

# Town of Foxborough



## Community Resilience Building Workshop *Summary of Findings*

March 2021

# Town of Foxborough

## Community Resilience Building Workshop

### Summary of Findings

#### Overview

Extreme weather and natural and climate-related hazards are an increasing concern for the communities of Massachusetts, and there is a clear need to involve municipalities, corporations, organizations, and the State in increasing resilience at all levels. Recent storm events affecting the region have highlighted many of the vulnerabilities that towns and cities face. Hurricane Irene and Superstorm Sandy brought intense flooding to many municipalities and threatened (or destroyed) infrastructure across the state. Extreme temperatures at both ends of the spectrum have pushed the limits of communities' preparedness to protect both infrastructure and people. In coastal communities, the impacts of sea level rise are felt daily and further exacerbate the impacts of other extreme events. Current climate modeling indicates that all of these hazards are expected to increase in frequency and scale over the coming decades. The Municipal Vulnerability Preparedness (MVP) program provides support and a prescribed process for towns and cities in Massachusetts to plan proactively for resiliency and implement key climate change adaptation actions.

In 2020, the Town of Foxborough was awarded a \$17,000 MVP grant to fund the planning stage of this process. The Town partnered with Fuss & O'Neill, a state certified MVP Provider, to build off of the momentum gained in recently updating Foxborough's Hazard Mitigation Plan and complete a comprehensive, baseline climate change vulnerability and resilience assessment. The output of this assessment ultimately identified a list of priority actions for the Town to address in the short, medium, and long term planning horizons. This process involved the formation of an MVP Core Team, which met virtually on December 9, 2020 to determine initial concerns and worked to identify stakeholders within the municipality and set goals for the process. Those stakeholders were then invited to participate in a Community Resilience Building (CRB) workshop on January 26, 2021, also held virtually due to COVID-19 restrictions. Participants in the CRB workshop engaged in one of two half-day-long sessions, as part of a tried and tested process developed by The Nature Conservancy. The CRB methodology is an "anywhere at any scale" format that draws on stakeholders' wealth of information and experience to foster dialogue about the strengths and vulnerabilities within the Town. Workshop participants interacted at both large and small group levels, using an iterative process to gather input, synthesize ideas across groups, and ultimately develop a set of priority resilience and adaptation actions.

The CRB workshop's central objectives were to:

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

## Top Hazards and Vulnerable Areas

During the Community Resilience Building workshop, participants were asked to identify the top four natural hazards of concern for the Town of Foxborough. Discussion of the top hazards built on earlier conversations that took place at the MVP Core Team Meeting. Flooding was identified as a top hazard. Additionally, wind events, winter storms, and extreme weather (which could take the form of rain or snow and ice) were also identified as top hazards. These four hazards have already had demonstrated impacts on the Town, and as climate change progresses, these hazards are expected to have ever greater consequences for infrastructure and the environment, as well as for various societal elements. Specific areas of concern are identified below.

### Top Hazards

- Flooding
- Wind Events
- Extreme Weather
- Winter Storms

### Areas of Concern

While impacts are expected to be felt Town-wide, certain elements, locations, or community groups are of particular concern. The following are examples of some of the areas of concern discussed at the CRB workshop.

#### Neighborhoods/Communities

Senior population, Foxborough Housing Authority residents

#### Facilities

Foxborough Highway Garage, Foxborough Public Schools, Foxborough High School, Heaton's Marine, Gillette Stadium water reuse plant

#### Dams

Crackrock Pond Dam, Carpenter Pond Dam, Glue Factory Pond Dam (West)

#### Infrastructure

Cocasset Street rail underpass, Culverts at East Street/Route 140 and town-wide, drinking water supply and infrastructure, sewer pump stations, pole utility lines



Foundry Pond Dam



Flooding at the Cocasset St. rail underpass

## Current Concerns and Challenges Presented by Hazards

Major storm events have been a recurring threat to Foxborough throughout its history, from hurricanes bringing wind, intense precipitation, and localized flooding, to winter storms delivering ice and snow. Extended power outages have been more prevalent in Foxborough in recent years as significant ice and wind storms have downed trees and power lines. In response, the Town and National Grid are more proactively maintaining trees in known problem areas.

More recently, the Town has been experiencing an increasing regularity of large storms, meeting the criteria of the current “100-year storm” occurring every few years. In a Town accustomed to severe weather, there is a sense that Foxborough has been through this before, and knows how to handle storm-proofing, but there is also a sense that modern storms are different in important ways. The Assistant Fire Chief noted storms in 2009 that flooded houses and basements that had never flooded before. The Town’s DPW director indicated that over the last ten to fifteen years in particular, he has



Tree downed during Nor’easter on December 5, 2020

noted an increasing frequency of storms. The intensity of recent rain and wind events strains several aging dams in Foxborough, including Crackrock Pond Dam, increasing the vulnerability to breaching, particularly where trees grow on embankments, such as Carpenter Pond Dam, and Glue Factory Pond Dam West.

More intense storms delivering higher volumes of precipitation in a single event are expected to continue to put significant pressure on the Town’s infrastructure, including dams, culverts, and other drainage infrastructure that were designed to handle smaller storms with more consistent distributions of precipitation. This problem already manifests itself at points across the Town, such as East Street, the Cocasset Street rail underpass, and the Highway Garage, which are all prone to flooding. There are also some senior living communities located in areas that may be cut off from essential services during flood events.

At the opposite extreme, drought has also had recent impacts on the Town. Foxborough is under mandatory two day per week water restrictions year-round, and recent droughts have been sufficiently severe that they reinforced Foxborough’s need to connect to alternate sources of drinking water supply. The Town has previously attempted to interconnect with nearby water supplies, focusing on a redundant groundwater source to reduce the Town’s reliance on surface water.

Extreme temperatures are also negatively impacting the Town’s infrastructure. Extreme temperatures have also had social impacts in the Town, leading to greater need for of cooling and warming shelters, which are especially critical for the high percentage of vulnerable populations in the Town. Foxborough’s Housing Authority owns several properties serving vulnerable low-income and senior populations that do

not have back-up power or air conditioning, and do not have the electrical systems necessary to support those upgrades.

## Specific Categories of Concerns and Challenges

### *Infrastructural*

#### Dams

The status, structural condition, and safety of several Town-owned dams in Foxborough was a common concern among workshop participants. Dams specifically identified during the workshops included Crackrock Pond Dam, Carpenter Pond Dam, and Glue Factory Pond Dam. Crackrock Pond Dam is the primary dam of concern in Foxborough. The Town recently became a co-owner of this Significant Hazard Dam across the Neponset River downstream of the Neponset Reservoir. The dam creates an impoundment adjacent to a recently upgraded and highly utilized recreation area. Workshop participants noted that it is an old dam in poor condition. In addition, algal blooms in Crackrock Pond produce unpleasant odors that reduce the usability of the adjacent recreation area during the summer. Along with the foul odors during the summer, there is also concern of contaminated sediment in the pond. Workshop participants discussed several potential benefits of addressing the issues created by the dam.

Carpenter Pond Dam, also known as Lakeview Pond dam, which serves as a bridge across Cocasset Brook, is another dam that was heavily discussed. The major items of concern included trees growing on the embankment, and the dam's age and condition. Workshop participants also reiterated recommendations from the Town's Hazard Mitigation Plan (HMP) where they expressed a desire to remove Glue Factory Pond Dam and conduct ecological restoration activities. Identifying the legal owner for Glue Factory Pond Dam would need to be resolved prior to examining the feasibility of removal. West Street Dam, a Significant Hazard dam with a poor condition rating, was also discussed; however, it is scheduled for repairs in 2021 following a grant award.

#### Culverts

Existing culverts and bridges were designed to accommodate historic patterns of precipitation and runoff, but are rapidly becoming inadequate as a result of climate change. While design standards have changed to accommodate and address observed changes in precipitation and intensity, the Town's infrastructure largely predates such changes, and thus has not kept up with new standards. As precipitation events become more intense and less predictable, undersized culverts are expected to pose a greater threat of failure and flooding. Moreover, some of the Town's culverts are known to be in poor structural condition, which could increase their risk of failure. In addition to the town-wide concern for the resilience of culverts and bridges, workshop participants identified the crossing on East Street at the Canoe River as one of particular concern. The Town's HMP additionally recommended upsizing the Rumford River crossing at Morse Street, downstream of the Glue Factory Pond dam.

#### Stormwater Infrastructure

Stormwater infrastructure is also recognized as a Town-wide concern. As with culverts conveying natural streams, there is a general recognition that much of the stormwater drainage system in Town was designed to accommodate historic patterns of precipitation and runoff, and may be undersized as climate and weather patterns continue to shift. The Town's aging stormwater infrastructure exacerbates flooding potential during heavy and intense rains. While the entire system was discussed for being vulnerable to future flooding, the Cocasset Street underpass was the most frequent specific location identified among workshop participants. At this location the road passes under a rail bridge and four 12-inch pipes connect to a single 12-inch pipe meant to convey stormwater. This area regularly floods during rain events, and

has also been known to freeze in the winter, creating traffic hazards. East Street at the Canoe River, which was also noted for its culvert, floods during rain events. Workshop participants also noted a number of other areas experiencing stormwater-related flooding including the Bleachery area, where industrial buildings were flooded. Edwards Road and Beach Street, the area downhill from Dudley Estates, and Heaton's Marina around Neponset Reservoir also experience flooding during heavy precipitation events. Chestnut Street from the traffic circle at North Street to the intersection at Payson Road was also noted by workshop participants as a stormwater flooding concern. Importantly, this is the location of the Foxborough Public Safety Building. Other locations noted as stormwater flooding concerns include the Route 140 underpass under US Route 1.

### Water Supply

Residents and business in Foxborough rely on the Town's public water supply. The Town currently sources all of its drinking water from groundwater drawn from around the Neponset Reservoir and several other wells around town. Foxborough's location at the headwaters of several watersheds places physical limits on its water supply capacity. The Town regularly faces voluntary water restrictions during summer months and recently instituted year-round outdoor water use restrictions. The Town is constructing new wells at its treatment plant off of Chestnut Street to expand its water supply. The Town assessed the feasibility of interconnecting with nearby water supplies to increase resilience and reduce the Town's reliance on Town sources.

### Wastewater Infrastructure

Foxborough is part of a regional wastewater network, along with the Towns of Mansfield and Norton. Foxborough, higher in elevation at the intersection of three watersheds, sends its wastewater to Norton. Workshop participants noted wastewater infrastructure as a concern, particularly in low-lying areas along Morse Street, where sewer lift stations have flooded in the past, resulting in sewer overflows. These pump stations now have back-up power supplies, but remain vulnerable in their low-lying locations.

### Electrical Infrastructure

Electrical lines can be knocked out by snow, ice, and wind events, and have caused extensive impacts to the Town in previous years. Workshop participants recalled several extended outages, where ice accretion and wind events downed power lines in portions of the Town. In particular, older pine trees on Mill Street and Prospect Street are known to be a problem. Workshop participants also expressed an interest in storm-hardening and establishing redundancy in the system in the case of power outages – including for the power supply to Gillette Stadium, which is a major population center on game days. According to workshop participant Ann Malley, Community and Customer Management supervisor for National Grid, the utility is addressing climate resiliency in Foxborough in two ways: 1) by assessing the resilience of existing infrastructure and 2) by proactively maintaining trees in the right-of-way. National Grid is also working to increase the use of renewable generation and also considering how best to address challenges posed by expected future shifts in peak energy use, such as a potential spike on



Downed power line from an intense storm on August 4, 2020

stadium game days, and in nighttime usage due to increasing number of electric vehicles being charged at night, when solar production is at its lowest.

### Septic Systems

While some areas of Foxborough, are sewerred, a large proportion of Foxborough's residential properties are served by onsite septic systems. These systems, if not maintained properly, are vulnerable to failure and leakage, especially during flooding or heavy precipitation events, potentially leading to discharges of sanitary waste to the environment. This poses an obvious threat to both human health and the environment. Workshop participants expressed concern over the potential increased risk of failure of septic systems in the Town.

