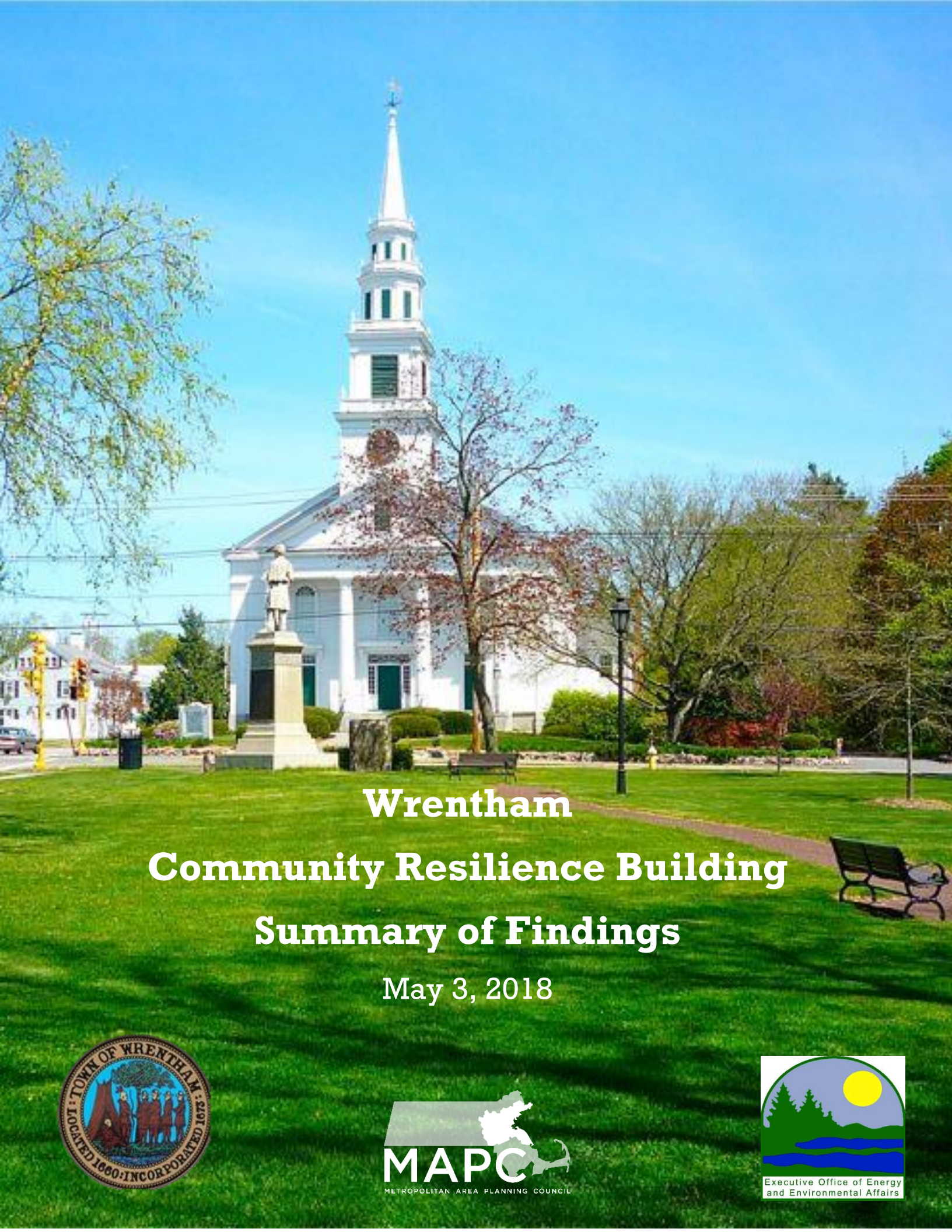

Wrentham
Community Resilience Building
Summary of Findings

May 3, 2018

MAPC
METROPOLITAN AREA PLANNING COUNCIL

Executive Office of Energy and Environmental Affairs

ACKNOWLEDGEMENTS

The project was conducted by the Metropolitan Area Planning Council (MAPC) with funding from Executive Office of Energy and Environmental Affairs. Special thanks to Chief McMorrow for initiating the program for the Town, to the Wrentham Police and Fire for providing and arranging the workshop space, to Kevin Sweet, Town Administrator, for managing the process, and to all the participants who enthusiastically and diligently worked to create a more resilient Wrentham.

METROPOLITAN AREA PLANNING COUNCIL

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Supporting Materials	Elise Harmon
Workshop Facilitators	Anne Herbst, Ralph Wilmer, Carolina Prieto

Town of Wrentham

Town Administrator	Kevin Sweet

CORE TEAM MEMBERS

Kevin Sweet	Town Administrator
Darryl Luce	Conservation Commission
Joe Heck	Emergency Management
Jay McMorrow	Chief, Fire Department
Mike Lavin	Director of Public Works
John Charbonneau	Director of Planning and Development
George Labonte	Police Lieutenant
William McGrath	Chief of Police

Citation

Metropolitan Area Planning Council. 2018. *Town of Wrentham Municipal Vulnerability Preparedness Program. Community Resilience Building Workshop Summary of Findings*. Wrentham, Massachusetts.

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Overview

In the last five years, Massachusetts has experienced increasingly more frequent and severe weather events. Record-breaking snowfall in 2015, an extensive and severe drought in 2016, the warmest year on record in 2017, and four Nor'easters in one month and flooding comparable to the Blizzard of 1978 in 2018 are just some examples. Climate Change is not imminent but affecting the people and cities and towns of the Commonwealth today. Wrentham is currently challenged with localized flooding in roads, low drinking water supply during times of drought, water quality and stormwater management challenges, and widespread loss of electricity during severe storms. However, Wrentham has been proactive in planning and incrementally improving its resilience to natural hazards in the last eight years. The Town had to foresight to update its Natural Hazard Mitigation Plan and to pursue the Municipal Vulnerability Preparedness program simultaneously. These combined efforts will minimize loss, maximize recovery, and protect its community in the face of our changing climate. Wrentham envisions natural hazards and climate change as opportunities to build an even more vibrant, safe, and healthy community through these planning and action efforts.

Community Resilience Building Workshop

Wrentham received a grant from the Massachusetts Executive Office of Energy and Environmental Affairs to participate in the Commonwealth's Municipal Vulnerability Preparedness (MVP) program. The program provides supports for municipalities to plan and implement key climate resilience actions using a community-based, multi-disciplinary, participatory planning effort through the Community Resilience Building (CRB) platform.[1] Wrentham contracted with the Metropolitan Area Planning Council (MAPC) to administer the program with the community. The process was guided by a core team that also serves as its Natural Hazard Mitigation steering committee, providing synergy and alignment with both processes.

Participants were identified using guidance from the CRB Workshop Participant Worksheet[2] and MAPC's best practices in ensuring equity in climate adaptation planning.[3] Wrentham's Town Administrator sent personal invitations to over 37potential participants with broad sector/community stakeholder representation. Wrentham gathered 28 participants across 11 municipal departments, the school, housing authority, two businesses, health providers, religious leaders, Council on Aging, Food Pantry, and political leaders to participate in the CRB workshop. Participants were assigned to small teams in a manner that maximize the diversity of sectors in any one given table. The goal in this method was to enhance different perspectives and identify resiliency opportunities that solved multiple vulnerabilities across sectors.

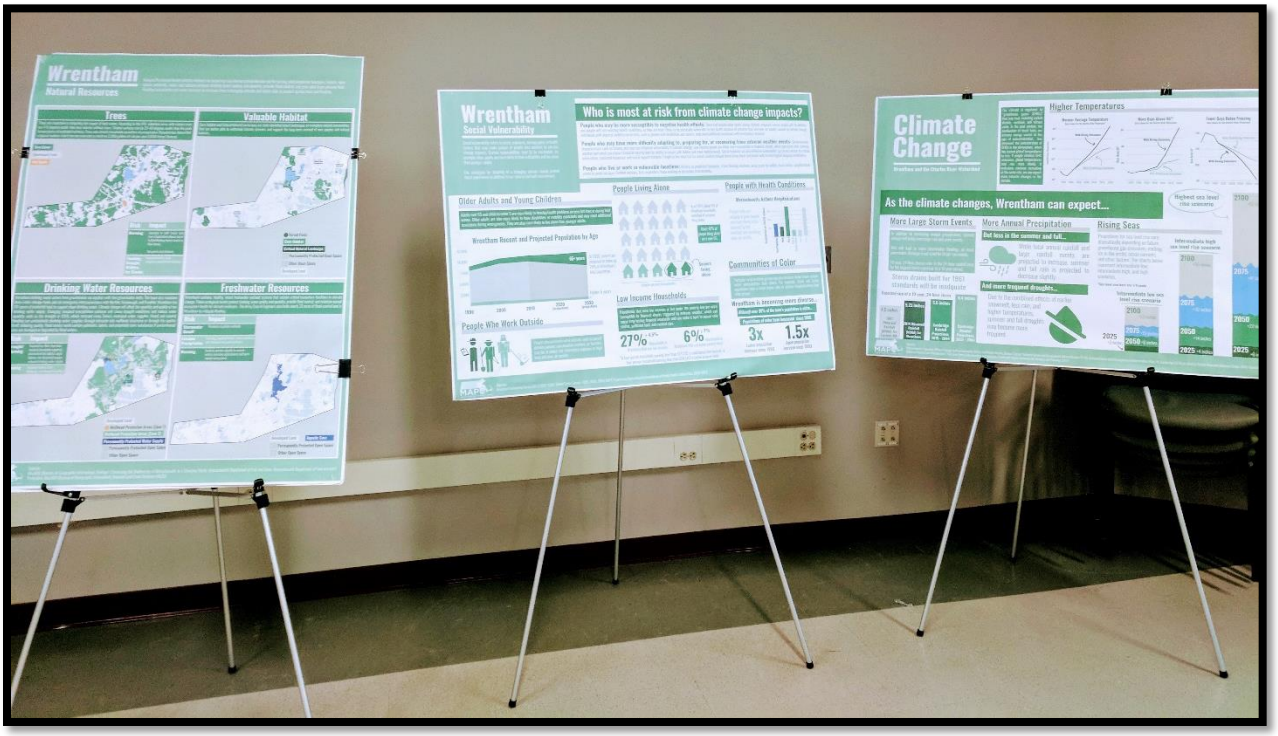
The Core Team outlined the following objectives for its MVP and CRB participatory planning event:

1. Understand connections between ongoing natural hazards and climate change on local planning and actions in Wrentham.
2. Identify and map vulnerabilities and strengths of people and places, both buildings and natural environment/parks.
3. Develop and prioritize actions that reduce vulnerabilities and reinforce Wrentham strengths.

1 www.CommunityResilienceBuidling.com
2 https://docs.wixstatic.com/ugd/29a871_7f4a484414be4e5f87d1041de9c8524f.pdf
3 https://www.mass.gov/files/mapc-equity-and-climate-planning-mvp-webinar.pdf

4. Identify opportunities to advance actions that further reduce the impact of hazards and increase resilience in Wrentham.

Figure 1 Informational posters on climate, environment and people for Wrentham MVP workshop.



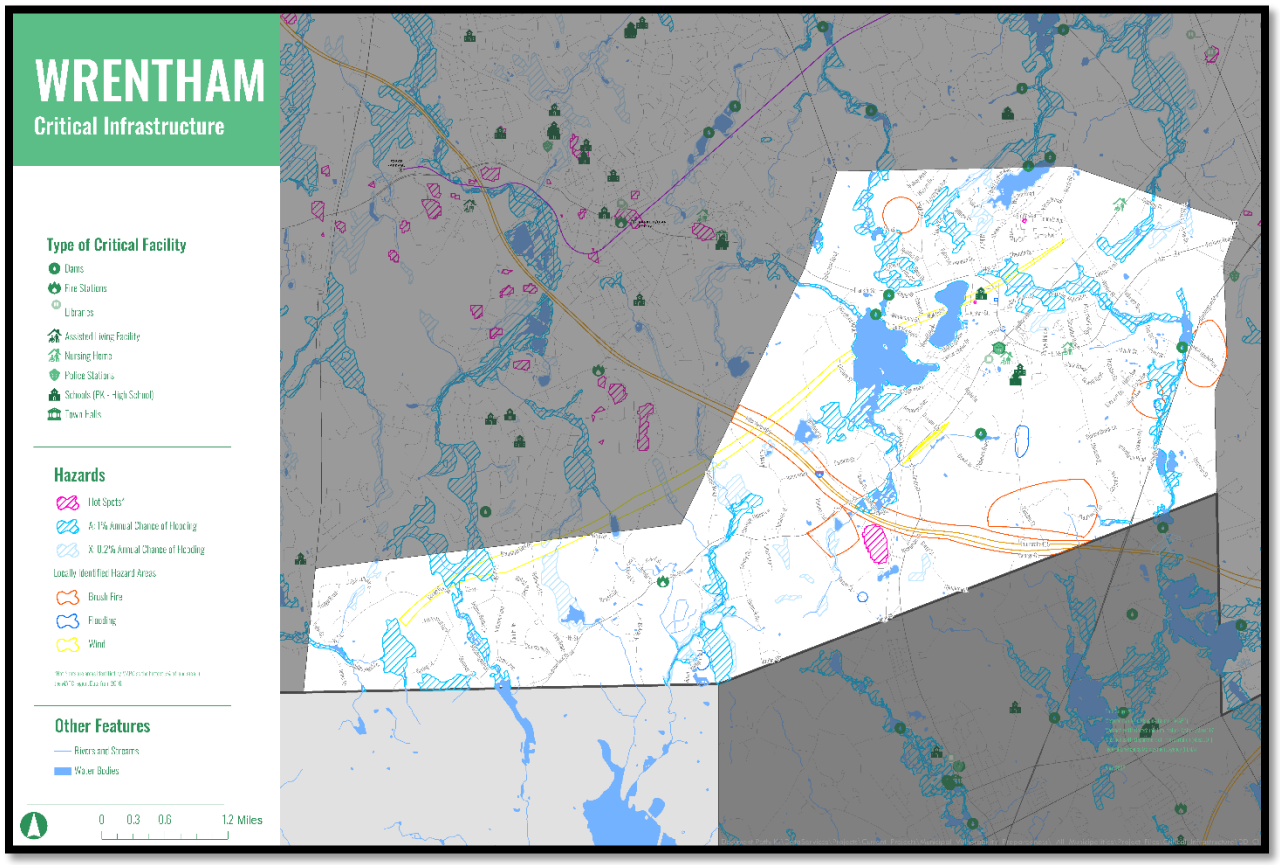
MAPC led and facilitated the workshop with four CRB-trained individuals. They provided to participants an introduction to climate change, climate observations and projections, and implications of these changes on the Town of Wrentham's society, infrastructure, and environment. These were presented in both poster form (Figure 1 and Appendix B) and Power Point presentation form (Appendix A). Climate change data used to inform Wrentham's risk came from the following sources: (i) the Northeast Climate Science Center, (ii) National Oceanic and Atmospheric Administration, (iii) Cambridge Climate Change Vulnerability Assessment, (iv) the Boston Research Advisory Group, (v) Massachusetts Office of Coastal Zone Management, and Blue Hill Observatory and Science Center. Furthermore, each small team had a table map (Figure 2 and Appendix B) that identified Wrentham's Critical Infrastructure, 1% Annual Chance Flood, locally identified hazards and areas of extreme heat.[4]

Participants brought a wealth of knowledge and expertise from their respective yet diverse local experiences and fields and engaged in a consensus-building effort that gathered to "solve the problem" of climate change as noted by one participant. Driven by those who live and work in Wrentham, the opportunity to advance resiliency is greatly enhanced through the CRB workshop platform, a collaborative exercise for Wrentham's future. After identifying the Town's vulnerabilities and identifying and prioritizing actions in their small groups using the CRB Risk

[4] MAPC uses land surface temperature data during the hottest periods of the summer months in 2016 to ascertain how likely an area may experience the urban heat island effect. We represented the area in Wrentham that outlines the top fifth percentile of land surface temperature of the 101 communities in Metro Boston.

