



**Town of Needham
Community Resilience Building
Workshop
Summary of Findings
May 2020**



Community Resilience Building Workshop

Municipal Vulnerability Preparedness Program

Summary of Findings

OVERVIEW

Recent years have seen notable weather extremes in Needham. The winter of 2015 brought record-breaking snow, resulting in downed trees and power outages. The following year the Needham area was under a drought warning from July to November 2016. The winter of 2018 once again brought severe winter storms with a succession of four nor'easters pummeling the town in March. In March 2010 rainfall was so significant that a federal disaster was declared for eastern Massachusetts, resulting in \$59 million in assistance to individual households and \$26 million in reimbursements to the state and municipalities. In Needham, 232 properties received flood insurance payments or disaster assistance. Globally, the past five years are the hottest in recorded history.

In 2017, the Commonwealth of Massachusetts inaugurated the Municipal Vulnerability Preparedness (MVP) program to assist municipalities in planning for and implementing strategies to adapt to predicted changes in our warming climate. The predicted changes include both increased flooding from large rain events and a greater likelihood of drought, increased extreme heat days and heat waves, and increased flooding from sea level rise.

The Town of Needham, seeking to be proactive in addressing future climate threats, applied for a state grant to complete the Community Resilience Building (CRB) Workshop under the MVP program. Concurrent with the MVP program, Needham is updating its Hazard Mitigation Plan (HMP). The HMP is a five-year plan, developed under the auspices of FEMA, that identifies strategies to address natural hazards. Upon completion of the projects, the Town of Needham will be eligible to apply for state and federal grants to address natural hazards and climate risks.

The Town of Needham is partnering with the Metropolitan Area Planning Council (MAPC) to complete the MVP program and the Hazard Mitigation Plan. The MVP Core Planning Team identified and recruited community stakeholders to participate in the one-day CRB Workshop. Thirty-nine people representing Needham town staff, members of Needham Boards and Commissions, and Needham community organizations gathered on January 10. The central objectives of the workshop were to:

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

Materials provided for the workshop included local and regional data for changes in temperature, precipitation, and sea level recorded to date, as well as future projections to the end of the century. Posters provided data and mapping specific to Needham infrastructure, demographics, and natural resources (see Appendix A). The participants considered Needham's strengths and vulnerabilities focusing on infrastructure, society, and the environment. Working in small groups, and then together in a large group, they prioritized actions designed to increase Needham's resilience to future extreme weather events.

TOP HAZARDS AND VULNERABLE AREAS

The Core Planning Team identified the top natural hazards. Based on their recent work on the Hazard Mitigation Plan and review of workshop materials, the team identified flooding, heat waves, severe storms (wind, ice, snow) and drought as the climate hazards of greatest concern facing Needham. Flooding, drought, and severe storms have affected Needham in recent years. Considering town demographics, the team also included extreme heat as a top hazard.

Top Hazards

- Flooding
- Heat Waves
- Severe Storms (wind, ice, snow)
- Drought

CURRENT CONCERNS AND CHALLENGES PRESENTED BY HAZARDS

Participants and town officials noted the increasing frequency and intensity of storms, including heavy rain events; the recent period of drought; and nor'easters that brought damaging winds and snowfall. The principal threats from nor'easters are power outages and damage from falling trees and limbs, as well as travel restrictions due to heavy snow. Large rain events result in flooding when stormwater drainage capacity is exceeded and when groundwater levels are high. Droughts are harmful to local aquatic resources and vegetation. Participants expressed concern for water quality



and quantity as Needham relies on groundwater resources for water supply. As these issues are not new, the Town of Needham, through its emergency management activities and hazard mitigation

planning, has taken many steps to prepare for extreme weather and prevent harm to people and property. Workshop participants shared concerns that projected climate threats will heighten current challenges, particularly flooding, water quality and supply, and damage to, and from, trees.

AREAS OF CONCERN

Geographic:

Some of Needham's climate challenges are widespread across the town. These include power outages and damage from falling trees. Stormwater flooding, as evidenced by the flood claims from 2010, is concentrated in the more densely developed northeastern end of town. Participants cited the stretch of Interstate 95 that runs within Needham as a source of multiple concerns including excessive heat, air pollution, severe evacuation bottlenecks that could occur in the event of an emergency, and risks from hazardous materials being transported on the highway and located in commercial areas adjacent to the highway.

Hurricane Irene



Source: Needham Patch

Societal:

Potential vulnerable populations identified include older adults, low income residents, limited English language speakers, people with disabilities, and people who work in Needham but live elsewhere. Participants prioritized outreach and developing support services for these

populations. Many participants highlighted the large number of assisted living, nursing home, and senior housing facilities located in Needham. Suggestions included outreach and assistance to ensure that facilities are prepared to manage emergencies, as well as direct outreach to older adults.

The town's Public Health Department, in collaboration with Emergency Management and the local Housing Authority, recently completed a series of three workshops targeted to older adults and their caregivers. The workshops focused on preparation for extreme weather and improving social cohesion. The workshops provided opportunities to develop relationships with the Housing Authority and to gain insight into the types of messaging and outreach strategies that are most effective. Notably, they found that a focus on emergency preparedness rather than climate change was more engaging due its near-term focus and relative simplicity. Moreover, a focus on personal protection was more engaging to the participants than legacy-based thinking (such as focusing on grandchildren). These insights will assist the town in crafting its outreach strategies and methods going forward.

Environmental:

Continued protection of town drinking water supply was a key concern. Needham relies on its aquifer, and the town supplements that supply with water from the MWRA. Participants identified protection of the aquifer as an important town strength. The recently adopted Stormwater Bylaw was also highlighted as a strength. Managing the impacts of on-going development and redevelopment is an important priority. The need for forest and tree management was highlighted by many participants. Concerns include managing fire, pests, and invasive species. Strategies to protect existing trees and encourage tree planting were also highlighted.

Infrastructure:

Specific infrastructure concerns included flooding threats to the Water Treatment Plant and associated pumping stations, as well as the DPW building. The Central Avenue bridge over the Charles River that connects to the Town of Dover was identified as being in poor condition. Undersized stormwater capacity is an on-going concern. In some locations infiltration and inflow into the sewer system requires bypass pumping to avoid system backups.

CURRENT STRENGTHS AND ASSETS

Workshop participants identified numerous Needham strengths and assets that will support resilience to future climate impacts. As shown below, participants identified many town strengths across environment, infrastructure and society.

Environment

- Adoption of a new stormwater bylaw with green infrastructure and dry well requirements.
- Active Conservation Commission.

- Protection of natural resources including public wetlands along the river, drinking water aquifer, and The Charles River Natural Valley Flood Storage Area that is protected by the Army Core of Engineers.
- Natural resources including Ridge Hill Reservation, Cutler Park, reservoirs, Rosemary Lake, Trout Pond, Town Forest, rail trails, Newman School and reservoir trails; wildlife including eagles; Charles River bordering the town on three sides.
- The aquifer, along with MWRA supplement, provides town drinking water.
- Trees on public ways are protected or replaced.
- The 9-hole golf course is using goats for management of invasives.
- Fire roads are well-maintained in the Town Forest.
- Agricultural resources including Volante Farms and the Needham Community Farm.
- Protection of FEMA floodplain areas; there is robust floodplain capacity.

Infrastructure

- The many public and private schools and colleges could serve as shelters.
- There are many hotels that could provide emergency shelter.
- Many public facilities, including Old Town Hall and the Rosemary Center, have generators.
- Beth Israel Deaconess Medical Center is located in town.
- There is good public and private transportation access with highway, rail, and bus.
- There is lots of privately owned solar, and solar at the transfer station and the Sunita L Williams School.
- The town has ample grocery stores, restaurants and gas stations.
- Town roads are not subject to flooding.
- Important infrastructure includes the dam at Rosemary Street, bypass pumps to separate stormwater and sewer, bridges (many of which have recently been rebuilt), the police and fire stations, generators and backup pumps.
- The bulk of residents live in walkable areas.
- There is an active food service program in the schools.
- The town has both school buses and Council on Aging buses.
- The town has a robust communications network including three new towers.
- Work is being done to increase redundancy of utility lines and clear obstructions.
- Water infrastructure includes the water treatment plant and wells at the Charles River, St. Mary's Pump Station (MWRA feed), sewer pump stations, and water interconnections with other towns.
- There is not a lot of manufacturing, so fewer pollutant sources.

Society

- The library is a good resource for elders and others and, provides good communication.
- The Senior Center is active and provides support services including van services (but does not have a generator).
- Needham Community Council has a good network and services many people.
- The YMCA is a good resource for communication and services.

- There is a strong network of religious organizations in town, including the Needham Clergy Association.
- There is a strong Local Emergency Planning Council.
- Public health and emergency communications provide good education.
- Youth and Family Services provides good support.
- The Chamber of Commerce can network and provide support.
- There is a high-quality EMS.
- Town communication: Alert Needham and social media are strong.
- Police, first responders, Reserve Medical Corps, hospital and DPW personnel are all strengths for the town. Interdepartmental coordination is a strength.
- RAVE system provides support to medically vulnerable people.
- Many lower income residents are in more walkable areas.
- Community cohesion includes block parties, small-lot neighborhoods, community websites (Next Door), volunteers, and service clubs. Strong community participation as shown in turnout for the MVP workshop.
- The DPW has heat days language in its contract.
- Parks and Recreation facilities and programs.

TOP RECOMMENDATIONS TO IMPROVE RESILIENCE

Each of the five workshop groups identified vulnerabilities and suggested solutions. The solutions were prioritized as High, Medium, or Low. Each group then identified their four highest priorities. The participants voted for their personal top four priorities from among the table group priorities. There was overlap in the top priorities of the five groups. The top five priorities were highlighted by more than one table group. Twelve distinct areas of focus emerged from the twenty highest priorities identified by the groups. The highest priorities are listed below in order of the number of votes they received. See Appendix B for all the recommendations.

Highest Priorities

Develop communication strategies: Several groups proposed targeted outreach to specific populations including seniors, low income residents, limited English language speakers, people with disabilities, people with cell phones, and people who work in Needham but live elsewhere. Creating a neighbor-to-neighbor outreach program was proposed.

Communicate and address health impacts: Provide outreach and education about extreme heat impacts and, mosquito and tick-borne illnesses. Develop heat exposure guidelines. Create a permanent shade structure at Rosemary Pond. Develop mosquito control plans, consider a regional plan, support environmentally friendly strategies.

Stormwater: While many groups highlighted Needham's new Stormwater Bylaw as a strength, stormwater management was identified as a top priority. Suggestions included providing needed funding and a long-term plan, addressing stormwater needs on large developments and ensuring new developments have increased capacity, incorporating nature-based solutions and, analyzing and planning for retrofits of undersized systems.

Water infrastructure: Monitoring and assessing vulnerabilities of the system was a general priority. Protecting the wells and water treatment plant, which are subject to flooding, was a key concern. In addition, assuring the protection and functioning of the St. Mary's Pump Station, town interconnections, and sewer pump stations was highlighted.

Tree and Forest Management: Develop a forest management plan to address invasive species, pests, and vulnerability to fire. Develop a tree bylaw. Identify locations to plant trees.

Ensure robust infrastructure: Consider cyber security, redundancy, and generator backup.

Upgrade the Central Avenue Bridge: Coordinate the work with the Town of Dover.

Focus on wetlands: Incorporate more climate concerns and resiliency in the local bylaw. Provide public education on the value and importance of wetlands.

Focus on seniors in public housing: Upgrade the building and infrastructure. Create additional green space. Develop a communications and coordination plan for emergencies.

