DRAFT



CITY of BOSTON
2026 Natural Hazard Mitigation Plan Update

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GLOSSARY

Term	Definition
1% Annual Storm or 100-year 24-hour Precipitation Event	A 24-hour storm that has a 1% chance of happening in any year.
100-year floodplain	Area with a 1% annual chance of flooding (or 1 in 100 chance)[1]. Also known as a 1% Annual Exceedance Probability (AEP) flood event (see definition for Annual Exceedance Probability below).
500-year floodplain	Area with a 0.2% annual chance of flooding (or 1 in 500 chance).[1] Also known as a 0.2% Annual Exceedance Probability (AEP) flood event (see definition for Annual Exceedance Probability below).
Annual Exceedance Probability (AEP)	Probability of a flood event being equaled or exceeded in a given year.
Assets	Resources, both physical and human, that contribute to a community's well-being and resilience.
Capability Assessment	An evaluation of the abilities and resources that are already in place in the city to reduce hazard risk.
Climate Change	According to the Massachusetts State Hazard Mitigation and Climate Adaptation Plan (SHMCAP) climate change refers to "a change in the state of the climate that can be identified by statistical changes of its properties that persist for an extended period, whether due to natural variability or as a result of human activity."[2]
Combined Sewer / Combined Wastewater Systems	A combined sewer system collects rainwater runoff, domestic sewage, and industrial wastewater into one pipe. When the amount of runoff exceeds the capacity of the wastewater treatment plant, untreated stormwater and wastewater flows into nearby waterbodies.

1 Federal Emergency Management Agency (FEMA), "Flood Zones." https://efotg.sc.egov.usda.gov/references/public/NM/FEMA_FLD_HAZ_guide.pdf

2 Massachusetts State Hazard Mitigation and Climate Adaptation Plan, 2018. https://www.mass.gov/service-details/massachusetts-integrated-state-hazard-mitigation-and-climate-adaptation-plan

Term	Definition
Community Lifelines	The most fundamental services in the community that, when stabilized, enable all other aspects of society to function. The integrated network of assets, services and capabilities that provide community lifeline services are used day to day to support recurring needs. Lifelines enable the continuous operation of critical government and business functions and are essential to human health and safety or economic security, as described in the National Response Framework, 4th Edition.[3]
Community Resilience	The ability of a community to prepare for anticipated hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions. Activities such as disaster preparedness (which includes prevention, protection, mitigation, response and recovery), and reducing community stressors (the underlying social, economic and environmental conditions that can weaken a community) are key steps to resilience.[4]
Critical Facilities and Infrastructure	This is defined by FEMA as a facility where even a low risk of disruption would constitute a severe threat. FEMA includes hospitals, fire stations, police stations, critical record storage facilities, and similar structures within this scope. The American Society of Civil Engineers also includes facilities related to energy, water, transportation, communication systems, and natural and virtual resources within their definition of critical facilities.
Equity	The consistent and systematic fair, just and impartial treatment of all individuals.[5]
Extent	The range of anticipated intensities of the identified hazards. The information must relate back to each of the plan participants or the planning area, depending on the hazard. Extent is most commonly expressed using various scientific scales.[6]
Flood Elevation	The height floodwaters would reach at a particular site during the occurrence of a specific flood.

[3] FEMA Local Mitigation Planning Policy Guide, 2022
[4] FEMA Local Mitigation Planning Policy Guide, 2022
[5] FEMA Local Mitigation Planning Policy Guide, 2022
[6] FEMA Local Mitigation Planning Policy Guide, 2022

Term	Definition
Flood Insurance Rate Map (FIRM)	Official map of a community on which FEMA has delineated the Special Flood Hazard Areas (SFHAs), the Base Flood Elevations (BFEs), and the risk premium zones applicable to the community, based on historic information.[7] See definitions for 100- and 500-year floodplains, and flood elevation, above.
Floodplain	Any land area susceptible to being inundated by floodwaters from any source.
Floodplain Management	Comprehensive planning and regulations aimed at minimizing flood risks and guiding development within flood-prone areas.
Floodplain Mapping	The creation of detailed maps that indicate areas susceptible to flooding, aiding in hazard assessment, land-use planning, and emergency response.
Green Stormwater Infrastructure	Sustainable approaches to managing stormwater runoff using natural systems such as vegetated swales, rain gardens, and permeable pavements to reduce flooding and improve water quality.
Hazard Mitigation	Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards.[8]
Heat Index	The National Weather Service (NWS) Heat Index or the "real feel" is based on temperature and relative humidity. The Heat Index is what the temperature feels like to the human body when relative humidity is combined with the air temperature and is measured in °F. The NWS Heat Index considers shady and light wind conditions but does not account for strong winds or full sun exposure. Exposure to full sunshine can increase Heat Index values by up to 15°F and strong wind or very hot dry air can be detrimental to public health and safety. The NWS uses the Heat Index to issue warnings and advisories relevant to public health considerations when daytime heat indices are more than 100°F for two or more hours.

[7] FEMA National Flood Insurance Program Terminology Index, 2020. https://www.fema.gov/flood-insurance/terminology-index
[8] FEMA Local Mitigation Planning Policy Guide, 2022

Term	Definition
Impacts	The consequences or effects of each hazard on the participant's assets identified in the vulnerability assessment. For example, impacts could be described by referencing historical disaster damages with an estimate of potential future losses (such as percentage of damage vs. total exposure).[9]
Inland Flooding / Flooding from Precipitation	Inland floods can occur after rain falls for many days in a row, as a result of brief periods of intense precipitation, when snowpack melts quickly, or when dams or levees fail. Whenever the volume of water on land overcomes the capacity of natural and built drainage systems to carry it away, inland flooding can result.
Invasive Species	A type of plant, animal, or other organism that does not naturally live in a certain area but has been introduced there, often by people. An invasive species can spread quickly, hurt native species, and disrupt ecosystems.
Low Impact Development (LID)	Planning and design strategies that aim to minimize the impact of urban development on the environment by using practices such as reducing impervious surfaces, conserving water, and promoting natural drainage.
Massachusetts Coast Flood Risk Model (MC-FRM)	The projected sea level rise / storm surge data values provided through the Tool are based on the Massachusetts Coast Flood Risk Model (MC-FRM) outputs as of 9/13/2021, which included GIS-based data for three planning horizons (2030, 2050, 2070) and six return periods (0.1%, 0.2%, 0.5%, 1%, 2%, 5%). These values are projections based on assumptions as defined in the model and the LiDAR used at the time, for a hydrodynamic, probabilistic model that considers hundreds of thousands of historic and simulated storms. For additional information on the MC-FRM, review the additional resources provided on the Start Here page.
Natural Hazards	A source of harm or difficulty created by a meteorological, environmental or geological event. Natural hazards, such as flooding and earthquakes, impact the built environment.[10]
NOAA Atlas 14	Precipitation frequency estimates data server, provided by NOAA.[11]

[9] FEMA Local Mitigation Planning Policy Guide, 2022
[10] FEMA Local Mitigation Planning Policy Guide, 2022
[11] NOAA Atlas 14 Point Precipitation Frequency Estimates: Northeastern States; NOAA Atlas 14, Volume 10, Version 3

Term	Definition
Pests	Pests are any organisms (including plants and animals) that pose health, environmental, economic, or aesthetic risks.
Relative Humidity	The percentage of water vapor in the atmosphere that can be retained in the atmosphere without condensation.
Repetitive Loss (RL) Structure	One covered under an NFIP flood insurance policy that (1) has incurred flood-related damage on two occasions, in which the cost of repair, on average, equaled or exceeded 25% of the value of the structure at the time of each such flood event; and (2) at the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage. (44 CFR § 77.2(i))[12]
Resilience	The ability to withstand and swiftly recover from an extreme event. Ideally, resilient systems "bounce forward" to create healthier, greener, and more equitable systems and spaces.
Return Period / Recurrence Intervals	Annual probability of occurrence of an event. Also known as recurrence interval. Used in design based on risk tolerance of the asset.
Risk	According to SHMCAP, risk is defined as "the potential for an unwanted outcome resulting from a hazard event, as determined by its likelihood and associated consequences; and expressed, when possible, in dollar losses. Risk represents potential future losses, based on assessments of probability, severity, and vulnerability."[13]
Riverine Flooding	Flooding that occurs when rivers, streams, or other bodies of water overflow their banks, often due to heavy rainfall or snowmelt.

[12] FEMA Local Mitigation Planning Policy Guide, 2022
[13] Massachusetts Integrated State Hazard Mitigation and Climate Adaptation Plan, 2018. https://www.mass.gov/service-details/massachusetts-integrated-state-hazard-mitigation-and-climate-adaptation-plan

Term	Definition
Sea Level Rise (SLR)	The worldwide average rise in mean sea level, which may be due to a number of different causes, such as the thermal expansion of sea water and the addition of water to the oceans from the melting of glaciers, ice caps, and ice sheets; contrast with relative sea-level rise.[14]
Severe Repetitive Loss (SRL) Structure	One that is covered under an NFIP flood insurance policy and has incurred flood-related damage (1) for which four or more separate claims have been made under flood insurance coverage, with the amount of each claim (including building and contents payments) exceeding $5,000 and with the cumulative amount of such claims payments exceeding $20,000; or (2) for which at least two separate flood insurance claims payments (building payments only) have been made, with cumulative amount of such claims exceeding the value of the insured structure. (44 CFR § 77.2(j))[15]
Severity	Used to evaluate criticality of an asset and is defined as the consequences that are associated from the loss or inoperability of an asset.
Social Vulnerability	The potential for loss within an individual or social group, recognizing that some characteristics influence an individual's or group's ability to prepare, respond, cope or recover from an event. These characteristics can overlap within populations to create heightened vulnerability, which may be compounded by infrastructure deficiencies within communities and historic or existing discriminatory government policies.[16]
State Hazard Mitigation and Climate Adaptation Plan (SHMCAP)	The SHMCAP for the Commonwealth was adopted on September 17, 2018. This plan, the first of its kind to comprehensively integrate climate change impacts and adaptation strategies with hazard mitigation planning, also complies with current federal requirements for state hazard mitigation plans and maintains the Commonwealth's eligibility for federal disaster recovery and hazard mitigation funding under the Stafford Act.[17]

[14] NH Coastal Flood Risk Science and Technical Advisory Panel, 2020. New Hampshire Coastal Flood Risk Summary, Part II: Guidance for Using Scientific Projections. Report published by the University of New Hampshire, Durham, NH.
[15] FEMA Local Mitigation Planning Policy Guide, 2022
[16] FEMA Local Mitigation Planning Policy Guide, 2022
[17] https://resilientma.org/shmcap-portal/index.html#/

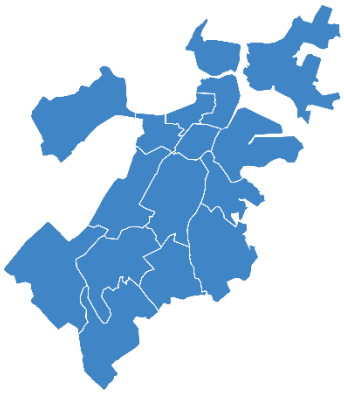
Term	Definition
Storm Surge	An abnormal rise in sea level accompanying a hurricane or other intense storm, whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the cyclone.[18]
Stormwater Flooding	Flooding caused by excessive rainfall that overwhelms drainage systems and leads to water accumulation in urban or low-lying areas.
Stormwater Management	Strategies and techniques to control the quantity and quality of stormwater runoff, mitigating flooding and pollution impacts on local water bodies.
Tree Canopy	Tree canopy refers to the part of a city that is shaded by trees.
Urban Heat Island Effect (UHI)	Dark, paved, and impervious surfaces, such as asphalt roads and buildings with black roofs, contribute to the urban heat island effect. These surfaces absorb more heat than vegetated or light colored surfaces, and they release this heat back into the surrounding environment.
Vulnerability	A description of which assets, including structures, systems, populations and other assets as defined by the community, within locations identified to be hazard-prone, are at risk from the effects of the identified hazard(s).[19]

[14] Glossary – Storm Surge, 2009. National Weather Service.
https://w1.weather.gov/glossary/index.php?word=Storm+Surge
[19] FEMA Local Mitigation Planning Policy Guide, 2022

EXECUTIVE SUMMARY

To be included in the final plan.

DRAFT



CHAPTER 1:

Introduction

1. INTRODUCTION

This Natural Hazard Mitigation Plan (NHMP) was prepared by the City of Boston through the Office of Emergency Management (OEM). The following plan outlines a strategic roadmap to reduce the risks of natural hazards within the City of Boston and the broader region. This project was funded by a Federal Emergency Management Agency (FEMA) grant and the City of Boston.

1.1. What is a Natural Hazard Mitigation Plan?

Natural hazards, such as winter storms, extreme temperatures, and flooding, can threaten lives, property, and public safety. An NHMP is a planning strategy to aid municipal, county, and state governments in understanding how to reduce the risks, vulnerabilities, and impacts associated with natural hazards to better protect people, homes, businesses, and critical infrastructure.

Natural hazard mitigation planning is a community-driven process to plan for and mitigate natural hazard risks. Through this process, the City of Boston has defined local natural hazards, assessed vulnerabilities and risks, reviewed current mitigation measures, and developed priority actions that will better prepare residents and infrastructure against various natural hazards.



Natural Hazards

Natural Hazards are environmental phenomena that have the potential to impact societies and the human environment. They include coastal and inland flooding, hurricanes, earthquakes, wildfires, extreme temperatures, drought, and more.



Natural Hazard Mitigation

Natural hazard mitigation is an effort to reduce impacts from natural hazards through community planning, policy changes, educational programs, infrastructure projects, and other activities.



Vulnerability

Vulnerability is a description of which city "assets" (people, structures, community lifelines and other critical facilities, natural resources, cultural resources, historic resources, the economy, and activities that have value to the community) are at risk from the effects of a natural hazard. (FEMA)



Impacts

Impacts are the consequences or effects of each hazard on the city's assets identified in the vulnerability assessment. For example, impacts may include injuries or loss of life, displacement, disruption of essential services, damage to homes and infrastructure, economic losses, and other effects on the community. (FEMA)



Resilience

Resilience is the ability to withstand and swiftly recover from an extreme event. Ideally, resilient systems "bounce forward" to create healthier, greener, and more equitable systems and spaces.



Climate Change

Climate Change refers to major, long-term, large-scale shifts in climate conditions, including temperature, precipitation, and wind patterns (Boston Public Health Commission). In Boston, these changes contribute to increasing risks from extreme heat, stormwater and inland flooding, coastal flooding, and other climate-related hazards.

The benefits of natural hazard mitigation planning for the City of Boston include:

- **Increasing public awareness of natural hazards.** Individuals educated on the risks they face can take action to minimize potential impacts on themselves and their communities.
- **Efficiency through collaboration.** The many city departments and stakeholders working together on this NHMP can incorporate hazard risk reduction with other ongoing community plans and goals.
- **Directing resources towards greatest vulnerabilities.** The hazard mitigation plan incorporates a prioritization process that evaluates the established mitigation actions based on their cost-effectiveness and alignment with various community goals, so that resources are directed toward the highest priorities.
- **Unlocking federal funding opportunities.** To be eligible for specific federal grants through FEMA, local governments must prepare an NHMP meeting the requirements of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended by the Disaster Mitigation Act of 2000. An approved and adopted mitigation plan is a requirement to apply for FEMA Hazard Mitigation Assistance (HMA) and High Hazard Potential Dam (HHPD) grant programs.

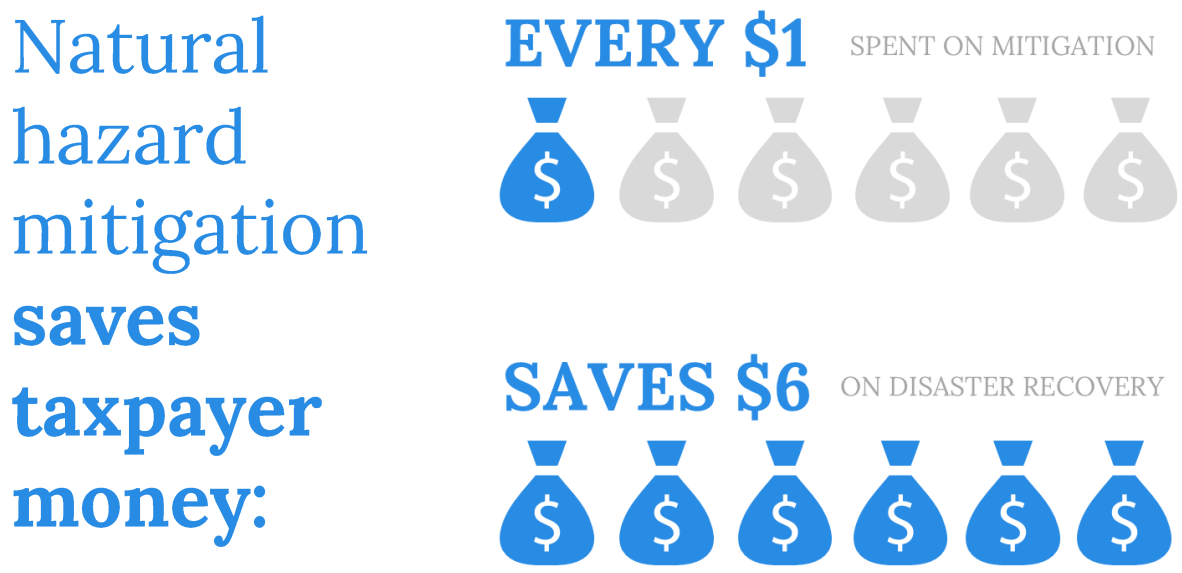


Figure 1-1: Natural hazard mitigation saves $6 on average for every $1 spent on federal mitigation grants. Study conducted by the National Institute of Building Sciences. Source: NIBS: Mitigation Saves

1.2. Planning Process

The Boston NHMP update was informed by a thorough review and analysis of the latest applicable data, alongside input from the Executive Steering Committee, Local Planning Team, key stakeholders, and public engagement activities. The NHMP planning process followed the timeline below.

Table 1-1: Planning Timeline

	2025		2026											
Chapter	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
1: Planning Process	■	■	■	■	■	■	■	■	■	■	■			
2: Hazard Mitigation Goals	■	■												
3: Community Profile	■	■	■	■										
4: Hazard Profiles and Risk Assessment		■	■	■	■	■	■							
5: Capabilities Assessment	■	■	■	■	■									
6: Hazard Mitigation Actions					■	■	■	■	■					
7: Plan Adoption and Maintenance								■	■					
Plan Adoption										■	■	■	■	■
Engagement Events	**S**		**S** **P**	**P**	**P**	**S**	**S**				**P**			

S Stakeholder engagement (Executive Steering Committee and Local Planning Team)

P Public Engagement (Focus Groups & Public Meeting)

1.2.1. Previous Plans and Studies

During the development of this NHMP, the most critical resources and reports guiding the process were the 2021 Boston NHMP, Climate Ready Boston, Coastal Resilience Solutions for Neighborhoods, and the Heat Resilience Solutions for Boston Report. These cornerstone documents provide essential risk assessments, mitigation goals, and community priorities that have shaped the overall direction, strategies, and focus areas for all City related efforts in the last ten years, as well as provided the basis of information for this NHMP update.

The planning team consistently returned to these foundational plans throughout the process, drawing on their comprehensive analyses, climate projections, and actionable recommendations to ensure continuity, relevance, and effectiveness in Boston's evolving resilience framework. The following subsections provide a closer look at each of these pivotal reports, highlighting how their findings and strategies informed the structure and substance of this NHMP.

For additional plans and documents that were reviewed for the development of this NHMP, refer to Appendix A.

Boston Natural Hazard Mitigation Plan Update | 2021

In 2021, the City of Boston completed a comprehensive update to its NHMP[20], replacing the previous 2016 plan update. The update was led by the Office of Emergency Management with broad engagement from an Executive Steering Committee, Local Hazard Mitigation Team, and public input via surveys and virtual meetings. This 2021 update assessed risks posed by flooding, sea-level rise, extreme heat, winter weather, and other natural hazards. The plan's development involved detailed risk and vulnerability analyses using tools like FEMA Hazus, and focused on mitigation goals such as protecting public health, preserving critical infrastructure, and enhancing resilience by safeguarding natural resources. This plan builds upon a 2013 Climate Ready Boston Report from the Mayor's Climate Preparedness Task Force examining the preparedness of municipal facilities, operations, services, and policies for the effects of climate change.

Since its adoption, information from the 2021 NHMP has been integrated into other City planning mechanisms through the use of shared hazard and climate data, consideration of potential impacts to vulnerable populations and critical infrastructure, and incorporation of hazard mitigation priorities into broader resilience and planning efforts. The hazard information, vulnerability findings, and risk considerations established through the NHMP have helped inform how the City evaluates climate and natural hazard impacts across

[20] City of Boston. (2021). *City of Boston natural hazard mitigation plan.* https://www.boston.gov/sites/default/files/file/2021/12/Boston%20NHMP_2021-12-08_Combined_8.pdf

populations, neighborhoods, infrastructure, and community services in related planning efforts. In addition, mitigation strategies identified through the NHMP are advanced through other City plans, programs, projects, and implementation activities, allowing hazard mitigation to be incorporated into ongoing resilience, infrastructure, emergency management, and community planning rather than functioning as a stand-alone planning effort. Further details provided on this in Section 6.1.1. This coordination also works across planning processes, as updated data, analyses, and priorities developed through other City initiatives are incorporated back into subsequent NHMP updates.

The 2021 Boston NHMP serves as the foundation for the 2026 update, providing the baseline assessments and goals that will guide the new planning cycle. It established the city's core strategies for addressing climate-related hazards and identifying critical infrastructure vulnerabilities, which the 2026 update builds upon by incorporating recent data, evolving climate projections, and lessons learned from implementation. In essence, the 2021 plan serves as the backbone of the process, maintaining continuity as the 2026 update refines and expands Boston's resilience and risk framework for the future.

Climate Ready Boston | 2016

The 2016 Climate Ready Boston report[21] builds upon the City's 2007 Climate Action Plan, as well as the 2011 and 2014 updates, and acts as a complement to efforts to reduce emissions and mitigate climate change. This report notes that Boston has faced 21 federally or state-declared disasters since 1991. With the expectation that this number will keep rising, the document provides updated climate forecasts, evaluates Boston's vulnerabilities, pinpoints local climate concerns, and outlines climate resilience efforts through four goals and eleven strategies.

Since its publication, the Climate Ready Boston report has served as a foundational resource for the city, guiding the design and implementation of resilience strategies across all departments. Frequently referenced in municipal planning and policy development, the updated climate forecasts, vulnerability assessments, and framework for climate resilience informs both day-to-day operations and long-term initiatives for the City of Boston. Its importance to the NHMP process lies in its comprehensive approach to evaluating local climate risks and its actionable strategies, focusing on mitigation efforts that are grounded in the latest community priorities.

[21] City of Boston. (2016). *Climate Ready Boston.* https://www.boston.gov/sites/default/files/file/2023/03/2016_climate_ready_boston_report.pdf

Coastal Resilience Solutions Neighborhood Plans | 2017-2022

The Coastal Resilience Solutions plans[22] are neighborhood level resilience plans that outline strategies for each of Boston's five coastal neighborhoods to address flooding risks from sea level rise and coastal storms. These plans present tailored strategies, including natural and hybrid infrastructure, enhanced public access, ecosystem restoration, green space integration, and flood barriers, to reduce flood hazards while improving connectivity, recreation, and ecological health along Boston's 47-mile coastline. This effort was part of the implementation of the Climate Ready Boston initiative and has formed a cohesive blueprint that has now transitioned into the implementation stage, catalyzing both structural and nature-based projects under the City's resiliency agenda.

- East Boston and Charlestown Phase I | 2017
- South Boston | 2018
- Dorchester | 2020
- Downtown and North End | 2020
- East Boston and Charlestown Phase II | 2022

Boston's Coastal Resilience Solutions neighborhood plans provide detailed strategies for mitigating coastal flooding and sea level rise, which are critical hazards addressed in a NHMP. Reviewing these plans ensures alignment between local resilience efforts and the NHMP, strengthens risk assessments with neighborhood-specific data, and identifies projects that can be prioritized for FEMA funding. Incorporating these plans also leverages extensive community engagement and equity considerations, creating a more comprehensive and actionable roadmap for hazard mitigation.

Heat Resilience Solutions for Boston | 2022

The City of Boston's Heat Resilience Solutions plan[23] addresses the growing threat of extreme heat, which is projected to increase significantly due to climate change. The plan identifies environmental justice neighborhoods as priority areas, recognizing that historic inequities that have contributed to higher urban heat island effects and reduced tree canopy. Using detailed heat modeling and community input, the plan outlines 26 strategies across eight action areas, including operational response, cooling networks, green infrastructure, building retrofits, and land-use planning. These strategies aim to reduce heat exposure, improve public health, and advance equity while supporting Boston's climate goals.

[22] City of Boston. (n.d.). *Coastal resilience planning.* Boston.gov. https://www.boston.gov/departments/climate-resilience/coastal-resilience-planning
[23] City of Boston. (n.d.). *Heat resilience solutions for Boston.* Boston.gov. https://www.boston.gov/departments/climate-resilience/heat-resilience-solutions-boston

Incorporating this plan into the NHMP ensures alignment with climate projection data and hazard mitigation objectives as they relate to extreme heat related natural hazards and provides actionable projects that can qualify for FEMA funding.

1.2.2. Key Stakeholders

Executive Steering Committee

The Executive Steering Committee (ESC) played a critical role in guiding the overall development and approval of the plan. Its purpose was to provide strategic oversight, ensure alignment with city priorities, and support successful adoption by MEMA and FEMA. The ESC served as the decision-making body that reviewed progress, offered input on major components, and helped maintain momentum throughout the planning process.

Fourteen (14) committee members were invited and participated in four scheduled meetings over the course of the project. These included both in-person and virtual workshop sessions, each lasting approximately 1 to 1.5 hours. Attendees were invited to each of the four meetings by a member of the OEM project management team through both email and calendar invitations. All feedback from the group during meetings was gathered through discussion-based exercises when in person and Slido live polling and the selected platforms chat feature while virtual.

Meetings were spaced roughly every two to three months occurring in November, January, April, and May. This cadence was consistent with the duration of the project's planning process, execution of the engagement strategy, and timely placed for feedback at critical milestones.

- *Executive Steering Committee Meeting 1 – November 10, 2025*
  The first Executive Steering Committee meeting served as the kickoff for the Boston NHMP Update and was hosted in person at City Hall. The meeting introduced the project team, provided an overview of the purpose and importance of an NHMP, reviewed FEMA's updated guidance and new focus areas since the 2021 plan update, and began discussion of updated mitigation goals. The meeting also established expectations for the planning process, upcoming milestones, and the ESC's role in guiding the plan update. Feeback in this meeting was gathered through a discussion-based exercise about updating the plan's goals. ESC members were engaged and willing to give insight about how to reshape the previous plans goals to reflect the city's priorities.

- *Executive Steering Committee Meeting 2 – January 12, 2026*
  The second ESC meeting was hosted virtually and focused on advancing the plan's capabilities assessment and community profile. The project team facilitated discussion of departmental survey responses, and gathered input on local

capabilities, existing programs, and areas where additional information was needed. The meeting also included a detailed review of FEMA-required asset categories. Feedback was gathered through live polling during this virtual meeting, gathering detailed information to confirm that the asset inventory accurately reflected important community assets and critical facilities to be considered in the risk assessment.

- *Executive Steering Committee Meeting 3 – April 1, 2026*
  The third ESC meeting was held virtually and focused on the vulnerability assessment and hazard profiles. The project team reviewed the meaning of vulnerability and impacts in the context of the NHMP and presented hazard profile information for the 15 hazards evaluated in the plan. ESC members provided feedback through live polling on hazard data, risk findings, and observed or anticipated impacts to City assets, which helped refine the risk assessment and ensure that the plan reflected local knowledge and departmental experience.

- *Executive Steering Committee Meeting 4 – May 13, 2026*
  The fourth ESC meeting focused on mitigation strategy development. The meeting was held in person in the Civic Pavilion, where the project team provided an overview of mitigation actions and facilitated small-group discussions to develop actions addressing the 15 hazards included in the plan. ESC members were asked to consider upcoming departmental projects, future funding needs, and the status of outstanding actions from the 2021 plan. The group also participated in follow up action prioritization activity to organize proposed mitigation actions into high, medium, and low-priority categories.

In addition to meeting participation, the ESC was responsible for reviewing and providing input on targeted requests. These included outreach and engagement strategies, approach to the Local Planning Team (LPT), assessment of capabilities, and review of draft chapters.

Finally, the ESC supported the formal adoption of the plan. This includes assisting with presentations to the public and participating in City Council presentations as needed to secure approval. Through these responsibilities, the ESC ensures that the planning process is collaborative, transparent, and responsive to community needs.

For an expanded list of the ESC and all meeting materials, please refer to Appendix B.

Local Planning Team

The Local Planning Team (LPT) served as an expanded stakeholder group for the Boston NHMP Update. The LPT included a list of 96 representatives from neighboring communities, local and regional agencies, businesses, academia, nonprofit organizations,

and other community partners with relevant knowledge of hazards, assets, populations, infrastructure, and resilience priorities across Boston.

To support broader stakeholder involvement beyond the Executive Steering Committee, the project team invited LPT members to participate in one of two identical one-hour virtual webinar sessions held on June 3, 2026 at 12pm and June 10, 2026 at 6pm. The sessions were designed to provide an overview of the planning process and collect discussion input from participants, with the goal of emphasizing that participants' expertise and perspectives were important to identifying risks, setting priorities, and advancing strategies to strengthen resilience across the City.

During the LPT webinar, the project team reviewed the purpose of the NHMP, the value of hazard mitigation planning, and the structure of the plan, including the community profile, hazard profiles, risk assessment and vulnerabilities, capabilities assessment, mitigation actions, and plan maintenance. The presentation also reviewed the City's mitigation goals, FEMA asset categories, and the natural hazards evaluated as part of the plan update.

LPT members were asked to provide input on the community profile and asset inventory, including whether critical facilities, natural and cultural resources, economic assets, and other valued community assets were accurately represented. Participants were also asked to share insights on hazard impacts, trends, and community vulnerabilities to help refine the risk assessment, as well as feedback on proposed mitigation strategies and opportunities to strengthen the City's mitigation efforts.

Input gathered through the LPT process helped confirm local priorities, identify potential gaps in the asset inventory and vulnerability assessment, and inform the refinement of mitigation actions. For an expanded list of those invited to participate in the LPT and all meeting materials, please refer to Appendix C.

1.3. Public Engagement

1.3.1. Engagement Strategy

The engagement strategy for the Boston NHMP Update was designed to provide multiple opportunities for residents, community members, students, older adults, City staff, and other stakeholders to learn about the plan and share input on natural hazard risks, vulnerabilities, and mitigation priorities. Rather than relying on a single public meeting or one method of outreach, the process used a layered engagement approach that combined in-person outreach, targeted workshops, digital engagement, a public survey, and existing City and community convenings. This approach helped create multiple entry points for participation and allowed the project team to gather input from people with different levels of familiarity with hazard mitigation planning.

A central goal of the engagement strategy was to support an accessible and equitable planning process. The project team prioritized outreach methods that reduced barriers to participation by bringing engagement opportunities to places where people were already gathering, using plain-language materials, offering both in-person and online opportunities, and providing flexible ways for participants to share input. Engagement activities were designed to focus not only on technical hazard data, but also on lived experiences, everyday disruptions, preparedness challenges, and community priorities. This was especially important for understanding how hazards affect populations that may face greater risk during extreme events, including older adults, students, residents with limited access to transportation, residents with language access needs, and communities that experience higher exposure to flooding, extreme heat, winter storms, and other hazards.

The engagement approach emphasized meeting people where they are. This included tabling at the Boston Community-Based Flood Resilience Open House, where attendees were invited to share how natural hazards have affected their neighborhoods and daily lives; workshops at senior centers in East Boston and Brighton to hear directly from older adults about preparedness needs and barriers; and a school-based activity through the Boston Public Schools Art for Change program to introduce students to natural hazard mitigation and gather youth perspectives. These activities helped document lived experiences related to flooding, extreme temperatures, winter weather, power outages, transportation disruptions, and other hazard impacts.

To broaden awareness beyond in-person events, the project team also used social media and a public survey to explain the purpose of the NHMP, define key mitigation concepts, and invite residents to participate. The survey provided an opportunity for residents and community members to identify the hazards they are most concerned about, describe impacts they have experienced, and suggest actions that could help Boston become more resilient. To improve accessibility, the survey was made available in English and Spanish and included information on interpretation, translation, and disability accommodation services. Social media materials also helped make the planning process more understandable by using short, educational content to explain what the NHMP is, why it matters, and how residents could provide input.

Equity was also incorporated through coordination with City staff and partner groups that understand community needs, service gaps, and neighborhood-specific vulnerabilities. The Executive Steering Committee, Local Planning Team, and Cross-Agency Climate Resilience group provided additional pathways for gathering input from City departments, regional partners, community organizations, and other stakeholders. These groups helped review key findings, identify gaps in the asset inventory and vulnerability assessment, and provide feedback on mitigation strategies.

Together, these engagement activities supported a planning process that was community-informed, accessible, and responsive to local knowledge. Input gathered through the engagement process helped refine the risk assessment, capabilities assessment, and mitigation action strategy by identifying community concerns, preparedness barriers, priority hazards, and opportunities for more targeted outreach and resilience investments.

All materials developed for the following engagement activities can be found in Appendix D.

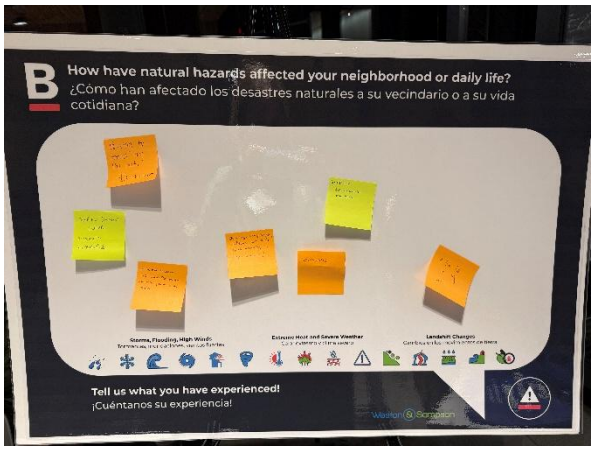
1.3.2. Engagement Activities

Green Infrastructure Planning & Flood Mapping Climate Social

As part of the NHMP update process, the Office of Emergency Management participated in a community tabling engagement event at the Boston Community-Based Flood Resilience Climate Social event on February 3, 2026. The event was advertised through the City of Boston's Green Infrastructure webpage and coordinated by the Charles River Watershed Association. The event provided an opportunity to raise awareness about the NHMP update, share information about natural hazard risks, and gather input from residents and community members on how hazards affect daily life in Boston neighborhoods.

The event brought together the Boston Community-Based Flood Resilience project team, community partners, and local resource providers. Attendees learned how results from the Boston Flood Survey are being used to inform resilience planning, explored the updated flood viewer tool, and connected with resources related to flood preparedness, emergency management, and community resilience.





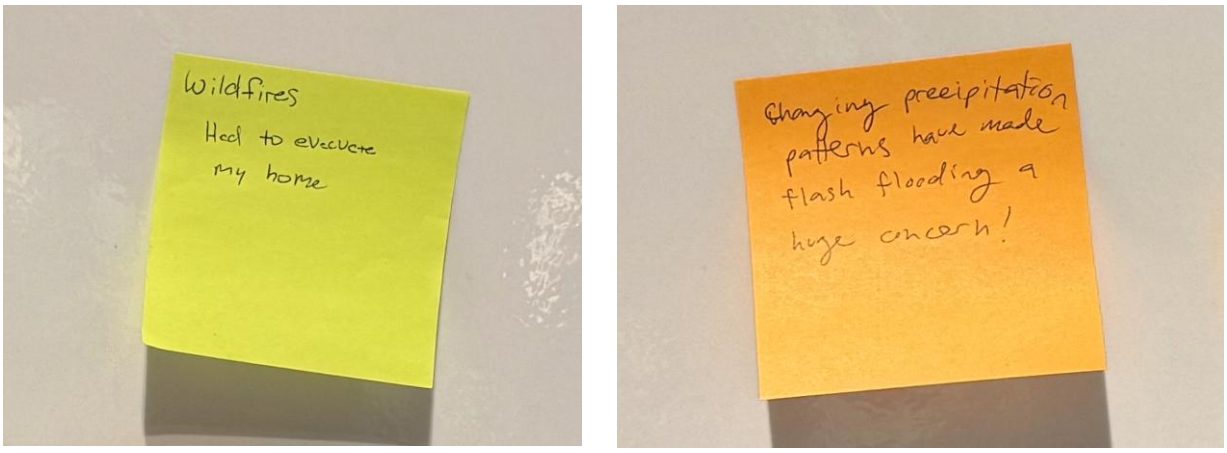


Figure 1-2. Climate Social tabling event.

At the Office of Emergency Management table, staff shared information about the NHMP update and invited attendees to participate in a low-barrier feedback activity. A poster asked the question: "How have natural hazards affected your neighborhood or daily life?" Participants responded using sticky notes, identifying personal experiences, neighborhood concerns, and observed impacts related to flooding and other natural hazards.

Attendees described a range of ways natural hazards have affected their neighborhoods and daily routines. Several comments focused on winter weather and storm preparedness, including having to shovel out cars in Dorchester, keeping storm drains clear, and ensuring hydrants remain accessible. Others raised concerns about heavier precipitation and flash flooding, noting that changing rainfall patterns have made flooding a growing concern. Attendees also identified hazards such as hurricanes, wildfires, and fallen trees, including one comment about evacuating a home due to wildfire and another about a tree falling on a car. Overall, the feedback highlighted both everyday disruptions and more serious safety concerns tied to natural hazards in Boston neighborhoods.

Input collected during the event can be found in Appendix D. It will help inform the NHMP update by documenting lived experiences, neighborhood-level vulnerabilities, and community priorities.

Senior Center Workshops

As part of the public engagement process for the Boston NHMP update, the project team conducted workshops at the two senior centers in Boston, East Boston on February 19, 2026 (30 attendees) and Brighton on March 18, 2026 (16 attendees), to gather input from older adults and better understand how natural hazards affect residents who may face increased risk during extreme events. These workshops were coordinated closely with their programming manager and advertised by the community center themselves through their community boards at the center and monthly newsletter. These workshops were

designed to make the NHMP process accessible, community-centered, and focused on lived experience.

The workshops began with a brief presentation explaining what natural hazard mitigation is and why the NHMP matters for Boston. Participants were introduced to mitigation as the effort to reduce the impacts of hazards such as flooding, extreme temperatures, coastal storms, and winter weather through planning, policy, education, infrastructure projects, and other actions. The presentation also explained that the NHMP identifies the hazards that pose the greatest risk to Boston, assesses the vulnerability of residents, infrastructure, and critical facilities, and develops strategies to reduce future hazard impacts.



Figure 1-3. Senior Center Workshops, Brighton (Left) and East Boston (Right).

The senior center workshops emphasized why hazard mitigation is especially important for protecting health, safety, and quality of life. The presentation highlighted that Boston experiences natural disasters that can threaten residents, transportation services, businesses, and infrastructure, and that the NHMP helps guide the City's work to prepare for and build a more resilient community. The workshops also connected the plan to broader City priorities, including preparedness planning, equitable outcomes, public consensus-building, and eligibility for FEMA mitigation grants and federal disaster recovery funding.

Following the presentation, participants took part in small group discussions focused on their experiences, needs, and priorities. Discussion questions asked participants how natural hazards have affected them or their community, what existing programs or resources they use during hazard or disaster events, and what additional help they need to feel better prepared for future hazard events. These conversations provided valuable input on the challenges older adults may face before, during, and after hazards, including issues related to mobility, access to cooling or warming spaces, transportation, communication, power outages, and awareness of available resources.

Input from the senior center workshops helped the project team better understand the specific needs of older adults and other vulnerable populations in Boston. Participants' feedback will inform the NHMP's risk assessment, capability assessment, and mitigation strategy by identifying community concerns, gaps in preparedness resources, and opportunities for improved outreach and support. The workshops also helped strengthen public awareness of hazard mitigation and provided residents with an opportunity to directly shape the City's priorities for reducing risk from future natural hazard events.

These workshops were an important component of the NHMP engagement process because they brought planning conversations directly to residents who may be disproportionately affected by extreme heat, flooding, winter storms, coastal hazards, and power disruptions. By meeting participants in familiar community settings, the City was able to support more inclusive engagement and ensure that the experiences of older adults are reflected in the updated mitigation plan.

Social Media

The NHMP update was promoted through a series of social media posts on the Office of Emergency Management's social media accounts, designed to build awareness, explain the purpose of the plan, and direct residents to participate. The posts introduced the Boston NHMP Update as an opportunity for residents to help shape how the City prepares for flooding, extreme heat, winter storms, and other hazards. They also included clear calls to action, directing viewers to take the NHMP survey and visit the project webpage for more information. The posts can be found in Appendix D.

The campaign used an educational "swipe to learn more" format to make the project accessible. Posts explained what an NHMP is, defined key terms such as natural hazards, hazard mitigation, and resilience, and described the benefits of mitigation planning, including increasing public awareness, directing resources toward the greatest vulnerabilities, improving coordination, and unlocking federal funding opportunities.



Figure 1-4. Representative social media posts distributed.

The final post encouraged residents to complete the project's public survey to share their experiences with past natural hazard events and provide input on actions that could make Boston more resilient. Together, these posts helped "plug" the NHMP update by increasing visibility, explaining why the project matters, and reaching a larger network for public participation.

Public Survey

As part of the 2026 update to the City of Boston NHMP, the Office of Emergency Management developed and distributed a public survey to gather input from residents, community members, and other stakeholders. The survey was shared through links in presentations, on the NHMP city website page, within the social media post, and linked on distributed fact sheets. The survey was designed to better understand how natural hazards and climate-related impacts are experienced across Boston's neighborhoods, and to identify community priorities for reducing risk and improving resilience.

The survey introduced respondents to the purpose of the NHMP update, including the City's review of historic hazard events, future climate change projections, areas of vulnerability, and strategies to mitigate damage from extreme events. The survey emphasized that community experiences with previous natural hazard events and ideas for becoming more resilient are critical to understanding local vulnerability. The survey was made available in English and Spanish, and the survey notice included information on interpretation, translation, and disability accommodation services at no cost.

The survey received 10 responses from participants representing eight different neighborhoods across the city. All responses can be found in Appendix D. Respondents

were asked to share their experiences with natural hazards, identify the hazards they are most concerned about, describe impacts they have experienced, and suggest actions the City could take to reduce future risk. The responses provided community-level insight that helped inform the plan's risk assessment, capability assessment, and mitigation strategy.

Overall, survey responses indicated that residents are most concerned about severe winter weather (10 responses), average and extreme temperatures (8 responses), and flooding from precipitation (6 responses). Respondents reported that these hazards have affected them through damaged roadways and transportation disruptions, health impacts, and loss of access to services.

The survey also asked participants to identify actions that could help Boston become more resilient. Common recommendations included NFIP reform advocacy, citywide climate education, and climate upgrades to municipal buildings. These responses reinforced the importance of mitigation actions that are community-centered, accessible, and responsive to neighborhood-specific risks.

Art for Change Program with Boston Public Schools, "Build your own NHMP" Activity

As part of the Boston NHMP update, the project team partnered with Boston Public Schools through the Art for a Change program during school vacation week in April 22, 2026, to introduce middle school students to natural hazards, climate impacts, mitigation, and preparedness. This session was a part of the program offered by the Boston Public Schools weeklong Art for Change Program, and therefore not separately advertised. The session was designed as an interactive, age-appropriate planning exercise that connected citywide hazard mitigation concepts to a familiar environment: the students' own school.

At the start of the week, the students were introduced to the types of natural hazards included in Boston's NHMP, including flooding from precipitation, extreme temperatures, severe winter weather and Nor'easters, coastal flooding and storm surge, hurricanes and tropical cyclones, drought, coastal erosion, groundwater changes, and other severe weather events. These themes then carried on throughout the week in various sessions led by the Office of Emergency Management where they guided students in expressing their thoughts and ideas about various vulnerabilities and impacts through meaningful artistic drawings and paintings.

The core activity run by the NHMP project team asked students to develop a school-scale natural hazard mitigation plan using their current school as the planning area. The presentation framed schools as "mini cities" because they include people, buildings, shared spaces, and important services. This helped students understand that the same planning process used for a city can also be applied at the school level to protect students, teachers, staff, classrooms, gyms, cafeterias, and other critical spaces.



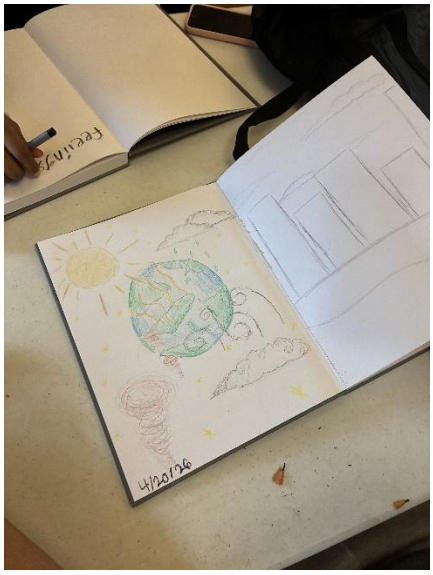
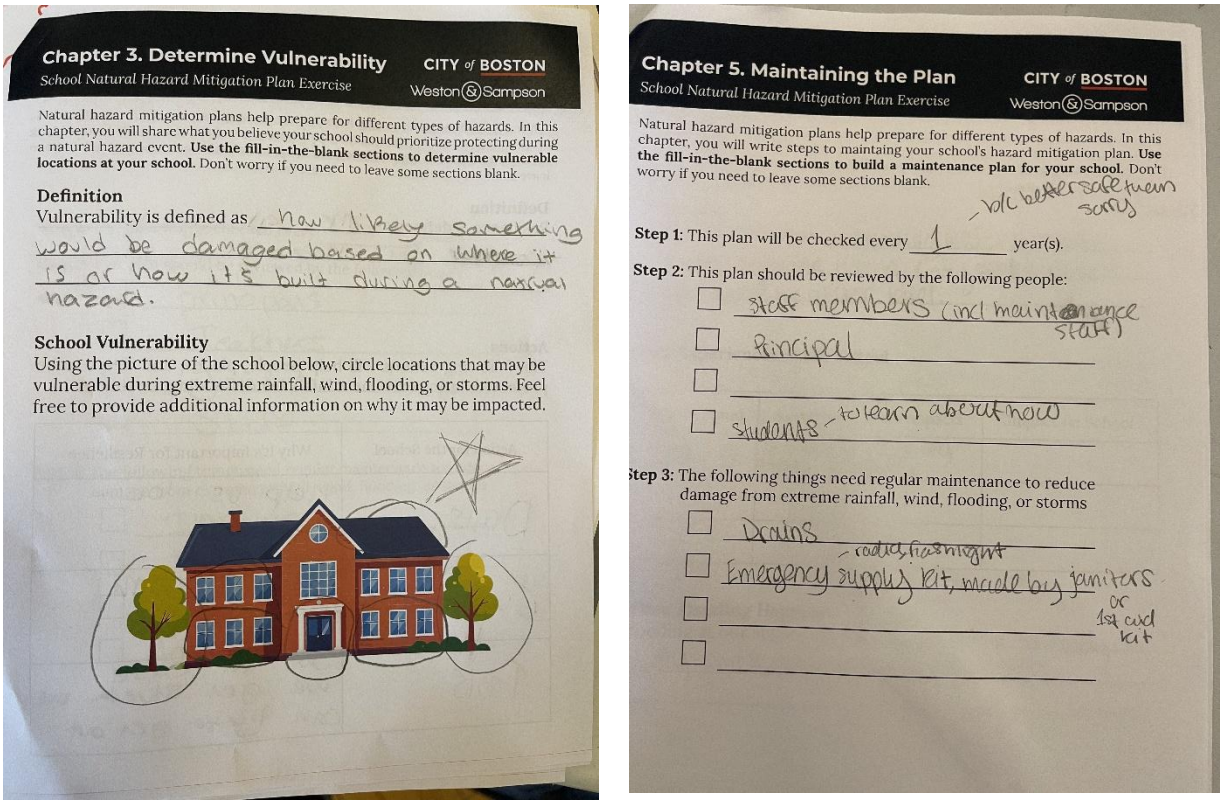


Figure 1-5. Art for Change BPS/OEM program. The program reached about 40 students.

Students completed a five-chapter School Natural Hazard Mitigation Plan Exercise. In Chapter 1, students identified hazards by defining flooding, documenting past flood experiences at their school, noting where flooding occurred, and describing the impacts on school operations. In Chapter 2, students identified school assets, including the people, places, and items that should be protected during extreme rainfall, wind, flooding, or storms. In Chapter 3, students determined vulnerability by identifying areas of a school building that may be at risk and explaining why those locations may be impacted.

The later chapters helped students move from identifying risk to developing solutions. In Chapter 4, students created mitigation actions for their school and explained why each action would support resilience. In Chapter 5, students considered how to maintain the plan over time by identifying how often it should be reviewed, who should participate in the review, and what school features may need regular maintenance to reduce damage from future hazard events.



Chapter 3. Determine Vulnerability
School Natural Hazard Mitigation Plan Exercise
CITY of BOSTON
Weston & Sampson

Natural hazard mitigation plans help prepare for different types of hazards. In this chapter, you will share what you believe your school should prioritize protecting during a natural hazard event. **Use the fill-in-the-blank sections to determine vulnerable locations at your school.** Don't worry if you need to leave some sections blank.

Definition
Vulnerability is defined as how likely something would be damaged based on where it is or how it's built during a natural hazard.

School Vulnerability
Using the picture of the school below, circle locations that may be vulnerable during extreme rainfall, wind, flooding, or storms. Feel free to provide additional information on why it may be impacted.