Matrix (Appendix C), the participants reconvened to vote on their overall top priority actions as a large group.

Figure 2 Wrentham Small Group working map



This report serves to provide a summary of findings from Wrentham's one-day CRB workshop on May 3, 2018. The prioritized actions in this plan represent a collective and collaborate effort to address climate resiliency and natural hazard mitigation from a multi-disciplinary approach.

Summary of Findings

Top Hazards and Vulnerable Areas

The Core Team identified top hazards for the community of Wrentham. These hazards were determined by challenges the Town has already experienced from recent events, long-standing issues, and alignment with the Town's Natural Hazard Mitigation Plan update. These top hazards have already affected stormwater management, road flooding, disruption in services, drinking water supply, and risks with downed trees and loss of electricity.

Town of Wrentham Climate Hazards include:

- Inland flooding
- Heat Waves
- Severe Storms (ice storms, tornados, Nor'easters, blizzards)
- Drought

These hazards pose greater risks in some areas of the Town than others. Table 1 summarizes participants identified areas of significant concern:

Table 1. Wrentham areas of concern, vulnerable to identified hazards.

Wrentham Areas of Concern

Neighborhoods	Society	Infrastructure	Environment
West Wrentham	People with Disabilities*	DPW Complex	Lakes
Lake Pearl	People with Medical Rehabilitation needs*	Well Pump Stations	Non-contiguous Open Space
Town Center	People with Mental Illness*	Wells	Drinking Water
Wrentham Outlets	Senior Citizens	Utility Substations	Non-point pollution
	Court House employees	Eagle Dam	Taunton River Basin
	Family Pets	Crocker Pond Dam	
	Low Income Individuals	Red Dam	
		Route 121	

** These individuals are all serviced in medical/professional facilities located in Wrentham.*

Current Concerns and Challenges Presented by Hazards

As described previously, Wrentham has been mitigating and responding to community concerns, damage, and emergencies as a result of extreme weather events for some time. Participants noted that these extreme events are becoming more frequent and intense more recently than in the past and they were eager to build upon their existing strengths to protect their people, places and economy through our changing climate. Inland flooding from precipitation events has been an ongoing challenge in the Town, particularly where drainage and stormwater infrastructure has been insufficient to manage the increasing levels of precipitation. Beavers also contribute to ongoing flooding. The lakes in Wrentham are often an area of consistent flooding during extreme precipitation events, making neighboring residences vulnerable to basement flooding. These challenges exacerbate water quality issues the Town faces in its lakes and streams and potentially in its aquifers. Non-point and point source pollutions, particularly from substandard onsite waste water systems, geese, and new development, cause major challenges for managing water quality for the Town.

Some most recent events that had a major impact on the Town include the drought of 2016 and the Nor'easters of 2018. In 2016 during one of the worst droughts MA has seen since the 1960s, the Town's aquifer supplies because extremely low no rainfall and excessively high demand for water use. The conditions raised concerns for public safety including brush fires and aquifer contamination. The Town declared a State V Water Ban in September 2016 as a result.[5] In March 2018, the Town had widespread electricity loss during Winter Storm Riley. This is an ongoing risk to the Town because of the location of the substations. During storms, if trees hit certain substation equipment, electricity loss becomes a regional vulnerability. And workshop participants noted that Wrentham is often one of the last towns to get electricity returned during emergencies.

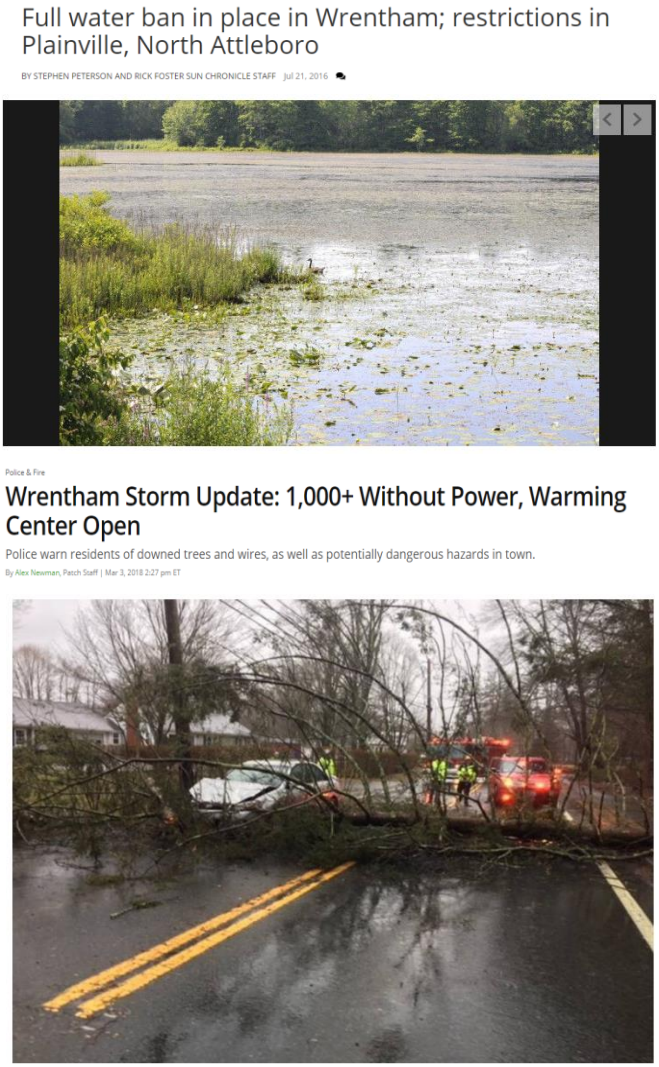


Photo Credit: Patch (top) and Wrentham Police Department (bottom).

[5]http://wrentham.ma.us/files/Wrentham%20Website%20Files/Public%20Works/Water%20Division/Miscellaneous/StageVWaterBanWebsiteUpdate-9-12-16%20.pdf

Specific Categories of Concerns and Challenges

Comprehensive Emergency Management Plan

There was a consensus with all participants that Wrentham is in need of a Comprehensive Emergency Management Plan, one that crosses all sectors and ensures the most comprehensive public safety assurances during emergencies. Of particular interest is public sheltering that supports the community for more than three days, is ADA compliant, includes showers that are ADA compliant, and includes food and potable water during emergencies. Another major concern around emergency management is communications both to the public through multi-media formats and within the public safety departments. Because electricity loss is a frequent risk, Wrentham wants to ensure that communication systems can function without electricity, internet and/or radio tower during extreme weather events.

Housing and Community-Based Facilities

Workshop participants consistently raised concerns over vulnerable populations that are serviced by the many housing, medical, mental health and/or rehabilitation facilities located in town. These include the Maple Nursing and Rehabilitation Center, Liberty Pines, Bennett Gardens, Wrentham Developmental Center and other housing authority facilities. Of particular concern is evacuation planning or sheltering-in-place capacity at these facilities. Is the Town or facilities prepared to mobilize these residents in a manner that is supportive to physical disabilities, mental health, and /or medical challenges? Workshop participants expressed urgency in communication, outreach, and collaborative planning to ensure safety to the most vulnerable populations in Wrentham.

Stormwater Management

Non-point source pollution, phosphorus loading, drainage, and stormwater infrastructure capacity causing potential flooding are all concerns raised by participants in relation to stormwater management. Participants noted that the lakes in Wrentham, such as Lake Pearl and Lake Archer, are vulnerable to nutrient loading from stormwater runoff detrimentally affecting the quality of these recreational lakes. Further, Wrentham is at the head of the Charles River Watershed, Ten-Mile River Watershed, and Taunton River Watershed. One participant noted that the Taunton River Watershed is a State Basin of Concern. Stormwater management is important to protect the quality of these rivers. Beaver activity, increased rainfall during precipitation events, and new development exacerbate the challenges of managing stormwater and inland flooding in Wrentham. Participants also expressed that solutions to managing stormwater should cross municipal departments. For example, the Board of Health is responsible for enforcing stormwater regulations and the Department of Public Works is responsible for managing and upgrading stormwater infrastructure. By including multiple municipal departments in stormwater management, participants stated that enforcement and proactive measures are better achieved collectively rather than burdening one entity, such as the Board of Health, to solve this complex and town-wide challenge.

Drinking Water Quality and Quantity

Drinking water quality and quantity were raised as challenges that face Wrentham. Though one participant noted Wrentham has a good sole-source aquifer, however past challenges and future climate projections could cause stressors to this functioning system. The Massachusetts drought of 2016 stressed many communities' drinking water supplies and Wrentham was not immune. In addition, participants noted that private wells in the western part of town do run dry during periods of low precipitation. Finally, though not currently an issue, participants noted that aquifer contamination is a risk, particularly with projected increased precipitation with climate change and flooding near well pumps.

Town Communications-Emergency and Residential

Participants had wide agreement on a need to plan and improve communications both within public safety staff, to the community, and with vulnerable populations. Public Safety staff raised concerns on the ability to communicate during emergency and/or extreme weather events if electricity or internet are not available. Further, if radio towers are vulnerable to high wind and damage, public safety is even further impeded to critical communication, particularly during rescues and/or weather-related hazards such as felled trees and electricity lines in roads. However, participants also noted that the Town does not have adequate communications to its residents particularly during times of emergency. They also noted that varying types of communication, such as Nexis, social media, print, and neighbor-to-neighbor, are the most effective means for widespread information and outreach.

Dams

There are three dams that participants identified as vulnerabilities because of existing conditions, ongoing maintenance requirements, or future climatic conditions. These include Eagle Dam, Red Dam, and Crocker Pond Dam. As most dams were designed using historical precipitation patterns, dam infrastructure will soon pose greater vulnerability with projected increases in precipitation. As it stands today, failure at Eagle Dam would create widespread damage to the Town, particularly residential areas, adjacent cranberry bogs, Route 140, buildings and municipal systems. An additional challenge with Eagle dam is the mature vegetation on the embankment. The Town is concerned that high winds, a hurricane or other storm will pull down the mature trees and cause flooding on State Route 140. Red Dam has ongoing maintenance challenges and Crocker Pond Dam requires coordination with the Town of Attleboro.

Open Space continuity and tree canopy

Wrentham has significant protected open space and tree canopy across the Town, however participants noted the discontinuity of both. For example, the Wrentham Village Premium Outlets area is an urban heat island and within the top 5% of hottest areas in the Metropolitan Boston region. The remainder of the Town has significant canopy cover to mitigate heat but open space is not generally contiguous. Climate resilience is enhanced by contiguous tracks of open space and natural areas, and participants noted that open space protection and regulation in development should be a priority.

Current Strengths and Assets

Wrentham has a solid foundation of assets, services, people and infrastructure that will serve to enhance its resiliency through our changing climate. CRB participants highlighted and sought to enhance these with best practice resiliency efforts to ensure a vibrant future for their community. Assets identified by participants include:

Centralized and cooperative public safety staff and building.

These well-trained, highly-committed staff are located in the public safety building which could become a center for communications and operations during emergencies. Further, the Town Hall, adjacent to the Public Safety Building, has a generator to serve during storms with electricity loss.

Natural assets and ecosystem services.

Wrentham has over 2,700 acres of open space and a tree cover that mitigates air pollutants, avoids stormwater costs, cools the Town and sequesters carbon at notable amounts. The Planning Board encourages open space in new development and a healthy tree canopy is valued by municipal officials, residents, and decision makers. Further, theses natural systems support clean drinking water and recharge for their aquifer. Their lakes are popular community gathering spaces.

Community services for vulnerable populations.

A notable outcome of the CRB workshop is a renewed awareness to the participants the extent of community services provided and available through medical, rehabilitation, and mental health facilities and programs in the Town of Wrentham. For example, Wrentham has five active day care centers and an active Council on Aging that also serves as a warming and cooling station. The Public Health Nurses do wellness visits to residents and have extensive knowledge of the community and its resident's needs. In addition, the Town supports a food pantry on Saturday mornings and workshop participants agreed that expanding hours and services of the food pantry during emergencies and extreme weather events could be really helpful. Other notable facilities include (i) the Wrentham Developmental Center, a state-owned facility providing in-patient treatment for mental illness, (ii) Maples Nursing Home and Rehabilitation Center, located in the center of Town providing assisted living and in-patient medical rehabilitation services, (iii) Liberty Pines, a privately-owned affordable senior housing facility, (iv) Bennett Gardens, an affordable senior housing facility provided by the Wrentham Housing Authority, (v) two additional assisted living and rehabilitation centers, Serenity Hill and Pond Home, and (vi) the Council on Aging Senior Center.

Top Recommendations to Improve Resilience

At the end of the workshop, participants gathered as a large group to report on their top resiliency actions for each of the three categories: infrastructure, societal, and environment, determined in their small groups. These actions were documented and combined when appropriate on posters. Participants then voted as a large group using orange stickers on their top three resiliency actions from the collated actions. Appendix D illustrates the voting results. From this exercise, the Wrentham CRB participants designated the following as their top priority actions:

Infrastructure

- Establish a shelter that can serve the community for multiple days, is ADA compliant, can include showers and cooking facilities, and provide back-up power generation. Consider the Delaney School as an option.
- Relocate the Department of Public Works complex including the building, salt shed, and other facilities outside of the floodplain.
- Improve and upgrade communication equipment and strategies for public safety and municipal staff, particularly during emergencies. Ensure there are back-up strategies that will function in the event of loss of electricity and internet, such as redundancy towers.

Society

- Create a more cohesive Local Emergency Planning Committee and work to create a better more cohesive Comprehensive Emergency Management Plan.
- Create a plan to protect residents during emergencies and extreme weather events for Bennett Gardens and other Housing Authority facilities.
- Increase the size of the Senior Center.
- Expand Food Pantry operations to include all residents and increase hours during time of emergencies and extreme weather events.
- Create back up potable water options during emergencies and extreme weather events.

Environment

- Re-evaluate existing stormwater bylaws. Ensure bylaws address water quality issues and green infrastructure opportunities for stormwater management.
- Create a new Open Space and Recreation Plan that prioritizes connected open space and acquiring land that prioritizes resiliency and climate/natural hazard mitigation.
- Restore the lake systems in town for water quality, recreation opportunity, and flood mitigation.