Focus on residents with medical needs: Develop a list of medically fragile people for wellness visits during emergencies. Communicate the list with the hospital to ensure capacity for likely patients in the event of emergency.

Create a disaster response plan: The plan should include evacuation strategies.

Focus on hazardous materials: Map hazardous materials sites and communicate the information to the hospital.

High Priorities

- Develop strategies to reduce hotspots at critical facilities. Encourage green roofs, replace surface lots with structured facilities, revisit design standards. Look into solar canopies.
- All stormwater flows to the Charles River. Clear channels of trees, clear stormwater outfalls, remove sediment.
- Add water fountains and provide tick awareness at town parks and playgrounds.
- Monitor groundwater quality to protect the aquifer. Enforce protections.
- Assess invasive species and recruit volunteers to help manage invasives.
- Encourage standards to reduce water, plastics, and paper. Improve handling of recycling.
- Improve communication with the state regarding EEE. Consider not holding sports events in the evening.
- Maintain town fire roads. Assess fire vulnerability of town lands. Work with other towns on equipment sharing.
- Strategically expand generators to additional public facilities.
- Help assisted living facilities become resilient; provide information and guidelines. Analyze and plan for the need for emergency sheltering if facilities are not resilient.
- Coordinate regionally and with neighboring towns to address road flooding.
- Where possible, put electric wires underground; increase tree maintenance.
- Identify where groundwater is infiltrating the sewer system; do strategic repairs, continue Special Permit process that requires upgrades.
- Include generators for cooling the schools in the Capital Plan.

- Develop a small cell site to address the lack of cell network at the DPW building.
- Improve communications with Eversource; provide more resources for the Tree Warden to address risks to the electrical distribution system.
- Assess the need for upgrades to the gas distribution system to prevent/fix leaks.
- Review/change the parameters for opening and closing warming and cooling shelters. Consider a long-term shelter.
- Create additional water supply; install a redundant well.
- Provide education, communication, and assistance to residents in public housing at Linden Street.
- Encourage sign-up for the RAVE system, provide translation, have backup communication plan.
- Increase awareness of town facilities and communications systems.

Medium Priorities

- Educate the public to protect the trees on privately owned land.
- Encourage more vegetation and promote electric car infrastructure to address air pollution impact from cars.
- The Fire Department should continue planning to address brushfires along I-95 and lack of access to those areas.
- Continue working on adopting a protective tree bylaw to address loss of trees in residential areas.
- Reduce pesticide and pollutant runoff. Adopt a bylaw, restrict use, encourage natural landscaping.
- Continue annual funding for the stormwater program.
- Enforce stormwater management to address increasing impermeable surfaces resulting from development and tear downs (90 yearly).
- Preserve wildlife at the Ridge Hill/Nike site.
- Add Rosemary pool and building as a heating/cooling center.
- Develop a communication network with the hospital and pharmacies. Consider the need to stockpile medical supplies.
- Communicate with the MBTA regarding resilience. Develop better bus and walking connections to transit.
- Address hot spots at school parking lots with rain gardens, overhead solar panels.
- Address hot spots along Route 128. Add tree and trail requirements for large developments, require cooler roof materials, and nature-based solutions.
- Work with the Chamber to build up relationships with owners and developers.
- Make sure the Fire Department has information regarding hazardous materials in Route 128 developments.
- Push for speedier updates to gas pipes, and long-term strategy to move electricity underground. Gain public information from Eversource on gas line locations.
- Develop a regional disaster evacuation plan considering exit points at Dedham, Central, and Charles River Road.
- Investigate the need to protect facilities and pump stations as wastewater gets overwhelmed with stormwater.
- Study ways to improve cell service at the treatment plant.

- Engage Norfolk County Mosquito Control to address areas along tracks, the Charles river and swales.
- Consider a parking garage (and solar) at the town center to increase parking.
- Pursue upgrades to the DPW to address flooding and aging infrastructure.
- Schools could serve as shelters – consider solar installations and battery storage.
- Convert to environmentally sustainable generators.
- Coordinate with the many facilities that serve special needs populations. Be aware of their needs and emergency plans.
- Do outreach to low income residents about available town services.
- Consider the needs of outdoor workers. Monitor protocols for health and safety.
- Encourage new cell towers and services to address gaps on Rt. 135 near Wellesley.

Low Priorities

- Study drought issues; consider a water management plan.
- Enforce anti-idling to address air quality concerns.
- Manage open space for resilience, consider opportunities for green infrastructure.
- Work with the MBTA regarding emergency plans, alternatives in the event of shutdowns, and evacuation plans.
- Encourage more tree planting and permeable surfaces; make this a requirement for new development.
- Study issues associated with Route 128, including air quality, that may occur during emergencies.
- Monitor impacts of transfer station on nearby wetlands.
- Town Hall has flooded in the past.
- Address DPW parking lot flooding when dam overtops. Improve spillway.
- Address road flooding, e.g. junction of Chestnut and Pine. Add funding.
- Analyze projected resiliency of town bridges that are critical to transportation.
- The Town's civic infrastructure is centralized. Prioritize resiliency in this area.

No Priority Listed

- Investigate whether wood debris needs removal in protected forests.
- Develop a bylaw to protect trees on private property.
- Reduce greenhouse gas emissions. Develop a sustainability plan.
- Formalize outreach to medically vulnerable residents.
- Consider town-funded redevelopment of St. Mary's public housing (vulnerable to storm damage) Linden Chambers Senior Housing (in disrepair)
- Consider needs of large daytime (worker) population who take transit or drive.
- Be prepared with counselling services during disasters.
- Coordinate buses to cooling centers.
- Provide list of alternative resources (snowmobiles) if roads are closed.
- Evaluate evacuation plans in light of the potential for bottlenecks associated with I-95.

LISTENING SESSION

Due to the coronavirus pandemic the Listening Session was held virtually. The session was advertised via email and Needham social media. A video presentation and a copy of the draft report were made available on-line. Over 50 people viewed the video and 20 respondents filled out a survey. Their responses are summarized below.

Respondents were asked to identify their top 3 priorities from among the top twelve priorities identified in the workshop. The results are as follows:

Water infrastructure: 12
Stormwater: 10
Tree and forest management: 9
Robust infrastructure: 8
Wetlands protection: 4
Disaster response: 4
Communications: 4
Health impacts: 3
Senior public housing: 2
Hazardous materials plan: 2
Medical needs plan: 2
Central Avenue bridge: 0

We received many thoughtful and detailed comments the participants. Many respondents connected climate mitigation and resilience strategies. The following summarizes the responses to a question asking for additional strategies. Suggestions included:

- Be bold in reducing carbon emissions. Maintain and protect the power grid. Increased car tax, provided town-wide renewal transportation, ban fossil fuel infrastructure and companies from the Town; incentivize renewable energy and remote town functions including meetings and work.
- Move utilities underground.
- Develop energy independence and reduce greenhouse gasses. Increase residential solar power for resilience of the power grid and reduction of greenhouse gases.
- Address the negative effects of development, including tear downs and larger house construction, through improved zoning and open space planning.
- Increase housing density in order to provide for more wetlands to provide mitigation for development, and to reduce carbon footprints.
- Disaster planning should be an ongoing effort among Needham and state agencies and other relevant parties.
- Remove overhanging branches along power lines. We need fewer trees there, not more.
- Consider betterments to fund improved stormwater infrastructure. Monitor effectiveness of new stormwater and zoning bylaws.
- Develop a communication strategy that focuses on identifying and targeting those individuals or groups most at risk. For example, if the Town of Needham knew all of the elderly and those with limited means, we would know who would be at highest risk for heat related events and these people could be warned, but also local neighborhood groups or individuals could

assist as well. The co-benefits of this approach are to incorporate civic duty and neighborly cooperation. Emphasizing co-benefits with every proposed action (i.e. leads to better health, saves money etc.) can help people buy in to the process and make it more successful. In the big picture, avoiding heat stroke, flooding and contamination of the water supply are likely the biggest issues for Needham that need detailed plans to avoid illness and death.

- How big a risk is fire in our Town Forest? Has that been assessed?
- What about mental health services? With climate effects, heat and mental stress will become an issue. We see this with COVID and parallels do exist.

Finally, participants were asked for additional comments.

- Let's strive to meet the challenge of climate change with the bold attention required and lead that effort here at home. I'd like us to play more offence and less defense.
- Strike any references to the climate change. It's a left-wing fallacy, not anything that threatens the Town. We do not have weather that gets more and more destructive.
- I have noticed the town planting trees along the roadways under utility and power lines (i.e. West St). As part of the implementation of planting trees, I suggest consideration should be taken on the placement of plantings not to interfere with infrastructure.
- Too often trees are falling on South Street, and other streets and some poor soul has to go out and repair in a storm. Be proactive and do maintenance now, before disaster.
- The Needham Heights area lacks open spaces relative to other parts of town. The length of Rosemary Brook is an important resource that should be made accessible. There should be a boardwalk through the Sweet Preserve, and signage to encourage walking along this entire route - what a resource to teach children about the importance of wetlands.
- I echo the need for storm water management. With increased frequency of storms, floods are more likely, and there needs to be enough capacity for these floods to be absorbed in brooks and water retention space.
- The program participants identified several strengths/assets, and then included the magnification of these strengths as their highest priority needs. This is an expected outcome of assembling a group of mostly department managers and staff, and elected officials. Including the views of a less personally invested expert panel (in addition to or rather than the less-informed public-such as myself) would be a valuable exercise to account for the natural biases of the participants and to yield a more objective prioritization.
- I'm concerned that the current focus of these plans only represents a small subset of Needham's population (older, retired, less diverse), and that won't address the needs of the future population that these measures will impact more strongly. I would like to see a higher reliance on outside experts and controlled input from the current community (including myself) to ensure a demographically balanced response.
- Many of the "highest priority" strategies include or subsume more specific strategies which have been assigned to lower priority ratings. These substrategies should be called out in the final reporting so that these ideas are not lost in the more general and nebulous highest priority descriptions.
- I think the document should make it clear that our efforts here are to adapt to human caused climate change and that mitigation is addressed or should be addressed thru a different mechanism , though some actions of course can serve both mitigation and adaptation. This document should say clearly that climate change has arrived, it will affect Needham and these are the important actions we can take to adapt and avoid and limit the risk to human health,

our economic health and maintaining the social fabric of community especially for those at highest risk for harm to the effects of climate change.

