



Source: Wikipedia



Source: saugus-ma.gov

Source: Kevin Davis

Saugus Natural Hazards and Climate Planning



Saugus Natural Hazards and Climate Planning



Agenda
Welcome
Hazard Mitigation Plan Overview
Climate Change Observations and Projections
Natural Hazards and Climate Impacts for Saugus
Saugus Climate Priorities
Feedback: Share your questions, observations, and priorities

Project Team

Alexander Mello	Senior Planner, Project Co-coordinator
Jeannie Meredith	Planning Administration, Project Co-coordinator
Scott Crabtree	Town Manager
Ronald Giorgetti	Police Chief
Kevin Murphy	Police Department
Fred Varone	Building Commissioner
Frank McKinnon	Conservation Commission
Brendan O'Regan	Director of Public Works
Debbie Nickolas	Inspectional Services
Todd Baldwin	Facilities Engineer
Michael Newbury	Fire Chief
Paul Rupp	Town Consultant

EEA
Municipal
Vulnerability
Preparedness
Plan



FEMA
Hazard
Mitigation
Plan



**Hazard Mitigation and
Municipal Vulnerability
Preparedness Plan**



Combined Plan + Listening Session

Hazard Mitigation Plan	Municipal Vulnerability Preparedness (MVP)
Federal program FEMA	State program, Executive Office of Energy and Environmental Affairs (EEA)
Addresses all natural hazards:	Addresses all climate hazards:
<ul style="list-style-type: none"> • Flooding • Extreme heat and cold • Drought • Landslide • Wildfires • Hurricanes • Tornadoes • Winter Storms • Wind • Invasives • Earthquakes 	<ul style="list-style-type: none"> • Environment • Infrastructure • Society

Hazard Mitigation Plans

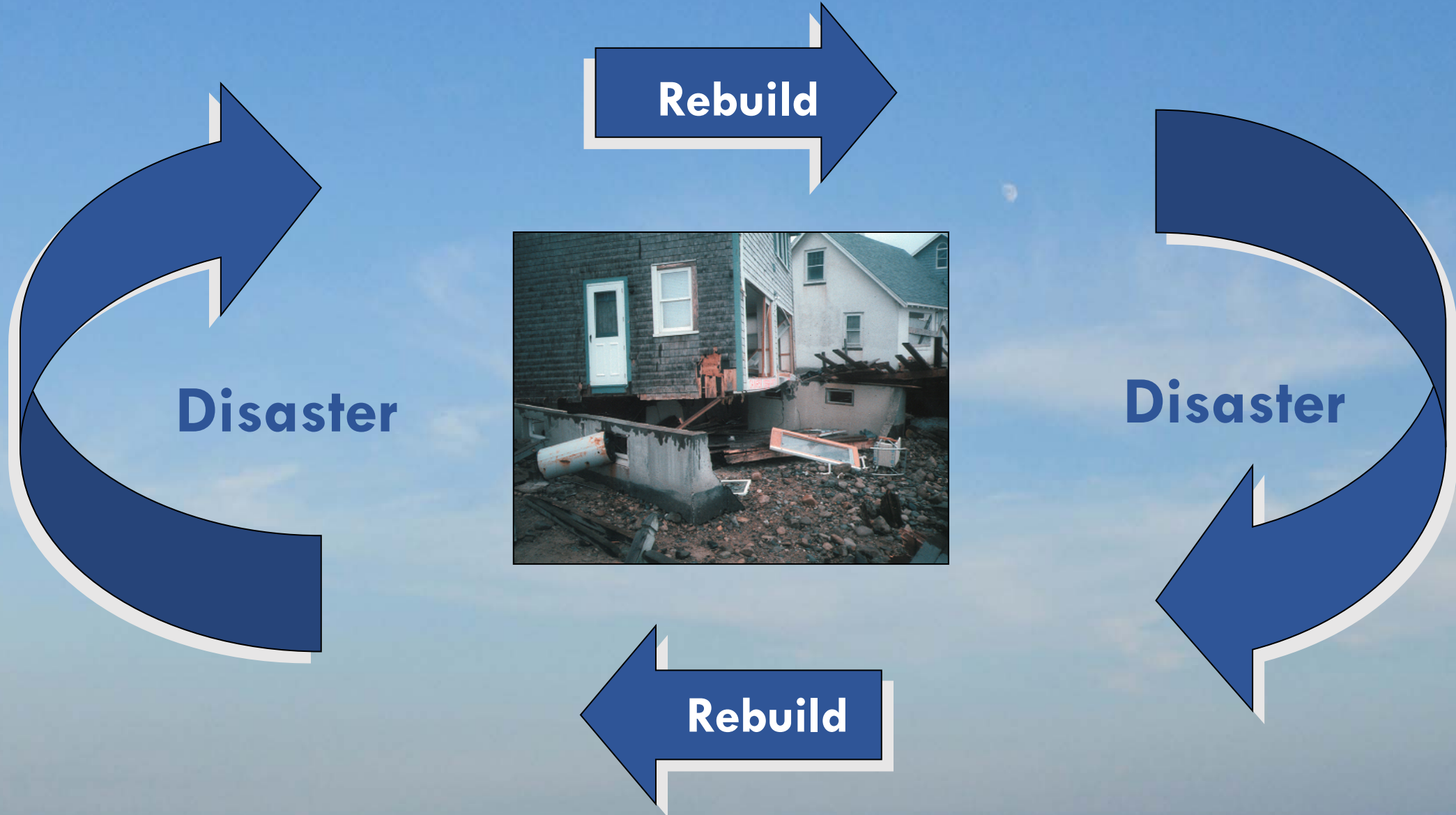
- The **Federal Disaster Mitigation Act of 2000** requires towns to adopt a Hazard Mitigation Plan to be eligible for FEMA mitigation grants.
 - Saugus' first plan has expired and now must be updated
 - This Plan will meet FEMA's requirements and make the Town eligible for FEMA mitigation project grants



Hurricane Irene

Image Source: <https://saugus.wickedlocal.com>

Breaking the Cycle of Disaster & Rebuilding



Plan Development Steps



Hazard Identification & Mapping

- Critical Infrastructure
- Flood Zones
- Historic Flooding
- Fire Risk
- Future Development

Existing Mitigation Measures

MULTI-HAZARDS

- Comprehensive Emergency Mgt. Plan (CEMP)
- Local Emergency Planning Comm. (LEPC)
- Massachusetts State Building Code
- Communications Equipment
- Emergency Power Generators

FLOOD HAZARDS

- National Flood Insurance Program (NFIP)
- Street sweeping and catch basin maintenance
- Stormwater and Wetlands regulations
- Conservation/Recreation Open Space Plan

WIND HAZARDS

- DPW tree maintenance program

WINTER STORM HAZARDS

- Snow storage space
- Snow and Ice Removal
- Public outreach and education

BRUSH FIRE HAZARDS

- Fire Department development review
- Public education

DAM HAZARDS

- DCR Dam Safety regulations
- Permits required for construction

GEOLOGIC HAZARDS

- Massachusetts State Building Code

Remaining steps for Hazard Mitigation Plan

- **Develop new mitigation strategies for this Plan Update**
- **Final Public Meeting to review the Draft Plan**
- **Review by MEMA and FEMA, revisions if needed**
- **The Town will vote to adopt the plan**
- **Approved plan will be in effect for 5 years**
- **The Town will be eligible for FEMA mitigation grants**

Municipal Vulnerability Preparedness Program



Saugus MVP Workshop



Workshop Objectives

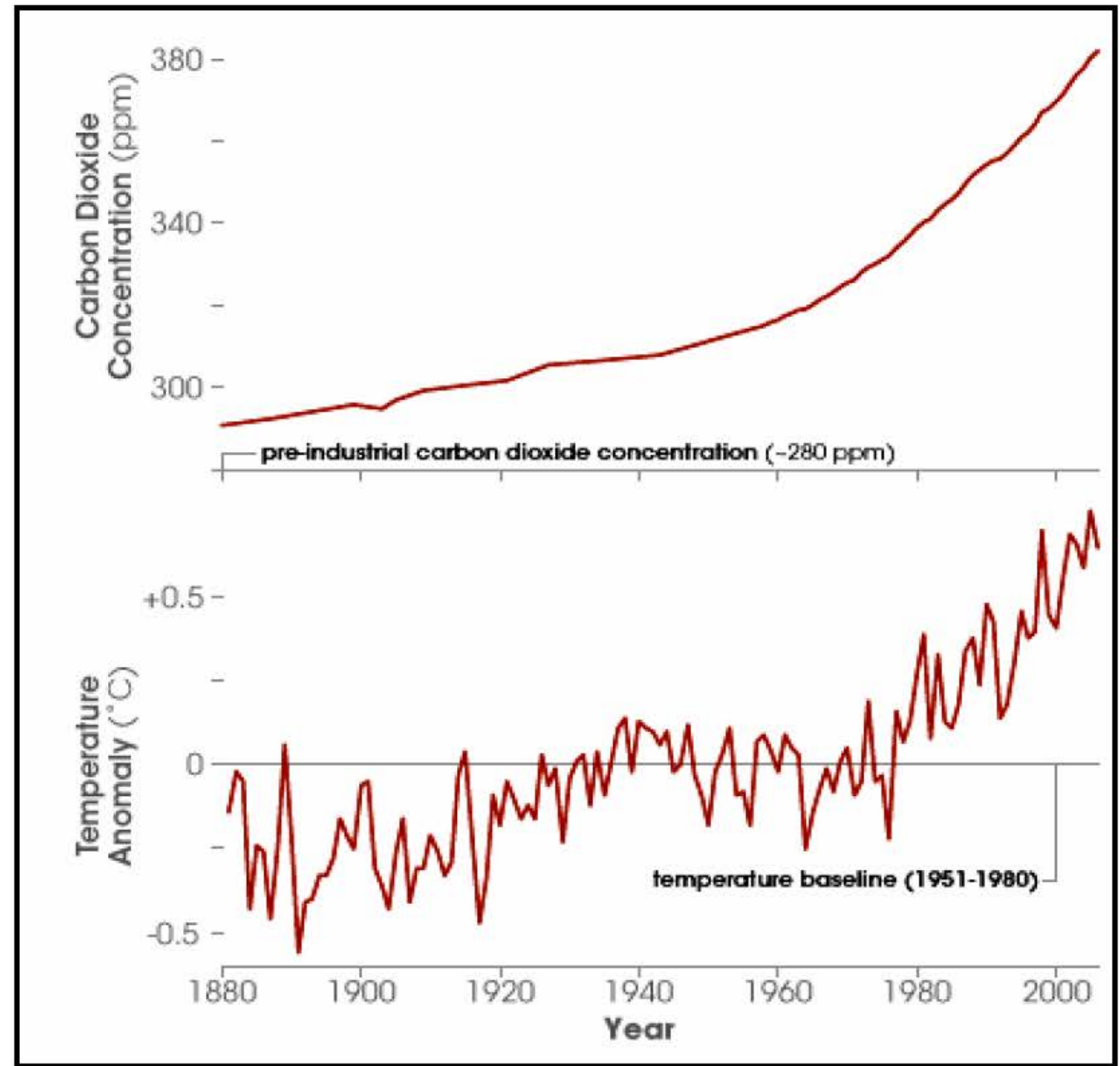
- Understand extreme weather and climate related hazards
- Identify existing and future strengths and vulnerabilities
- Develop and prioritize opportunities to take action to reduce risk and build resilience



