaws for residential and natural systems; look into stormwater bylaws					H	S&O	
Town Staffing	Town-wide	Town	V	Prioritize list of staffing needs							H	O
Rural Character	Town-wide	Private	S	Develop Town Master Plan & look into clean commercial to supplement tax revenue, especially in the event of Bog owner sale of land; Develop and update stormwater bylaws especially for re-development; Reach out to Bog Owners to Plan ahead/Continue to coordinate with them							H	S&O
Elderly Population	Town-wide	Private	V	Establish handicap accessible vehicle fleet; develop notification system/ communications on available resources; town buildings convert to ADA accessible				Update AC at cooling facilities; replace generators at cooling facilities	H	O		
Sheltering Facilities	Multiple	Town/Private	V & S	Install underground utilities to elementary school; continue lead treatment in water; investigate new water source; upgrade generator at church and make ADA compliant					M	S & O		
Emergency Operating Center	N/A	Town	V	Establish reliable communications including internet & telecom access; establish more permanent location for EOC; equip facility w/ I.T. equipment					H	S		
Emergency Management Plan	Town-wide	Town	V & S	Establish formal, written plan & make available to public; develop local Hazard Mitigation Plan; provide training opportunities to local emergency management officials					M	L & O		
Public Safety Communications	Town-wide/regional	Town/Private	V & S	Develop integrated public safety communication upgrade plan; upgrade radio equipment; reduce dead spots in town					H	S & O		
Environmental												
Tree Cover	Town-wide	Town & Private	V&S	Look into Scenic Roads Bylaw; Road Maintenance Plan; Implement Pavement management Plan; Develop Emergency Evacuation Routes/Plan; Emergency Action Plan; Implement open Space plan; land acquisition							L	L & O
Large Biodiversity	Town-wide	Town & Private	S	Implement open space plan; Identify actions for key wetlands							M	S&O
Wetlands	Town-wide	Town & Private	V&S	Implement open space plan; Identify actions for key wetlands	Identify potential easements/review property lines; maintain existing natural wetlands; Implement open space plan; Identify actions for key wetlands		Implement open space plan; Identify actions for key wetlands		H	S&O		
High Ground Water	Town-wide	Town & Private	V	Implement open space plan; Identify actions for key wetlands	Protect water from septic leakage through update bylaw for land requirement		Maintain exiting Natural wetlands; Develop community wellhead action plan; identify &acquire community well head; update septic bylaw		H	L&O		
Retention Ponds/Reservoir	Town-wide	Town & Private	V&S	Maintain and evaluate existing ; determine if there is larger capacity in certain reservoirs; determine other actions needed; remove trees from these assets; Develop stormwater management plan and projects; Implement open space plan; Identify actions for key wetlands			Implement open space plan; Identify actions for key wetlands		H	L&O		
Water Quality	Town-wide	Town & Private	V	Implement open space plan; Identify actions for key wetlands	Develop Town Master Plan & look into clean commercial to supplement tax revenue, especially in the event of Bog owner sale of land; Develop and update stormwater bylaws especially for re-development; Reach out to Bog Owners to Plan ahead/Continue to coordinate with them; Protect water from septic leakage through update bylaw for land requirement		Maintain exiting Natural wetlands; Develop community wellhead action plan; identify &acquire community well head; update septic bylaw		H	S&O		
Sysco	Spring Street	Private	V & S	Develop regional response plan (continue)					L	O		
Cranberry Bogs	Town-wide	Private		Continue to support local agriculture through extension programs & other related initiatives					L	O		
Forested Areas	Town-wide	Town/Private	V & S	Develop vehicle access plan for public safety; become involved with Forest service "Fire safe communities"; investigate appropriate equipment to provide access/ egress for law enforcement, fire & rescues; develop more comprehensive community awareness of high fire days; tree trimming contract w/ private company							H	S & O
Open Space (Parks & Wetlands)	Town-wide	Town/Private	V & S	Continue acquisition; update open space bylaw; update open space plan; create open space residential development bylaw; develop mosquito control program; identify land critical to maintaining water quality							H	O
Farms	Town-wide	Private	V & S	Continue to support local farms through extension programs & other related initiatives							M	O
Winnetuxet River	Multiple	Town/Private	V & S	Maintain water ways; purchase land along river for flood areas					L	L		



APPENDIX E

- Top Priority Voting Results

Severe Weather *

Inland Flooding *

Drought *

Extreme Temp

Inland Flooding *

Severe Winter Storms

Drought *

Other Severe Weather *

Severe Weather

Inland Flooding

Drought

Extreme Temperatures

- New septic system + well at Town Center Campus
- Upgrade all radio equipment
- Purchase fire trucks capable of accessing retreat lots, private paths + private roads
- Establish + properly outfit EOC ~
- New municipal storage building
- Establish tree trimming contract with private company

- Update zoning bylaws + stormwater regulations ✓
- Update shelter facility ~
- Implement open space plan ~
- Reach out to large landowners (bogs) to review future land use
- Develop community well head + backup water supplies ✓
- Update emergency evacuation plan ~

- Establish EOC + update ~~review~~ Emergency Management Plans
- Develop + implement Town Center Campus Plan
- Develop community wellhead + backup water supplies
- Update zoning bylaws including natural resource design + stormwater regulations
- Develop + upgrade town wide radio communications
- Implement open space plan
- New municipal storage building