Chapter 5. Maintaining the Plan
School Natural Hazard Mitigation Plan Exercise
CITY of BOSTON
Weston & Sampson

Natural hazard mitigation plans help prepare for different types of hazards. In this chapter, you will write steps to maintain your school's hazard mitigation plan. **Use the fill-in-the-blank sections to build a maintenance plan for your school.** Don't worry if you need to leave some sections blank.

Step 1: This plan will be checked every 1 year(s).

Step 2: This plan should be reviewed by the following people:
- ☐ staff members (incl maintenance staff)
- ☐ Principal
- ☐
- ☐ students - to learn about how

Step 3: The following things need regular maintenance to reduce damage from extreme rainfall, wind, flooding, or storms
- ☐ Drains - radiator/fire might
- ☐ Emergency supply kit, made by janitors or 1st aid kit
- ☐
- ☐

Figure 1-6. Student's worksheet pages from the "Build Your Own HMP" activity.

By creating their own plans, students learned why natural hazard mitigation planning is important and how preparedness efforts can help protect people, facilities, and daily school operations. The program reached had about 40 students who participated in this activity and then continued their learnings about natural hazard mitigation with the Office of Emergency Management's CERT team throughout the rest of the week.

Cross Agency Climate Resilience Group

The Cross-Agency Climate Resilience (CACR) meeting is a monthly city meeting series that brings together city staff from across many departments to learn about and discuss climate resilience work. CACR meetings include presentations on City-led climate resilience plans and projects, updates from external partners, field trips, and other opportunities to build shared understanding across departments. This meeting was advertised through an email invitation to the CACR members.

Presenting to the CACR group during their April 28, 2026 meeting about the NHMP update was important in providing an early overview of the update process and making additional city department staff who are not directly involved in the Executive Steering Committee aware that this work was underway. While various departments and their staff may already be closely engaged with the update, others may be less familiar with the NHMP process,

including why the plan is updated every five years, what typically changes from one plan update to the next, and how departmental input helps shape the final plan.

This meeting was intended to serve as both a general education opportunity and an initial feedback-gathering session before presenting it to the broader Local Planning Team, which many of the staff were invited to take part in.

Public Meeting

As part of the final phase of the planning process, the City of Boston held a virtual public meeting on September 2, 2026. This meeting was publicly advertised through the city's public notices page[24] and a flyer on the NHMP page, along with invitations emailed directly to the individuals of the Executive Steering Committee, the Local Planning Team, and to the individuals who took the survey and indicated they wanted to be kept up to date on the project.

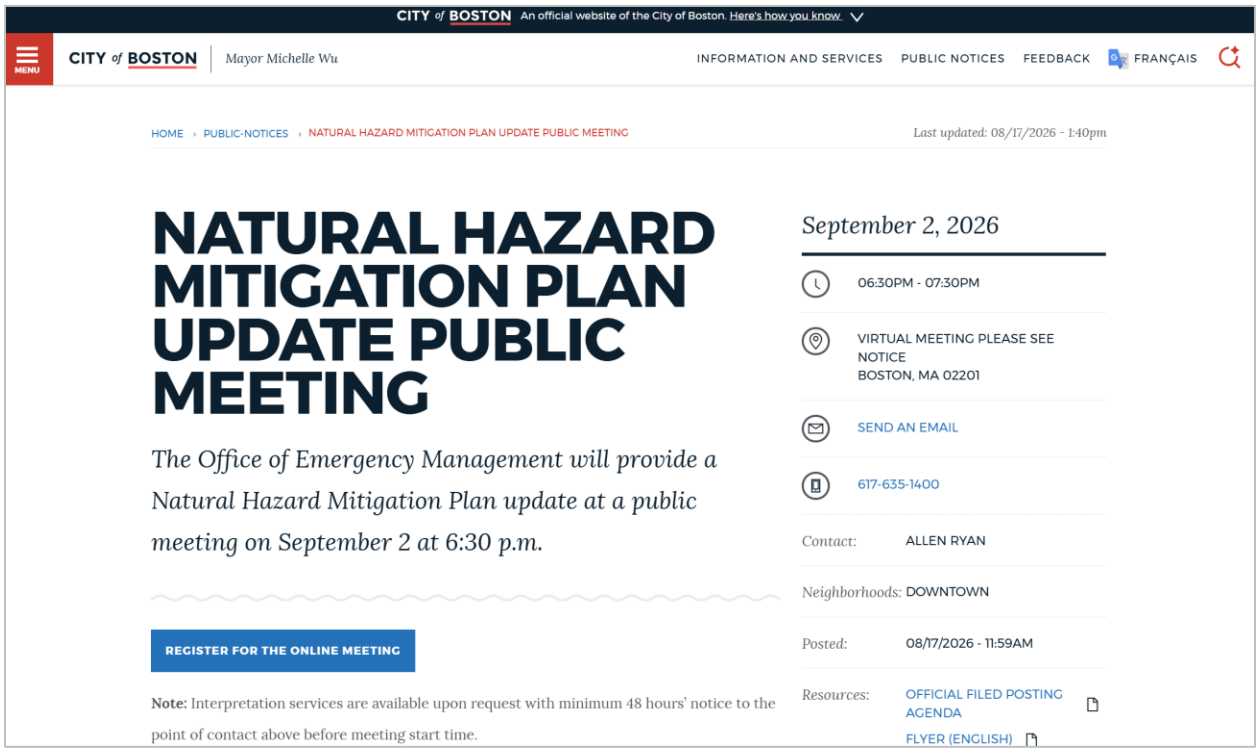


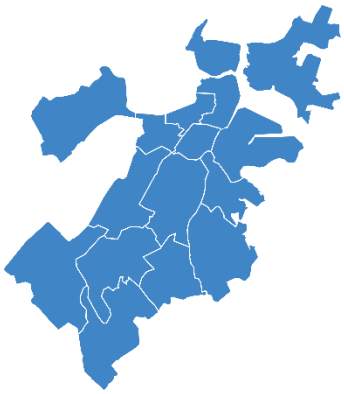
Figure 1-7. City Public Notices page advertising the public meeting.

The meeting provided community members with an opportunity to review parts of the draft NHMP and provide feedback on how the City could help residents and communities connect, prepare, and protect themselves from extreme weather, flooding, and other natural hazards.

[24] City of Boston. (2026, August 17). *Natural hazard mitigation plan update public meeting.* https://www.boston.gov/public-notices/16604521

The meeting was conducted through Zoom, with advance registration required to receive the meeting link. To support inclusive participation, language interpretation services were made available upon request for individuals who registered and identified their preferred language by August 20, 2026. Community members who were unable to attend the meeting were provided an additional opportunity to participate by reviewing the full draft plan online and submitting feedback through September 18, 2026. Comments received during the public meeting and online review period were considered for inclusion as the city finalized the plan.

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CHAPTER 2:

Natural Hazard Mitigation Goals

2. NATURAL HAZARD MITIGATION GOALS

On November 10, 2025, the Executive Steering Committee conducted an exercise to review the goals of the previous 2021 Natural Hazard Mitigation Plan (NHMP), identify changing city priorities through the last five years, and establish the goals of the 2026 NHMP Update.

2.1. Goals from the 2021 Plan

The goals from the 2021 plan reflect Boston's priorities during and following the Covid pandemic. These goals reflect a very comprehensive approach to natural hazard mitigation and climate adaptation planning, with a heavy emphasis on equity, community engagement, natural resource protection, and infrastructure improvement. The five overarching goals from the 2021 plan are described below:

1. Equitably protect the health and safety of the public through awareness, preparedness, and connections.
2. Invest in protecting properties and structures.
3. Increase resilience by protecting and enhancing natural resources.
4. Ensure that essential services and infrastructure will function during and after a hazard event and prepare essential services for projected climate change.
5. Implement natural hazard mitigation and climate adaptation projects that meet strategic priorities.

Each goal is supported by sub-goals that offer further context and details related to the main objective. These strategies identify focus areas within each goal and outline corresponding actions or recommendations for achieving them.

2.2. Evolving City Priorities

During a review of the 2021 natural hazard mitigation goals, the ESC expressed concern about the vagueness and the difficulty of measuring progress towards the goals over the last five years. Reflecting an overall shift in approach, the ESC emphasized the need to make the updated goals more specific, measurable, and actionable. This transition marks a move from a period primarily focused on planning and demonstration projects to a phase of accelerated climate resilience implementation, which is expected to define the next five

years in Boston. The consensus among the ESC for this NHMP update was that each of the goals should correspond to one or more demonstrable objectives. It was agreed that revising the goals to more clearly connect to the great work the city has been doing, and plans to do, would support the implementation of actions outlined in this NHMP in a meaningful way.

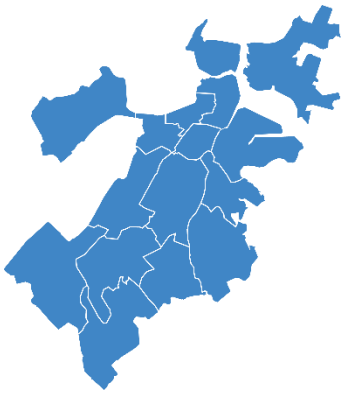
2.3. Updated Goals

Implement strategic and equitable natural hazard mitigation planning by building a comprehensive and adaptable approach that integrates social, economic, and environmental solutions focused on minimizing risks that guide long term effective resilience planning.

1. Build informed, connected communities ready for natural hazards through coordinated education, accessible preparedness resources, early warnings, support for vulnerable groups, and improved evacuation procedures.
2. Encourage the protection of private property and buildings through the promotion of educational initiatives and the implementation of regulatory planning tools, financial incentives, and innovative strategies that prioritize protection for those most vulnerable.
3. Create community resilience by expanding green infrastructure, protecting open spaces, and improving access to natural systems that support an accessible and equitable climate-resilient city. Promote neighborhood-level education and stewardship so all residents can actively maintain these natural resources and their ecosystem benefits.
4. Support vulnerable populations before, during, and after hazard events by maintaining the reliable performance of essential public services and critical infrastructure by prioritizing interventions that reduce risks to critical systems, build operational redundancy, increase preparedness, and minimize secondary impacts.
5. Coordinate investments citywide, countywide, and statewide to improve governance and collaboration in reducing risks to natural hazards.
6. Enhance post-disaster recovery by fostering a collaborative mindset and increasing energy independence where possible, to minimize disruptions, support equitable recovery, and facilitate the rapid restoration of essential resources and services.


Build **informed, connected communities** ready for natural hazards.
Encourage the **protection of private property** and buildings.
Create **community resilience** and promote neighborhood-level education and stewardship.
Implement strategic and equitable hazard mitigation planning by building a comprehensive and adaptable approach that integrates social, economic, and environmental solutions focused on minimizing risks that guide long term effective resilience planning.
Support vulnerable populations before, during, and after hazard events.
Coordinate investments citywide, countywide, and statewide.
Enhance post-disaster recovery by fostering a collaborative mindset and increasing energy independence.

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CHAPTER 3:

Community Profile

3. COMMUNITY PROFILE

This Community Profile provides an overview of the City of Boston's context that informs the hazard identification, risk assessment, and mitigation strategies presented in this Natural Hazard Mitigation Plan (NHMP). As a large, diverse, and economically vibrant city, Boston relies on an extensive network of people, facilities, infrastructure, and natural systems to support daily operations and long-term resilience.

This chapter establishes a baseline understanding of the community's physical, social, environmental, and economic characteristics, emphasizing factors that influence vulnerability to natural hazards as well as the city's capacity for preparedness, response, recovery, and mitigation. The following serves as a comprehensive inventory of all community assets, detailing them across multiple categories as outlined in Figure 3-1. Collectively, these asset categories illustrate what is at risk from natural hazards and help inform the prioritization of mitigation actions identified later in the plan.

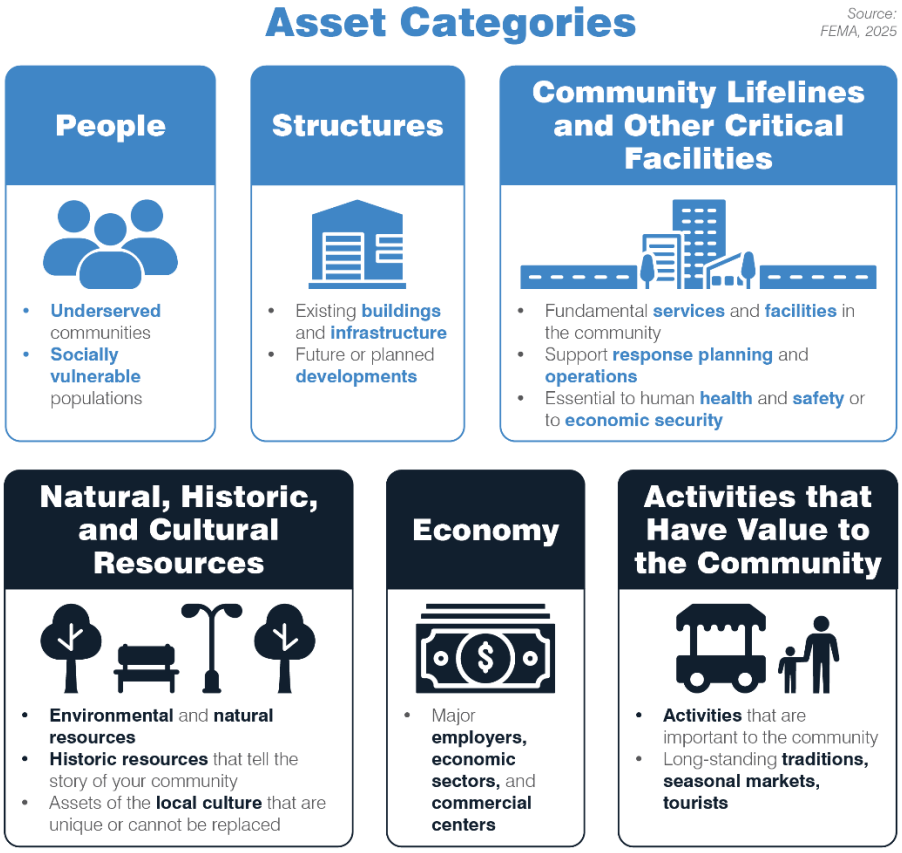


Figure 3-1: Categories to identify assets at risk to natural hazards. Source: FEMA, 2025.

Asset data presented in this plan was compiled from federal, state, regional, and City of Boston data sources. Data sources and the date each dataset was obtained or accessed were documented as part of the GIS asset inventory. Because these datasets are periodically updated by their respective data providers, asset information reflects conditions available as late as February 2026 and may not represent subsequent changes.

The information presented in this chapter provides a foundation for subsequent sections of the NHMP, so that the final mitigation strategies are responsive to Boston's unique characteristics, risks, and community needs.

3.1. City Context

Founded in 1630, Boston has grown from a small settlers' town on the Shawmut peninsula to a city of nearly 700,000 people as of 2025. An important port city since its early days, Boston's location at the mouth of three rivers has played a key role in shaping its economy, character, and heritage. As the city grew, Boston's residents modified the land and surrounding waterways, filling in wetlands and waterbodies to expand the city's footprint (see Figure 3-2). Areas such as Back Bay, Logan Airport, the South End and the most recent developments in the Seaport District were built upon this fill. These historical practices have contributed to some of the vulnerabilities the city faces today, such as sea level rise, flooding, and earthquakes.

Over its nearly 300-year history, Boston's physical and demographic characteristics have been influenced by historic events such as the revolutionary war era to the rise and fall of industrial manufacturing, to urban renewal policies, the city has been continually reshaped by societal changes.

In the past few decades, Boston has experienced a growing knowledge economy. This attracted young people and new technological industries, but the city is still juggling the legacies of inequality, unaffordability, and environmental contamination. The city's features listed in this chapter serve as both strengths and vulnerabilities as the region faces climate change and natural hazards.

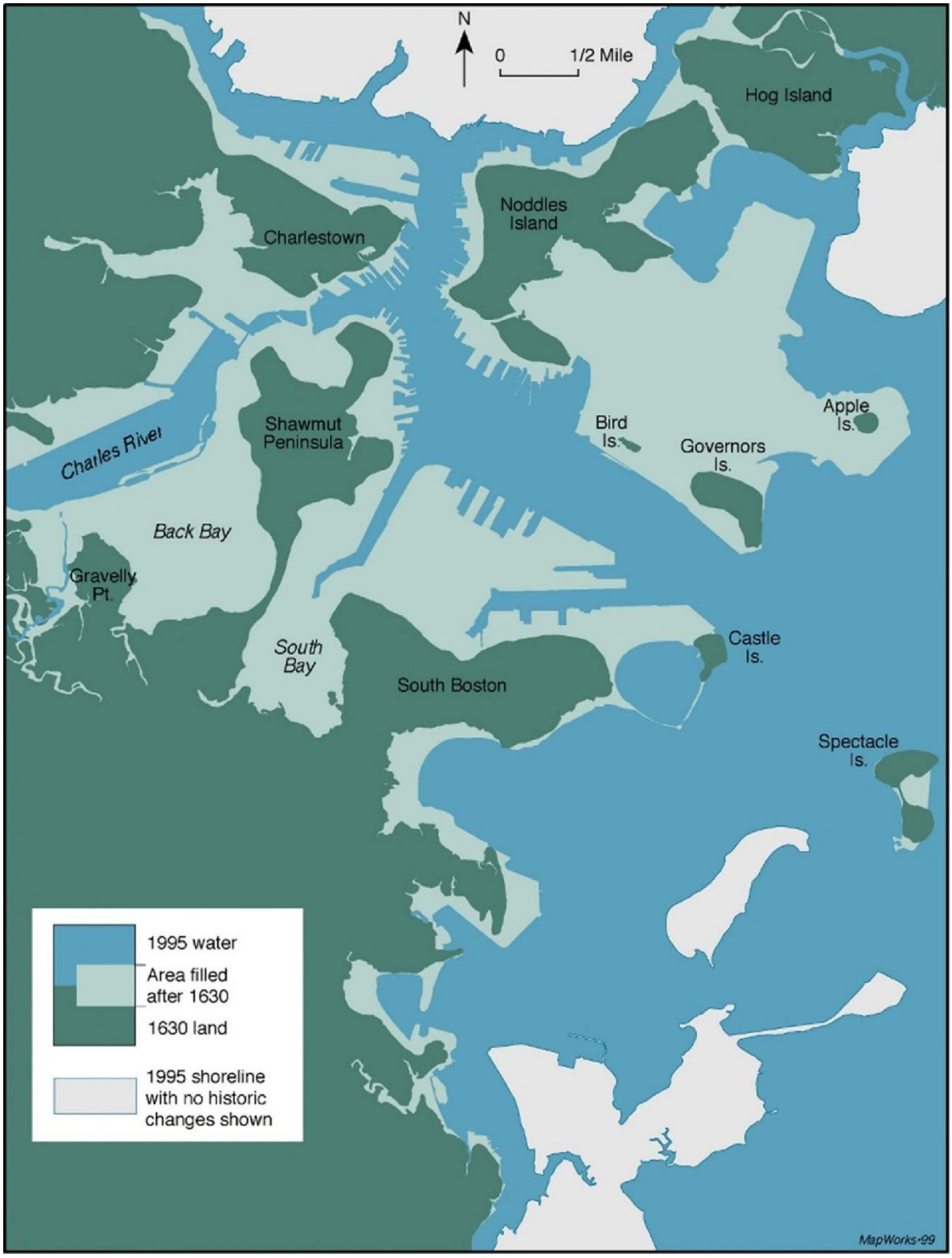


Figure 3-2. Boston shoreline change, 1630 - 1995. Source: Boston Public Library[25]

[25] Map Works, Inc. (1999). Boston shoreline 1630 [Map]. Retrieved from https://ark.digitalcommonwealth.org/ark:/50959/q524n430n

3.2. People

With a population of 652,442 people spread across 26 neighborhoods (Figure 3-5) and 48.3 square miles[26], the people of Boston are the city's greatest asset, contributing to the city's social, cultural, and economic vitality while also representing a key consideration in natural hazard mitigation planning.

Boston is home to a large and diverse population, encompassing a wide range of ages, incomes, languages, cultures, and abilities. Within this population are socially vulnerable groups, also known as "priority populations", including older adults, children, low-income households, people with disabilities, residents with limited English proficiency, and communities of color[27]. Each of these groups may experience disproportionate impacts from natural hazards due to factors such as housing conditions, limited access to resources, health disparities, and limited mobility. Understanding the distribution and needs of these populations is essential to identifying risks and reducing inequities to adequately support the safety and resilience of all Boston residents.



Figure 3-3. Kids playing. Source: City of Boston.



Figure 3-4. Residents dancing. Source: City of Boston.

[26] U.S. Census Bureau. (2024). *Boston, MA* [American Community Survey 1-year estimates]. In Census Reporter. https://censusreporter.org/profiles/16000US2507000-boston-ma/

[27] Executive Office of Energy and Environmental Affairs. (2022). *MVP 2.0 process guide* (Massachusetts Municipal Vulnerability Preparedness Program). https://www.mass.gov/doc/mvp-20-process-guide/download

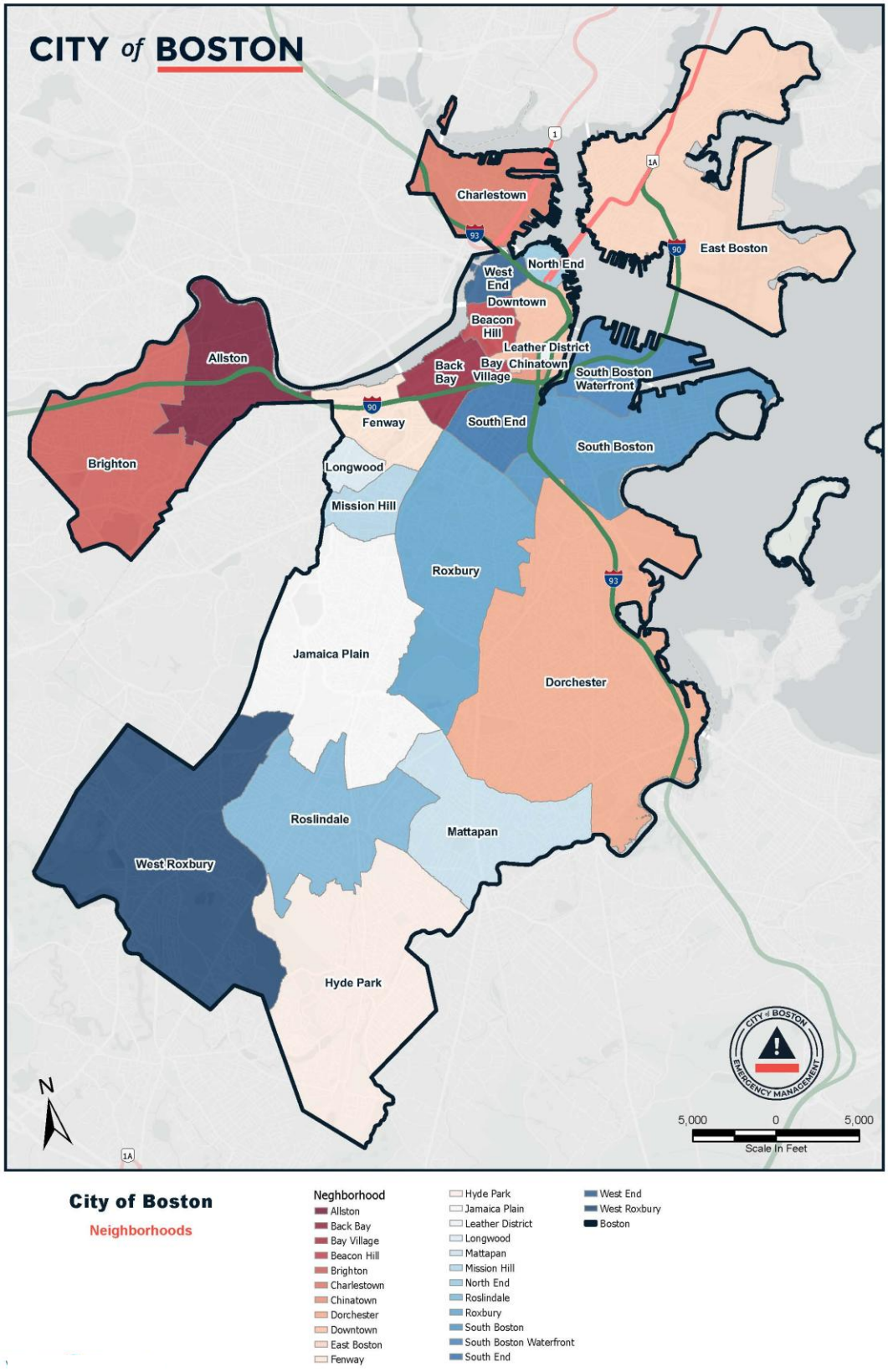


Figure 3-5. Boston Neighborhoods.

3.2.1. Population Demographics

Highlighting diversity across city neighborhoods, about 27% of Boston's population is foreign born[26], and under 50% of the population identifies as white[28], as shown in Table 3-1 below. This stands in contrast to the population of Massachusetts as a whole, which is almost 70% white[29] and less than 20% foreign born[30]. Additionally, Boston has the largest number of multilingual residents out of all cities and towns in Massachusetts. More than a third of Boston's population speaks a language other than English at home. Though more than 100 languages are spoken by the city's residents, the most prevalent languages are Spanish, Chinese, Haitian, Kabuverdianu, and Vietnamese.[31]

Table 3-1. Demographics

Race or Ethnicity	Boston[28]	Massachusetts[29]
Native Hawaiian and Other Pacific Islander	0.1%	0.03%
Native American and Alaska Native	0.1%	0.1%
Other Race	1.0%	1.2%
Two or More Races	5.2%	4.5%
Asian	9.9%	7.0%
Black or African American	20.3%	6.5%
White	44.5%	67.8%
Hispanic or Latino	18.9%	12.9%

The following graphic (Table 3-2) summarizes the key demographic and socioeconomic characteristics of the City of Boston and compares them to statewide conditions in Massachusetts. This highlights differences in age distribution, educational attainment, social characteristics, income, and housing, providing important context for understanding population trends and potential vulnerability to natural hazards. These indicators help

[28] Data USA. (n.d.). *Boston, MA profile*. https://datausa.io/profile/geo/boston-ma
[29] Data USA. (n.d.). *Massachusetts profile*. https://datausa.io/profile/geo/massachusetts
[30] Census Reporter. (2024). *Massachusetts: Profile data*. https://censusreporter.org/profiles/04000US25-massachusetts/
[31] City of Boston Planning Department. (April 18, 2025). *Boston's Multilingual Populations*. 425820a8-7aaf-4610-a2e1-9c00b1ce2af6

illustrate how Boston's population differs from the rest of the Commonwealth and identify demographic factors that may influence risk, preparedness, and recovery across the city.

Table 3-2. Comparison of Demographic and Socioeconomic Indicators.

BOSTON[26,28]		MASSACHUSETTS[29,30]	
AGE			
14% **Under 18**	**13%** 65 and over	**19%** Under 18	**18%** 65 and over
EDUCATION			
55.8% **Bachelor's degree or higher**		**47.8%** Bachelor's degree or higher	
SOCIAL			
26.6% **Foreign-born**	**2.3%** Veteran	**34.3%** Speak language other than English at home	**18.1%** Foreign-born	**4.1%** Veteran	**25.3%** Speak language other than English at home
INCOME			
$96,931 **Median household income**	**15.6%** Poverty rate	**$99,858** Median household income	**10.4%** Poverty rate
HOUSING			
296 K **Housing units[32]**	**35%** Owner-occupancy rate[32]	**$703 K** Median value of owner-occupied housing units	**3.05 M** Housing units	**62%** Owner-occupancy rate[32]	**$571 K** Median value of owner-occupied housing units
HEALTH INSURANCE			
3.05% **Uninsured**	**23.2%** Medicaid	**2.65%** Uninsured	**18.5%** Medicaid

[32] City of Boston. (2022). *Boston Housing Conditions and Real Estate Trends Report.* https://docs.google.com/document/d/1t7Hlb6jIKe1mDnGK2ivArejDdZKrQ_sZ5DrOxEdS2Jo/edit?tab=t.0

Population Growth

Boston's population has fluctuated over time in response to social, economic, and political factors. The city's population grew throughout the 20th century, hitting its peak at over 800 thousand residents in 1950. Over the next few decades, the population declined, largely due to suburban growth, resulting in a population almost 30% smaller by 1980. Beginning in the 1980s, Boston began to grow and recover. This growth accelerated after the Great Recession: between 2010 and 2014, Boston's population grew by 6%, twice as fast as the nation. The city's knowledge economy has fueled much of this growth, which is projected to continue in the coming decades. Boston may be home to approximately 724,000 residents by 2030 and over 800,000 residents by 2050[33].

3.2.2. Priority Populations and Social Vulnerability

Understanding social vulnerability and the needs of priority populations is essential for reducing risk among Boston's diverse residents. Priority populations are often identified as the most vulnerable, as they may require additional support when preparing for, responding to, and recovering from extreme events. Factors contributing to this vulnerability include mobility limitations, challenges in accessing emergency communications, language barriers, or health-related conditions. Additionally, the economic status of communities and individuals significantly affects their capacity to recover and rebuild following disasters.



Figure 3-6. Community members play shuffleboard at Langone and Puopolo Park. Weston & Sampson, 2021.

[33] City of Boston. (2018). *Imagine Boston 2030: A Plan for the Future of Boston.* imagine20boston202030_pages2.pdf

Examples of priority populations include:

- Children
- Adults over age 65
- Veterans
- People with limited English proficiency
- People with disabilities
- People born outside of the U.S.
- Renters
- People without access to a computer and/or internet service
- People living in poverty
- Adults without a high school education

A more common indicator of priority populations are Environmental Justice (EJ) communities. EJ communities are considered priority populations in planning because they represent neighborhoods that may face greater exposure to environmental burdens and have historically had less access to decision-making, resources, and environmental benefits.



Figure 3-7. Gathering in Chinatown. Credit: Weston & Sampson, 2025.

In Massachusetts, a neighborhood is defined as an EJ population if it meets one or more specific criteria related to socioeconomic and demographic conditions, such as if the median household income is at or below 65% of the statewide median, if minorities comprise a significant share of the population, if a high percentage of households have limited English proficiency, or if both minority status and lower income are present together in the context of municipal income levels. These criteria help identify communities that may be more vulnerable to hazards and environmental stressors and support targeted outreach and equitable mitigation planning. The EJ communities within the City of Boston are shown in Figure 3-8 below.

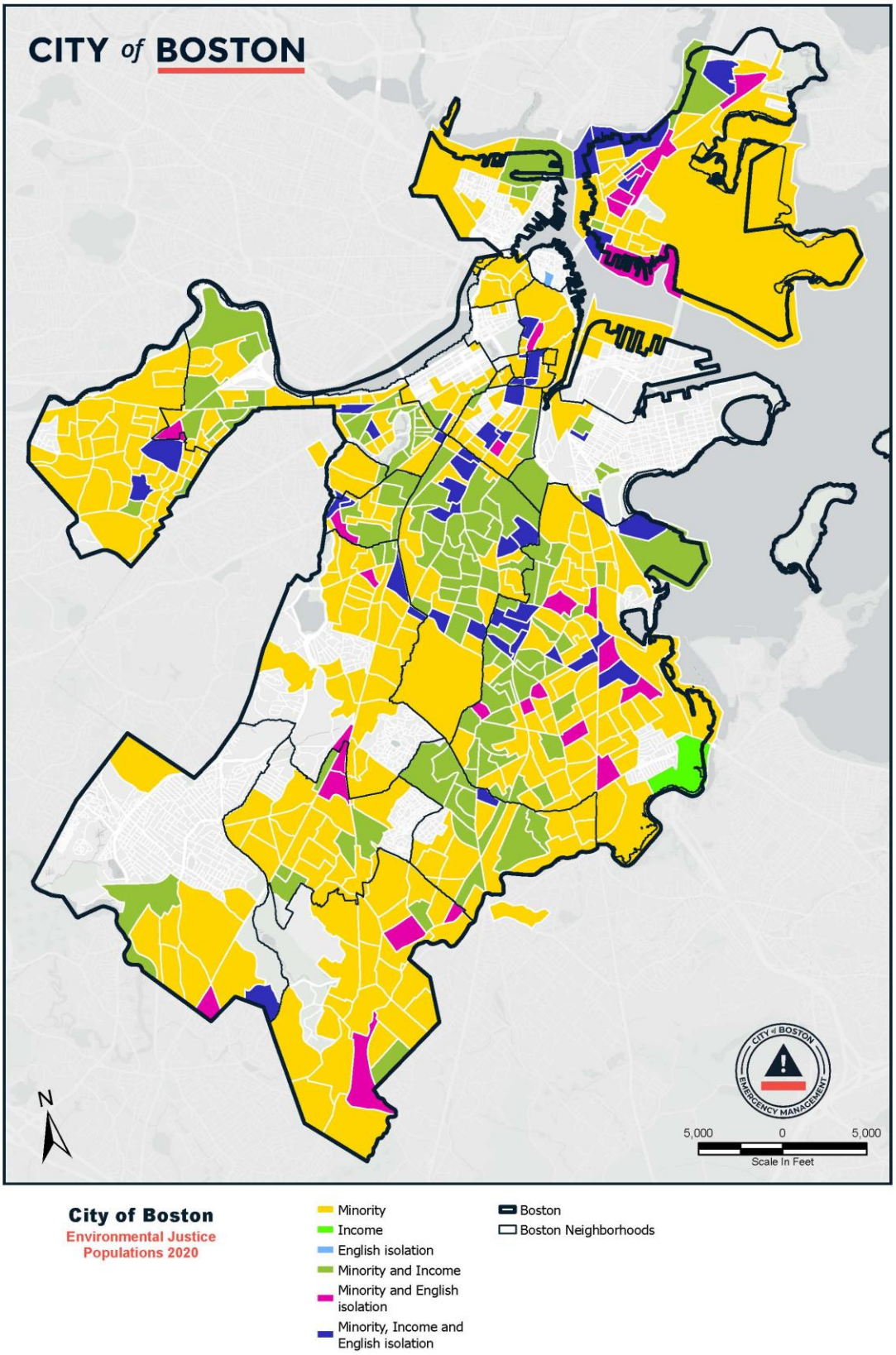


Figure 3-8. Massachusetts Environmental Justice (EJ) populations. Source: MA OEJE, 2022.

3.2.3. Regional Populations

Community Partners

Vital to community success are City of Boston partner organizations and collaborating groups. The city works with a wide variety of organizations ranging from local nonprofits and advocacy groups to regional agencies and service providers. Much of the day-to-day operations and essential processes would not run smoothly without their expertise, resources, and ongoing support. These partners play key roles in delivering vital services, facilitating community engagement, and supporting the needs of all residents, especially priority populations and EJ communities. Their collaboration is instrumental in building resilience, promoting equity, and maintaining the social and economic well-being of Boston's neighborhoods.

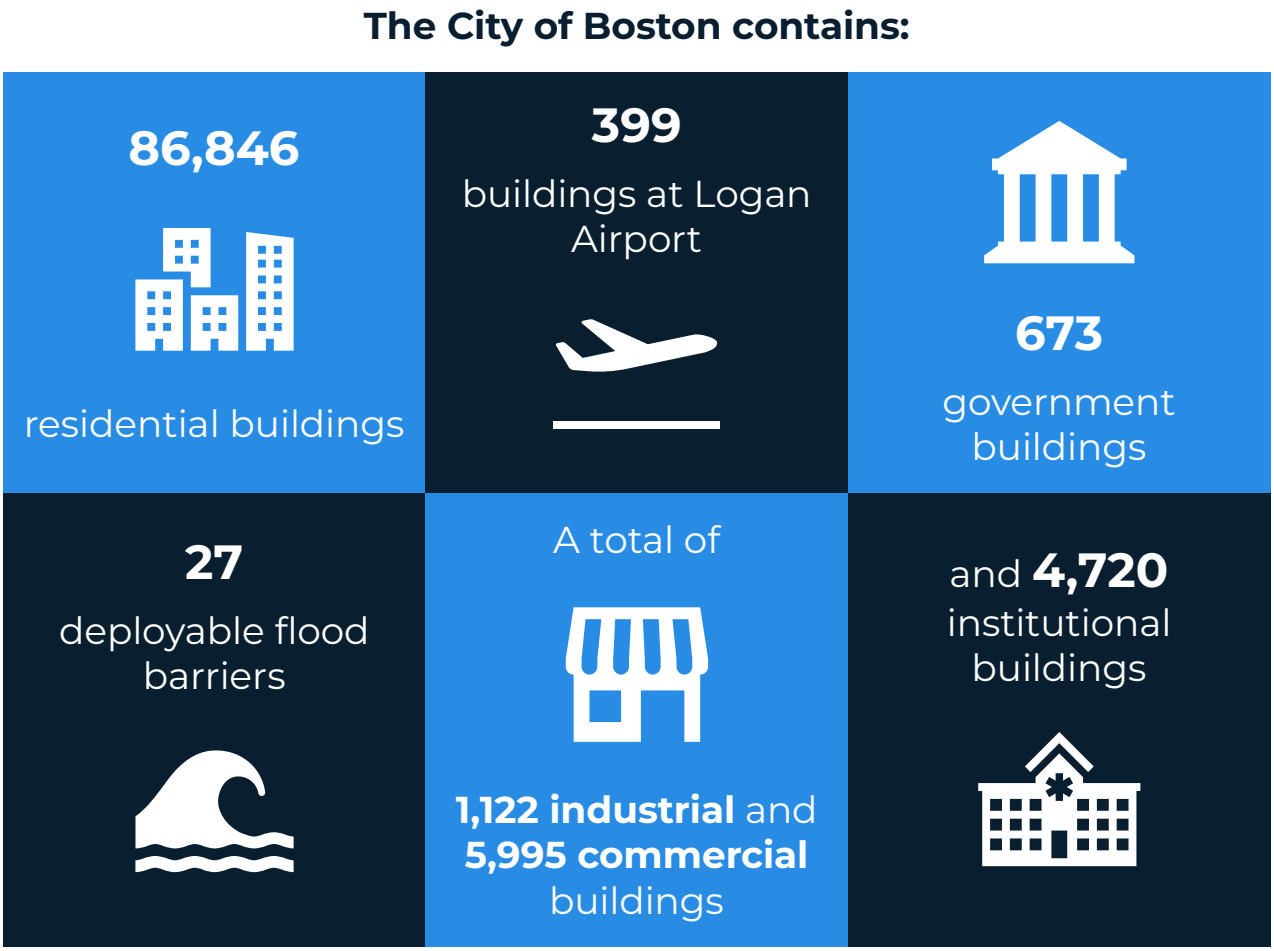
Commuters and Essential Workers

As a regional metropolitan area, the City of Boston is not only comprised of its residents, but commuters represent a significant additional group that contributes to Boston's daily population. These individuals often rely on local transportation systems, public services, and city infrastructure during their time in Boston, increasing the number of people present in the city at any given moment.

In the context of natural hazards, it is crucial to consider the unique needs and challenges faced by commuters and more importantly, essential workers. For example, many healthcare workers may live outside city limits and in the event of an emergency their services and labor are critical. These groups may be unfamiliar with local emergency procedures, evacuation routes, or available resources. Including these groups in emergency planning helps create comprehensive safety measures and fosters protection of individuals within city limits during extreme weather events.

3.3. Structures

The city's numerous residents, businesses, and industries rely on safe, functional buildings and infrastructure. While all structures are exposed to some level of risk, it is essential to identify those that are most vulnerable to natural hazards, as well as those that are most critical to the community (see Section 3.4 on Community Lifelines). This section provides an overview of existing structures in the city, as well as planned future infrastructure projects.



3.3.1. Existing Structures

Buildings

The City of Boston contains over 128,600 buildings as of 2025, according to the city structures database. Table 3-3 displays counts of the city's buildings by their use types.

Table 3-3. Buildings Breakdown by Use Type.

Use Type	Count
Commercial (C)	5,995
Condo Main (CM)	11,277
Exempt / Institutional (E)	4,720
Garage (G)	13,070

Use Type	Count
Industrial (I)	1,122
Logan Airport (LIA)	399
Other (O)	11,144
Residential 1 Family (R1)	31,235
Residential 2 Family (R2)	18,283
Residential 3 Family (R3)	14,743
Residential 4-6 Units (R4)	2,893
Residential 7 or more Units (A)	8,415
Mixed Residential Commercial (RC)	3,780
Residential Lot (RL)	827
Tank (T)	32
Government (XG)	673
Total Number of Buildings	128,608

NFIP Claims

FEMA tracks a given property's loss history through National Flood Insurance Program (NFIP) claims. A total of 514 NFIP claims were processed for properties in the City of Boston from 1978 through 2025. Of these, 25 claims were recorded since 2021, affecting 131 insured units, as shown in Table 3-4.

Table 3-4. NFIP Claims and Policies in Boston, 2021 - 2025

Year	Claims	Policies
2021	7	7
2022	0	0
2023	7	121

Year	Claims	Policies
2024	10	10
2025	1	1

Note: **Claims** represents the number of NFIP claim records occurring in each year. **Policies** represents the sum of insured units in active NFIP policies associated with those claims in each year.

Claim payments can include compensation for both building damage and contents damage. The average claim payment in Boston since 1978 has been over $16,000. The median payment is over $4,000 and the maximum payment is $508,000. Overall, NFIP claim payments for properties in Boston total almost $6 million (Table 3-5).

Table 3-5. Summary of Boston NFIP Claim Payments, 1978 - 2025

Individual Claim Payments			Total Claim Payments (1978 – 2025)
Mean	Median	Max	
$16,474.73	$4,248.15	$508,242.20	$5,897,954

The top causes of damage, according to NFIP claims, are “accumulation of rainfall or snowmelt” and “tidal water overflow”. Table 3-6 describes different causes of damage and the number of NFIP claims recorded for each.

Table 3-6. Common Causes of Damage for Boston NFIP Claims, 1978 - 2025

Code	FEMA Cause of Damage Description	# of Claims
4	Accumulation of rainfall or snowmelt	236
1	Tidal water overflow	197
2	Stream, river, or lake overflow	36
0	Other causes	26
3	Alluvial fan overflow	1
9	Earth movement, landslide, subsidence, sinkholes, etc.	1
Blank	Unknown (cause not listed)	17

Structures that have experienced repeat flooding may be at increased risk of damage from future flood events. NFIP-insured structures that have two or more paid flood losses of more than $1,000 in a ten-year period are considered Repetitive Loss (RL) structures[34]. Structures that have either a) four or more claims payments over $5,000 each, or b) two or more claims payments where the total value is greater than the property's current value, with at least two of these claims occurring within a ten-year period, are designated as Severe Repetitive Loss (SRL) structures[35].

As of April 30, 2026, the City of Boston contains 27 RL structures, and one SRL structure, as shown in Table 3-7.

Table 3-7. RL and SRL Structures by Building Occupancy Type.

Occupancy Type	Number of RL Structures	Number of SRL Structures
Single Family Residence	4	0
2-to-4-unit Residential	3	0
5+ Unit Residential	4	0
Non-Residential	9	1
2-to-4-unit Non-Condo Residential	1	0
5+ Unit Non-Condo Residential	1	0
Single Residential Unit within Multi-Unit	1	0
Non-Residential	4	0
Total	27	1

A map of the generalized areas of repetitive loss structures is shown in Figure 3-9 below. More information on the city's National Flood Insurance Program and repetitive loss structures can be found in Section 5.1.

[34] *Repetitive loss structure.* (2020, March 5). FEMA.gov. https://www.fema.gov/about/glossary/repetitive-loss-structure

[35] *A Policyholder's Guide to Severe Repetitive Loss.* (2025). FEMA. https://agents.floodsmart.gov/sites/default/files/media/document/2025-07/fema-nfip-policyholders-guide-severe-repetitive-loss_brochure-07-2023.pdf

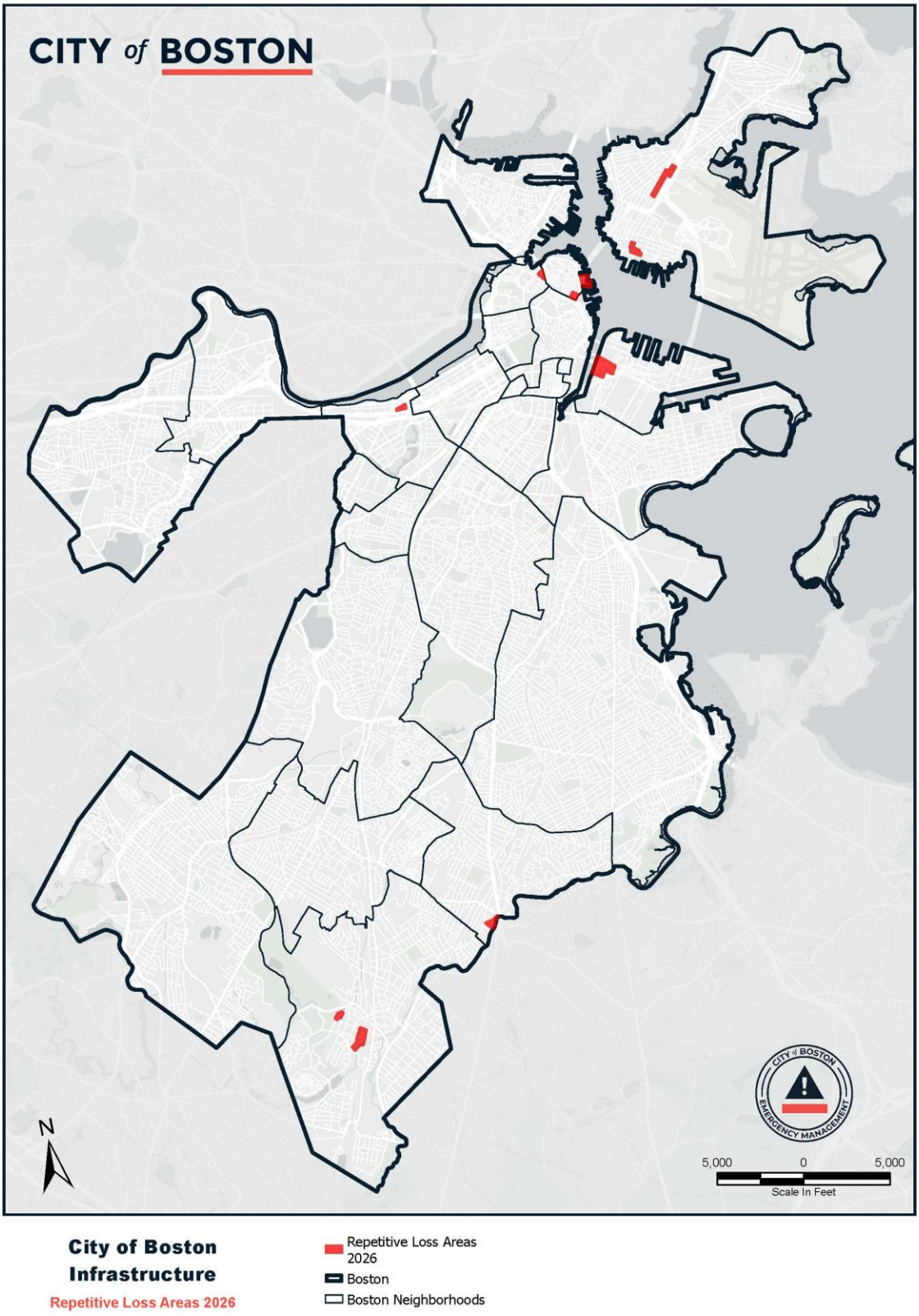


Figure 3-9. Generalized areas of repetitive loss structures in Boston.

Deployable Flood Barriers

Deployable flood barriers have been installed throughout the city to provide temporary protection in the event of a flood. There are currently at least 27 deployable flood barriers throughout Boston. Of the barriers reported to the city, six are owned by the city, two by the MBTA, six by Massport, one by the Federal Reserve Bank of Boston, and 12 are privately owned.

Starting in 2024, the city has been hosting an annual Deployables Day, which is both an educational event for the public and a training exercise for those responsible for deploying the barriers.

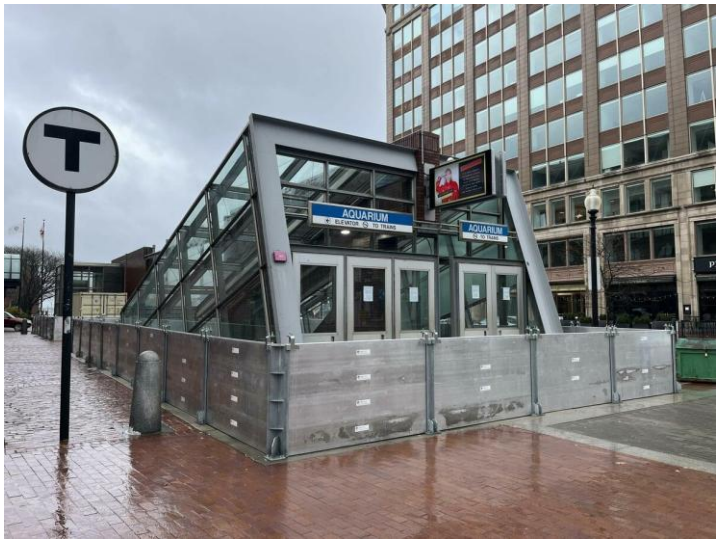


Figure 3-10. Deployable flood barrier at the Aquarium T station. Source: City of Boston.



Figure 3-11. Deployables Day demonstration and sign. Source: City of Boston.

Table 3-8. Deployable Flood Barriers in Boston Neighborhoods

Neighborhood	# of Deployable Barriers
Charlestown	2
Downtown	8
East Boston	6
Fenway	1
Leather District	1

Neighborhood	# of Deployable Barriers
South Boston	1
South Boston Waterfront	8
Total Number of Deployables	27

3.3.2. Future Development

To gain a comprehensive understanding of future development within the City of Boston, the citywide coastal resilience project tracker[36] was leveraged to identify a snapshot of ongoing and future projects, across all neighborhoods and stages, that prioritize the advancement of resilient infrastructure. The focus of these projects is specifically on mitigating risks associated with coastal flooding, inland flooding, and extreme heat. Nearly every Boston neighborhood is engaged in efforts to strengthen resilience, with projects spanning a range of types including green infrastructure, coastal defenses, enhanced public facilities, and improved open spaces, all strategically designed to address the challenges posed by climate change and natural hazards.