### Buildings and Facilities

Parts of the Highway Garage have poor drainage, and flooding is a recurring concern. Water risks getting into underground fuel tanks, and Town staff have had to pump water away from the tanks during rain events. In addition, the Town's schools are aging and, while some have been retrofitted for air conditioning, several schools in the Town lack air conditioning, or are only partially air conditioned. These schools are exploring options for retrofits while also considering what HVAC options will provide the best capacity to adapt to changes in extreme temperatures expected as a result of climate change. Workshop participants also brought up concerns over Foxborough Housing Authority properties, all of which lack back-up power and some of which need upgraded electrical systems in order to install generators, particularly at the Norbert Carl Annon complex and Centennial Court.



Flooding at the Highway Garage

## Societal

### Vulnerable Populations

Workshop participants identified seniors and low-income households as populations of concern, particularly those served by the Foxborough Housing Authority. These populations may lack adequate resources to adapt to the effects of climate change in Foxborough, including changes in extreme temperatures. Workshop participants also noted that some assisted living communities are located in areas that are vulnerable to flooding or may be cut off from essential services during an emergency, such as the senior population on Granite Street.

### Emergency Shelters

Multiple schools, as well as the senior center and public safety center serve as shelters and warming and cooling centers. While vulnerable populations and residents generally have access to Town resources such

as heating and cooling stations, including the senior center, workshop participants noted that these facilities are insufficiently used when they are opened during an emergency. Workshop participants expressed concern that senior residents in particular who are susceptible to extreme temperatures and emergency events may be hesitant to leave their homes to utilize cooling centers or emergency shelters. Workshop participants also discussed a need for planning for pets at emergency shelters, as many residents are unwilling to leave their homes if they cannot bring their pets with them.

#### Schools

Foxborough's schools and student population are affected by a variety of hazard types. Schools are increasingly forced to cancel classes due to snow and ice events or extreme cold that make it impossible to safely get students to school. Cancellations, in turn, have the potential to extend the school year further into the summer, which increases the risk that school will be in session during extreme heat events. As days above 90 degrees increase, heat stroke is a concern for the student population in general, as several schools are not air conditioned. Further, there is often a ripple effect of unintended consequences when schools close, in which parents have to miss work, which has been demonstrated during the COVID-19 pandemic.

#### Provisions, Medicine, and Fuel

Maintaining access to essential supplies like groceries, medicines, and fuel (for vehicles, heating, and generators), as well as critical medical care and drug treatment during emergencies, is important during hazard events. Issues of access can be exacerbated for vulnerable populations, and for particular neighborhoods where there is limited access to grocery stores. Foxborough has pharmacies, grocery stores, and gas stations within the Town. Despite having these resources in Town, workshop participants expressed concern that certain vulnerable populations may not be able to access these resources during hazard events.

#### Emergency Planning and Communications

The Town deploys an emergency alert system during emergency situations, which sends emergency messages to anyone with a phone number registered with the system. As in many municipalities, this system requires residents to opt-in, and question remains whether critical communications services like this can reach everyone with consistent and reliable information, such as residents without a cell phone or landline, and residents who speak English as a second language. Existing social organizations in the Town complement and bolster the formal communications system by coordinating on-the-ground information gathering and sharing strategies to reach more citizens.

#### Water Rights

Residents on Mirimichi Lake enjoy access to a quality surface water for recreational purposes. This lake is also a water source for the Town of Attleboro, whose recent draw-downs have created use conflicts. Both are valid uses of the resource, and workshop participants acknowledged the need to better coordinate and jointly manage this valuable resource.

### *Environmental*

#### Water Quality

Surface waterbodies are subject to algal blooms, particularly during times of excessive heat and/or drought. Excessive algal growth is exacerbated by climate change impacts, including increasing temperatures, drier summers, and overall lower water levels. This can in turn result in fish kills, recreation impacts, and negative health effects. The problem is exacerbated by increasing nutrient pollution, which is frequently driven in part by historic land use change around ponds and reservoirs. If residential lawns lead



right down to the water, there is no buffer to trap and filter nutrients. Stormwater infrastructure discharging directly to the Neponset Reservoir may be a significant source of pollutants, such as phosphorus, that contribute to algae blooms. Workshop participants expressed concern over the potential impacts of climate change on the Neponset Reservoir, which is adjacent to multiple Town groundwater wells. Participants from the Neponset Reservoir Restoration Committee noted that the hydrologic connection between the reservoir and adjacent drinking water infrastructure was unquantified.

#### Environmental Contaminants

Workshop participants raised questions about the location and extent of environmental contaminants that remain as legacy pollution from the Town's industrial past, the potential negative impacts these contaminants have had and may continue to have on the Town's water quality, and how human communities, ecosystems, and wildlife could be affected. This is particularly pertinent as climate change threatens to mobilize latent contamination through increased heat or flooding risks. Sediments behind some dams near industrial facilities were also raised as a concern. Sediments in the Neponset Reservoir and Crackrock Pond have previously been contaminated by heavy metals from upgradient industrial facilities. Workshop participants also expressed concern about hazardous materials stored in areas prone to flooding, such as Heaton's Marina, and noted that other properties may contain hazardous materials but that there was no comprehensive, shared knowledge of these locations.

#### Trees, Forests, and Open Space

The Town Forest provides critical ecosystem services that help buffer the effects of climate change, from storing and sequestering carbon, to increasing groundwater recharge, to modulating local temperature. Street trees are likewise critical for infiltration of rainwater and provision of shade and cooling. However, trees and forests are also threatened by climate change. Wind and storms cause blowdowns, drought can contribute to die-off, new invasive pests (e.g., Emerald Ash Borer and Hemlock Woolly Adelgid) are eliminating certain tree species, and others are in decline (especially oaks) due to shifting temperature and precipitation regimes that favor more southerly species. Foxborough has numerous trees on private property, which the Town and National Grid are prohibited from maintaining, that nonetheless pose a hazard to utility poles. Foxborough is also home to a State Forest, which was the subject of a forest impact study. Workshop participants expressed interest in applying study results to the Town forest. Open space is also critical in floodplains for providing a buffer and increased flood storage, near public water supplies to maintain high water quality and promote recharge, and to maintain overall habitat connectivity that will be vital to allowing ecosystems and individual species to adapt to a changing climate. From a social perspective, open space and parks also provide opportunities for recreation, stress-relief, and relief during heatwaves. Workshop participants expressed concern over the accessibility of these resources to vulnerable populations, especially those living in densely populated areas.

#### Local Agriculture

Climate change is expected to result in a longer growing season for New England, which can be beneficial for some crops but may lead to issues with others, for instance, by allowing additional time for blight or other crop diseases to develop. Early melt of snow pack, drought, excessive rain, and changing temperatures may all affect agriculture and livestock at varying scales. Workshop participants expressed concern over how unpredictable climate and weather conditions may impact specific farms in the Town, such as Oake Knoll Farm and Indian Rock Farm. The Town has adopted an Agricultural Commission to help support and protect farms.

#### Pests and Disease Control

Climate change is affecting pests and disease vectors both through changing precipitation conditions and changing temperature conditions. Warmer, wetter conditions lead to increased mosquito populations,

while the absence of sufficient periods of cold means that pest populations that would historically have been killed off or reduced are able to survive the winter and emerge in greater numbers the following season. Further, as the Massachusetts climate begins to look more like the climate of the mid-Atlantic and southern states, we are seeing new types of diseases show up in existing pests (e.g. mosquitoes carrying West Nile Virus, Eastern Equine Encephalitis (EEE), or Zika and ticks carrying Rocky Mountain Spotted Fever). These changes present a major public and animal health challenge in terms of education, prevention, and treatment. 2018 marked the Commonwealth's highest ever incidence of West Nile Virus diagnosis, and 2019 marked the highest number of EEE cases in recent history in Massachusetts. The Town is currently a member of the Norfolk County Mosquito Control District. There has also been an increase in Lyme disease and tick-borne diseases in the Town in recent years. At the same time, the Town is facing inadequate public health staff capacity which places an extra burden on the Town to address these climate impacts.

### Beavers

Concerns about beavers were discussed as an environmental issue, but also, and more critically, as an infrastructure problem. Whereas the town generally has some record of and control over man-made stream crossings or impoundments, beaver activity is often known only anecdotally and can cause unpredictable problems during heavy precipitation when flooding occurs in unexpected locations. Beaver dams are of concern near East Street at the Canoe River. Foxborough's Conservation Agent noted the importance of beavers as keystone species and the need to consider sublethal interventions, such as beaver deceivers.

## Current Strengths and Assets

While the Town recognized a number of vulnerabilities, workshop participants identified key strengths as well.

- The Town recently finished construction on a new emergency dispatch center to support the Southeastern Massachusetts Regional 911 District, serving the towns of Foxborough, Mansfield, Easton, and Norton.
- There is sufficient capacity at heating and cooling centers available in the Town.
- The Town is home to a Town Forest and State Forest that can help buffer the impacts of climate change.
- Foxborough has a strong culture of volunteerism among its residents and a history of partnership with non-profit organizations in community-building projects.
- The Town has conducted initial feasibility studies for dam removal at two locations. The Town is planning to repair the West Street dam in 2021 and has finished maintenance at the Neponset Reservoir dam.



Newly completed regional dispatch center (WJAR)

- Foxborough is home to Gillette Stadium, which can be made available to serve as a staging area during emergencies, and has stormwater facilities and a wastewater reuse plant designed to withstand the 100-year storm.
- The Town maintains close working relationships with local companies, in particular the Kraft Group and Schneider Electric, the latter of which is home to the Foxborough Food Pantry.
- Town staff maintains lists of vulnerable population members to conduct wellness checks for members of vulnerable populations during severe weather events to continue providing essential services.
- Foxborough is part of a mosquito control district.
- Foxborough maintains a good working relationship with faith leaders to identify members of vulnerable populations.
- The Town is building a new water treatment facility and redrilling wells for public water supply and maintains 4 million gallons of capacity in its two water tanks.
- The Town's primary emergency shelter is the Charles Taylor Elementary School, which has a backup generator, and the Burrell Elementary School is being renovated with hurricane glass to enable additional shelter capacity.
- Foxborough Cable Access is a non-profit local television station providing public access, educational, and governmental programming.
- The Town maintains a fiber-optic loop between the public safety complex and the high school.
- The Town is making progress toward an upgraded wastewater treatment plant.
- The Foxborough Agricultural Commission provides support for local agriculture.
- The Town and Wastewater District have installed back-up power at low-lying sewer lift stations.
- The Town is part of multiple regional municipal coalitions that increase resilience by sharing services. The 9-1-1 Network, MFN Wastewater District, Greater Attleboro Taunton Regional Transit Authority, and animal shelter are examples of Foxborough's benefit from and commitment to regional resilience.



Foxborough Public Safety Complex



Foxborough Common.  
(John Phelan)

## Top Recommendations to Improve Resilience in Foxborough

Participants at the CRB workshop identified a number of recommendations to address vulnerabilities and increase resiliency in three main topic areas: infrastructure, environment, and society. The impacts of extreme precipitation and flooding were a primary concern that emerged in both the small and large group discussions, encompassing a wide variety of infrastructural and societal concerns. The resilience of some of the dams in Town, as well as the stormwater infrastructure was a major theme of the workshops. Providing sufficient protections and planning for vulnerable populations in Town, such as seniors, was another major theme.

### *Highest Priority*

- Conduct a full feasibility and alternatives assessment of Crackrock Pond Dam, Carpenter Pond Dam, and Glue Factory Pond Dam. This would include alternatives and recommendations for repair, replacement, and potentially removal, including identifying funding opportunities for these efforts. This study would attempt to meet the following goals: 1) investigate opportunities to restore the riparian zone and create river access points along the river corridor, using land exposed by draining the dam impoundments, 2) reduce water quality and sediment impacts from contaminants and pollutants, and 3) increase recreational value of properties upstream. Ensure

public input is received on preferred alternatives, for example by establishing a citizens' commission.