Our Warming Planet



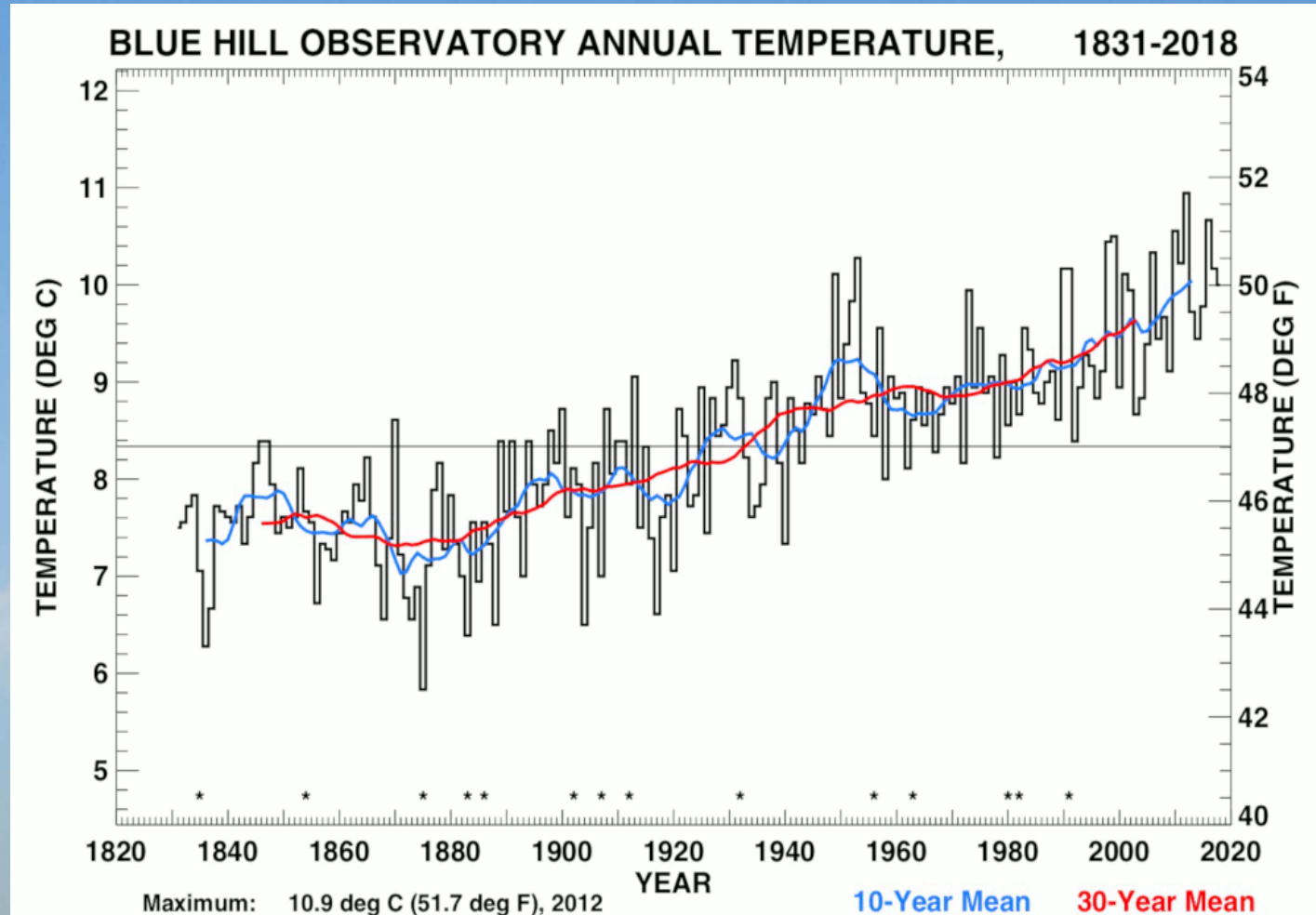
Global Temperature and CO₂ Trends



Source: MA Climate Change Adaptation Report 2011

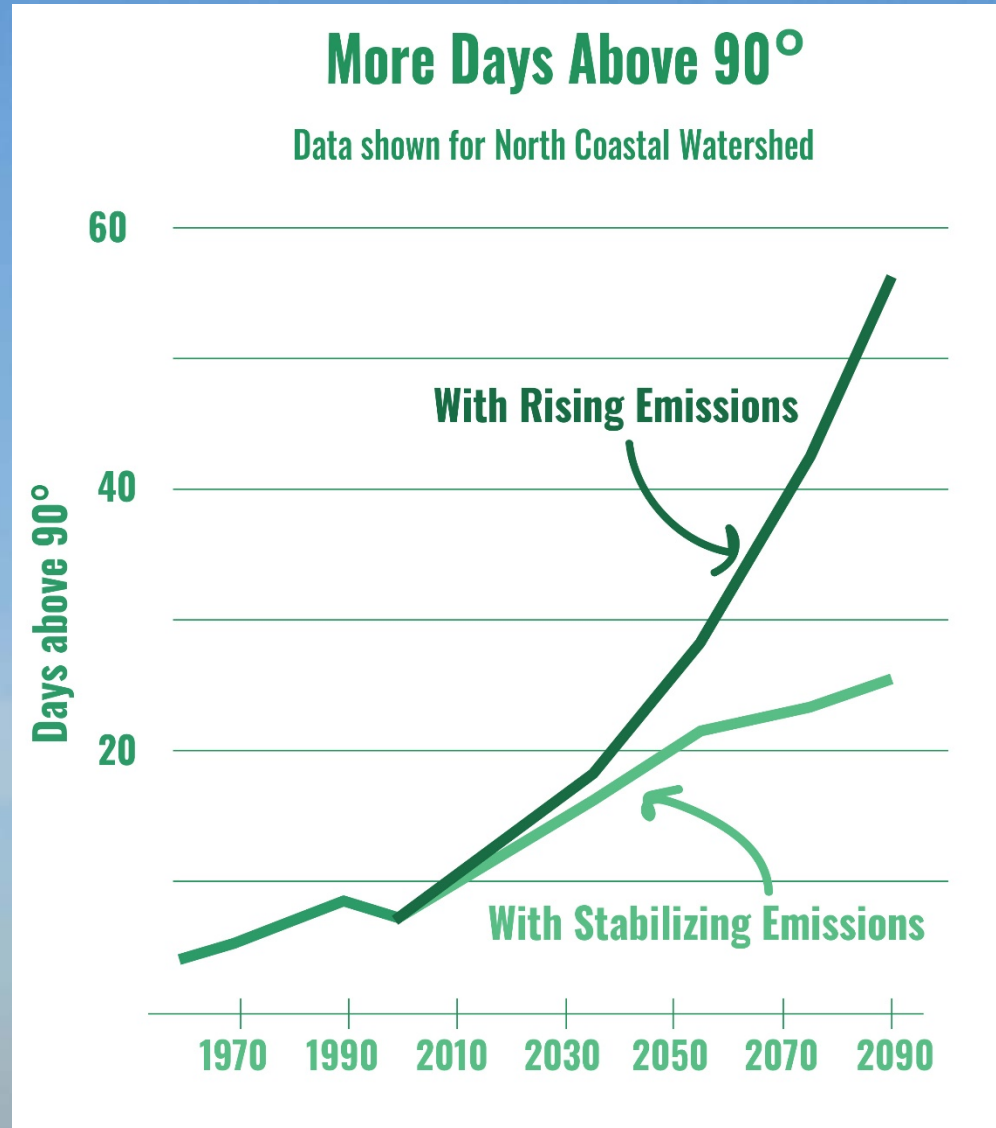
Temperature change: Observed

Nearly 3° F since 1831

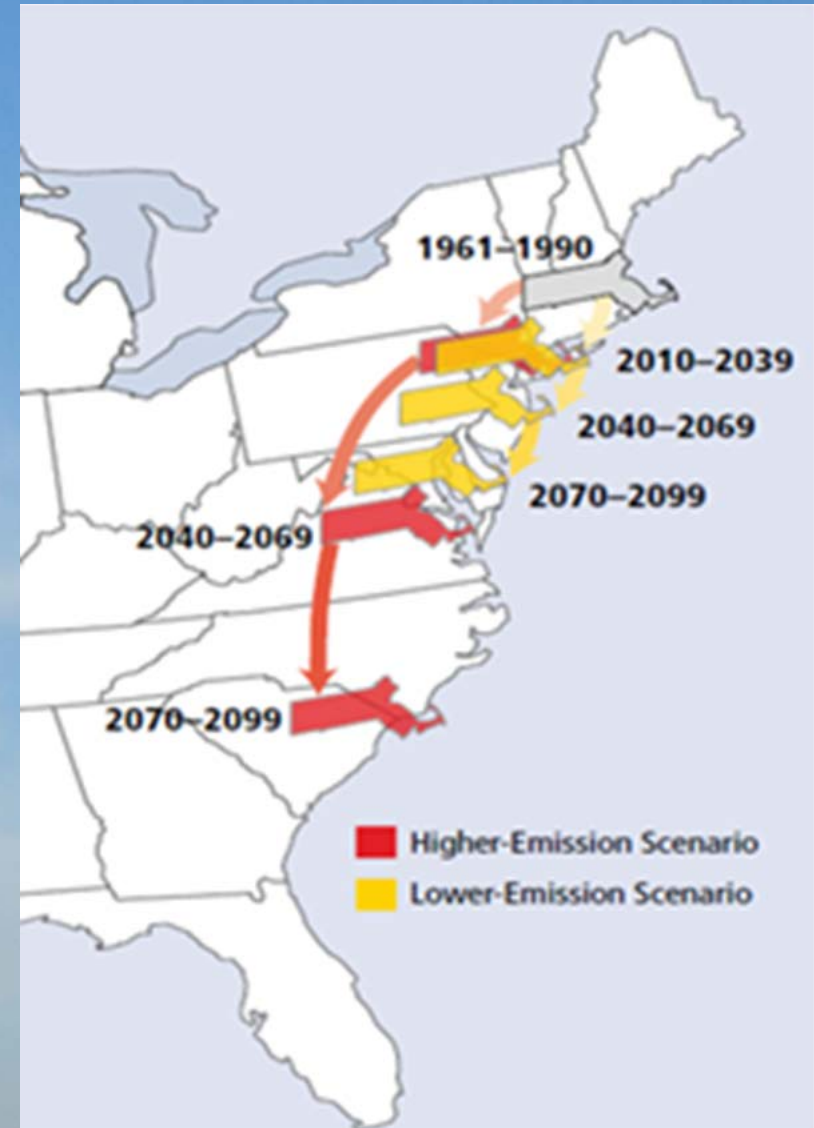


Blue Hill Observatory Annual Temperature, 1831-2018