While some infrastructure projects are nearing completion, many others are in the planning or design phases, pending funding approval, or are labeled as potential focus areas for the future. The City of Boston has adopted an accelerated approach to implementing these critical improvements, underscoring a citywide commitment to safeguarding communities from future climate risks. The following Table 3-9 highlights ongoing and upcoming projects, each dedicated to fortifying Boston's infrastructure against natural hazards.

[36] City of Boston. (2026, January 28). *Coastal Resilience Implementation.* Boston.gov. https://www.boston.gov/departments/climate-resilience/coastal-resilience-implementation

Table 3-9. Ongoing and Future Development Projects Related to Coastal Resilience Infrastructure within the City of Boston.

Neighborhood	Project	Project Type	Project Phase	Major Improvements
Charlestown	Ryan Playground[37]	Parks and Green Space, Coastal Resilience	Construction	Berm, Seawall, Harborwalk, Fields and Recreation Space
	Charlestown Navy Yard and Little Mystic Channel	Coastal Resilience	Design	TBD
	Barry Playground[38]	Parks and Green Space	Design	Recreation fields and courts
Dorchester	Morrissey Boulevard South	Future Focus Area	TBD	TBD
	Dorchester Resilient Waterfront at Tenean Beach[39]	Coastal Resilience	Design	Elevated roadways and passive flood mitigation
	Neponset Circle	Future Focus Area	TBD	TBD
	Port Norfolk	Future Focus Area	TBD	TBD

[37] City of Boston. (2025, October 9). *John J. Ryan Playground improvements.* Boston.gov. https://www.boston.gov/departments/parks-and-recreation/project/john-j-ryan-playground-improvements
[38] City of Boston. (2025, October 9). *Barry Playground improvements.* Boston.gov. https://www.boston.gov/departments/parks-and-recreation/project/barry-playground-improvements
[39] Boston Planning & Development Agency. (2026). *Dorchester Resilient Waterfront Project at Tenean Beach / Conley Street.* https://www.bostonplans.org/planning-zoning/planning-initiatives/dorchester-resilient-waterfront-project

Neighborhood	Project	Project Type	Project Phase	Major Improvements
Downtown	Resilient Long Wharf[40]	Coastal Resilience	Design	Elevated Harborwalk and seawall, Deployable barriers
	Christopher Columbus Park	Coastal Resilience	Design	TBD
	Atlantic Avenue	Future Focus Area	TBD	TBD
East Boston	Resilient Border Street Waterfront Project[41]	Coastal Resilience	Design	Elevated seawall
	Resilient Bennington Street and Fredericks Park[42]	Coastal Resilience	Design	Elevated roadway, Wetland Buffer Ecological Restoration
	Resilient East Boston Waterfront Project[43]	Coastal Resilience	Design	Elevated seawall, Harborwalk
	Resilient Mario Umana Academy	Coastal Resilience	Design	To be started in 2026.

[40] Boston Planning & Development Agency. (2026). *Long Wharf coastal flood resilience planning.* https://www.bostonplans.org/planning-zoning/planning-initiatives/long-wharf-coastal-flood-resilience-planning

[41] City of Boston. (2026). *Resilient Border Street Waterfront Project.* Boston.gov. https://www.boston.gov/departments/climate-resilience/project/resilient-border-street-waterfront-project

[42] City of Boston. (2026). *Resilient Bennington Street and Fredericks Park.* Boston.gov. https://www.boston.gov/departments/climate-resilience/project/resilient-bennington-street-and-fredericks-park

[43] Boston Planning & Development Agency. (2026). *East Boston Resilient Waterfront Project.* https://www.bostonplans.org/planning-zoning/planning-initiatives/east-boston-resilient-waterfront-project

Neighborhood	Project	Project Type	Project Phase	Major Improvements
	Coleridge Street	Future Focus Area	TBD	TBD
	Route 1A	Future Focus Area	TBD	TBD
	Orient Heights Rail Yard	Future Focus Area	TBD	TBD
North End	Lovejoy Wharf and South Bank Park	Future Focus Area	TBD	TBD
South Boston	Resilient Moakley Connectors[44]	Parks and Green Space, Coastal Resilience	Design	Berm
	Resilient Moakley Park[45]	Parks and Green Space, Coastal Resilience	Design	Berm, Fields and Recreation
	Harbor Point	Future Focus Area	TBD	TBD
	Resilient Fort Point Channel Infrastructure Project[46]	Coastal Resilience	Design	Berm, Elevated Seawall, Harborwalk

[44] City of Boston. (2025, December 10). *Resilient Moakley Connectors*. Boston.gov. https://www.boston.gov/departments/parks-and-recreation/project/resilient-moakley-connectors
[45] City of Boston. (2025, December 10). *Resilient Moakley Park*. Boston.gov. https://www.boston.gov/departments/parks-and-recreation/project/resilient-moakley-park
[46] Boston Planning & Development Agency. (2026). *Fort Point District Planning (100 Acres)*. https://www.bostonplans.org/planning-zoning/planning-initiatives/fort-point-district-planning-100-acres

Neighborhood	Project	Project Type	Project Phase	Major Improvements
South Boston Waterfront	Raymond L. Flynn Marine Park[47]	Coastal Resilience	Planning	Master Plan for Future Development
	Reserved Channel	Future Focus Area	TBD	TBD
	Seaport Boulevard Drydock 4	Future Focus Area	TBD	TBD

3.4. Community Lifelines and Other Critical Facilities

Community lifelines are fundamental services in a community: they enable all other aspects of society to function and require rapid intervention when disrupted in order to protect public health and safety[48]. Community lifelines and other critical facilities play a crucial role during and after a disaster. Their operations help mitigate the severity of impacts and enhance recovery capabilities. Therefore, the protection and post-disaster stabilization of these lifelines is key to community resilience. FEMA has classified and defined eight community lifelines, as shown:



[47] Boston Planning & Development Agency. (2026). *Raymond L. Flynn Marine Park master plan update.* https://www.bostonplans.org/planning-zoning/planning-initiatives/raymond-l-flynn-marine-park-master-plan-update

[48] *Community lifelines.* (2024, March 8). FEMA.gov. https://www.fema.gov/emergency-managers/practitioners/lifelines



Figure 3-12. FEMA Community Lifelines.

3.4.1. Safety and Security



Figure 3-13. Public Works flushing hydrants during a storm in Boston. Credit: Weston & Sampson, 2023.

The Safety and Security lifeline underpins a community's ability to protect life, property, and social order before, during, and after a disaster. This category encompasses government and emergency related services and facilities, such as city hall, courthouses, law enforcement, fire services, emergency medical services, and other community safety functions as they are often the first to respond to emergencies and the last to fully stand down. Their continuity is essential for incident stabilization, public protection, and the effective coordination of response and recovery activities. The following Table 3-10 and Figure 3-16 demonstrate the community lifeline facilities related to safety and security.

Table 3-10. Safety and Security asset counts.

Community Lifeline	Asset Type	Count
Safety and Security	City Hall	1
	Courthouses	10
	Fire and Emergency Medical Service EMS Stations	33
	Fire EMS Boston Supplement	24
	Local EOC	1
	Local Law Enforcement	40



Figure 3-14. Roxbury Police Department. City of Boston.



Figure 3-15. Brighton Police Department. City of Boston.

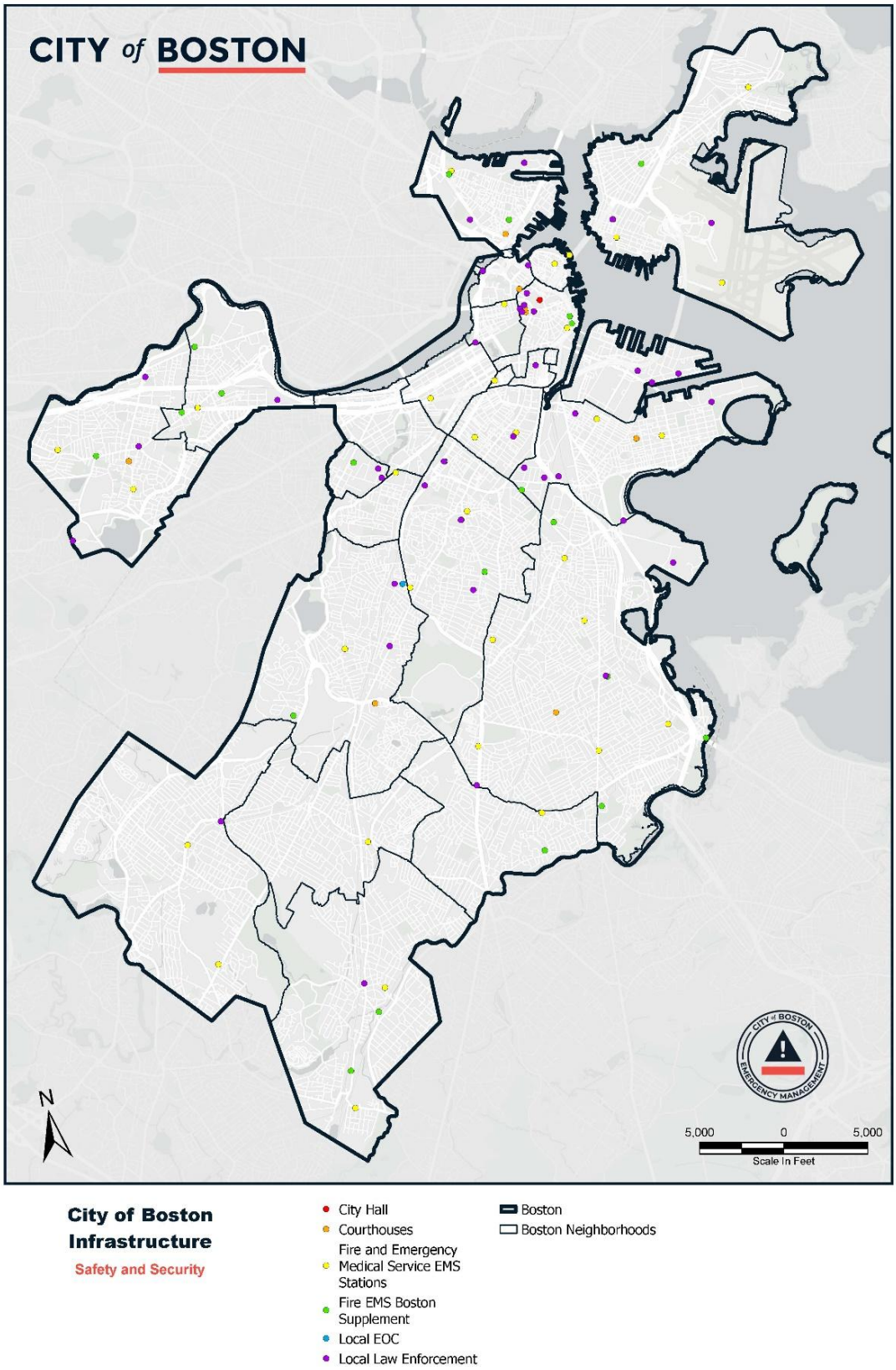


Figure 3-16. Safety and Security assets.

3.4.2. Food, Hydration, Shelter

The Food, Hydration, and Shelter lifeline ensures that basic human needs are met in the aftermath of disruptive events. Access to safe food, potable water, and shelter is critical to preventing secondary public health crises and supporting displaced populations. Disruptions to this lifeline can quickly compound disaster impacts, particularly for vulnerable populations, making its stabilization a priority for short- and long-term recovery.

Food and Hydration

The food system is a critical component of Boston's Food, Hydration, and Shelter lifeline because access to safe, reliable, and culturally appropriate food and drinking water supports both day-to-day public health and disaster recovery. In the event of a natural disaster, residents and populations within a city can access food and hydration through a variety of sources strategically distributed across urban areas.

Boston's food system includes both formal and community-based assets. Grocery stores, convenience stores, corner stores, food pantries, soup kitchens, Fair Foods sites, SNAP retailers, farmers markets, community gardens, and urban farms all contribute to food access before, during, and after hazard events.

Supported by GrowBoston, the Mayor's Office of Food Justice, and local partners, community gardens and urban farms strengthen local food networks and community preparedness by expanding neighborhood access to fresh produce, particularly in areas where residents face barriers to affordable, nearby, and reliable food sources.

The Boston Food Forest Coalition (BFFC) is a community group that tends to several community gardens. The BFFC focuses on locating these gardens[49] primarily in neighborhoods more commonly known as food deserts, where access to grocery stores within a reasonable distance is limited. The presence of these gardens or "food forests" as they refer to them, provide fresh produce and educational opportunities in healthy foods to the neighboring communities.

[49] Boston Food Forest Coalition. (n.d.). *Locations*. https://www.bostonfoodforest.org/locations

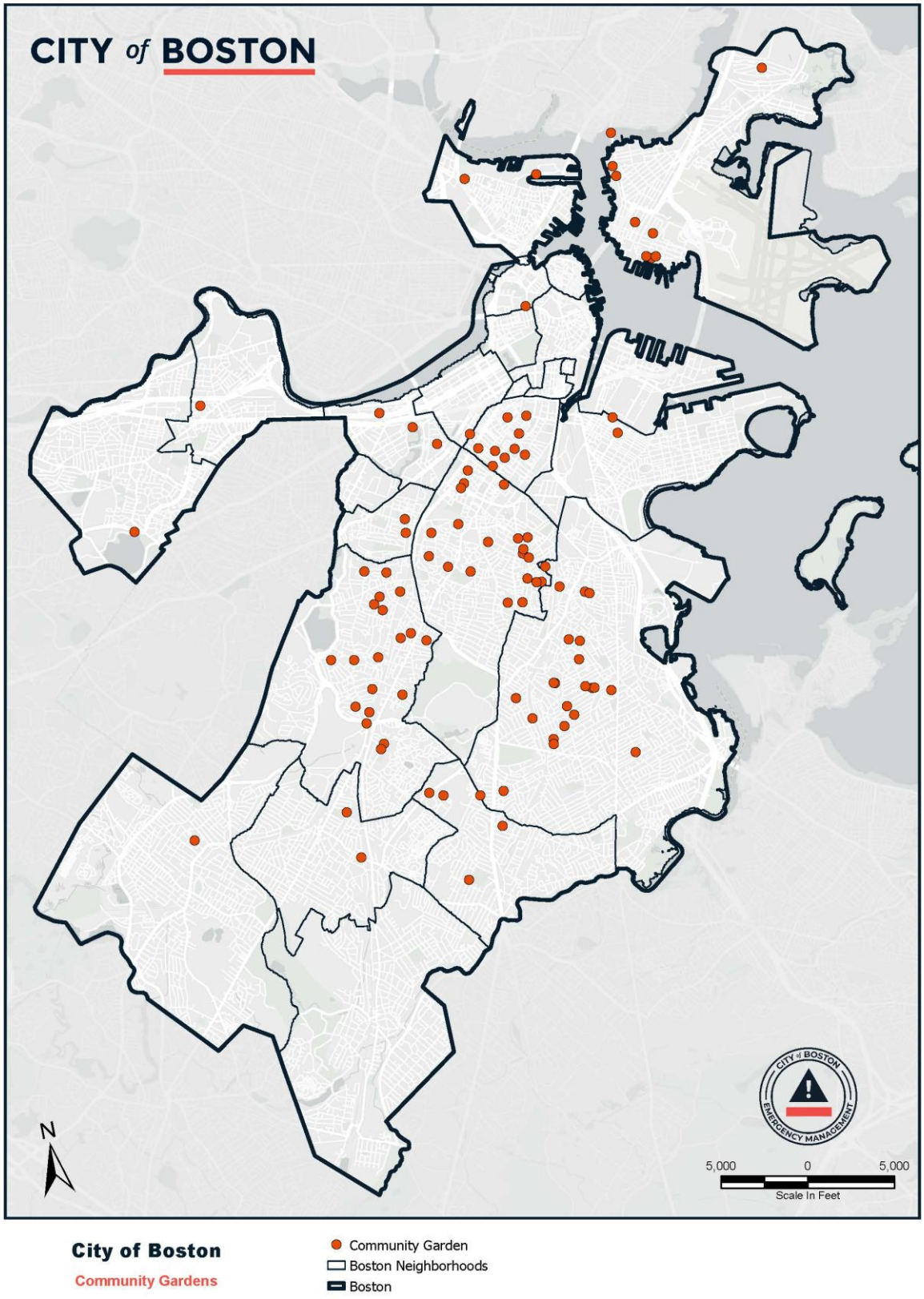


Figure 3-17. Community gardens throughout Boston.

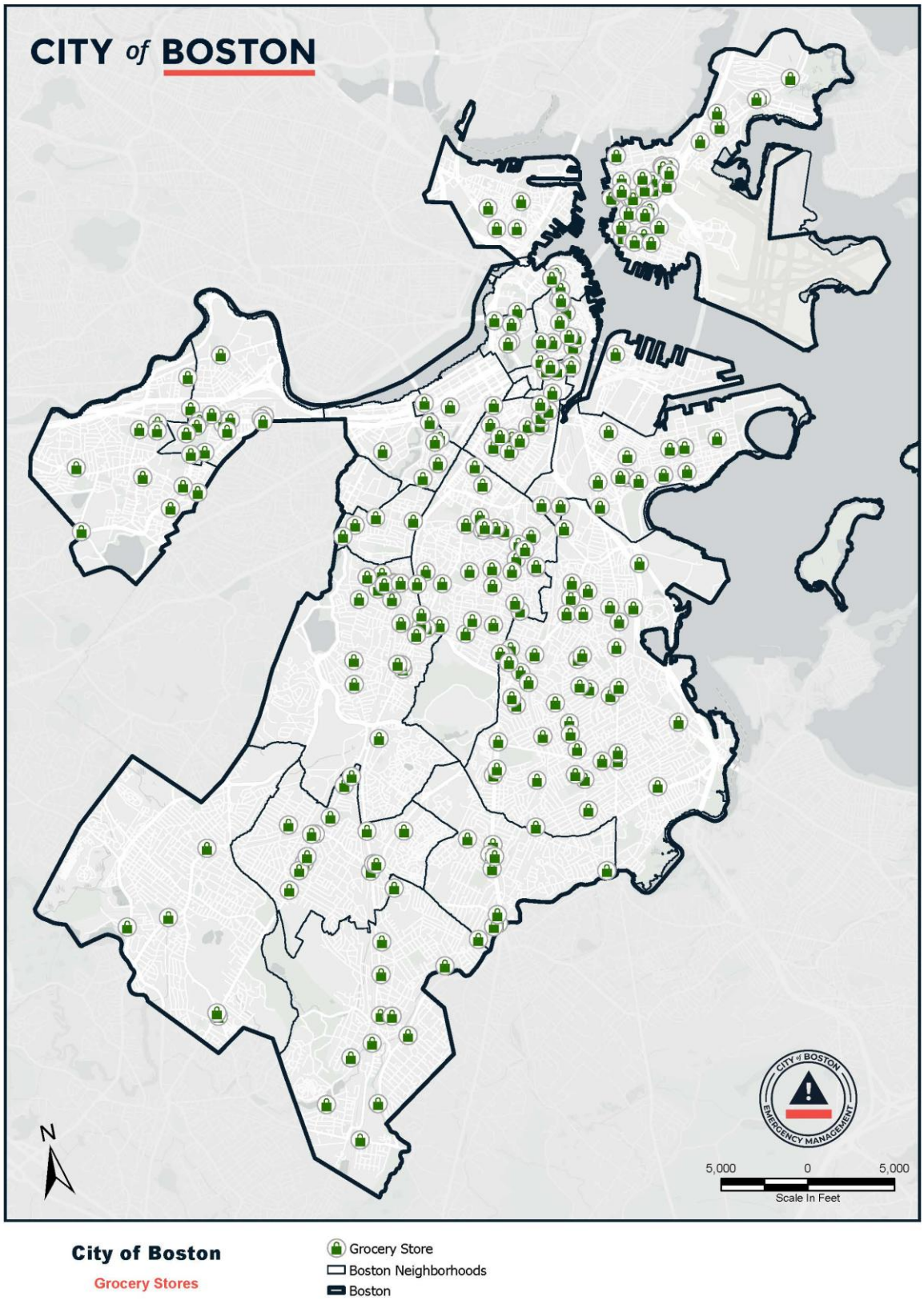


Figure 3-18. Grocery stores throughout Boston.

Food and beverage outlets, including grocery stores, convenience stores, and corner stores, are distributed throughout neighborhoods and play a crucial role in providing access to necessary supplies. According to the 2025 Retail Sector Industry profiles[50], of the 2,050 retail stores 625 were food and beverage stores. The most common and largest suppliers being Star Market, Roche Brothers, Stop and Shop, and Whole Foods.

Awareness of Supplemental Nutrition Assistance Program (SNAP) retailer locations is also critical during emergencies, as these sites provide priority populations with access to food and essential supplies when other channels may be inaccessible. The SNAP retailer locator[51] identifies over 1,000 retailers within a 10-mile radius of Downtown Boston that accept SNAP benefits, ensuring individuals and families reliant on assistance can meet their nutritional needs in times of crisis.

Hydration stations situated in public parks and community gathering areas further contribute to health and safety by providing accessible drinking water during natural hazard events. The Parks and Recreation Department maintains a comprehensive listing of all parks, including the number equipped with wheelchair-accessible drinking fountains.

Additionally, local emergency shelters collaborate with these institutions to guarantee ongoing access to safe nutrition and hydration for vulnerable and displaced individuals throughout and following disaster events.

The following table displays the count of various food resources within the City of Boston.

Table 3-11: Community Lifeline Asset Counts

Community Lifeline	Asset Type	Count
Food	Community Gardens	111
	Urban Farms	22
	Convenience stores	237
	Grocery Stores	276
	Food Resources*	170

*Food Pantry, Soup Kitchen, Fair Foods Site

[50] City of Boston Planning Department Research Division. (2025). *Industry profiles 2025: Retail sector.* https://www.bostonplans.org/getattachment/d9d29215-8081-44e8-85ac-d330906e0f73

[51] U.S. Department of Agriculture, Food and Nutrition Service. (n.d.). *SNAP retailer locator* [Interactive map]. ArcGIS. https://usda-fns.maps.arcgis.com/apps/webappviewer/index.html?id=15e1c457b56c4a729861d015cd626a23

Shelters

Shelters are a critical component of community lifelines before, during, and following a natural hazard event. These facilities provide immediate, safe refuge for individuals and families displaced by disasters, ensuring protection from environmental hazards and access to basic needs such as food, water, and sanitation. By partnering with local organizations, emergency management agencies, and public facilities, shelters help stabilize affected populations, prevent further health crises, and create a foundation for both short-term relief and long-term recovery. Their effective operation supports community resilience, especially for vulnerable groups during and after disruptive events.

Should residents within the City of Boston need to evacuate their homes in the event of an emergency, there are 51 neighborhood emergency shelters across the city, shown in Figure 3-19. These shelters are often schools or community centers that are equipped in handling a large influx of people in the event of a disaster. These same schools and community centers are also utilized as cooling and warming centers during weather emergencies and play a critical role throughout the year in providing safe spaces for community members.

Boston Center for Youths and Families operates 36 community centers across the city, most of which are doubling as shelters in the event of a natural hazard event. Outside of emergency events, these facilities are vital as community gathering spaces with programming and initiatives that target building several forms of community resilience.

Beyond the emergency shelters activated during disasters, Boston maintains a network of dedicated overnight emergency shelters[52] specifically serving individuals experiencing homelessness. These facilities play an essential role in safeguarding one of the city's most vulnerable populations, providing a secure and supportive environment each night. The importance of these shelters is heightened during all types of weather and natural hazard events, as people without stable housing are especially at risk from extreme temperatures, storms, or other disruptions. By offering consistent access to safe shelter, necessities, and essential support services, these shelters serve as a daily lifeline, protecting health and well-being, mitigating the effects of exposure, and fostering pathways to long-term stability for those facing housing insecurity. Their ongoing operation is crucial not only in times of crisis but year-round, ensuring that the needs of the unhoused community are met regardless of the season or circumstance.

[52] City of Boston Mayor's Office of Housing. (2026, April 15). *Services for those experiencing homelessness.* Boston.gov. https://www.boston.gov/departments/housing/services-those-experiencing-homeless

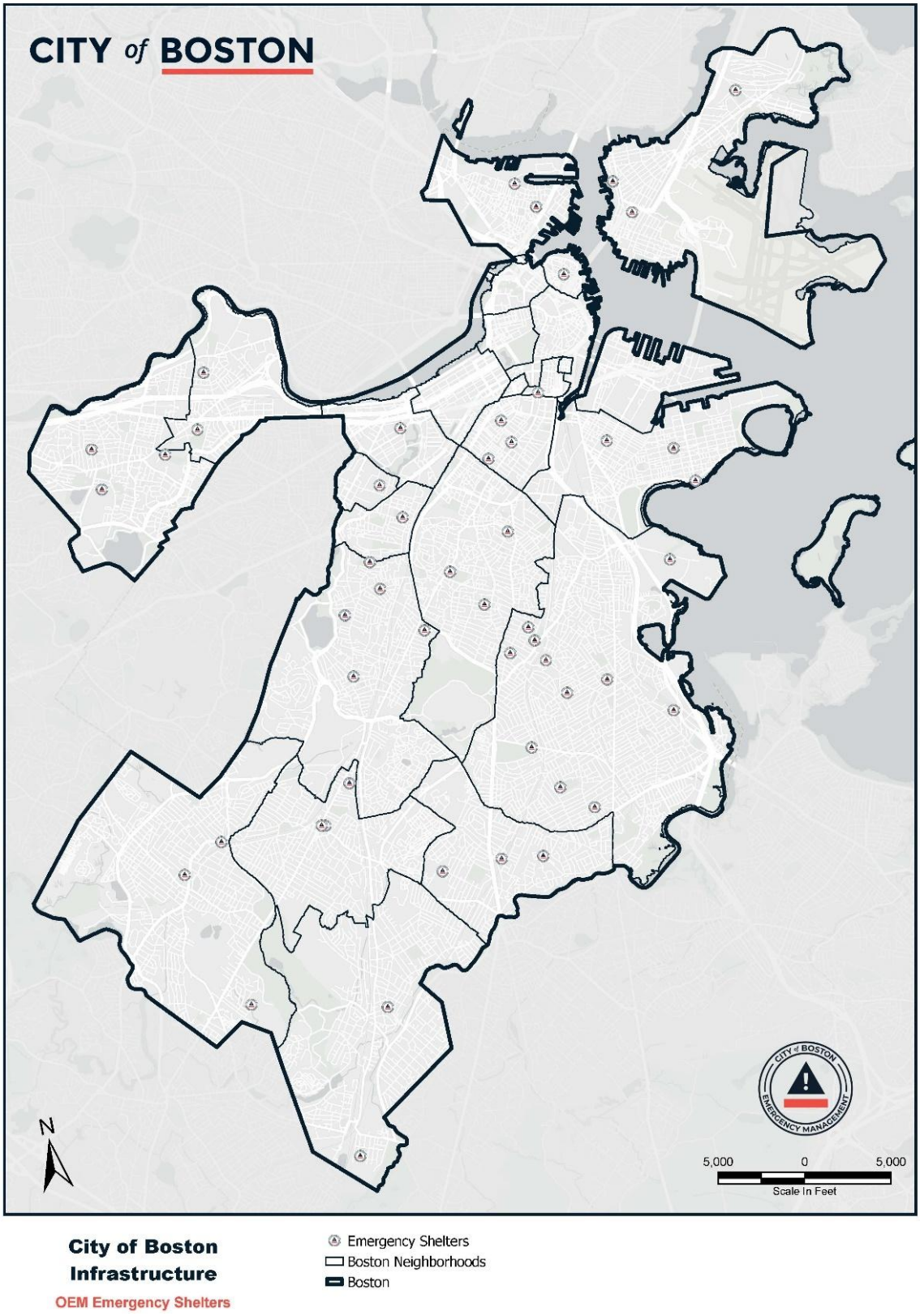


Figure 3-19. Designated emergency shelters in Boston.

The following Table 3-12 displays the counts of shelters throughout the City of Boston.

Table 3-12. Shelter asset counts

Community Lifeline	Asset Type	Count
Shelter	OEM Neighborhood Emergency Shelters*	51
	Community Centers	36
	Overnight Emergency Shelters	9

* Due to the nature of shared spaces during emergency, some of those within this count are also counted in their primary use category, community centers or schools.

3.4.3. Health and Medical

The Health and Medical lifeline supports the preservation of life and the prevention of disease through medical care, public health services, patient movement, medical supply chains, and fatality management. During disasters, health systems often face surges in demand while operating under constrained conditions. People with pre-existing conditions, the elderly, young children, and pregnant and nursing parents are particularly vulnerable to disruptions in medical services. Maintaining functional health and medical services is vital for reducing mortality, managing injuries, and supporting community-wide recovery.



Figure 3-20. Massachusetts General Hospital. Credit: K. Zirkel. 2024.

Boston stands out as one of the nation's premier cities for healthcare, boasting a concentration of more than 20 world-renowned hospitals, specialized medical centers,

outpatient facilities, and more (see Table 3-13 and Figure 3-21). Facilities such as Massachusetts General Hospital, Brigham and Women's Hospital, Beth Israel Deaconess Medical Center, and Boston Children's Hospital are just a few examples of the city's extensive healthcare infrastructure. This network not only serves Boston residents but also draws patients from across the region and beyond, making Boston a critical hub for specialized and advanced medical care.

During a natural disaster, the importance of these healthcare centers extends far beyond city limits. Hospitals and medical centers in Boston often accommodate individuals from neighboring communities and states who require urgent care, especially when local resources are overwhelmed or inaccessible. As such, emergency preparedness planning must account for the diverse populations these institutions serve, so that both city residents and those seeking care from outside Boston have continued access to life-saving medical services during times of crisis. This regional role highlights the city's responsibility to maintain resilient healthcare facilities and coordinated response strategies that can support a broad spectrum of needs in disaster scenarios.

Table 3-13. Health and medical asset counts.

Community Lifeline	Asset Type	Count
Health and Medical	Assisted Living	11
	Behavioral Health Center	2
	Community Health Center	35
	Health Center	11
	Hospital	23
	Nursing Home	27

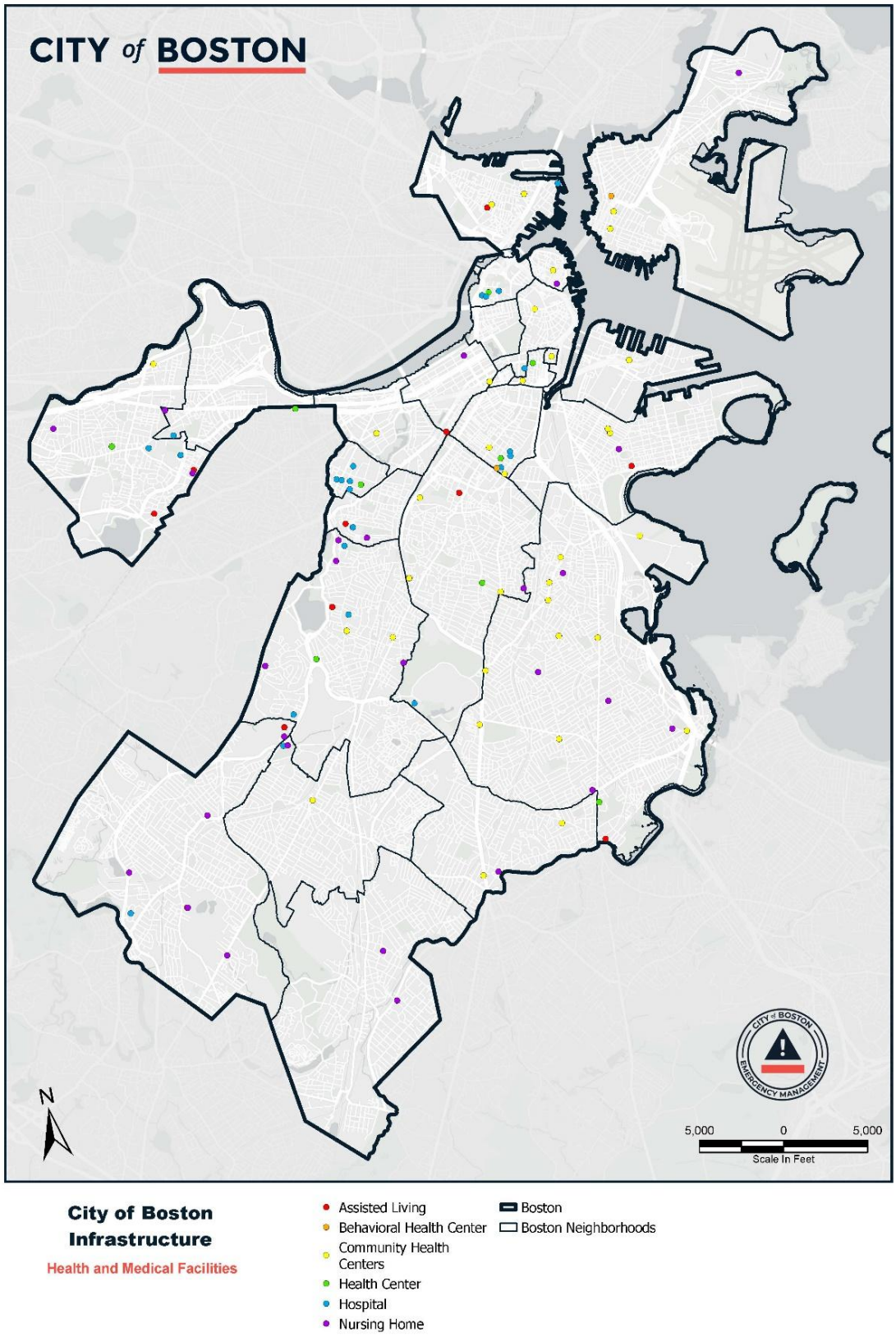


Figure 3-21. Boston Health and Medical Assets.

3.4.4. Water Systems

The Water Systems lifeline encompasses potable water infrastructure, stormwater, and wastewater management systems that are essential for public health, sanitation, and fire protection. Disruptions to water services can have immediate and widespread consequences, including disease transmission, environmental contamination, and limitations on emergency response. Rapid restoration and protection of water systems are therefore central to community resilience.

The Boston Water and Sewer Commission (BWSC) and the Massachusetts Water Resources Authority (MWRA) operate and maintain the City of Boston's drinking water distribution and stormwater and wastewater collection systems. Drinking water is sourced from 90 miles west of the city, from the Wachusett and Quabbin Reservoirs.

BWSC serves roughly 20,500 acres which is about 70% of the city's land area. Boston's water infrastructure[53] stretches across the city with about 1,000 miles of pipe, ranging in size from 4 inches to 48 inches in diameter, and includes thousands of hydrants and valves to support firefighting and system control. The sewer network[54] is comprised of approximately 1,500+ miles of pipe, including sanitary sewers, storm drains, catch basins, and combined sewers that collect wastewater and stormwater runoff for conveyance to the MWRA's treatment facilities on Deer Island. Boston's stormwater system[55] covers about 80% of the city with separate storm drains; the rest is served by combined sewers or separate sanitary sewers.

Additionally, according to BWSC's infrastructure data, the Commission also operates Combined Sewer Overflows (CSOs)[56], regulators, tide gates, and siphons. There are about 200 tide gates installed at outfalls and other critical points along Boston's coastline and waterfront to protect the sewer and storm drain systems from backflow due to high tides and storm surge.

The following Table 3-14 presents approximate counts for all assets related to the water systems throughout the city. Due to the volume of the water system data and public safety of the assets, the critical infrastructure noted below was assessed, but not able to be shown spatially.

[53] Boston Water and Sewer Commission. (n.d.). *Water system.* https://www.bwsc.org/environment-education/water-sewer-and-stormwater/water-system
[54] Boston Water and Sewer Commission. (n.d.). *Sewer system.* https://www.bwsc.org/environment-education/water-sewer-and-stormwater/sewer-system
[55] Boston Water and Sewer Commission. (n.d.). *Stormwater system.* https://www.bwsc.org/environment-education/water-sewer-and-stormwater/stormwater-system
[56] Boston Water and Sewer Commission. (n.d.). *Combined sewer overflows.* https://www.bwsc.org/environment-education/water-sewer-and-stormwater/cso-public-notification

Table 3-14. Water Systems asset counts

Community Lifeline	Asset Type	Count
Water System - Sewer	Wastewater Collection System	1,541 linear miles
	Sanitary Sewer	719 miles
	Storm Drain	673 miles
	Combined Sewer	136 miles
	Sewer Pump Stations	9
	Outfalls	281
	Regulators	143
	Manholes	50,717
	Tide Gates	199
Water System - Water	Water Distribution System	1,010 miles
	Hydrants	12,861
	Valves	17,929
Water System - Stormwater	Stormwater Drainpipe	673 miles
	Stormwater Outfalls	281
	Catch Basins	30,570
Water System – Combined Sewer System	Combined Sewers	12 miles
	CSO Outfalls	27
	CSO Regulators	143

Note: All counts taken from the Boston Water and Sewer Commission, as of March 2026.

3.4.5. Energy

The Energy lifeline provides the power and fuel necessary to sustain nearly all other lifelines and critical facilities. Electricity and fuel systems support healthcare operations, communications, water treatment, transportation, and emergency services. Energy disruptions can cascade across sectors, amplifying disaster impacts and slowing recovery, making energy system resilience a foundational concern.

As summarized in Table 3-15, the city contains one petroleum product terminal, Chelsea Terminal in the Boston Harbor, multiple oil/energy-related facilities, seven power plants, and an extensive network of electric transmission lines spanning approximately 149 miles around the city. These assets are regionally significant and often serve populations beyond municipal boundaries, further elevating their importance during hazard events.

Table 3-15. Energy asset counts.

Community Lifeline	Asset Type	Count
Energy	Petroleum Product Terminals	1
	Power Plants	7
	Transmission lines	~149 miles

3.4.6. Communications

The Communications lifeline enables information sharing, coordination, and situational awareness during emergencies. This includes communications infrastructure, responder communications, public alerts and warnings, 911 and dispatch services, and supporting financial systems. Reliable communications are essential for effective emergency response, public safety messaging, and maintaining trust between authorities and the community.

Internally, the city communicates through Slack channels, their own radio frequencies, and workforce alert systems for city employees. Additional communication techniques during and after a natural hazard event include the use of mobile tower or communications assets, such as Cell on Wheels (COWs), Land Mobile Radio Networks (LMRN), and Cell on Light Trucks (COLT), for continued communication abilities for responders.

Externally, the city operates both an emergency 911 line and a non-emergency 311 line, available 24 hours a day to all residents. The 311 line is accessible via phone, a mobile app, and an online service request form, ensuring that community members have multiple ways to connect with city officials and advocate for improvements in their neighborhoods. After

a storm, such as a significant snowstorm, making 311 requests to report unshoveled sidewalks or unplowed streets is especially important for advancing equity. These reports help address barriers that disproportionately affect people with disabilities, seniors, and others who may face challenges in mobility, ensuring that everyone can safely access public spaces and services.

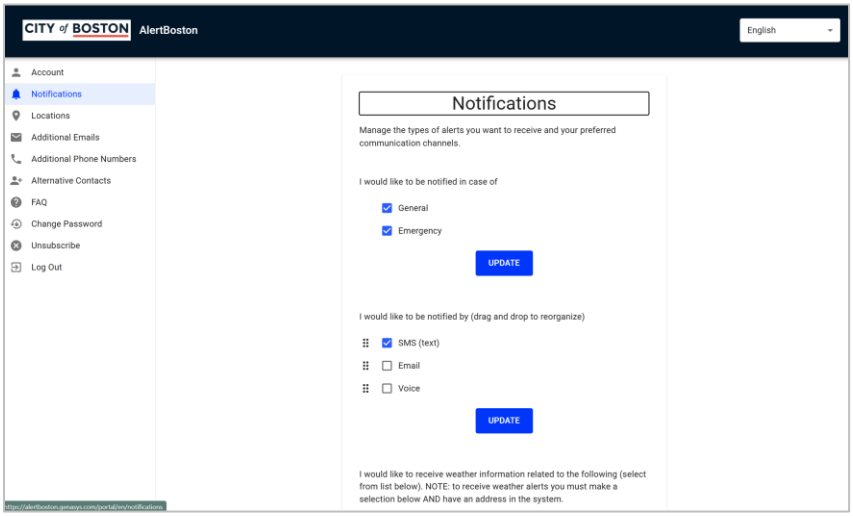


Figure 3-22. Alert Boston resident notification portal.

The AlertBoston[57] notification system is an emergency city-wide notification system used to provide critical updates and emergency notifications to residents. To ensure broad accessibility, AlertBoston can deliver messages in 11 different languages, helping to keep all community members informed and safe during emergencies.

In addition to these systems, the city has approved 446 small cell wireless facility locations across the city to support enhanced cellular coverage and network capacity, see Figure 3-23. These small cell installations improve communications reliability, particularly during high-demand periods or emergency events, and provide additional redundancy to the broader wireless network, supporting faster restoration of service following disruptions.

There is also a free wireless network, "Wicked Free Wi-fi"[58], available for use throughout the city, with over 299 locations. The free Wi-Fi is designed as an outdoor service, specifically to work outside homes and businesses, offering residents free internet access. The service has an estimated 130 access points and is helping to advance the city's equity goals and reduce barriers to access. This service may be impacted during weather events but may be a helpful tool before a storm event is set to occur.

[57] City of Boston. (n.d.). *City of Boston alerts and notifications.* https://www.boston.gov/departments/emergency-management/city-boston-alerts-and-notifications
[58] City of Boston. (n.d.). *Wicked Free Wi-Fi.* https://www.boston.gov/government/cabinets/innovation-and-technology/wicked-free-wi-fi

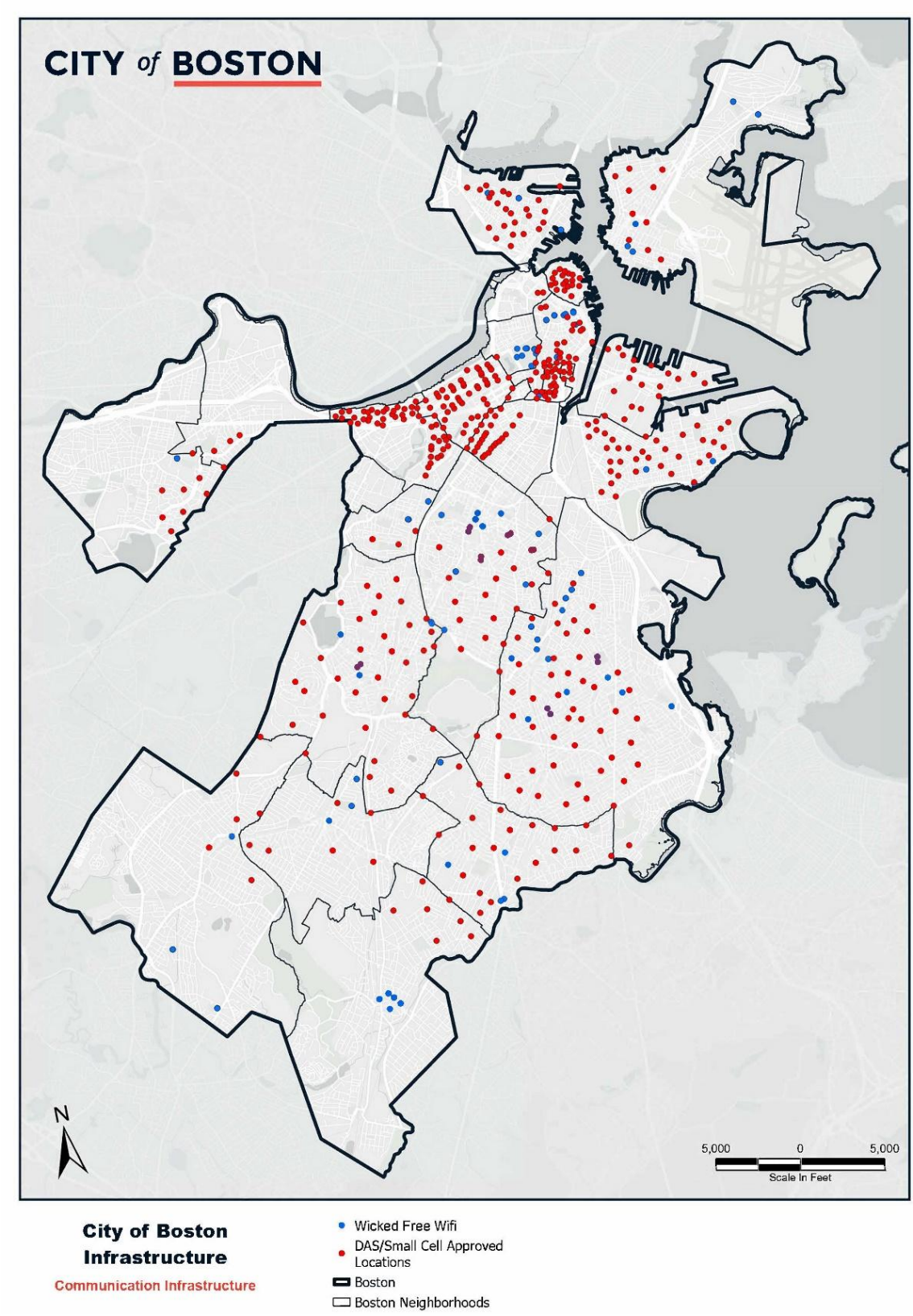


Figure 3-23. Communications infrastructure.

3.4.7. Transportation

The Transportation lifeline supports the movement of people, goods, and emergency services through roadway, mass transit, rail, aviation, and maritime systems. Functional transportation networks are critical for evacuations, supply chain continuity, emergency response, and economic recovery. Damage or disruptions can isolate communities and significantly hinder response and recovery operations.



Figure 3-24. I-90 and MBTA Commuter Rail. Credit: Weston & Sampson, 2025.

Boston's transportation network encompasses a wide range of infrastructure that is essential for ensuring the movement of people, goods, and emergency services throughout the city. The city's transportation network includes 189 miles of designated evacuation routes (Figure 3-25), which are vital for organized and efficient evacuations during emergencies. These routes are carefully planned to provide clear access for residents and first responders in the event of a natural disaster or other major incident.

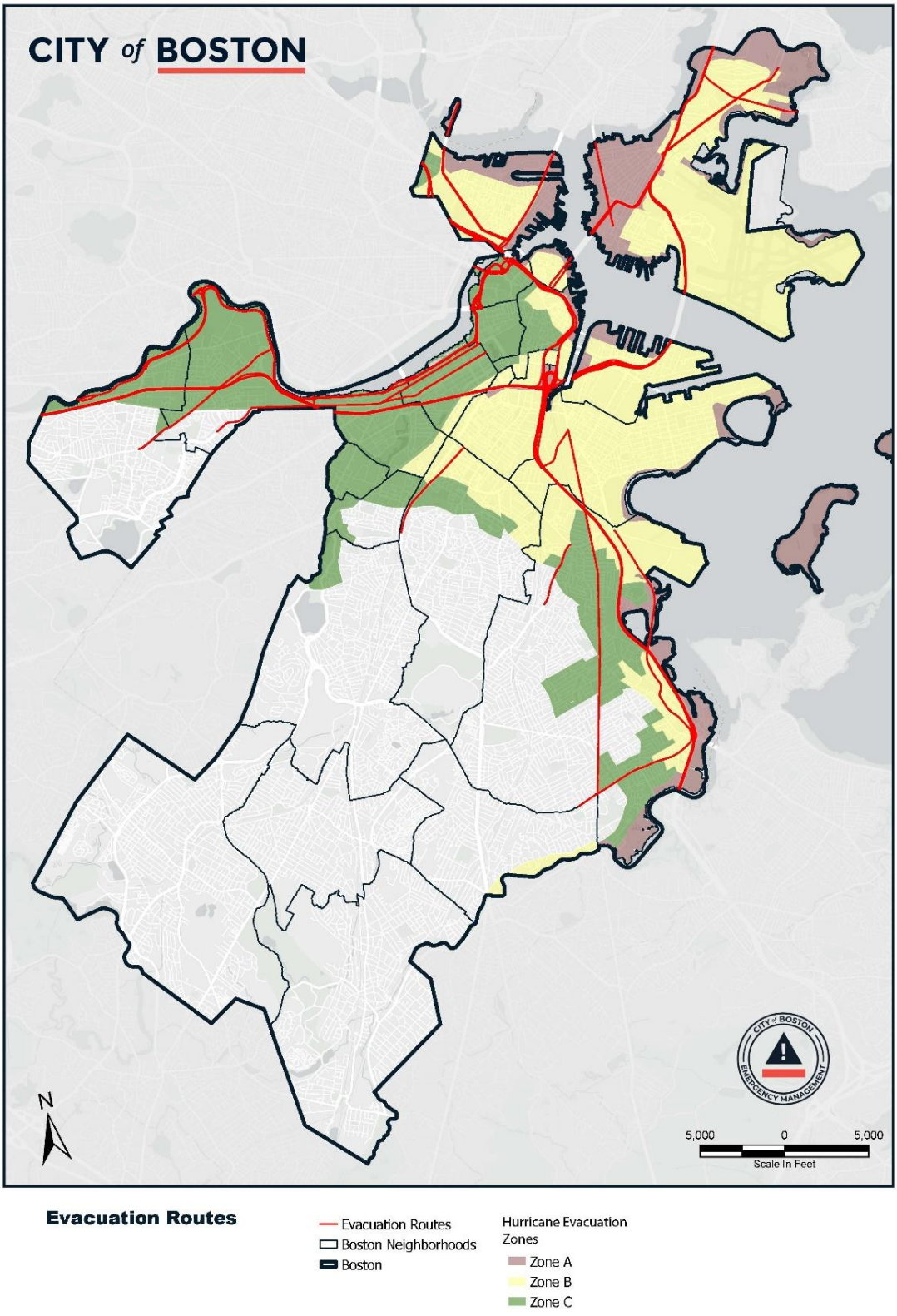


Figure 3-25. Boston Evacuation routes to higher ground from the Hurricane Evacuation Zones.