CRB WORKSHOP INVITED PARTICIPANTS

* = representative attended

State Senator*

State Representative*

Needham Public Works*

Needham Building Department*

Needham Water, Sewer, and Drains*

Needham Water Treatment*

Needham Schools*

Needham Emergency Management*

Needham Conservation*

Needham Parks and Recreation*

Needham Finance and Administration*

Needham Fire*

Needham Town Manager Office*

Needham Information and Technology*

Needham Planning and Community Development*

Needham Police*

Needham Public Information*

Needham Public Health*

Needham Council on Aging*

Needham Youth and Family Services*

Needham Select Board*

Needham School Committee*

Needham Planning Board*

Needham Historical Commission*

Needham Commission on Disabilities*

Needham Conservation Commission*

Needham Town Technology Committee*

BID-Needham*

Babson College

League of Women Voters*

Needham Heights Neighborhood Association*

MWRA*

Charles River Watershed Association*

Babson College

MEMA

Green Needham*

Newton Needham Chamber of Commerce*

MA DEP

MA DOT

Wellesley Light Plant
 Dedham/Westwood Water District
 Eversource
 Tenant Representative Needham Housing Authority
 Olin College
 Walker School
 Charles River Center
 St. Sebastian
 Needham Community Farm
 Needham History Center and Museum
 Wingate
 Northhill
 Rotary
 Exchange
 Needham Clergy Association
 Riverside
 Needham Community Council
 Springwell

CRB WORKSHOP PROJECT TEAM

Needham Core Team

Rebecca Ping	Emergency Management Administrator, Project Coordinator
Deb Anderson	Conservation Agent
Nick Ceurvals	Fire Department
Steve Cusick	Manager, Water Treatment Plant
Anthony Del Gaizo	Town Engineer
Barry Dulong	Director, Building Maintenance
Sean Harrington	Superintendent, Water and Sewer
Rhain Hoyland	Superintendent, Highway Division
Robert Lewis	Assistant Director, Public Works
Carys Lustig	Assistant Superintendent, Water and Sewer
John McGrath	Police Department
Richard Merson	Director, Public Works
Jessica Moss	Council on Aging
David Roche	Building Department
Eleanor Rosellini	Green Needham
Tiffany Zike	Public Health Nurse

Facilitation Team

Anne Herbst	Metropolitan Area Planning Council (Lead Facilitator)
Ella Wise	Metropolitan Area Planning Council
Jennifer Kaplan	Metropolitan Area Planning Council
Martin Pillsbury	Metropolitan Area Planning Council
Iolando Spinola	Metropolitan Area Planning Council

Lizzie Grobbel

Metropolitan Area Planning Council

Citation

Metropolitan Area Planning Council. 2020. Town of Needham Municipal Vulnerability Preparedness Program. Community Resilience Building Workshop Summary of Findings. Needham, Massachusetts

Acknowledgements

Thank you to the MVP Core Team members, CRB workshop participants, and Emergency Management Administrator Rebecca Ping who served as the local Project Coordinator. Funding for the CRB Workshop was provided by the Commonwealth of Massachusetts through a grant from the Municipal Vulnerability Preparedness program.

Actions Prioritization

Stormwater

- Action:
 - Long-term plan
 - Nature-based solutions
 - Address on long developments residential
- 1A

Water Infrastructure

- Monitor basin vulnerabilities, protect:
 - Water Treatment Plant & wells
 - City Pumping Station
 - Town Hydroelectricity
 - 10 Storm Pump Stations
 - Stormwater drainage system

BRIDGES

- Upgrade Central Avenue Bridge
- Coordinate with Dover
- 3

PERMANENT SHADE STRUCTURES

- Policy SOP
- Heat Exposure Guidelines
- 6

Find ways to protect the perimeter of the well and treatment plant

Ticks & Mosquitoes

- Action:
 - More education & communication w/ public
 - Look at Mosquito control
 - Maybe develop regional plan
- Study & support environmentally-friendly mosquito control, including public education about treating standing water
- Education & Communication about Mosquitoes/Tick-borne illnesses and extreme heat

Wetlands

- Action:
 - Education for public
 - Wetlands by-law to incorporate more climate concerns & resiliency
- 3

TREES

- Work on Tree By-law
- ID areas to plant trees
- Assess vul. to fire, pests, etc
- Forest Management & Invasive Species Management
- 14

Wetlands

- Action:
 - Building/infrastructure green spaces - More
 - Communications & Land use plan for emergency
- Develop list of emergency people for outdoor work during disaster. Communicate lists to help to ensure capacity for all potential sick patients
- 4

Develop a communications network

- Include a neighbor to neighbor reach out
- 6

Upgrade Public Communications

- esp. for Seniors, Low Income, Language limited, people with Disabilities
- Reach people via cell phones, etc
- 1

COMMUNICATIONS

- Robust Infrastructure
- Cyber security
- redundancy
- generator back up
- 10

OUTREACH

- Senior Population
- Disabilities
- Non-English Speaking
- People who work in Needham that don't live here
- 9

Map

- Map areas with high vulnerability to hazards
- Identify & communicate to hospital
- 1

Form Board

002000

002000

002000

Base Map

NEEDHAM

Critical Infrastructure

Critical Infrastructure

-  Schools (PK - High School)
-  Assisted Living Facility
-  Nursing Home
-  Rest Home
-  Dams
-  Police Stations
-  Fire Stations
-  Town Halls
-  Libraries

Hazards

-  Hot Spots*
-  A: 1% Annual Chance of Flooding
-  X: 0.2% Annual Chance of Flooding

Locally Identified Hazard Areas

-  Brush Fire
-  Flooding

March 2010 Claims

-  Flood Insurance
-  Disaster Assistance

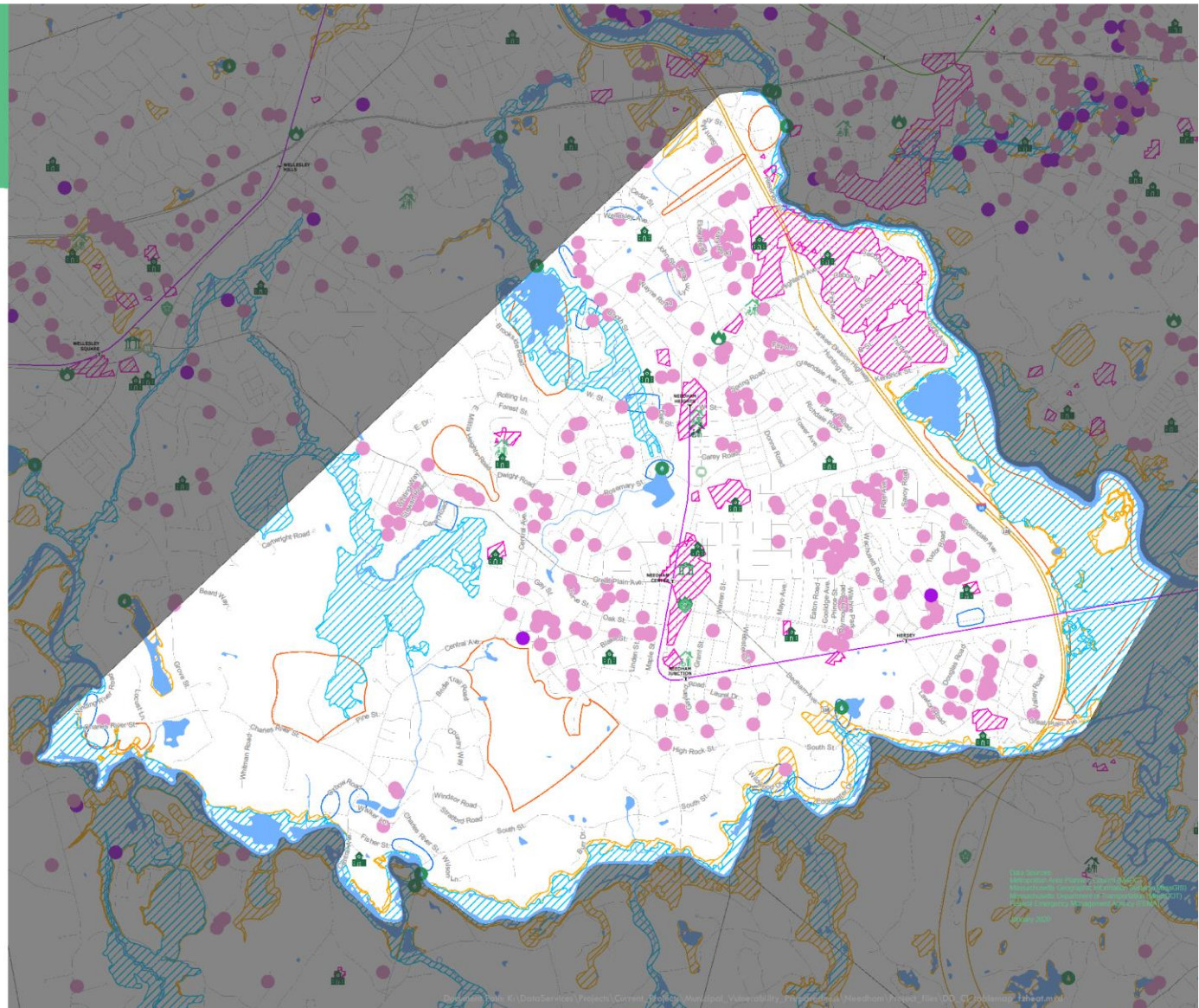
Other Features

-  Rivers and Streams
-  Water Bodies

*Hot Spots are areas identified by MAPC as the hottest 5% of land area in the MAPC region.
Data from 2016.