- Undertake drainage study to identify opportunities for green infrastructure and capacity increases across the Town, with a primary goal of reducing the burden on existing systems. Key areas include the Cocasset Street rail underpass, and the known constriction behind the High School, and areas around the Neponset Reservoir. Projects should also focus on areas where green infrastructure can simultaneously address impacts relating to climate hazards, addressing water quality challenges, and increasing groundwater recharge. Essential to these efforts will be to simultaneously review the Town's bylaws and regulations and update as necessary to support green infrastructure and low-impact development.
- Conduct feasibility study for drainage upgrades to Highway Garage to become more resilient to flooding. The study should specifically focusing on alternatives for the refueling station to reduce dependence on pumps to prevent pollution from underground fuel storage tanks.
- Upgrade electrical infrastructure at Foxborough Housing Authority properties necessary to install back-up generators to address vulnerability to extreme weather. New electrical systems should be designed to support air conditioning installation to address excessive heat impacts to vulnerable populations.
- Conduct study to assess location of hazardous material storage in wellhead protection area/recharge zone. Coordinate with fire department to review records and identify priority areas, link pieces of information. Increase education and outreach surrounding hazardous materials storage. Conduct ongoing monitoring of contaminated sediments to ensure safety of water supply.
- Explore feasibility of regional partnerships to increase water supply resilience beyond groundwater supplies. This could involve constructing a pumping station to address pressure differences, and drawing on water supplies in neighboring municipalities.
- Assess opportunities to reduce nutrient inputs from non-point sources and increase recharge through infiltration stormwater BMPs, particularly around the Neponset Reservoir. These nature-based solutions may also help alleviate flooding issues identified in the Neponset Reservoir watershed.
- Develop education and outreach to residents living in in the floodplain and flood-prone areas to increase awareness among individuals and families residing in these areas of the potential risks, as well as actions they can take, such as clearing catch basins before and during storms to prevent basement flooding. Partner with Foxboro Cable Access to develop and deliver content. Ensure that outreach targets renters as well as property owners.
- Engage with the Town of Attleboro to satisfy competing water draw requirements with Mirimichi Pond resident preferences.

### *Moderate Priority*

- Conduct a Town-wide field inventory of culverts that builds upon the Town's past assessments. Rank and prioritize projects for increased flooding resiliency and storm-hardening,

followed by design and implementation of priority re-sizing or replacement projects that meet Massachusetts River and Stream Crossing Standards. Green infrastructure, Low-Impact Design, and other nature-based solutions should be integrated with hard-infrastructure improvements to establish approaches that will be robust in the face of natural hazards and climate-change scenarios.

- Review and prioritize schools without air conditioning to install air conditioning at facilities supporting the widest variety of community uses.
- Continue to foster public/private and public/non-profit partnerships to provide extra capacity to aid the Town during hazard events and increase community resilience. For example, continue to partner with the Kraft Group and Schneider Electric, particularly at Gillette Stadium and at the food pantry. Continue to partner with Eagle Scouts for projects that contribute to climate resilience and community organizations that volunteer to increase the Town's capacity to respond to severe weather.
- Continue the Town's ongoing infiltration and inflow work to reduce the risk of reduced water quality and sanitary sewer problems from climate-related increased storm intensity and elevated groundwater levels.
- Conduct feasibility study to assess potential for additional upgrades to sanitary sewer pump stations to prevent system backups during flood events.
- Conduct robust education and outreach to build awareness of the Town's resources and make Foxborough residents aware of the many planning efforts, agreements, shelters, and transit options which are focused on making the Town more resilient to climate change impacts. Ensure that all residents know how to access these resources when they are needed. Encourage use of emergency shelters and heating and cooling centers through educational/outreach partnership with Foxboro Cable Access and via official social media channels to develop and distribute content.
- Identify principal hazard areas causing long duration outages. Conduct outreach to home owners in problem areas to address hazard trees on private property with the potential to fall on utility lines. Increase proactive removal of hazard trees by offering replacement trees or incentives to remove. Coordinate with National Grid outside of five year trimming cycle to remove high hazard trees in areas with repeated outages.
- Conduct outreach to businesses storing hazardous materials in flood prone areas to limit storage near water or where flood waters have the potential to reach storage locations.
- Continue commitment to open government by supporting public access television in distributing information via open, televised meetings and social media postings.
- Build on existing relationships with faith leaders and expand to additional faith groups. Include faith groups and faith leaders in communications for weather and extreme events to benefit from their knowledge of the needs of vulnerable community members.

- Engage with GATRA to expand transportation options to warming and cooling centers for vulnerable populations during extreme events. Consider using Foxborough School Busses as local alternative.
- Review results of Commonwealth's forest resilience study of the State Forest and adapt the findings and recommendations to the adjacent Town forest.
- Develop plans for pet evacuation and sheltering to ensure that individuals' pets are safe and secure during a hazard, and that concern about pets does not prevent people from evacuating during an emergency.
- Increase public awareness programs related to vector-borne diseases, such as EEE, West Nile, and Lyme disease, to educate residents on the risks and warning signs of these diseases. This should include coordination with the Norfolk Mosquito Control District, with programs targeted at residents to increase awareness of new diseases and encourage early testing.
- Conduct feasibility study to identify resilient uses for renovating the former State Hospital facility at Payson Road Recreation Area.
- Continue to participate in the Canoe River Aquifer protection study.

### *Lower Priority*

- Assess the sufficiency of West Street Dam improvements to address climate-related vulnerabilities, as well as potential for contamination. Develop preservation plans and explore funding options.
- Prioritize routine maintenance of the Neponset Reservoir Dam which was recently upgraded and reregistered.
- Assess dam removal or repair options at Glue Factory Pond East Dam, by soliciting public feedback, including nature-based solutions.
- Assess feasibility of additional wastewater reuse capacity to reduce burden on existing groundwater supplies.
- Review National Grid study on burying utilities, specifically around Chestnut Street and other known problem areas, to increase resilience to ice and wind events.
- Proactively identify areas for beaver deterrent devices, balancing habitat creation and needs with flooding, drainage, and septic system concerns.

Continue to identify and evaluate hazardous waste storage in flood prone areas. Coordinate existing knowledge within the Fire Department of identified hazardous waste with other Town staff who are in positions to address and improve storage locations. Analyze hazardous materials risk to develop an understanding of how climate-change induced hazards could potentially increase the risk of contaminants originating from 21E sites and locations with significant chemical storage.

## CRB Workshop Participants

All workshop invitees are listed below; attendees are indicated with an asterisk.

Name	Organization
William Keegan*	Town of Foxborough, Town Manager
Michael Johns*	Town of Foxborough, Assistant Town Manager
Chris Gallagher*	Town of Foxborough, Director of Public Works
Lance DePriore*	Town of Foxborough, Town Engineer
Michael Kelleher	Town of Foxborough, Fire Chief
Tom Buckley*	Town of Foxborough, Assistant Fire Chief
Matthew Brennan*	Town of Foxborough, Health Director
Kevin Duquette	Town of Foxborough, Assistant Health Director
John Robertson, Jr.	Town of Foxborough, Health Inspector
Jane Pierce*	Town of Foxborough, Conservation Agent
Paige Duncan*	Town of Foxborough, Planning Director
Gabriela Jordan*	Town of Foxborough, Staff Planner
Bob Worthley*	Town of Foxborough, Water Supervisor
William Yukna	Town of Foxborough, School Business Manager
Tony Moussalli	Town of Foxborough, School Facilities Manager
Marc Craig*	Town of Foxborough, Human Services Director
Margaret Hurd	Town of Foxborough, Foxborough Housing Authority
Michael Grace	Town of Foxborough, Police Chief
Amy Berdos	Foxborough School Superintendent
Diane Passafaro*	Town of Foxborough, Public Health Coordinator
Mark Elfman	Chair, Select Board
Eric Arvedon	Chair, Board of Health
Robert Boette	Chair, Conservation Commission
Kevin Weinfeld	Chair, Planning Board
Mark Frencik*	Chair, Historical Commission
Heather Harding*	Chair, Open Space Committee
Jay Barrows*	Representative, 1 <sup>st</sup> Bristol District
Paul Feeney	Senator, Bristol and Norfolk District
Kerry Snyder*	Neponset River Watershed Association
Ian Cooke*	Neponset River Watershed Association
Steve Sacco	Schneider Electric
Dan Krantz*	The Kraft Group
Woody Benisek-Beal*	The Kraft Group
Representative	Foxborough Common Business Collaborative
Representative	Tri-Town Chamber of Commerce
Tom Ashton	MassDCR - F. Gilbert Hills State Forest
Karen Louise Stein	Mass Audubon - Moose Hill
Bill Buckley*	Local Engineer (Bay Colony)
Richard Lewis*	Neponset Reservoir Restoration Commission
Ann Malley*	National Grid
Aidee Cira	MassDOT
Carolyn Meklenburg*	Massachusetts MVP Regional Coordinator
Horace Jones*	Neponset Reservoir Conservation Commission
Michael Webber*	Foxboro Cable Access



Cynthia Tracy*	Fultura
Arnold Robinson*	Fuss & O'Neill
William Guenther*	Fuss & O'Neill
Stefan Bengtson*	Fuss & O'Neill

## Citation

Fuss & O'Neill (2021). Community Resilience Building Workshop Summary of Findings. Town of Foxborough, Fuss & O'Neill, Inc. Quincy, Massachusetts.

## CRB Workshop Project Team

Name	Organization	Role
Chris Gallagher	Director of Public Works	Project Coordinator/ Core Team Member
Michael Johns	Assistant Town Manager	Core Team Member
Lance DelPriore	Town Engineer	Core Team Member
Tom Buckley	Assistant Fire Chief	Core Team Member
Paige Duncan	Planning Director	Core Team Member
Jane Peirce	Conservation Agent	Core Team Member
Bob Worthley	Water Superintendent	Core Team Member
Tom Wryn	Building Inspector	Core Team Member
William Guenther	Fuss & O'Neill	MVP Lead Facilitator
Arnold Robinson	Fuss & O'Neill	MVP Facilitator/Scribe
Stefan Bengtson	Fuss & O'Neill	MVP Facilitator/Scribe

## Acknowledgements

Many thanks to the MVP Core Team members, CRB workshop participants, and to Chris Gallagher who acted as the local Project Coordinator.

Funding for the CRB Workshop was provided through a Massachusetts MVP grant.