Appendix C contains the risk matrices from the CRB Workshop Small Group, which includes vulnerabilities, strengths, actions, prioritization, and time frame. Table 2 summarizes participant's recommended actions for climate resiliency and their priority ranking/timeframe by small group and category.

Table 2 Summary of all actions by priority, category, and small group.

Small Group	Category	Resiliency Action	Priority	Time Frame
Blue	Environment	Mitigate non-point source pollution by upgrading storm drains, discouraging geese, and using green infrastructure	H	Long-Term
Green	Environment	Stormwater Management: (i) Identify and map outfalls, (ii) research existing stormwater bylaws, and (iii) determine whether bylaw updates are required to meet future precipitation projections.	H	Ongoing
Green	Environment	Perform a site feasibility study for new well in west Wrentham and create a water line on Madison.	H	Short-Term/Long-Term
Blue	Infrastructure	Elevate or move the Department of Public Works building to vacant parking lot or out of flood area. Make it ADA compliant. ADA compliant for showers.	H	Short-Term
Blue	Infrastructure	Install generator in high school/elementary school to create an emergency shelter.	H	Short-Term
Green	Infrastructure	Install generator of sufficient capacity at Senior Center and increase occupancy or additional warming centers.	H	Short-Term
Green	Infrastructure	Create a task force to identify how to manage emergency operations around having a centralized "command center" during emergencies.	H	--
Green	Infrastructure	Perform assessment/feasibility for relocating DPW building. Relocate Building	H	--
Red	Infrastructure	(i) Establish a real shelter, (ii) establish a local or regional emergency planning committee, and (iii) provide training for volunteers and medical professionals on emergency response.	H	--

Small Group	Category	Resiliency Action	Priority	Time Frame
Red	Infrastructure	Public Safety Communication: Pursue equipment upgrades, establish local redundancy, identify local ham radios.	H	--
Blue	Society	Expand Food Pantry hours to more than just 2 hours on Saturday. Create a plan for stocking food during emergencies for all residents.	H	Short-Term
Red	Society	Residential, medical, and mental health facilities: Town and facilities should communicate resilience plans and emergency services needs. The LEPC should engage and coordinate with residents and facility managers in planning, particularly around evacuation.	H	--
Blue	Environment	Trees and Storms: Create a taskforce for public safety. Work with National Grid on minimizing tree falling and electricity loss during emergencies.	M	--
Green	Environment	(i) Develop budget for tree maintenance, (ii) coordinate with Tree warden for tree planting and mortality, and (iii) create a hazard tree assessment/inventory.	M	Ongoing
Green	Environment	Dams: Consider options for removal versus repair (Eagle), (ii) explore dam removal funding opportunities (Eagle), (iii) coordinate with Attleboro on dam maintenance (Crocker Pond).	M	Short-term/Ongoing
Green	Environment	Develop a beaver management plan.	M	Long-Term
Red	Environment	Focus on contiguous block of open space, climate is used in open space planning, better understand climate with open space planning.	M	--
Red	Environment	Planning Board has strong tree regulations but improvements could include tree maintenance plans for public trees re-plantings for climate resilience to mitigate tree mortality.	M	--
Blue	Infrastructure	Water Supply: Provide bottled water at public safety station during emergencies or when wells run dry. Encourage more people on Town water.	M	--
Green	Infrastructure	Sheltering Capacity Schools: Add generator and air conditioning for schools.	M	Long-Term
Red	Infrastructure	Investigate non-grid power dependent supply, green sources. Provide solar charging stations and staff the station with EMS.	M	--
Red	Infrastructure	Rebuild Eagle Dam	M	--

Small Group	Category	Resiliency Action	Priority	Time Frame
Red	Infrastructure	Ensure that the regional dispatch for emergency services has a back-up generator and battery.	M	--
Blue	Society	Senior Affordable Housing Facilities: Create a plan to bring residents to shelter.	M	--
Blue	Society	Improve outreach and communications to low-income residents, particularly since they are geographically located throughout town. Use Nixel campaign.	M	--
Green	Infrastructure	Create a security plan for well pump stations located in flood zones.	M/L	--
Blue	Infrastructure	Flooding on Rt. 121: Build another road and/or seek municipal aid from other communities.	L/M	--
Blue	Infrastructure	Water Tank contamination: Communicate with State, work with State Representatives to minimize/mitigation potential contamination issues.	L/M	--
Red	Society	Encourage "Neighborhood Watch" with neighbors helping neighbors, enhance emergency notification through social media and signage.	L/M	--
Blue	Environment	Ongoing maintenance of Red Dam to ensure safety.	L	--
Blue	Infrastructure	Explore actions to make the library a warming center	L	--
Blue	Infrastructure	Maintain relationship with National Grid liaison, trim trees back 3 feet every 3 years, create a task force with National Grid, Police, and Fire. Check-in 1-2 times a year.	L	--
Red	Infrastructure	Waste Water Treatment Pumping Stations: Assess vulnerability and pursue resiliency planning. Investigate back-up capacity/power supply.	L	--
Red	Infrastructure	Make sure they will shut down plant if they have a failure.	L	--
Blue	Society	Establish better communication and collaboration between Town and Wrentham Developmental Center.	L	--
Blue	Society	Need to establish better communication, inquire on emergency management plan.	L	--

Small Group	Category	Resiliency Action	Priority	Time Frame
Green	Society	Increase size of community center, add generators, gas conversion and solar panels for electricity.	L	--
Blue	Society	Emergency Communications: (i) upgrade public safety communications to commercial grade radios, (ii) reverse all to calls to all citizens, (iii) utilize multi-media such as website, social media, texting and Nixel.	--	--
Green	Society	Create an emergency management plan that considers potable water distribution.	--	--
Red	Environment	Create plans for treating, containing, and back up for the aquifer, particularly regarding pollutants and times of drought.	--	--
Red	Environment	Address water quality issues in lakes (vegetation overgrowth) with new green infrastructure/treatments and septic system upgrades.	--	--
Blue	Society	Encourage Seniors to sign on to Nixel.	--	--
Green	Society	Create an emergency management plan.	--	--

CRB Workshop Participants

MAPC provided a modified CRB participant worksheet to the Core Team which built an invitation list of 37 potential attendees. This included seven elected officials, 14 municipal department managers, four appointed committees, three local clergy, the food pantry, housing authority, nursing/rehabilitation center, Wrentham Outlet Mall, a realtor, and an engineering firm.

The Town Administrator wrote a compelling invitation which was sent as an attachment via email. The invitation described the day's events and instructed people to RSVP directly to Darci Schofield at MAPC. Two weeks prior to the workshop date, the Town Administrator sent a brief follow up email to the same list which emphasized that that the invitees "local knowledge and expertise will make a difference." One week prior to the workshop, Wrentham called invitees personalize the RSVP process. Personal telephone calls were instrumental in getting those who had not committed to attend.

First	Last	Affiliation	Small Group
Judy	Fenton, RN	Public Health	Blue
Donna	Nye	BHHS Page Realty	Blue
Joe	Heck	Emergency Management	Blue
Nancy	Mure	Wrentham Food Pantry/Council on Aging	Blue
Jeffrey	Plimpton	Recreation Director	Blue
Maureen	Osolnik	Capital Budget, Recycling, Library	Blue
Alan	Cameron	Superintendent of Schools	Blue
James	McMorrow	Fire Chief	Blue
Designee		Maples Rehabilitation and Nursing Center Designee	Blue
Michael	Lavin	Director of Public Works	Green
John	Charbonneau	Planning Director	Green
Jim	Anderson	Selectman	Green
Karen	Jelloe	Wrentham Finance Director	Green
Kendall	Joyce	Wrentham Housing Authority	Green
John	Naff, CBO	Building Commissioner, Zoning Enforcement Officer	Green
Darryl	Luce	Conservation Agent	Green
George	LaBonte	Police Lieutenant	Green
George	Smith	Board of Health	Green
Lauren	Hewitt, RN	Public Health	Red

First	Last	Affiliation	Small Group
Stephen	Schwarm	Planning Board	Red
First	**Last**	**Affiliation**	**Table**
Kevin	Sweet	Town Administrator	Red
*Ken	Landin	Original Congregational Church	Red
Erika	Jacques	Senator Richard Ross office	Red
Fran	Padula	Council on Aging	Red
William	McGrath	Police	Red
Leo	Immonen	Chair, Conservation Commission	Red
Rep. Shawn	Dooley	House of Representatives	Red

* Denotes confirmed participant with unexpected obligation prohibiting attendance.

CORE TEAM MEMBERS

Kevin Sweet	Town Administrator
Darryl Luce	Conservation Commission
Joe Heck	Emergency Management
Jay McMorrow	Chief, Fire Department
Mike Lavin	Director of Public Works
John Charbonneau	Director of Planning and Development
George Labonte	Police Lieutenant
William McGrath	Chief of Police

Citation

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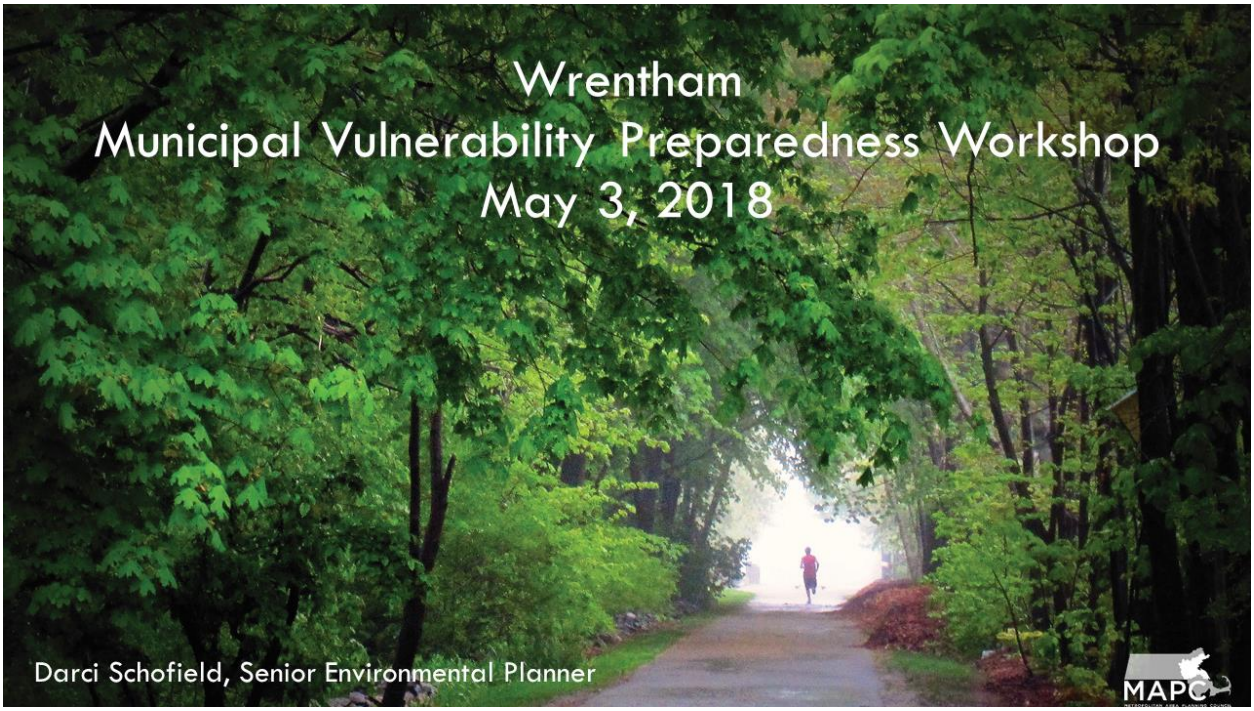
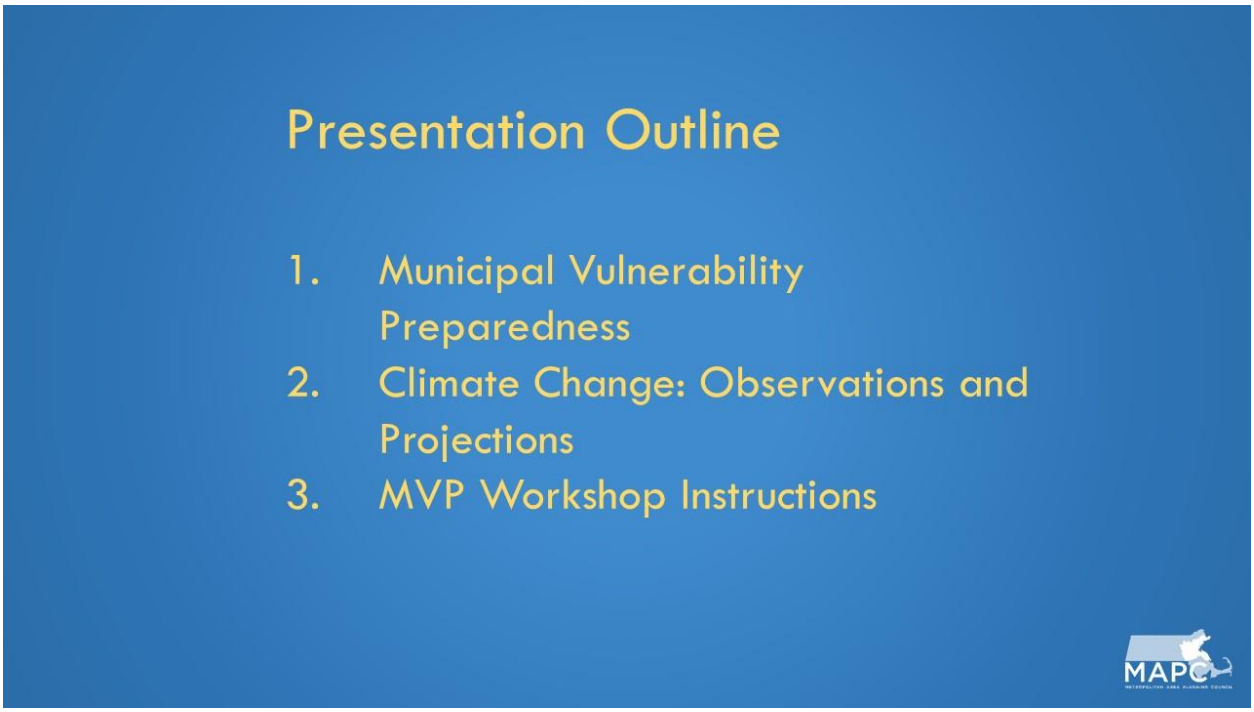
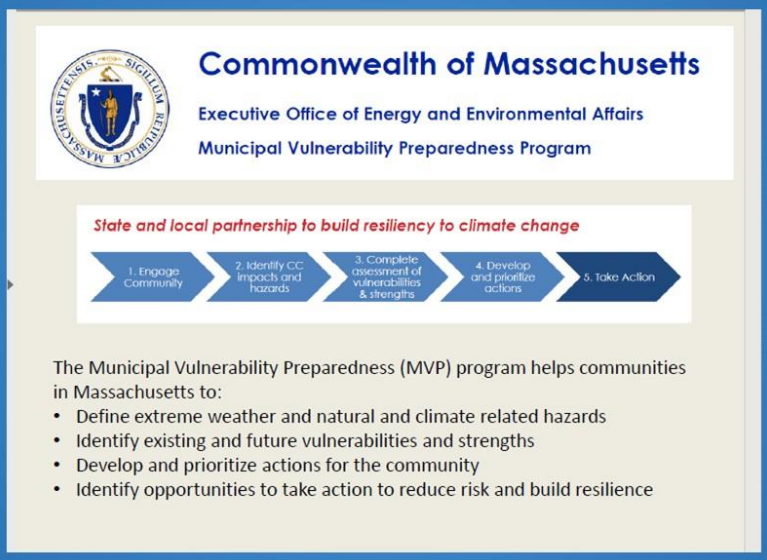
Appendix A – Wrentham CRB Workshop Presentation