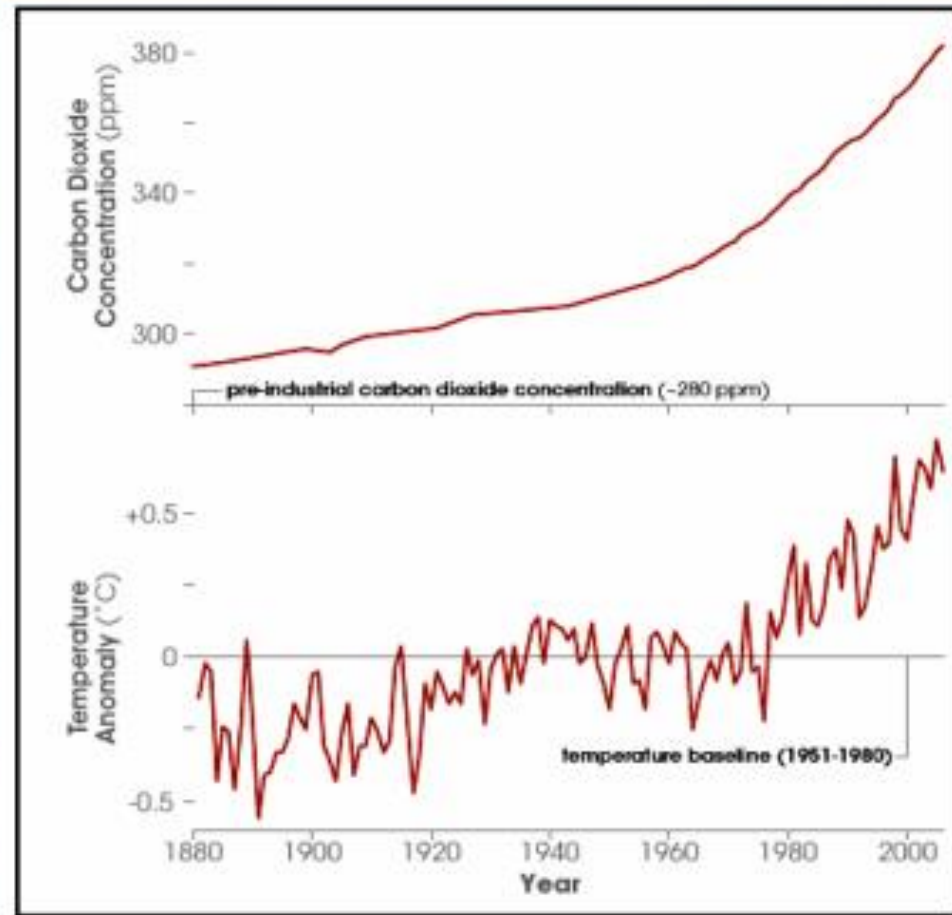


0 0.2 0.4 0.8 Miles





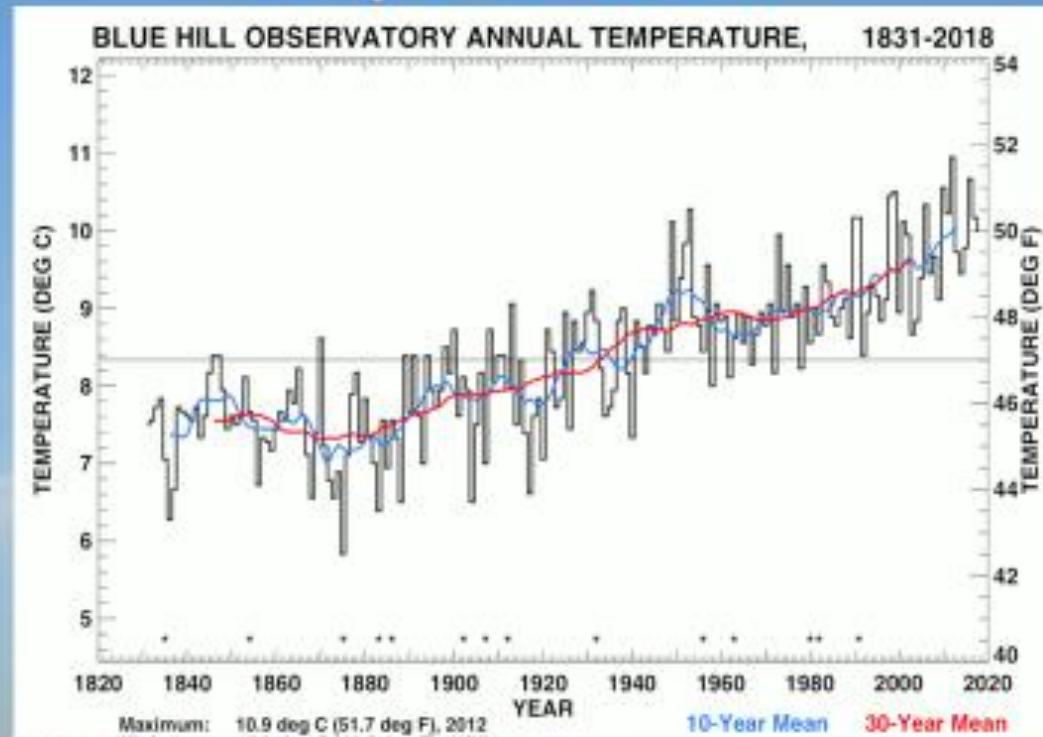
Global Temperature and CO₂ Trends



Source: MA Climate Change Adaptation Report 2011

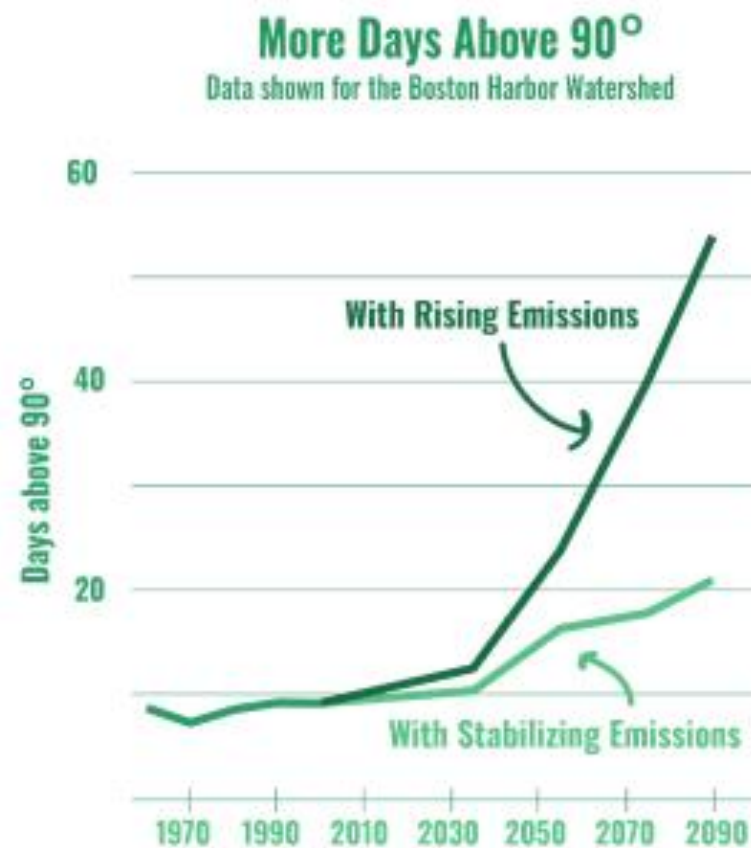
Temperature change: observed

Nearly 3° F since 1831



Blue Hill Observatory Annual Temperature, 1831-2018

Temperature change: projected

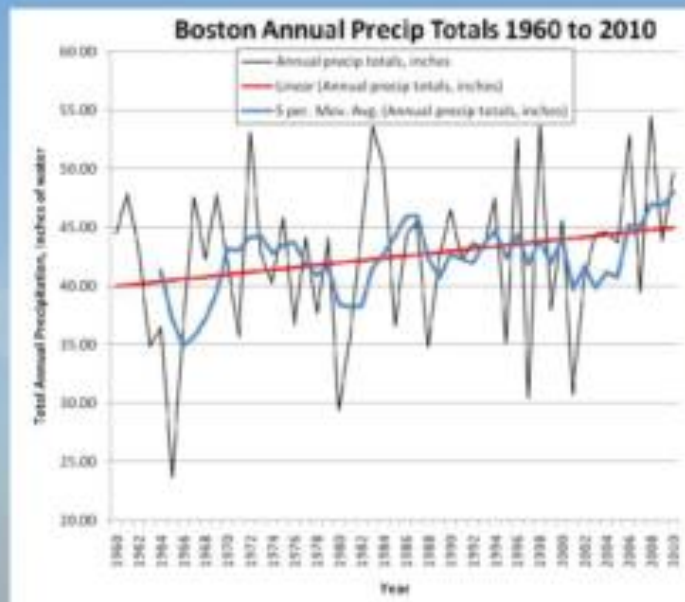
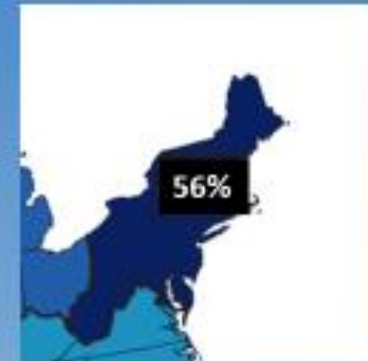


Source: Northeast Climate Adaptation Science Center

Precipitation change: observed

For the Northeast United States: 56% increase in the amount of rain that falls in the top 1% events from 1958 – 2016.

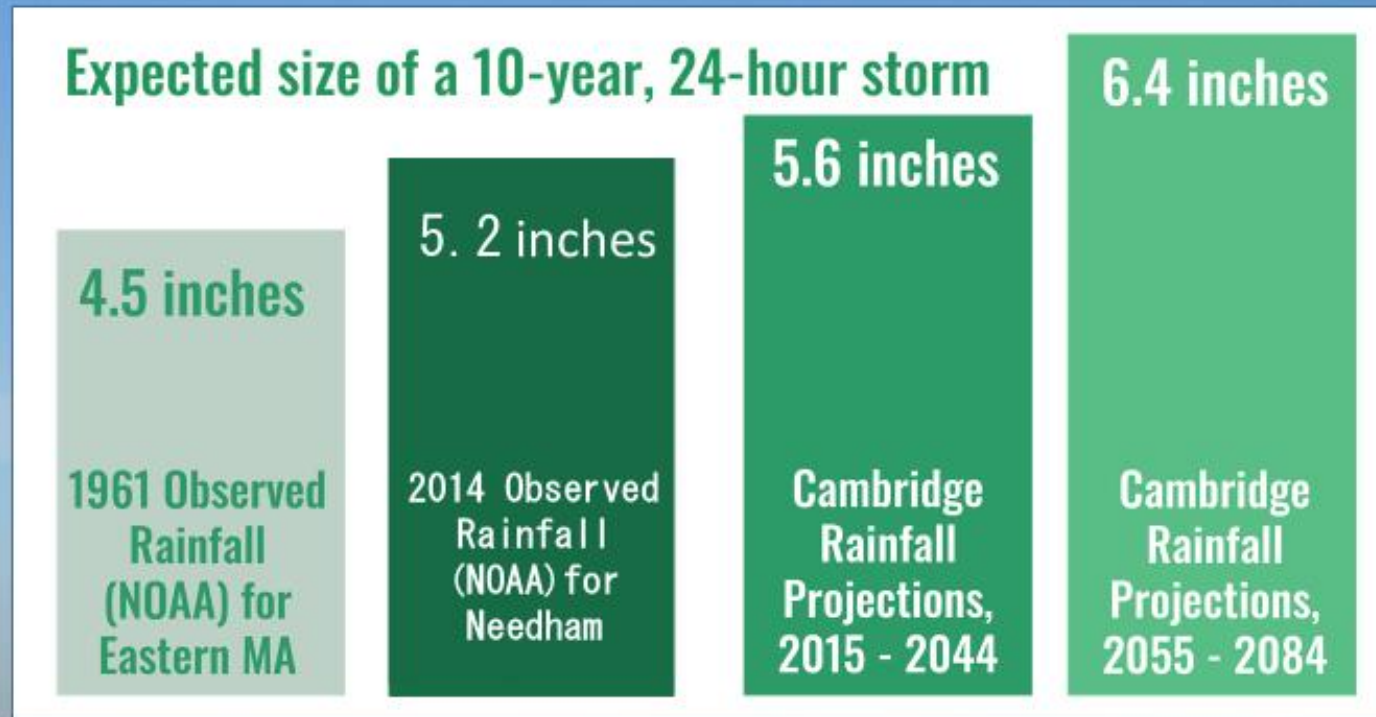
Source: US National Climate Assessment 2018



Source: MA Climate Change Adaptation Report 2011

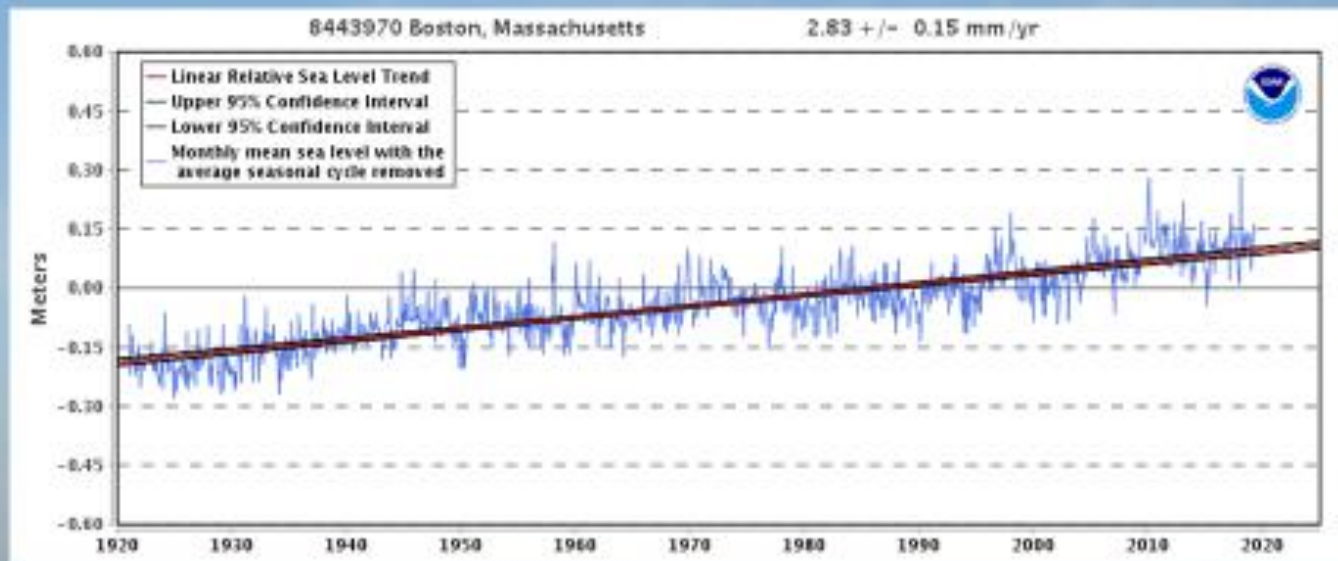
For Boston area: 10% increase over the past 50 years