Climate Change: Temperature Projected

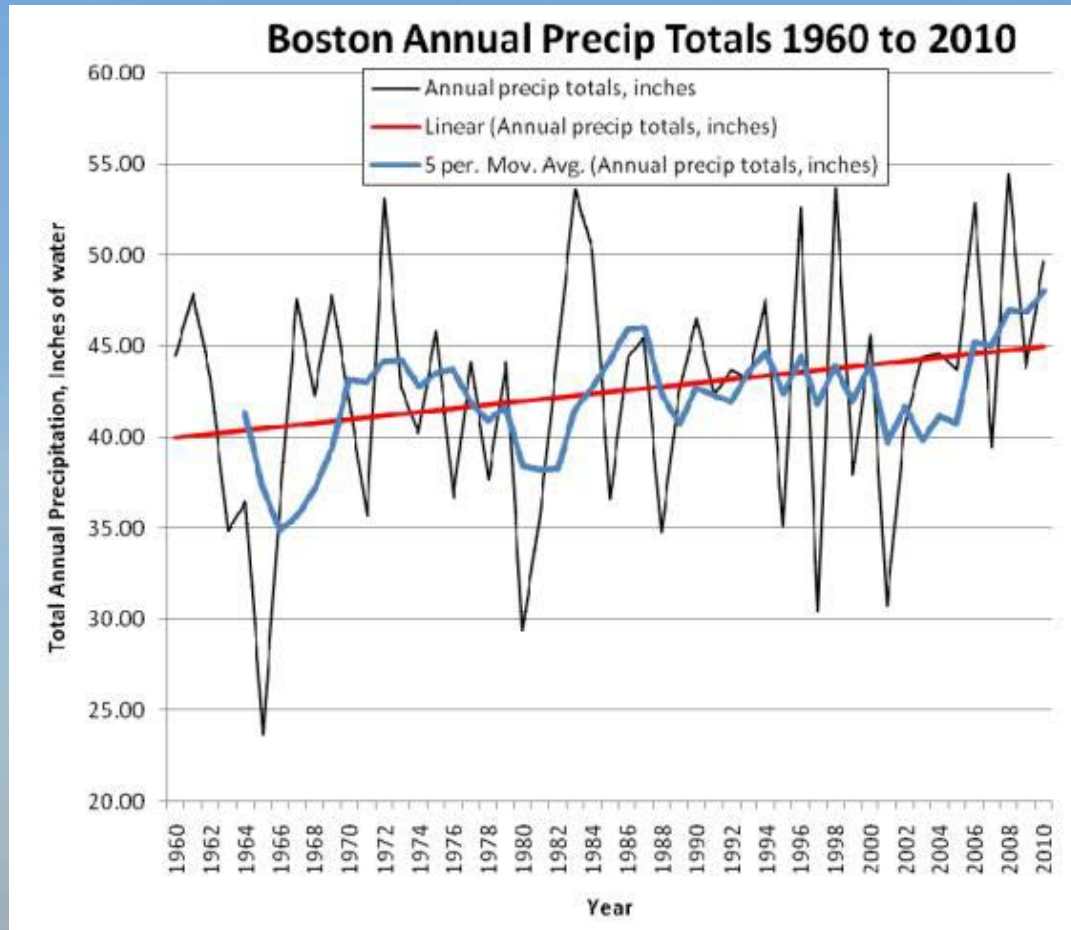


Source: the Northeast Climate Adaptation Science Center

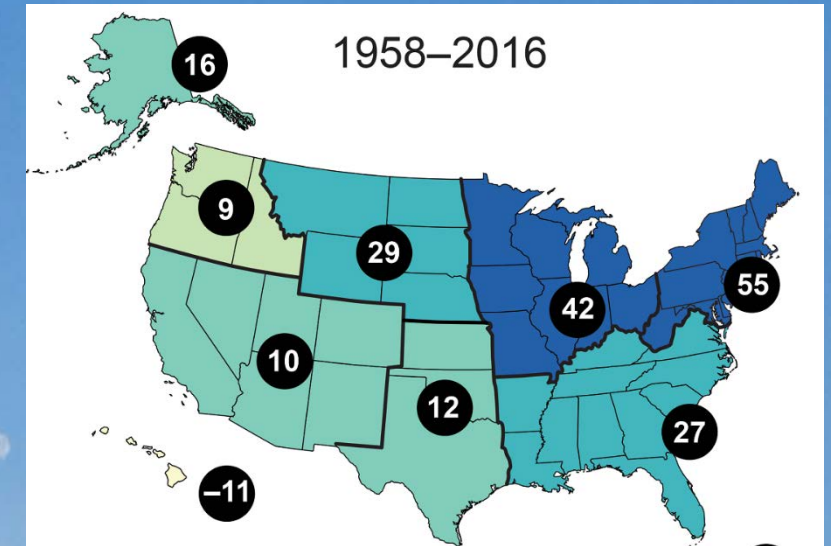


Precipitation Change: Observed

For the northeast US: 55% increase in the amount of rain that falls in the top 1% events from 1958 – 2016
(Source: *The Fourth National Climate Assessment*, 2018).