Municipal Vulnerability Preparedness (MVP)



https://www.mass.gov/files/mvp-training-opening.pdf

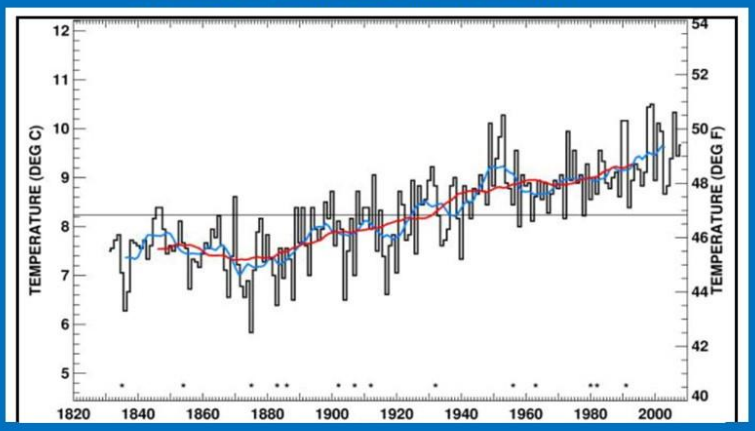
Wrentham MVP Agenda

May 3, 2018	
10:00 am	Welcome, Introductions
10:20am	Climate Change Projections and Implications for Wrentham
10:45 am	Workshop Instructions Presentation
10:55	Small Group Exercise-Identifying Risk Areas and Community Strengths
12:00 pm	Lunch
12:45 pm	Small Group Exercise- Creating Climate Actions
1:30 pm	Small Group Exercise- Prioritizing Climate Actions
2:00	Break
2:15 pm	Large Group Report Out-Community Resilience Building. Choose your action priorities with Sticky Dots
2:50 pm	Next Steps and Workshop Close

Temperature change: Observed

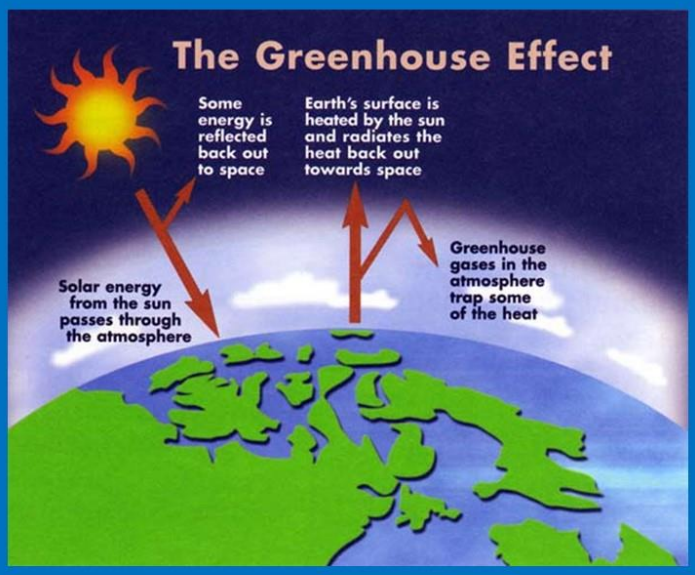
Blue Hill Observatory Annual Temperature, 1831-2008

Source: Michael J. Iacono (from MA Climate Change Adaptation Report 2011)

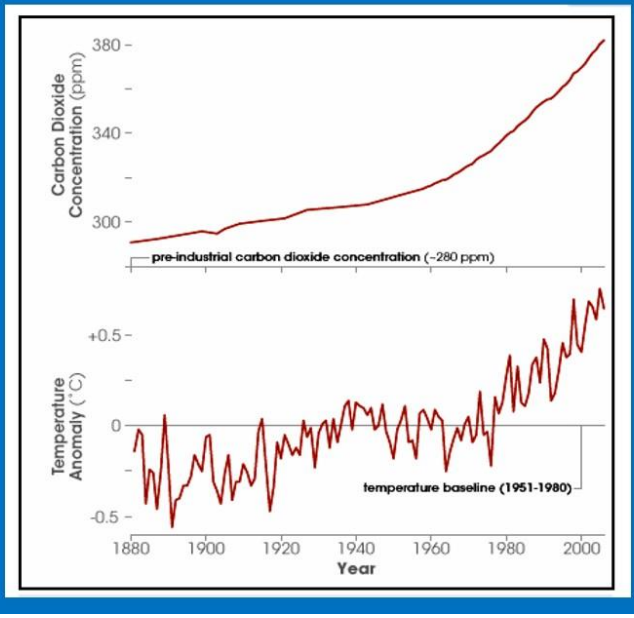


For the Northeast United States: temperature increased by almost 2 degrees, between 1895 and 2016 (US National Climate Assessment 2017)

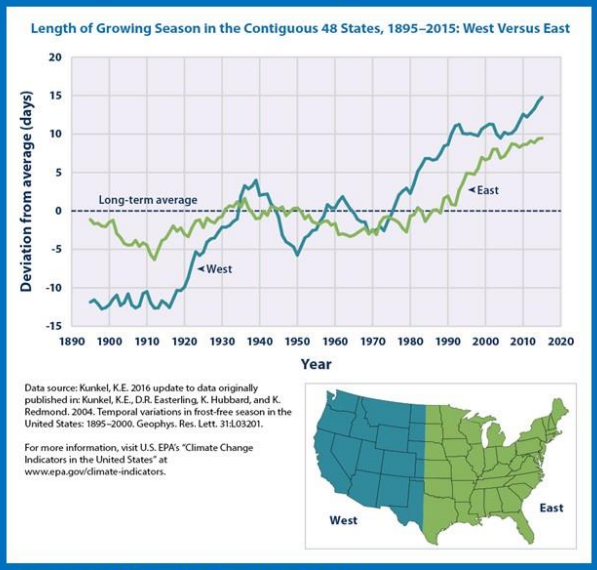
Climate Change: Process



Climate Change: Process

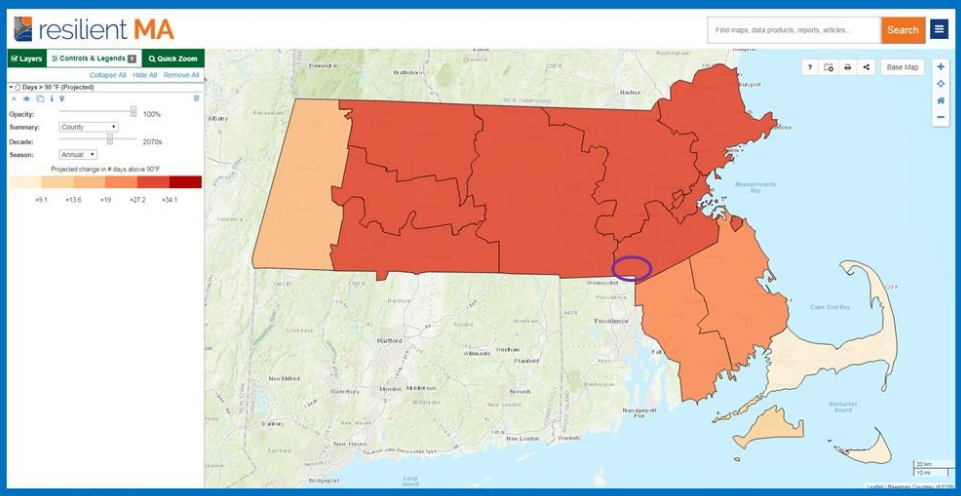


Temperature change: Observed



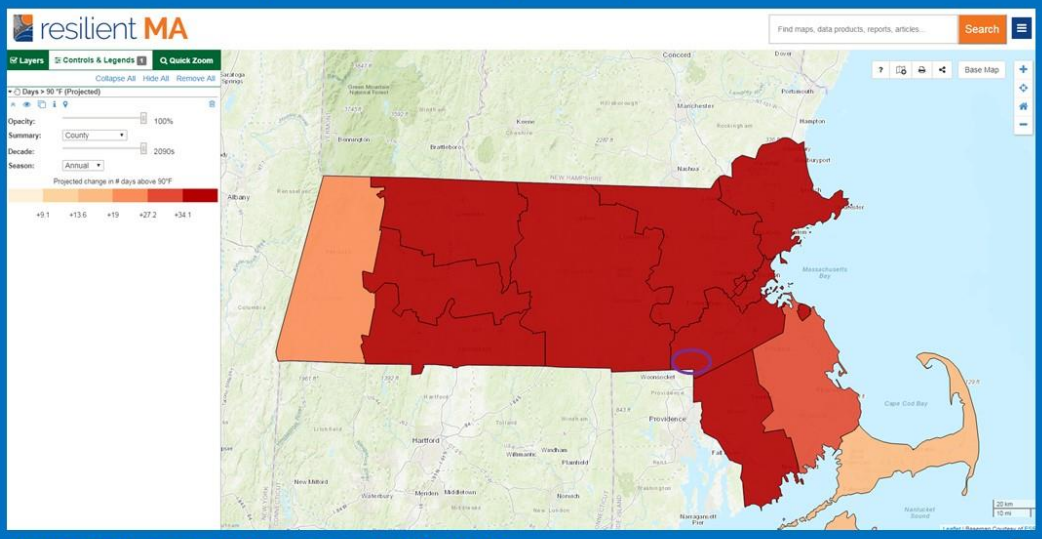
Source: U.S. EPA Climate Change Indicators 2016

Temperature change: Projected 2050



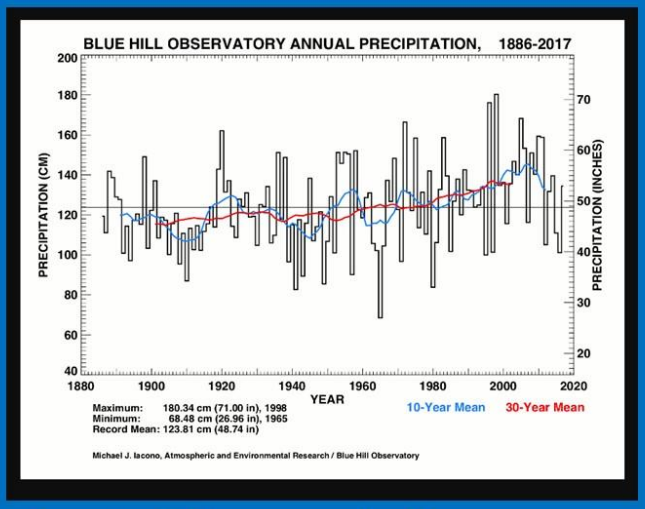
Nearly 39 days over 90 degrees annually by mid-century.
www.resilientma.org/map

Temperature change: Projected 2090

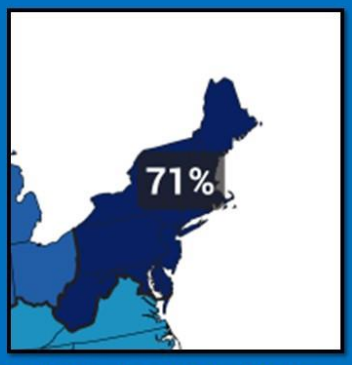


Nearly 50 days over 90 degrees annually by 2090.
www.resilientma.com/map

Precipitation Change: Observed



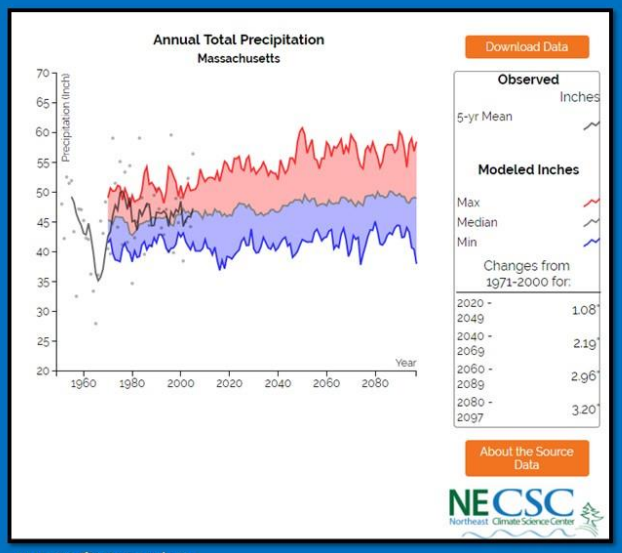
Boston Area10% increase over last 50 years



For the Northeast United States: 71% increase in the amount of rain that falls in the top 1% events from 1958 – 2012.

Source: US National Climate Assessment 2016

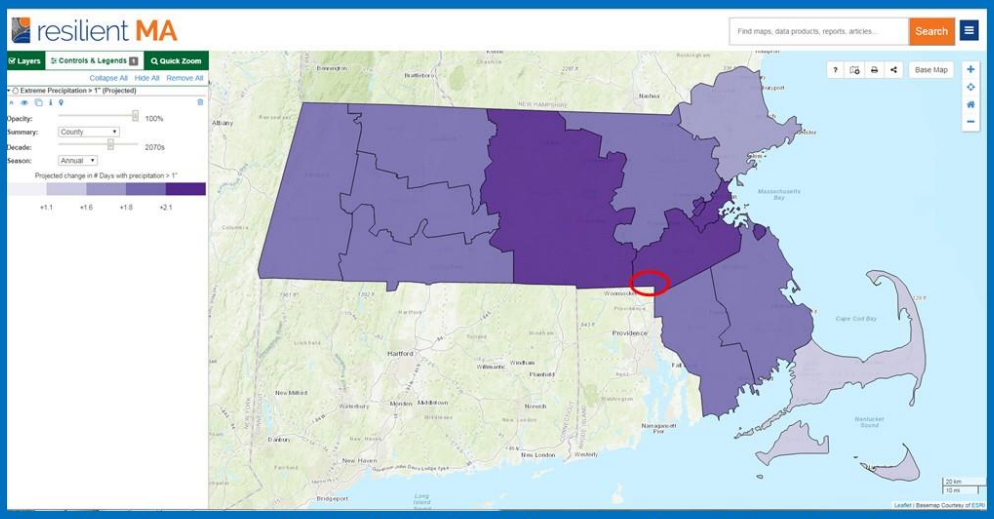
Precipitation Change: Projected



www.resilientma.org/map

- Baseline annual precipitation Norfolk County is 46.7 inches.
- Precipitation is 51inches statewide by 2090.
- Greatest increase in precipitation during the winter months.