## Appendix A

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### Final Risk Matrix



TOP PRIORITY HAZARDS (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

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

				Flooding	Wind Events	Extreme Weather	Winter Storms	Priority	Time	
								H - M - L	Short Long Ongoing	
Features	Location	Ownership	V or S							
<b>Infrastructural</b>										
Dams	West St	Municipal	S	Are the ongoing improvements sufficient to address the existing vulnerability or is further action required?  Current work should remove the hazards associated with this dam (grant from state 700K)	Mine Phase I info or aerials to determine which might be more susceptible to wind impacts, trees growing on embankments			L	O	
	Crackrock Pond	Municipal	V	Alternatives analysis: Risk analysis of sediment transport with options for removal/capping, dam removal, dredging etc. Solicit public feedback on studying options, citizens commission				Phase 2 inspection Solicit public feedback on studying options	H	S
	Neponset Reservoir	Municipal	S					Recently upgraded and registered, routine maintenance planned	L	L
	Carpenter Pond	Municipal	V					Phase 2 inspection Solicit public feedback on studying options	H	S
	Glue Factory Pond West	Disputed	V	Investigate ownership Phase 2 inspection					H	S
	Glue Factory Pond East	Municipal	V	Look at alternatives, including removal.					L	L
Drinking Water Supply	Neponset Reservoir	Municipal	V	Study to assess location of hazmat storage in wellhead protection area/recharge zone, coordinate with fire dept to review records and identify priority areas. Link pieces of information. Increase education and outreach surrounding hazardous materials storage.  Ongoing monitoring of contaminated sediments to ensure safety of water supply.		Explore feasibility of regional partnerships to increase supply resilience. Assess opportunities to reduce nutrient inputs from non-point sources and increase recharge through stormwater infiltration BMPs	H	L		
Culverts	East St Town-wide	Municipal	V	Conduct town-wide assessment to prioritize crossings for replacement East St. floods, would like to see replaced with new culvert that passes stream standards Recommend to FEMA reassessing the FIRM panel for East St crossing				M	L	
Wastewater Infrastructure	Gillette Stadium	Private	S	Underutilized wastewater reuse system at stadium. Look for opportunities to increase wastewater reuse.				L	O	
	Morse St	Municipal	V	Continue I/I and repair work, Conduct feasibility study to assess potential for upgrades to pump stations to prevent system backups				M	S	
	Gavins Pond Dam	Municipal	V					M	O	

Stormwater Infrastructure	Cocasset St underpass Constriction behind the High School Town-wide System	Municipal	V	Undertake drainage study to determine additional capacity needs and identify additional infiltration opportunities to reduce burden to the system  Alternatives analysis for upgrading constriction behind High School  Assess capacity of the system to accomodate large and intense storms. Local and Regional hydraulic modeling of				H L M	S L O	
Pole Utilities	High School to Public Safety	Municipal	S	Fiber-optic connection provides resilience with multiple sites Review National Grid study to bury utilities to increase resilience to extreme events.				L	L	
	Town-wide		S/V	Identify principal hazard areas causing long duration outages. Outreach to home owners in problem areas to address hazard trees. Increased proactive removal of hazard trees by offering replacement trees or incentives to remove.  Coordinate with National Grid outside of five year trimming cycle to remove high hazard trees in areas with repeated				M	O	
Buildings and Facilities	Schools	Municipal	V		Review and prioritization of the remaining schools for AC			M	L	
	Heaton's Marine	Private	V	Conduct outreach to limit hazardous materials storage in structures near water				M	S/O	
	Highway Garage	Municipal	V	Feasibility study for upgrades to become more resilient to flooding, specifically looking at alternatives for the refueling station.				H	S	
	Dispatch System	Municipal Regional	S	New state-of-the-art facility, serving Norton, Foxborough, Easton						O
	Chestnut St	Municipal	S	Could be mitigated and turned into a resource area, especially as part of a nearby resiliency project				M	L	

### Societal

Vulnerable Populations	Centennial Ct N. Carol Annon Ct Town-wide	Municipal	V	Upgrade electrical infrastructure in order to install back up generators at Housing Authority Properties				H	S
	Town-wide	Municipal	S	Continue to maintain and expand list of people in vulnerable populations to enable wellness checks during extreme events				M	O
	Town-wide	Municipal	V	Engage with GATRA to expand transportation options to warming and cooling centers for vulnerable populations during extreme events Develop educational/outreach advertising content to increase awareness of transit options and use of warming and cooling centers by vulnerable populations. Consider using				M	L
Communication Services	Town-wide	Municipal Non-profit	S	Partnership to produce educational/outreach content related to flooding, clearing catch basins during storms, and preventing basement flooding				H	S
	Town-wide	Municipal	S	Continue to distribute information via open, televised meetings and social media postings				M	O
Organizational Partnerships	Town-wide	Non-Profit Private	S	Build on existing relationships and expand to additional faith groups. Include faith groups and faith leaders in communications for weather and extreme events.				M	O
				Continue to coordinate with Boy Scouts to support Eagle Scout projects. Continue coordination with Scouts and US Junior Chamber during exteme events				L	O
				Continue to partner with corporate groups such as Kraft Group and Schneider Electric, to support climate and societal resilience ventures, including at food pantry				M	O
Water Rights	Mirimichi Pond	Private	V		Engage with Attleboro to satisfy competing water draw requirements with resident preferences		H	L	

### Environmental

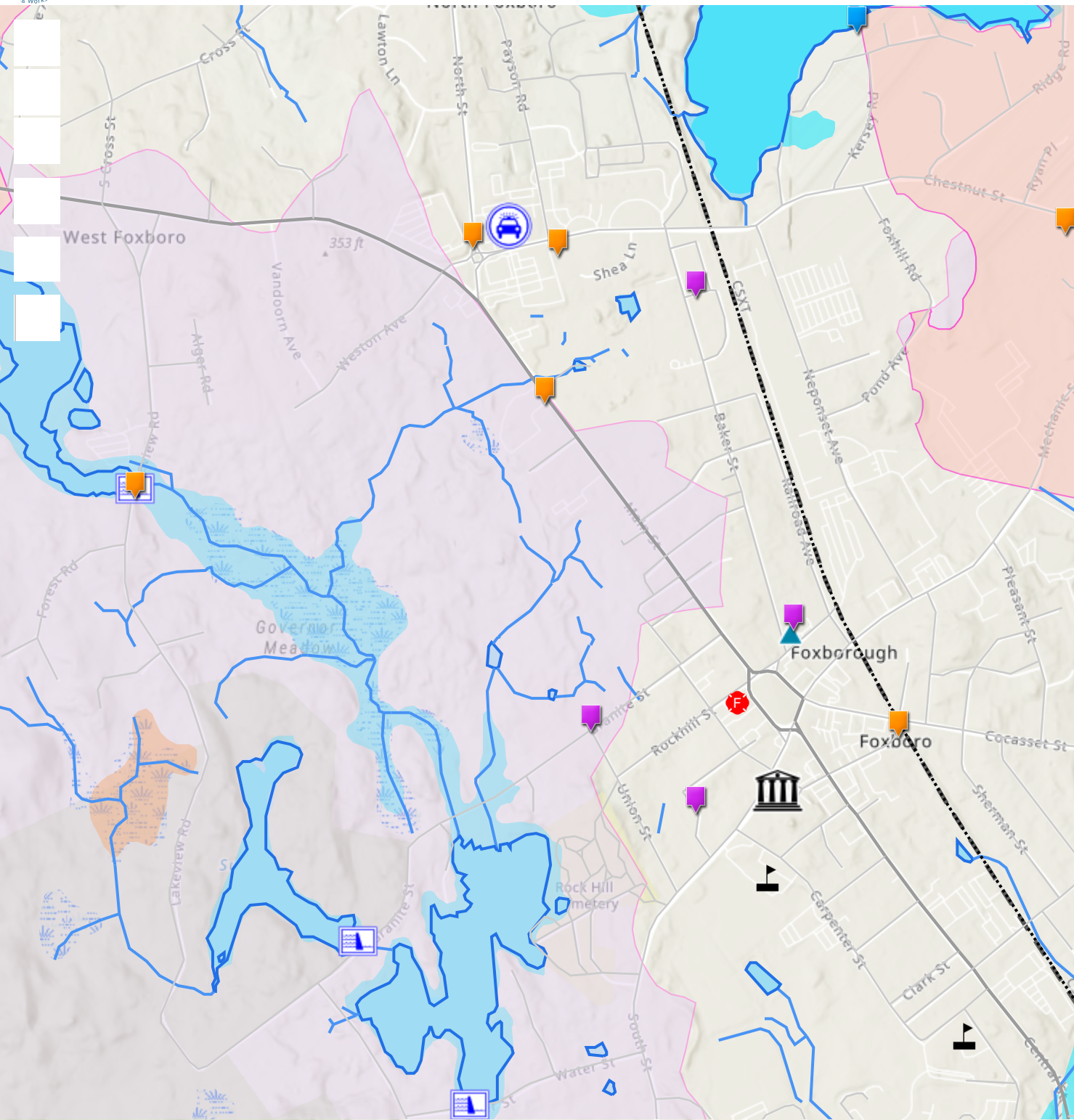
Tree and Forest Management	State and Town Forests Trees along roads			Continue work with National Grid to keep lines clear and power is getting to the stadium	Partner with State to apply study results and identify impacts to Town and State forests			M	O/S
Beavers	Cocasset River Wading River		V	Proactively identify areas for beaver deterrent devices, balancing habitat creating and needs with flooding, drainage, septic				L	L

Hazardous Waste	Flood-prone areas	Various	V	Continually identifying and evaluating Hazardous Waste storage in flood prone areas.				L	O
Canoe River	Canoe River	N/A	V	Continue to participate in ongoing study				L	O
Animal Shelter	Mansfield	Regional	S	Continue collaboration with Mansfield				L	O

## Appendix B

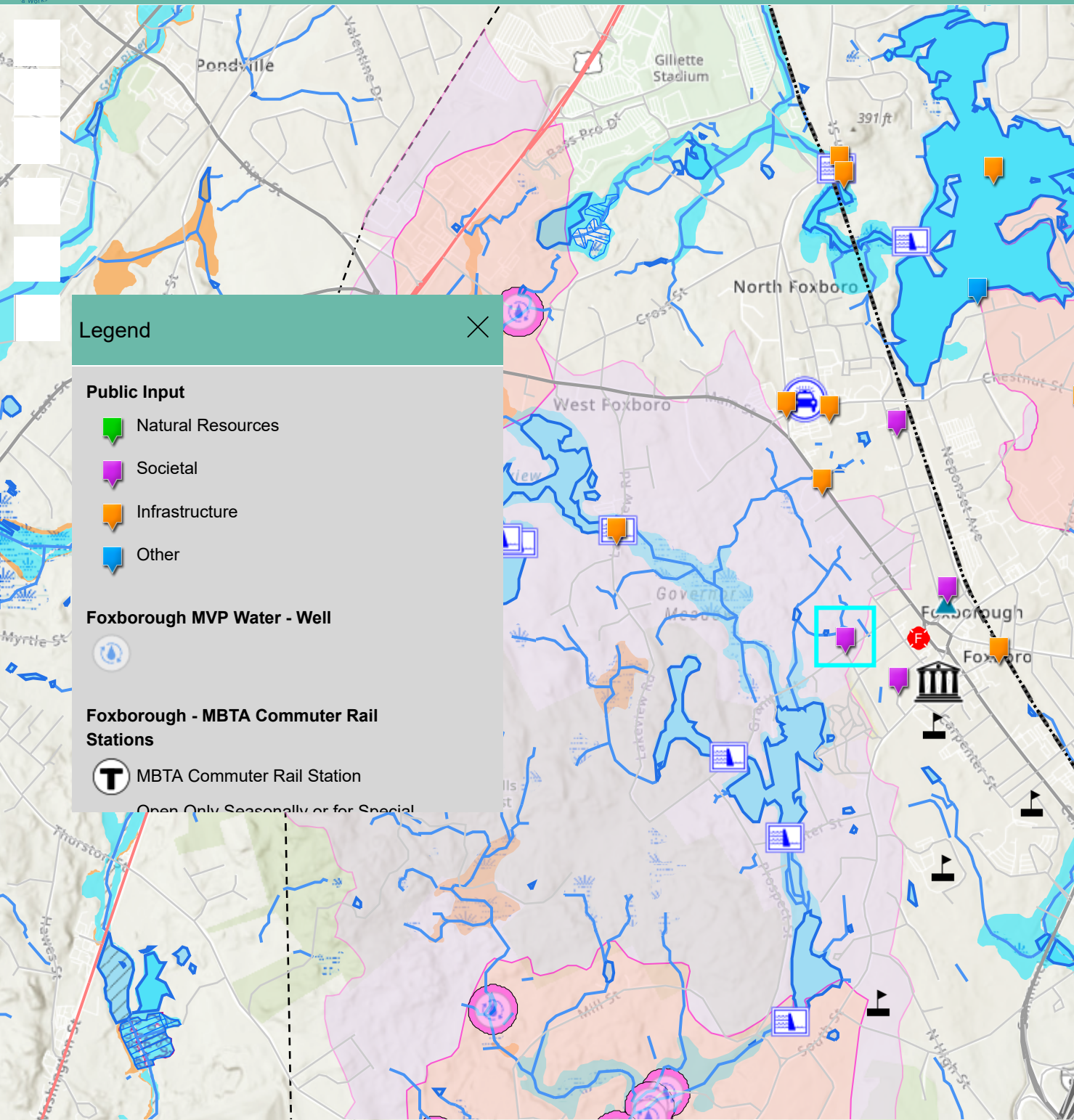
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### CRB Workshop Base Map