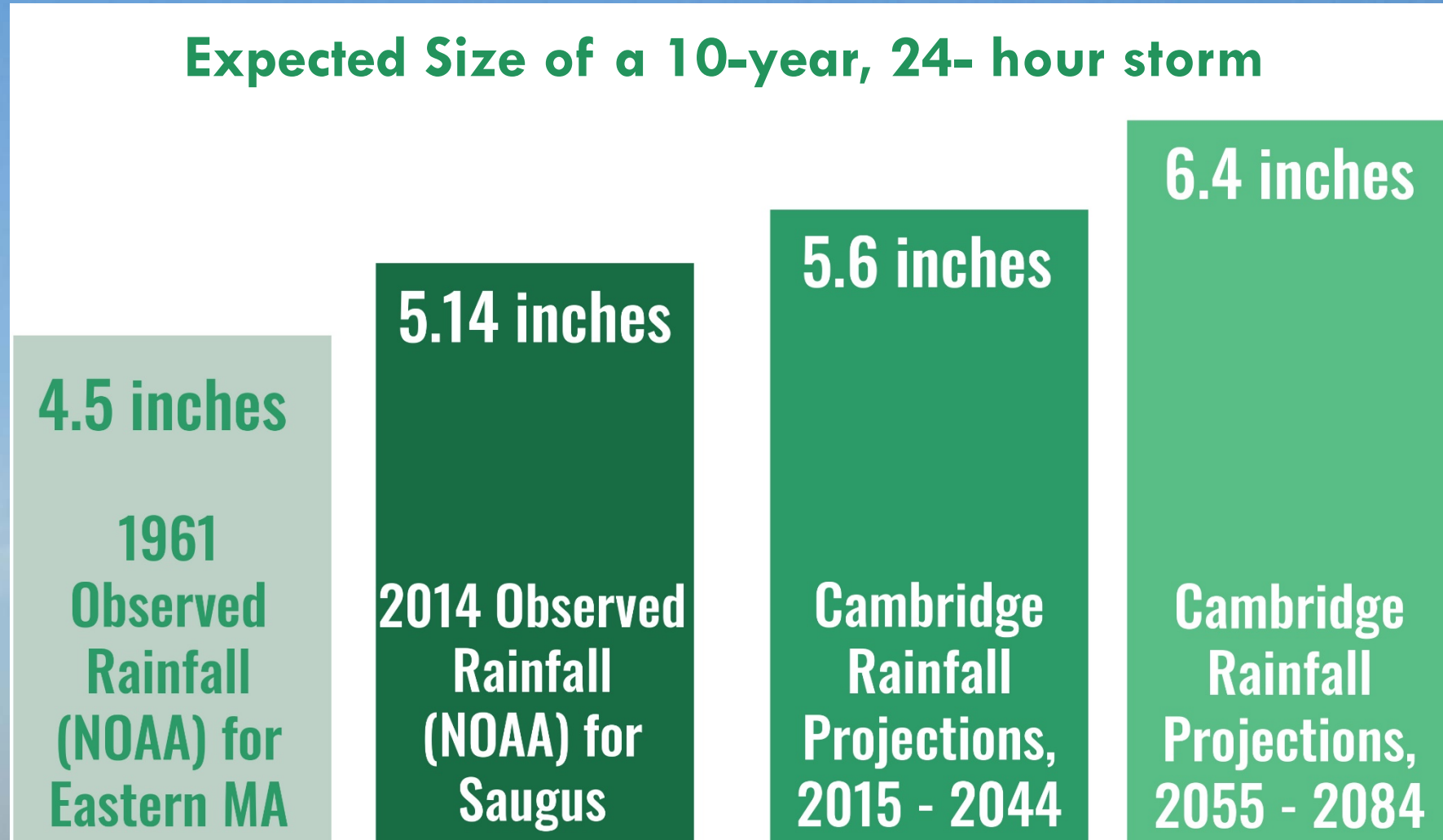


Source: MA Climate Change Adaptation Report 2011

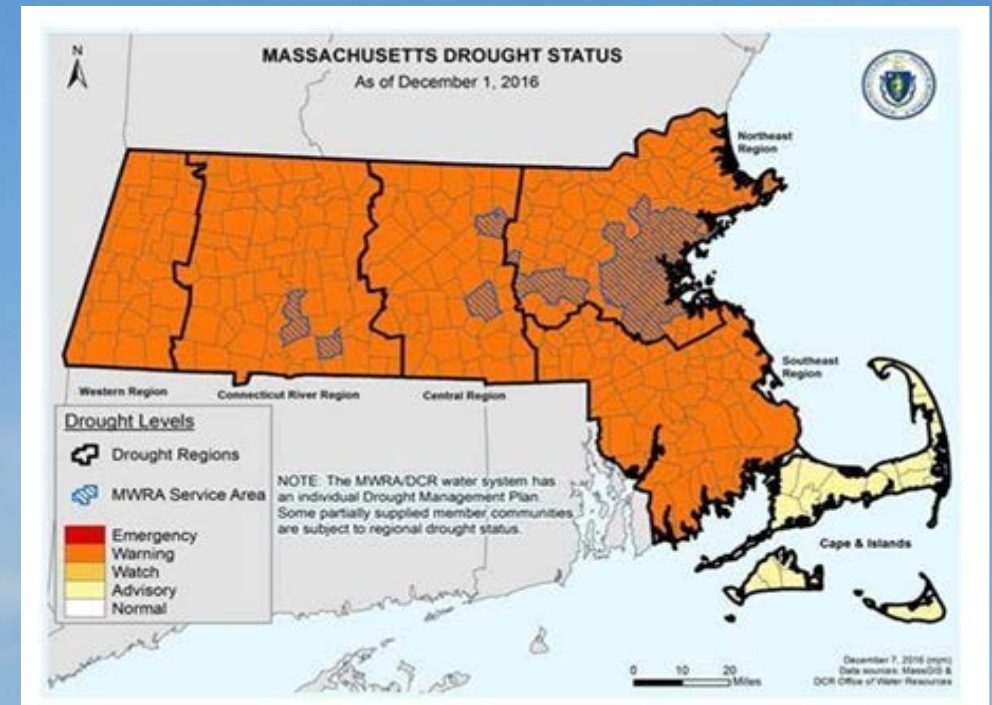
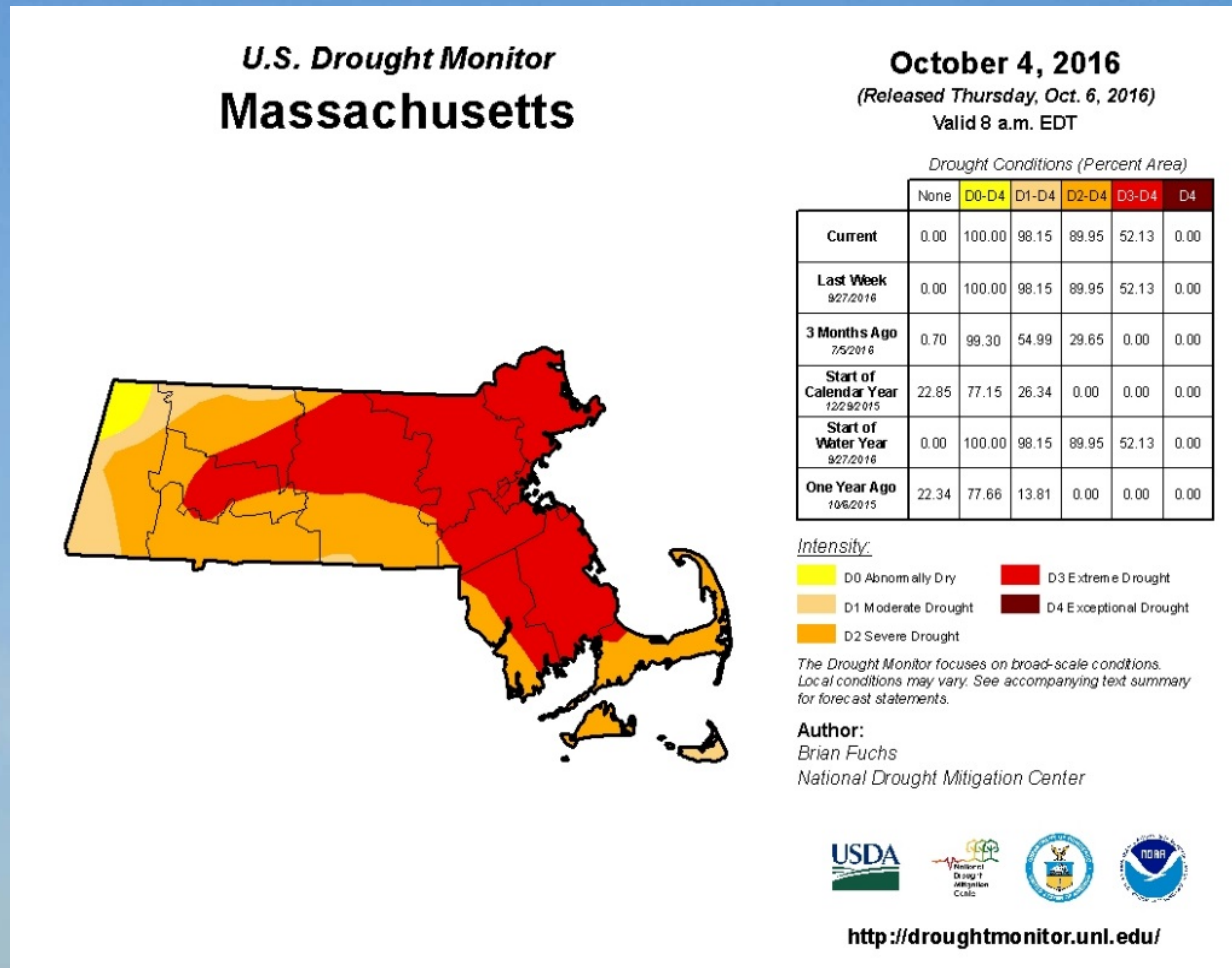


- Boston area: 10% increase in annual precipitation over 50 years
- More extreme high/heavy rain and more deficit/drought
- Runoff instead of percolation into groundwater