Precipitation change: projected

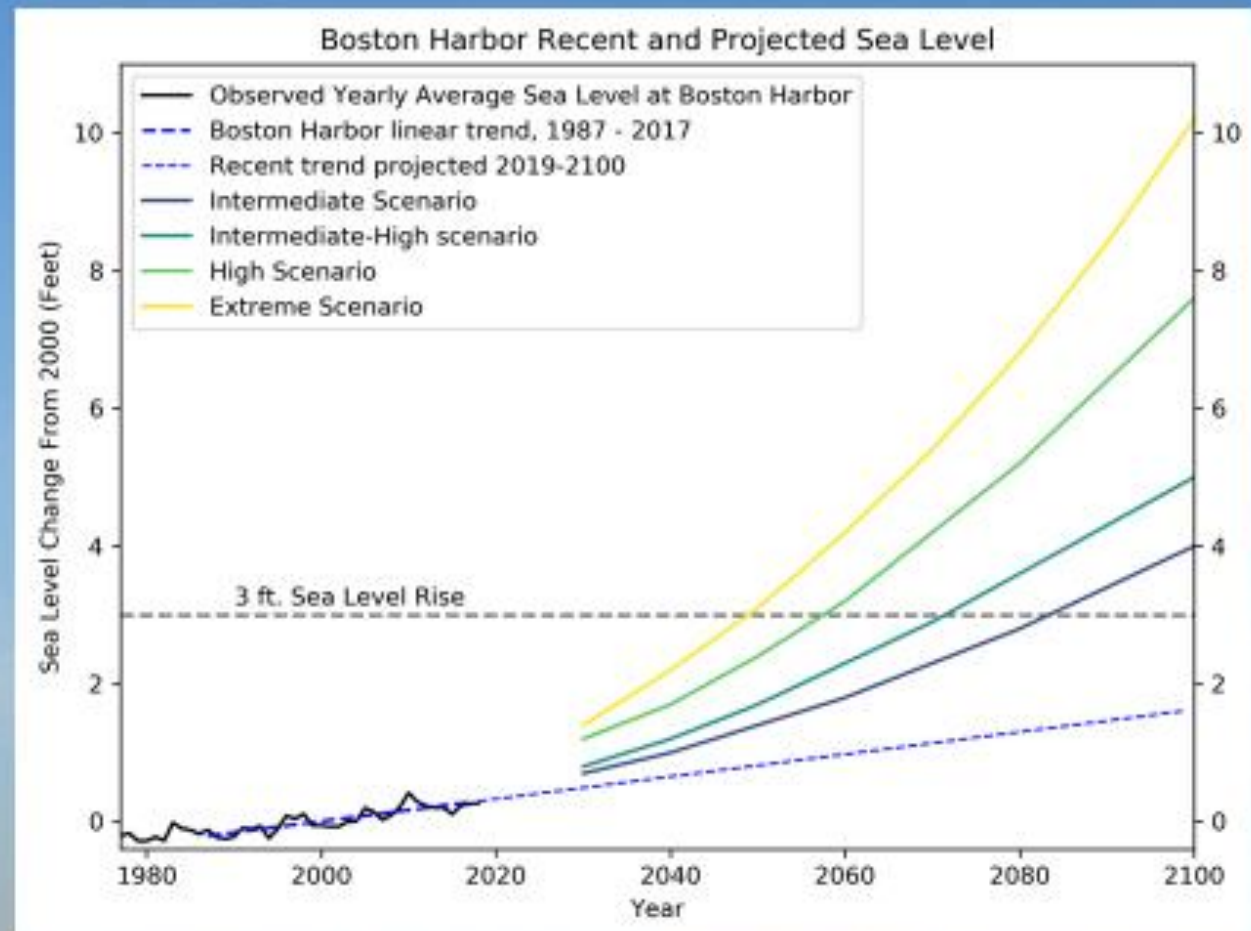


Sea level rise: observed

- Boston tide station
- Record from 1921-2018
- Equivalent to 11 inches in 100 years



Sea level rise: Projected to 2100 for Boston Harbor



Source: Northeast Climate Adaptation Science Center and MAPC

POSTERS

NEEDHAM

Critical Infrastructure

Infrastructure will be at risk to damage from flooding, and loss of function due to power outages. Increasing large rainfall events may subject roads, bridges, dams and buildings to more frequent or severe flooding. Areas that don't flood today may become vulnerable. FEMA flood zones reflect only current conditions, although the .2% (500-year) flood zones may indicate where future flooding will occur. FEMA flood zones also do not generally capture stormwater flooding. That is, flooding that exceeds the capacity of current stormdrains and culverts. We don't currently have models that project where future flooding from larger rain events will occur. Power outages affecting infrastructure and communications may become more frequent as result of high energy demand during heat waves. Winter outages could be caused by ice storms if warming results in temperatures hovering around freezing. The potential for more intense hurricanes could cause outages due to falling trees. Finally, buildings, roadways, and railways can be stressed by extreme heat. Heat can cause damage to expansion joints on bridges and highways, and may cause roadways to deteriorate more rapidly.

Critical Facilities

- Critical Facilities

Other Features

- Rivers and Streams
- Water Bodies

March 2010 Claims

- Flood Insurance
- Disaster Assistance

*Hot Spots are areas identified by MITC on the basis of 2010 flood zone in the MITC map data from 2010.

Label	Name
1	Bradenwood Elementary School
2	Ellis School
3	Hillside Elementary School
4	William Mitchell Elementary School
5	Newman Elementary School
6	Pollard Middle School
7	Needham High School
10	Charles River Ave. for Retarded Citizens
12	St. Joseph Elementary/Middle School
13	St. Sebastian's High School
24	Needham High School Shelter
31	Riverside Community Care
36	Walker Home School
38	Town Hall
39	Avery Manor Nursing Home
40	Brianwood Nursing Home
41	North Hill Retirement Community
43	Wingate Nursing Home
44	Varizon Telephone Switch Bldg
45	Coca-Cola Bottling Company
46	Varizon
47	Level III
48	Algonquin Gas Meter Station
50	Kerlan-Lane Petroleum
51	Concord of Needham Inc.
52	Mull Motors Inc.
57	Pollard Middle School-Shelter
58	Emergency Management/Operations Center
59	Beth Israel Deaconess Hospital
60	Needham Department of Public Works
61	Media Transmission Towers
62	Media Transmission Towers
63	St. Mary Pump Station
65	Water Treatment Plant
66	Needham Fire Department Station#2
67	Needham Fire Dept.
68	Needham Police Dept.
69	Needham Public Library
70	Bothe Brothers Supermarket
71	Water Storage Tank Storage #2
72	Water Storage Tank Storage #1
74	Sudbury Farms Supermarket
76	Duke Energy HGO Transmission Line PC
77	Center Methodist Church
78	Charles River Industry
79	U.S. Post Office
80	U.S. Post Office
81	St. Joseph Church
83	First Baptist Church
84	Presbyterian Church
85	Council on Aging
86	Public Services Administration Building
87	Recycling and Transfer Station
88	School Administration Building
89	Manigault Haddad Middle School
90	City College of Engineering
91	YMCA After-school

Hazards

- Hot Spots*

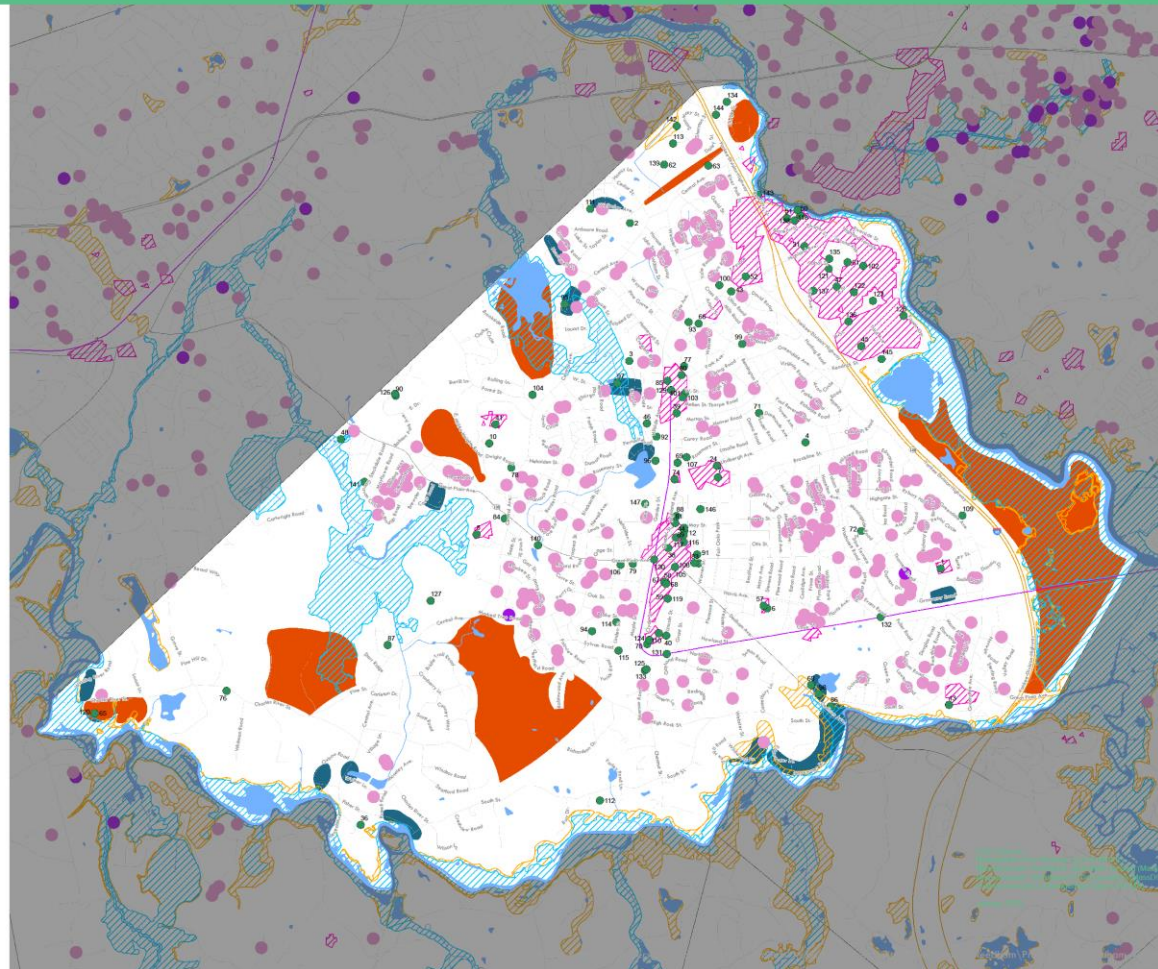
- A: 1% Annual Chance of Flooding
- X: 0.2% Annual Chance of Flooding