Figure 3-26. Green Line at Park Street. Credit: 4300streetcar, Photographer. 2024.

Public transit, operated by the Massachusetts Bay Transit Authority (MBTA) is another cornerstone of Boston's transportation system, with bus, subway (T), commuter rail, and ferry transportation available for residents, visitors, and commuters throughout the city and region.

- **Bus:** There are 1,981 MBTA bus stops across 150 different routes serving over 3,000 miles of Boston and the greater region.
- **T:** There are five subway/light rail lines that serve the City of Boston, with approximately 153 stops and stations in service, 112 within the City of Boston.
- **Commuter Rail:** There are 12 commuter rail lines serving the great Boston area, with approximately 143 active stops and stations, 23 of which are within city boundaries. The commuter rail operates with Boston from two main terminals, North and South Station, where commuters then need to transfer to the bus or T lines to continue movement within the city.
- **Ferry:** There are 6 ferry lines operating year-round and seasonal services within Boston. Lines run within Boston to Charlestown and East Boston, and outside Boston to the greater north and south shore regions such as Hingham, Quincy, Salem, and Winthrop.

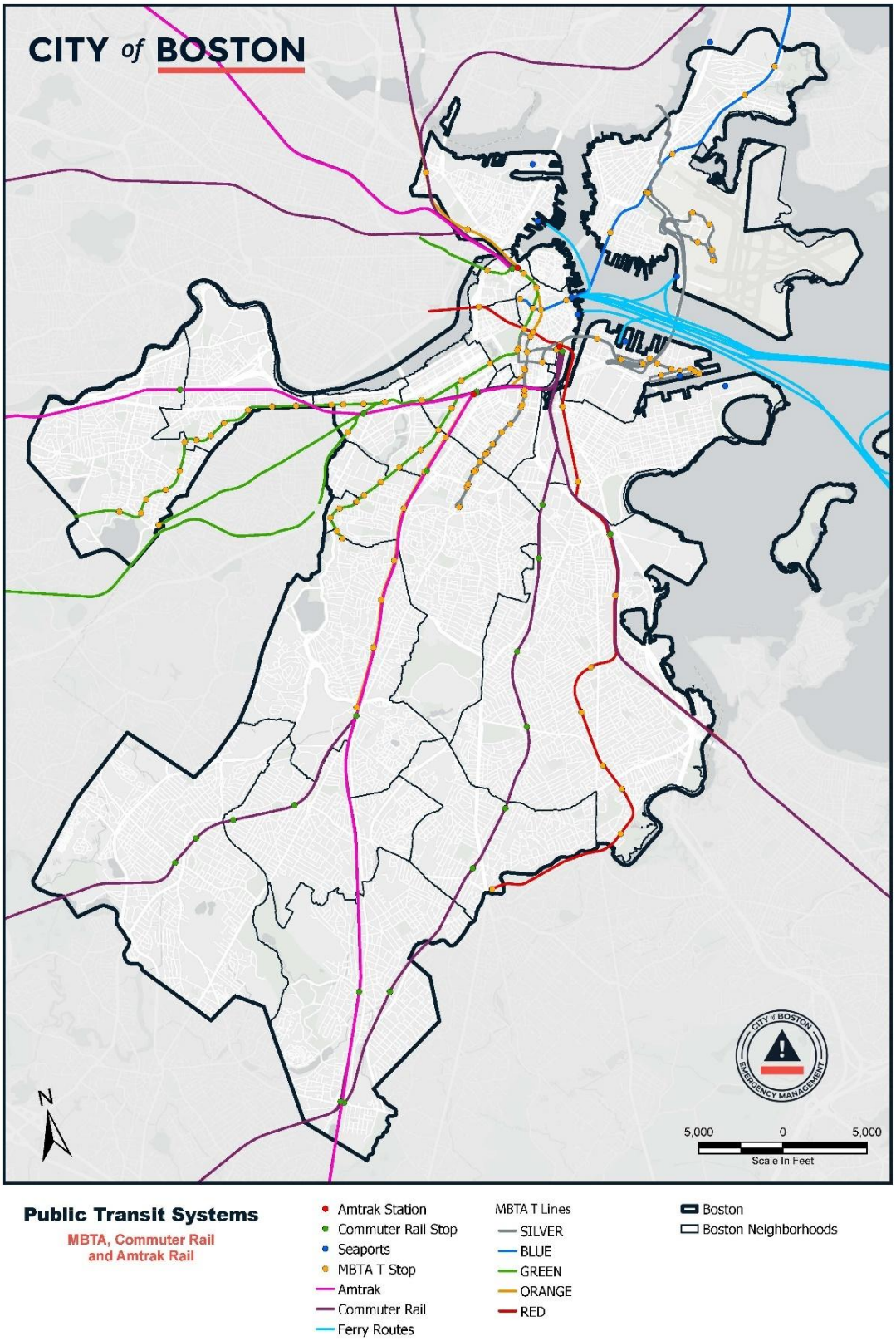


Figure 3-27. Rapid transit infrastructure in Boston.

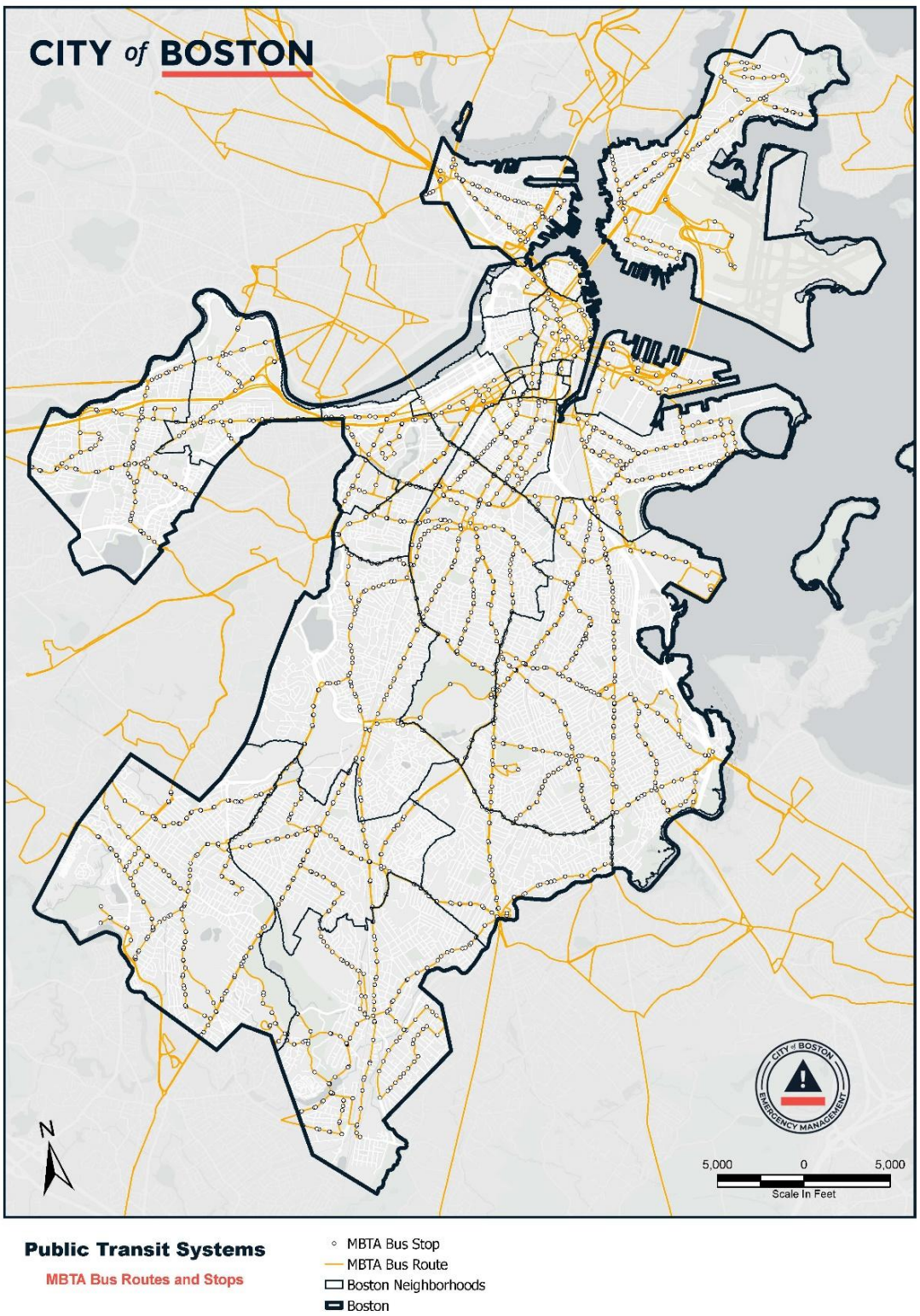


Figure 3-28. MBTA Bus routes and stops.

Additionally, the city features 175 miles of bike trails and lanes, supporting sustainable and active transportation modes for daily commuting and recreation within and reaching the greater Boston area. For those without personal bikes, the city offers about 300 Blue Bike Stations where residents and visitors can rent a bike for use around the city conveniently picking it up at one station and returning it to another.

By maintaining robust evacuation routes, an extensive bus network, and safe bike trails, Boston's transportation infrastructure plays a critical role in supporting emergency response, supply chain continuity, and the city's economic recovery efforts following disruptive events. Additional transportation assets within Boston are described in Table 3-16.

Table 3-16. Transportation asset counts, not shown in maps.

Community Lifeline	Asset Type	Count
Transportation - Car	EV Stations (Privately Owned)	487
	EV Stations (City-Owned)	32
	Tunnels	44*
Transportation - Water	Docks	189
	Seaports	10
	Boat Ramps	8
Transportation - Air	Airports	1
	Aviation Runways	8
Transportation - Rail	Amtrak Lines	5
	Amtrak Stops	3
	Rail Network Lines**	9 miles
	Railroad Bridges	45

*Includes entrances and exits, north/south and east/west bound lanes

**Owned by CSTX for freight use.

3.4.8. Hazardous Materials

The Hazardous Materials lifeline addresses facilities, materials, pollutants, and contaminants that pose risks to human health and the environment. During disasters, hazardous materials incidents can exacerbate impacts and complicate response efforts. Effective management, containment, and remediation of hazardous materials are essential for protecting public health and enabling safe recovery.

Boston contains a significant number of state-regulated oil and hazardous materials sites, including MassDEP-listed sites with Activity and Use Limitations (AULs), Tier Classified disposal sites under MGL Chapter 21E, and locations associated with historical industrial activity. These sites may contain contaminated soil, groundwater, or building materials that could be mobilized during flooding, coastal storm surge, erosion, or infrastructure damage. Inundation of these areas may spread contaminants beyond site boundaries, increasing environmental and public health risks and extending recovery timelines.

Additional hazardous materials assets include DEP Bureau of Air and Waste major facilities, solid waste diversion and disposal facilities, and underground storage tanks (USTs) associated with fuel storage and distribution.

The hazardous materials asset types and counts shown below represent state-regulated facilities and sites within Boston that store, manage, or are associated with oil, hazardous materials, solid waste, or contaminated properties, and therefore present potential for secondary impacts during hazard events.

Table 3-17. Hazardous Materials asset counts.

Community Lifeline	Asset Type	Count
Hazardous Materials	MassDEP Oil and/or Hazardous Material Sites with Activity and Use Limitations (AUL)	589
	DEP Bureau of Air and Waste Major Facilities	203
	MassDEP Solid Waste Diversion and Disposal – Landfills	7
	Tier Classified Oil and Hazardous Waste Sites (MGL 21 E)	209

3.4.9. Other Critical Facilities

In addition to FEMA-designated community lifelines, a range of other critical facilities play an important role in supporting community stability, continuity of services, and social well-being during and after disasters. Facilities such as public and private schools, universities and colleges, licensed childcare programs, places of worship, and public libraries often serve as community anchors, informal shelters, information hubs, or distribution points for aid. The facilities summarized in Table 3-18 below contribute significantly to a community's ability to respond, recover, and maintain social cohesion following disruptive events.

Table 3-18: Other Critical Facility asset counts

Critical Facility Type	Count
Community Pools	18
Correctional Facilities	4
Education	274
Licensed Child Care Programs	207
Place of Worship	187
Post Offices	33
Public Libraries	29
Ice Rinks	20

Education

The Boston metropolitan area is one of the largest higher education centers in the United States, with a dense concentration of colleges, universities, and specialized institutions, shown in Figure 3-30. Each academic year, from late August through May, tens of thousands of students move into Boston and surrounding communities, creating a significant seasonal population increase and noting the importance of educational institutions as critical facilities within the city. This influx places added demand on additional city assets such as housing, transportation systems, utilities, health care, and emergency services, and results in high residential densities in dormitories and off-campus multifamily housing conditions that can complicate evacuation, sheltering, and damage assessment during hazard events.



Figure 3-29. Ribbon cutting at the Patrick J. Kennedy Elementary School in East Boston. City of Boston, 2026.

Students represent a distinct population group for emergency planning. Many are new to the region each year and may be unfamiliar with local hazards such as nor'easters, coastal flooding, extreme temperatures, and severe storms. Language diversity and varying levels of preparedness awareness can also affect risk communication. As a result, coordination with higher education institutions, targeted outreach at the start of each academic year, and planning assumptions based on peak academic-year population levels are important components of effective hazard mitigation, response, and recovery planning in the region.

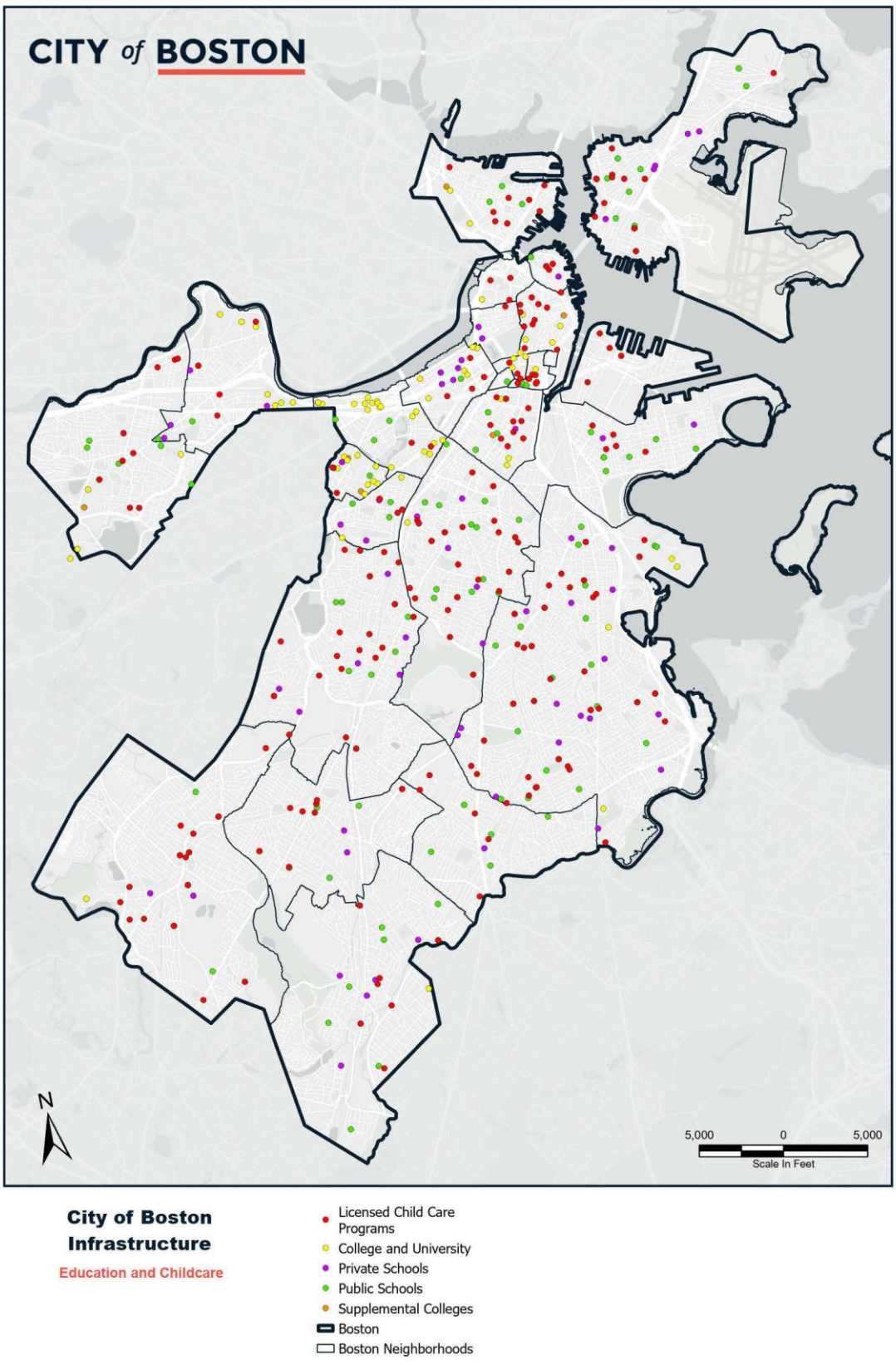


Figure 3-30. Education and childcare facilities.

Community Facilities

Additional community facilities, such as libraries, and places of worship, play a critical role in supporting community structure and social cohesion, both during routine operations and in emergency situations. These facilities often serve as trusted gathering spaces and may be used for information dissemination, unofficial warming or cooling centers for their community members, temporary shelters, food distribution, or other recovery services following a disaster. Their accessibility, familiarity, and geographic distribution make them especially important for reaching vulnerable populations. Though not always officially designated shelter locations these assets support community resilience during and after hazard events.

Ice rinks have also demonstrated adaptive emergency use as such during the COVID-19 pandemic, several jurisdictions repurposed ice rinks as temporary morgues due to their large open layouts and existing refrigeration capabilities, highlighting their potential role in emergency surge capacity planning.

3.4.10. Dams

Dams across Boston play a vital role as critical facilities, serving essential purposes such as flood risk reduction, water supply management, and recreational opportunities. Their strategic locations and structural integrity are crucial for protecting densely populated urban areas from flooding and ensuring the continued operation of key infrastructure. In the event of severe weather or other hazard events, the stability and security of these dams are paramount, as any failure could have significant consequences for public safety, economic stability, and the environment.

Given the concentration of high-value assets and large populations downstream, Boston's dams require ongoing maintenance and robust emergency planning. Regular inspections, clear communication strategies, and coordination among local, state, and federal agencies are necessary to mitigate risks and enhance community resilience. As the city continues to grow and adapt to changing climate conditions, the role of dams as critical infrastructure remains a central consideration in hazard mitigation and emergency preparedness efforts.

High Hazard Potential Dams

High Hazard Potential Dams (HHPDs) represent a distinct category of critical infrastructure due to the severe consequences associated with their potential failure. Dams classified as “high” hazard potential could result in the loss of human life if they fail. Dams with a “significant” hazard potential are unlikely to result in the loss of human life but are likely to cause economic losses and environmental damage in the case of failure.

Suffolk County contains one HHPD within its boundaries, and four significant hazard dams, according to the US Army Corps of Engineers, National Inventory of Dams. The dams within city limits are as follows:

Table 3-19. Dams within Suffolk County. Source: USACE, National Inventory of Dams.

Dam	Owner	Primary Purpose	Hazard Potential Classification
New Charles River Dam[59]	DCR	Flood Risk Reduction	Significant
Chestnut Hill Reservoir Dam[60]	DCR	Water Supply	High
Westinghouse Dam[61]	DCR	Recreation	Significant
Neponset River Dam - Lower Mills[62]	DCR	Flood Risk Reduction	Significant
Tileston & Hollingsworth Dam[63]	DCR	Flood Risk Reduction	Significant

All five of the dams within the county limits are owned and regulated by the Massachusetts Department of Conservation and Recreation and as a result, the City of Boston is not responsible for their day-to-day operations, maintenance, or structural safety. Additional dams located outside Suffolk County, such as the Amelia Earhart Dam, also pose a risk to the City of Boston.

Nevertheless, potential dam failure during a natural hazard event could have significant impacts on downstream populations, infrastructure, and municipal operations. Accordingly, the city considers the presence of these dams in its natural hazard mitigation planning to understand potential consequences, support emergency preparedness and

[59] U.S. Army Corps of Engineers. (n.d.). *National Inventory of Dams*: MA01092. https://nid.sec.usace.army.mil/nid/#/dams/system/MA01092/summary
[60] U.S. Army Corps of Engineers. (n.d.). *National Inventory of Dams*: MA01113. https://nid.sec.usace.army.mil/nid/#/dams/system/MA01113/summary
[61] U.S. Army Corps of Engineers. (n.d.). *National Inventory of Dams*: MA03339. https://nid.sec.usace.army.mil/nid/#/dams/system/MA03339/summary
[62] U.S. Army Corps of Engineers. (n.d.). *National Inventory of Dams*: MA01093. https://nid.sec.usace.army.mil/nid/#/dams/system/MA01093/summary
[63] U.S. Army Corps of Engineers. (n.d.). *National Inventory of Dams*: MA01094. https://nid.sec.usace.army.mil/nid/#/dams/system/MA01094/summary

coordination, and assess impacts to critical facilities, transportation networks, and essential services.

3.5. Natural, Cultural, and Historic Resources



3.5.1. Natural Resources



Figure 3-31. Public Garden. Source: City of Boston.

Natural resources both support Boston's hazard resilience and add to residents' quality of life. Boston's natural resources include the ocean, coastline, rivers, wetlands, harbor islands, uplands, and more. The city is located on the Massachusetts coastline along the Atlantic Ocean and within both the Charles River Watershed and the Boston Harbor Watershed, including the northern Mystic River sub-watershed and the southern Neponset River sub-watershed. Much of Boston's land is covered by roads, buildings, sidewalks, and other paved areas, which are collectively referred to as impervious surfaces. These impervious surfaces do not allow rainfall to infiltrate into the ground; instead, they generate stormwater runoff, which can carry pollutants into the nearby rivers and Harbor.

Boston's public park system is extensive and interconnected, covering about 20% of the city land area. The Boston Parks and Recreation department owns and cares for over 2,000 acres of park space[64], with more park land owned and cared for by DCR and other federal or private entities. For instance, the Emerald Necklace, designed by famed landscape architect Frederick Law Olmsted, stretches approximately seven miles from Dorchester to Back Bay. Residents and visitors alike can bike, run, walk, and play in these numerous green spaces throughout the city. Some parks even offer spaces for community gardens and urban farms, allowing residents to grow their own produce. The city park inventory includes 283 park properties, two golf courses, 72 squares, 17 fountains, 210 courts, 12 street hockey rinks, 16 historic burial grounds, and three active cemeteries.

Beyond its formal parks, Boston also maintains a broader network of protected open spaces that support ecological health, climate resilience, and neighborhood livability. Conservation areas, waterfront buffers, wetlands, and greenways help manage stormwater, reduce urban heat island impacts, and provide habitat for native species while offering residents access to nature. Corridors such as the Harborwalk and various community-managed open lots expand public access to the city's shoreline and underserved neighborhoods. Together, these open spaces complement the park system by preserving environmental resources and strengthening Boston's capacity to adapt to sea level rise and extreme weather.

[64] City of Boston. (2023). *Open Space and Recreation Plan 2023–2029: Section 1 – Executive summary.* https://www.boston.gov/sites/default/files/file/2023/09/Section%201_1.pdf

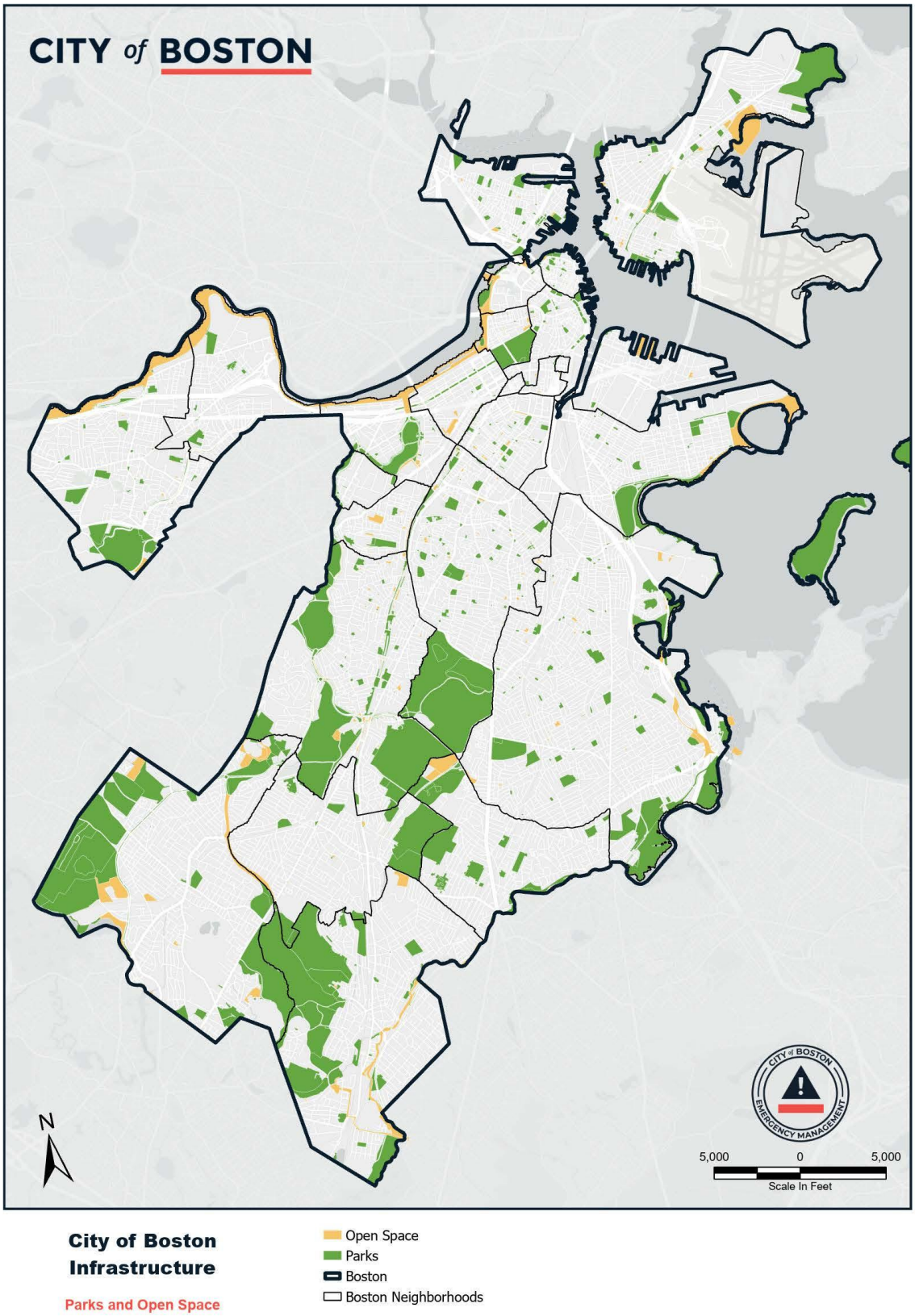


Figure 3-32. Boston parks and open space.

Boston's open spaces also provide numerous environmental and resilience benefits. Boston's park system contributes to a tree canopy that covers about 27% of the city, as reported in the 2019 Canopy Change Assessment[65], including over 38,000 public street trees. The urban forest, with thousands of trees on streets and public or private land, absorbs stormwater, improves water quality, and provides shade to reduce heat during summer. Additionally, these areas support a variety of wildlife; the city even contains protected habitats, like vernal pools, which are home to frogs, salamanders, and other sensitive species.

Because of Boston's location along the Atlantic Ocean, the city's coastline plays a critical role in protecting inland areas from coastal storms and flooding. Barrier beaches act as natural buffers, absorbing wave energy and reducing the impact of storm surges on neighborhoods and infrastructure. In addition, marine habitats and wetland resource areas along the coastline provide essential ecosystem services, such as water filtration, erosion control, and wildlife habitat, while supporting the overall resilience of the city's waterfront communities.

Table 3-20: Natural Resource Counts

Natural Resource Type	Count
Areas of Critical Environmental Concern	Fowl Meadow and Ponkapoag Bog Neponset River Estuary Rumney Marshes
Barrier Beaches	12
Burial Grounds	16 historic burial grounds 3 active cemeteries
Courts and Outdoor Recreation	210 courts 12 street hockey rinks 2 golf courses
NHESP Certified Vernal Pools	19
NHESP Estimated Habitats	~14,000 acres

[65] City of Boston. (2020). *Change assessment with MJW letter* [PDF]. https://www.boston.gov/sites/default/files/file/2020/09/Change-assessment_w_MJW-letter.pdf (2024 Assessment data to be published.)

Natural Resource Type	Count
NHESP Potential Vernal Pools	53
NHESP Priority Habitats of Rare Species	~1,250 acres
Parks and Squares	283 park properties 72 squares
Prime Forest Land	~1,900 acres
Shellfish Growing Areas	Coastline is conditionally restricted and prohibited.
Wetlands	~5,300 acres

3.5.2. Cultural Resources

Boston contains an extensive and nationally significant collection of cultural resource assets, including museums, concert halls, theaters, and major sports venues. Prominent facilities such as Fenway Park, the Institute of Contemporary Art (ICA), the Museum of Science, Symphony Hall, and numerous neighborhood-based cultural institutions serve as major gathering places for residents and visitors alike. These venues support arts, education, tourism, and economic activity, while also contributing to community identity and social cohesion across the city's diverse neighborhoods.



Figure 3-33. Fenway Park. Source: F. Briones on Pexels.

Cultural resources in Boston extend beyond individual buildings to include historic districts, landscapes, and interpretive walking trails that document the city's layered social, political, and cultural history. Trails such as the Freedom Trail, Irish Heritage Trail, Black Heritage Trail, and Boston Women's Heritage Trail highlight the contributions of historically significant communities and individuals, providing accessible, place-based opportunities for education and engagement. These resources are critical not only for preserving Boston's heritage, but also for fostering inclusivity, civic pride, and intergenerational learning.

From a hazard mitigation perspective, cultural resource assets are often highly vulnerable due to their age, location in flood-prone or coastal areas, and the irreplaceable nature of historic materials and collections. Damage or loss of these assets can have long-term impacts that extend beyond physical repair, affecting tourism, economic vitality, and community identity. Protecting cultural resources through mitigation planning, climate adaptation strategies, and coordinated emergency response efforts is therefore essential to maintaining Boston's social fabric and ensuring that historical and cultural assets remain accessible for future generations.

Table 3-21. Cultural Resource asset counts

Cultural Resource Type	Count
Museums	46
Concert Halls	16
Stadiums	6
Trails	5



Figure 3-34. The Conservatory Lab Charter School performing at the Strand Theatre. Source: City of Boston.



Figure 3-35. Museum of Fine Arts. Source: W. Kunz on Flickr.

3.5.3. Historic Resources

The City of Boston is well known for its historical significance. The city contains thousands of sites, buildings, structures, landscapes, and districts that reflect the people, events, and eras that have shaped Boston's development from the colonial period through the present day. These resources not only help preserve Boston's rich history and unique character, but they also attract curious visitors to the city.

Boston's historic assets include iconic landmarks such as the Old North Church, Granary Burying Ground, Faneuil Hall Marketplace, and the Bunker Hill Monument, as well as numerous neighborhood-scale historic buildings, streetscapes, and cultural landscapes. Many of these resources are associated with significant architectural styles, social movements, and historically significant communities, including immigrant populations, abolitionists, women's rights advocates, and civil rights leaders. Collectively, these assets provide tangible connections to the city's past and serve as important educational and interpretive resources for residents and visitors.



Figure 3-36. Old State House. Source: National Park Service.



Figure 3-37. Bunker Hill Monument. Source: National Park Service.

The city currently contains ten designated historic districts[66] that protect areas of architectural and historical significance. The earliest of these, the Historic Beacon Hill District, was established in 1955, while the most recent, the Highland Park Architectural Conservation District, was designated in 2022. In addition to locally designated districts,

[66] City of Boston. (2025, October 30). *Map of Boston historic landmarks and districts.* https://www.boston.gov/departments/landmarks-commission/map-boston-historic-landmarks-and-districts

Boston includes a substantial number of properties listed on the National Register of Historic Places and the State Register of Historic Places, reflecting the city's extensive inventory of historically significant resources at the local, state, and federal levels.



Figure 3-38. Historic Beacon Hill. Source: City of Boston.

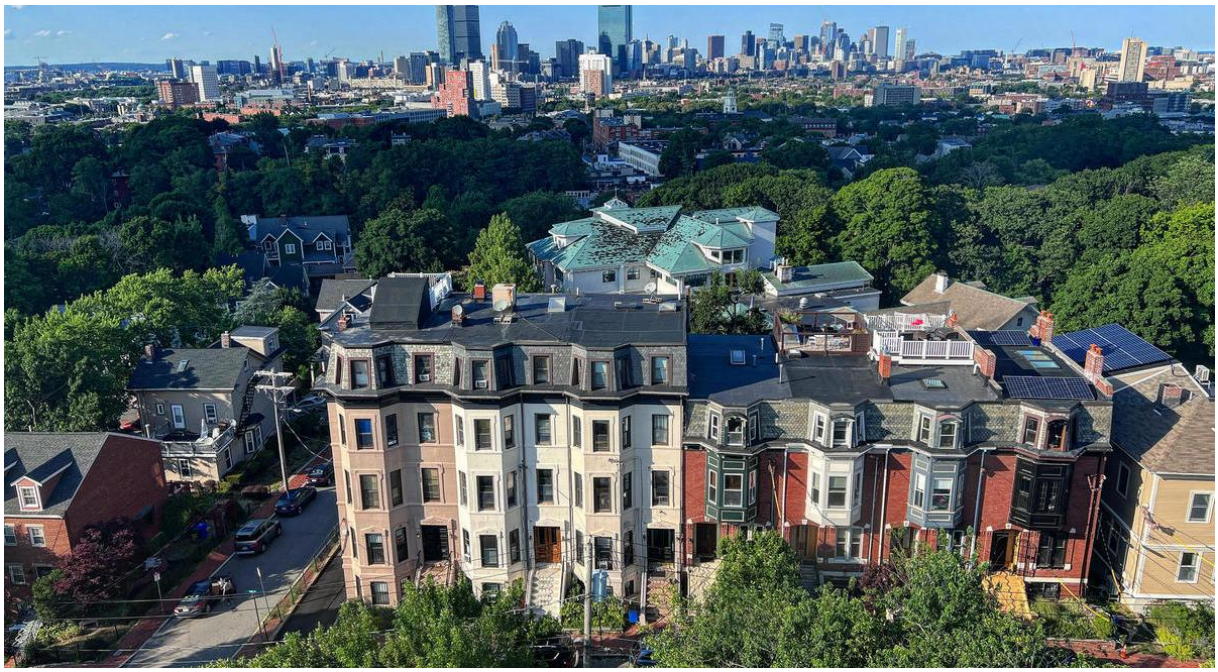


Figure 3-39. Highland Park Architectural Conservation District. Source: City of Boston.

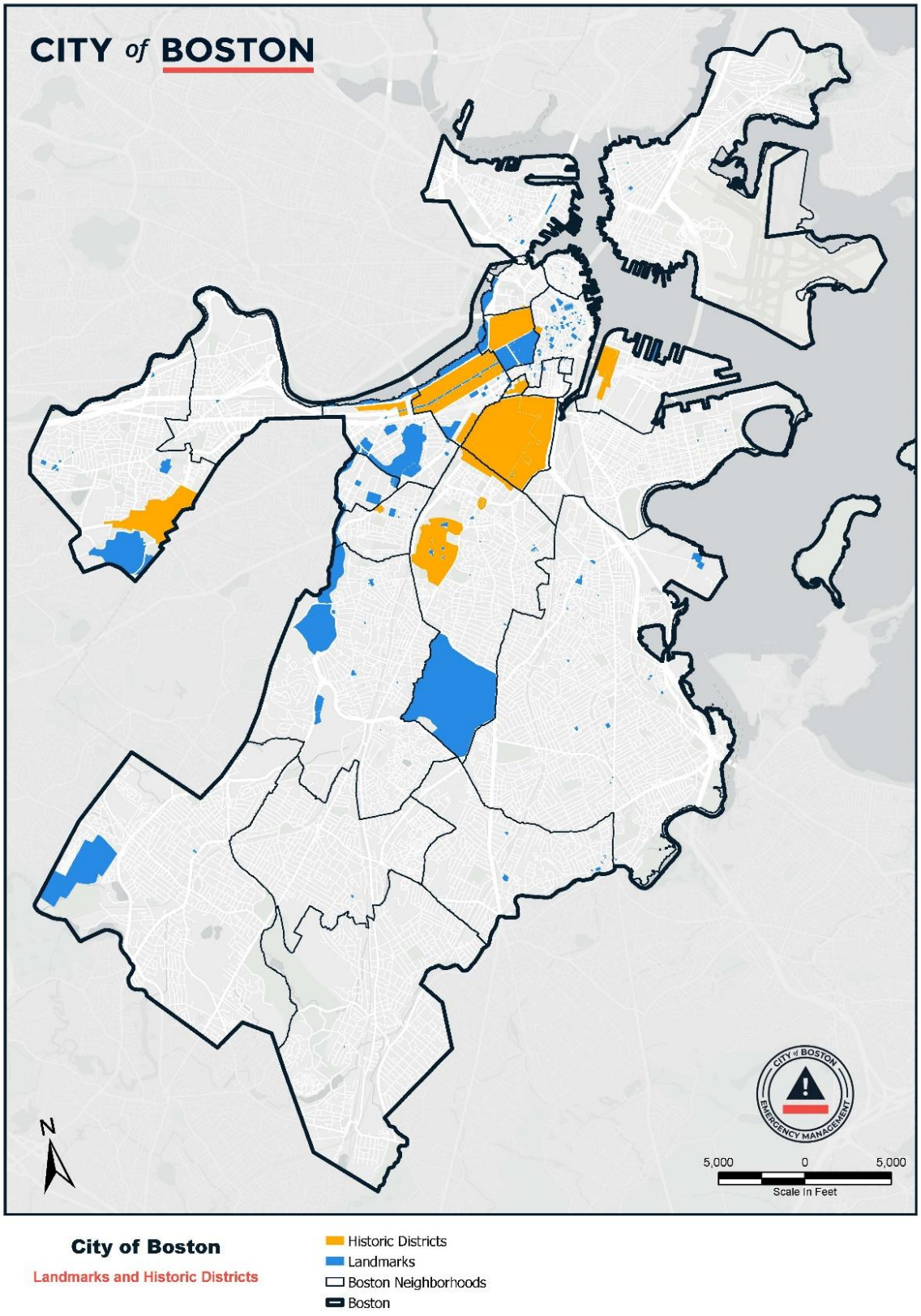


Figure 3-40. Boston Historic Districts and Landmarks.

Boston also actively supports historic preservation through the Community Preservation Act (CPA), with almost 200 projects across the city. The CPA provides funding for the rehabilitation, restoration, and protection of historic resources, focusing on keeping sites in active use, contributing to present neighborhood vitality, and are preserved for future generations. These investments often prioritize community-based preservation efforts and help protect resources that may otherwise be vulnerable to neglect or redevelopment pressures.

From a hazard mitigation perspective, many historic resources face elevated risk due to their age, construction materials, and locations. Damage to historic resources can result in long-term social, cultural, and economic impacts that extend beyond physical loss. The destruction or degradation of historic sites may disrupt neighborhood identity, reduce tourism, and diminish opportunities for education and cultural engagement. As such, protecting historic resources is an important component of community resilience.

To support this effort, the city has developed the *Resilient Historic Buildings Design Guide*[67], which provides preservation-sensitive strategies to reduce risks from flooding, sea level rise, storm surge, and extreme precipitation. A recent example of this approach can be seen at 15 Necco Street, located within the historic Fort Point waterfront district of Boston. Built within the context of the former Boston Wharf Company holdings, the property integrates flood-resilient retrofits such as deployable flood barriers, elevated ground-floor systems, and watertight utility protections. These measures demonstrate how historically significant waterfront properties can be adapted to meet contemporary climate risks while maintaining their architectural and cultural integrity.

By aligning hazard mitigation practices such as elevating critical systems, improving drainage, and incorporating flood-resistant materials with historic preservation standards, the guide ensures that resilience measures strengthen Boston's historic assets while maintaining their architectural integrity and cultural significance.

Table 3-22. Historic Resource asset counts

Historical Resource Type	Count
Community Preservation Act (CPA) Projects	195 projects
Massachusetts Historic Commission	797 areas and 17,536 sites[68]

[67] City of Boston Environment Department. (2018). *Resilient, historic buildings design guide* [PDF]. https://www.boston.gov/sites/default/files/imce-uploads/2018-10/resilient_historic_design_guide_updated.pdf

[68] Esri. (2020). *MassHistoric Commission Inventory* [Interactive web map]. ArcGIS Online. https://www.arcgis.com/apps/mapviewer/index.html?layers=e27a15d822ef4b10bb4dd6eb631ceb3c

Historical Resource Type	Count
National Register of Historic Places	9,339 total places
State Register of Historic Places	794 areas & 17,424 sites

3.6. Economy

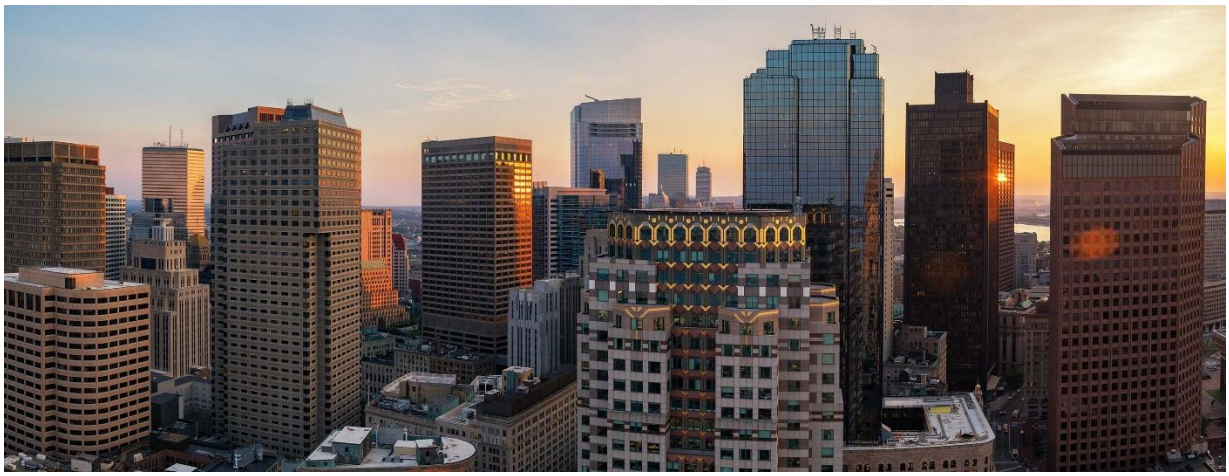


Figure 3-41. Downtown Boston. Source: City of Boston.

Boston is an economic hub for both the state of Massachusetts and the broader New England region. Its economy is driven by healthcare, higher education, professional and financial services, and technology sectors. It is also home to state government and federal facilities, and a working waterfront.

Boston experienced rapid population growth between 2010 and 2020, growing at nearly double the rate during the previous decade. Likewise, job opportunities in the city have expanded, especially in health care and social assistance, professional and technical services, and education[69]. Growth can both increase revenues, jobs, and business opportunities, and create demand that drives up costs of housing, living expenses, and business rents.

The regional economy depends heavily on the Greater Boston area. While 229,600 people commute into the city for work, less than 100,000 city residents commute to jobs outside

[69] City of Boston. (2021). *Boston's People and Economy.* https://www.boston.gov/sites/default/files/file/2021/10/6%20-Volume%201%20-%20Boston%E2%80%99s%20People%20and%20Economy_1.pdf

of the county[70]. Commuters into the city benefit the most from Boston's economic growth: Boston residents have lower incomes than non-residents and are underrepresented in the highest-paying and fastest-growing sectors of the city's economy[71]. There are also large disparities in wealth and employment rates across the city, with burdens most heavily felt by communities of color[72]. Boston must contend with economic inequalities both within the city and across the metropolitan region to ensure the equitable distribution of economic benefits.

The COVID-19 pandemic tested Boston's economic resiliency. The city lost over 100,000 payroll jobs between February and April of 2020, and the unemployment rate peaked at 15.7%, almost twice as high as that during the Great Recession's peak in 2009. However, the city has rebounded, and fast: as of June 2023, Boston's employment numbers had not only recovered but also surpassed the pre-pandemic peak. Boston's unemployment rate for 2023 was down to 3.2%, which was 0.4 percentage points below the national average. Overall, the city experienced a much faster economic recovery from the pandemic than after previous recessions[73].

Despite the economic rebound, Boston continues to feel the impacts of the pandemic across healthcare and education sectors, tourism and commuting trends, and the state of small businesses. For instance, foot traffic in Boston's commercial hubs has increased since the pandemic but, as of 2023, remains below 2019 levels. Likewise, bus and subway ridership remains low, and office vacancy rates in the city have been slowly increasing. Demand for rental housing remains high[73]. These changing pressures may shift development policies and trends as the city continues to adjust to the "new normal".

[70] City of Boston. (2017). *Go Boston 2030: Boston Today.* https://www.boston.gov/sites/default/files/document-file-03-2017/go_boston_2030_-_3_boston_today_spreads.pdf
[71] City of Boston. (2018). *Imagine Boston 2030: A Plan for the Future of Boston.* imagine20boston202030_pages2.pdf
[72] City of Boston. (2017). *Resilient Boston: An Equitable and Connected City.* resilient_boston_digital.pdf
[73] Boston Planning & Development Agency. (2024). *Boston's Economy 2024: Recovery, Resilience, and Growth.* https://www.boston.gov/sites/default/files/file/2024/06/Economy-Report-Final.pdf

ECONOMIC HIGHLIGHTS

Boston's Gross City Product (GCP) was **$168.2 billion** in 2022 (Boston's Economy 2024)

Boston had **685,805 payroll jobs** in mid-2023, above the pre-pandemic peak (Boston's Economy 2024)

Boston is expected to have more than **900k jobs by 2050**, a 25% increase from 2014 (Imagine Boston 2030)

MAJOR EMPLOYERS

Healthcare
Financial Services
Tourism
Education
Technology
Professional Services
State and Federal Government
Small Businesses

MARITIME INDUSTRY

The Port of Boston generated **$8.2 billion** of economic value in 2018 (Economic Impact of the Port of Boston, 2019[74])



the Port creates approximately **66,000 jobs** (Economic Impact of the Port of Boston, 2019)

Each year, about **2.3 million** metric tons of cargo pass through the Port (Economic Impact of the Port of Boston, 2019)

PANDEMIC IMPACTS AND RECOVERY

15.7% unemployment rate at the height of the pandemic (Boston's Economy 2024)

100,000+ jobs lost between February and April 2020 (Boston's Economy 2024)

3.2% unemployment rate in 2023, 0.4% below the national rate (Boston's Economy 2024)

[74] Massachusetts Port Authority. (2019). *Economic impact of the Port of Boston* (Final report, June 3, 2019) [PDF]. Martin Associates. https://www.massport.com/sites/default/files/2023-09/massport_final_report_6-03-2019-report-final.pdf

Regional Workforce

As a large metropolitan area, Boston relies heavily on its regional workforce and commuting population to sustain and support its vibrant economy. Many people who work in Boston travel from neighboring towns and suburbs outside the city boundaries, making commuters a vital part of daily operations across various industries. This influx of workers from surrounding regions not only helps meet the demand for labor in the city but also contributes to Boston's continued growth and competitiveness. The interdependence between Boston and its commuter population highlights the importance of regional transportation networks and policies that facilitate access for those living beyond city limits.

According to a brief from the New England Public Policy Center and the Federal Reserve Bank of Boston, Boston has a commute share of 75%, which is calculated as the percentage of a county subdivision's local employment with a home address in another county subdivision[75]. The study demonstrates that 66 cities and town contribute to the 75% commute share of Boston's employment, this is demonstrated in Figure 3-42.

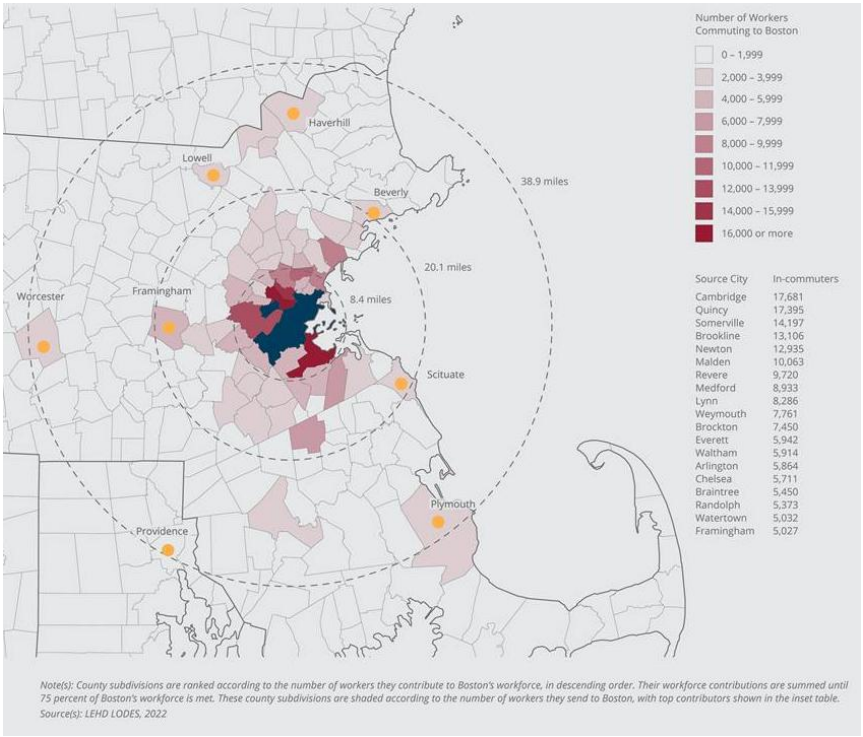


Figure 3-42. Sources of Boston's Workforce, 2022. Source: Federal Reserve Bank of Boston, Commuting Brief, 2025.