Precipitation Change: Projected Standard Design Storm



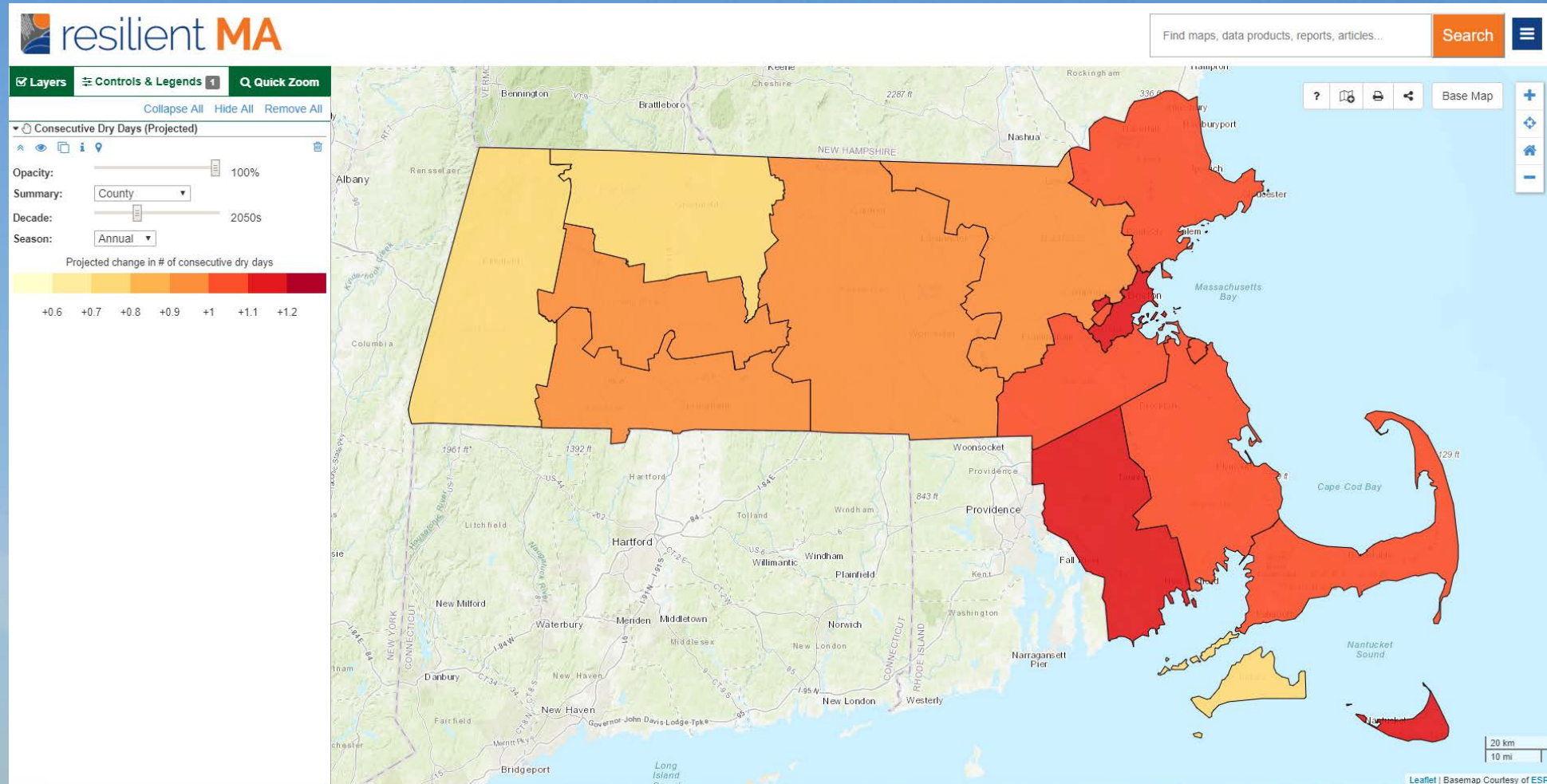
Precipitation Change: Drought Observed



The drought of 2016 was the worst in 35 years.

US Drought Monitor

Precipitation Change: Projected Dry Days 2050

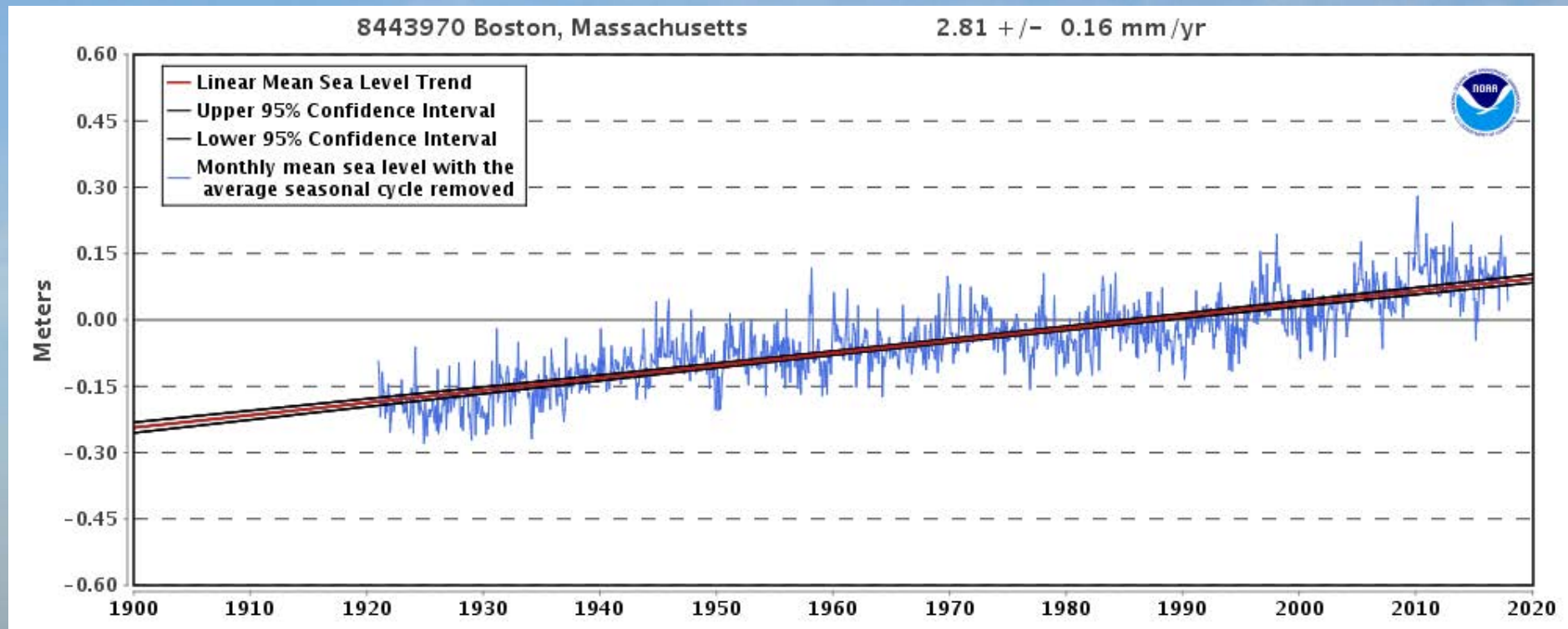


Consecutive dry days increase from 17 days to 18 days annually by 2050.

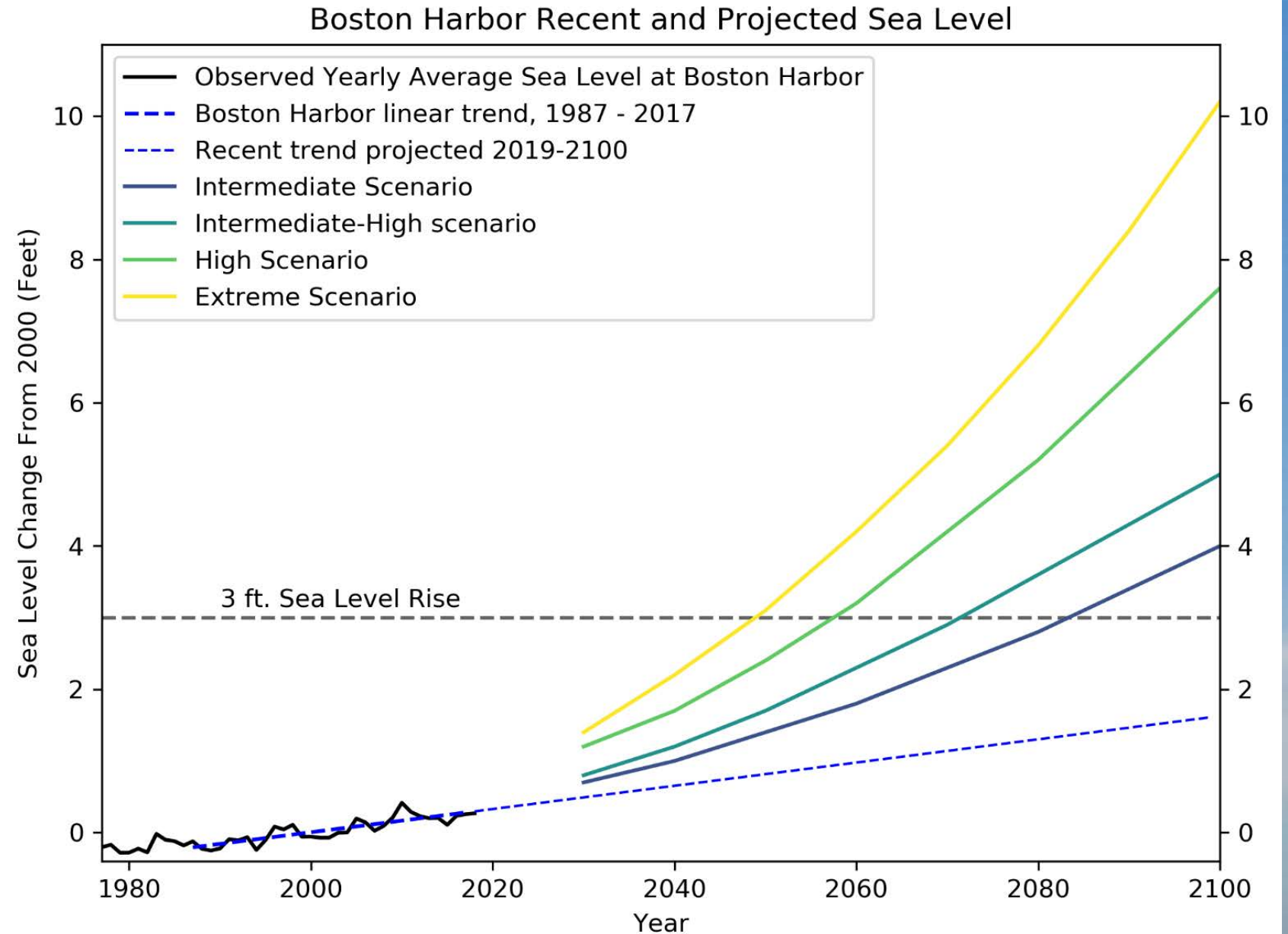
www.resilientma.org/map

Sea Level Rise: Observed

- *Boston tide station*
- *Record from 1921-2016*
- *Equivalent to 11 inches in 100 years*