Locally Identified Hazard Areas

- Brush Fire
- Flooding

Label	Name
92	Needham Community Council/Pood Pantry
93	Daley Building
94	High Rock School
95	Santa Williams School
96	Rosemary Recreation Complex
97	West Street Sewer Pump Station
98	Dedham Avenue Water Pump Station
99	Arts Memory Care
100	Wingate of Needham
101	CoreWell Urgent Care
102	Onwards Adult Day Care
103	Trader Jack's
104	Volante Farm
105	First Parish in Needham
106	Congregational Church
107	Christ Episcopal Church
108	First Church of Christ Scientist
109	Greenfield Ave. Worship Center
110	Chesnut Street Animal Hospital
111	Highland Avenue Animal Hospital
112	Stanley Tippet House
113	Needham Public Housing
114	Needham Public Housing
115	Needham Public Housing
116	Varizon Telephone Switch Building
117	Maritime Development Labs Inc
118	ATA - MA3438
119	Beth Israel Deaconess Hospital
120	Charles River Water Treatment Facility
121	Digital 105 Cable, LLC
122	General Dynamics C4 Systems
123	Needham Nine Owners LLC
124	Needham Oil & Air
125	NSTAR Station 148 & 381
126	Olin College of Engineering
127	Recycle and Transfer Station
128	Cellular
129	Needham Heights
130	Needham Center
131	Needham Junction
132	Harvey
133	Eversource Electric Substation
134	Water Pump Station 3
135	Sheraton Needham Hotel
136	Residence Inn by Marriott Station Needham
137	Hilton Homewood Suites
138	Needham CO - LTPF9 (AT&T Services Inc)
139	WBZ Transmitter Site (American Tower)
140	Great Plain Pump Station
141	Alden Road Pump Station
142	Cook's Bridge
143	Reservoir B
144	Reservoir A
145	Kendrick Street Pump Station
146	Warren Pump Station
147	Lake Drive Pump Station

0 0.225 0.45 0.9 Miles



Needham

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.

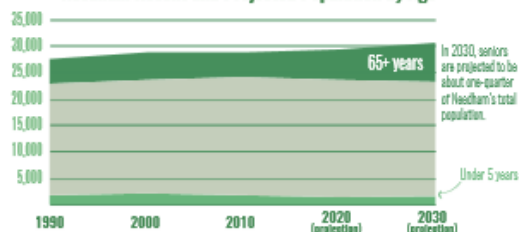
People who may have more difficulty adapting to, preparing for, or recovering from extreme weather events: Socioeconomic characteristics such as income and race can influence vulnerability to climate change. Low-income people are often more susceptible to financial shocks, which can occur after extreme 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.

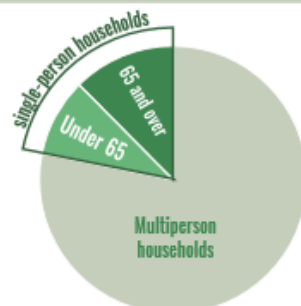
Older Adults and Young Children

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 constraints and may need additional assistance during emergencies. They are also more likely to live alone than younger adults.

Needham Recent and Projected Population by Age



People Living Alone



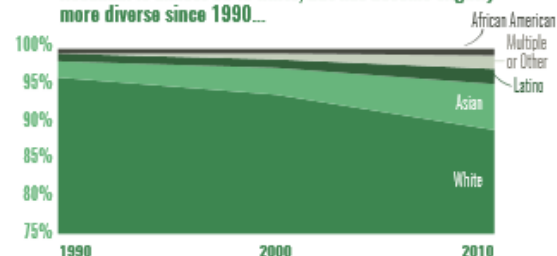
As of 2010, about 22% of Needham households consisted of someone living alone.

57% of people living alone were over 65.

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. Heat waves and poor air quality can trigger asthma.

Needham is almost 90% white, but has become slightly more diverse since 1990...



Low-Income Households

19.8% ±2.7% of households in Needham are low-income

5.8% ±1.5% of households in Needham are below the poverty level

39.8% ±6.4% of seniors in Needham are low-income

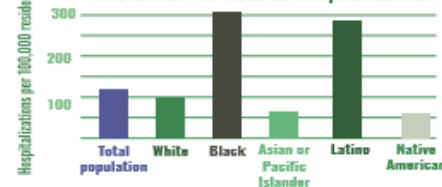
*A four-person household earning less than \$18,150 is considered low-income; a four-person household earning less than \$24,563 is below poverty level

People Who Work Outside



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

Massachusetts Asthma Hospitalizations



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

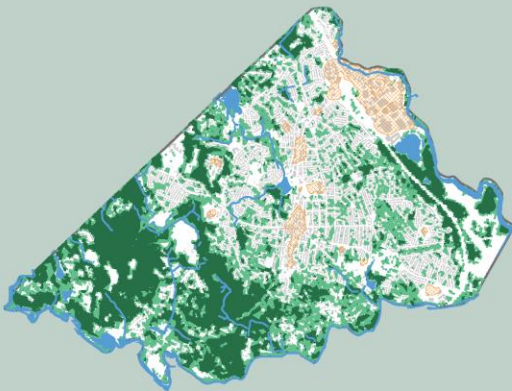
Needham

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).

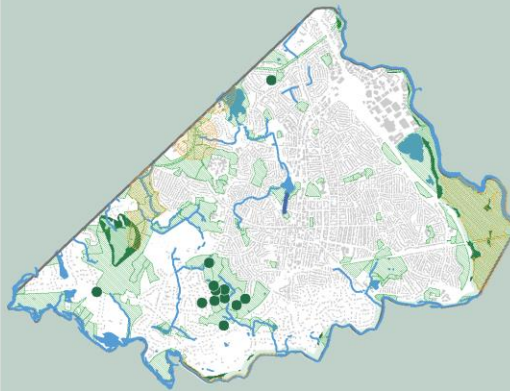


- Hot Spots
- 50% – 75% Tree Cover
- 75% – 100% Tree Cover
- Developed Land

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	Weakens and damages trees

Valuable Habitat

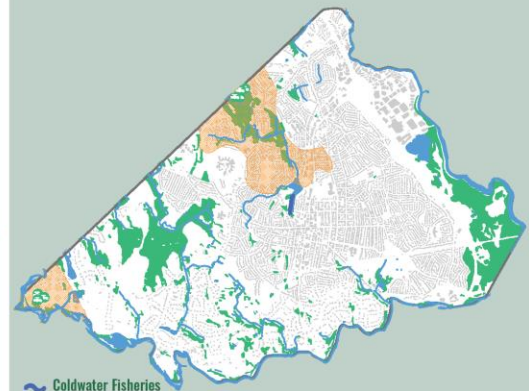
Core Habitat and Critical Natural Landscapes are state-identified intact landscapes, or exemplary natural communities, that are better able to withstand climate stresses and support the long-term survival of rare species and natural habitats. Rare Species Habitat identifies the known habitat areas for state-protected rare plant and animal species.



- ~ Coldwater Fisheries
- Vernal Pools
- Core Habitat
- Critical Natural Landscape
- Rare Species Habitat
- Open Space
- Developed Land

Water Resources

Needham contains, healthy, intact freshwater wetland systems that sustain critical ecosystem functions. These ecological assets protect water quality and quantity, provide flood control, and maintain overall ecosystem health for climate resilience.



- ~ Coldwater Fisheries
- Wellhead Protection Areas (Zone II)
- Groundwater Pumping Station
- Wetlands
- Developed Land

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
Extreme Precipitation	Scouring, impaired waters, sewer overflows



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)

APPENDIX B – TABLE MATRIX RESULTS

Participants were divided into small groups identified as Blue, Green, Orange, Yellow, and Red. Concerns were categorized as Environmental, Infrastructure, or Societal. Participants identified climate-related strengths and vulnerabilities for Needham. Solutions were proposed for the vulnerabilities. Solutions were then prioritized as High, Medium, or Low. Each table was asked to identify their top four priorities. The information was recorded in a matrix for each table and is reproduced in the chart below.

Table	Topic	Strengths (S) & Vulnerabilities (V)	S/V	Solutions	Priority
Blue	Environment	stormwater bylaw has been adopted; regulations are on the way	S		
Blue	Environment	bald eagles have been seen in town	S		
Blue	Environment	Vulnerable species require attention and resources	S/V	Forest Management Plan/Study	M
Blue	Environment	Ticks and other insects will require attention/resources	V	education/outreach/think about regional mosquito control plan	H
Blue	Environment	lots of wetlands in town - there have been fires there	V	public education, review wetlands bylaw for climate concerns and resilience	H
Blue	Environment	there is a working group for a tree bylaw	V	generate more support, for the bylaw, there is opposition	H
Blue	Environment	maximized residential development is having a negative impact on stormwater	V	monitor if new stormwater and zoning bylaws are effective in addressing this issue	H
Blue	Environment	Invasive plants species	V	Recruit resident volunteers to help with treatment	H
Blue	Environment	rats due to trash pickup and restaurants	V		H
Blue	Environment	Geese have a negative impacts (feces) beavers cause flooding	V		L
Blue	Environment	Drought is something to study	V	water management plan? Water bird study?	L
Blue	Environment	tree maintenance is ok, but also a challenge	V	educate the public so they can take action on their own land	M
Blue	Environment	private property tree maintenance could be better	V	educate the public so they can take action on their own land	M
Blue	Environment	air quality due to traffic and highway in town	V	more vegetation need, promote electric car infrastructure	M
Blue	Environment	cayotes are more active now, being pushed out of former habitats	V		M

Blue	Environment	larger trees in town are vulnerable - mostly the pines	V		M
Blue	Environment	Forested areas: cooling, wildlife, stormwater control +, ticks, fire, aging trees -	V/S	need Forest Mgmt. plan, research into a health assessment	H
Blue	Environment	Charles River cooling and wildlife habitat +, future flooding -	V/S	connect with Charles River Watershed Assoc. partner in a regional flooding model	M/H
Blue	Environment	Town has local well water			
Blue	Infrastructure	8 public and private schools and colleges, could serve as shelter	S	need generator, research on power infrastructure	
Blue	Infrastructure	active food services at the schools	S		
Blue	Infrastructure	BIDMC in town	S		
Blue	Infrastructure	Old Town Hall with backup generator can be useful in emergency	S	connect SSREC to fiber, better access for maintenance	
Blue	Infrastructure	roads in town are not prone to flooding	S		
Blue	Infrastructure	playgrounds and playing fields	S		
Blue	Infrastructure	Dam at Rosemary Street	S		
Blue	Infrastructure	library is a good resource for elders and others	S		
Blue	Infrastructure	water treatment plant is in a low area, sand bagging is needed in large storms	S/V	might need an earthen berm to protect it	H
Blue	Infrastructure	MBTA stations -shut downs in cold weather can affect town workforce	S/V	connect with MBTA, what other resources can be utilized, bus shelters, digital train alerts	L
Blue	Infrastructure	runoff is being investigated in some areas of town	S/V		
Blue	Infrastructure	stormwater and sewage are beyond capacity with large storms	V	town is investing capital, but more funding may be needed, more nature-based solutions needed	H
Blue	Infrastructure	some of the bridges in town are old	V	bridge to Dover needs study and improvement	H
Blue	Infrastructure	Fire and police building is out of date (new one coming)	V	something to look at , end in coming	L
Blue	Infrastructure	Rt 128 may require attention during emergencies, impacts on air quality	V	need to study this	L
Blue	Infrastructure	transfer station near the wetlands has a lot of impact on it	V	they have been working on it, monitor for the future	L
Blue	Infrastructure	hotspots at school parking lots	V	rain gardens, trees, solar panels over the lots,	M