[75] Bodenschatz, H., Inkelas, E., & Thompson, J. P. (2025). *Getting to work in New England: Commuting patterns across the region* (New England Public Policy Center Regional Brief 2025-2). Federal Reserve Bank of Boston. https://www.bostonfed.org/publications/new-england-public-policy-center-regional-briefs/2025/getting-to-work-in-new-england.aspx

Tourism

Tourism is a significant economic driver in Boston, supporting businesses and employment across hospitality, restaurant, retail, transportation, entertainment, and cultural sectors. In 2025, Greater Boston welcomed approximately 38.7 million domestic visitors, who generated more than $14 billion in direct spending, in addition to approximately 2.2 million international visitors[76]. Meet Boston identifies travel and hospitality as one of the region's largest industries, demonstrating the importance of the visitor economy to Boston's overall economic activity.

At the statewide level, travel and tourism generated $24.2 billion in direct visitor spending, supported approximately 155,800 jobs, and produced $2.3 billion in state and local tax revenue in 2024[77]. Because Boston serves as one of the Commonwealth's primary tourism destinations, natural hazards that disrupt transportation, damage cultural and recreational assets, close businesses, or reduce access to major attractions and events can have economic impacts extending beyond direct physical damages.

3.7. Activities that Have Value to the Community

Communities in Boston take part in a variety of activities that add cultural, economic, and educational value to their lives. These activities may include celebrations, commemorations, sporting events, holidays, festivals, historical reenactments, and other occasions. Many activities are longstanding traditions in the city, while others have been more recently established. Inventorying when, where, and how these activities take place is important to plan for their continuation amidst shifting hazards.



Figure 3-43. Boston Marathon. Source: JD Baskin on Flickr, 2010.



Figure 3-44. Pride Celebration. Source: City of Boston.

[76] Meet Boston. (n.d.). *Statistics & reports.* https://www.meetboston.com/press-room/statistics-and-reports/
[77] Massachusetts Office of Travel and Tourism. (2025, August 19). *Tourism drives continued economic growth in Massachusetts.* Mass.gov. https://www.mass.gov/news/tourism-drives-continued-economic-growth-in-massachusetts



Figure 3-45. St. Anthony's Feast, 2013. Source: City of Boston.



Figure 3-46. Open Streets - Dorchester. Source: City of Boston.

Table 3-23 highlights some of Boston's most popular events and activities. These events were chosen at random from the list of 2024 event permits and licenses applied for within the City of Boston. This should not be considered an exhaustive list as there are several activities and events that happen several times in various neighborhoods, as well as pop up and smaller events that may not have applied for a permit.

Table 3-23. Activities that Have Value to the Boston Community

Activity Name	Additional Details
Allston Brighton Parade	Street parade and celebration. Annual in September. Allston Brighton.
Anderson Tree Lighting	Tree lighting ceremony and holiday gathering. Annual in late November or early December. Hyde Park.
Bands on Blackfan	Free outdoor summer concert series. Longwood Medical Area.
Beacon Hill Art Walk	Boston artists display and sell their work to locals and visitors. Annual in late spring or early summer. Beacon Hill.
Beacon Hill Holiday Stroll	Streets close to cars to allow pedestrians to shop, eat, and enjoy live performances. Annual in December. Beacon Hill.

Activity Name	Additional Details
Boston Book Festival	Street festival featuring live music, exhibitors and vendors, and free activities, in celebration of literature and literacy. Annual in October. Copley Square.
Boston Calling Music Festival	Multi-day outdoor music festival. Annual in late spring or early summer. Allston.
Boston Common Tree Lighting	Tree lighting and celebration to kickoff the holiday season. Annual in early December. Boston Common.
Boston Harborfest	Multi-day festival celebrating the Fourth of July and Boston's harbor and history. Annual in early July. Events occur Downtown, along the Charles River Esplanade, and in the North End and Charlestown.
Boston Local Food Festival	Outdoor festival celebrating local foods with vendors and activities. Annual in September. Rose Kennedy Greenway.
Boston Marathon	The world's oldest marathon. Annual on Patriots' Day in April. Hopkinton to Boston.
Boston Portuguese Festival	Celebration of Portuguese pride, history and culture. Annual in June. Boston City Hall Plaza.
Boston Pride Parade and Festival	Celebration of LGBTQ+ community through parade, festival, and other events. Annual in June. Parade from Copley Square to Boston Common.
Lunar New Year Lion Dance Parade	Celebration of the Lunar New Year. Annual in mid-winter. Chinatown.
Chinatown Main Street Summer Festival	Festival including food, shops, dances, martial arts, and other performances. Annual in summer. Chinatown.
Convite Internacional Banilejo	A cultural celebration for Baní, Dominican Republic. Annual in July. Jamaica Plain.

Activity Name	Additional Details
Corpus Christi Procession	A Catholic religious procession celebrating the Feast of Corpus Christi. Annual in June. East Boston, North End, and Seaport.
Dominican Festival and Parade	A celebration of Dominican culture with music, dance, and a street parade. Annual in August. Jamaica Plain and Roxbury.
Dorchester Day Parade	Neighborhood parade celebrating Dorchester's community and heritage. Annual in June. Dorchester.
Festival Betances	Cultural festival honoring Puerto Rican and broader Latin American heritage. Annual in Summer. South End.
Greek Independence Day Parade	A parade celebrating Greek independence. Annual in late April. Back Bay.
JP Morgan Corporate Challenge Run	Corporate running event that brings teams together for a road race. Annual in May/June. Back Bay.
Light Up Seaport	Winter celebration and tree lighting. Annual in December. Seaport District.
Lilac Sunday at the Arnold Arboreum	Springtime tradition where people picnic and enjoy blooming lilacs. Annual in May. Arnold Arboretum in Jamaica Plain.
My Caribbean One World Expo	Multicultural Caribbean arts, food, and cultural expo. Annual in July. Rose Kennedy Greenway.
National Night Out	Nationwide community-police engagement event promoting safety and neighborhood unity. Annual in August. Multiple neighborhoods.
Neighborhood Block Parties	Informal community gatherings organized by residents or local groups. Occur throughout summer, across many Boston neighborhoods.

Activity Name	Additional Details
North End Fisherman's Feast	Italian-American festival featuring food, entertainment, and a procession. Annual in August. North End.
Open Newbury Street	Newbury Street closes to cars and opens to pedestrians for shopping, music, and dining. Sundays in summer. Back Bay.
Party in the Park	Annual outdoor luncheon benefiting the Emerald Necklace parks. Annual in May. The Emerald Necklace.
Run to Home Base	A charity walk/run benefiting veterans. Annual in June. Starts in Boston Common, ends in Fenway Park.
Shakespeare on the Common	Free outdoor performances of Shakespeare plays in Boston Common. Summer.
South Boston St. Patrick's Day Parade	A major Irish cultural parade with bands and floats. Annual in March. South Boston.
SoWa Open Market	Weekly open-air market featuring artisans, food, and vintage goods. Sundays from spring through fall. South End.
St. Anthony's Feast	Historic Italian street festival with food, music, and a statue procession. Annual in late August. North End.
Strides for Action	Fundraiser for HIV/AIDS and the LGBTQIA+ community. Annual on the first Sunday of June. Starts in Brighton, route goes along the Charles River.
Walk for Hunger	A long-distance community walk to raise awareness and funds to fight hunger. Annual in May. Begins and ends at Boston Common.
Youth Fest!	Youth-focused festival with activities, performances, and resources. Annual in summer. City Hall Plaza.

Many Boston events are not listed in the table above. In 2024, the City received applications for the following types of entertainment and event licenses, as shown in Table 3-24.

Table 3-24. Entertainment Licenses in Boston in 2024

License Type	Count
Live Entertainment (Annual License)	61
Non-Live Entertainment (Annual License)	92
Night Club (Annual License)	74
One-Time Entertainment	2,052
One-Time Carnival Entertainment	52
Special Event	897

Community Events and Programs

Community events and programs, such as the Boston Marathon, youth programs and sports, cultural representation events, and city-led public education initiatives, play a critical role in the resilience and wellbeing of Boston's neighborhoods.

- **Boston Marathon:** As one of the city's most iconic events, the Boston Marathon brings together residents, local organizations, and public safety agencies in a shared experience. The event not only promotes physical health but also fosters a strong sense of unity regionwide. Its extensive planning and coordination with emergency services provide valuable lessons in large-scale event management, crowd safety, and rapid response strategies, skills that are directly transferable to disaster response and recovery efforts.
- **Youth Programs and Sports:** These programs offer more than just recreational opportunities; they serve as platforms for youth engagement, leadership development, and community building. By involving young people in structured activities and teams, the city strengthens social ties and instills values of teamwork, responsibility, and cooperation. Such connections are crucial during emergencies, as communities with strong youth engagement often demonstrate greater resilience, adaptability, and capacity to mobilize resources and support.
- **Cultural Representation Events:** Boston's diverse population is reflected in its many cultural festivals and heritage celebrations. These events provide opportunities for different communities to share traditions, build mutual understanding, and foster

inclusivity. This inclusivity is vital for equitable risk reduction and for ensuring that no group is left behind during a crisis.

- **City Events for Public Education:** The requirement that all city-led projects include engagement and outreach components is fundamental to the NHMP's success. Public education events raise awareness about projects going on in the city and the valuable steps to preparedness and action city officials are taking to protect this city against the effects of natural hazards. Effective outreach ensures that the whole community is informed, engaged, and ready to respond together in the face of disaster.



Figure 3-47. Festival in Chinatown. Source: City of Boston.



Figure 3-48. Festival Betances 2024. Source: City of Boston.

By supporting and expanding these programs and events, Boston not only strengthens its social fabric but also enhances its capacity to withstand, respond to, and recover from natural hazards.

3.8. Land Use and Development

Land use and development play a critical role in Boston's resilience. These activities are largely regulated by the Boston Planning and Development Agency (BPDA), Conservation Commission, and Zoning Commission. Development regulations influence where and how development can occur. This section provides a summary of Boston's current land use, recent history of developments, and planned future developments.

3.8.1. Current Land Use

This section provides a summary of Boston's current land use patterns, including the distribution of residential, commercial, industrial, open space, and government land. Understanding existing land use is essential for natural hazard mitigation planning, as it

helps identify where people, infrastructure, and essential services are concentrated and how exposure to natural hazards varies across the city.

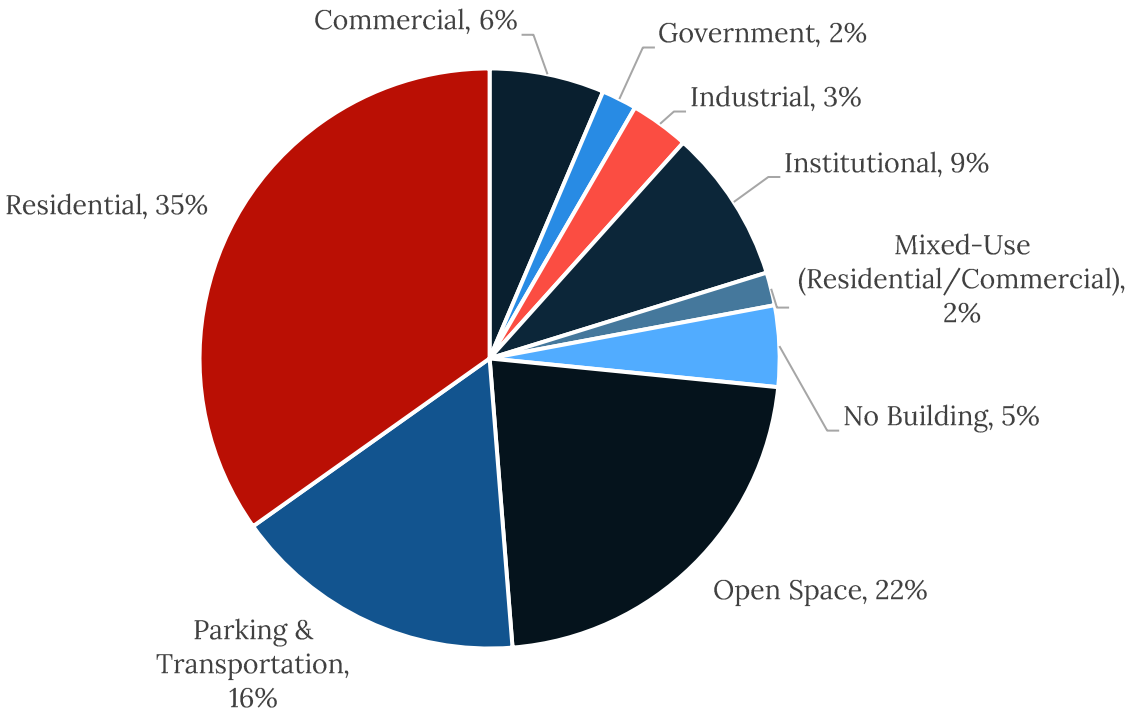


Figure 3-49. Boston Land Use by Area, based on FY2025 parcel data.

Boston's current land use patterns reflect a city dominated by residential development, with over one-third of total land area dedicated to purely residential uses, as shown in Figure 3-49. This concentration underscores the importance of addressing natural hazard risks where people live, particularly in neighborhoods with dense housing and vulnerable populations.

For a better understanding, land use was analyzed at a more detailed parcel level, shown in Table 3-25. Open space accounts for nearly one-quarter of the city's land area, including parks, conservation areas, and other undeveloped lands that can play a critical role in flood storage, heat mitigation, and emergency access during extreme events.

Transportation-related uses comprise approximately 15 percent of land area, with an additional 1 percent devoted to parking, highlighting the extensive footprint of transportation infrastructure that must remain functional during emergencies for evacuation, response, and recovery. Commercial land uses represent about 6 percent of the city's land area, reflecting a relatively compact footprint for purely commercial activity. Institutional uses cover roughly 9 percent of land, and include major hospitals, universities, and other essential facilities that are critical to disaster response and continuity of

services. Industrial and government uses together represent only about 5 percent of land area, and approximately 5 percent of parcels are vacant or undeveloped, which may present opportunities for future development or strategic mitigation measures if carefully planned.

Table 3-25. Parcels broken down by Land Use Type.

Parcel Land Use	Count	Land Area (sq ft)	% of City's Land Area
Commercial	6,040	93,556,920	6.4
Government	1,555	28,615,045	2.0
Industrial	1,090	47,912,540	3.3
Institutional	3,640	125,422,645	8.6
Mixed-Use (Residential/Commercial)	2,310	26,894,220	1.8
No Building	6,710	65,997,390	4.5
Open Space	2,990	323,826,670	22.2
Parking	9,295	13,222,475	0.9
Residential 1 Family	30,430	155,664,045	10.7
Residential 2 Family	16,740	82,416,860	5.6
Residential 3 Family	13,255	48,988,135	3.4
Residential Multifamily	89,055	221,851,230	15.2
Transportation	330	227,111,575	15.5
Total Number of Parcels	183,440		

The City of Boston owns 2,976 parcels throughout the city, of which about 40 percent (1,238 parcels) are considered vacant or underutilized. A few key departments are stewards of the majority of the city's parcels, as shown in Table 3-26.

Table 3-26. Key City Departments and Parcel Ownership[78]

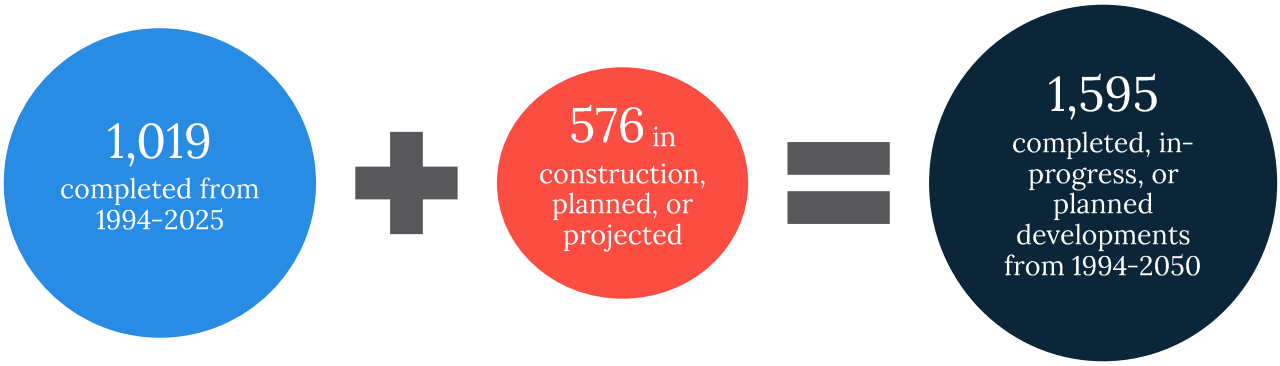
Department	Number of Parcels	Use(s)
The Mayor's Office of Housing (MOH)	1,124	To be redeveloped as affordable housing or sold. Some (20%) not buildable.
Boston Parks and Recreation Department (BRPD)	624	Preserved as open space.
Boston Planning & Development Agency (BPDA)	227	Most are fully leased and in active use.
Boston Housing Authority (BHA)	248	Public housing.
Boston Public Schools (BPS)	160	School facilities and playing fields.

3.8.2. Recent Development History

This section summarizes development activity that has occurred since the adoption of the previous NHMP in 2021. Changes in regulations, infrastructure, and the built environment provide important context for understanding how the community's resilience has evolved over time. By compiling information on recent developments and regulatory changes, this section establishes an updated inventory of assets that will inform subsequent analyses.

The Metropolitan Area Planning Council (MAPC) tracks both past and planned developments in the Greater Boston region through MassBuilds. Though the dataset is not fully comprehensive, it was compared to available BPDA data for all developments that would require Article 80 review and found to be both inclusive of the BPDA data and more wide-ranging. MassBuilds is useful for assessing general development trends over time and across different areas. The following figures provide information for a range of completed, in-progress, planned, and projected developments in the City of Boston from 1994 to 2050.

[78] City of Boston. (2022). *Public Land for Public Good: Citywide Land Audit.* 2022-CityLandAuditReport_Final (3).pdf



As of late 2025, MassBuilds reported 1,019 completed development projects in Boston since 1994. This means that almost 200 developments have been completed since the publication of the City's previous NHMP, which reported 824 completed developments.

Many of the most recent developments have occurred in East Boston, Brighton, South Boston, Dorchester, and Roxbury, as depicted in Figure 3-50. Low-lying coastal areas, such as East Boston, South Boston, and the South Boston Waterfront have greater exposure to sea level rise and coastal flooding. Recent developments in East Boston include Clippership Wharf, Addison Apartments, and The Mark at DeNormandie Wharf, all which sit on the waterfront, among others more inland.

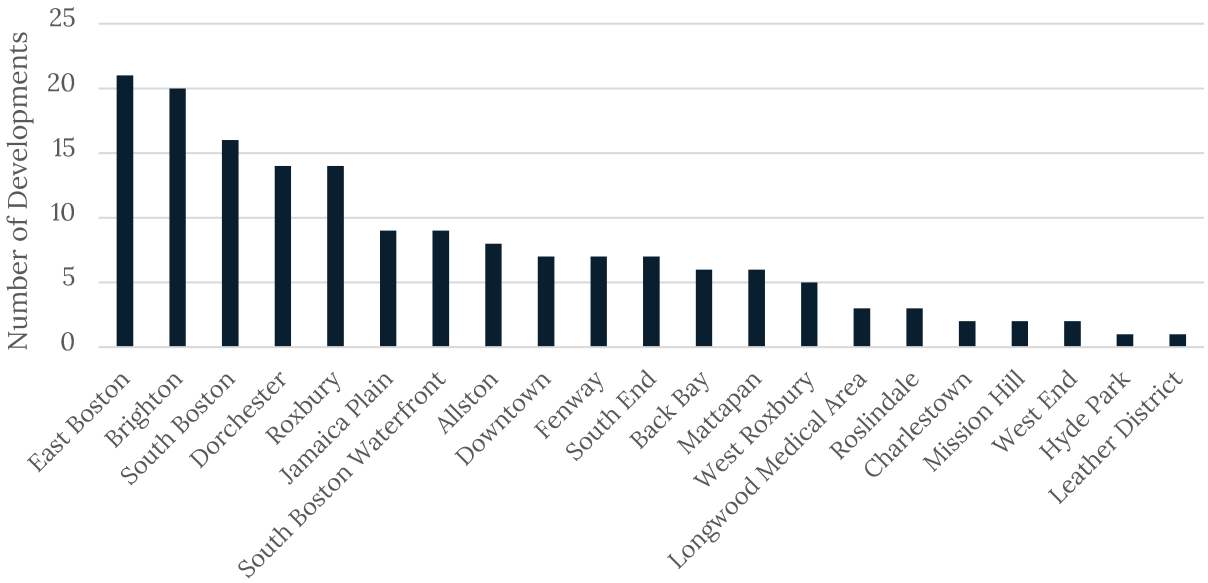


Figure 3-50. Completed Developments, 2021 through 2025. Source: MassBuilds.

Building and Energy Codes

Since the previous plan was published in 2021, Massachusetts has finalized substantial updates to the State Building Code, culminating in adoption of the 10th Edition in 2024, with mandatory statewide enforcement beginning in 2025. These updates strengthen requirements related to flood and storm resilience, particularly for buildings located in floodplains and coastal areas. The code incorporates updated floodplain management standards, including enhanced requirements for Coastal A Zones, where structures may be subject to wave action during major storms. New and substantially improved buildings in these areas must meet stricter elevation and foundation design standards, including the use of open foundations where required. A key change finalized with the 10th Edition is the increase in freeboard requirements by one foot above the base flood elevation in both A and V flood zones, improving protection against flood damage and reducing long-term risk. The code also updates structural design criteria, including wind speeds and other environmental loads, improving resistance to extreme weather events statewide, including in the City of Boston.

During the same period, Massachusetts updated its building energy codes, finalizing alignment with the 2021 International Energy Conservation Code (IECC) by 2024–2025. In addition to the statewide base energy code, Massachusetts maintains higher-performance, municipal opt-in energy codes, including the Stretch Energy Code and the Specialized Stretch Energy Code, both of which were updated between 2022 and 2024. The City of Boston has adopted the Specialized Stretch Energy Code, which applies more stringent energy performance standards to new construction and major renovations than the base code. These requirements improve building envelope performance and system efficiency, reducing overall energy demand. From a natural hazard mitigation and resilience perspective, improved energy efficiency supports building performance during extreme heat and cold events, reduces strain on the electrical grid during peak conditions, and enhances occupant comfort and safety during power disruptions.

Zoning Updates

Since 2020, Boston's zoning reforms that directly influence future hazard exposure and resilience include the Squares + Streets zoning initiative and the Downtown Boston rezoning. The Squares + Streets program promotes modest increases in residential density and mixed-use development near transit and neighborhood[79]. By encouraging growth in walkable, transit-accessible areas, this zoning update can reduce reliance on cars, limit sprawl, and potentially lower exposure to hazards linked to less resilient infrastructure.

[79] *Squares + Streets Zoning Districts | Bostonplans.org*. (n.d.). City of Boston Planning Department. https://www.bostonplans.org/planning-zoning/zoning-initiatives/squares-streets-zoning-districts

However, it can also increase the density of populations in these areas, requiring greater access to critical resources and services.

The 2025 Downtown Boston zoning update built off the PLAN: Downtown planning initiative, supports increased residential and mixed-use development, including office-to-residential conversions[80]. While this densification can help revitalize the city's urban core, parts of Downtown Boston also face risks from urban heat island effects, localized flooding, and other natural hazards. This zoning change underscores the need to integrate natural hazard mitigation strategies, such as green infrastructure and resilient building design, to minimize risk to growing downtown populations.

Other zoning updates, such as citywide Article 80 amendments[81], Inclusionary Zoning[82] changes, and net zero carbon requirements[83], primarily influence development processes and building performance. These can indirectly reduce risk by encouraging energy-efficient construction and ensuring affordable housing is incorporated into resilient neighborhoods, though they do not directly alter land use patterns or hazard exposure.

Development in Hazard Prone Areas

Since the previous NHMP update, development within Boston's flood-prone and coastal areas has been shaped by significantly strengthened regulatory standards. New projects are required to comply not only with FEMA floodplain management regulations but also with the city's Coastal Flood Resilience Design Guidelines, first adopted in 2019 through the Climate Ready Boston initiative. These guidelines were codified through the Coastal Flood Resilience Overlay District (Article 25A) in 2021, embedding elevated design requirements, floodproofing standards, and resilient ground-floor planning directly into the zoning code for properties located in present and future flood hazard areas.

These strengthened standards have reduced the structural, building-level vulnerability of new and substantially improved development by requiring higher elevations, floodproofing, resilient ground-floor design, and consideration of future coastal flood conditions. New development subject to these requirements is generally expected to perform better during flood events than older development constructed under previous standards.

However, if development and redevelopment continues to occur in neighborhoods exposed to present and projected coastal flooding, inland flooding, extreme heat, and other hazards,

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[80] PLAN: *Downtown | Bostonplans.org.* (n.d.). City of Boston Planning Department. https://www.bostonplans.org/planning-zoning/planning-initiatives/plan-downtown

[81] *Improving our development review process | Bostonplans.org.* (n.d.). City of Boston Planning Department. https://www.bostonplans.org/projects/improving-development-review-process-article-80

[82] Inclusionary Zoning. (2025, December 11). *Inclusionary zoning.* Boston.gov. https://www.boston.gov/departments/housing/inclusionary-zoning

[83] *2024 Net Zero Carbon Zoning Initiative | Bostonplans.org.* (n.d.). City of Boston Planning Department. https://www.bostonplans.org/planning-zoning/zoning-initiatives/2024-net-zero-carbon-zoning-initiative

overall vulnerability will increase. This growth can increase the number of people and economic assets located in hazard-prone areas, even where individual buildings are designed to be more resilient. Therefore, the overall change in vulnerability from development remains mixed, strengthened regulations have reduced the vulnerability of many individual projects, while continued growth in exposed locations may increase citywide exposure and the potential consequences of future hazard events.

Land Use Changes in Neighboring Jurisdictions

Boston is part of a densely developed and highly interconnected metropolitan region. Neighboring communities, including Cambridge, Somerville, Brookline, Chelsea, Everett, Revere, Winthrop, and Quincy, continue to experience redevelopment, housing growth, infill construction, transit-oriented development, and changes along waterfront and former industrial areas. Although these land-use decisions occur outside Boston's jurisdiction, they may affect the City's risk because regional watersheds, transportation networks, utility systems, emergency services, and economic activity cross municipal boundaries.

Increased development and impervious surface coverage in neighboring communities may increase stormwater runoff and place additional pressure on shared rivers, drainage systems, and downstream areas. Growth in coastal and low-lying locations may also increase the regional population and number of assets exposed to flooding, while creating additional evacuation, transportation, shelter, and emergency-response demands that may affect Boston. Development that increases reliance on regional transit, roadways, energy systems, and water and wastewater infrastructure can also increase the consequences of disruptions to those systems during a hazard event.

Conversely, neighboring communities' adoption of resilient zoning, green infrastructure, open-space protection, coastal flood defenses, and updated stormwater standards may reduce shared regional risk. Continued coordination through watershed partnerships, regional transportation and infrastructure planning, and multi-jurisdictional climate resilience initiatives will therefore be important as development patterns evolve throughout Greater Boston.

Summary of Vulnerability due to Development since Previous HMP

Overall, the City of Boston has taken numerous steps to reduce vulnerability to natural hazards since 2020, as described above. Considering these efforts, overall risk has reduced, however localized impacts will still be felt.

3.8.3. Anticipated Future Development

This section describes major anticipated future growth based on adopted plans and approved projects. Considering future development is important for natural hazard

mitigation planning because it helps foster planning for future growth in ways that reduce exposure, avoid hazard-prone areas, and support long-term resilience.

Within the commercial core, the city plans to continue encouraging dense, mixed-use development. However, this will not be able to accommodate the amount of population and job growth the city is projected to experience. Thus, the city is also investing in "expanded neighborhoods", transit-accessible areas along the edges of existing neighborhoods, which could support significant developments of mixed-use housing. These expanded neighborhoods include Suffolk Downs, Sullivan Square, Beacon Yards, Fort Point Channel, Newmarket & Widett Circle, and Readville[84].

Beyond develops in general, it is useful to assess where housing units are being built. As displayed in Figure 3-51, the neighborhoods of Dorchester, Roxbury, South Boston, Allston and Brighton have the greatest amount of planned and projected developments. Gentrification and displacement are key concerns in these neighborhoods. Additionally, areas like South Boston Waterfront, East Boston, and Downtown will be at risk of sea level rise and coastal flooding. Neighborhoods with the lowest amounts of development include the North End, Bay Village, and Beacon Hill, which are densely settled, historic neighborhoods.

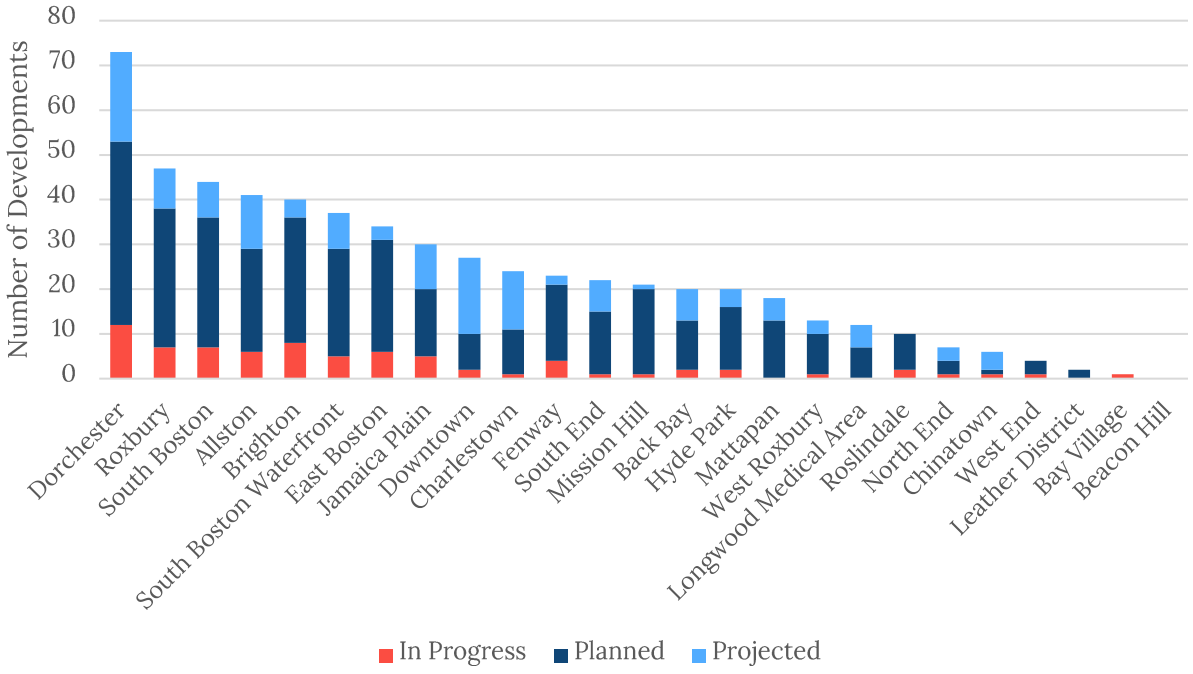


Figure 3-51. In Progress, Planned, and Projected Developments in Boston through 2050. Source: MassBuilds.

[84] City of Boston. (2018). *Imagine Boston 2030: A Plan for the Future of Boston.* imagine20boston202030_pages2.pdf

Notably, though Boston is a densely populated and historic city, new development outpaces redevelopment in the city. Out of all completed and planned developments since 1994, new development accounts for 70% of projects. The majority of developments since 1994 in Boston have been for residential use, followed by commercial and mixed-use developments. Based on what is known about planned and projected future developments, this trend is likely to continue.

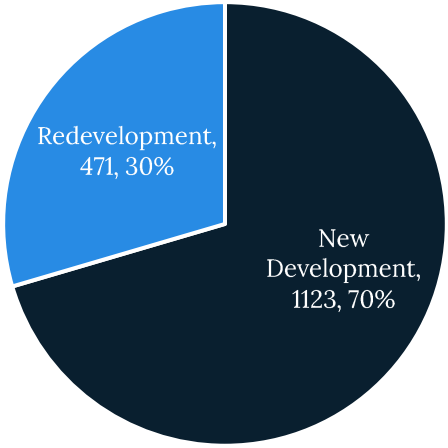


Figure 3-52. Comparison of New Development and Redevelopment Projects in Boston from 1994 to 2050. Source: MassBuilds.

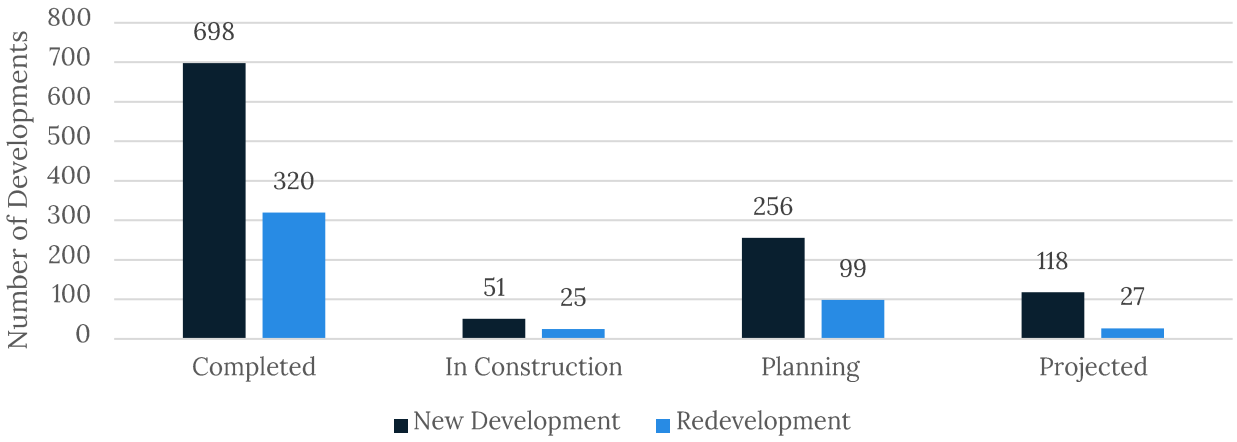
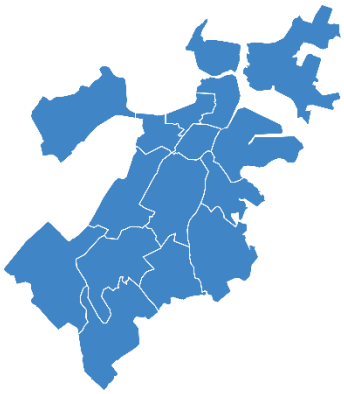


Figure 3-53. Comparison of New Development and Redevelopment Projects in Boston by Phase from 1994 to 2050. Source: MassBuilds



CHAPTER 4:

Hazard Profiles & Risk Assessment

4. HAZARD PROFILES & RISK ASSESSMENT

4.1. Hazard Profiles

Natural hazards can cause damage or loss to physical assets such as buildings, infrastructure, and natural, historic, or cultural resources throughout the city. They can also impact people, including underserved communities and priority populations, as well as disrupt city operations, workflows, and community activities that hold social or economic value. A statement by the EPA revealed that "Some individuals and communities are more susceptible to disproportionate harm from climate change due to differences in exposure and vulnerability to climate hazards".[85]

For each natural hazard profile, the hazard is described using the following sections in reference to past natural hazards events as a way to identify patterns and prepare for the future:

- Description
- Severity
- Probability
- Location
- Previous Occurrences
- Impacts of Climate Change
- Vulnerability and Risk

4.1.1. Description

This section will include a brief description of each natural hazard stemming from the 2023 ResilientMass Plan[86] which addresses the state hazard and climate mitigation plan.

The following hazard profiles were developed based on the natural hazards that can affect the City of Boston, shown in Figure 4-1.

[85] U.S. Environmental Protection Agency. (n.d.). *Climate change risk and impact assessment (document ID: 352694).* https://assessments.epa.gov/risk/document/&deid=352694

[86] Massachusetts Executive Office of Energy and Environmental Affairs. (2023, October 10). *ResilientMass plan: Massachusetts state hazard mitigation and climate adaptation plan.* https://www.mass.gov/doc/resilientmass-plan-2023/download

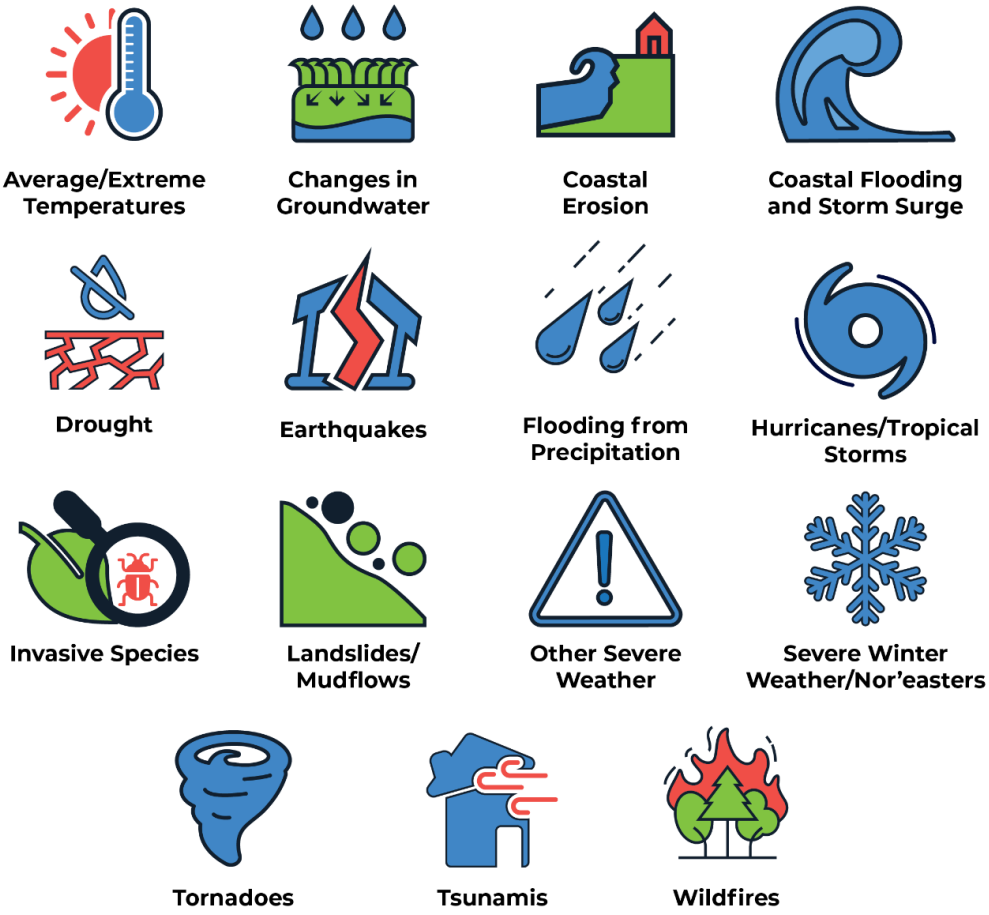


Figure 4-1 Natural hazards described within this Natural Hazard Mitigation Plan, as set forth within the 2023 Resilient Mass Plan

4.1.2. Severity

The severity of the hazard is synonymous with the magnitude, or likely range of magnitude. To illustrate the severity of the various hazards, this section may include scientific charts or scales to describe how serious the natural hazard event can be.[87] Where possible, the severity of a hazard can be measured using an established indicator, such as the Richter Scale for earthquakes, the Heat Index for Extreme Heat, or Categories for Hurricanes. In the event there is not a normalized scale for the natural hazard, it may be described using the levels in Table 4-1.

[87] Massachusetts Executive Office of Energy and Environmental Affairs, Massachusetts Executive Office of Public Safety and Security, & Massachusetts Emergency Management Agency. (2023). *ResilientMass plan: Chapter 5: Risk assessment and hazard analysis.* https://www.mass.gov/doc/resilientmass-plan-chapter-5-risk-assessment-and-hazard-analysis/download

Table 4-1. Levels of Severity

Levels of Severity	
Minor	Property damage is limited and isolated; there is no damage to public infrastructure such as roads, bridges, rail, airports, or public parks. The geographic area of impact is small (for example, one or two neighborhoods). Essential services (utilities, hospitals, schools, etc.) remain uninterrupted, and there are no injuries or fatalities.
Serious	There is scattered major damage to private property (for example, over 10% destroyed); some minor damage to public infrastructure. The geographic area is broader (several communities). Essential services may be briefly interrupted (up to one day). Some minor injuries occur, but fatalities are not expected.
Extensive	Major property damage is consistent across the area (for example, more than 25% of properties affected); substantial damage to public infrastructure (with repairs potentially taking several days). Essential services are interrupted from several hours to several days. Many injuries and possible fatalities may occur.

4.1.3. Probability

Climate projections indicate that long-term weather patterns are shifting, which may alter the frequency of natural hazard events. This section describes how climate change is expected to influence the likelihood of each hazard and to what degree such changes may occur. Climate change is also expected to alter hazard severity, duration, and geographic extent, which is discussed further in Section 4.1.6.

Boston's climate preparedness, planning, design, and engineering efforts have been guided by 2030, 2050, and 2070 planning horizons for long-term resilience efforts. For the purposes of this Natural Hazard Mitigation Plan (NHMP), the analysis focuses on **present-day conditions (2030, bounding years 2015–2044)** and **long-term future resilience (2070, bounding years 2055–2084).** These horizons are consistent with those used in municipal resilience planning across Massachusetts. Given that hazard frequencies may change over time, the probability of each hazard occurring is described for both the present-day and future, using the same categorization system, as shown in Table 4-2.

Table 4-2. Probability of Hazard

Present and Future Probability of Hazard	
Very Low	Events that occur, or are projected to occur, less frequently than once in 100 years (less than 1% chance per year).
Low	Events that occur, or are projected to occur, from once in 50 years to once in 100 years (1% to 2% chance per year).
Medium	Events that occur, or are projected to occur, from once in 5 years to once in 50 years (2% to 20% chance per year).
High	Events that occur, or are projected to occur, more frequently than once in 5 years (greater than 20% chance per year).

4.1.4. Location

The location of the natural hazard can be described as how much of the City of Boston is affected or impacted by the natural hazard event. This can be described as a percentage of the city for both past and present occurrences, as well as future natural hazard predictions, as shown in Table 4-3.

Table 4-3. Percent of Location impacted

Percent of City Affected by Hazard	
N/A	Hazard has not yet affected city area
Small	Less than 10% of the city is or could be affected by the hazard
Medium	Between 10-50% of the city is or could be affected by the hazard
Large	More than 50% of the city is or could be affected by the hazard

4.1.5. Previous Occurrences

Historical occurrences of hazards in Boston will be incorporated into the city's hazard profiles to provide context for mitigation planning. Federal Disaster Declarations, which formally recognize events that exhaust local resources and require federal assistance, along with Massachusetts State of Emergency Declarations issued by the Governor, will be reviewed to document the frequency, types, and severity of past disasters.

This section will also include stories from residents, businesses, and city officials to describe these events when possible. This review will inform the assessment of potential future hazards and help to identify patterns, vulnerable areas, and priorities for future mitigation actions.

4.1.6. Impacts of Climate Change

Climate change is a key factor shaping the frequency, intensity, and duration of natural hazards impacting Boston. Altered weather patterns, rising sea levels, and increasing temperatures are already changing the city's exposure and vulnerability to a variety of hazards, most notably coastal flooding, extreme heat, severe storms, and inland flooding. These shifting conditions present significant challenges to Boston's infrastructure, public health, economy, and natural systems.

While Section 4.1.3 characterizes how the probability of hazards may change, this section focuses on how climate change is expected to affect hazard intensity, duration, and geographic extent. In some cases, hazards with modest changes in probability may experience significant increases in impact due to greater intensity or exposure. Assessing how climate change affects each hazard is critical for guiding mitigation efforts, prioritizing investments, and enhancing long-term community resilience.

4.1.7. Vulnerability and Impacts

Assessing vulnerability and risk is essential for identifying where and how Boston is most at risk from natural hazards. Vulnerability describes the characteristics of people, places, and systems that affect their ability to anticipate, withstand, and recover from hazard events, while risk reflects the potential for loss when these vulnerabilities overlap with hazard exposure. By evaluating these factors, the city can determine which neighborhoods, infrastructure, and populations face the greatest threats, enabling data-driven strategies that enhance resilience, minimize long-term damages, and protect the health and safety of Boston residents.

Types of Vulnerability Analysis

The methods used to assess vulnerability and potential impacts vary by hazard based on the nature of the hazard and the type, scale, and availability of supporting data. Where detailed spatial or modeled data were available, the assessment evaluated the people, buildings, infrastructure, and other assets located within identified hazard areas. For hazards with limited spatial or modeling data, historical events and documented impacts were used to characterize potential consequences. In some cases, multiple methods were used together to provide a more complete understanding of vulnerability and risk. The primary types of analysis used in this plan are described below, as defined by FEMA.

1. **Scenario-Based Analysis:** A scenario analysis asks "what if" a certain event occurs. This kind of analysis uses a hypothetical situation to think through potential impacts and losses.
2. **Exposure Analysis:** An exposure analysis identifies the existing and future assets in known hazard areas. GIS is often used for this analysis and to make maps to visualize the risk. An exposure analysis can quantify the number, type and value of structures, community lifelines and other assets in areas of identified hazards. It can identify any assets exposed to multiple hazards.
3. **Historical Analysis:** Historical analysis uses data on the impacts and losses of previous hazard events. These help predict the impacts and losses for a similar future event.

Table 4-4. Analysis Type by Natural Hazard

Natural Hazard	Analysis Type
Average/ Extreme Temps	Exposure Analysis/ Historic Analysis
Changes in Groundwater	Historic Analysis/Scenario Analysis
Coastal Erosion	Historic Analysis
Coastal Flooding and Storm Surge	Exposure Analysis
Drought	Historic Analysis
Earthquakes	Historic Analysis/Scenario Analysis
Flooding from Precipitation	Exposure Analysis
Hurricanes/Tropical Cyclones	Exposure Analysis/ Scenario Analysis
Invasive Species	Historic/Scenario Analysis

Natural Hazard	Analysis Type
Landslides/Mudflows	Scenario Analysis
Other Severe Weather	Historic Analysis
Severe Winter Weather/Nor'easters	Historic Analysis
Tornadoes	Historic Analysis
Tsunamis	Scenario Analysis
Wildfires	Exposure Analysis

4.2. Average/Extreme Temperatures

Extreme temperature hazards, including both extreme heat and extreme cold, present significant and increasing risks to the City of Boston, affecting public health, infrastructure, and overall community resilience. These hazards are defined by sustained deviations from normal seasonal temperatures and are becoming more frequent and intense due to climate change. Extreme heat has emerged as a growing concern, with rising average temperatures and more frequent and longer heat waves. Boston's dense urban environment also contributes to the "urban heat island" effect, where built surfaces such as asphalt and concrete absorb and retain heat, rather than reflecting it, causing elevated temperatures relative to surrounding rural zones.[88] Heat events place strain on public health systems, increase energy demand, and elevate the risk of heat related illness, particularly when high humidity raises the heat index to dangerous levels. At the same time, extreme cold continues to pose serious risks through sudden and severe cold snaps that are often accompanied by wind, snow, and ice, creating hazardous conditions for residents and infrastructure.

The likelihood of both hazards remains high, with extreme heat projected to increase substantially in frequency and severity over the coming decades, while extreme cold is expected to occur less often but remain unpredictable and intense. Boston has already experienced record-breaking heat events and notable cold outbreaks, demonstrating its exposure to both extremes. Climate projections indicate a sharp increase in the number of

[88] U.S. Environmental Protection Agency. (2025, September 2). *What are heat islands?* https://www.epa.gov/heatislands/what-are-heat-islands

days above 90 degrees Fahrenheit, while cold events will continue to occur as short but severe episodes. These hazards impact the entire city but are not experienced equally. Neighborhoods with dense development and limited tree canopy face higher heat exposure, and vulnerable populations such as older adults, young children, low-income households, and individuals experiencing homelessness are at greater risk during both heat and cold events.

The impacts of extreme temperatures extend across people, buildings, infrastructure, natural systems, and the local economy. Extreme heat increases health risks, places stress on energy systems and can lead to power outages while also accelerating the deterioration of buildings and reducing economic productivity. Extreme cold similarly strains energy and water systems, damages structures through freezing conditions, and disrupts transportation and daily activities. Both hazards increase demand on emergency services and critical facilities and can limit access to essential resources and community spaces. Natural systems such as urban tree canopy, which play an important role in reducing heat, are also vulnerable to prolonged temperature extremes. These combined impacts highlight the importance of coordinated planning, resilient infrastructure, and targeted support for vulnerable populations to reduce risk and strengthen the city's ability to respond to extreme temperature events.

Extreme Heat

4.2.1. Description

Extreme heat refers to prolonged periods of excessively high temperatures, often accompanied by high humidity, that pose significant risks to public health, infrastructure, and the environment. While average temperatures in Boston have been steadily increasing over time, climate change is accelerating this trend, contributing to more frequent, longer lasting, and more intense heat waves. Although the city has typically faced its highest temperatures in summer, these seasonal highs may begin to become more typical earlier and later in the season than normal.