Sea level rise: Projected to 2100 for Boston Harbor



Source: Northeast Climate Adaptation Science Center and MAPC

SAUGUS

Critical Infrastructure

Critical Facilities

- Critical Facilities

Other Features

- Rivers and Streams
- Water Bodies

March 2010 Claims

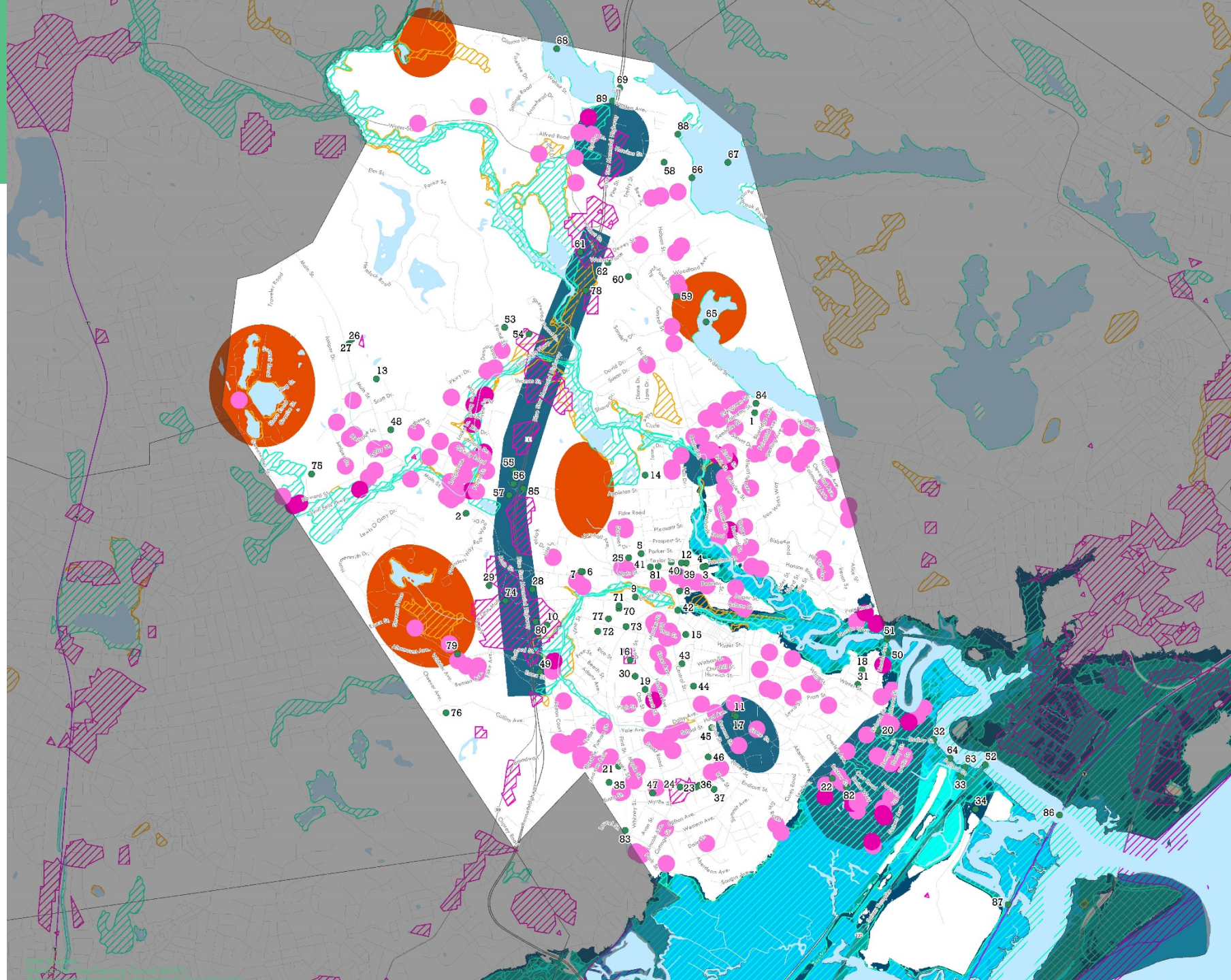
- Flood Insurance
- Disaster Assistance

Hazards

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

Locally Identified Hazard Areas

- Brush Fire
- Flooding



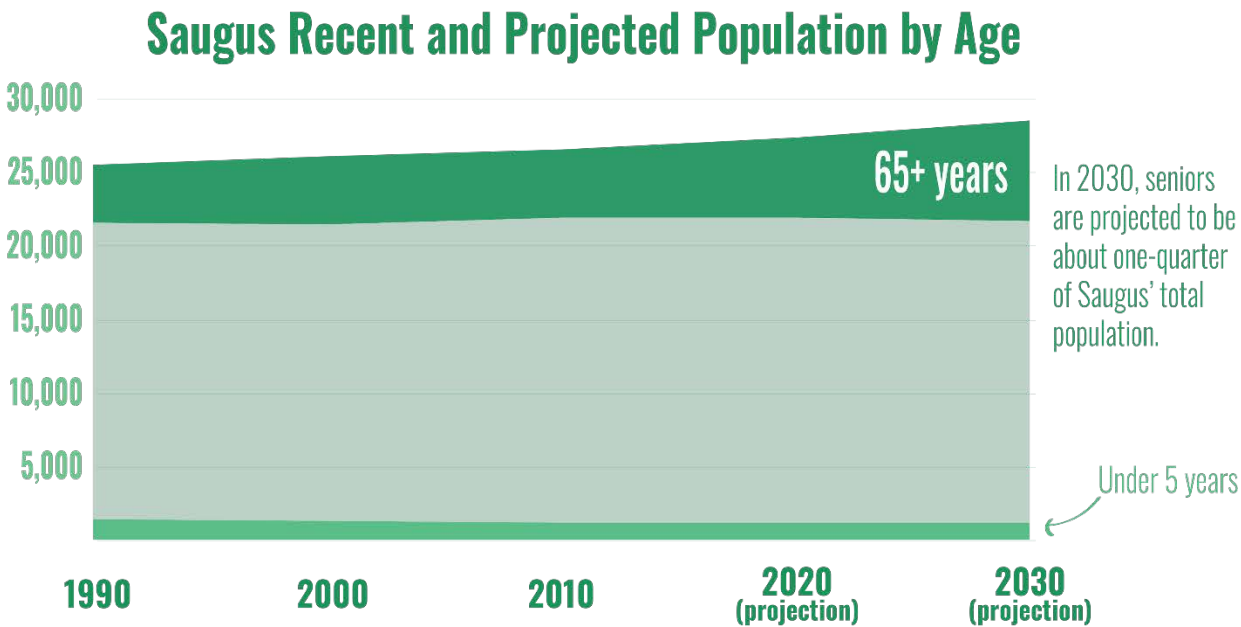
Social Vulnerability

Who is most at risk from climate change impacts?

- People who may be more susceptible to negative health effects
- People who may have more difficulty adapting to, preparing for, or recovering from extreme weather events
- People who live or work in vulnerable locations

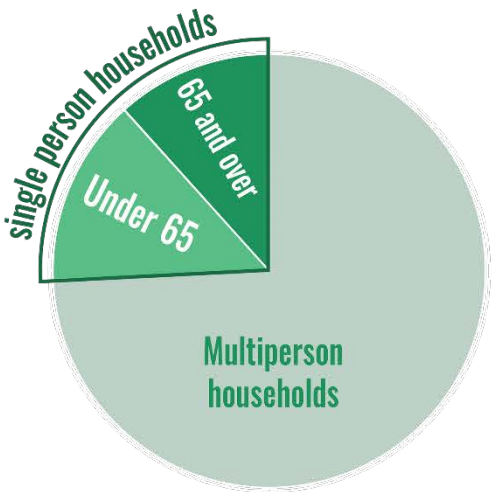
Social Vulnerability

Older Adults and Young Children



People Living Alone

People living alone and people with limited English proficiency may have limited access to critical information, municipal resources, and social support systems that can bolster emergency response.



As of 2010, about 25% of Saugus households consisted of someone living alone.

Almost 50% of people living alone were over 65.