Blue	Infrastructure	new development along Rt. 128 is a hot spot	V	add trees/trails to requirements for large development, look at requiring rooftop vegetation or cooler roof materials, need nature-based solutions	M
Blue	Infrastructure	Rt 128 ownership changes, need to review communications	V	work with Chamber to build up relationships with owners and developers	M
Blue	Infrastructure	hazardous materials might be located in Rt. 128 developments	V	Fire dept. needs info. For the future, public support might be needed	M
Blue	Infrastructure	DPW is in low-lying location near the river, at risk of flooding	V	study issue, look at increasing culvert size, or moving	M
Blue	Infrastructure	gas and electric in town are vulnerable	V	push utility to update gas pipes, move electricity underground - that is a long-term effort	M
Blue	Infrastructure	increasing numbers of electric cars in Needham,		need more charging stations	
Blue	Society	Rosemary Rec center is great emergency space has generator	S		
Blue	Society	Senior Center support services, but no generator for cooling center	S		
Blue	Society	YMCA - good communication, generator, cooling center, showers	S		
Blue	Society	Library has good communication	S		
Blue	Society	Needham Community Council has good network, services a lot of people	S		
Blue	Society	good local emergency committee	S		
Blue	Society	medically vulnerable residents are able to use RAVE system for support	S	VNA could also be a resource	
Blue	Society	A better Religion?? Strong network of religious groups in town	S		
Blue	Society	Needham Chamber of Commerce can network and support	S		
Blue	Society	public health and emergency services does good education	S		
Blue	Society	Rave System (reverse 911)	S/V	look into other language capacity	M
Blue	Society	there are 3 areas of public senior housing that need support	V	look at the buildings - they are old, more green space needed, need communication plan, more coordination	H

Blue	Society	Housing for disability/needs in town will need more support	V	create emergency plans and communication for the future, work with partners/plan in space but more support is needed	H
Blue	Society	language support will be needed in the future	V	build up town communication/interpretation services for non-English speaking residents	H
Blue	Society	long-term care and assisted living facilities	V	create emergency plans and communication for the future, work with partners/plan in space but more support is needed	M
Blue	Society	the low-income population (26%) is something to consider	V	education about services available in town for those who need it	M
Blue	Society	Landscaper/DPW/1st responders/Construction (outdoor workers)	V	protocols are in place and should continue - monitor it	M
Blue	Society	school are hot due to turf fields and parking	V		
Green	Environment	fire roads are maintained in the town forest	S		
Green	Environment	active Conservation Commission	S		
Green	Environment	Protected wetlands along river are publicly owned	S		
Green	Environment	aquifer w/ MWRA supplement provides drinking water	S		
Green	Environment	aquifer is well-protected	S		
Green	Environment	trees on public way are protected or replaced	S		
Green	Environment	hazardous materials trucks drive along I-95	V	map sites with haz mat and share with hospitals, etc.	H
Green	Environment	mosquito habitat breeding grounds	V	ID environmentally friendly control programs (e.g. educate on standing water)	H
Green	Environment	More tick-born illnesses	V	as above	H
Green	Environment	dead trees near well-field limit access, fire hazard	V		L
Green	Environment	fire hazard in peat along I-95 near industrial area, smoke hazards	V		L/M
Green	Environment	lots of invasive species, especially in wetlands, (plants and pests)	V	on-going management and restoration	M
Green	Environment	brush fire along I-95, lack of access	V	fire dept continue planning	M
Green	Environment	loss of tree cover in residential areas	V	continue working on adopting protective tree law	M
Green	Environment	Industrial are near Needham St. is a hazmat issue/ also at transfer station	V		

Green	Environment	limited debris clearance in some protected forests	V	study whether this is hazardous	
Green	Environment	lots of impermeable surfaces	V	study how to increase permeable surfaces in an environmentally friendly way	
Green	Environment	no bylaw protects privately owned trees	V	see above??	
Green	Environment	lots of radio frequency			
Green	Infrastructure	many public facilities have generators	S	support and expand to other facilities strategically	H
Green	Infrastructure	lots of privately owned solar	S	support it	L
Green	Infrastructure	solar farms contribute to the grid	S	expand, maybe in parking lots, be strategic, store in batteries, look into wind power,	
Green	Infrastructure	bypass pumps keep stormwater and sewer separate	S		
Green	Infrastructure	bulk of residents live in walkable areas	S		
Green	Infrastructure	lots of grocery stores	S		
Green	Infrastructure	highway/rail/bus access	S		
Green	Infrastructure	Olin College facility	S		
Green	Infrastructure	many hotels that can provide emergency shelter	S		
Green	Infrastructure	many bridges have recently been rebuilt	S		
Green	Infrastructure	resilient hospital, but very limited capacity	S/V	develop list of medically fragile for wellness checks, ID all assisted patients to ID total # of potential patients in a disaster	H
Green	Infrastructure	long-term care facilities could be strengths if well prepared	S/V	help assisted living facilities become resilient, provide info and guidelines	H
Green	Infrastructure	lots of public buildings but differences in the resources between them	S/V		
Green	Infrastructure	Many roads in neighboring Dover flood	V	coordinate with neighboring towns and region	H
Green	Infrastructure	lack of communication and planning between these resources e.g. Do hotels know they could shelter?	V	town staff should coordinate on all MVP priorities	H
Green	Infrastructure	overhead wires that supply electricity are vulnerable particularly in treed areas	V	when possible, underground wires, do more tree maintenance	H

Green	Infrastructure	SW capacity is designed for 25-year storm, but storms are getting bigger	V	analyze and plan for retrofits, update design standards	H
Green	Infrastructure	infiltration of sewer system when gw table is high	V	ID where infiltration is happening, strategically repair pipes, continue special permit process that requires upgrades	H
Green	Infrastructure	critical civic facilities are in hotspots - too much paving	V	plant trees, encourage green roofs, replace surface lots w/ structured, revisit design standards, look into solar canopies	H
Green	Infrastructure	many long-term care facilities, if not resilient, many vulnerable people	V	analyze and plan for emergency sheltering, need to check if it already exists	H
Green	Infrastructure	Town hall has flooded	V		L
Green	Infrastructure	dam near the DPW overtops, floods vehicle parking	V	design to go through spillway	L
Green	Infrastructure	Dependent on bridges	V	analyze projected resiliency of bridge infrastructure	L/M
Green	Infrastructure	Roads that get flooded due to SW overflow (DPW has mapped)	V	hard to know how many are vulnerable, DPW can study and strategize	L/M
Green	Infrastructure	aging and expanding natural gas system	V	lobby gas co's and state - hard to know what to do at town level	
Green	Infrastructure	low-lying roads/bridge in the southwest corner	V		
Green	Infrastructure	civic infrastructure is all in one place	V/S	prioritize resiliency in this area	L/M
Green	Society	lower income people are in more walkable areas	S		
Green	Society	several strong congregations	S		
Green	Society	interfaith council	S		
Green	Society	active ymca	S		
Green	Society	active senior center	S		
Green	Society	lots of block parties, small-lot neighborhoods	S		
Green	Society	Needham community websites (Next Door)	S		
Green	Society	high-quality EMS	S		
Green	Society	small # of unhoused	S/V		L
Green	Society	dispersed deed-restricted unit (not all in one project)	S/V		
Green	Society	some felt weakening civic engagement, neighborliness	V		L

Green	Society	lack of aware among new residents about potential hazards	V		L
Green	Society	people living in "garage unders" have been surprised by bad flooding	V		L
Green	Society	lack of evacuation routes	V		L
Green	Society	higher income people are in more remote areas	V	improve/build sidewalks	M
Green	Society	bad cell service on Rt. 135 near Wellesley	V	encourage new towers/service	M
Green	Society	lots of medically vulnerable residents, especially dependent on devices (Oxygen)	V	centralized number to call, need to be publicized and formalized	
Green	Society	lack of communication/coordination between hospital/assisted care/Fire/EMS	V		
Green	Society	socially isolated residents - don't know who are where they are	V	fire dept. has "SAFE" education program that could be expanded	
Green	Society	St. Mary's public hsg, very vulnerable to storm damage	V	look at town-funded redevelopment	
Green	Society	Linden Chambers senior housing in disrepair	V	look at town-funded redevelopment	
Green	Society	larger daytime population/ who work take transit or drive	V	be prepared with staff and equipment	
Green	Society	police fire have list of people to check for medical needs, but based on who calls them	V/S		
Orange	Environment	Protected drinking water/clean water	S	forest mgmt/ meadow	M
Orange	Environment	Natural Valley flood storage	S		
Orange	Environment	Goat scaping (private land)	S		
Orange	Environment	SW bylaw water quality and volume for MS4	S		
Orange	Environment	Town parks/playgrounds	S/V	need water fountains, tick awareness	H
Orange	Environment	Rosemary Lake, ponds, reservoir - impaired water bodies, contaminated	S/V		
Orange	Environment	Charles River, Alder /Fuller Brook	S/V		
Orange	Environment	coyotes, deer, fox, hedgehogs, otters, eagles, beavers	S/V	deer control, hunting otters and coyotes	
Orange	Environment	Invasive species	V	Assess species, volunteers	H
Orange	Environment	Mosquitoes, ticks (deer)	V	investigate what to do, more education and communication	H

Orange	Environment	trash management, plastics, recycling	V	encourage standards to reduce waste, plastics, paper. Better way to handle recycling	H
Orange	Environment	Pesticide runoff/contaminants/pollutants	V	local bylaw by citizens, restrict use, encourage natural landscaping	M
Orange	Environment	stormwater runoff	V		
Orange	Environment	Greenhouse gas emissions	V	town plan to reduce ghgs, sustainability plan, muni, electric vehicles and charging station	
Orange	Environment	Ridge Hill/Nike site	V/S	Preserve wildlife/education invasive species	M
Orange	Environment	Town Forest and the Charles River wellfield	V/S		
Orange	Environment	Marsh/bog - fire risk, cooling	V/S		
Orange	Environment	Toxic waste sites/reactor barrier wall (TCE) MDL, Celledex	V/S	don't create more	
Orange	Environment	DEP contaminated sites - Shell, Nike		don't create more	
Orange	Infrastructure	police/fire station	S	communications	L
Orange	Infrastructure	Rosemary pool and building, BOH	S	add as a heating/cooling center?	M
Orange	Infrastructure	schools, colleges	S		
Orange	Infrastructure	School buses and COA buses	S		
Orange	Infrastructure	restaurants, supermarkets, gas stations, town fueling station, solar array, public transit	S		
Orange	Infrastructure	generators, backup pumps	S	assess capacity, need, funding for more	
Orange	Infrastructure	Railroad - 4 train stations, good for evacuation, problem if a failure	S/V	contact MBTA re: emergency plan, alternative solutions, evacuation	L
Orange	Infrastructure	Hospital/pharmacies	S/v	need communication network, stash of medicines?	M
Orange	Infrastructure	Hotels-business district	S/V	should be part of disaster plan	
Orange	Infrastructure	transfer station	S/V	keep it	
Orange	Infrastructure	Cochran Dam	S/V		
Orange	Infrastructure	Electricity/Eversource reliability project	S/V		
Orange	Infrastructure	sewage pumping stations	V	CIP, maintenance, awareness of changes to industry standards	L