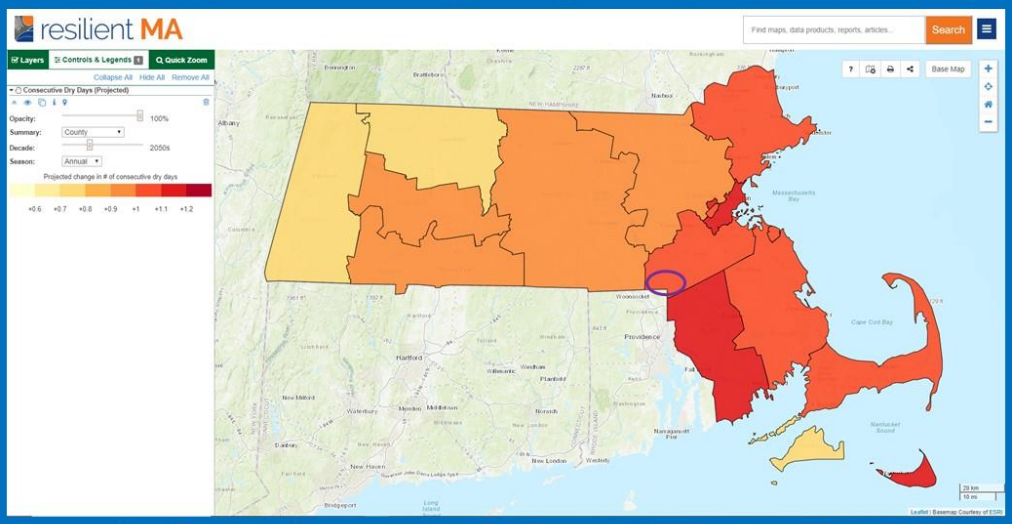
Precipitation Change: Projected 2050



Precipitation events with > 1 inch of rain increases from 8 days baseline to days annually by 2050.

www.resilientma.org/map

Precipitation Change: Project Dry Days 2050



Consecutive Dry Days increases from 17 days to 18 days annually by 2050.

www.resilientma.org/map

Climate Strength &Vulnerability: People

Communities of Color

Wrentham is becoming more diverse...

Although over 96% of the town's population is white...

Populations of color have increased since 1990.

3x Latino population increase since 1990

1.5x Asian population increase since 1990

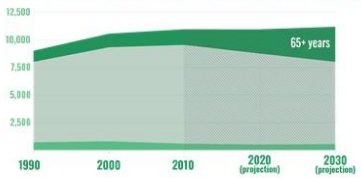
Low Income Households

27% ± 4.5% Households in Wrentham that are low-income

6% ± 2% Households in Wrentham that are below poverty level

*A four-person household earning less than $78,150 is considered low-income; a four-person household earning less than $24,563 is below poverty level

Older Adults and Young Children

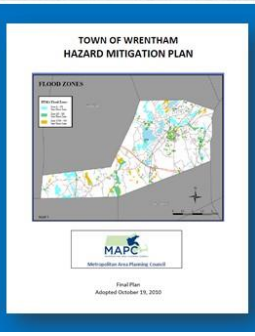


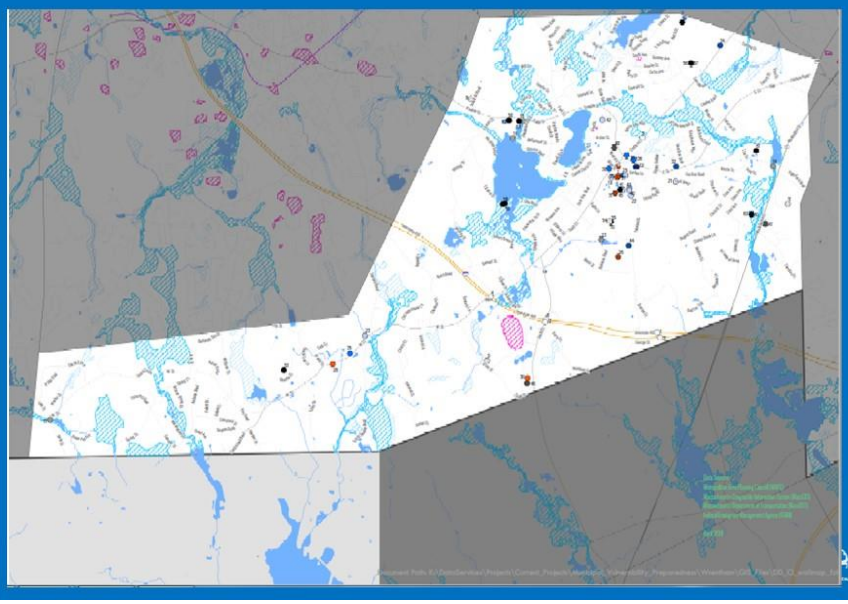
People Living Alone

Climate Strength & Vulnerability: Infrastructure

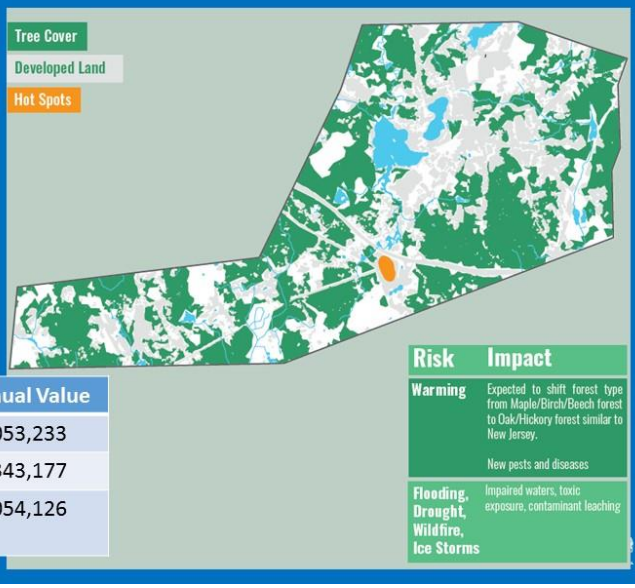

Wrentham Storm Update: 1,000+ Without Power, Warming Center Open

Police warn residents of downed trees and wires, as well as potentially dangerous hazards in town.





Climate Strength & Vulnerability: Environment



Tree Benefits	Annual Capture	Annual Value
Carbon Sequestration	8,110 tons CO_2	$1,053,233
Air Pollution	970,571 lbs pollutants	$2,343,177
Avoided Stormwater Runoff	118 MG	$1,054,126

Risk	Impact
Warming	Expected to shift forest type from Maple/Birch/Beech forest to Oak/Hickory forest similar to New Jersey. New pests and diseases
Flooding, Drought, Wildfire, Ice Storms	Impaired waters, toxic exposure, contaminant leaching

Step 1: Identify Risk Areas and Community Strengths

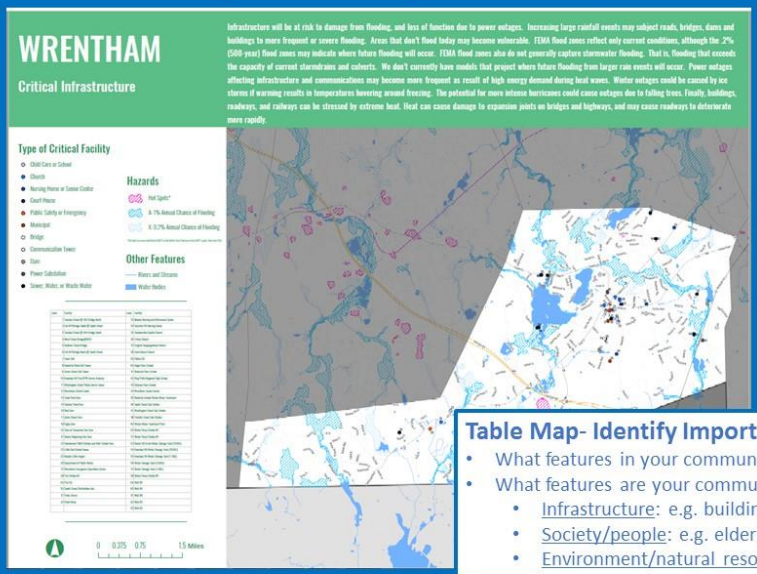


Table Map- Identify Important Community Features

- What features in your community are most vulnerable to weather-related impacts?
- What features are your community's biggest strengths relative to climate impacts?
  - Infrastructure: e.g. buildings, roads, bridges, wells
  - Society/people: e.g. elderly citizens living in flood zones
  - Environment/natural resources: e.g. wetlands, protected land in flood zones

Step 1: Identify Risk Areas and Community Strengths

Features (V = vulnerability, S = strength)	Location	Ownership	V or S	Flooding	Heat Waves	Severe Storms (wind, snow, ice)	Drought	Priority (High, Medium, Low)	Time (Short-term, Long-term, On-going)
INFRASTRUCTURE									
SOCIETY									
ENVIRONMENT									

Populate Matrix with Map Info: Identify Important Community Features on Left Four Columns.

- What features in your community are most vulnerable to weather-related impacts?
- What features are your community's biggest strengths relative to climate impacts?
  - Infrastructure: e.g. buildings, roads, bridges, wells
  - Society/people: e.g. elderly citizens living in flood zones
  - Environment/natural resources: e.g. wetlands, protected land in flood zones

Step 3: Develop Actions
Step 4: Prioritize

Gloucester Community Resilience Building Risk Matrix

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

www.CommunityResilienceBuilding.org

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

Infrastructural Features	Location (describe here in words or mark # on map)	Ownership (identify private, public, etc.)	V and/or S	Coastal Flooding/ Storm Surge/ Sea Level Rise	High Winds	Extreme Cold/ Winter Storms/Snow	Extreme Heat/ Fire/ Drought	Priority (H - M - L)	Time (Short Lon Ongoing)
				ACTIONS - list below					
Example: Waste water treatment plan	Essex Ave.	City	V	*Gloucester CC Adaptation Plan*: Use existing protective berm and topography to build up from. Design, permit and construct a higher berm along the southern side of the property. Build a flood wall along Route 133 with a temporary closure at the property entrance.				H	S

COMPLETE right side of matrix: Develop Actions

1. Develop Actions – How should we reduce vulnerability and/or reinforce strengths?
2. Prioritize – Are actions high, medium, or low priority?
3. Determine Urgency – Are actions ongoing? Or a short-term or long-term step?

Examples

Infrastructure

Strength
Most municipal buildings are not in flood areas.

Vulnerability
The DPW is in a flood zone and has flooded in the past.

Potential Actions
Flood proof the DPW with earthen berms or flood fences.

People

Strength:
The Council on Aging maintains a list of older adults in need of support during emergencies.

Vulnerability:
Some residents are not fluent in English and may not understand emergency notices.

Potential Actions:
Translate emergency materials. Partner with community organizations that can provide services.

Natural Resources

Strength:
The Town has minimal development along the Charles River.

Vulnerability:
Drinking water aquifers are vulnerable to contamination with flooding.

Potential Actions:
Increase purchase of watershed protection lands.

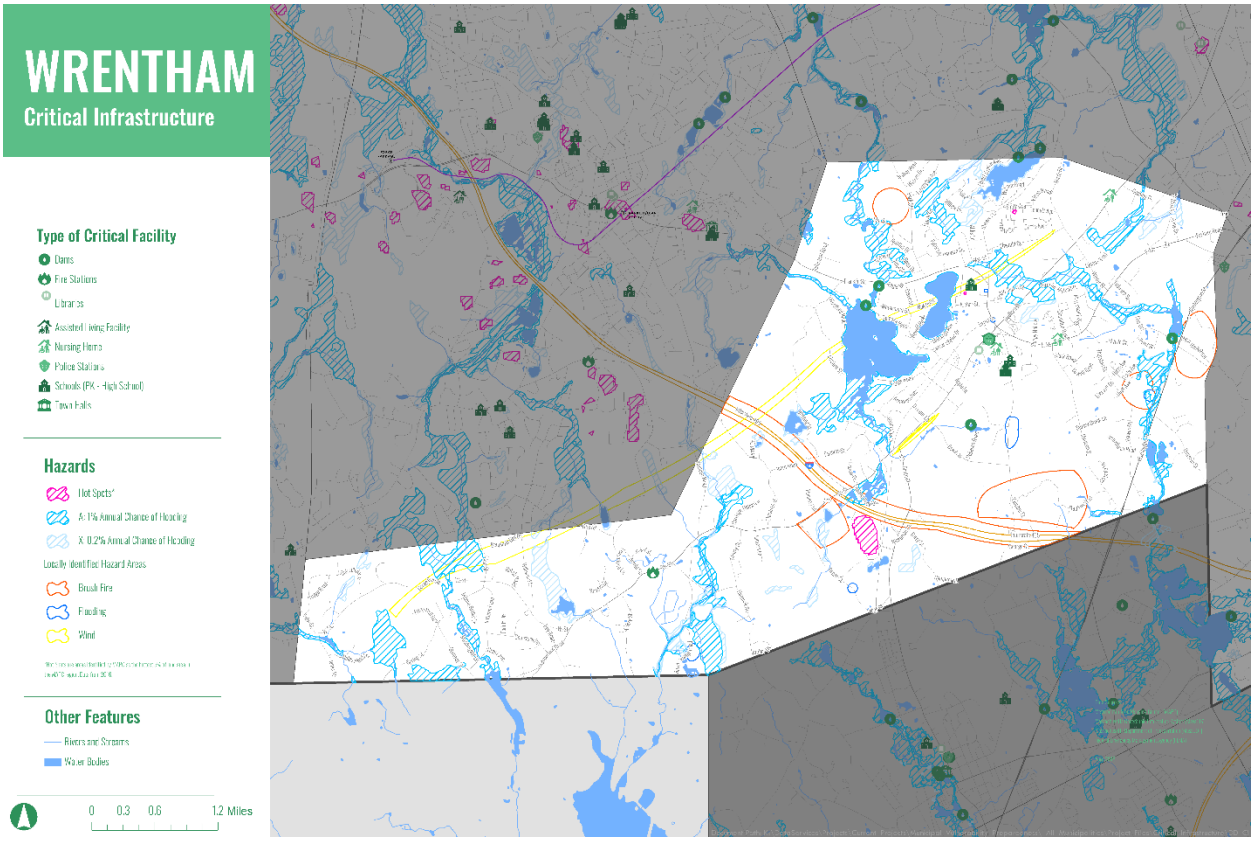
MVP Instructions

Ground Rules

- Everyone has an equal opportunity to contribute
- Everyone is an expert; respect others' point of view.
- Respect limited time.
- Please work to complete the worksheet and tasks. Your input is important!
- Please turn off your cell phone or keep on vibrate.

Thank you for your participation!