## Public Input

Chestnut Street Main Pow...	0	♥
Dudley Estates and North ...	0	♥
Chestnut St & North St - I...	0	♥
Crackrock Pond Dam - Inf...	3	♥
East Belcher road near Co...	0	♥
DPW Poor Drainage - Infra...	0	♥
Heaton's Marina - Other : ...	0	♥
Residnetial Development - ...	0	♥
Lakeview Pond - Infrastru...	1	♥
Pierce Street Crossing - In...	0	♥
Cocasset Street Railroad ...	1	♥
Cocasset Street at Railroa...	0	♥
- Infrastructure · 1/14/2021	1	♥



## Legend

### Public Input

- Natural Resources
- Societal
- Infrastructure
- Other

### Foxborough MVP Water - Well



### Foxborough - MBTA Commuter Rail Stations



Open Only Seasonally or for Special

## Public Input

Residential Development - ...	0
Lakeview Pond - Infrastru...	1
Pierce Street Crossing - In...	0
Cocasset Street Railroad ...	1
Cocasset Street at Railroa...	0
- Infrastructure : 1/14/2021...	1
East Street at Canoe River...	0
Low Income-Affordable S...	0
Culvert on Morse Street at...	0
Glue Factory Pond Area - ...	0
Glue Factory Pond East D...	0
Bleachery Area - Infrastru...	1
Payson Road and Chestn...	0



## Appendix C

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### CRB Workshop Outputs: Participatory Mapping Exercise Results

OBJECTID	Comment Type	Information Comment	Comment Date	Full Name	Location	Comment Date2	Location2	Latitude	Longitude	Number of Votes
2	INFRASTRUCTURE	HMP Vulnerable area note: Flooding - Cocasset Street at Railroad Crossing - Four 12-inch pipes go into a structure and one 12-inch pipe leaves the structure	2020-12-09 14:34	Fuss & O'Neill	24-24 Cocasset St	2021-01-26 14:21	Cocasset Street at Railroad Crossing	42.06436454	-71.24675209	2
3	INFRASTRUCTURE	From Foxborough HMP - Vulnerability - Flooding at East Street at Canoe River Crossing	2020-12-09 14:34	Fuss & O'Neill	205-221 East St	2021-01-26 14:15	East Street at Canoe River Crossing	42.05659225	-71.19639351	1
4	OTHER	From Foxborough HMP - Vulnerability - Flooding - Heaton's Marina on Neponset Heights Ave - Flooding from Neponset Reservoir	2020-12-09 14:34	Fuss & O'Neill	68 Neponset Heights Avenue	2021-01-26 19:16	Heaton's Marina	42.07964742	-71.24801263	2
5	INFRASTRUCTURE	From Foxborough HMP - Vulnerability - Lakeview Pond: Tall, old dam; town is concerned about it.	2020-12-09 14:34	Fuss & O'Neill	43-55 Lakeview Rd	2021-01-26 19:24	Lakeview Pond	42.06964499	-71.26955613	12
6	INFRASTRUCTURE	Concern about flooding at crossing	2020-12-09 16:39	Fuss & O'Neill	4 Pierce Street	2021-01-26 14:14	Pierce Street Crossing	42.07751566	-71.28016322	1
7	SOCIETAL	Elderly population on Granite street in flood zone	2020-12-15 21:07	Fuss & O'Neill	11-33 Granite St	2021-01-26 19:15	Granite Street Elderly Population	42.0641765	-71.25593033	5
8	SOCIETAL	From 2020 HMP -Critical Facility: Retirement home with nursing unit	2020-12-17 15:31	Fuss and O'Niell	Doolittle Homes Inc	2021-01-26 19:08	Retirement Home	42.06640968	-71.24988137	4
9	SOCIETAL	From 2020 HMP -Critical Facilities: Norbert Carl Annon Court Foxborough Housing Authority Low Income-Affordable Senior Housing	2020-12-17 15:31	Fuss and O'Neill	100-110 N Carl Annon Ct	2021-01-26 19:19	Low Income-Affordable Senior Housing	42.07379276	-71.25283162	7
10	SOCIETAL	From 2020 HMP -Critical Facilities: Centennial Court Elderly Housing Foxborough Housing Authority Low Income-Affordable Senior Housing	2020-12-17 15:31	Fuss and O'Neill	2-98 Centennial Ct	2021-01-26 19:14	Low Income-Affordable Senior Housing	42.06237876	-71.25280981	5
11	INFRASTRUCTURE	From 2020 HMP -Critical Facilities: Department of Public Works Flooding is an issue at this site (poor drainage). Water risks getting into fuel tanks (underground) – have had to pump water elsewhere during rain events.	2020-12-17 15:31	Fuss and O'Neill	70 Elm Street	2021-01-26 19:14	DPW Poor Drainage	42.05496016	-71.2376754	12
12	INFRASTRUCTURE	From 2020 HMP -Vulnerable Areas: Bleachery Area. Industrial Buildings Flooded	2020-12-17 15:31	Fuss and O'Neill	131 Morse Street	2021-01-26 19:25	Bleachery Area	42.04580528	-71.21394648	10
13	INFRASTRUCTURE	From 2020 HMP -Vulnerable Areas: Flooding- Main Street, New Residential Development	2020-12-17 15:31	Fuss and O'Neill	6 Goodwin Drive	2021-01-06 20:06	Residnetial Development	42.07554908	-71.28027242	0
14	INFRASTRUCTURE	From 2020 HMP -Vulnerable Areas: Flooding- Neponset Reservoir	2020-12-17 15:31	Fuss and O'Neill	Town of Foxborough, Massachusetts	2021-01-26 19:27	Neponset Reservoir	42.08559457	-71.24709936	13
15	INFRASTRUCTURE	From 2020 HMP -Vulnerable Areas: Flooding-Edwards Road and Beach Street Neponset Reservoir flooding and drainage from Dudley Hill	2020-12-17 15:31	Fuss and O'Neill	Beach St	2021-01-26 19:08	Neponset Reservoir	42.09323988	-71.23729866	4
16	INFRASTRUCTURE	From 2020 HMP -Vulnerable Areas: Flooding- Kraft Parking Lot, 119 Washington Street New parking lot. Seepage from groundwater, puddle and freezing problems.	2020-12-17 15:31	Fuss and O'Neill	Washington St	2021-01-26 19:13	Kraft Parking Lot	42.07841131	-71.28407306	1
17	INFRASTRUCTURE	From 2020 HMP -Vulnerable Areas: Flooding- Pierce Street Under Route 1	2020-12-17 15:31	Fuss and O'Neill	Washington St	2021-01-26 19:14	Pierce Street Under Route 1	42.07911765	-71.28251416	2
18	INFRASTRUCTURE	From 2020 HMP -Vulnerable Areas: Ice- Dudley Estates and North Street, by railroad Groundwater seeps from ledge and freezes.	2020-12-17 15:31	Fuss and O'Neill	92-96 North St	2021-01-26 19:15	Dudley Estates and North Street	42.08609853	-71.25630385	4
19	INFRASTRUCTURE	From 2020 HMP -Vulnerable Areas: Ice - Cocasset Street Railroad Underpass Becomes flooded and freezes	2020-12-17 15:31	Fuss and O'Neill	336-398 Cocasset St	2021-01-26 19:14	Cocasset Street Railroad Underpass	42.06121372	-71.20212748	10
20	INFRASTRUCTURE	From 2020 HMP -New Actions: Remove Glue Factory Pond East Dam and perform restoration	2020-12-17 15:31	Fuss and O'Neill	138-170 Morse St	2021-01-26 19:18	Glue Factory Pond East Dam	42.04608941	-71.21100771	4
21	INFRASTRUCTURE	From 2020 HMP -New Actions: Upsize the culvert on Morse Street at Rumford River, downstream of the Glue Factory Pond Dam	2020-12-17 15:31	Fuss and O'Neill	188-198 Morse St	2021-01-26 19:14	Culvert on Morse Street at Rumford River	42.04448424	-71.213161	2
22	NATURALRESOURCES	From 2020 HMP -Other Notes: Beavers are starting to become a problem. Active at Culvert on Route 106 and in Bleachery Pond.	2020-12-17 15:31	Fuss and O'Neill	11 Cedar Street	2021-01-26 19:19	Culvert on Route 106	42.02450554	-71.27431544	4
23	INFRASTRUCTURE	From 2020 HMP -Other Notes: Main power line on Chestnut Street: town has looked into undergrounding, but National Grid wants it above ground	2020-12-17 15:31	Fuss and O'Neill	93-105 Chestnut St	2021-01-06 20:06	Chestnut Street Main Power Lines	42.07552122	-71.24176605	0
24	INFRASTRUCTURE	From 2020 HMP: Area of Concern- Glue Factory Pond Area, particularly the Rumford River culvert under Morse Street and the culvert connecting the West and East ponds under Morse Street	2020-12-17 15:31	Fuss and O'Neill	139-171 Morse St	2021-01-26 19:25	Glue Factory Pond Area	42.04635863	-71.2119603	5
25	INFRASTRUCTURE	From 2020 HMP: East Belcher road near Comcast (where there's a "zig-zag" in the road) experiences flooding issues. This section of road is at the upstream end of a 0.2% annual-chance flood zone	2020-12-17 15:31	Fuss and O'Neill	77-81 E Belcher Rd	2021-01-26 19:09	East Belcher road near Comcast	42.05214211	-71.2236829	5
26	INFRASTRUCTURE	From 2020 HMP: Crackrock Pond Dam on the Neponset River at North Street is old and in bad shape.	2020-12-17 15:31	Fuss and O'Neill	89-89 North St	2021-01-26 19:14	Crackrock Pond Dam	42.08545558	-71.25600677	16
27	INFRASTRUCTURE	From 2020 HMP: flooding in London Estates, a new development off Main Street, but it is mostly just "nuisance" flooding	2020-12-17 15:31	Fuss and O'Neill	97-99 Main St	2021-01-26 19:06	London Estates	42.07176463	-71.25730609	1

29	INFRASTRUCTURE	Significant Hazard Classification - Poor Condition Rating. Grant received. Repairs scheduled for 2021.	2021-01-14 18:31 West Street Dam	23-31 West St	2021-01-26 19:24	42.038321 -71.27496171	13
30	INFRASTRUCTURE	Flooding in the area of Chestnut St & North St during heavy rain events	2021-01-22 12:51 T. Buckley	9-11 North St	2021-01-26 19:08 Chestnut St & North St	42.07520695 -71.25945971	3
31	INFRASTRUCTURE	Flooding at the intersection of Payson Road and Chestnut Street during heavy rain events.	2021-01-22 12:51 T. Buckley	12-14 Chestnut St	2021-01-26 14:25 Payson Road and Chestnut Street	42.07504767 -71.25691698	3
32	INFRASTRUCTURE	Flooding at Bridge	2021-01-26 14:20 Jay Barrows	38-98 County St	2021-01-26 14:22	42.04044663 -71.22318872	0
33	INFRASTRUCTURE	Occasional vulnerability to power loss due to intense storms.	2021-01-26 19:17 Woody Benisek-Beal	Washington St	2021-01-26 19:20 Electric service entry point to Patriot Place	42.09241181 -71.26948542	0
34	INFRASTRUCTURE	Dam was designed for 100 YR storm event in 2002. Is this now becoming vulnerable to flooding?	2021-01-26 19:17 Woody Benisek-Beal	Patriot Pl	2021-01-26 19:23 Alby Way Dam	42.0952739 -71.26185722	0
35	INFRASTRUCTURE	Gillette Stadium site stormwater system was designed in 2002 for 100 YR storm events. Could this system be vulnerable?	2021-01-26 19:17 Woody Benisek-Beal	Gillette Stadium	2021-01-26 19:27 Patriot Place/Gillette Stadium storm water systems.	42.09740998 -71.26342987	0
36	INFRASTRUCTURE	Cellular service tower. Is this a potentially vulnerable service due to intense storms?	2021-01-26 19:17 Woody Benisek-Beal	11 Annette Road	2021-01-26 19:28 Route 1 Cellular service tower.	42.08705206 -71.27784943	0

## Appendix D

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### CRB Workshop Presentation Materials



*Boston Firefighters, January 4, 2018 (Reuters)*



*Flooding, Foxborough, MA*

# Municipal Vulnerability Preparedness Program Core Team Meeting Town of Foxborough

January 26, 2021

# MVP CRB Workshop Agenda

**1:00PM – 1:10PM - Sign-on/Sign-in**

**1:10PM – 1:15PM - Welcome from Town of Foxborough**

**1:15PM – 1:25PM - Introduction to Massachusetts Municipal Vulnerability Preparedness Program (MVP) (Regional Coordinator Carolyn Meklenburg)**

**1:25PM – 1:35PM - CRB Team and participant introductions**

**1:35PM – 1:45PM - Introduction to Climate Change and the Town of Foxborough**

**1:45PM – 2:00PM - Introduction to CRB Workshop process: Mapping, Risk Matrix**

**2:00PM – 4:00PM - Identify Foxborough's vulnerabilities and strengths  
Map Tour  
Vulnerabilities/Strengths**

**4:00PM – 4:30PM - Prioritize response actions (Using Risk Matrix)**

**4:30PM Discussion on next steps**

**Conclusion**



# Municipal Vulnerability Preparedness Program

Carolyn Meklenburg  
Greater Boston Regional Coordinator  
MA Executive Office of Energy and Environmental Affairs

The Municipal Vulnerability Preparedness Program  
seeks to build climate resilience across the  
Commonwealth.