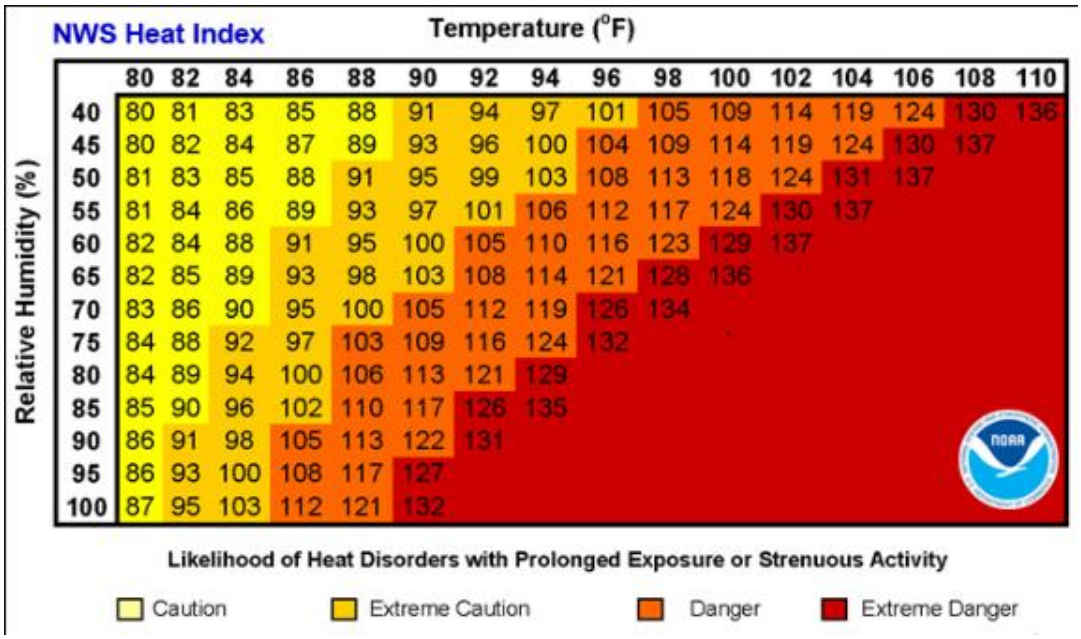
4.2.2. Severity

The severity of extreme heat can be evaluated by understanding the relationship between relative humidity and the effect of prolonged heat waves, demonstrated using the Heat Index Chart. The heat index is an important public health indicator, as values exceeding 90°F fall within the "extreme caution" range, conditions under which prolonged exposure or intense physical activity can pose health risks.

Relative humidity amplifies the adverse effects of high temperatures on human health. The National Weather Service (NWS) measures the intensity of extreme heat using the Heat

Index, which combines air temperature and relative humidity to estimate how hot it "feels" to the human body under typical conditions. This "feels like" temperature provides a more accurate reflection of potential heat stress and associated health risks than air temperature alone.

The NOAA NWS Heat Index chart (shown in Figure 4-2) demonstrates how rising humidity levels can significantly elevate perceived temperatures. Understanding this relationship is critical for assessing and predicting the impacts of extreme heat and humidity on public health.



Classification	Heat Index	Effect on the body
Caution	80°F - 90°F	Fatigue possible with prolonged exposure and/or physical activity
Extreme Caution	90°F - 103°F	Heat stroke, heat cramps, or heat exhaustion possible with prolonged exposure and/or physical activity
Danger	103°F - 124°F	Heat cramps or heat exhaustion likely, and heat stroke possible with prolonged exposure and/or physical activity
Extreme Danger	125°F or higher	Heat stroke highly likely

Figure 4-2. NWS Heat Index, NOAA

A heat wave, according to the United States Environmental Protection Agency (EPA), is a period lasting at least four days of unusually high temperatures, defined as an average temperature that would historically occur only once every ten years[1]. Such events strain public health systems via increased heat-related illnesses and deaths, worsen air quality (leading to more heart and lung disease), and impose higher energy demands from increased air conditioning.[89]

[89] U.S. Environmental Protection Agency. (n.d.). *Climate change impacts on health.* https://www.epa.gov/climateimpacts/climate-change-impacts-health

Boston's dense urban environment contributes to the "urban heat island" effect.[90] This effect exacerbates heat wave impacts in cities by amplifying air temperatures, increasing cooling costs, and elevating the risk of heat-related mortality and infrastructure stress.[91]

4.2.3. Probability

According to the Massachusetts Bureau of Climate and Environmental Health's Unhealthy Heat Forecast, the state has warmed by nearly 3.5 degrees Fahrenheit since the 1900s and is expected to continue rising. By 2050, the number of days above 90 degrees Fahrenheit is expected to double or triple. [92]

In 2024, Boston had fewer days above 90°F than usual, yet it was still the third hottest year on record for Massachusetts. That year, Boston recorded 12 days over 90°F, compared to only five such days in 2023.

On June 24, 2025, Boston reached 102°F, the warmest June day on record[93], marking the first time the city hit triple digits since July 2022 and triggering a citywide heat emergency. According to First Street, there were three days in 2025 when temperatures rose above 100°F, and twenty-one days above 90°F.[94]

Extreme heat has a high probability for both present and future natural hazard events, because it has already occurred more frequently than once in 5 years and is expected to continue to occur more frequently in the future.

4.2.4. Location

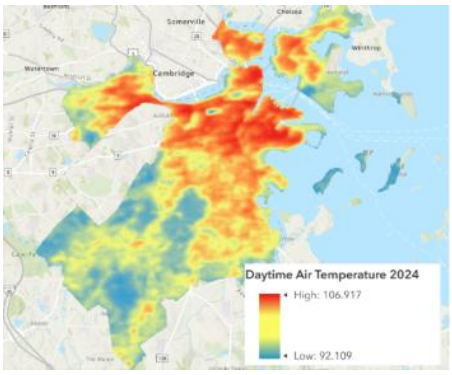


Figure 4-3. Boston Daytime Ambient Air Temperature in °F, 2024 Boston Heat Map Explorer

[90] U.S. Environmental Protection Agency. (2025, September 2). *What are heat islands?* https://www.epa.gov/heatislands/what-are-heat-islands
[91] U.S. Environmental Protection Agency. (2017, January 19). *Heat island impacts.* https://19january2017snapshot.epa.gov/heat-islands/heat-island-impacts_.html
[92] Massachusetts Department of Public Health. (n.d.). *Massachusetts unhealthy heat forecast.* Commonwealth of Massachusetts. https://www.mass.gov/info-details/massachusetts-unhealthy-heat-forecast
[93] Eliasen, T & Riley, N. 2025. https://www.cbsnews.com/boston/news/boston-heat-wave-warning-weather-temperatures/
[94] First Street Foundation. (n.d.). *Extreme heat and heat wave risk in Boston, MA.* https://firststreet.org/city/boston-ma/2507000_fsid/heat

Extreme heat is considered a city-wide natural hazard in Boston but is often more extreme in the denser, more concentrated parts of the city that have less tree canopy, more pavement, and dark surfaces, such a rooftops, that absorb more heat. Expanding urban tree canopy cover in highly developed areas is a key strategy to reduce extreme heat exposure.[95] Figure 4-3 highlights the City's daytime average temperature in 2024, which is heavily influenced by land surface conditions.

4.2.5. Previous Occurrences

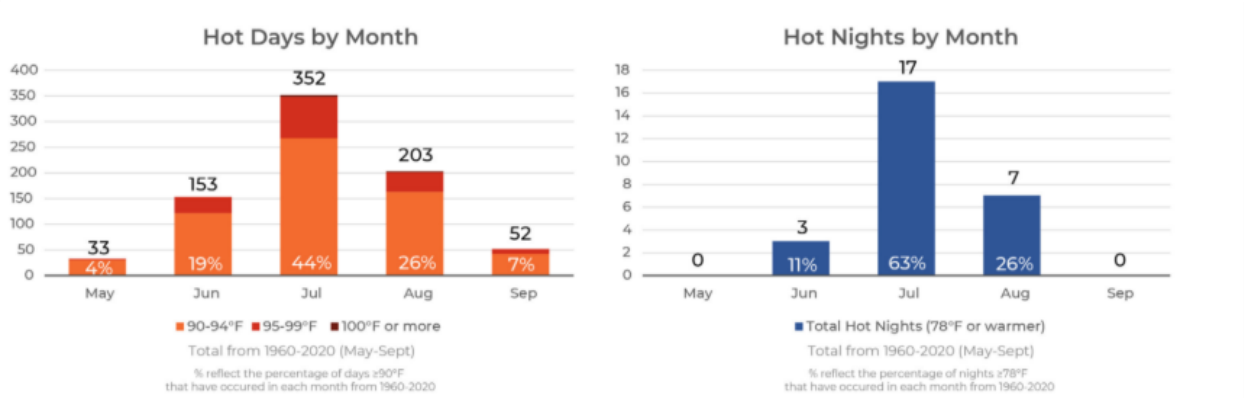


Figure 4-4. Boston's total hot days & nights from 1960-2020. Source: Boston Heat Resilience Plan and NOAA, page 53.

The City of Boston issues a Heat Advisory or a Excessive Heat warning when the maximum heat index temperature meets the thresholds defined by Boston's Public Health Commission. A *Heat Advisory* is declared in Boston when there is a period of two or more consecutive days above 95°F heat index that is sustained for 2 or more hours and an *Excessive Heat Warning* is issued when there is one day or more of a 105°F heat index that is sustained for 2 or more hours. Gathered by Boston's Heat Resilience Plan, recent hot days (above 90°F) and nights (above 78°F) by month of the year are shown in Figure 4-4.

Historically, Boston has experienced the hottest days and nights within this decade compared to the last 50 years (Figure 4-5). In 2021, there were 24 days above 90°F and four heatwaves.

[95] City of Boston. (2022, September). *Urban Forest Plan.* https://www.boston.gov/departments/parks-and-recreation/urban-forest-plan

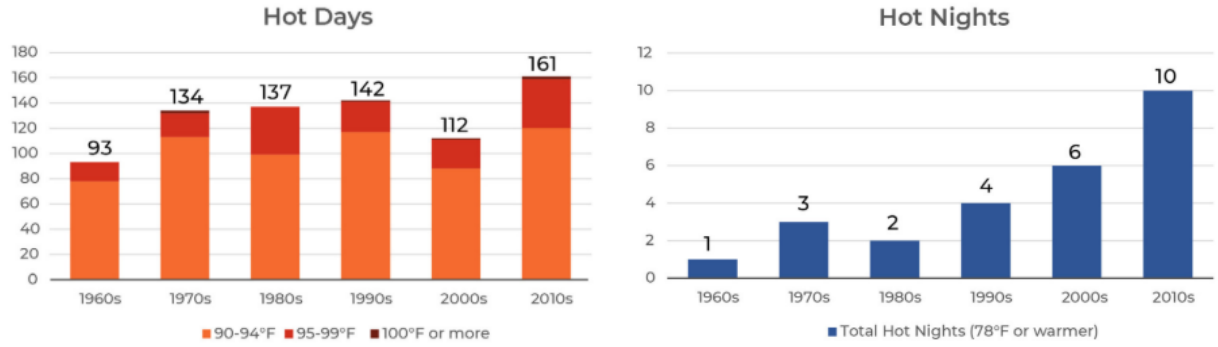


Figure 4-5. Boston's total hot days and night by decade. Source: Boston Heat Resilience Plan and NOAA, page 53.

4.2.6. Impacts of Climate Change

In Boston, extreme heat is becoming an increasing concern as climate change leads to more frequent hot days, longer heat waves, and rising summer temperatures. The extent of future warming will depend on how rapidly and effectively global greenhouse gas emissions are reduced.

The high-emissions (RCP 8.5) scenario assumes that the level of human activities, such as factory operations and fossil fuel consumption, will remain the same and if not worsen. If this scenario is played out in the upcoming decades, there will be a significant rise in the number of very hot days (over 90°F) in Boston.

The frequency of these days is expected to increase to about 17–26 days per year by the 2030s, 25–42 days by the 2050s, and 33–62 days by the 2070s. In the most extreme cases, the city could experience up to 87 days above 90°F by the 2080s.[96]

4.2.7. Vulnerability and Impacts

Present Day Heat Risk

Extreme heat is an increasingly frequent hazard in Boston, with impacts driven by rising temperatures, prolonged heat waves, and the Urban Heat Island Effect. Unlike more localized hazards, heat exposure affects the entire city, though the severity of impacts varies significantly across neighborhoods and populations. Areas with dense development, high concentrations of impervious surfaces, and limited tree canopy tend to experience higher ambient temperatures, particularly during multi-day heat events.

[96] City of Boston. (2022, April 21). *Heat resilience solutions for Boston: A climate resilience plan.* https://www.boston.gov/sites/default/files/file/2022/04/04212022_Boston%20Heat%20Resilience%20Plan_highres-with%20Appendix%20%281%29.pdf

Recent emergency notification data highlights the growing frequency and intensity of heat-related hazards. In 2025, the City of Boston issued 10 AlertBoston emergency notifications, including 6 heat emergencies compared to 3 cold emergencies. These alerts were concentrated in the summer months, when the majority of heat-related illnesses and fatalities occur. This trend reflects increasing strain on public health systems and emergency response services, as well as a growing need for coordinated heat preparedness and response strategies.

Future Heat Risk

Climate change is expected to significantly increase both the frequency and severity of extreme heat events in Boston. Rising average temperatures, more frequent heat waves, and warmer nighttime temperatures will reduce opportunities for cooling and increase cumulative heat exposure. These changes are projected to elevate baseline conditions, making extreme heat events more dangerous and more common over time.

As temperatures rise, neighborhoods already experiencing elevated heat exposure due to limited vegetation and high building density will face intensified conditions. The interaction between climate change and existing urban form will amplify disparities in heat exposure, particularly in environmental justice communities. Increased demand for cooling is also expected to place additional strain on energy systems, raising the risk of outages during peak heat periods and compounding health and safety risks.

Impacts on Assets

People

Residents of Boston vary in their sensitivity to extreme heat based on age, health status, housing conditions, and access to resources. Older adults, young children, and individuals with chronic illnesses are particularly vulnerable, as their bodies are less able to regulate temperature and may not recognize early signs of heat stress. In Boston, approximately 5% of the population is age 5 and younger and 13% is age 65 and older, representing a significant portion of residents at increased risk during heat events.

People experiencing homelessness face heightened vulnerability due to prolonged outdoor exposure and limited access to cooling resources. Social factors such as language barriers, social isolation, and limited mobility can further reduce individuals' ability to respond to heat warnings or access cooling centers.

Environmental justice populations are disproportionately affected by extreme heat. These communities often experience overlapping risk factors, including lower access to air conditioning, higher energy cost burdens, and residence in neighborhoods with fewer trees and green spaces, this is common in neighborhoods like Dorchester, Mattapan, and

Roxbury. As a result, they face both higher exposure to extreme heat and reduced adaptive capacity.

Structures

Extreme heat can significantly impact buildings, particularly older structures that lack modern cooling systems or adequate insulation. Indoor temperatures in these buildings can rise to dangerous levels during prolonged heat events, increasing health risks for occupants.

Heat exposure can also accelerate the deterioration of building materials, roofing systems, and mechanical equipment. Increased reliance on air conditioning places additional strain on building systems and can lead to higher energy costs, particularly for low-income households. Over time, these impacts contribute to increased maintenance needs and reduced building resilience.

Community Lifelines and Other Critical Facilities

Extreme heat poses risks to critical facilities and community lifelines that support public health and safety. Hospitals and emergency services may experience increased demand during heat events due to heat-related illnesses. Cooling centers play an essential role in reducing exposure, but their effectiveness depends on accessibility, awareness, and capacity.

Energy infrastructure is particularly vulnerable, as increased electricity demand for cooling can strain the grid and increase the likelihood of outages. Power disruptions during extreme heat events can have cascading impacts, especially for residents who rely on electrically powered medical devices or cooling systems.

Transportation infrastructure is also affected by extreme heat. Public transit systems may face increased operational challenges as vehicles and stations become overheated, affecting rider comfort and reliability. These impacts can disrupt daily commutes and limit access to essential services, particularly for residents without alternative transportation options.

In addition, crops grown in community gardens and local farms may be damaged or destroyed by extreme heat, potentially disrupting some residents' access to fresh produce.

What We Heard from the Community

Workshop participants identified senior centers, libraries, air conditioning, and shaded areas as important resources during heat waves. Some participants emphasized that there are not always enough accessible places where residents can get out of the heat.

Natural, Cultural, and Historic Resources

Extreme heat places significant stress on Boston's natural systems, particularly urban vegetation and tree canopy, which play a critical role in moderating temperatures. Prolonged heat and drought conditions can weaken trees, increase susceptibility to pests and disease, and contribute to long-term canopy loss if not properly managed. This is especially concerning in neighborhoods that already have limited green space, where the loss of vegetation can further intensify local heat conditions.

At the same time, natural resources, particularly urban forests and parks, represent one of the most effective tools for mitigating extreme heat. Expanding and maintaining tree canopy provides shade, reduces surface and air temperatures, and improves overall thermal comfort for residents. Parks, street trees, and green corridors can serve as critical cooling assets, helping to offset the Urban Heat Island Effect and reduce exposure in densely developed areas.

Economy and Activities that have Value to the Community

Extreme heat can disrupt economic activity, community life, and access to public spaces. High temperatures may reduce foot traffic in commercial areas, particularly for small businesses that rely on outdoor activity. Workers in outdoor industries, such as construction and landscaping, face increased health risks and potential productivity losses during heat events.

Community activities and public events may be canceled or modified due to unsafe conditions, limiting opportunities for social interaction and recreation. Parks and open spaces, while providing some cooling benefits, may become underutilized during extreme heat if adequate shade and cooling features are not available.

Additionally, extreme heat can increase operational costs for businesses and institutions due to higher energy demand for cooling, while also placing strain on municipal resources responding to heat-related impacts. Together, these effects demonstrate how extreme heat can disrupt both economic stability and the everyday activities that contribute to community well-being.

Extreme Cold

4.2.8. Description

Extreme cold refers to prolonged periods of very low temperatures, often accompanied by wind chill, snow, and ice, that pose risks to public health, infrastructure, and essential services. In Boston, extreme cold events typically occur during the winter months, late November to early March, with temperatures occasionally dropping below 0°F and wind

chills making conditions even more hazardous. Boston's coastal location can even intensify cold conditions when combined with nor'easters or blizzards, resulting in heavy snowfall and strong winds.

These events can lead to hypothermia, frostbite, and other cold-related illnesses, particularly among vulnerable populations such as older adults, young children, individuals experiencing homelessness, and those without adequate heating. Extreme cold also places stress on critical infrastructure, including energy systems, as heating demand spikes. Frozen pipes, power outages, and transportation disruptions are common consequences, which can further compound risks for residents.

4.2.9. Severity

Extreme cold is worsened by factors like wind and humidity and can be evaluated by using the Wind Chill Temperature Index. The Wind Chill Temperature Index, shown in Figure 4-6, combines air temperature and wind speed to reflect how cold it feels[97].

To indicate real time severity, the National Weather Service issues a Wind Chill Advisory when values fall between –15°F and –24°F for three or more hours. Under strong winds, frostbite can occur in as little as 30 minutes, even at relatively mild temperatures.

In Boston, the anticipated extent of extreme cold ranges from advisory-level conditions, when the City issues a cold advisory for one or more days with an observed wind chill of 0°F or below, to more dangerous wind chill conditions that can cause frostbite within 30, 10, or as few as 5 minutes. Figure 4-6 applies to Boston by allowing observed or forecast air temperatures and wind speeds within the city to be compared with the corresponding wind chill value and frostbite risk. Although extreme cold may affect the entire city, conditions may be especially severe in exposed coastal and waterfront areas where strong winds can further reduce wind chill values.

[97] National Weather Service. (n.d.). *Wind chill*. Retrieved April 13, 2026, from https://www.weather.gov/ama/windchill

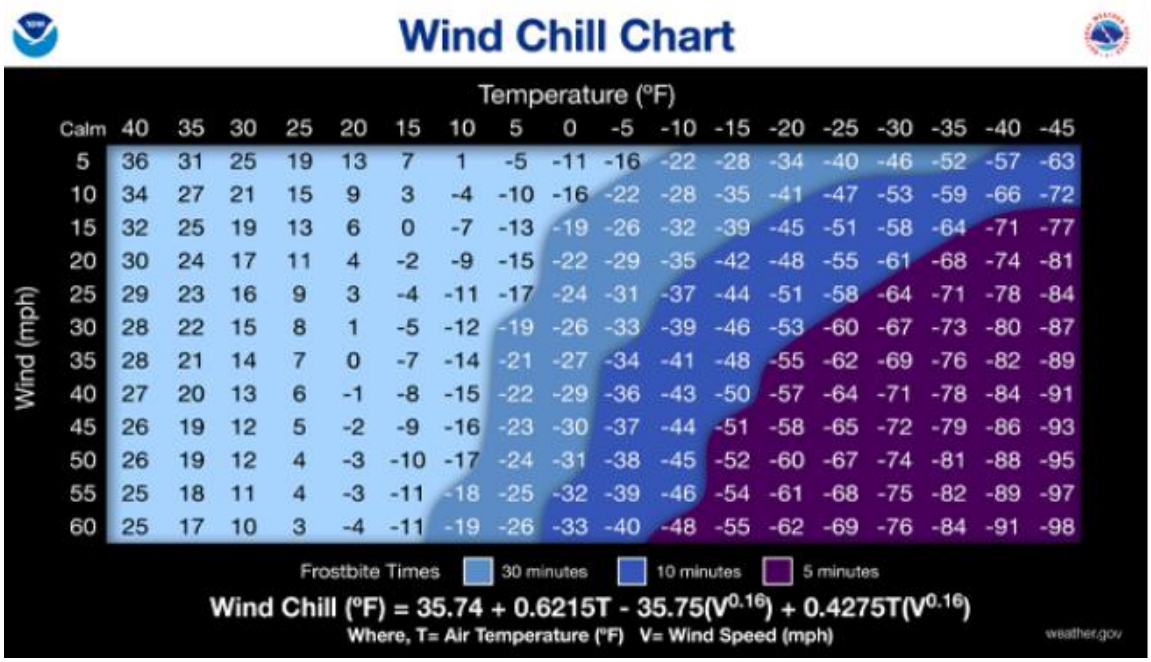


Figure 4-6. National Weather Service Wind Chill Chart

4.2.10. Probability

Extreme cold is not only identified through the number of cold days, but the severity of the cold when it does happen. In Figure 4-7, Boston's climate projections consensus predicts an overall decrease in the number of days below 32 degrees °F, but states that "the risk of frost and freeze damage and cold snaps will continue."[98] As climate change progresses, warmer winters are becoming typical, yet sudden cold spells and freezing temperatures accompanied with high winds and colder wind chills are also happening more often.

Extreme cold has a high probability for both present and future natural hazard events, because it has already occurred more frequently than once in 5 years and is expected to continue to occur more frequently in the future.

[98] Douglas, E., Kirshen, P., Hannigan, R., Herst, R., & Palardy, A. (2016, June). *Climate Ready Boston: Climate change and sea level rise projections for Boston (Boston Research Advisory Group report).* University of Massachusetts Boston. https://www.boston.gov/sites/default/files/file/2019/12/03_climate_ready_boston_digital_climateprojectionconsensus.pdf

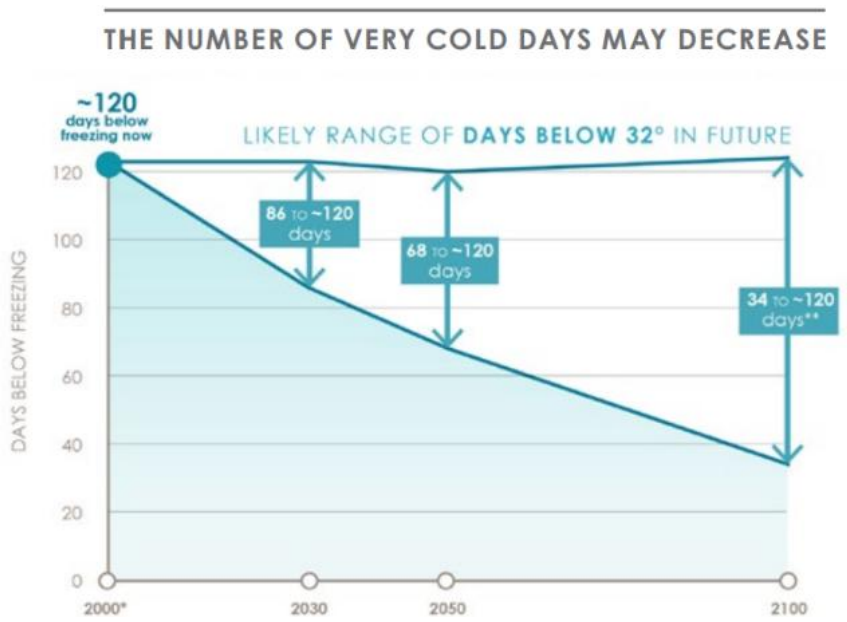


Figure 4-7. Projected number of cold days. Source: Climate Ready Boston.

4.2.11. Location

Extreme cold is considered to be a city-wide natural hazard in Boston but can disproportionately affect priority communities throughout the city, and especially people without shelter, stranded, and those living in poorly insulated infrastructures.

4.2.12. Previous Occurrences

In early February of 2023, the northeast experienced an Arctic Blast, bringing negative temperatures across the state of Massachusetts. The City of Boston reached -10 degrees Fahrenheit for the first time since January of 1957,[99] recording wind chill and "feels like" temperatures of -30 degrees Fahrenheit. The remainder of the month continued to bring the coldest temperatures and wind chills since February of 2016 and was the second period of below average temperatures that winter.

In 2025,[100] low temperatures in Boston dipped to about 19 degrees Fahrenheit in January and 9 degrees Fahrenheit in February.

4.2.13. Impacts of Climate Change

Climate change is expected to influence the frequency and intensity of extreme cold events in Boston in complex ways. Overall, average winter temperatures in the region are

[99] National Weather Service. (2025). *2023 weather year in review: Boston/Norton, MA.* ArcGIS StoryMaps. https://storymaps.arcgis.com/stories/f1bde8168bcb440b86d47409ef04042a
[100] Extreme Weather Watch. (n.d.). *Boston, Massachusetts weather in 2025.* https://www.extremeweatherwatch.com/cities/boston/year-2025

projected to rise, leading to fewer prolonged cold spells. However, climate variability and disruptions in the polar jet stream may continue to produce short but intense cold outbreaks.[101]

4.2.14. Vulnerability and Impacts

Present and Future Cold Risk

Extreme cold remains a recurring winter hazard in Boston, typically occurring during periods of sustained low temperatures, often in combination with snow, ice, and strong winds. Recent conditions demonstrate that cold events continue to require coordinated public response; in 2025, the City issued three AlertBoston cold emergency notifications during January and February. These events often occur during or immediately following winter storms, compounding impacts by combining freezing temperatures with hazardous travel conditions, power disruptions, and increased demand for emergency services.

While long-term climate trends suggest a decrease in the overall frequency of extreme cold, sudden and severe cold outbreaks will continue to affect the region. These events may occur with little warning and, when combined with other winter hazards, can create complex and widespread impacts across the city. As a result, extreme cold remains an ongoing risk, particularly when conditions persist over multiple days or strain critical systems.

Impacts on Assets

People

Boston's vulnerability to extreme cold is strongly influenced by housing conditions, access to reliable heating, and population sensitivity. Older adults, young children, and individuals with chronic health conditions are particularly susceptible to hypothermia, frostbite, and respiratory complications. People experiencing homelessness face some of the highest risks, as prolonged exposure to freezing temperatures can quickly become life-threatening.

Households with limited financial resources may struggle to afford heating costs, increasing the likelihood of unsafe indoor conditions. Social isolation, mobility challenges, and language barriers can further limit access to warming centers, emergency information, and support services. These factors often overlap in environmental justice communities, where residents may face both higher exposure and reduced ability to respond to extreme cold.

[101] Massachusetts Division of Fisheries and Wildlife. (n.d.). *Changes in winter*. Massachusetts Wildlife Climate Action Tool. https://climateactiontool.org/content/changes-winter/index.html

Structures

Extreme cold can significantly impact residential and commercial buildings, particularly older structures with inadequate insulation or aging heating systems. Prolonged low temperatures increase the likelihood of frozen and burst pipes, leading to water damage, costly repairs, and temporary displacement of residents or businesses.

Repeated freeze-thaw cycles can also contribute to the deterioration of building materials, roofs, and facades over time. Buildings without energy-efficient upgrades or resilient heating systems are especially vulnerable, and increasing variability in winter temperatures may further stress these structures.

Community Lifelines and Other Critical Facilities

Cold weather places increased demand on energy systems, particularly during extended periods of low temperatures when heating needs are highest. This demand can strain the electrical grid and increase the likelihood of outages, which can have serious consequences for residents reliant on electric heating or medical equipment.

Water and wastewater infrastructure are also vulnerable, as freezing conditions can damage pipes and disrupt service delivery. Healthcare facilities and emergency services may experience increased demand due to cold-related illnesses and injuries, requiring coordinated response efforts across agencies.

Transportation systems are highly susceptible to extreme cold and associated winter conditions. Snow and ice accumulation create hazardous travel conditions, leading to delays, accidents, and reduced mobility. Maintaining passable roadways requires significant municipal resources for plowing, salting, and ongoing maintenance.

Natural, Cultural, and Historic Resources, Economy, and Activities that have Value to the Community

Extreme cold can stress natural systems, including urban vegetation and wildlife. Prolonged freezing temperatures and rapid temperature fluctuations can weaken trees and plant species, particularly those already affected by pests, disease, or prior climate stressors. Freeze-thaw cycles may also impact soil conditions and contribute to localized erosion.

Economic activity and daily life across Boston is also disrupted during extreme cold events. Hazardous conditions may reduce customer traffic in commercial areas, delay deliveries, and limit workforce mobility, particularly for industries reliant on outdoor labor or transportation networks.

Community events, recreational programs, and public gatherings are often canceled or postponed during extreme cold conditions. Access to parks, open spaces, and cultural

amenities may be reduced, while municipal resources are frequently redirected toward snow removal, emergency response, and public safety operations. These disruptions highlight the broader impacts of extreme cold on both economic stability and community well-being.

4.3. Changes in Groundwater

Changes in groundwater are a persistent, localized hazard for Boston, especially in filled-land neighborhoods and historic waterfront areas where older masonry buildings depend on submerged wood-pile foundations. Groundwater levels can decline or rise due to precipitation variability, drought, sea-level rise, impervious surfaces, leaking tunnels and pipes, sump pumping, construction dewatering, and underground infrastructure that alters local groundwater flow. Severity is generally localized but can be serious: lowered groundwater can expose wood piles to air, causing decay, settlement, cracking, warped floors, and building safety concerns, while rising groundwater can contribute to wet basements, mold, corrosion, hydrostatic pressure, and reduced stormwater storage capacity. Areas of greatest concern include the Fenway, Back Bay, South End, Bay Village, parts of Beacon Hill, Chinatown, the Leather District, the Bulfinch Triangle, the North End, Downtown waterfronts, Fort Point Channel, and sections of East Boston. Historic examples, including the Boston Public Library foundation repairs and Otis Place townhouse settlement, show that groundwater decline has already caused costly structural impacts in Boston.

Climate change is expected to make groundwater risk more complex by changing precipitation, snowmelt, drought, evapotranspiration, recharge patterns, sea levels, and coastal groundwater elevations. Boston may experience declining groundwater in some inland filled areas while also seeing rising groundwater in coastal and low-lying areas, creating different risks in different neighborhoods. People are generally affected indirectly through building safety, displacement, indoor air quality, mold, and service disruptions, with renters, older adults, people with respiratory conditions, and lower-resource households facing greater burdens. Structures are among the most vulnerable assets, particularly historic masonry buildings on wood piles, but community lifelines such as tunnels, utilities, basements, drainage systems, sidewalks, streets, and public buildings may also face increased maintenance, localized flooding, groundwater intrusion, or settlement issues. Natural, cultural, and historic resources are vulnerable where groundwater affects historic districts, waterfront areas, trees, landscaped spaces, and open spaces. Economic impacts are likely to be localized but costly, including engineering studies, monitoring, foundation repair, stabilization, waterproofing, mold remediation, drainage improvements, and recharge systems, with potential effects on housing affordability, property values,

public facilities, small businesses, cultural institutions, and Boston's historic neighborhoods.

4.3.1. Description

Changes in groundwater refer to sustained or episodic changes in groundwater elevation, including both lowered groundwater levels and rising groundwater levels that are driven by increased precipitation, land use shifts, and sea level rise. Physical drivers of groundwater changes are shown in Figure 4-8.

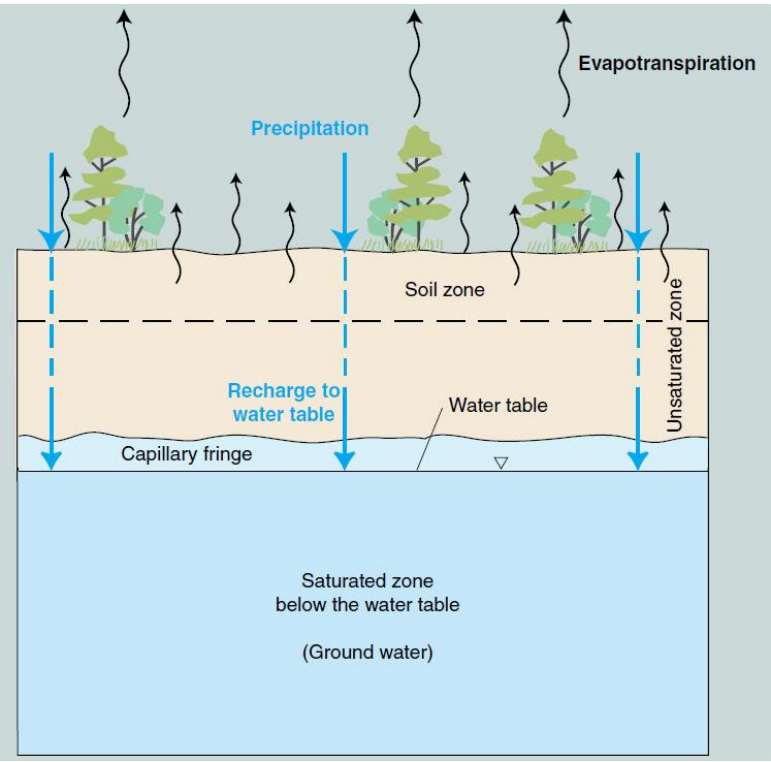


Figure 4-8. USGS Groundwater Model. Source: Water Science School, USGS.[102]

In Boston, the hazard is especially important because large portions of the city were constructed on filled land, where many older masonry buildings are supported by wood-pile foundations. Wood piles can remain durable for long periods when they stay submerged, but if groundwater drops and exposes the tops of the piles to air, the wood can decay, causing settlement and structural damage. The Boston Groundwater Trust[103] emphasizes that risk depends not only on the groundwater level, but also on the relationship between groundwater elevation and each building's wood-pile cut-off

[102] Water Science School. (n.d.). *Groundwater is the area underground where openings are full of water* [Illustration]. U.S. Geological Survey. https://www.usgs.gov/media/images/groundwater-area-underground-where-openings-are-full-water

[103] Boston Groundwater Trust. (n.d.). *Groundwater & building foundation data.* https://www.bostongroundwater.org/groundwater-building-foundation-data

elevation; buildings with higher pile cut-offs are more vulnerable when groundwater levels decline (Figure 4-9).

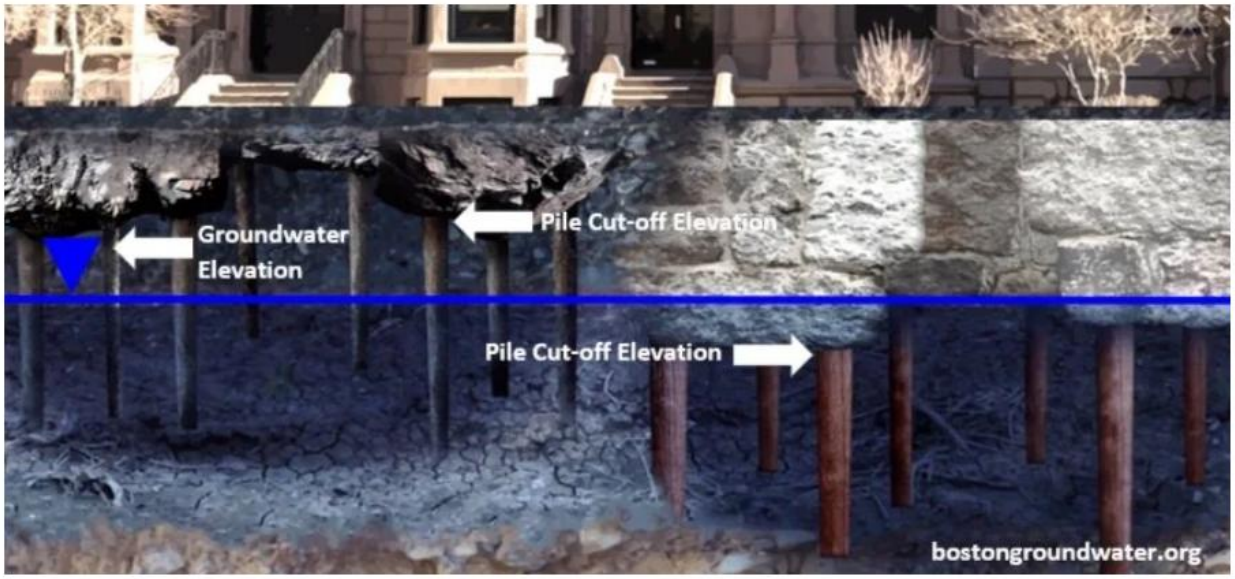


Figure 4-9. Groundwater elevation and wood pile cut-off grade. Source: Boston Groundwater Trust.[104]

4.3.2. Severity

The severity of groundwater change in Boston should be characterized as localized but potentially serious. While groundwater fluctuations may not affect all neighborhoods equally, impacts can be severe where groundwater decline exposes wood piles, where rising groundwater contributes to basement flooding or mold, or where underground infrastructure alters local groundwater movement.

Lowered groundwater can lead to microbial decay of exposed wood piles. As piles deteriorate, buildings may experience differential settlement, cracking, warped floors, malfunctioning windows and doors, and, in severe cases, compromised occupancy safety.

Levels can vary significantly over short distances due to leaking tunnels, pipes, basements, buried walls and other impermeable structures, local recharge systems, precipitation, sump pumps, and construction dewatering. As a result, groundwater change is best understood as a parcel-, block-, or neighborhood-scale hazard, rather than a uniform citywide condition.

To address this issue at the source, the City of Boston has enacted the Groundwater Conservation Overlay District (Figure 4-10). This regulatory measure is designed to protect

[104] Boston Groundwater Trust. (n.d.). *Groundwater & building foundation data.* https://www.bostongroundwater.org/groundwater-building-foundation-data

and maintain groundwater levels, especially in areas where historic buildings rely on submerged wood piles for structural integrity. The overlay district requires new developments and renovations to incorporate groundwater recharge systems, such as permeable surfaces and stormwater management features, to help restore and sustain groundwater. By enforcing these standards, Boston aims to reduce the risks and severity associated with fluctuating groundwater in these areas, including foundation damage, flooding, and mold growth.

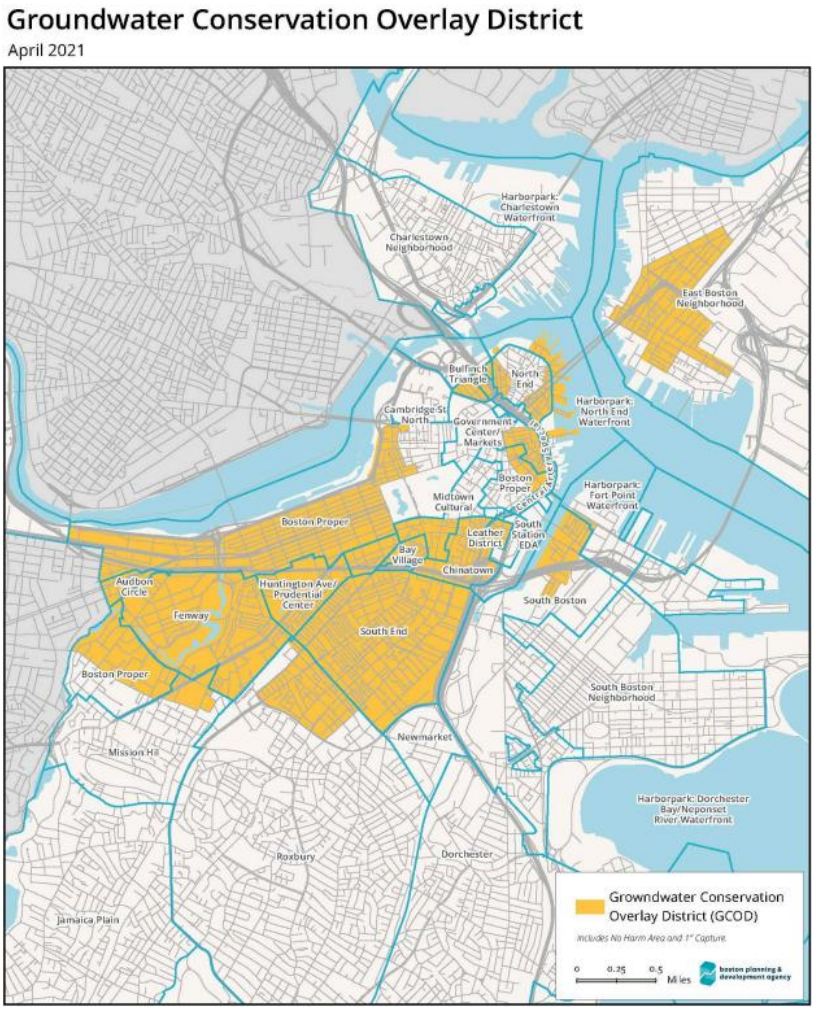


Figure 4-10. Boston Groundwater Conservation Overlay District. Source: Boston Groundwater Trust and BPDA[105].

Boston has also advanced stormwater infiltration and groundwater recharge through BWSC's green infrastructure and low impact development programs[106], which promote

[105] Boston Groundwater Trust. (n.d.). *Maps.* https://www.bostongroundwater.org/maps
[106] Boston Water and Sewer Commission. (n.d.). *Green infrastructure and low impact development.* https://www.bwsc.org/environment-education/green-programs/green-infrastructure-and-low-impact-development

stormwater practices that capture runoff, reduce pollutants, and allow water to infiltrate into the ground where site conditions are appropriate. These practices include rain gardens, tree pits and trenches, permeable paving, stormwater chambers, drywells, and bioswales, which can help restore infiltration in highly impervious areas while reducing runoff and improving water quality. BWSC also requires stormwater retention and infiltration for qualifying construction and reconstruction projects and has implemented a stormwater charge, credit program, and grant program[107] to support additional stormwater and green infrastructure improvements on private property. Together, these programs create regulatory and financial mechanisms that encourage property owners to reduce runoff and, where feasible, contribute to groundwater recharge.

4.3.3. Probability

The probability of continued groundwater fluctuation is likely to highly likely, because Boston's groundwater system is already affected by development patterns, impervious cover, precipitation variability, drought, aging underground infrastructure, sump pumping, dewatering, and sea level rise.

In keeping with recent projections[108], increased precipitation during late fall and early winter is anticipated to temporarily enhance groundwater recharge during those seasons. However, this benefit will likely be offset by significant declines in recharge later in the year, as reduced snowpack and higher rates of evapotranspiration in vegetated areas diminish available moisture for infiltration. These shifting patterns add complexity to the hazard, as seasonally variable recharge may influence the exposure of wood-pile foundations and increase risks associated with both declining and rising groundwater levels.

These likely changes underscore the importance of ongoing vigilance and adaptive management to protect Boston's historic neighborhoods and vulnerable structures.

4.3.4. Location

The areas of greatest concern are Boston's filled-land neighborhoods and historic waterfront areas where wood-pile-supported buildings, dense impervious cover, and underground infrastructure are concentrated. The Boston Groundwater Trust identifies affected filled-land areas including the Fenway, Back Bay, South End, Bay Village, parts of

[107] Boston Water and Sewer Commission. (n.d.). *Stormwater grant and credit program.* https://www.bwsc.org/stormwater-grant-and-credit-program

[108] Douglas, E., & Kirshen, P. (2022, June 1). *Climate change impacts and projections for the Greater Boston Area: Findings of the Greater Boston Research Advisory Group report.* University of Massachusetts Boston, School for the Environment. https://www.umb.edu/media/umassboston/editor-uploads/news-2023/umb-rpt-GBRAG-620-with-date.pdf

Beacon Hill, Chinatown, the Leather District, the Bulfinch Triangle, the North End, Downtown waterfronts, Fort Point Channel, and sections of East Boston (Figure 4-11).

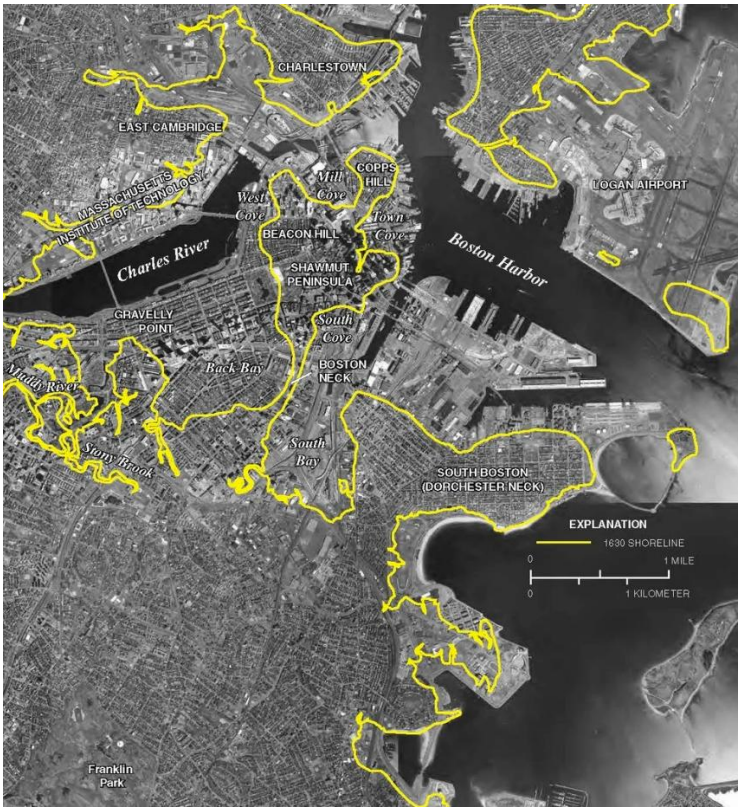


Figure 4-11. Estimated 1630 Boston shoreline overlying a 199 orthophotograph of Boston. Source: USGS Publication and Boston groundwater Trust[109].

4.3.5. Previous Occurrences

Many historic rowhouses in Boston, built on wood piles in the 1800s, require sufficiently high groundwater to keep the piles submerged. Declining groundwater has become a significant issue in areas like Back Bay, the South End, and Fenway, with wood pile repairs costing over $20 million in the past 25 years.

In Boston, groundwater levels have occasionally declined due to increased impervious surfaces, drought, and losses from leaks or sump pumps. Lower groundwater levels can cause wood pilings in filled areas like Back Bay to deteriorate, potentially damaging or destabilizing buildings if repairs are not made.[110]

[109] Weiskel, P. K., Barlow, L. K., & Smieszek, T. W. (2005). *Water resources and the urban environment, lower Charles River watershed, Massachusetts, 1630–2005* (Circular 1280). U.S. Geological Survey. https://pubs.usgs.gov/circ/2005/1280/pdf/cir1280.pdf

[110] Lambrechts, J. (2008). *The problem of groundwater and wood piles in Boston: An unending need for vigilant surveillance* (AC 2008-1977). American Society for Engineering Education.

In 1986, a townhouse on Otis Place in the Beacon Hill Flat settled several inches after wood foundation pilings deteriorated due to lowered groundwater levels. The Boston Groundwater Trust also notes that the Boston Public Library's main building in Copley Square required major foundation repairs in 1929 after groundwater decline contributed to decay of wood pilings.[111]

4.3.6. Impacts of Climate Change

Climate change is expected to increase the complexity of this hazard by altering aquifer recharge, driven by shifts in precipitation, more extreme temperatures and drought events, and snowmelt patterns. Seasonal recharge and stream baseflows may increase in late fall and early winter due to higher precipitation. However, overall annual recharge is projected to decline after 2030 as reduced snowpack and higher evapotranspiration, caused by warmer temperatures and extended warm seasons, limit the amount of water infiltrating into the ground. Rising relative sea levels will cause groundwater levels to increase along the coast, extending farther inland than areas affected by tidal flooding. In coastal and low-lying areas, groundwater rise associated with sea level rise can increase the likelihood of wet basements, mold, damage to subsurface utilities, reduced stormwater storage capacity, and flooding impacts that extend beyond mapped surface flood zones.[112]

4.3.7. Vulnerability and Impacts

Groundwater change is a persistent and localized hazard in Boston, particularly in filled-land neighborhoods where historic buildings, dense development, impervious surfaces, and underground infrastructure interact with shallow groundwater conditions. Unlike hazards that produce immediate visible damage, groundwater impacts may develop gradually over months or years, or they may occur more abruptly, at the parcel, block, or neighborhood scale.

Historic occurrences, including foundation repairs at the Boston Public Library and settlement at Otis Place in Beacon Hill, demonstrate that groundwater decline can result in significant structural damage when wood-pile foundations are exposed to air. Future conditions may increase the complexity of this hazard, as Boston may experience both declining groundwater in some inland filled areas and rising groundwater in coastal and low-lying areas.