Appendix B –Climate Change Posters and Maps



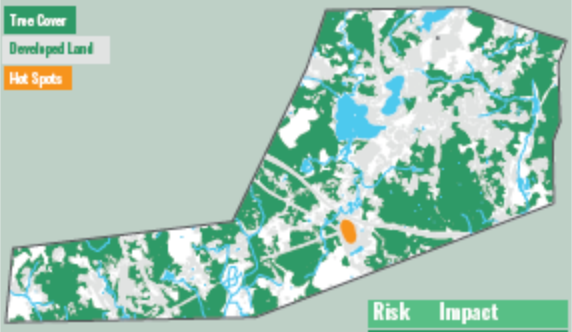
Wrentham

Natural Resources

Natural Resources lessen climate impacts by absorbing and storing carbon dioxide and by serving vital protective functions. Forests, open space, wetlands, rivers, and streams protect drinking water quality and quantity, provide flood control, and give relief from extreme heat. Healthy ecosystems are more resistant to stresses from a changing climate and better able to protect against heat and flooding.

Trees

Trees are important in mitigating the impact of heat waves. According to the EPA, suburban areas with mature trees are 4-6 degrees cooler than new suburbs without trees. Shaded surfaces can be 25-40 degrees cooler than the peak temperatures of unshaded surfaces. Trees also absorb remarkable quantities of precipitation. Research has shown that a typical medium-sized tree can intercept as much as 2,380 gallons of rain per year (USDA Forest Service).



Risk	Impact
Warming	Expected to shift: forest type from Maple/Birch/Beech toward to Oak/Hickory forest similar to New Jersey. New pests and diseases
Flooding, Drought, Wildfire, Ice Storms	Impaired waters, toxic exposure, contaminant leaching

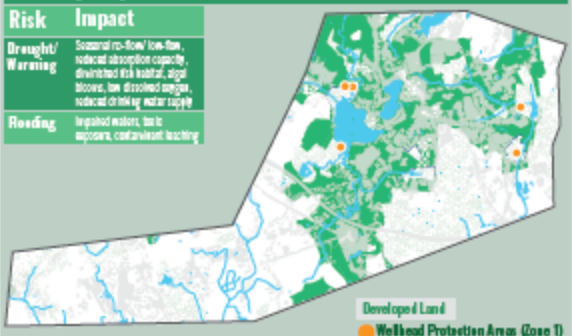
Valuable Habitat

Core Habitat and Critical Natural Landscapes are state-identified intact landscapes, or exemplary natural communities, that are better able to withstand climate stresses, and support the long-term survival of rare species and natural habitats.

Drinking Water Resources

Wrentham drinking water comes from groundwater via aquifers with five groundwater wells. The town also maintains three water storage tanks and six emergency interconnections with Norfolk, Foxborough, and Franklin. Wrentham has 191 acres of protected land to support clean drinking water. Climate change will affect the quantity and quality of our drinking water supply. Changing seasonal precipitation patterns will cause drought conditions and reduce water quantity, such as the drought in 2016, which stressed many Town's municipal water supplies. Inland and coastal flooding can contaminate drinking water supplies through intrusion into wellhead structures or through the aquifer itself, reducing quality. Flood waters could contain pollutants, debris, and potentially toxic substances if contaminated sites are damaged or degraded by flood waters.

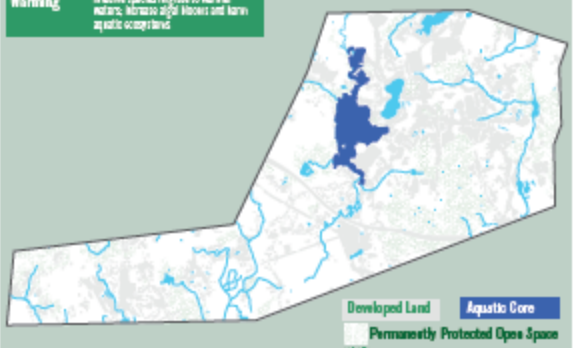
Risk	Impact
Drought/ Warming	Seasonal no-flow/ low-flow, reduced absorption capacity, diminished fish habitat, algal blooms, low dissolved oxygen, reduced drinking water supply
Flooding	Impaired waters, toxic exposure, contaminant leaching



Freshwater Resources

Wrentham contains, healthy, intact freshwater wetland systems that sustain critical ecosystem functions in climate change. These ecological assets protect drinking water quality and quantity, provide flood control, and maintain overall ecosystem health for climate resilience. The Army Corp of Engineers also holds nearly 32 acres of flood-control land in Wrentham to mitigate flooding.

Risk	Impact
Stormwater Runoff	Threatens to pollute wetlands
Extreme Precipitation	Scouring, impaired waters, sewer overflows and increased non-point pollution
Warming	Invasive species migrate to warmer waters, increase algal blooms and harm aquatic ecosystems



Sources
MassGIS (Bureau of Geographic Information); BioMap2: Conserving the Biodiversity of Massachusetts in a Changing World; Massachusetts Department of Fish and Game; Massachusetts Department of Environmental Protection; MassGIS (Bureau of Geographic Information); National Land Cover Database (NLCD)

Wrentham
Social Vulnerability

Social vulnerability refers to social, economic, demographic, or health factors that may make groups of people less resilient to climate change impacts. Certain vulnerabilities tend to be correlated: for example, older adults are more likely to have a disability and live alone than younger adults.

Our strategies for adapting to a changing climate should protect these populations in addition to our natural and built environment.

Who is most at risk from climate change impacts?

People who may be more susceptible to negative health effects: These can include older adults, young children, pregnant women, people with disabilities, and people with pre-existing health conditions, as they are more likely to be physically vulnerable to the health impacts of extreme heat and poor air quality caused by climate change. Individuals with physical mobility constraints, such as people with disabilities and seniors, may need additional assistance with emergency response.

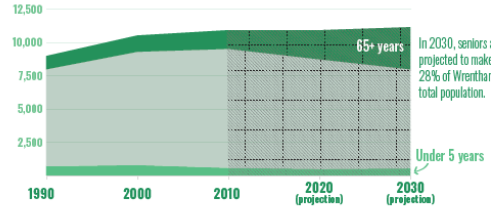
People who may have more difficulty adapting to, preparing for, or recovering from extreme weather events: Socioeconomic characteristics such as income and race can influence vulnerability to climate change. Low-income people are often more susceptible to financial shocks, which can occur after extreme weather and which can impact financial security and the ability to secure safe shelter and meet medical needs. Social isolation can also influence vulnerability, as it limits access to critical information, municipal resources, and social support systems. People at the most risk for social isolation include those living alone and people with limited English language proficiency.

People who live or work in vulnerable locations: Historic or predicted floodplain, urban flooding locations, areas prone to wildfire, heat islands, neighborhoods prone to power outages. Outdoor workers, first responders, those working in hot indoor environments.

Older Adults and Young Children

Adults over 65 and children under 5 are more likely to develop health problems on very hot days or during heat waves. Older adults are also more likely to have disabilities or mobility contraints and may need additional assistance during emergencies. They are also more likely to live alone than younger adults.

Wrentham Recent and Projected Population by Age



In 2030, seniors are projected to make up 28% of Wrentham's total population.

People Who Work Outside

People who primarily work outside, such as parcel delivery people, construction workers, or farmers, may be at added risk from extra exposure to high heat and poor air quality.

People Living Alone

As of 2010, about 1/5 of Wrentham households consisted of someone living alone.

About 40% of people living alone were over 65.

Low Income Households

Households that earn low incomes or live under the poverty line are more susceptible to financial shocks triggered by extreme weather, which can cause long-lasting financial insecurity and can make it hard to secure safe shelter, sufficient food, and medical care.

27% ± 4.5% Households in Wrentham that are low-income

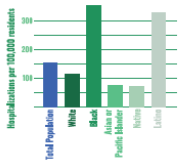
6% ± 2% Households in Wrentham that are below poverty level

*A four-person household earning less than $78,150 is considered low-income; a four-person household earning less than $24,563 is below poverty level

People with Health Conditions

Massachusetts Asthma Hospitalizations

People who are already in poor health are more likely to be harmed by hot weather and resulting poor air quality.



Communities of Color

Particular racial or ethnic groups may also be more likely to have certain social vulnerabilities than others. For example, Black and Latino populations have a much higher rate of asthma hospitalizations than other groups.

Wrentham is becoming more diverse...

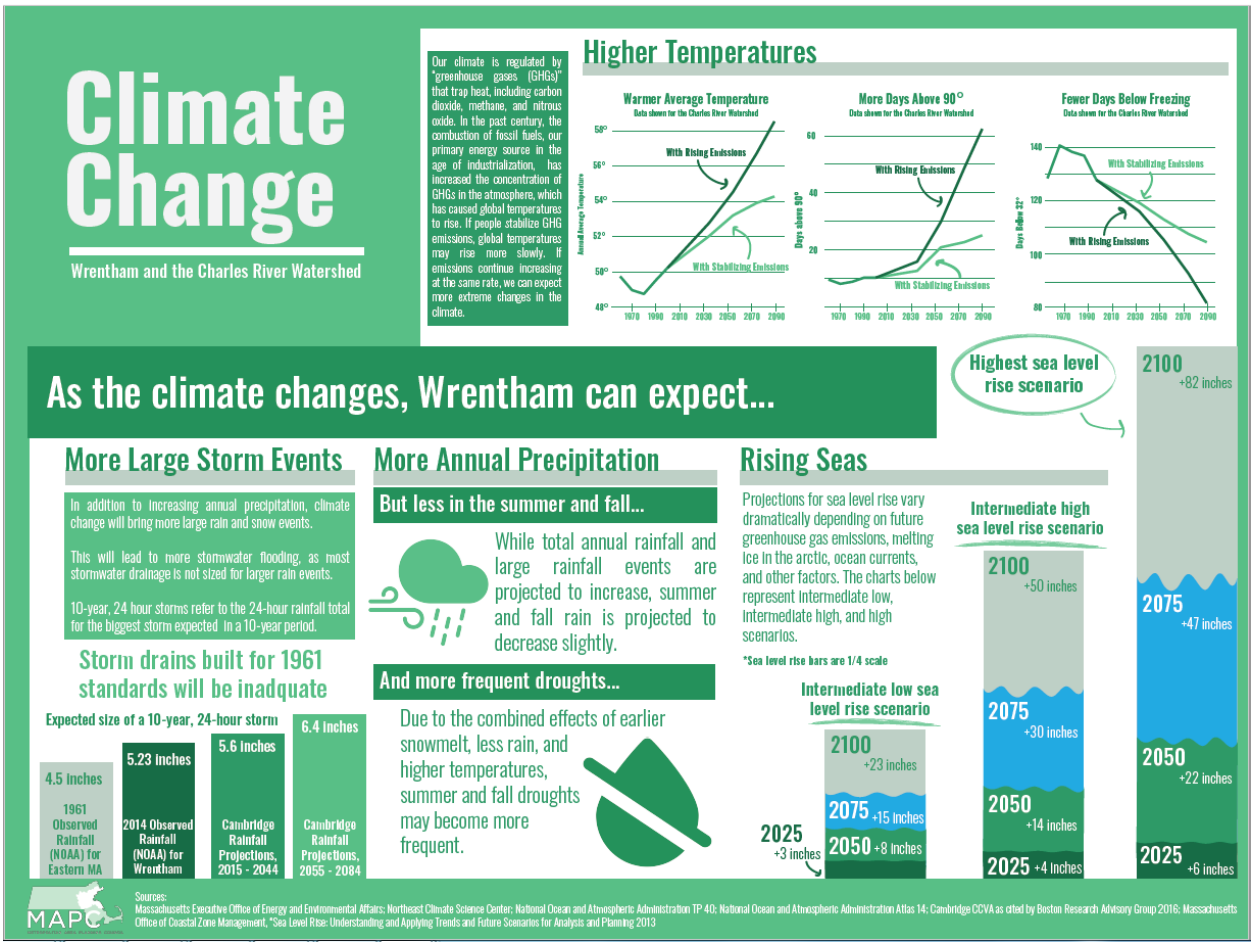
Although over 96% of the town's population is white...

Populations of color have increased since 1990.

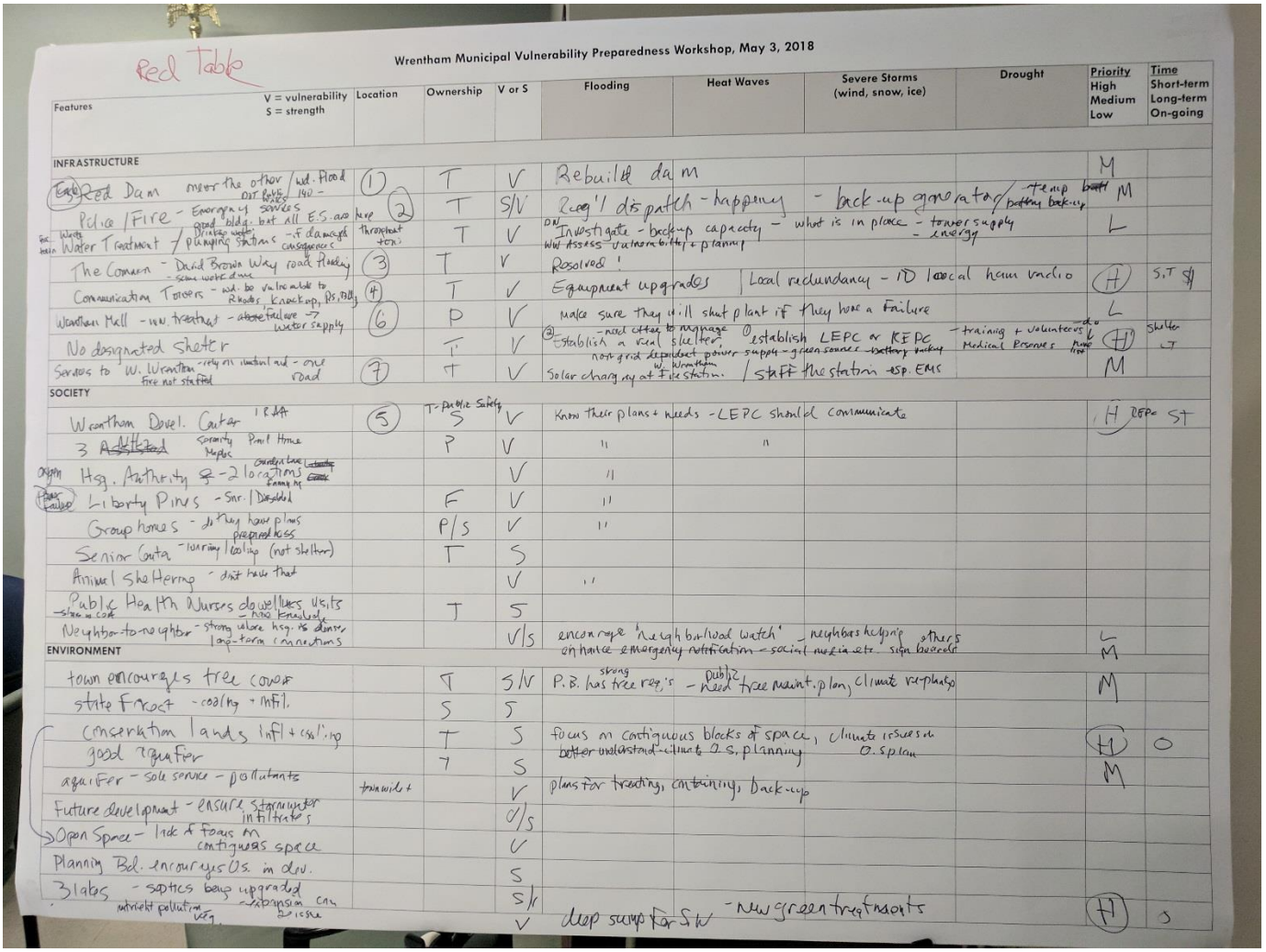
3x Latino population increase since 1990