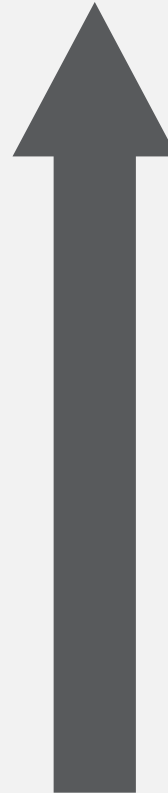
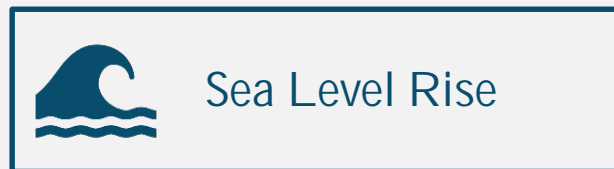
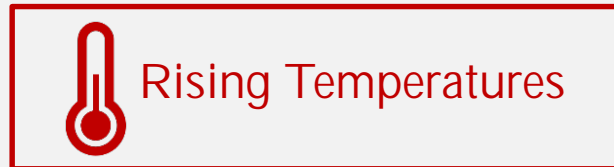




Climate resilience is the ability of a community to understand the needs of its built, social and natural environment to anticipate, cope with, and rebound stronger from events and trends related to climate change hazards.

Resilient communities don't just recover—they *continuously build capacity* to reduce the impacts of future climate events.

# How has climate change impacted Massachusetts?



**2.9° F**  
Since 1895  
(statewide)

**55%**  
Since 1958

**11 in.**  
Since 1922  
(Boston)

# What does the climate data look like?



Rising Temperatures

Photos: Warm February day in Worcester



The New York Times <https://nyti.ms/2d3Z0aK>

*Scenes From New England's Drought: Dry Wells, Dead Fish and Ailing Farms*

By Jess Bidgood

Sept. 26, 2016



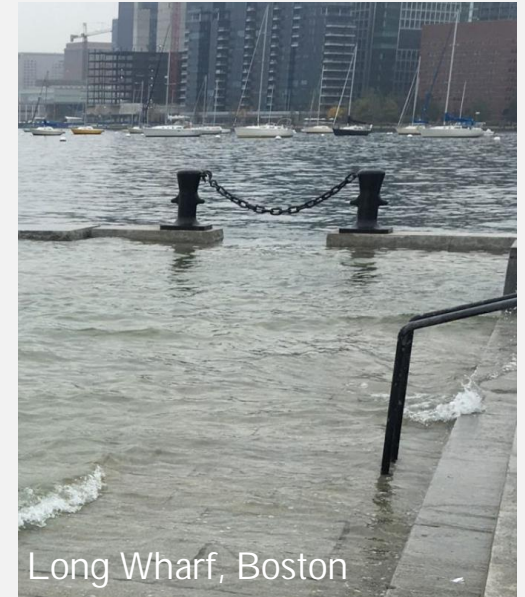
Heavy Precipitation



City of Medford



Sea Level Rise



Long Wharf, Boston

# How will climate change impact Massachusetts?

*By end of century:*



## RISING TEMPERATURES

10.8°F increase in avg annual temp.  
Up to 64 fewer days/year with min. temperatures < 32° F  
Up to 64 more > 90°F days/year



## CHANGES IN PRECIPITATION

18% increase in consecutive dry days  
57% increase in days with > 1 in. rainfall  
7.3 inches additional annual rainfall



## SEA-LEVEL RISE

4-10.5 feet along the MA coast



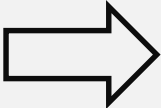
## EXTREME WEATHER

Increase in frequency and magnitude

# MVP Planning Grant

COMMUNITY RESILIENCE BUILDING WORKSHOP(S)

- Define and characterize hazards using latest science and data
- Identify existing and future community vulnerabilities and
- Develop and prioritize community adaptation actions
- Determine overall priority actions
- Conduct community engagement
- Receive MVP designation



# MVP Action Grant

Implement priority adaptation actions identified through planning process

# Planning GRANT

\$15,000- \$100,000 per plan  
Some expanded scopes  
\$1M available

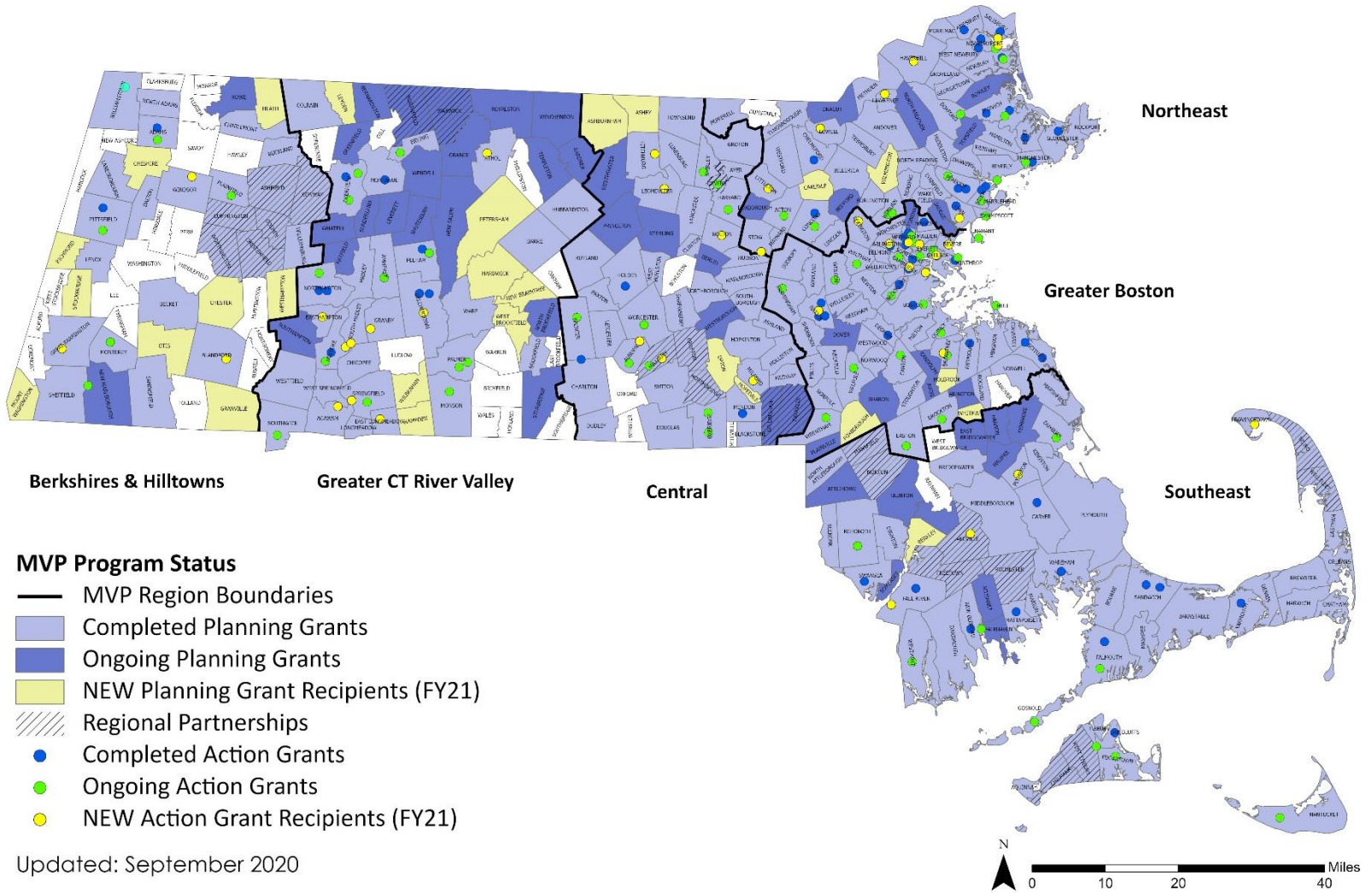


# Action GRANT

Open to MVP communities  
\$25,000- \$2M per project  
25% (non-state) match required  
\$10M available annually



# Four Years of MVP



# The MVP Program holds these core values:

- Furthering a **COMMUNITY IDENTIFIED PRIORITY ACTION** to address climate change impacts
- Utilizing best available **CLIMATE PROJECTIONS AND DATA** for a proactive solution
- Employing **NATURE-BASED SOLUTIONS**
- Meaningfully engaging and addressing threats faced by **ENVIRONMENTAL JUSTICE COMMUNITIES** and **CLIMATE VULNERABLE POPULATIONS**
- Conducting robust **COMMUNITY ENGAGEMENT**
- Achieving **BROAD & MULTIPLE COMMUNITY BENEFITS**
- Committing to **MONITORING** project success and **MAINTAINING** the project into the future
- Utilizing **REGIONAL SOLUTIONS** toward regional benefit
- Pursuing **INNOVATIVE, TRANSFERABLE** approaches





# What are some examples of MVP Action Grant projects?

## EASTON

FY20: \$177,620

**Restoring** degraded stream channel to a **healthy wetland** by removing old building remnants and invasive plants



## MEDFORD

FY20: \$36,136

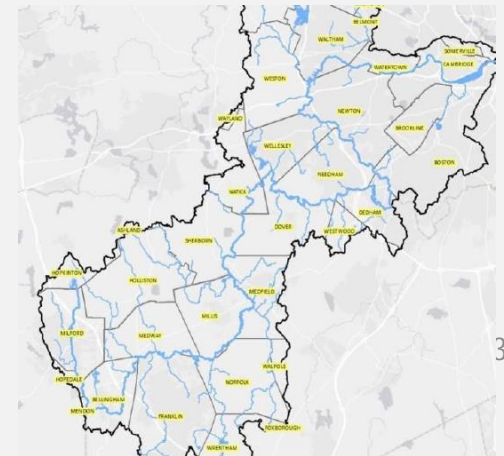
Engaging **underrepresented residents** in climate action planning through a series of family-friendly dinners, featuring **translators** and **culturally-relevant food**