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https://static1.squarespace.com/static/65a6df2546867357add67b5c/t/671a8a4257fdc43b62beac82/1729792579169/The+Problem+of+Groundwater+and+Wood+Piles+in+Boston+%E2%80%9CAn+Unending+Need+for+Vigilant+Surveillance.pdf

[111] Boston Groundwater Trust. (n.d.). *Overview*. https://www.bostongroundwater.org/overview

[112] Knott, J. F., Kirshen, P., & Douglas, E. (2022, November 1). *Climate change impacts on groundwater in MAPC communities*. University of Massachusetts Boston, School for the Environment. https://www.umb.edu/media/umassboston/editor-uploads/news-2023/umb-rpt-groundwater-10.22-16-phk-11-1-22-final.pdf

People

Boston residents' exposure to groundwater change is generally indirect but can still be significant where groundwater fluctuations affect building safety, indoor environmental quality, and access to essential services. Therefore, residents impacts are directly correlated with impacts affecting structures they may be in at the time.

Structures

Structures are among the most vulnerable asset categories for this hazard. Many older masonry buildings rely on wood-pile foundations that must remain submerged to avoid decay. In areas with older buildings, lowered groundwater may contribute to structural settlement, cracking, and other building stability concerns. While sudden displacement of residents is unlikely in most cases, progressive foundation deterioration could require temporary relocation, emergency repairs, or long-term building restrictions if structural conditions become unsafe. The risk varies building by building because vulnerability depends not only on groundwater elevation, but also on the elevation of the wood-pile cut-off and the condition of the foundation system.

Under a groundwater decline scenario, structures in filled-land neighborhoods may be most vulnerable where wood piles are located close to groundwater levels, such as during the historic examples, the Otis Place townhouse settlement and major foundation work at the Boston Public Library, where these impacts became serious when groundwater levels remained low long enough to expose wood piles to decay.

Under a groundwater rise scenario, residents in coastal and low-lying areas may experience increased basement dampness, mold, and indoor air quality concerns. These impacts may be especially burdensome for renters, older adults, people with respiratory conditions, and households with limited resources to address water intrusion, mold remediation, or structural repairs.

In a future scenario involving prolonged drought, increased groundwater pumping, or construction dewatering, additional buildings in filled neighborhoods could face similar risks. Conversely, in a future scenario involving sea level rise and rising groundwater, structures in coastal and low-lying areas may experience wet basements, increased hydrostatic pressure on foundations, corrosion of building systems, and increased mold or moisture damage. As a result, both low and high groundwater conditions can threaten buildings, though through different mechanisms.

Community Lifelines and Other Critical Facilities

Community lifelines and critical facilities may be affected where groundwater change compromises the reliability of transportation, utilities, drainage, and below-grade infrastructure. Groundwater levels in Boston can vary significantly over short distances due

to all the underground infrastructure such as the tunnels (MBTA and roadways), buried walls, leaking pipes, basements (specifically basement apartment units), various recharge systems throughout the dense urban neighborhoods, and ongoing construction activity. These localized influences can create uneven conditions that are difficult to predict and manage. For now, the Boston Groundwater Trust oversees tracking groundwater levels and advancing recharge initiatives to be proactive about impacts from low or rising levels.[113]

Under a groundwater decline scenario, underground infrastructure may contribute to or worsen the hazard if leaking tunnels, pipes, or drainage systems draw groundwater away from vulnerable foundation areas. This could increase the risk of settlement near streets, sidewalks, utilities, or public buildings.

Under a groundwater rise scenario, coastal and low-lying areas may experience increased groundwater intrusion into basements, utility vaults, tunnels, and other subsurface spaces. Rising groundwater can also reduce the capacity of soils to absorb rainfall, limiting stormwater storage and increasing the likelihood of surface flooding during heavy precipitation events. While widespread lifeline failure is unlikely, localized service disruptions, increased maintenance needs, and emergency repairs may become more frequent as groundwater conditions become more variable.

Natural, Cultural, and Historic Resources

Cultural and historic resources are highly vulnerable where they are located in filled-land neighborhoods or historic waterfront areas with groundwater-sensitive foundations. Many of Boston's historic districts contain older masonry buildings that contribute to the city's architectural and cultural identity. If groundwater decline damages wood-pile foundations, the resulting settlement or structural deterioration may threaten historic buildings that are costly, complex, or difficult to repair. Because historic structures often require specialized materials and preservation-sensitive construction methods, impacts may be more expensive and time-consuming than repairs to newer buildings.

Natural systems may also be affected by changing groundwater conditions. In areas where groundwater rises, soils may remain saturated for longer periods, affecting urban trees, landscaped areas, and open spaces that are not adapted to persistently wet conditions. In areas where recharge declines, vegetation may experience additional stress during dry periods. While these impacts are expected to be localized, they may compound other climate-related stressors such as extreme heat, drought, and coastal flooding.

Economy and Activities that have Value to the Community

Economic impacts from groundwater change are likely to be localized but potentially costly. Historic wood-pile foundation repairs in Boston have already required substantial

[113] Boston Groundwater Trust. (n.d.). *Overview*. https://www.bostongroundwater.org/overview

investment, and similar repairs can be expensive for individual property owners, condominium associations, institutions, and public agencies. Costs may include engineering studies, groundwater monitoring, foundation repairs, structural stabilization, basement waterproofing, mold remediation, and upgrades to drainage or recharge systems.

In a future groundwater decline scenario, economic impacts would likely be concentrated in older filled-land neighborhoods where foundation repairs could affect housing affordability, property values, insurance considerations, and long-term maintenance costs. In a future groundwater rise scenario, economic impacts may expand to coastal and low-lying areas where wet basements, damaged utilities, reduced stormwater capacity, and increased maintenance needs affect homes, businesses, public facilities, and infrastructure. These impacts could also affect community activities by disrupting libraries, schools, cultural institutions, small businesses, and historic districts that contribute to Boston's identity and local economy.

4.4. Coastal Erosion

Coastal erosion is an ongoing and long-term hazard affecting both the natural and developed shorelines along Boston's approximately 47 miles of coastline. Driven by natural forces such as waves, tides, and sea level rise, as well as human shoreline modifications, erosion results in the gradual loss of land and sediment over time. Boston Harbor's large daily tidal range further influences erosion by exposing and inundating shoreline areas, increasing stress on both natural features and built infrastructure. While much of Boston's waterfront is protected by seawalls and other engineered structures, these systems shift the nature of erosion risk from land loss to the potential degradation or failure of protective infrastructure. Climate change is expected to intensify these risks by increasing sea levels and the frequency and intensity of coastal storms, leading to greater wave action, structural stress, and long-term maintenance challenges.

The severity and probability of coastal erosion vary across the city but remain significant, particularly during major storm events such as nor'easters and hurricanes. Developed areas are most vulnerable where shoreline protection structures are aging or in poor condition, with erosion potentially causing undermining, overtopping, or localized structural failure. In less developed areas such as beaches and the Boston Harbor Islands, erosion occurs more regularly through natural processes and can result in the permanent loss of land, habitats, and cultural resources. Although widespread catastrophic impacts are unlikely, erosion presents a consistent and localized risk across Boston's waterfront neighborhoods, especially in areas like Downtown, South Boston Waterfront, East Boston, and Charlestown where protective infrastructure is heavily relied upon.

The vulnerability and impacts of coastal erosion extend across people, infrastructure, natural systems, and the local economy. While direct risks to residents are relatively limited compared to flooding, erosion can threaten public access areas, parks, and waterfront pathways, particularly when combined with storm events. Buildings and infrastructure are at greater risk where seawalls and other protective systems are weakened, with potential impacts including exposed utilities, damaged roads, and increased maintenance costs. Critical facilities such as transportation corridors and maritime infrastructure may experience reduced reliability over time if erosion undermines their foundations. Natural, cultural, and historic resources are among the most vulnerable, especially on the Harbor Islands where erosion can lead to irreversible loss of habitats and archaeological sites. Economic impacts are also evident through disruptions to recreation, tourism, and waterfront activities, as well as increased costs for shoreline stabilization and repairs. Together, these impacts highlight coastal erosion as a persistent hazard that requires ongoing monitoring, maintenance, and adaptation to protect Boston's shoreline and community assets.

4.4.1. Description

Coastal erosion describes the loss of coastal land and sediments over time. It can be caused by natural factors such as wind, waves, currents, and sea level rise (Figure 4-12). Boston's shorelines are potentially vulnerable to erosion. This includes developed and armored shorelines, such as those protected by seawalls, and undeveloped shorelines, such as beaches and bluffs.

Boston Harbor experiences a large semi-diurnal tidal range of approximately 9 to 11 feet. These daily tidal fluctuations play a critical role in coastal processes by regularly exposing and inundating shoreline areas. At high tide, wave action can reach higher elevations along seawalls, bluffs, and beaches, increasing the potential for erosion, overtopping, and structural stress. At low tide, exposed sediments may be more vulnerable to transport by currents and wave action. This tidal variability influences both natural shoreline dynamics and the performance of coastal protection infrastructure.

Human impacts on the shoreline, such as construction, dredging, or infilling, can also alter patterns of erosion. The construction of seawalls and other infrastructure may have mixed impacts on erosion, as it can protect some coastal areas while creating greater erosion hazards for others.[114]

[114] Commonwealth of Massachusetts. (n.d.). *Massachusetts Shoreline change Project.* Mass.gov. https://www.mass.gov/info-details/massachusetts-shoreline-change-project

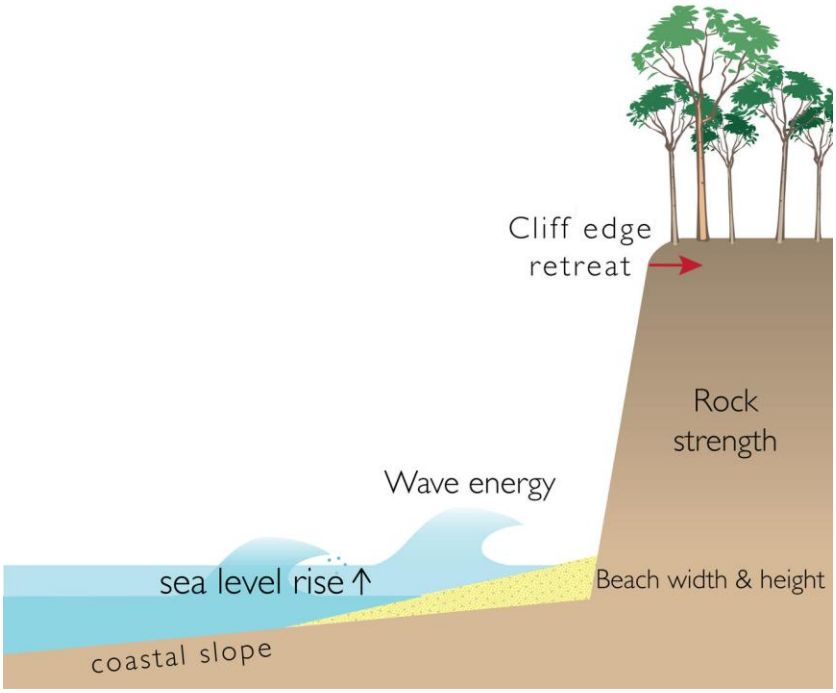


Figure 4-12. Factors that Affect Coastal Cliff Erosion[115]

4.4.2. Severity

Coastal erosion has the potential to be most severe along heavily developed portions of Boston's coastline. The Massachusetts Coastal Infrastructure Inventory and Assessment Project documents an extensive network of seawalls, revetments, bulkheads, piers, and other shoreline stabilization structures throughout Boston Harbor.[116] Because much of Boston's coastline is armored, erosion severity in developed areas is more likely to manifest as the structural degradation or failure of protective infrastructure, rather than large-scale shoreline retreat. The Inventory indicates that shoreline protection structures vary in age, material type, and condition throughout Boston.[117] Structures that are aging or in poor condition could be compromised by erosion during severe storm events. The failure or overtopping of these structures could result in costly repairs and secondary impacts. For instance, erosion could collapse structures and expose underground utilities or other infrastructure components, potentially resulting in debris release or localized environmental impacts.[114]

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[115] USGS. (2021, February 26). *Factors that can affect coastal cliff erosion.* https://www.usgs.gov/media/images/factors-can-affect-coastal-cliff-erosion

[116] Massachusetts Department of Conservation and Recreation. (2009). *Massachusetts Coastal Infrastructure Inventory and Assessment Project: Boston Harbor.* https://www.mass.gov/info-details/inventories-of-seawalls-and-other-coastal-structures

[117] Massachusetts Department of Conservation and Recreation. (2009). *Massachusetts Coastal Infrastructure Inventory and Assessment Project: Boston Harbor.* https://www.mass.gov/info-details/inventories-of-seawalls-and-other-coastal-structures

Along Boston's less-developed and undeveloped coastlines, such as beaches and the Harbor Islands, erosion is less likely to damage critical facilities or dense infrastructure. However, impacts in these areas may still be severe in terms of the permanent loss of natural, cultural, and historic resources, particularly where archaeological sites or sensitive habitats are present.

4.4.3. Probability

Shorelines are constantly changing. Coastal erosion can occur slowly over time or happen very quickly. Seasonal changes in waves, winds, and ocean currents can gradually wear away shorelines or allow them to rebuild. In contrast, major storms, such as nor'easters or hurricanes, can significantly reshape a shoreline in a very short period of time.[114]

Along Boston's developed coastlines, erosion is most likely to occur during severe storms. While the most severe coastal storms occur intermittently, they can cause substantial damage and are expected to become more frequent and intense in the future.

Boston's undeveloped coastlines experience erosion more often, driven by regular seasonal and year-to-year coastal changes. These areas are also vulnerable to less frequent but potentially more damaging erosion from major storm events.

4.4.4. Location

Boston's approximately 47 miles of coastline are potentially susceptible to erosion. The vast majority of this, about 43 miles, are armored with seawalls, breakwaters, and other structures.[118] These shoreline protection structures are concentrated in the Downtown, South Boston Waterfront, East Boston, and Charlestown neighborhoods.[119] Along these developed shorelines, areas with weakened or failing infrastructure are most susceptible to erosion, especially those without a beach to help buffer against waves. In contrast, along less developed shorelines, particularly on the Boston Harbor Islands, coastal cliffs and bluffs are susceptible to retreat and collapse during high-energy storm events.

4.4.5. Previous Occurrences

In Boston, coastal erosion has been observed mostly along shores of the Boston Harbor Islands (Figure 4-13). In addition, Carson Beach, L Street Beach, and M Street Beach in South Boston have experienced shoreline change over time, though much of the change has been gains of sediment rather than losses. Hardened shorelines, such as those

[118] Writer, S. H. B. (2025, July 29). Living Seawall Project enhances marine habitat in Boston. *Here Boston.* https://www.hereboston.com/living-seawall-project-boston/

[119] According to the Coastal Infrastructure Inventory, shoreline protection structures are concentrated along Boston's urban waterfront, including Downtown, the South Boston Waterfront, East Boston, and Charlestown.

Downtown or along the South Boston Waterfront, also have the potential to be impacted by erosion, though few studies have yet documented those impacts in Boston.

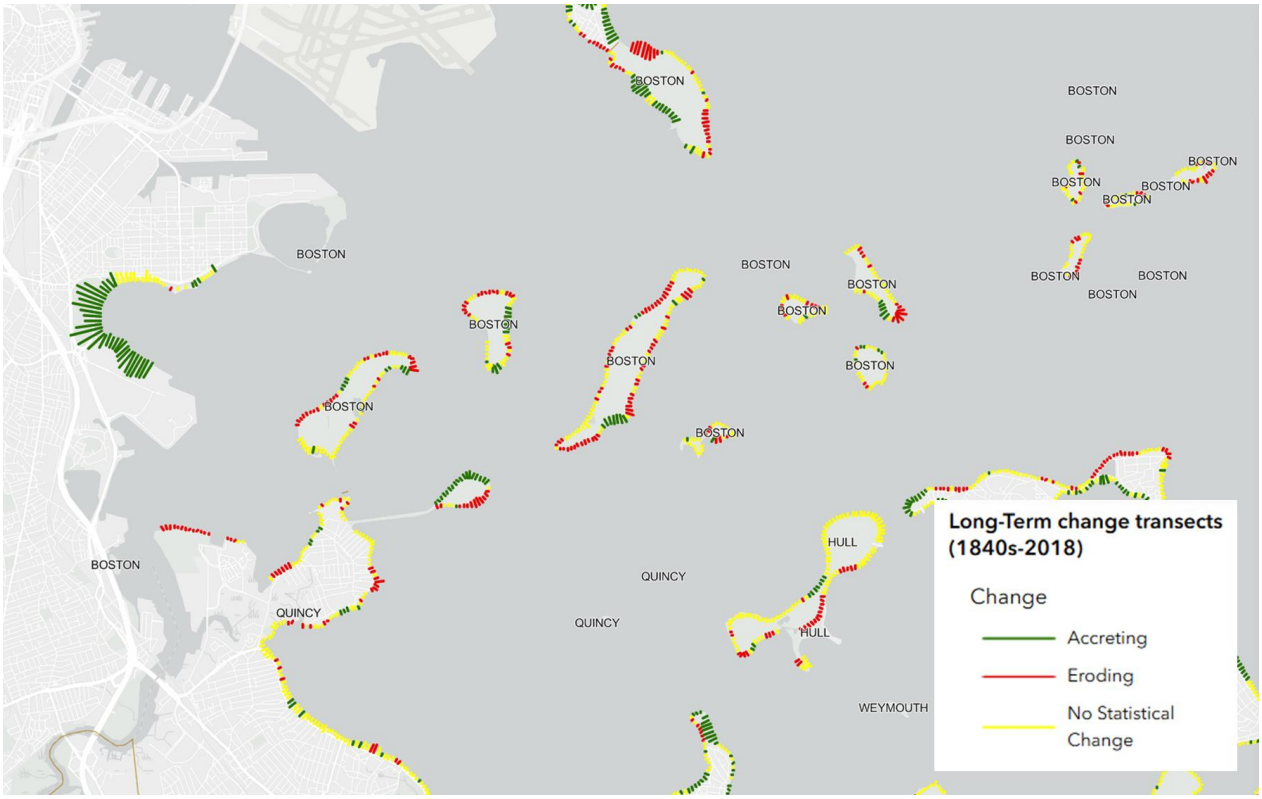


Figure 4-13. Long-Term Shoreline Change in Boston[120]

4.4.6. Impacts of Climate Change

Climate change is expected to worsen the impacts of coastal erosion through sea level rise and more frequent, intense coastal storms. Rising seas will expose additional shoreline areas to wave action and increase the frequency of overtopping existing protective structures. Because Boston relies heavily on engineered shoreline protection systems, these assets may experience prolonged wave exposure and hydraulic forces beyond their original design conditions, potentially accelerating deterioration and increasing erosion-related damage during storm events.

[120] *Long-Term Rates | Coastal Erosion Viewer* (1800s-2018). (n.d.). https://experience.arcgis.com/experience/894264afb93f4006920798ca4250b9e8/page/Long-Term-Rates



Figure 4-14. Eroding Shoreline at Thompson Island[121]

Climate change impacts on the Boston Harbor Islands are a subject of ongoing study, as significant erosion has occurred at multiple islands (Figure 4-14). The City of Boston, in collaboration with Tribes, scientists, and archaeologists, is creating the Boston Harbor Islands Archaeological Climate Action Plan (not yet publicly available as of June 2026). The Plan will summarize the risks to archaeological sites and cultural spaces on the Islands due to erosion caused by climate change.[121]

4.4.7. Vulnerability and Impacts

People

Boston residents' overall exposure to coastal erosion is relatively limited compared to other coastal hazards such as flooding, largely because much of the shoreline is armored and the city's most densely developed areas are protected by seawalls. Historically, erosion impacts on residents have been concentrated in recreational or less-developed areas, such as the Boston Harbor Islands and public beaches in South Boston. In the future, with more intense coastal storms combined with sea level rise, localized erosion could threaten public access areas, waterfront parks, and sections of the Harborwalk, creating temporary safety risks and limiting recreational use. Direct displacement of residents is considered unlikely under

[121] Boston, C. O. (2023, July 6). *Boston Harbor Islands Archaeological Climate Action Plan.* Boston.gov. https://www.boston.gov/departments/archaeology/boston-harbor-islands-archaeological-climate-action-plan

most erosion scenarios, but erosion occurring simultaneously with coastal flooding could increase risks to people in low-lying waterfront neighborhoods.

Structures

Structures are most vulnerable where shoreline protection infrastructure is aging, undermined, or lacking natural buffers. Because much of Boston's coastline is armored, erosion risk in developed areas is closely tied to the condition and performance of these systems. Statewide inventory efforts have documented extensive armored shoreline throughout Boston Harbor, much of which requires ongoing inspection and maintenance to remain effective.[122] Historically, erosion has been more significant along natural shorelines, while hardened areas have experienced less land loss. However, under a future scenario of higher sea levels and stronger storms, wave action could undermine seawalls, bulkheads, and building foundations along developed waterfronts such as Downtown, the South Boston Waterfront, East Boston, and Charlestown. Erosion could expose underground utilities, destabilize roads and piers, and increase long-term maintenance costs. While widespread structural collapse is unlikely, localized damage could be significant and costly, particularly where infrastructure is already aging or otherwise in poor condition.

Community Lifelines and Other Critical Facilities

Critical facilities and community lifelines located directly along the waterfront, including transportation corridors, utilities, and maritime infrastructure, are potentially vulnerable if erosion compromises supporting land or structural protection systems. Historically, erosion has not resulted in major disruptions to Boston's critical facilities; however, future severe storms could accelerate shoreline degradation near port facilities, ferry terminals, and segments of waterfront roadways. Erosion that undermines seawalls or revetments may reduce the reliability of these assets over time, particularly when combined with coastal flooding. While the probability of sudden, catastrophic failure is low, erosion could contribute to increased maintenance needs and episodic service disruptions.

Natural, Cultural, and Historic Resources

Natural, cultural, and historic resources are among the most vulnerable assets to coastal erosion in Boston. Historic evidence shows ongoing shoreline change and bluff retreat on several Boston Harbor Islands. Due to future climate change, erosion is expected to accelerate, threatening archaeological sites, historic landscapes, salt marshes, and coastal habitats. These resources often lack engineered protection and may be permanently lost if

[122] Massachusetts Department of Conservation and Recreation. (2009). *Massachusetts Coastal Infrastructure Inventory and Assessment Project: Boston Harbor.* https://www.mass.gov/info-details/inventories-of-seawalls-and-other-coastal-structures

erosion continues. Cultural and historic resources on the Islands are particularly vulnerable because once eroded or submerged, they cannot be restored.

Economy and Activities that have Value to the Community

Economic impacts from coastal erosion are likely to be localized, particularly for recreation, tourism, and waterfront-dependent activities. Erosion at beaches and on the Harbor Islands has affected recreational access and required periodic maintenance or nourishment. In the future, erosion could temporarily close beaches, damage park infrastructure, and reduce tourism revenue associated with ferry services and public events. Cumulative impacts from coastal erosion combined with coastal flooding and sea level rise could increase the costs of shoreline stabilization and infrastructure repair.

4.5. Coastal Flooding and Storm Surge

Coastal flooding and storm surge represent one of the most significant and rapidly intensifying hazards facing the City of Boston, driven by the combined effects of high tides, storm surge, wave action, and long-term sea-level rise. These events occur when ocean waters inundate normally dry land, often during nor'easters or hurricanes, and can become especially severe when storm surge coincides with high tide. Boston's extensive waterfront, history of landfilling, and concentration of development in low lying areas increase its exposure to flooding. Climate change is expected to further amplify these risks by raising baseline sea levels and increasing the frequency and intensity of coastal storms, causing flood events that were once rare to occur more regularly and with greater impact.

The severity and probability of coastal flooding are expected to increase substantially over time, with projections indicating up to 21 inches of sea level rise by 2050 and over 4 feet by 2070. These changes will expand the geographic extent and depth of flooding, placing more neighborhoods and assets at risk. Currently, many waterfront areas such as East Boston, Charlestown, South Boston, and the North End are already located within designated flood hazard zones, experiencing periodic disruptions including roadway closures, infrastructure damage, and service interruptions. Historical events demonstrate that even moderate storms can cause significant impacts, while future conditions will lead to more frequent and widespread flooding, including inland areas not currently considered at risk.

The impacts of coastal flooding extend across people, structures, infrastructure, and the local economy, with increasing consequences over time. Vulnerable populations, including environmental justice communities and residents with limited resources, face greater challenges in preparing for and recovering from flood events. Thousands of structures are already exposed to flooding, with projections showing a dramatic increase in the number of buildings at risk, leading to potential structural damage, displacement, and repeated economic losses. Critical infrastructure such as transportation networks, utilities, and

public transit systems are highly susceptible to disruption, affecting mobility and emergency response. Flooding also threatens community spaces, businesses, and cultural resources, limiting access to essential services and reducing economic activity. Together, these impacts highlight coastal flooding as a growing and long-term hazard that will require continued investment in resilience, infrastructure adaptation, and equitable planning strategies to protect Boston's communities and assets.

4.5.1. Description

Coastal flooding and storm surge represent one of the most significant and rapidly intensifying natural hazards affecting coastal communities such as the City of Boston. Coastal flooding occurs when ocean waters inundate normally dry land, primarily due to high astronomical tides, sea level rise, wave action, and storm surge associated with coastal storms such as nor'easters and hurricanes (Figure 4-15). Storm surge refers to the abnormal rise of water generated by a storm, over and above predicted tidal levels, driven by strong onshore winds and low atmospheric pressure. When storm surge coincides with high tide, the resulting coastal flooding can be severe, widespread, and damaging.



Figure 4-15. Types of coastal flood risk. Source: City of Boston, Coastal resilience page.

4.5.2. Severity

In Boston, the severity of coastal flooding and storm surge ranges from serious to extensive, depending on storm intensity, timing with high tide, wave action, and future sea level conditions. Coastal flooding is primarily caused by extreme high tides, storm surge, and waves associated with nor'easters, hurricanes, and other coastal storms. Floodwater can enter the city through Boston Harbor, tidal rivers, channels, and low-lying shoreline pathways, with the greatest impacts occurring in waterfront and filled-land neighborhoods.

Flood depths vary based on storm conditions, shoreline elevation, and location and are illustrated through FEMA flood mapping and the Massachusetts Coast Flood Risk Model. Floodwater may move relatively slowly in sheltered inland areas but can have greater velocity and force along exposed shorelines, tidal channels, and areas affected by storm surge or wave action. Coastal A Zones may experience waves between 1.5 feet and less than

3 feet during the 1-percent-annual-chance flood, while V Zones may experience waves of 3 feet or higher. These waves can increase structural damage, erosion, debris impacts, and risks to people and infrastructure.

Severe coastal storms and nor'easters can cause widespread property damage across multiple neighborhoods and significantly affect roads, utilities, sewer systems, transit corridors, and emergency access. Repairs may take several days, and interruptions to transportation and essential services can complicate emergency response. Rising sea levels are expected to increase flood depths and expand the area exposed to damaging coastal flooding, including locations that currently flood only during the most severe events.

Coastal storms and extreme high tides can often be forecast several hours to several days in advance, providing time for public warnings, deployment of temporary flood barriers, and other emergency preparations. However, the timing and severity of flooding may change as storm track, wind direction, rainfall, and tidal conditions interact. Even moderate coastal storms can therefore cause transportation delays, building damage, and strain on emergency services, particularly when flooding occurs during peak tides or critical operations.

4.5.3. Probability

According to the 2023 ResilientMass Plan, Massachusetts is planning for up to 2.5 feet of sea level rise by 2050, relative to 2008 levels, if global emissions are not significantly reduced[123]. This rise in baseline sea level amplifies the height and inland extent of storm surge and increases the frequency of coastal flooding during routine high tides. As a result, flood conditions that were once associated only with major storms are expected to occur more regularly in the coming decades.

Using the Massachusetts Coast Flood Risk Model (MC-FRM), coastal flood risk in Boston is expressed as an Annual Coastal Flood Exceedance Probability (ACFEP)[124], the annual chance (from 0.1% to 100%) that a given location will flood in each scenario year (2030 and 2070), shown in Figure 4-16. Boston is expected to see its sea level rise by 1.2 feet by 2030. The risk of flooding in coastal neighborhoods will range from 0.1% to 20%, classified as low to medium frequency.

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[123] Massachusetts Executive Office of Energy and Environmental Affairs, Massachusetts Executive Office of Public Safety and Security, & Massachusetts Emergency Management Agency. (2023). *ResilientMass plan: Chapter 5: Risk assessment and hazard analysis.* https://www.mass.gov/doc/resilientmass-plan-chapter-5-risk-assessment-and-hazard-analysis/download

[124] Massachusetts Office of Coastal Zone Management. (n.d.). *2030 Massachusetts Coast Flood Risk Model (MC-FRM)* [Interactive map]. In *MA Sea Level Rise and Coastal Flooding Viewer*. Massachusetts Executive Office of Energy and Environmental Affairs. https://experience.arcgis.com/experience/23d861b79aed450eb8972013dd28579b/page/MA-Coast-Flood-Risk-Model

By 2070, sea levels may increase by 4.2 feet and some areas may flood annually due to higher water and stronger storms, showing high frequency of the hazard in the future.

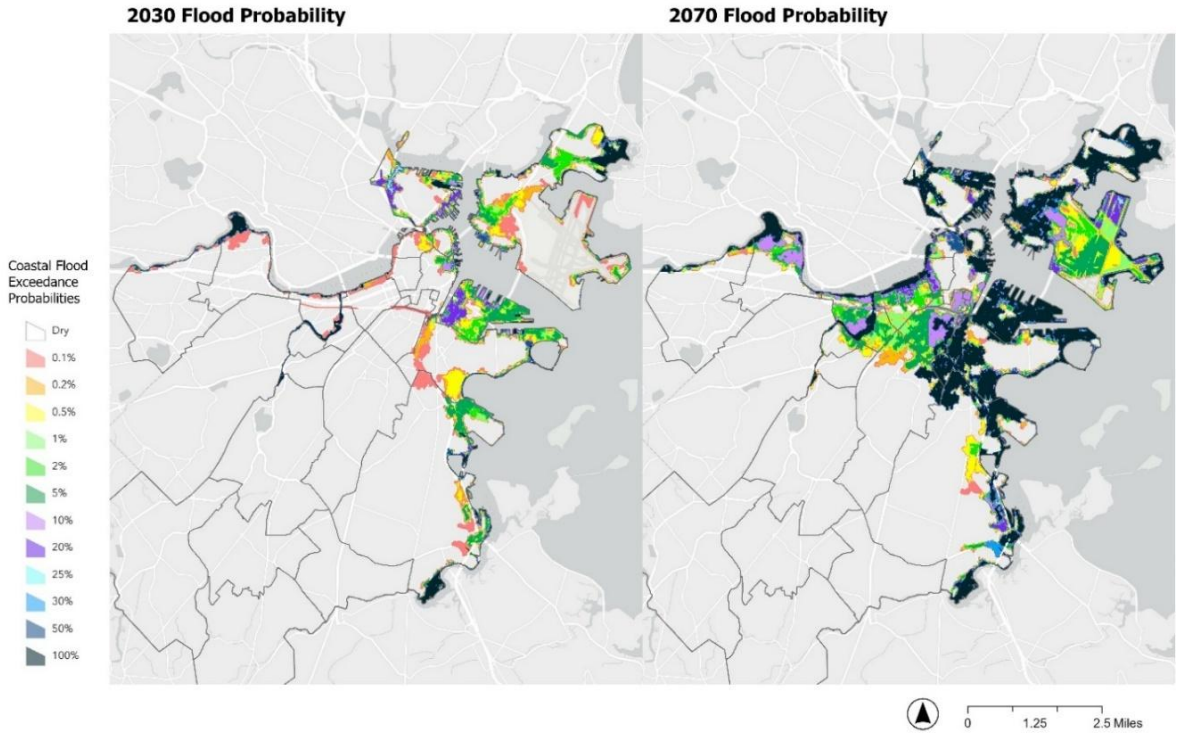


Figure 4-16. MC-FRM 2030 and 2070 Coastal Flood Exceedance Probabilities. Source: CZM.

4.5.4. Location

As a dense coastal city with approximately 47 miles of shoreline along the Boston Harbor (Atlantic Ocean) and its tributaries (the Charles, Neponset and Mystic Rivers), Boston is highly exposed to flooding caused by storm surge, high astronomical tides, wave action, and long-term sea level rise. Boston's vulnerability to coastal flooding is shaped by its extensive waterfront, historic landfilling, and concentration of critical assets in low-lying areas. Many neighborhoods, including portions of East Boston, Charlestown, South Boston, Dorchester, Downtown, and the North End are located at or near current sea level and are exposed to storm surge and tidal flooding during present day storms and high tides from Boston Harbor and connected waterways.

According to the Climate Ready Boston report[125], approximately 10% of Boston is exposed to sea level rise and coastal flooding across the evaluated scenarios. Because the extent of coastal flooding is projected to increase over time, the location of this hazard is classified as medium based on the percentage of the city affected, with approximately 10% to 50% of

[125] City of Boston. (2016, December 7). *Climate Ready Boston: Final report.* https://www.boston.gov/sites/default/files/embed/2/20161207_climate_ready_boston_digital2.pdf

Boston potentially impacted or at risk. Some of the areas most heavily affected are shown in Figure 4-17 using data from FEMA's National Flood Hazard Layer.

The Coastal A Zone includes portions of the 1-percent-annual-chance coastal floodplain located landward of the V Zone and seaward of the Limit of Moderate Wave Action, or LiMWA. During the base flood, waves in this area are expected to range from 1.5 feet to less than 3 feet. Although these waves are smaller than those expected in the V Zone, they can still increase damage to buildings and infrastructure. Figure 4-17 identifies the LiMWA and associated Coastal A Zone areas throughout Boston, as well as the broader 1-percent- and 0.2-percent-annual-chance flood hazard areas.

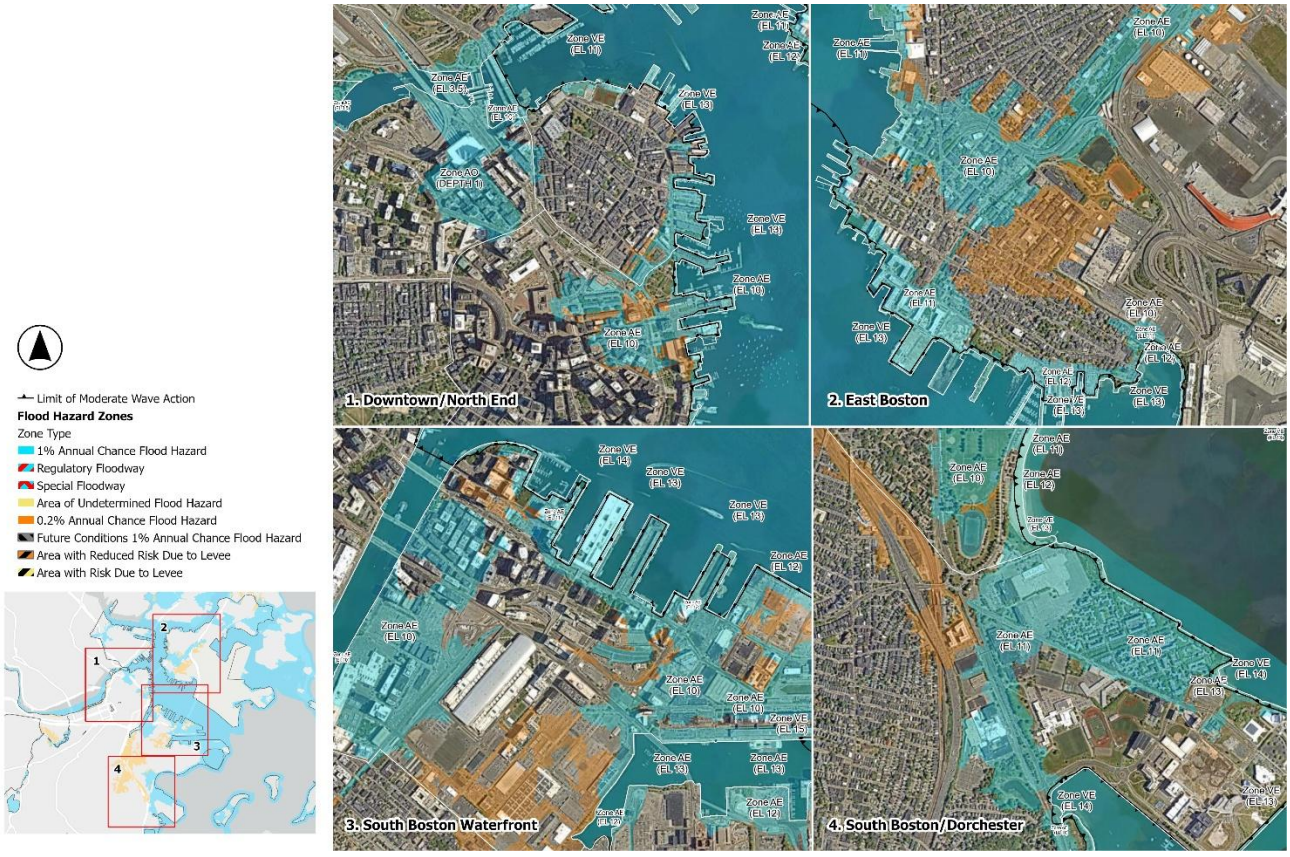


Figure 4-17. FEMA Flood Hazard Risk. 2025.

4.5.5. Previous Occurrences

Over the past decade, Boston has experienced several notable coastal flood and storm surge events that have underscored the city's vulnerability to these hazards. These incidents, driven by a combination of powerful storms, high astronomical tides, and rising sea levels, have led to repeated disruptions of transportation routes, closures of major roadways, and damage to infrastructure. Reviewing these recent occurrences provides important context for understanding the ongoing and increasing risks posed by coastal flooding in the region.

According to the NOAA Storm Events database, there have been 17 recorded coastal flood events within Boston from 2018 to 2026. Several of the events caused disruptions such as street closures and complete inundation of the Harborwalks.

- **January 30, 2018**: Coastal flooding caused significant disruptions in the Boston area. Early in the morning, flooding forced the closure of the exit ramp from I-93 northbound onto Morrissey Blvd in Dorchester. Shortly after, Conley Street near Tenean Beach became impassable, with several vehicles trapped in over a foot of water. By mid-morning, floodwaters had also inundated the corner of Mills Avenue and River Avenue in Revere, reaching depths of one foot and illustrating the city's vulnerability to coastal flooding during storm events.
- **March 2nd and 4th, 2018**: Sleeper Street in South Boston experienced flooding. Several thoroughfares in other neighborhoods such as the West End, East Boston, and Downtown also had road closures as a result, including Causeway Street, Morton Street, Bennington Street, B Street, and Atlantic Avenue. Additionally, Morrissey Boulevard in Dorchester was closed due to these conditions.
- **October 27, 2018:** Morrissey Blvd in Dorchester was closed due to minor coastal flooding.
- **November 25, 2018:** Coastal flooding affected Morrissey Boulevard and Freeport Street in Dorchester, as well as the ramp at Exit 14 of northbound I-93.
- **January 20, 2019:** Morrissey Blvd near the University of Massachusetts Boston in South Boston was closed because of coastal flooding. Freeport Street at Morrissey Blvd was also closed. Minor coastal flooding occurred on the access road to Malibu Beach in Dorchester.
- **October 28, 2019:** Morrissey Boulevard at Freeport Street and the entrance to UMass-Boston was flooded and rendered impassable due to coastal flooding.
- **April 9, 2020:** High astronomical tides caused the closure of two southbound lanes of Morrissey Boulevard between UMass-Boston and Freeport Street due to minor coastal flooding.
- **September 22, 2020:** Two southbound lanes on Morrissey Boulevard between Freeport Street and UMass-Boston were closed as a result of coastal flooding.
- **December 17, 2020:** Minor coastal flooding occurred around high tide. Two lanes, both northbound and southbound, of Morrissey Boulevard between UMass and Freeport Street were closed.
- **February 2, 2021:** Minor coastal flooding led to the closure of a portion of Morrissey Boulevard between UMass Boston and Freeport Street.
- **July 23, 2021:** High astronomical tides resulted in minor coastal flooding in the usual locations throughout Boston.
- **January 17, 2022:** Flooding was observed at Long Wharf in Boston. Morning lane closures occurred on Morrissey Boulevard due to flooding.

- **December 23, 2022:** Morrissey Boulevard was closed in multiple areas because of coastal flooding. Subsequently, moderate coastal flooding completely inundated Harborwalk and Long Wharf.
- **January 23, 2023:** In Dorchester, both lanes of Morrissey Boulevard were closed between Freeport Street and the University of Massachusetts. The ramp from I-93 to Morrissey Boulevard was also closed due to coastal flooding.
- **January 13, 2024:** Morrissey Boulevard was closed and much of Long Wharf was submerged.
- **March 10, 2024:** Morrissey Boulevard was closed due to coastal flooding.
- **April 4, 2024:** Morrissey Boulevard was closed from Freeport Street to JFK stations.

While the following events are recorded within the NOAA database, several occurrences in other neighborhoods have not been officially recorded, demonstrating that this list provides only a snapshot of the disruption of the natural hazard within the City of Boston. Other locations that have frequently seen coastal flooding are Lewis Street in East Boston, shown in Figure 4-18, and Long Wharf in Downtown, which has caused flood damage to the MBTA Aquarium Station.

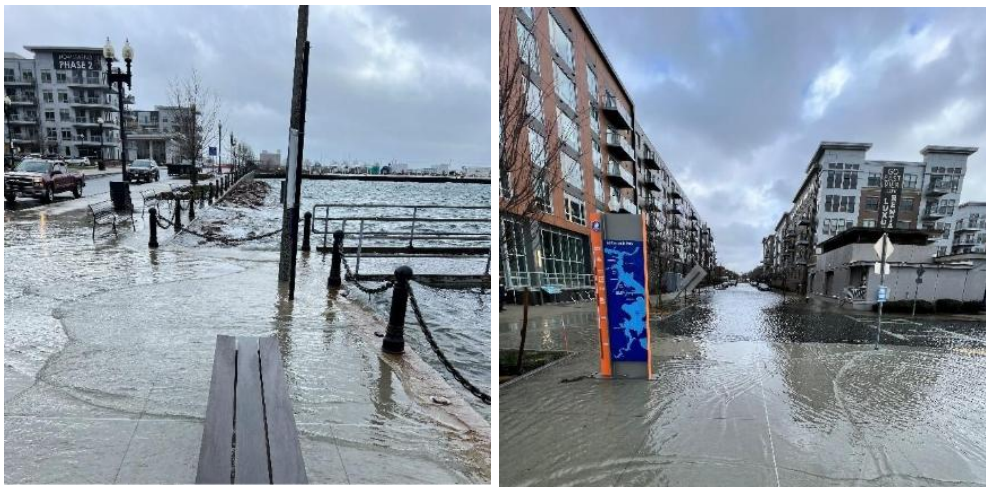


Figure 4-18. December 2022 flooding at Lewis Mall in East Boston. Photos by Weston & Sampson

4.5.6. Impacts of Climate Change

Climate change is fundamentally altering Boston's coastal flood risk and is a primary driver of increasing coastal flood and storm surge inundation events across the city.

As a dense coastal city with extensive waterfront infrastructure, Boston is particularly vulnerable to the combined effects of storm surge, sea level rise, and coastal wave action. Climate change is expected to exacerbate both the severity and geographic extent of coastal flooding, placing increasing strain on emergency response, infrastructure systems,

and vulnerable populations. Flood events that were historically rare are expected to occur more often, last longer, and cause cumulative damage over time, increasing recovery costs and long-term vulnerability.

The Climate Ready Boston report[126] demonstrates the annual losses that are associated with sea level rise (Figure 4-19). As this report was published in 2016, subsequent analyses have further evaluated the increasing economic and infrastructure consequences associated with future sea level rise and coastal storms.

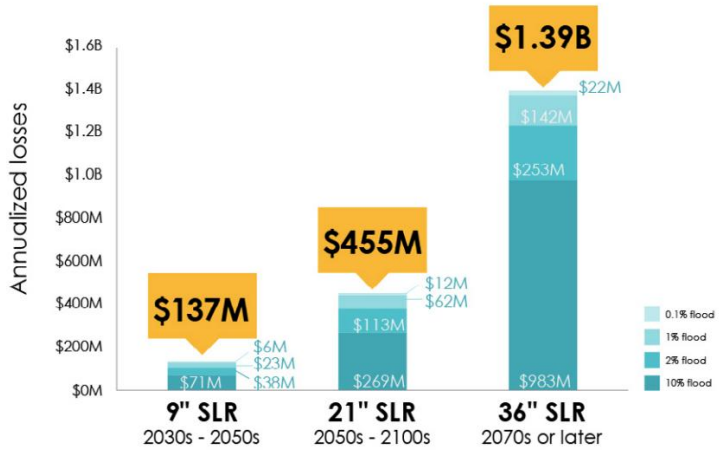


Figure 4-19. Expected annual losses due to sea level rise. Climate Ready Boston, 2016.

More recent analysis conducted through the City of Boston and U.S. Army Corps of Engineers (USACE) Coastal Storm Risk Management (CSRM) Feasibility Study further demonstrates how climate change is expected to increase coastal flood risk over time. The 2026 Draft Integrated Feasibility Report and Programmatic Environmental Assessment[127] evaluates coastal storm risk along approximately 47 miles of Boston's coastline and considers future sea level change in assessing impacts to people, buildings, transportation systems, critical infrastructure, and other community assets. Under the sea level change scenarios evaluated by USACE, relative sea level rise in Boston could reach approximately four feet by 2090. During a 1 percent annual chance coastal storm event under these future conditions, 20,000 or more structures could be affected, and cumulative flood damages over the study period could exceed $54 billion if additional risk reduction measures are not implemented. These findings reinforce that sea level rise will not only increase the depth

[126] City of Boston. (2016, December 7). *Climate Ready Boston: Final report.* https://www.boston.gov/sites/default/files/embed/2/20161207_climate_ready_boston_digital2.pdf
[127] City of Boston. (2026). *USACE draft integrated feasibility report: Boston CSRM.* https://www.boston.gov/departments/climate-resilience/usace-draft-integrated-feasibility-report-boston-csrm

and frequency of coastal flooding but will also expand flood exposure farther inland, increasing the potential for widespread and costly impacts across Boston.

4.5.7. Vulnerability and Impacts

Present Day Coastal Flood Risk

Present coastal flood conditions can be described using data from the FEMA National Flood Hazard Layer (NFHL), which identifies areas at risk for flooding based on current sea levels and storm impacts. According to the NFHL (Figure 4-20), many parts of Boston's waterfront neighborhoods, such as East Boston, Charlestown, South Boston, and the North End, are located within designated Special Flood Hazard Areas (SFHAs). These SFHAs represent locations with a 1% annual chance of flooding, commonly referred to as the "100-year floodplain", demonstrating a risk that may happen during a large storm event today. In recent years, moderate storms have already caused disruptions such as street flooding, basement inundation, and damage to public utilities, while more severe events have led to widespread disruptions and costly repairs. The NFHL mapping highlights the ongoing threat to both residential and commercial properties, emphasizing the need for continued resilience planning and flood mitigation efforts in the City of Boston.

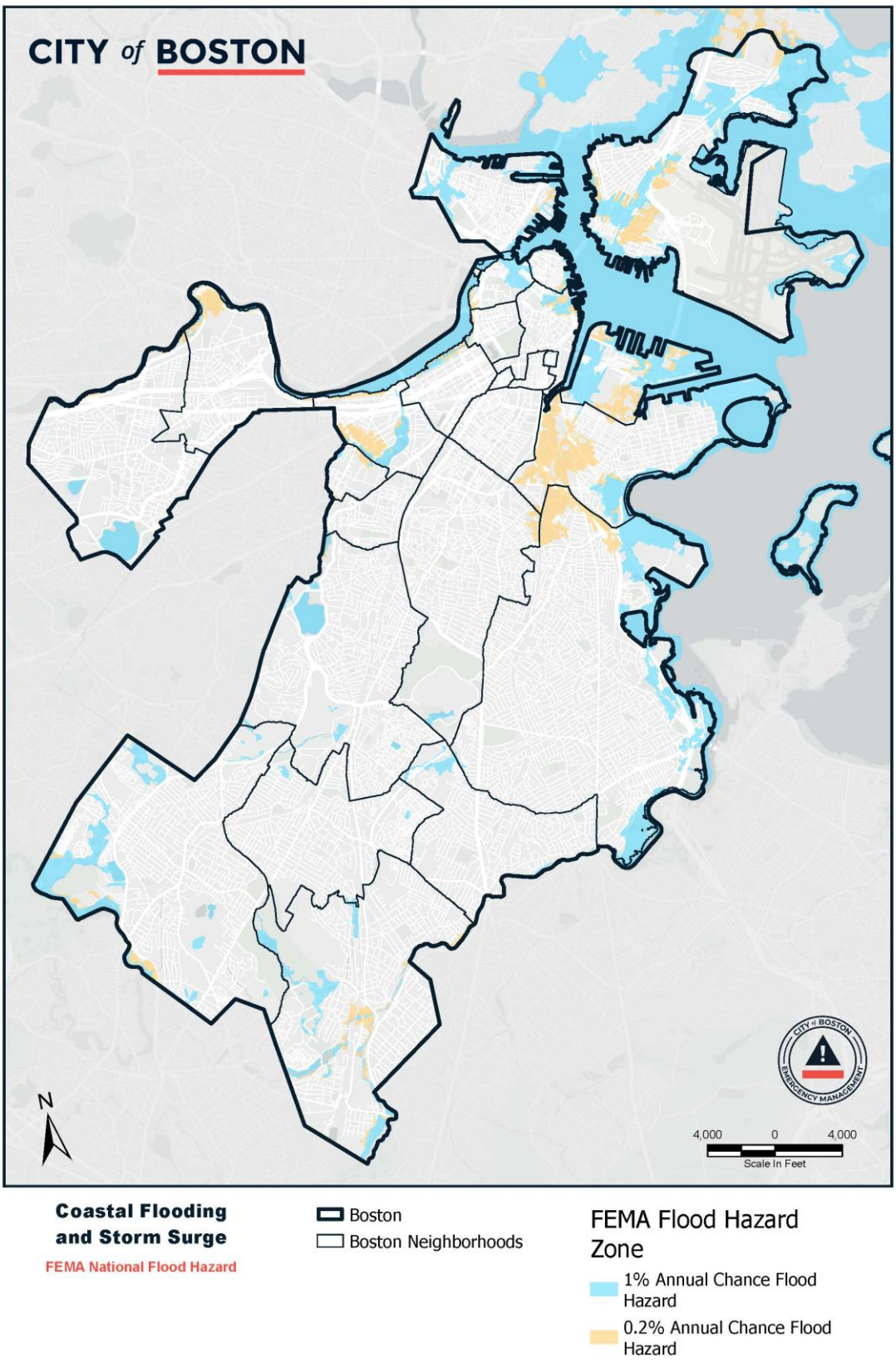


Figure 4-20. FEMA Flood risk across the City of Boston.