Social Vulnerability

Low-Income Households

37.7% $\pm 1.8\%$
of households
in Saugus are low-income

8.5% $\pm 1.8\%$
of households
in Saugus are below the poverty level

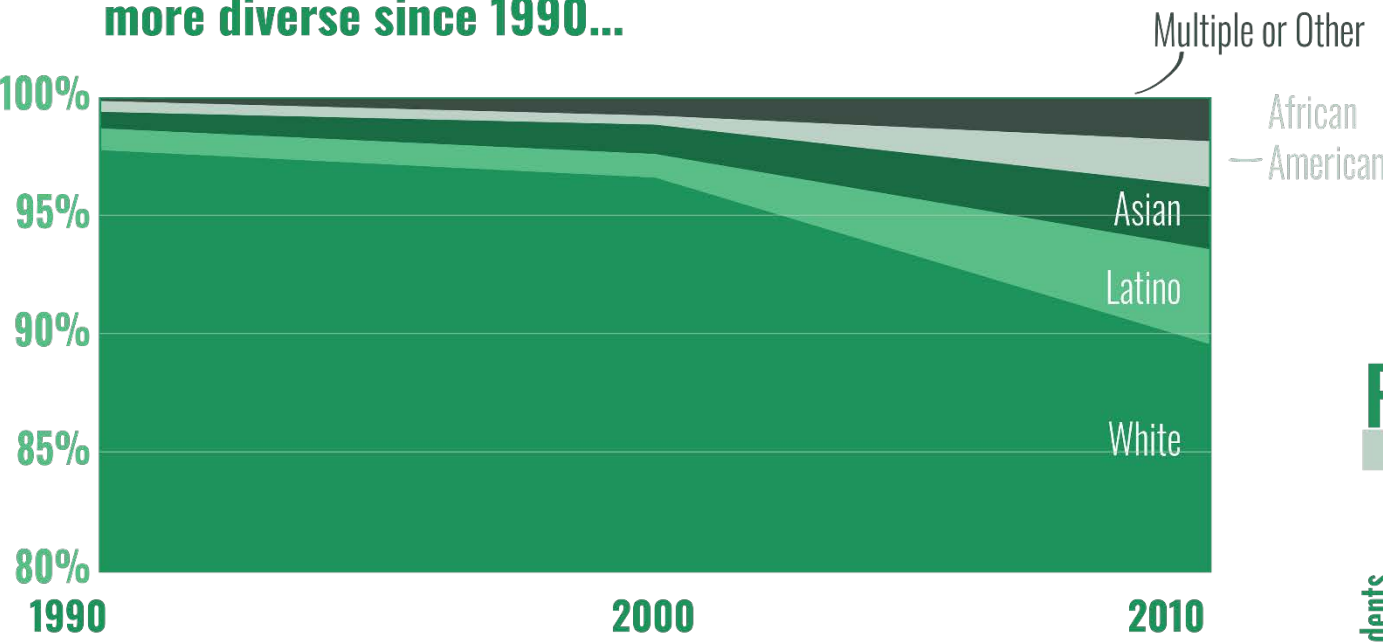
66.3% $\pm 4\%$
of Saugus seniors are
low-income

37.7% $\pm 3.5\%$
of Saugus seniors are
below poverty level

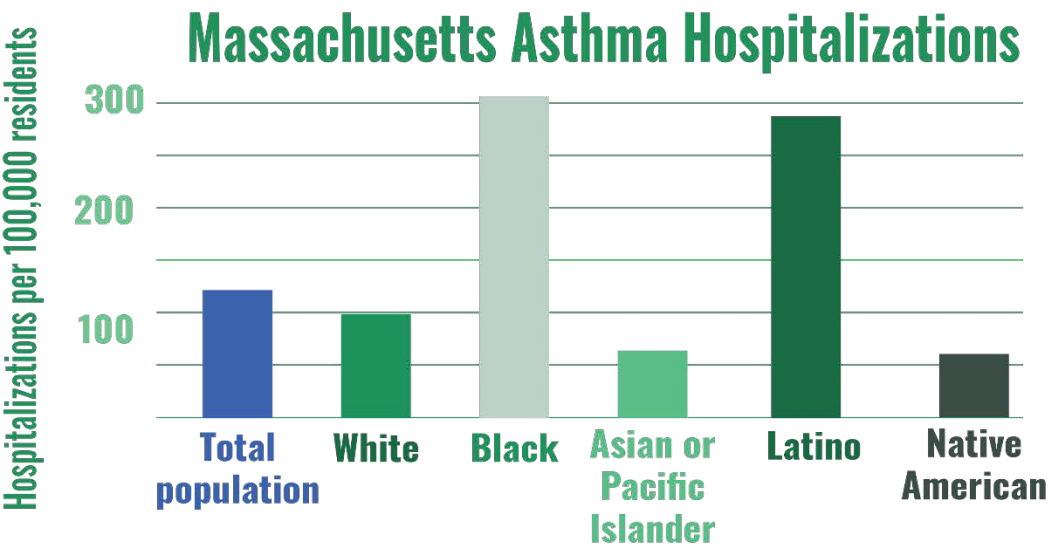
*A four-person household earning less than \$78,150 is considered low-income; a four-person household earning less than \$24,563 is below poverty level

Social Vulnerability

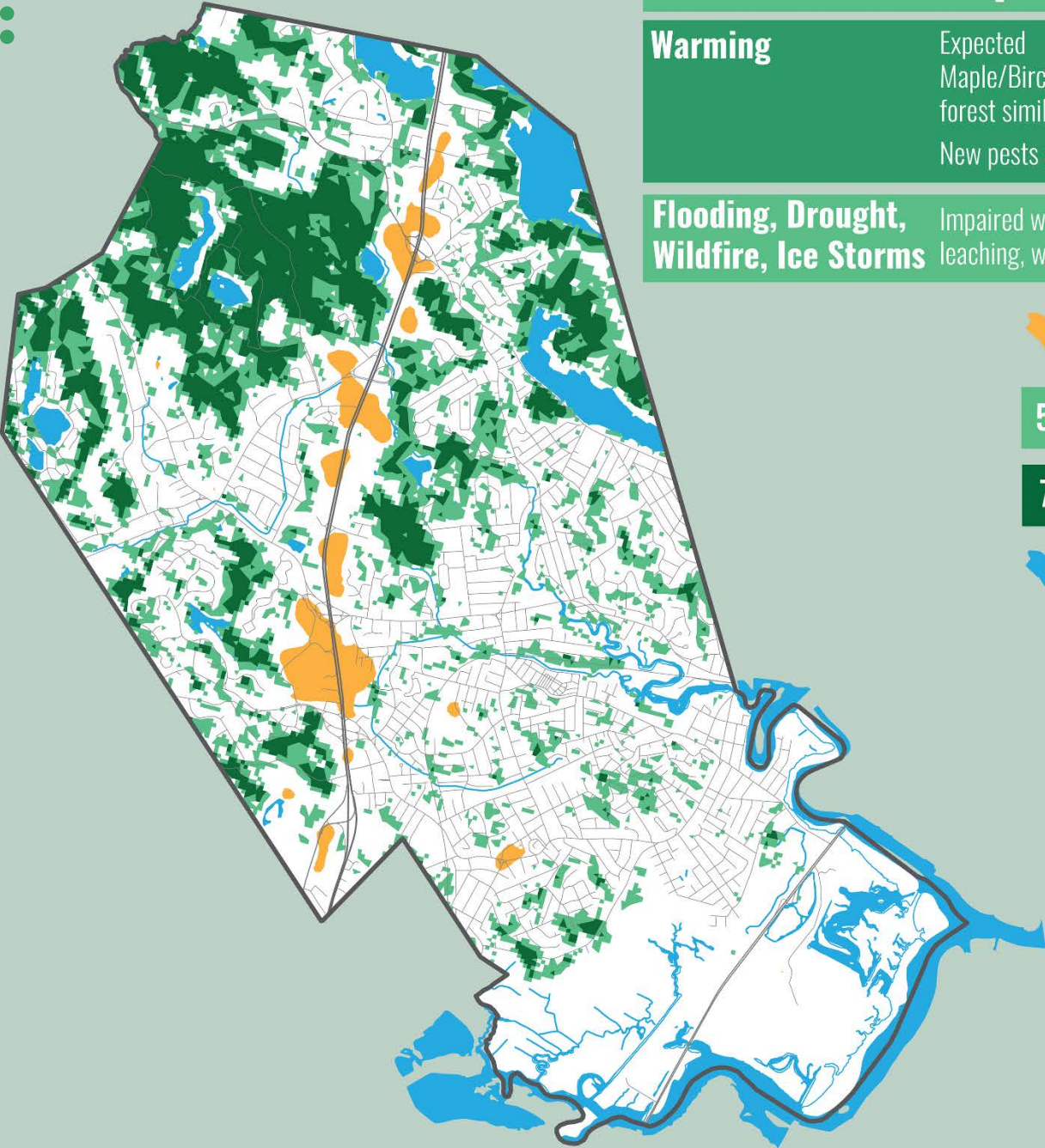
Saugus is about 90% white, but has become slightly more diverse since 1990...