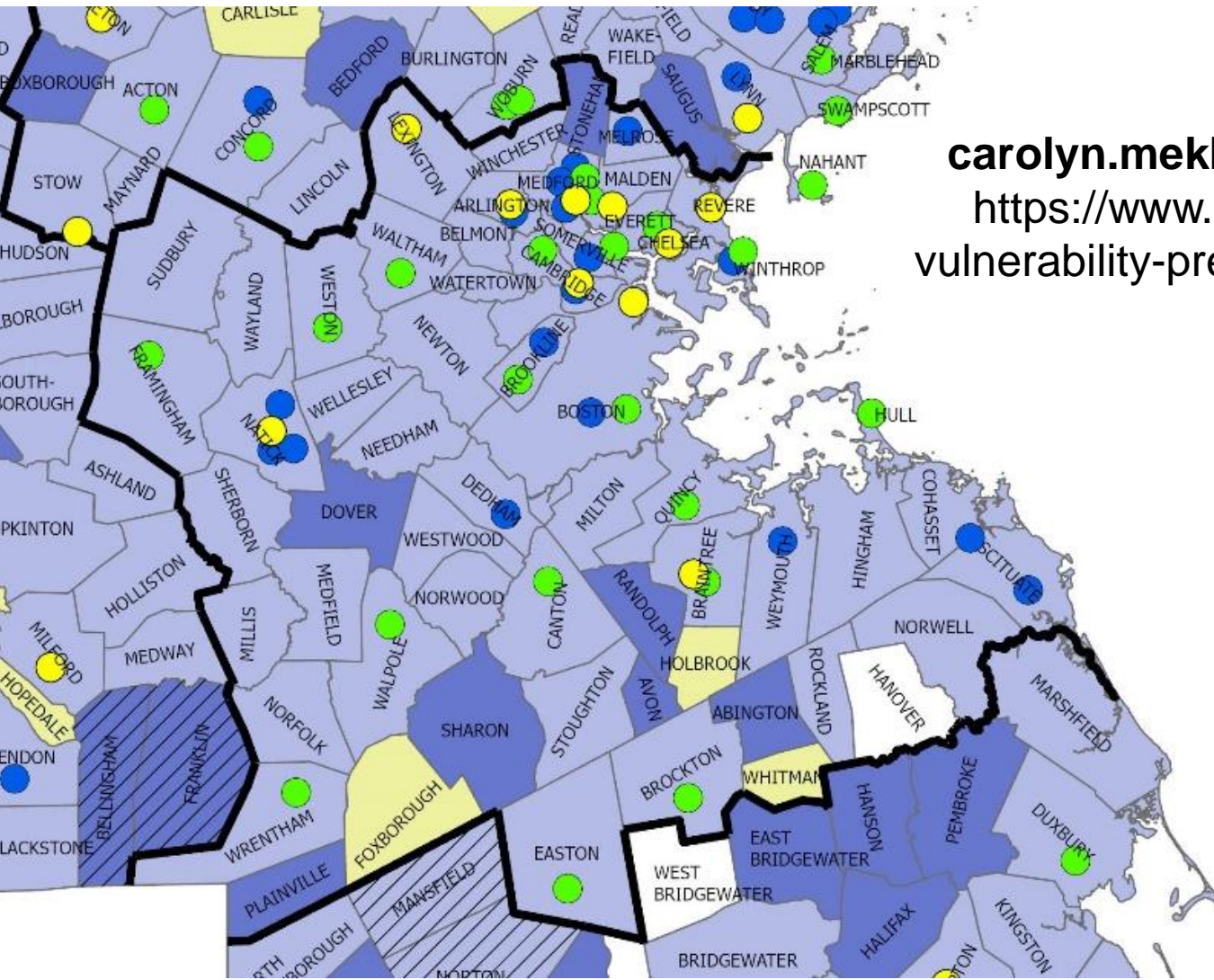


## NATICK/CRW

FY21: \$264,171

Modeling **flooding** in the Charles River Watershed to identify **regional opportunities** for watershed-scale adaptation **planning**





**carolyn.meklenburg@mass.gov**  
<https://www.mass.gov/municipal-vulnerability-preparedness-program>



**MVP**

Municipal Vulnerability Preparedness

# Fuss & O'Neill Overview



Fuss & O'Neill is a leading MVP consultant in assisting Massachusetts communities secure grant assistance, achieve designation as a Massachusetts Municipal Vulnerability Preparedness (MVP) community, and execute their MVP priority projects.

The MVP team is experienced in local government, environmental services, civil site engineering, stormwater management, and emergency management.

Fuss & O'Neill assisted new MVP communities secure more than \$700,000 MVP Action Grants in the program's first funding round.

# MVP Project Team



Bill Guenther is an Senior Scientist and Project Manager in Fuss & O'Neill's Water and Natural Resource Planning Department. His principal areas of expertise include watershed and stormwater management, water quality monitoring and evaluation, MS4 Compliance, structural and non-structural stormwater BMP selection, and Harmful Algal Blooms (HABs).



Arnold Robinson is Regional Director of Planning has been practicing in the fields of community planning, historic preservation and urban design for more than 30 years. His practice focuses on effectively engaging residents, public officials and diverse stakeholders in the planning and review process.



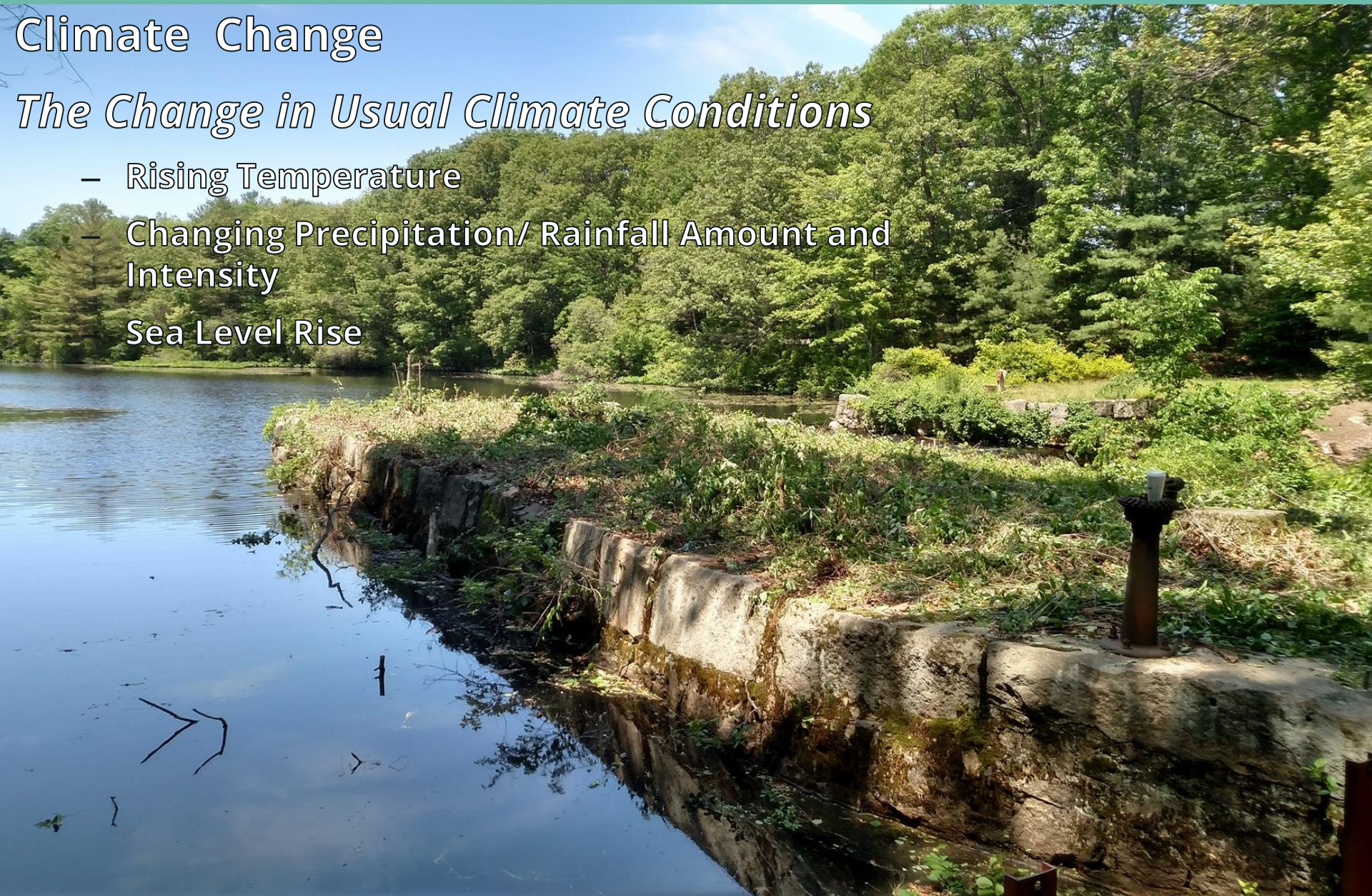
Stefan Bengston is an Environmental Scientist in Fuss & O'Neill's Water and Natural Resource Planning Department. His principal areas of expertise include watershed management, water quality monitoring, GIS analysis, and statistical modeling. He has also led field crews in wetland monitoring and ecological research.

# Terminology

## Climate Change

### *The Change in Usual Climate Conditions*

- Rising Temperature
- Changing Precipitation/ Rainfall Amount and Intensity
- Sea Level Rise



# Town of Foxborough – Taunton Basin

## Rising Temperature

Taunton Basin	Observed Baseline 1971-2000	Projected Change in 2030s	Projected Change in 2050s	Projected Change in 2070s	Projected Change in 2090s
Average Annual Temperature (°F)	49.85	2.03 to 3.77	2.68 to 5.94	3.12 to 8.62	3.43 to 10.49
Annual Days with Maximum Temperature over 90°F (Days)	7.43	5.38 to 14.58	7.20 to 29.31	9.27 to 49.91	11.88 to 65.46
Annual Days with Minimum Temperature below 32°F (Days)	129.76	-13.27 to -27.89	-18.99 to -43.59	-23.07 to -57.04	-24.79 to -67.94

# Town of Foxborough – Taunton Basin

## Changing Precipitation

Taunton Basin	Observed Baseline 1971-2000	Projected Change in 2030s	Projected Change in 2050s	Projected Change in 2070s	Projected Change in 2090s
Total Annual Precipitation (Inches)	47.48	-0.05 to 4.11	0.33 to 5.35	0.90 to 6.61	0.38 to 7.34
Annual Consecutive Dry Days (Days)	17.33	-0.23 to 1.29	-0.07 to 2.25	-0.90 to 2.80	-0.34 to 3.65

# Town of Foxborough – Boston Harbor Basin

## Rising Temperature

Boston Harbor	Observed Baseline 1971-2000	Projected Change in 2030s	Projected Change in 2050s	Projected Change in 2070s	Projected Change in 2090s
Average Annual Temperature (°F)	50.1	2.1 to 4.0	2.7 to 6.1	3.2 to 8.9	3.5 to 10.8
Annual Days with Maximum Temperature over 90°F (Days)	8	6 to 16	8 to 29	9 to 49	12 to 67
Annual Days with Minimum Temperature below 32°F (Days)	119	-12 to -27	-17 to -42	-21 to -55	-23 to -66



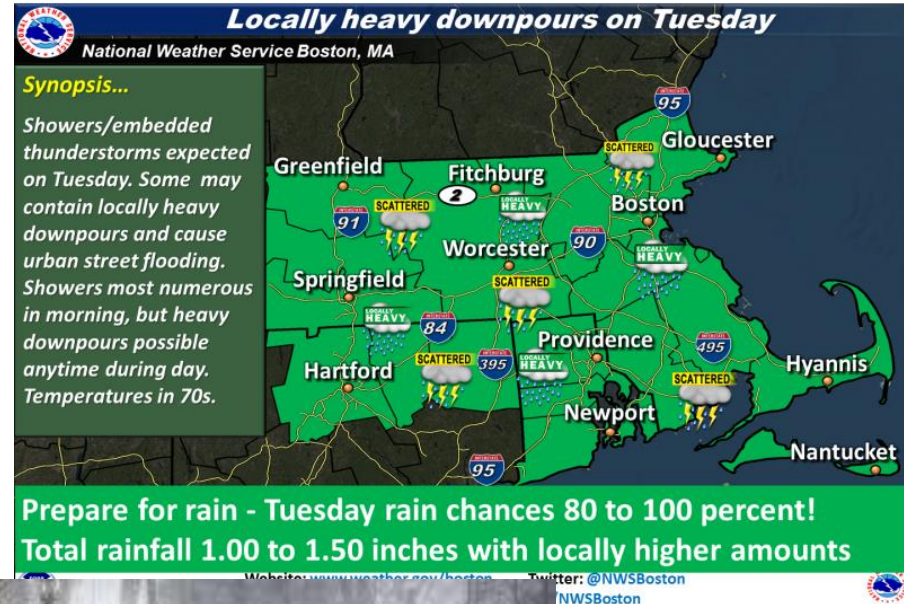
# Town of Foxborough – Boston Harbor Basin