1.5x Asian population increase since 1990

Sources:
American Community Survey (ACS) 2012-2016; United States Census 1990, 2000, 2010; MAPC Projections; Massachusetts Department of Public Health Asthma Data, 2008-2012


Climate Change
Wrentham and the Charles River Watershed
Our climate is regulated by "greenhouse gases (GHGs)" that trap heat, including carbon dioxide, methane, and nitrous oxide. In the past century, the combustion of fossil fuels, our primary energy source in the age of industrialization, has increased the concentration of GHGs in the atmosphere, which has caused global temperatures to rise. If people stabilize GHG emissions, global temperatures may rise more slowly. If emissions continue increasing at the same rate, we can expect more extreme changes in the climate.
Higher Temperatures
Warmer Average Temperature
Data shown for the Charles River Watershed
Annual Average Temperature
With Rising Emissions
With Stabilizing Emissions
More Days Above 90°
Data shown for the Charles River Watershed
Days above 90°
With Rising Emissions
With Stabilizing Emissions
Fewer Days Below Freezing
Data shown for the Charles River Watershed
Days Below 32°
With Stabilizing Emissions
With Rising Emissions
As the climate changes, Wrentham can expect...
More Large Storm Events
In addition to increasing annual precipitation, climate change will bring more large rain and snow events.
This will lead to more stormwater flooding, as most stormwater drainage is not sized for larger rain events.
10-year, 24 hour storms refer to the 24-hour rainfall total for the biggest storm expected in a 10-year period.
Storm drains built for 1961 standards will be inadquate
Expected size of a 10-year, 24-hour storm
4.5 Inches
1961 Observed Rainfall (NOAA) for Eastern MA
5.23 Inches
2014 Observed Rainfall (NOAA) for Wrentham
5.6 Inches
Cambridge Rainfall Projections, 2015 - 2044
6.4 Inches
Cambridge Rainfall Projections, 2055 - 2084
More Annual Precipitation
But less in the summer and fall...
While total annual rainfall and large rainfall events are projected to increase, summer and fall rain is projected to decrease slightly.
And more frequent droughts...
Due to the combined effects of earlier snowmelt, less rain, and higher temperatures, summer and fall droughts may become more frequent.
Rising Seas
Projections for sea level rise vary dramatically depending on future greenhouse gas emissions, melting ice in the arctic, ocean currents, and other factors. The charts below represent intermediate low, intermediate high, and high scenarios.
*Sea level rise bars are 1/4 scale
Intermediate low sea level rise scenario
2100 +23 inches
2075 +15 Inches
2050 +8 Inches
2025 +3 inches
Intermediate high sea level rise scenario
2100 +50 inches
2075 +30 inches
2050 +14 inches
2025 +4 Inches
Highest sea level rise scenario
2100 +82 inches
2075 +47 inches
2050 +22 inches
2025 +6 inches
MAPC
Sources:
Massachusetts Executive Office of Energy and Environmental Affairs; Northeast Climate Science Center; National Ocean and Atmospheric Administration TP 40; National Ocean and Atmospheric Administration Atlas 14; Cambridge CCVA as cited by Boston Research Advisory Group 2016; Massachusetts Office of Coastal Zone Management, "Sea Level Rise: Understanding and Applying Trends and Future Scenarios for Analysis and Planning 2013

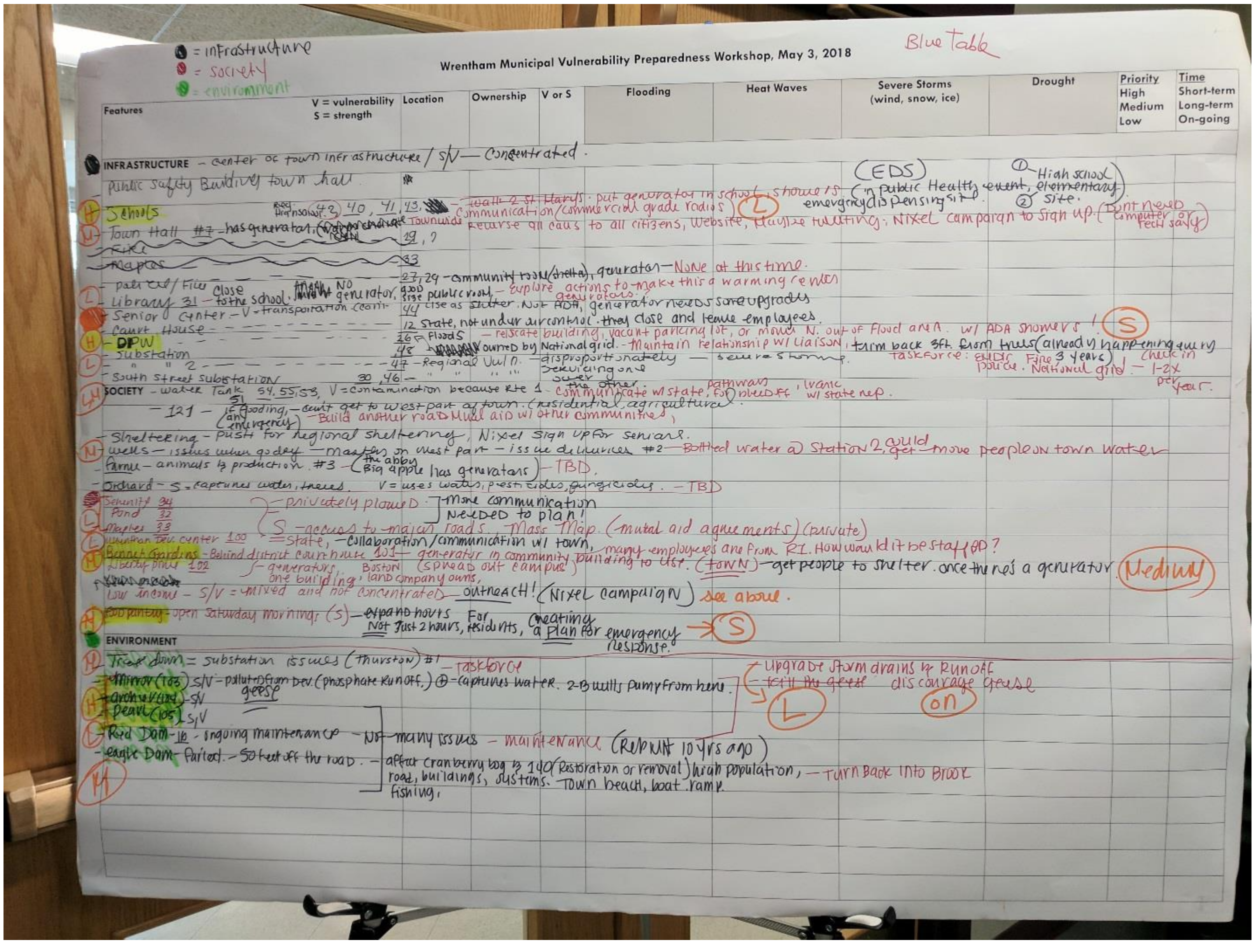
Appendix C- Workshop Risk Matrices

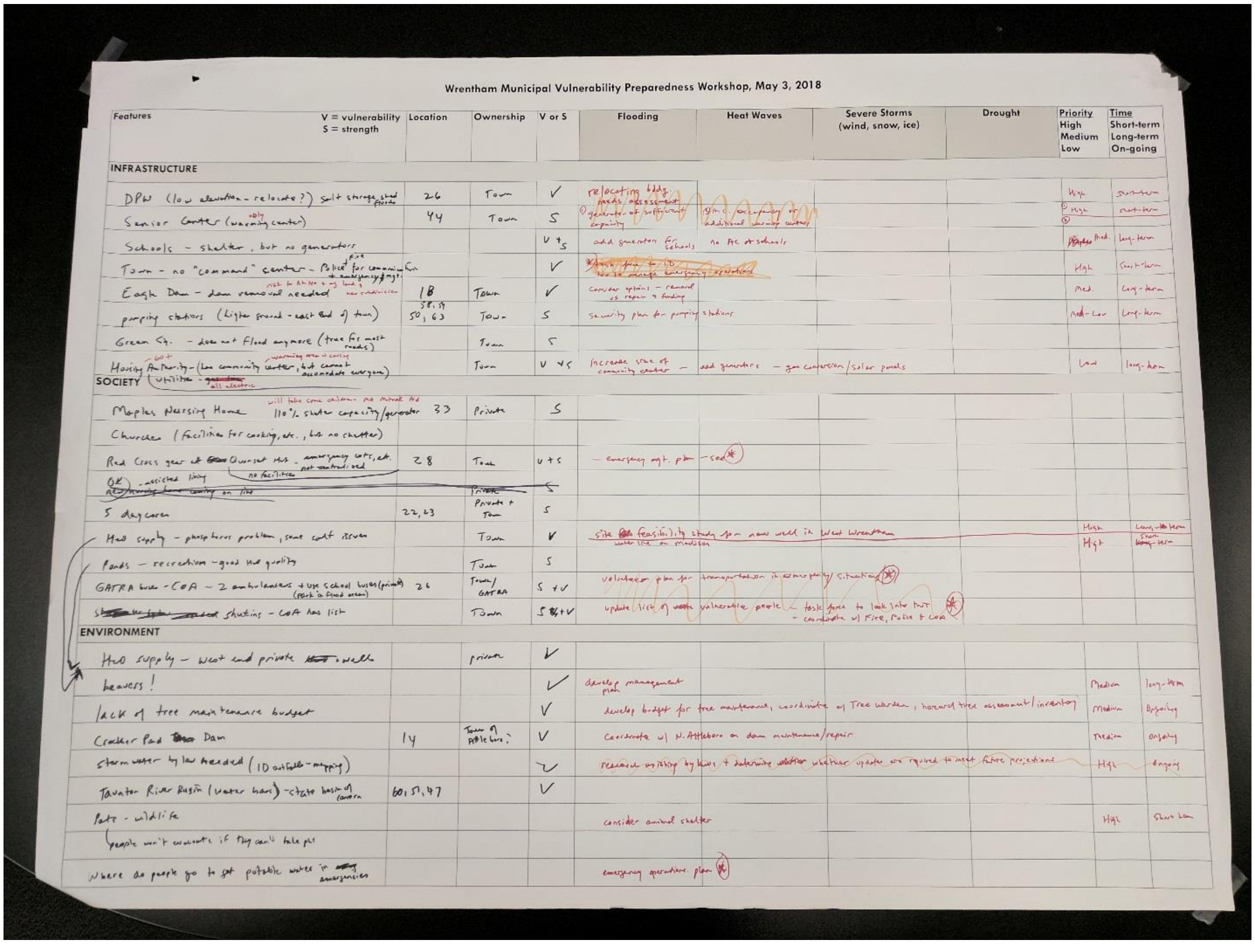


Red Table

Wrentham Municipal Vulnerability Preparedness Workshop, May 3, 2018

Features	V = vulnerability S = strength	Location	Ownership	V or S	Flooding	Heat Waves	Severe Storms (wind, snow, ice)	Drought	Priority High Medium Low	Time Short-term Long-term On-going
INFRASTRUCTURE										
Red Dam	over the other / wd. Flood DIF Rules / HU -	(1)	T	V	Rebuild dam				M	
Police / Fire	- Emergency services good bldg. but all E.S. are	here (2)	T	S/V	Req'l dispatch - happening		- back-up generator / temp battery back-up		M	
Water Treatment / Plumbing Stations	Printed water - if damaged consequences	throughout town	T	V	DW Investigate - backup capacity - what is in place - towers supply - energy WW Assess - vulnerability + planning				L	
The Corners	- David Brown Way road flooding - some work done	(3)	T	V	Resolved					
Communication Towers	- wd. be vulnerable to Roads, Knockup, PS, Bldg	(4)	T	V	Equipment upgrades	Local redundancy - ID local hams radio			(H)	S.T $
Wrentham Mall	- new treatment - above failure → water supply	(6)	P	V	make sure they will shut plant if they have a Failure				L	
No designated Shelter			T	V	② Establish a real shelter, establish LEPC or REPC - need other to manage - not grid dependent power supply - green source - battery backup		- training + volunteers Medical Reserves - do more here		(H)	Shelter LT
Services to W. Wrentham	- city on mutual aid - one road fire not staffed	(7)	T	V	Solar charging at Fire Station w. Wrentham	/ staff the station esp. EMS			M	
SOCIETY										
Wrentham Devel. Center	I&A	(5)	T - Public Safety S	V	Know their plans + needs - LEPC should communicate				H	DEPC ST
3 ~~Assisted~~	Sorority Pond Home Manor		P	V	"	"				
Hsg. Authority & -2 locations				V	"					
Liberty Pines	- Snr. / Disabled		F	V	"					
Group homes	- do they have plans preparedness		P/S	V	"					
Senior Center	- nursing / cooling (not shelter)		T	S						
Animal Shelter	- don't have that			V	"					
Public Health Nurses	do wellness visits - share a cold - not trained		T	S						
Neighbor-to-neighbor	- strong where neighbors know long-term connections			V/S	encourage 'neighborhood watch' _ neighbors helping others enhance emergency notification - social media etc - sign boards				L M	
ENVIRONMENT										
town encourages tree cover			T	S/V	P.B. has strong tree reg's - need public tree maint. plan, climate replant				M	
state Forest	- cooling + infil.		S	S						
conservation lands	infl + cooling		T	S	focus on contiguous blocks of space, climate issues & better understand climate O.S. planning				(H)	O
good aquifer			T	S					M	
aquifer	- sole source - pollutants	town wide +		V	plans for treating, containing, back-up					
Future development	- ensure stormwater infiltrates			V/S						
Open Space	- lack of focus on contiguous space			V						
Planning Bd. encourages OS. in dev.				S						
3 labs	- septics being upgraded nutrient pollution reg. - expansion can pose issue			S/V	deep sump for S/W		- New green treatments		(H)	O