People with Health Conditions



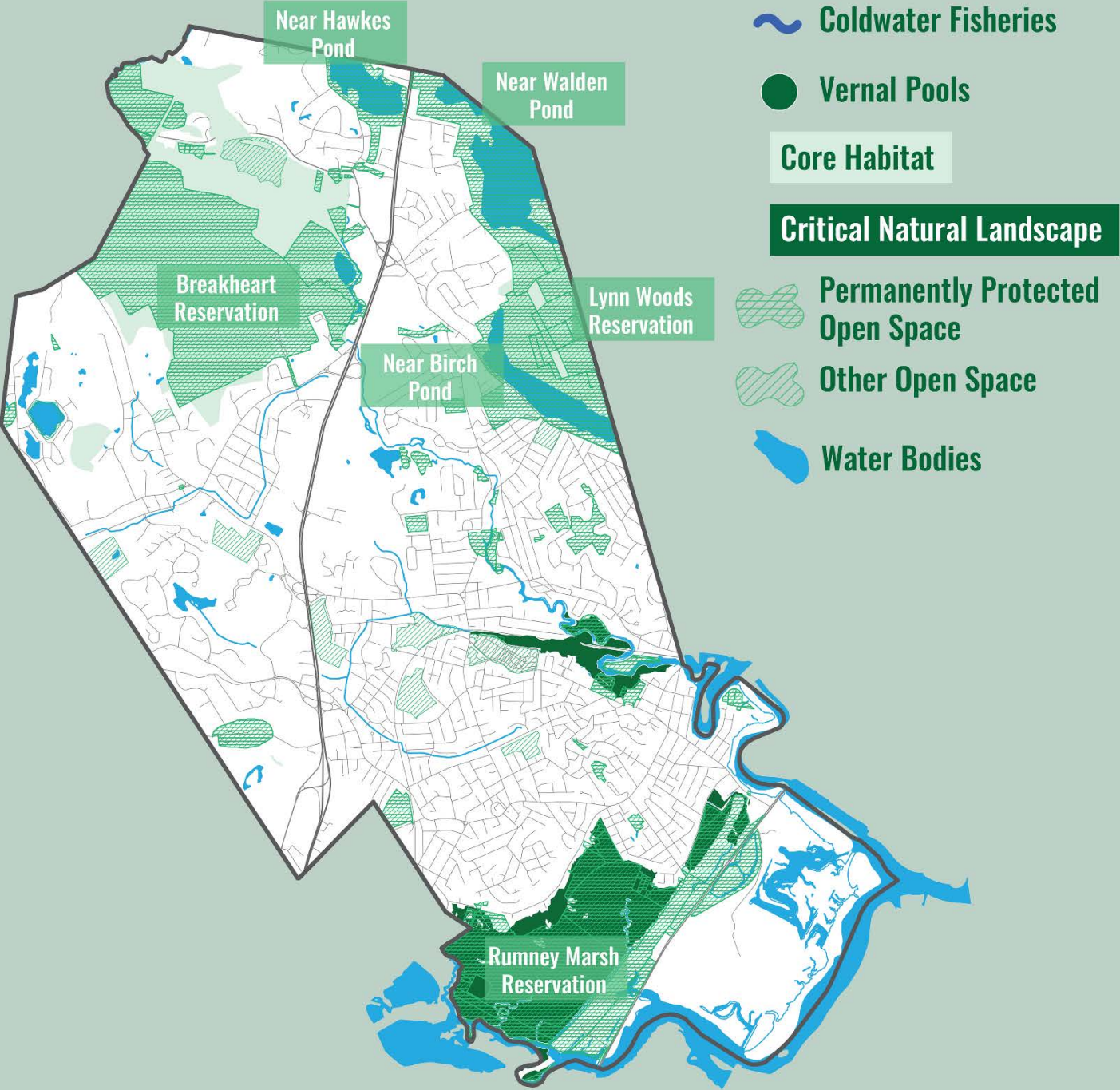
Natural Resources: Trees



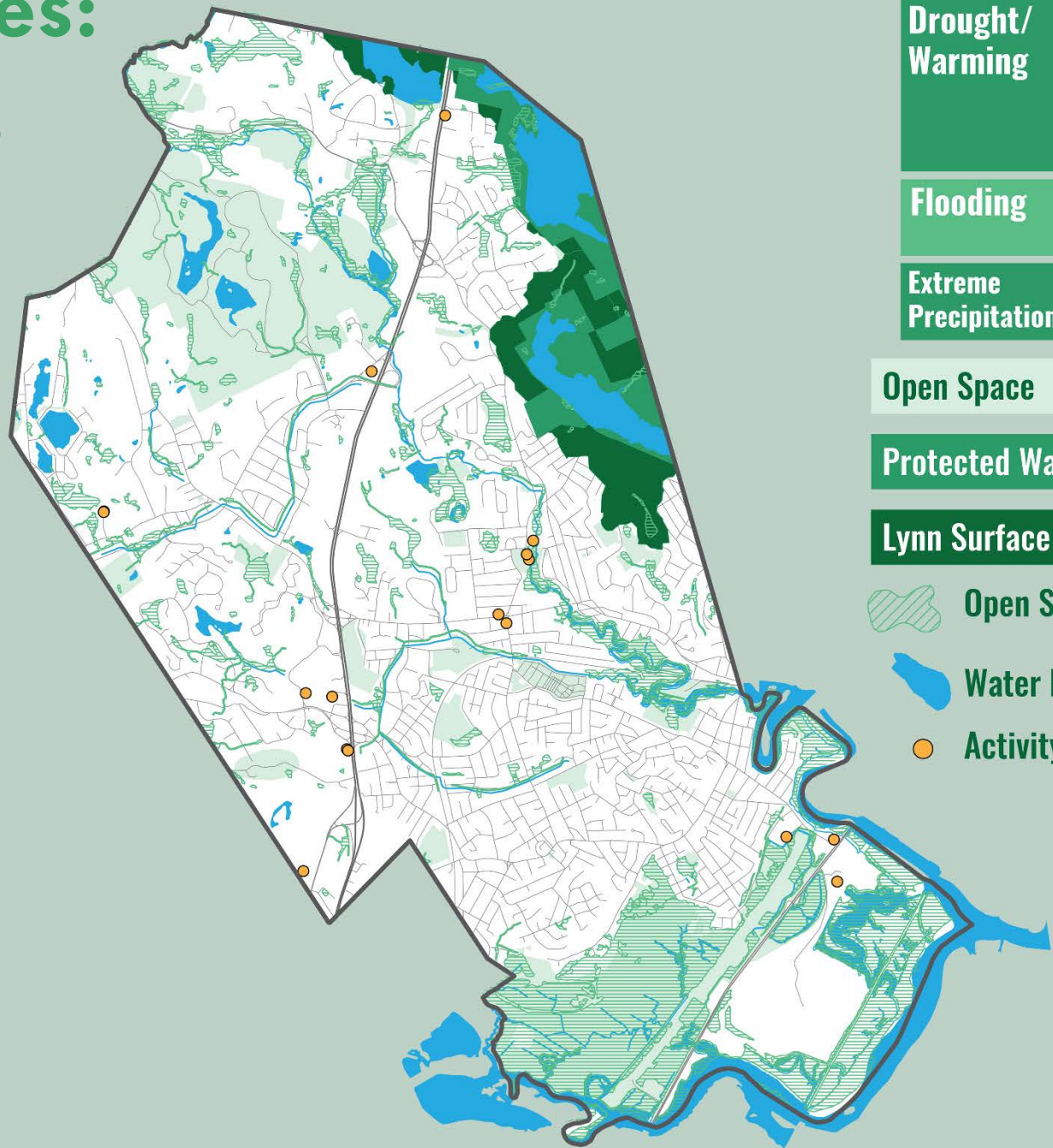
Risk	Impact
Warming	Expected to shift forest type from Maple/Birch/Beech forest to Oak/Hickory forest similar to New Jersey. New pests and diseases
Flooding, Drought, Wildfire, Ice Storms	Impaired waters, toxic exposure, contaminant leaching, weakened and damaged trees

- Hot Spots
- 50% – 75% Tree Cover
- 75% – 100% Tree Cover
- Water Bodies

Natural Resources: Valuable Habitat



Natural Resources: Water Resources



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

Open Space

Protected Water Supply Area

Lynn Surface Water Supply Watershed

- Open Space
- Water Bodies
- Activity & Use Limitation Sites

Highest Priorities

- **STORMWATER MANAGEMENT:** Stormwater management was identified as a top priority. Suggestions included providing adequate funding for recommended stormwater repairs, upgrades, and retrofits identified in the town's upcoming Stormwater Master Plan.
- **BUILD A NEW FIRE STATION:** Several groups proposed that a new public safety building/fire station be built on the town's westside.
- **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 Saugus but live elsewhere. Suggestions include collaborating with religious, community, and non-governmental organization (NGOs) to develop a plan to ensure effective and comprehensive communication. The plan should identify and address potential barriers to communication including cultural and religious differences.
- **CREATE A DISASTER RESPONSE PLAN:** The plan should include evacuation strategies and target outreach to residents and vulnerable populations who live along streams and wetland areas known to flood.
- **ENSURE ROBUST INFRASTRUCTURE:** Consider cyber security, redundancy, and generator backup.
- **MARSH AND WETLAND PROTECTION:** Provide public education on the value and importance of wetlands and build support among local and state agencies to implement the Rumney Marsh Restoration Plan
- **TREE CANOPY AND OPEN SPACE:** Care and maintenance of the town's existing tree canopy and planting of new trees were important resilience actions identified at the workshop in addition to the acquisition of open space parcels.
- **PARTICIPATE IN CRS:** Participate in Community Rating System (CRS) to inform and educate residents and businesses and reduce flood insurance rates. Update zoning and floodplain regulations.
- **CLEAR BROOKS AND STREAMS OF OBSTRUCTIONS:** Town brooks and streams need to be cleared of debris to prevent flooding. Continue to monitor and review separation of sewer waste and stormwater. Continue and expand annual efforts to prevent infrastructure damage and erosion.

Thank You!

Where to find more information

How to give your feedback