## Changing Precipitation

Boston Harbor	Observed Baseline 1971-2000	Projected Change in 2030s	Projected Change in 2050s	Projected Change in 2070s	Projected Change in 2090s
Total Annual Precipitation (Inches)	46.07	0.02 to 4.67	0.30 to 6.20	1.19 to 7.67	1.09 to 9.03
Annual Consecutive Dry Days (Days)	17.46	-0.29 to 1.41	-0.41 to 2.17	-0.93 to 2.88	-0.59 to 3.64

# Climate Change Impacts - Temperature

- Economic
  - Winter Recreation
  - Snow and Ice
- Agricultural
  - Longer Growing Season
- Health
  - Increased Pests
  - Heat Stroke
- Infrastructure
  - Road Buckling
  - More Potholes
  - Power Outages
- Environment
  - Change in Habitat



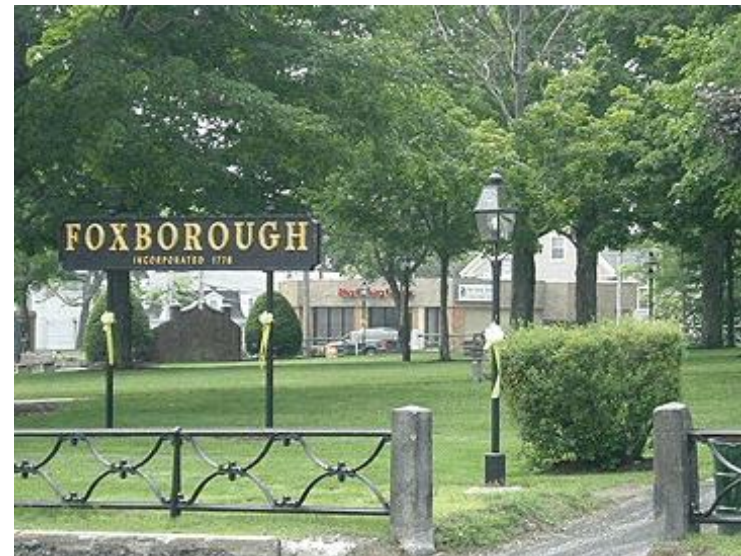
# Climate Change Impacts - Precipitation

- Economic
  - Dangerous Floods
  - Lost work time
- Agricultural
  - Excessively Wet Spring
  - Drought
- Health
  - Flood/High Water-related Deaths
  - Emergency Response Delays
- Infrastructure
  - Road Washout
  - Environment
  - Sewer System Overflows
  - Compromised Bridges
- Changes in Habitat



# MVP Program

- Top Priority Hazards
  - Flooding
  - Winter Storms Snow/Wind
  - Wind Events
  - Extreme Weather



# Risk Matrix

**Community Resilience Building Risk Matrix**



[www.CommunityResilienceBuilding.com](http://www.CommunityResilienceBuilding.com)

**H-M-L** priority for action over the **S**hort or **L**ong term (and **O**ngoing)  
**V** = Vulnerability **S** = Strength

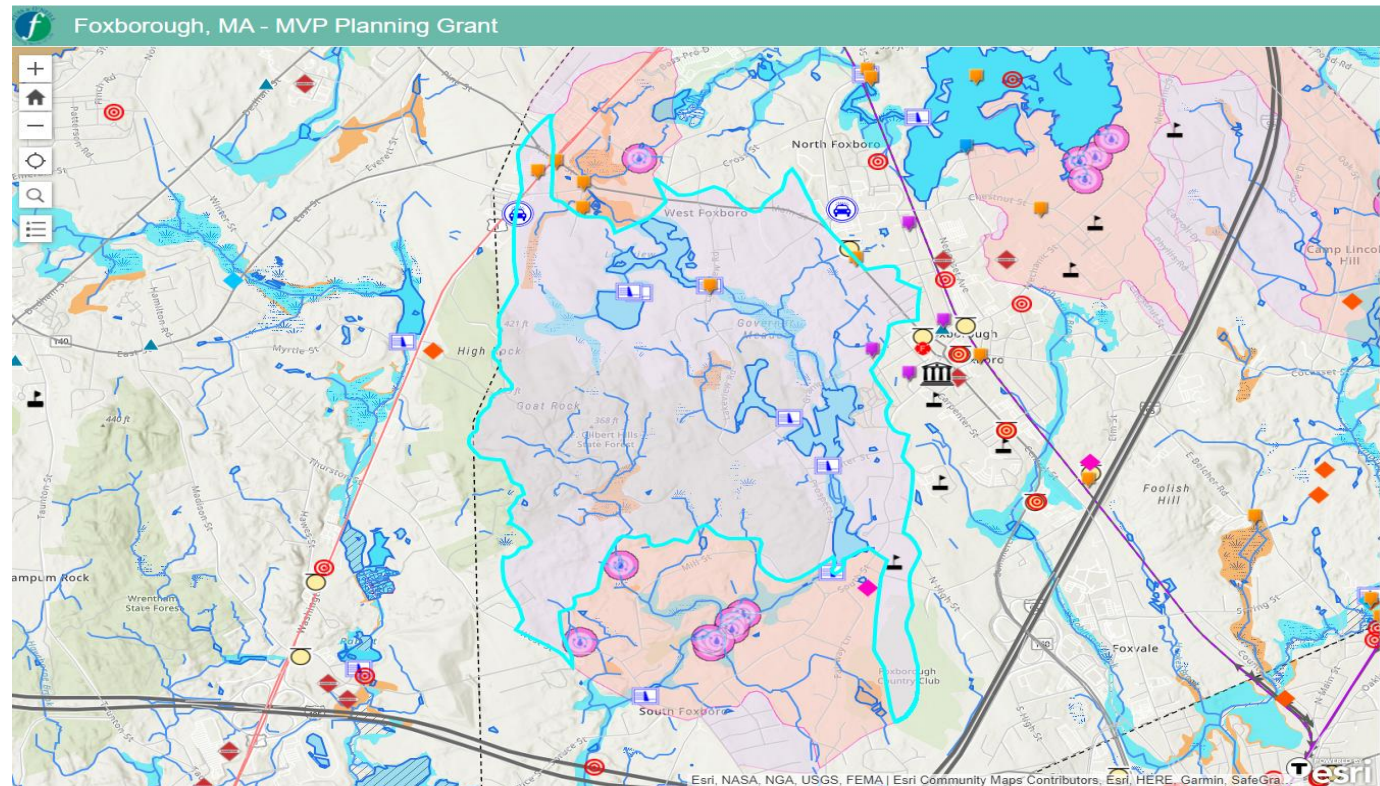
**Top Priority Hazards** (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features				Location	Ownership	V or S					Priority		Time			
											H	M	L	Short	Long	Ongoing
<b>Infrastructural</b>																
<b>Societal</b>																
<b>Environmental</b>																

# Mapping

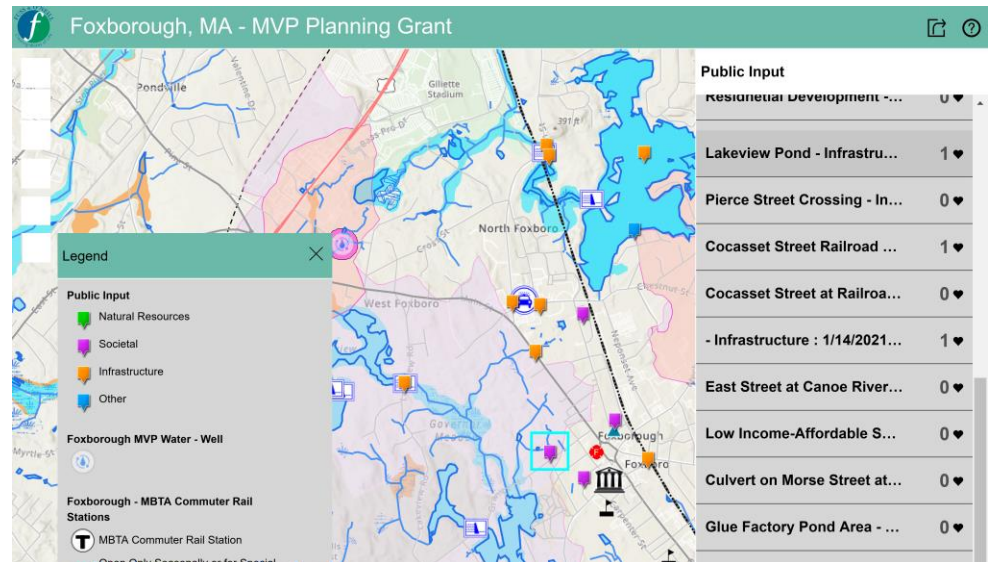
- 1) Log In
  - Log in to the Foxborough Climate Change Impact Mapping Tool
  - <https://fussandoneill.maps.arcgis.com/apps/CrowdsourceReporter/index.html?appid=5b8310b0e2be4b7a97793066c888286d>

If you are using Internet Explorer you will be prompted to use a different browser for best results



# Mapping cont.

- 2) Review the Map for contents
  - On the left side of the screen is a navigation tool bar
  - At the bottom of the toolbar is Legend Icon (looks like a small bulleted list)
  - Review the Legend so you can understand all the symbols on the map, including:
    - *Especially Existing Comments*



# Mapping cont.

- 3) Add your input to any existing Comments on the map:
  - If you see that someone else has already made an observation similar to the one you were thinking about, you can (and should) add your agreement, disagreement or additional thoughts.
  - Comments are in four categories:
    - *Infrastructure (ORANGE FLAGS) for assets roads, bridges, water and sewer systems, electrical generation and distribution, buildings, etc.*
    - *Natural resources (GREEN FLAG) for assets such as rivers and streams, wetlands, lakes, forests, etc.)*
    - *Societal (PURPLE FLAGS) for assets such as senior housing, neighborhoods with concentrations of elderly, ability-challenged or low-income residents, community organizations, etc.*
    - *Other (BLUE FLAGS) for assets that may not fit neatly into one of the other categories*



- 4) Add a new Comment to the Map
  - Click on the “Submit a Report” box on the bottom of the right menu
  - Select an area or asset you wish to locate and comment on. A new dialogue box will appear on the right side of the screen. Fill it out with the following information::

The screenshot shows a mobile application interface for submitting a public input. The form is titled "Public Input" and includes the following sections:

- Details:**
  - Comment Type (required):** A dropdown menu with "Select..." as the current selection. A red callout box labeled "Choose:" lists options: "Natural Resources", "Infrastructure", "Societal", and "Other".
  - Comment Date (required):** A date and time field showing "12/22/2020 3:30 pm".
  - Full Name (required):** A text input field. A red callout box labeled "Your name here" points to this field.
  - Information Comment:** A large text area for entering the comment. A red callout box labeled "Type the substance of your Comment" points to this area.
- Location:**
  - A prompt: "Click the map to draw the location." followed by a search bar "Enter an address to search" with search and location icons.
  - At the bottom, there are two buttons: "Report It" (with a small square icon) and "Cancel". A red callout box labeled "Click this when you're ready to post your Comment" points to the "Report It" button.



# Next Steps

- Draft Risk Matrix
- Prioritization Meeting
  - February 9, 2021 @ 9:00AM
  - Call will take 1-1.5 hours
  - Review prioritization and finalize the top 3-5 priorities

Questions?