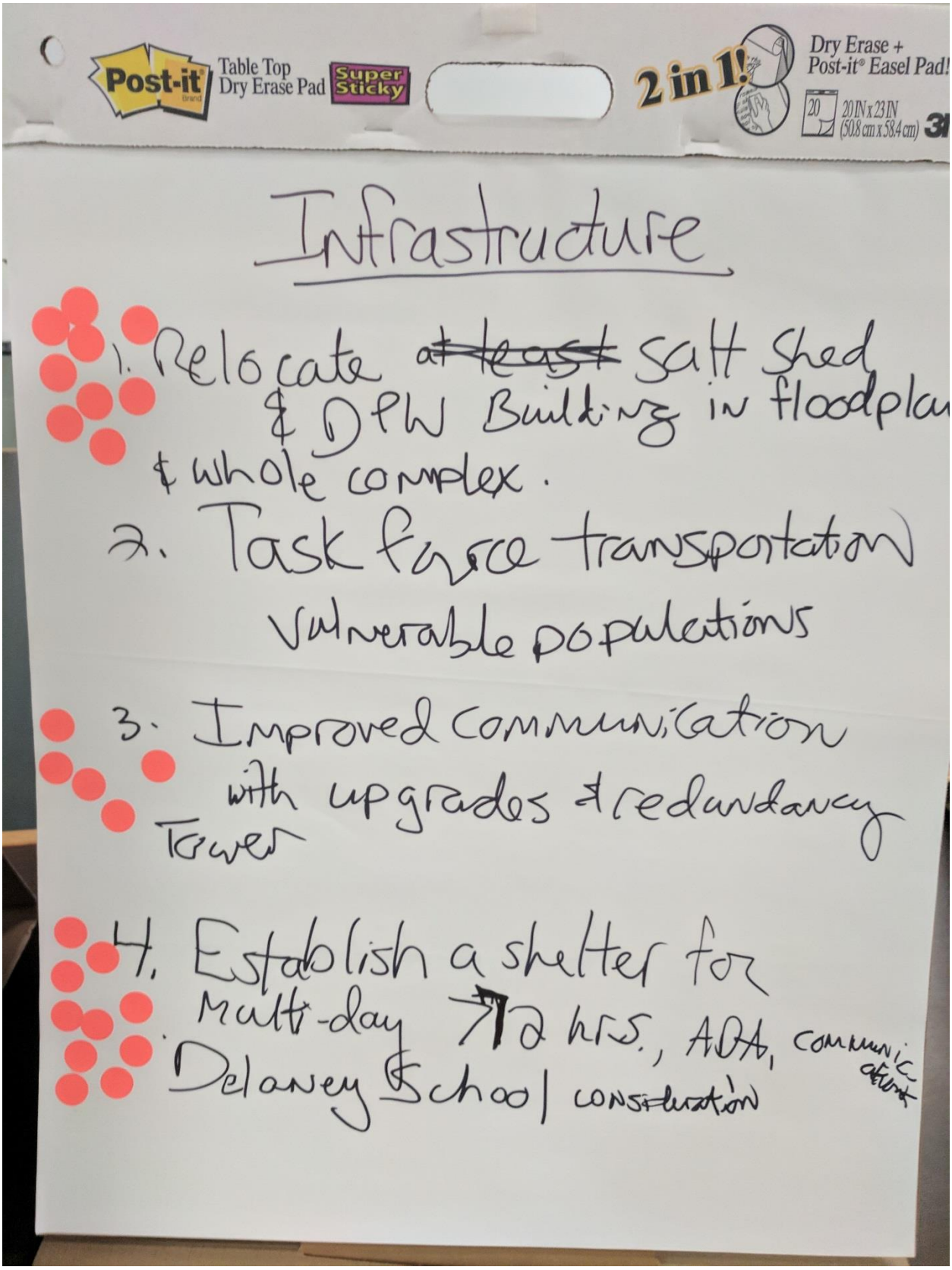

= infrastructure
= society
= environment
Wrentham Municipal Vulnerability Preparedness Workshop, May 3, 2018
Blue Table
Features
V = vulnerability
S = strength
Location
Ownership
V or S
Flooding
Heat Waves
Severe Storms
(wind, snow, ice)
Drought
Priority
High
Medium
Low
Time
Short-term
Long-term
On-going
INFRASTRUCTURE
SOCIETY
ENVIRONMENT

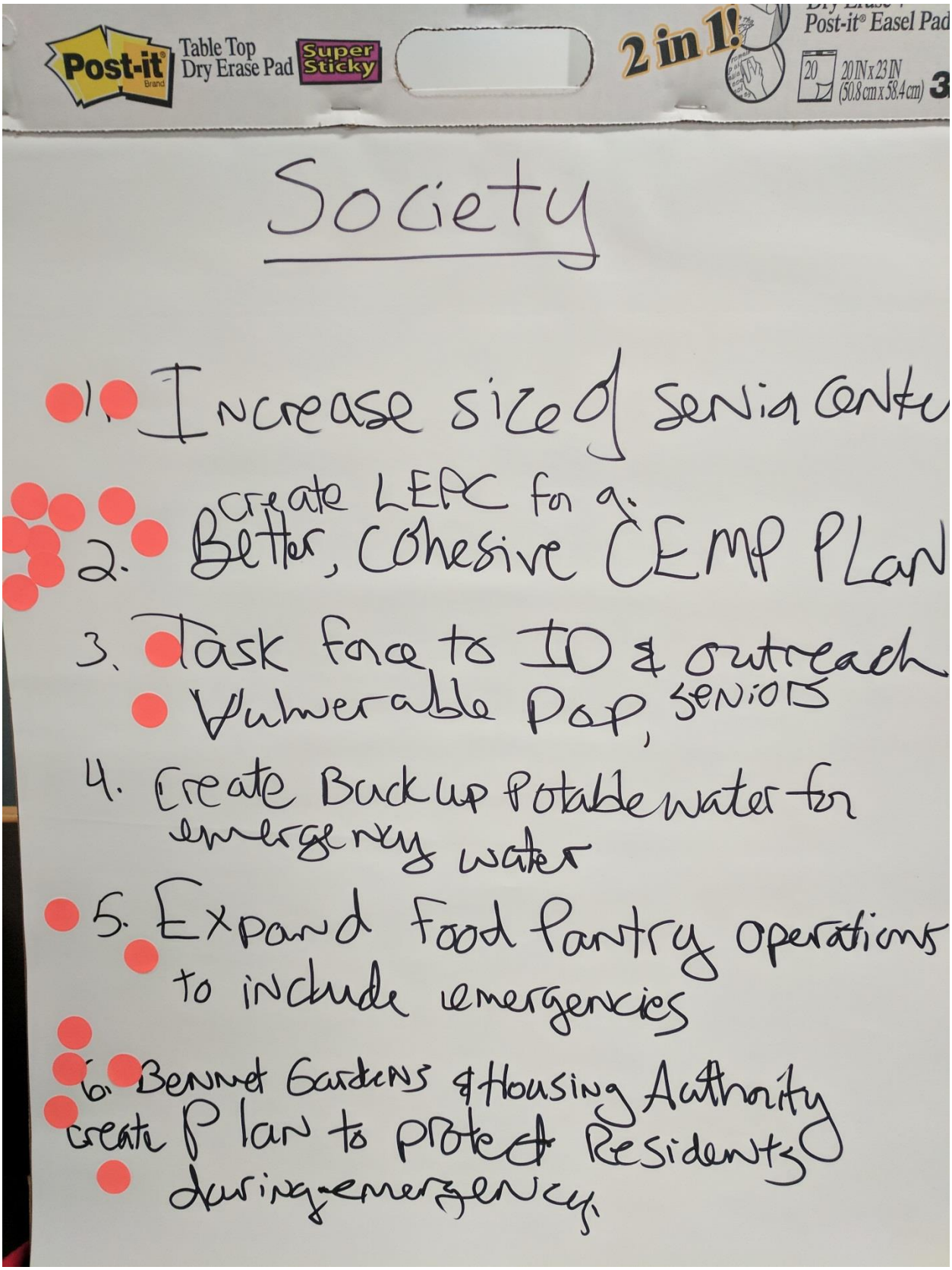


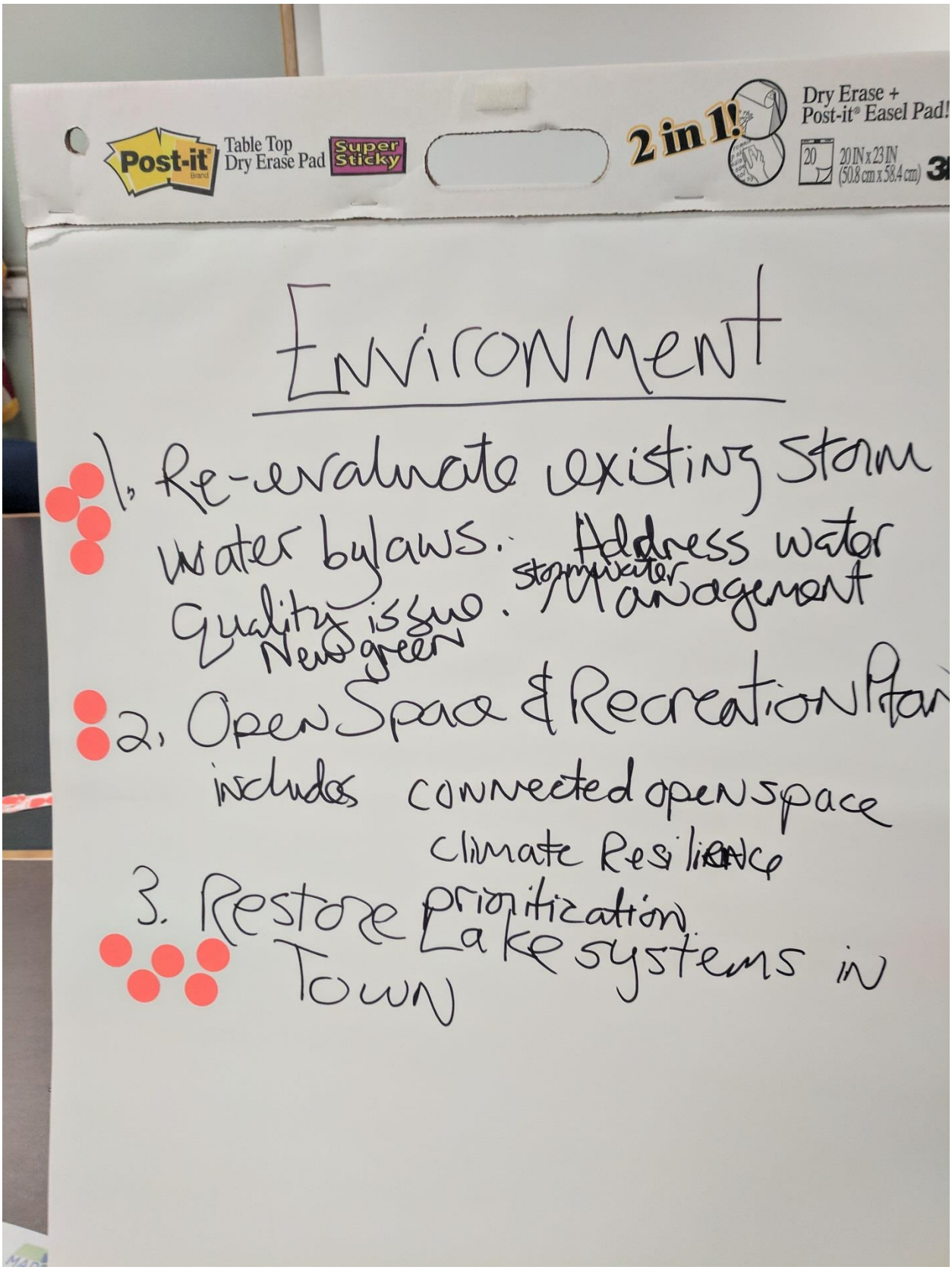
Wrentham Municipal Vulnerability Preparedness Workshop, May 3, 2018

Features (V = vulnerability, S = strength)	Location	Ownership	V or S	Flooding	Heat Waves	Severe Storms (wind, snow, ice)	Drought	Priority (High, Medium, Low)	Time (Short-term, Long-term, On-going)
INFRASTRUCTURE									
DPW (low elevation - relocate?) salt storage shed floods	26	Town	V	relocating bldgs needs assessment				High	Short-term
Senior Center (only warming center)	44	Town	S	generator of sufficient capacity	inc. occupancy or additional warming centers			High	Short-term
Schools - shelter, but no generators			V + S	add generators for schools	no AC at schools			Med.	Long-term
Town - no "command" center - Police + Fire for communication + emergency mgmt.			V					High	Short-term
Eagle Dam - dam removal needed	18	Town	V	Consider options - removal vs repair + funding				Med.	Long-term
pumping stations (higher ground - east end of town)	58, 59, 50, 63	Town	S	Security plan for pumping stations				Med-Low	Long-term
Green St. - does not flood anymore (true for most roads)		Town	S						
Housing Authority - 60+ (has community center, warming area + cooling, but cannot accomodate everyone)		Town	V + S	increase size of community center	add generators	- gas conversion/solar panels		Low	long-term
SOCIETY (utilities - all electric)									
Maples Nursing Home 110% shelter capacity/generator, will take some children - no Mutual Aid	33	Private	S						
Churches (facilities for cooking, etc., but no shelter)									
Red Cross gear at Quonset Hut - emergency cots, etc. not centralized, no facilities	28	Town	V + S	- emergency mgt. plan - see (*)					
OK - assisted living		Private	S						
5 daycares	22, 23	Private + Town	S						
H2O supply - phosphorus problem, some salt issues		Town	V	site feasibility study for new well in West Wrentham; water line on Madison				High; High	Long-term; Short-term
Ponds - recreation - good H2O quality		Town	S						
GATRA buses - COA - 2 ambulances + use school buses (private) (park in flood area)	26	Town / GATRA	S + V	volunteer plan for transportation in emergency situations (*)					
shut-ins - COA has list		Town	S + V	update list of vulnerable people - task force to look into that (*) - coordinate w/ Fire, Police + COA					
ENVIRONMENT									
H2O supply - west end private wells		private	V						
beavers!			V	develop management plan				Medium	long-term
lack of tree maintenance budget			V	develop budget for tree maintenance, coordinate w/ Tree Warden, hazard tree assessment/inventory				Medium	Ongoing
Cracker Pond Dam	14	Town of Attleboro?	V	Coordinate w/ N. Attleboro on dam maintenance/repair				Medium	Ongoing
stormwater bylaw needed (ID outfalls - mapping)			V	research existing bylaws + determine whether updates are required to meet future projections				High	Ongoing
Taunton River Basin (water bans) - state basin of concern	60, 51, 47		V						
Pets - wildlife; people won't evacuate if they can't take pet				consider animal shelter				High	Short-term
Where do people go to get potable water in emergencies				emergency operations plan (*)					

Appendix D Top Priority Actions Voting Results




Post-it Table Top Dry Erase Pad Super Sticky
2 in 1!
Post-it® Easel Pad
20 IN x 23 IN (50.8 cm x 58.4 cm)
Society
1. Increase size of senior cente
2. create LEPC for a Better, Cohesive CEMP PLan
3. Task force to ID & outreach Vulnerable Pop, seniors
4. Create Backup Potable water for emergency water
5. Expand Food Pantry operations to include emergencies
6. Bennet Gardens & Housing Authority create Plan to protect Residents during emergency.


Post-it Table Top Dry Erase Pad Super Sticky
2 in 1!
Dry Erase + Post-it® Easel Pad!
20 IN x 23 IN (50.8 cm x 58.4 cm)
Environment
1. Re-evaluate existing storm water bylaws. Address water quality issue. stormwater management
New green
2. Open Space & Recreation Plan
includes connected open space
climate Resilience
3. Restore prioritization Lake systems in Town