Orange	Infrastructure	SW drainage, road flooding e.g. Junction at Chestnut + Pine	V	continue follow up and discussions, SW bylaw and CIP, more \$	L
Orange	Infrastructure	bridges	V		L
Orange	Infrastructure	Gas lines - aging infrastructure, no accurate map	V	public access to Eversource	M
Orange	Infrastructure	traffic evacuation routes - exit points - Dedham, Central, Charles River Rd.	V	communicate and partner for disaster evacuation plan, communicate it regionally	M
Orange	Infrastructure	Proximity to other municipalities	V		
Orange	Infrastructure	town and community buildings as heating and cooling stations (short-term)	V/S	Review/change parameters for open and close (BOH) long-term shelter?	H
Orange	Infrastructure	drinking water supply/floodplain, MWRA option	V/S	add additional water supply, redundant well	H
Orange	Infrastructure	public housing at Linden St.	V/S	communication network, public information officer? Tech asst. for EAP to HA staff	H
Orange	Infrastructure	Radio communication and telemetry, general communications	V/S	develop neighborhood buddy system, emergency plan, ID vulnerable people	H
Orange	Infrastructure	I-95 and 128	V/S		
Orange	Society	town communication: Alert Needham, reverse 911, social media	S	more sign up, translation, backup plan, use as educational tool	H
Orange	Society	police, first responders, reserve medical corps, hospital personnel, DPW	S	ID organizer, database, put into action	H
Orange	Society	education of residents, preparedness tools	S	update and continue	S
Orange	Society	volunteers, service clubs, community council	S	could help with education, recruitment, ID populations	
Orange	Society	Rosemary (lake? Building?)	S		
Orange	Society	Local Emergency Planning Committee	S	help to organize communication effort	
Orange	Society	restaurants	S	loop in volunteer donations, power assistance	
Orange	Society	seniors living alone, in detached homes especially	V	create buddy system, ID who is alone, HHS, neighbors, expansion of sheriff program	H
Orange	Society	Low income residents	V	neighbor to neighbor program, connect with resources: community council, food pantries,	H

Orange	Society	ESL/language barriers	V	translate reverse 911, building relationships, community events, translation and interpretation available	H
Orange	Society	youth, lack of outdoor time	V	education and communication	L
Orange	Society	multiple groups are vulnerable, particularly in need of evacuation: nursing homes, assisted living, hospitals, public housing residents, day care centers	V	communications, ask about evacuation plans, provide technical assistance	
Orange	Society	seniors	V		
Orange	Society	handicapped/special needs, dialysis or medical needs, cognitive impairment	V	Have Fire Dept. communication, buddy system/plan	
Orange	Society	animals/pets what to do in emergency?	V	working on it?	
Orange	Society	isolated residents, homebound	V		
Orange	Society	Mental health/illness	V	education and counselling services at disaster events	
Orange	Society	Transportation to cooling centers	V	more coordination for buses	
Orange	Society	Walkability if roads are closed	V	list of alternative resources, e.g. snowmobiles	
Red	Infrastructure	3/4 of Needham's boundary is Charles River, there is robust floodplain capacity	S	maintain protections	L
Red	Infrastructure	redundancy project for utility lines	S	continue construction	L
Red	Infrastructure	there is a robust communications network in town	S	keep but, keep security protection for cyber security threats	M/H
Red	Infrastructure	not a lot of ?? Manufacturing (less pollution)	S		
Red	Infrastructure	Tree clearing from utility lines (?)	S	continue work	
Red	Infrastructure	the well system and treatment plant are in a critical area	V	find ways to protect perimeter of wells and treatment plan	H
Red	Infrastructure	no generator backup for schools (non-???) cooling?	V	capital plan for additional generator capacity	H
Red	Infrastructure	cell network at DPW building does not work (PSAB?)	V	develop a small cell site	H
Red	Infrastructure	the pool has no shade structure	V	create a permanent shade structure for lifeguards and visitors and ??	H/M
Red	Infrastructure	the wastewater system gets overwhelmed with stormwater	V	pump station review scenarios? Investigate protection of facilities	M

Red	Infrastructure	schools are not all air conditioned because of age?? (kids and ??)	V	plan to study systems and look for mitigation efforts - part of capital planning	M
Red	Infrastructure	treatment plan does not have cell service	V	study ways to improve cell service	M
Red	Society	library/senior center/YMCA/RRCs are potential cooling centers	S	strengthen facilities	H
Red	Society	communicate about a cooling center on Social Media/Alert Needham	S	get word out	H
Red	Society	?? People who work in emergency, like the medical reserve corps	S	awareness - get word out - increase funding	H
Red	Society	monthly local emergency meetings	S		
Red	Society	strong community involvement - good turnout for MVP	S		
Red	Society	DPW has heat days language in its contract	S	this language could be replicated elsewhere	
Red	Society	Needham school emergency mgmt. team needs action??	S		
Red	Society	25% of Needham lives alone (North Hill, Woodgate)	V	outreach to reach this population, work with the town clerk	H
Red	Society	I-95 can get bottlenecked, where will people go	V	do a study of evacuation routes, confirm current plans to see if they work with neighboring towns	
Red	Society	seniors and extreme weather, does there need to be outreach	V/S	public health and MAPC doing more outreach to senior about extreme weather	H
Red	Society	communication with non-English speaking population, other vulnerable groups	V/S	translation services for emergency messages; reach out prior to emergency, continue what is in place	H
Red	Society	support people who work in Needham but don't live in Needham	V/S	relook at continuity of operations, more subscriptions to alert Needham, work with Chamber to get the word out, check systems to make sure they work	H
Red	Society	community outreach and education - the town is working on it	V/S		
Red	Environment	SW bylaw passed; new homes will have dry wells	S		
Red	Environment	need to address mosquito impacts	V	no games at night? better communication with state on EEE ID, need info faster, local level plan is happening, need education	H
Red	Environment	impervious urban areas filter into rural natural areas (pervious)	V	stormwater program in place - but needs funding every year	M

Red	Environment	ticks protection during warm weather, trail maintenance	V/s	building trail steward system backup??	H
Red	Environment	dredging Lake Rosemary because it is Class 5, downstream brook is impaired	V/S	underway	M
Yellow	Environment	Charles River borders Needham on 3 sides	S	ongoing clearing of channel (trees) SW outfalls - clean sediment	H
Yellow	Environment	Cutler Park, reservoirs	S		L
Yellow	Environment	Ridge Hill Reservation	S		
Yellow	Environment	Rosemary Lake (being dredged), pool	S		
Yellow	Environment	Town Forest	S		
Yellow	Environment	Floodplains Town/FEMA flood overlay	S		
Yellow	Environment	9-hole golf course, invasive control with goats	S		
Yellow	Environment	Volente Farms, Needham Community Farm	S		
Yellow	Environment	Wildlife, Rail Trails, Williams School, eagles, etc.	S		
Yellow	Environment	Trail - Newman School, Rail Trail, DPW Pond trail	S		
Yellow	Environment	green infrastructure for new development, school, subdivision	S	follow MS4 requirements for green infrastructure	
Yellow	Environment	Trout Pond	S		
Yellow	Environment	Trees are mostly in the west of town, the east lacks trees	S/V	work on tree bylaw, ID areas to plant tree, assess vulnerability to fire	H
Yellow	Environment	Aquifer - good quality, vulnerable to flooding, drought, security	S/V	monitor groundwater quality; enforcement	H
Yellow	Environment	Back yards	S/V	communication/outreach/ demonstration project on native species	L
Yellow	Environment	Wetland, mosquitos and invasives	S/V	Coordinate with Norfolk County Mosquito Control	M
Yellow	Environment	Stormwater mgmt./ bylaw - must treat SW	S/V		
Yellow	Environment	Drought will cause fire vulnerability	V	maintain fire roads, work w/ other towns - shared equipment, assess fire vulnerability of town lands	H
Yellow	Environment	Air quality - from traffic near 128	V	enforce anti-idling, (at schools)	L
Yellow	Environment	loss of permeable surface to development - 90 teardowns/year	V	enforcement of stormwater management	M
Yellow	Infrastructure	water treatment plant and wells at the Charles River	S	monitor, protect, maintain	H

Yellow	Infrastructure	water interconnection with other towns	S	monitor, protect, maintain	H
Yellow	Infrastructure	10 sewer pump stations, 4 major	S	assess flood vulnerability, (replacement program in place)	H
Yellow	Infrastructure	St Mary's Pump station takes feed from MWRA (20% of supply)	S	monitor, protect, maintain	H
Yellow	Infrastructure	Open Space	S	manage with an eye towards resilience, opportunities for green infrastructure	L
Yellow	Infrastructure	Emergency communication system has 3 new towers	S	complete upgrades	L
Yellow	Infrastructure	Solar at the transfer stations	S		
Yellow	Infrastructure	Beth Israel Deaconess	S		
Yellow	Infrastructure	Bridges: Dover/Needham, Chestnut Street, Central St., Kendrick, Great Plain Ave.	S/V	upgrade Central Ave/Dover Bridge, coordinate with Dover	H
Yellow	Infrastructure	Reverse 911	S/V	upgrade town capabilities to reach cell phones/clean catch basins??	H
Yellow	Infrastructure	Needham Crossing Hot Spot (borders Charles River) transportation access is limited	S/V	encourage more tree planting and permeable surfaces, require this for new development	L
Yellow	Infrastructure	commuter rail is good if it is working, the town has 4 stops	S/V	communicate w/ MBTA on resilience, have a point of contact, better bus and walking to transit	M
Yellow	Infrastructure	stormwater system is undersized	V	assess drainage system, problem areas and mitigation options, (MS4)	H
Yellow	Infrastructure	electricity distribution - Eversource	V	improve communications, provide more resources for the Tree Warden	H
Yellow	Infrastructure	gas distribution - leaks	V	assess system - need for upgrades	H
Yellow	Infrastructure	mosquito control along track, Charles River, swales	V	Norfolk County Mosquito control	M
Yellow	Infrastructure	Public parking is limited at town center - also MBTA parking	V	possible parking garage/deck, add solar?	M
Yellow	Infrastructure	the DPW is dated and in a flood zone	V	Pursue DPW upgrades	M
Yellow	Infrastructure	Schools dispersed around town can be shelters. Vulnerability is air quality	V/S	investigate solar installations and battery storage	M

Yellow	Society	New Senior center is a good location (needs generator)	S	Assess options for environmentally sustainable generator	M
Yellow	Society	Shelter at the High School, Newman, Pollard schools	S	enhance environmentally sustainable generators	M
Yellow	Society	Council of Elders community-based work	S		
Yellow	Society	BIDMC in town	S		
Yellow	Society	interdepartmental communication and coordination	S		
Yellow	Society	senior center van service	S		
Yellow	Society	civically engaged town - could use more	S		
Yellow	Society	houses of worship - safe congregations	s		
Yellow	Society	Youth and Family Services	S		
Yellow	Society	Parks and Recreation, sports facilities and programs	S		
Yellow	Society	people with disabilities/illnesses, town has 2-3 ambulances	S/V	improve accessibility	M
Yellow	Society	Tippet House Hospice, Walker Home Therapeutic Day School, Avita Alzheimer's' Care	S/V	town should coordinate with the facilities, be aware of their needs and emergency plans	M
Yellow	Society	Communications on emergency shelter options	V	New public relations office to look into better communication, especially for seniors	H
Yellow	Society	Elderly population living alone independently	V	improved communication (as above) involve Needham Clergy, other civic associations	H
Yellow	Society	Low income housing	V	improved communication	H
Yellow	Society	limited English speakers, the does have translation services	V	improved communication	H