Future Coastal Flood Risk

The Massachusetts Coastal Flood Risk Model (MC-FRM) flood depth mapping represents the best available data for evaluating current and future coastal flooding and storm surge risk under projected sea level rise conditions. MC-FRM outputs depict the location, extent, and depth of flooding during a 1% annual chance (100-year) coastal flood event, incorporating anticipated sea level rise for future planning horizons. These projections provide a basis for assessing changes in vulnerability and risk to people, property, infrastructure, and critical facilities over time to evaluate future hazard conditions.

Under the 2030 flood depth scenario, shown in Figure 4-21, areas currently subject to coastal flooding remain vulnerable, with modest but meaningful increases in flood extent and inundation depth. Low-lying coastal areas, waterfront residential and commercial development, transportation corridors, and utility infrastructure experience greater exposure to shallow flooding during a 1% annual chance event. These conditions increase the potential for repetitive loss and contribute to the gradual degradation of public infrastructure and private structures.

The 2070 MC-FRM flood depth projections, shown in Figure 4-22, indicate a substantial increase in coastal flood vulnerability and risk as sea level rise significantly amplifies storm surge impacts. Flooding during a 1% annual chance event is projected to extend farther inland, to areas within the South End, Fenway, Back Bay, and Allston, reaching greater depths and affecting areas not currently mapped within FEMA Special Flood Hazard Areas. Deeper inundation increases the probability of structural damage to buildings, failure of electrical and mechanical systems, and loss of access along critical evacuation and emergency response routes. Critical facilities and lifeline infrastructure, including wastewater systems, transportation assets, and utility networks face heightened risk of functional disruption or long-term damage in the future flood risk model.

Comparison of the 2030 and 2070 flood depth scenarios demonstrates a clear escalation in both probability of impact and consequence severity over time. Overall, MC-FRM flood depth modeling confirms that coastal flooding and storm surge represent a growing and long-term hazard, with risk increasing substantially under future sea level rise conditions.

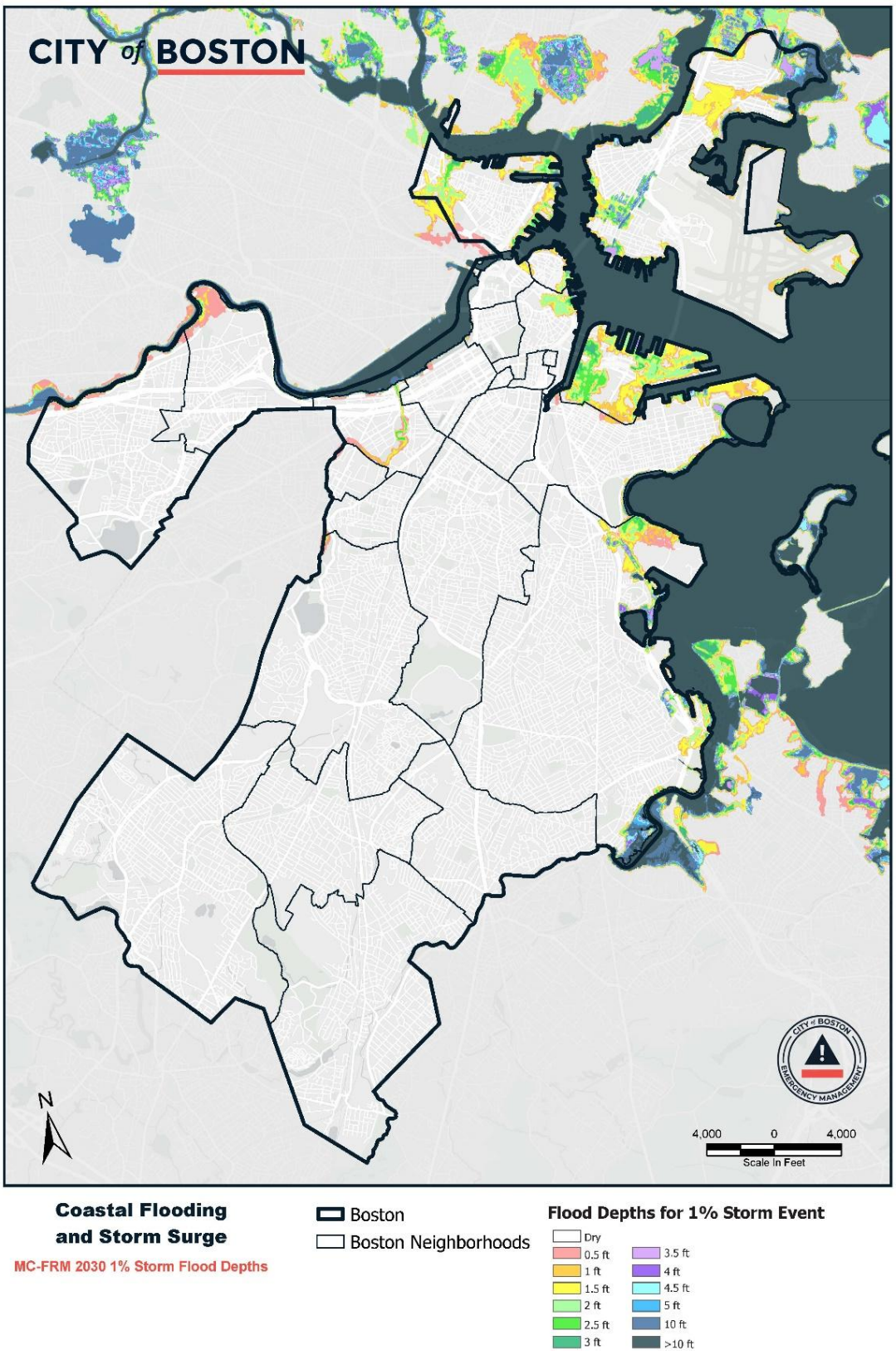


Figure 4-21. MC-FRM 2030 1% Storm Event Flood Risk.

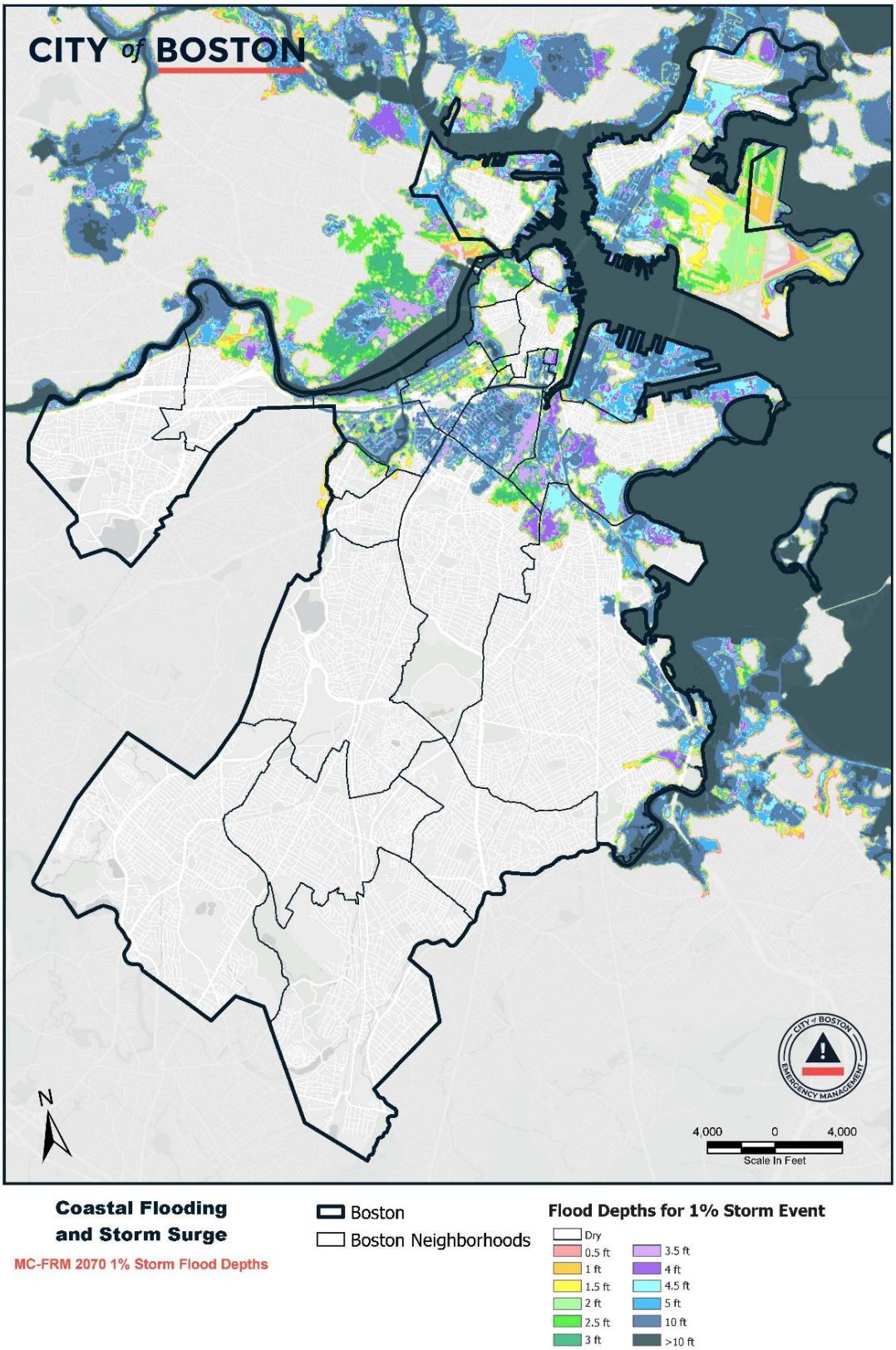


Figure 4-22. MC-FRM 2070 1% Storm Event Flood Risk.

Impacts on Assets

People

East Boston faces a significant flood risk, as much of it is located within designated Special Flood Hazard Areas according to FEMA, making it vulnerable to frequent and severe coastal flooding events. The neighborhood's vast immigrant population is especially at risk, as these communities may have limited resources and access to information, which can hinder their ability to prepare for, respond to, and recover from flood emergencies.

In addition to East Boston, several other Boston neighborhoods, including Charlestown, South Boston, Dorchester, and areas along the Neponset River such as Mattapan, face varying degrees of coastal or tidally influenced flood risk. Many of these areas include Environmental Justice populations identified by the Massachusetts Environmental Justice Map, indicating concentrations of low-income households, communities of color, and residents with limited English proficiency. These factors can increase vulnerability to flood impacts and complicate evacuation, response, and recovery. Even neighborhoods outside of the mapped floodplain, such as Roxbury, may experience indirect impacts through disruptions to critical infrastructure and community lifelines.

Structures

Coastal flooding presents a significant risk to structures located within mapped flood hazard areas. Based on current Flood Insurance Rate Maps (FIRMs), approximately 3,469 structures are located within the SFHA.

City-owned buildings are also located within mapped flood hazard areas. Table 4-5 identifies city-owned buildings located within high hazard FEMA flood zones (A, AE, and VE) and indicates their flood insurance status. A complete inventory of all city-owned buildings located within flood-prone areas, including FEMA flood zone and flood insurance status, is provided in Appendix E.

Table 4-5. City-Owned Buildings within the High Hazard Flood Zones (A, AE, VE)

Building	Street Address	Zip Code	Flood Zone	Flood Insurance Status
Boston City Hall	1 City Hall Square	2201	AE	Insured
West Roxbury Education Complex and Community Center	1205 VFW Parkway	2132	A	Insured

Building	Street Address	Zip Code	Flood Zone	Flood Insurance Status
Umana (Mario) Academy	312 Border Street	2128	AE	Insured
Curley Community Center / L St. Beach	1663 Columbia Road	2127	VE	Insured
Murphy (R.J) K-8 School & Leahy-Holloran BCC (same bldg)	1 Worrell Street	2122	AE	Insured
East Boston Stadium	143 Porter Street	2128	AE	Insured
Faneuil Hall	Faneuil Hall Square	2109	AE	Insured
East Boston Early Education Center	35 Gove Street	2128	AE	Insured
East Boston Branch Library	365 Bremen St.	2128	AE	Insured
Paris Street Community Center	112 Paris Street	2128	AE	Insured
Paris Street Pool	113 Paris Street	2128	AE	Insured
EAST BOSTON HEALTH CENTER	79 Paris Street	2128	AE	Insured
Alighieri Dante Montessori School	37 Gove Street	2128	AE	Insured
Previous Area A-7 Station	69 Paris Street	2128	AE	Insured
DIV 1 - DIST 1 - ENGINE 9 LADDER 2	239 Sumner Street	2128	AE	Insured

Building	Street Address	Zip Code	Flood Zone	Flood Insurance Status
Pino Community Center	86 Boardman Street	2128	AE	Insured
Fire Alarm Office	59 Fenway	2115	AE	Insured
Back Bay Fens Maintenance Yard	438 Park Dr.	2215	AE	Insured
Jamaica Pond Boathouse	507 Jamaicaway	2130	A	Insured
Columbus Park Day Care & Garage	1187 Columbia Rd	2127	AE	Insured
Back Bay Fens Maintenance Yard	438 Park Dr./Riverway	2215	AE	Insured
Will McDonough Field House	1187 Columbia Road	2127	AE	Insured
12 Channel Street	12 Channel Street	2210	AE	Insured
Golden Age Community Center	382 Main Street	2129	AE	Insured
Ambulance 15	512 Main St	2129	AE	Insured

Within this inventory, 27 structures are identified as Repetitive Loss (RL) and/or Severe Repetitive Loss (SRL) properties. These structures have experienced multiple flood-related insurance claims and represent a subset of buildings with heightened vulnerability to recurring coastal flood impacts, including structural damage, mold, and loss of use.

Future flood risk projections further illustrate the increasing exposure of the built environment. Under the 2030 MC-FRM 1-percent-annual-chance flood scenario, approximately 3,540 structures are anticipated to be located within the flood extent. Of

these, an estimated 1,750 structures are classified as residential or mixed-use residential, indicating a substantial potential impact to housing stock, population stability, and post-disaster recovery capacity.

By 2070, the projected 1-percent-annual-chance floodplain expands considerably under the MC-FRM scenario, encompassing approximately 17,780 structures. This represents a substantial increase in exposure, driven by factors such as sea level rise, storm surge, and changing coastal dynamics. Notably, approximately 11,760 residential or mixed-use structures remain within this projected flood extent, underscoring the persistent vulnerability of critical housing assets.

Structures located within these flood-prone areas are subject to a range of potential impacts, including:

- Structural damage from inundation and potential wave action
- Foundation undermining and erosion in coastal high hazard areas
- Damage to mechanical, electrical, and plumbing systems
- Increased frequency and severity of repetitive losses
- Displacement of residents and disruption of local economic activity

Future flood exposure will also be influenced by continued development and population growth in and near flood-prone areas. The increasing number of structures exposed to coastal flooding over time highlights the importance of continued mitigation efforts, including elevation, floodproofing, acquisition, and improved land use planning.

As discussed in Section 3.8.3, several neighborhoods expected to experience future growth, including Downtown, East Boston, the South Boston Waterfront, and Fort Point Channel, are also exposed to present or projected coastal and inland flooding.

Community Lifelines and Other Critical Facilities

Coastal flooding poses a direct risk to facilities that support Boston's Community Lifelines that enable daily life, emergency response, and long-term recovery. An analysis of assets within the present-day FEMA floodplain shows that a substantial number of these essential resources are exposed to flooding hazards.

Of the assets located within the floodplain, 29 facilities include educational assets such as schools or universities, community centers, libraries, and other critical assets. With Boston notably as a health center hub, it is important to recognize that only three assets in the flood zone are hospitals or community health centers, indicating the ability to continue with response even during a coastal flooding event.

Additionally, many essential food resources, including community gardens, grocery stores, food pantries, and convenience stores, are at risk of coastal flooding. 28 such resources are located within the flood extent of the MC-FRM 1% annual chance event in 2030, 68 are

within the extent in 2050, and 204 in 2070. Flooding of these resources could disrupt access to food and essential supplies, particularly during and immediately following coastal storm events.

Transportation

Coastal flooding poses a significant threat to the reliability and functionality of critical transportation infrastructure throughout the planning area. Key corridors, transit assets, and multimodal networks are already experiencing disruptions under present-day conditions, with risks projected to increase under future flood scenarios.

Public transit infrastructure is also vulnerable. Several stations within the MBTA system are located within both current FEMA flood zones and projected future flood extents identified by MC-FRM. Flooding at these locations can result in service delays, temporary station closures, and increased operational demands as crews deploy temporary flood barriers and implement protective measures. Services like water taxis and ferries are also disrupted due to flooding at stations and unsafe sea conditions.

At a broader network scale, all Amtrak and MBTA commuter rail lines serving Boston, approximately 2,300 miles of MBTA bus routes, and 48 miles of bicycle routes have segments located within the present-day FEMA floodplain. These exposures create system-wide vulnerabilities, where localized flooding can cascade into regional service disruptions affecting commuters, workforce mobility, and emergency response times.

Under future conditions, the extent of transportation infrastructure exposed to flooding is expected to increase within both the 2030 and 2070 MC-FRM 1-percent-annual-chance flood zones.

Natural, Cultural, and Historic Resources, Economy, and Activities that have Value to the Community

Natural areas located within Boston's present and projected coastal floodplain including wetlands, salt marshes, beaches, riverbanks, waterfront parks, and other open spaces provide important floodplain functions. These areas can temporarily store and slow floodwater, absorb wave energy, reduce shoreline erosion, filter pollutants, and provide habitat for fish, birds, and other wildlife, including rare or sensitive species identified in Section 3.5.1. Coastal flooding, sea level rise, and repeated extreme high tides may damage or reduce these functions through erosion, saltwater intrusion, prolonged inundation, and changes in plant and wildlife habitat. As these natural areas are degraded or lost, surrounding neighborhoods and infrastructure may become more exposed to flooding and wave impacts. Protecting and restoring coastal wetlands and other natural floodplain areas is therefore important both for ecological health and for reducing flood risk throughout Boston.

In addition to affecting these natural systems, coastal flooding and extreme high tide events can disrupt community resources, the local economy, and the activities that contribute to Boston's quality of life. When floodwater inundates roadways, transit corridors, and commercial areas, access to businesses becomes limited or unsafe. These conditions can delay deliveries, reduce customer traffic, and in some cases force temporary closures, resulting in lost revenue for local businesses. Repeated flooding can also strain long-term economic stability by increasing maintenance costs, insurance burdens, and uncertainty for waterfront and small businesses.

Beyond direct economic impacts, coastal flooding also affects community-centered activities that hold social and cultural value. Public events, recreational programs, and use of the city's open spaces, particularly along the waterfront, may be canceled or postponed due to unsafe conditions. Flooding of parks, trails, and community facilities limits access to gathering spaces that support public health and neighborhood cohesion. In the aftermath of flood events, municipal staff and community organizations often shift time and resources toward cleanup and recovery efforts, reducing capacity to support other initiatives and services. Together, these impacts highlight how coastal flooding can disrupt not only economic activity, but also the everyday experiences and connections that are vital to community well-being.

4.6. Drought

Drought is a recurring hazard in Boston that is characterized by extended periods of below average precipitation, reduced water availability, ecological stress, elevated wildfire risk, and strain on water supply systems. Although Boston has a humid continental climate and receives approximately 44.5 inches of precipitation annually, rainfall variability and extended dry periods can still produce drought conditions that affect water resources, vegetation, and ecological systems. Historical drought declarations indicate that drought is a moderate to high probability hazard for Boston, with notable recent events occurring in 2016 to 2017, 2020, 2022, 2024, and 2025. These events demonstrate that drought is not an isolated occurrence, but rather a persistent and cyclical risk that is expected to affect the city every two to three years.

Drought conditions generally affect the entire City of Boston because declarations are issued at the regional or watershed scale, and Boston is located within the Northeast Region of Massachusetts. However, impacts may vary locally depending on watershed conditions, soil moisture, vegetation, and patterns of urban development. Boston's water supply, provided by the Massachusetts Water Resources Authority through the Quabbin and Wachusett Reservoirs, offers substantial resilience during shorter drought events, but prolonged multiyear droughts can still strain regional water systems and require

conservation measures. Climate change is expected to intensify future drought risk by increasing temperatures, evaporation, soil moisture loss, and the length of dry periods between rainfall events. Boston's vulnerability is shaped by its dense urban environment, limited natural water storage, reliance on regional reservoirs, and exposure of parks, street trees, small water bodies, environmental justice communities, water dependent businesses, and municipal operations to prolonged dry conditions. While drought is not typically associated with immediate life safety impacts, it can produce cumulative consequences, including reduced water flow in streams and rivers, stressed vegetation, degradation of green space, increased urban heat island effects, higher maintenance costs, water restrictions, and elevated brush fire risk.

4.6.1. Description

Drought is an extended period of below average precipitation that results in reduced water availability, ecological stress, increased wildfire risk, and strain on water supply systems. Although Boston is located in a humid continental climate and typically receives consistent precipitation throughout the year, drought remains a recurring hazard due to variability in rainfall patterns and rising temperatures associated with climate change.

According to the National Oceanic and Atmospheric Administration climate normals for 1991 through 2020, Boston receives approximately 44 inches of precipitation annually, with relatively even distribution across seasons,[128] as shown in Table 4-6. Even with this annual average, short term deficits or extended dry periods can result in drought conditions that affect water supply, vegetation, and ecological systems.

Table 4-6. NOAA Climate Normals, Precipitation, 1991-2020.[129]

Season	Precipitation (inches)
Annual	44.52
Winter	11.36
Spring	11.20
Summer	11.48
Autumn	10.48

[128] National Oceanic and Atmospheric Administration, National Centers for Environmental Information. (n.d.). U.S. *climate normals*. https://www.ncei.noaa.gov/access/us-climate-normals
[129] National Oceanic and Atmospheric Administration, National Centers for Environmental Information. (n.d.). U.S. *climate normals: Boston, MA (station* USW00014739). https://www.ncei.noaa.gov/access/us-climate-normals/#dataset=normals-annualseasonal&timeframe=15&location=MA&station=USW00014739

4.6.2. Severity

Drought severity in Massachusetts is assessed by the Massachusetts Drought Management Task Force, which is coordinated by the Massachusetts Executive Office of Energy and Environmental Affairs (MA EOEEA). The Task Force evaluates six key indicators including precipitation, groundwater levels, streamflow, reservoir storage, evapotranspiration, and fire danger.[130]

Drought conditions are categorized into five levels, shown in Table 4-7. The end of a drought is primarily determined by improvements in precipitation and groundwater, which have the strongest influence on long term water supply and ecosystem recovery.

Table 4-7. Drought Condition Scale in Massachusetts.

Drought Level	Condition Description
Level 0	Normal
Level 1	Mild Drought
Level 2	Significant Drought
Level 3	Critical Drought
Level 4	Emergency

Boston, located in the Northeast Region of Massachusetts, has experienced multiple drought declarations in recent years, including Mild, Significant, and Critical conditions. As drought conditions can vary throughout the year, the most up to date drought conditions are kept and updated by the MA EOEEA. At the time of this report and as declared on April 8, 2026, the current drought status[131] for the City of Boston is Level 1, mild drought (Figure 4-23).

[130] Massachusetts Executive Office of Energy and Environmental Affairs. (2023). *Massachusetts drought management plan.* https://www.mass.gov/doc/massachusetts-drought-management-plan/download
[131] Massachusetts Executive Office of Energy and Environmental Affairs. (n.d.). *Drought status.* https://www.mass.gov/info-details/drought-status

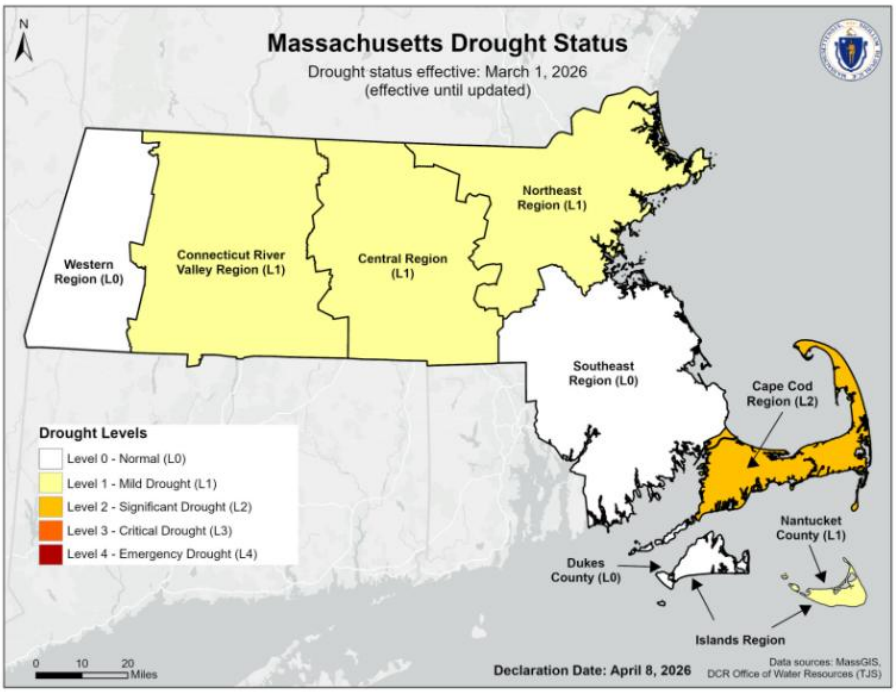


Figure 4-23. Current drought status as of April 2026. Source: MA EOEEA

4.6.3. Probability

Drought is a recurring hazard in Boston and across Massachusetts. Based on historical drought declarations and monitoring data from the United States Drought Monitor, the Northeast Region experiences drought conditions on a regular basis, though severity and duration vary from year to year (Figure 4-24).[132]

Since 2000, the region has experienced multiple drought events, with notable periods occurring in 2016 through 2017, 2020, 2022, and 2024. Between 2020 and 2025, drought conditions occurred in most years, with several months classified as Significant or Critical.[133]

[132] Massachusetts Executive Office of Energy and Environmental Affairs. (n.d.). *History of drought declarations in Massachusetts.* https://www.mass.gov/info-details/history-of-drought-declarations-in-massachusetts
[133] National Drought Mitigation Center, U.S. Department of Agriculture, & National Oceanic and Atmospheric Administration. (n.d.). *U.S. Drought Monitor.* https://droughtmonitor.unl.edu/

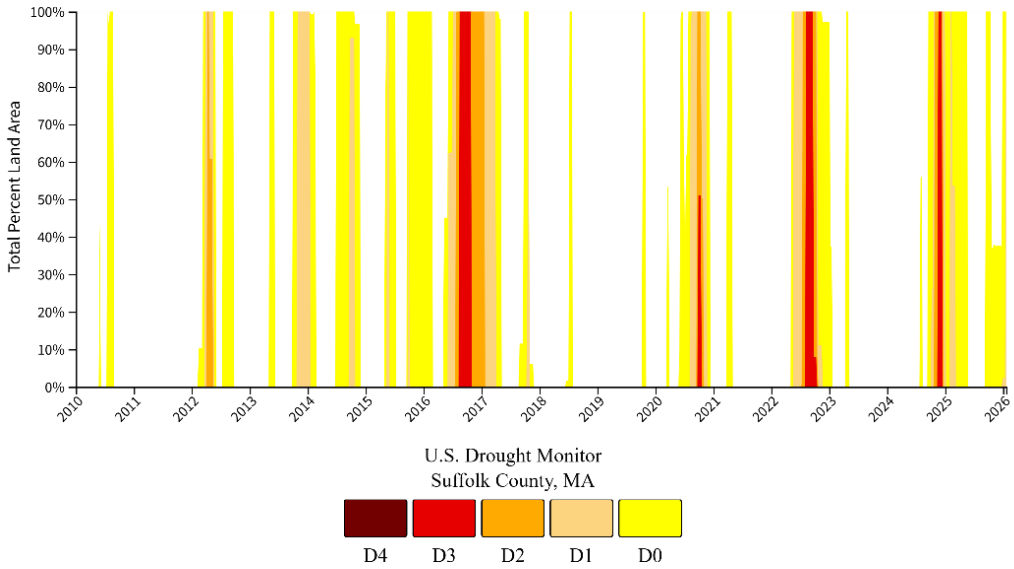


Figure 4-24. U.S Drought Monitor for Suffolk County, MA.

Given this historical frequency, drought in Boston can be characterized as having a moderate to high probability of occurrence, with at least some level of drought conditions expected every two to three years.

4.6.4. Location

Drought declarations in Massachusetts are issued at the regional or watershed scale. Boston lies entirely within the Northeast Region as defined by the Massachusetts Drought Management Plan.[134] As a result, drought conditions typically affect the entire city uniformly when regional declarations are issued.

However, watershed specific conditions can result in localized variation in drought severity. For example, the Charles River watershed has experienced more severe drought conditions at times compared to the broader region due to differences in hydrology and water storage.

Boston's water supply is provided by the Massachusetts Water Resources Authority, which sources water from the Quabbin and Wachusett Reservoirs. These large regional reservoirs west of the City of Boston provide a buffer against short term drought conditions but remain vulnerable during extended multi-year drought events.[135]

[134] Massachusetts Executive Office of Energy and Environmental Affairs. (2023). *Massachusetts drought management plan.* https://www.mass.gov/doc/massachusetts-drought-management-plan/download
[135] Massachusetts Water Resources Authority. (n.d.). *Reservoirs and watersheds.* https://www.mwra.com/your-water-system/reservoirs-watersheds

4.6.5. Previous Occurrences

Massachusetts has a long history of drought, with records dating back to the late nineteenth century. The most severe drought on record occurred between 1961 and 1969 and resulted in widespread water restrictions, emergency supply measures, and long-term infrastructure investments.

Since the adoption of the Massachusetts Drought Management Plan in 2000, drought monitoring has become more consistent. The Northeast Region, including Boston, has experienced several notable drought periods:

- **2016-2017** Significant to Critical drought
- **2020** Mild to Significant drought
- **2022** Significant to Critical drought
- **2024** Significant to Critical drought

Between 2020 and 2025, the Northeast Region experienced drought conditions in the majority of years, with multiple months reaching Significant or Critical levels (Table 4-8). These recurring events demonstrate that drought is not an isolated hazard but a persistent and cyclical risk.

Table 4-8. Northeast MA, Declarations of Drought from 2020 to 2025[136]

Year	Months with Any Drought (Mild+)	Months of Significant Drought	Months of Critical Drought
2020	5	4	0
2021	2	0	0
2022	6	4	3
2023	0	0	0
2024	5	3	2
2025	6	5	1
2026*	3	1	1

*Through March 2026

[136] Massachusetts Executive Office of Energy and Environmental Affairs. (n.d.). *History of drought declarations in Massachusetts.* https://www.mass.gov/info-details/history-of-drought-declarations-in-massachusetts

4.6.6. Impacts of Climate Change

Climate change is expected to intensify drought conditions in Boston through rising temperatures and changing precipitation patterns. Higher temperatures increase evaporation from soil and water bodies, reduce soil moisture, and lengthen dry periods even when total annual precipitation remains relatively stable.

According to the Massachusetts Climate Change Assessment, Boston is projected to experience a slight increase in consecutive dry days and variability in rainfall patterns over time (Table 4-9). While total precipitation may not significantly decrease, more precipitation is expected to occur in intense storm events, leaving longer dry intervals between storms[137].

While Boston's MWRA reservoir system remains resilient, climate change–driven droughts can still increase the frequency and severity of dry periods, heightening the need for water conservation and raising the risk of dry_vegetation conditions that contribute to brush fires and ecosystem stress.

Table 4-9. Consecutive dry day events, Boston Harbor, MA, Climate Change Assessment 2022[138]

Planning Horizon	Consecutive Dry Day Events	Days without Rain (annual)
Baseline	31	192
2050	31	185
2030	32	192
2070	32	194
2090	33	198

4.6.7. Vulnerability and Impacts

Boston's vulnerability to drought is shaped by its reliance on regional water supply systems, dense urban landscape, and limited natural water storage within the city. Although drought

[137] Massachusetts Department of Public Health, Bureau of Climate and Environmental Health. (n.d.). *Climate fact sheet: Heat and drought.* Retrieved April 13, 2026, from https://www.mass.gov/info-details/climate-fact-sheet-heat-and-drought

[138] Massachusetts Executive Office of Energy and Environmental Affairs. (2022, December). *2022 Massachusetts climate change assessment: Volume II—Statewide report.* https://www.mass.gov/doc/2022-massachusetts-climate-change-assessment-december-2022-volume-ii-statewide-report/download

events and impacts are typically slower to develop than other hazards, historical events demonstrate that prolonged precipitation deficits can result in widespread and cumulative impacts affecting water supply, ecosystems, and municipal operations. Historically, major drought events in Massachusetts, including the 1960s drought of record and more recent droughts in 2016–2017, 2020, 2022, and 2024, have led to water use restrictions, increased demand on reservoirs, and implementation of emergency management measures.

During the 1961–1969 drought, communities across the Commonwealth implemented strict conservation measures and expanded water supply infrastructure, highlighting the long-term strain drought can place on regional systems. More recent droughts have resulted in recurring state-issued drought declarations, including Significant and Critical levels in the Northeast Region.

The city's water supply system, managed by the Massachusetts Water Resources Authority, provides significant resilience due to large reservoir storage capacity. However, past drought conditions have had significant impact on people and natural systems requiring water conservation measures, public advisories, and increased monitoring of reservoir levels. Such requirements illustrate that even robust systems are vulnerable during extended dry periods. Local impacts are often more immediate in smaller water bodies, urban vegetation, and soil. Reduced streamflow, stressed trees, and degraded green spaces are common during drought conditions. These impacts can reduce the effectiveness of Boston's urban tree canopy in mitigating heat and can contribute to worsening urban heat island effects, as discussed in Section 4.2. Drought may also strain local food production, such as at farms and community gardens within the city, posing potential risks to food access.

Drought also increases the risk of secondary hazards, particularly brush fires in parks, open space areas, and the wildland urban interface. Historical drought periods in Massachusetts have been associated with elevated fire danger and increased demand on emergency services.

Certain populations are more vulnerable to drought impacts, such as environmental justice communities and residents in densely developed areas may experience greater impacts due to limited green space and higher exposure to heat during dry periods. Parks, recreation areas, and urban forestry assets are particularly vulnerable to prolonged moisture deficits, which can lead to long-term loss of vegetation and increased maintenance costs. Institutions and businesses that rely on water for operations may also be affected by conservation restrictions during more severe drought conditions.

Based on historical patterns, drought in Boston represents a moderate but increasing risk, characterized by its recurrence, long duration, and potential for widespread system impacts. While not typically associated with immediate life safety risks, drought has

demonstrated the ability to strain water resources, degrade environmental conditions, and increase the likelihood of secondary hazards over time. Climate change is expected to amplify these impacts by increasing temperatures and extending dry periods, further elevating Boston's vulnerability to future drought events.

4.7. Earthquakes

Earthquakes are a low-probability but potentially serious hazard for Boston because, while the region experiences infrequent seismic activity compared with the western United States, damaging earthquakes have occurred in Massachusetts and the broader Northeast. Earthquake shaking could affect the entire city rather than a single mapped hazard area, though impacts would be greatest where older buildings, critical infrastructure, and soft or filled soils overlap. Boston's older, harder bedrock can transmit shaking over long distances, meaning earthquakes centered outside the city or even outside Massachusetts can still be felt locally. Most small regional earthquakes are expected to produce weak to light shaking with little to no damage, but a moderate event could cause nonstructural damage, falling contents, cracked walls, chimney failures, and localized damage to vulnerable masonry or older buildings. Historic events, especially the 1755 Cape Ann earthquake, remain important planning scenarios because that event damaged brick structures and chimneys in Boston and had stronger effects on filled waterfront land.

Boston's earthquake vulnerability is driven by its age, density, historic building stock, extensive shoreline fill, underground infrastructure, and concentration of regional lifeline systems. People are most at risk from falling masonry, damaged chimneys, broken glass, and debris, particularly in dense neighborhoods with older structures and narrow streets; renters, older adults, people with disabilities, medically dependent residents, low-income households, non-English-speaking households, and people experiencing homelessness may face greater challenges during evacuation and recovery. Structures such as unreinforced masonry buildings, historic rowhouses, older commercial buildings, churches, schools, bridges, tunnels, wharves, retaining walls, and utility corridors could experience damage, especially on artificial fill, former wetlands, tidal flats, or soft soils. Community lifelines including hospitals, emergency facilities, transit systems, roads, bridges, tunnels, Logan Airport, port facilities, water and wastewater systems, power, gas, and communications could face direct damage or cascading disruptions. Climate change is not expected to increase earthquake frequency or magnitude, but sea-level rise, higher groundwater, coastal flooding, and storm damage could worsen consequences for waterfront structures, utilities, tunnels, and soils. A damaging earthquake could also affect historic landmarks, cultural institutions, hazardous materials sites, businesses, transportation, tourism, and regional commerce, making earthquake risk in Boston less about frequent events and more about the consequences of a rare event in a dense, historic, infrastructure-rich city.

4.7.1. Description

An earthquake occurs when stress in the Earth's crust is released suddenly also referred to as a slip, commonly along a fault or fracture, producing seismic waves that travel through the ground (Figure 4-25). Although the slip along the fault may only last a few seconds, a large earthquake can produce ground shaking that continues for many tens of seconds due to the variety and behavior of the seismic waves.[139] Earthquake magnitude describes the energy released at the source, whereas intensity describes the shaking and damage experienced at a specific location

Boston is located in a region of relatively infrequent seismicity compared with the western United States, but damaging earthquakes have occurred in Massachusetts and the broader Northeast. The region's older, harder bedrock can transmit shaking over long distances, meaning that earthquakes centered outside the city or outside Massachusetts can still be felt in Boston. Primary exposure in Boston includes older unreinforced masonry, brick chimneys, bridges, tunnels, utilities, and neighborhoods built on landfills where shaking may be amplified.[140]

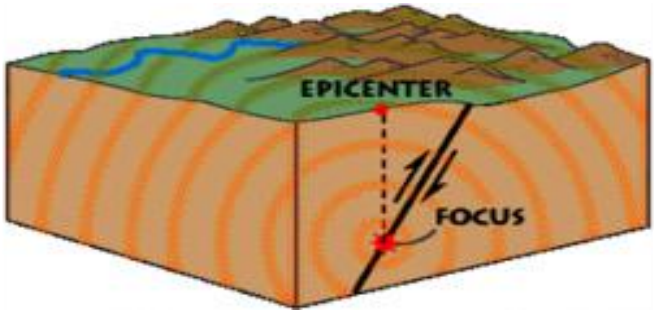


Figure 4-25 Earthquake Focus and Epicenter Model, USGS

4.7.2. Severity

Earthquake extent for mitigation planning is described using a combination of magnitude, Modified Mercalli Intensity (MMI), and ground-motion measures such as peak ground acceleration. Magnitude is useful for describing the source event, but MMI is often more relevant to local impact because it describes the effects of shaking on people, buildings, and infrastructure at a specific location. The USGS uses the Modified Mercalli Intensity Scale in the United States; the scale ranges from lower intensities that are not felt or are weakly felt to higher intensities associated with structural damage and destruction (Table

[139] Northeast States Emergency Consortium. (n.d.). *Earthquakes hazards.* https://nesec.org/earthquakes-hazards/
[140] Pratt, T., & Ebel, J. (n.d.). *ShakeMap scenario catalog for selected historical New England earthquakes.* U.S. Geological Survey. https://earthquake.usgs.gov/scenarios/catalog/nefema/

4-10). These descriptions help communities assess potential building vulnerability and damage patterns during significant seismic events.[141]

Table 4-10. The Modified Mercalli Intensity Scale, USGS. Earthquake Hazards Program.

Intensity	Shaking	Description / Damage
I	Not felt	Not felt except by a very few under especially favorable conditions.
II	Weak	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Weak	Felt quite noticeably indoors, especially on upper floors. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.
IV	Light	Felt indoors by many, outdoors by few. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Moderate	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Strong	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Very strong	Damage negligible in well-designed buildings; slight to moderate in well-built ordinary structures; considerable damage in poorly built structures; some chimneys broken.
VIII	Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Violent	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Extreme	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.

[141] Earthquake Hazards Program. (n.d.). *The Modified Mercalli Intensity Scale*. U.S. Geological Survey. https://www.usgs.gov/programs/earthquake-hazards/modified-mercalli-intensity-scale

For Boston, the expected severity of most small regional earthquakes is weak to light shaking, generally producing little to no damage. A moderate regional earthquake could produce noticeable shaking, nonstructural damage, falling contents, minor cracking, and localized damage to vulnerable masonry or older buildings.

4.7.3. Probability

While damaging earthquakes are less likely than other common hazards, such as coastal flooding, severe storms, or extreme heat, their low probability doesn't mean there is no danger. Minor tremors happen more often than major incidents. Massachusetts has experienced earthquakes throughout its history, including significant ones in 1727 and 1755, and recent regional tremors have been felt in Boston.

Therefore, even though damaging earthquakes are improbable annually, they remain a real possibility and cannot be predicted with certainty.

4.7.4. Location

Earthquake shaking could affect the entire City of Boston. Unlike hazards that are limited to mapped floodplains or coastal zones, earthquake ground shaking is not confined to a single neighborhood (Figure 4-26). However, impacts are not expected to be uniform citywide.

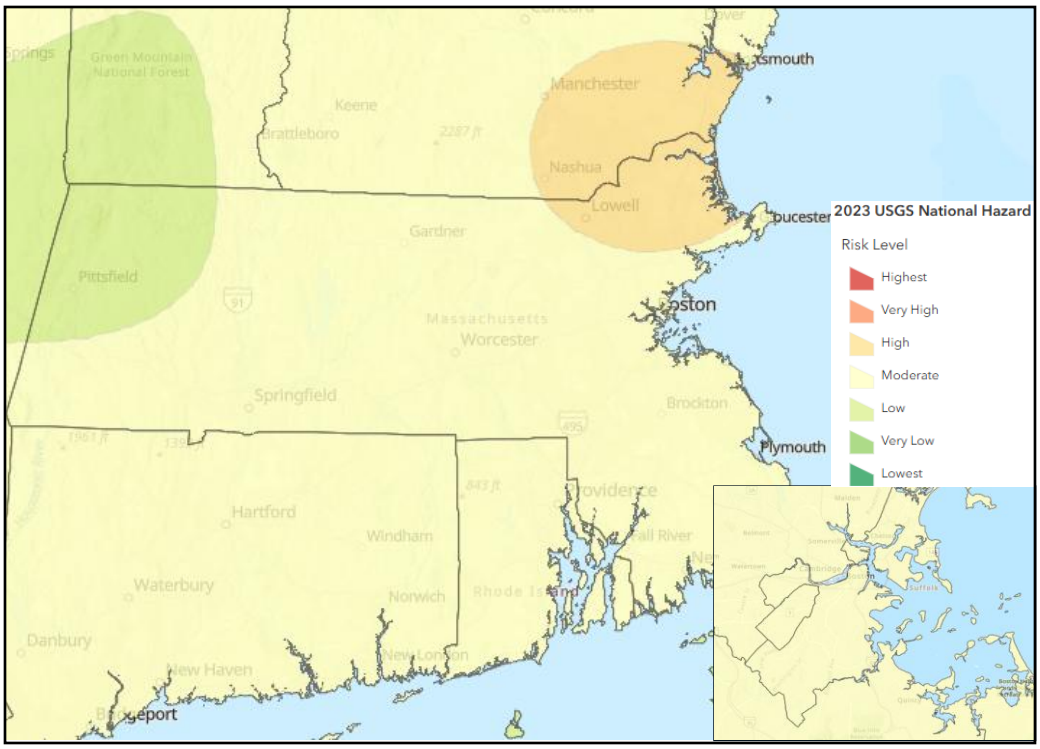


Figure 4-26. 2023 USGS National Hazard Map for Earthquakes[142]

Areas constructed on artificial fill, soft soils, former wetlands, former tidal flats, or reclaimed waterfront land may experience amplified shaking compared with areas underlain by shallow bedrock. These geologic conditions are important in Boston because there are 13 areas within the City of Boston where areas have been filled.[143]

Higher-concern locations include areas with concentrations of older masonry buildings, historic structures, bridges, tunnels, retaining walls, wharves, waterfront infrastructure, utility corridors, and critical facilities located on or near fill or soft soils.

4.7.5. Previous Occurrences

In the Boston area, the USGS has recorded eleven earthquakes, with six taking place offshore. The most damaging event in the region's history was the 1755 Cape Ann earthquake, which reached an estimated magnitude of 6.6 and caused substantial damage to brick structures and chimneys in Boston. Current analyses suggest that if a similar earthquake were to occur, it could lead to extensive destruction among older buildings and in neighborhoods built on soft soils or landfill.

[142] Central U.S. Earthquake Consortium. (2020, August 3). *USGS National Seismic Hazard Map (Simplified; 2% PGA, 50 years)* [Web map]. ArcGIS. https://www.arcgis.com/home/webmap/viewer.html?webmap=3cffcd969f044ca3a3099190b8bd9328

[143] Northeast States Emergency Consortium. (n.d.). *Earthquakes hazards.* https://nesec.org/earthquakes-hazards/

According to the latest USGS map, on April 10, 2009, a 2.3 magnitude quake struck just east of Boston Logan Airport, and in 2024, a 1.3 magnitude earthquake was detected about four kilometers southeast of South Boston.[144]

Table 4-11 below summarizes historic earthquakes felt throughout the Northeast, highlighting events both within Massachusetts and in surrounding regions. Even earthquakes that originate outside Boston can have significant impacts due to the city's geology and older infrastructure. Monitoring seismic activity in neighboring areas is crucial, as tremors from distant events may still affect Boston's buildings and public safety.

Table 4-11. Previous Occurrences of Earthquakes felt around the Northeast.

Date	Event / approximate source area	Magnitude / intensity information	Relevance to Boston
1668-2016	Earthquakes centered in Massachusetts	More than 400 known earthquakes centered in Massachusetts through 2016.[145]	Demonstrates a long record of low-to-moderate seismicity in the state.
Oct. 29, 1727	Newburyport-area earthquake	Estimated magnitude about 5.6; damaging earthquake year for Massachusetts.[146]	Damaged chimneys, cellar walls, and stone fences in northeastern Massachusetts and was felt over a broad area.
Nov. 18, 1755	Cape Ann earthquake, offshore northeastern Massachusetts	Estimated magnitude varies by source; commonly cited around M5.9 to M6.2.[147]	Most important historic planning event for Boston; damaged or destroyed many chimneys and damaged brick walls, with strongest effects reported on filled waterfront land.

[144] U.S. Geological Survey. (n.d.). *Latest earthquakes* [Interactive map search results, earthquakes from 1900–present in eastern Massachusetts and surrounding area]. https://earthquake.usgs.gov/earthquakes/map/
[145] Northeast States Emergency Consortium. (n.d.). *Massachusetts earthquakes.* https://nesec.org/massachusetts-earthquakes/
[146] Pratt, T., & Ebel, J. (n.d.). *ShakeMap scenario catalog for selected historical New England earthquakes.* U.S. Geological Survey. https://earthquake.usgs.gov/scenarios/catalog/nefema/
[147] U.S. Geological Survey. (2019, June 4). *M 5.9—The 1755 Cape Ann, Massachusetts earthquake* [Earthquake event page]. https://earthquake.usgs.gov/earthquakes/eventpage/ushis7/region-info

Date	Event / approximate source area	Magnitude / intensity information	Relevance to Boston
Oct. 16, 1963	Cape Ann area	Estimated magnitude about 4.0.[148]	Caused minor damage in northeastern Massachusetts, including fallen plaster, cracked brick walls, objects falling from shelves, and a broken window.
Nov. 8, 2020	Bliss Corner / Buzzards Bay, Massachusetts	M3.6 reviewed event.[149]	Felt in southeastern Massachusetts and Boston area; useful recent reminder of regional earthquake exposure.
Apr. 5, 2024	Tewksbury / Whitehouse Station, New Jersey	M4.8 reviewed event.[150]	Felt across the Northeast, including Massachusetts; shows that regional events outside New England can still affect Boston.
Jan. 27, 2025	York Harbor, Maine offshore area	M3.8 reviewed event.[151]	Felt across coastal New England, including Greater Boston; no major damage reported, but it prompted public awareness and response messaging.

Source: Compiled from NESEC/Weston Observatory earthquake history, USGS Earthquake Hazards Program event records, USGS NEFEMA Scenario Catalog, and NOAA/NCEI historical earthquake records.

[148] Northeast States Emergency Consortium. (n.d.). *Massachusetts earthquakes.* https://nesec.org/massachusetts-earthquakes/
[149] U.S. Geological Survey. (2020, November 8). *M 3.6–10 km S of Bliss Corner, Massachusetts* [Earthquake event page]. https://earthquake.usgs.gov/earthquakes/eventpage/us7000cc4d
[150] U.S. Geological Survey. (2024, April 5). *M 4.8–2024 Tewksbury, New Jersey earthquake* [Earthquake event page]. https://earthquake.usgs.gov/earthquakes/eventpage/us7000ma74/executive
[151] U.S. Geological Survey. (2025, January 27). *M 3.8–9 km SE of York Harbor, Maine* [Earthquake event page]. https://earthquake.usgs.gov/earthquakes/eventpage/at00sqr6q8/executive

4.7.6. Impacts of Climate Change

Climate change is not expected to increase the frequency or magnitude of earthquakes. Earthquakes are driven primarily by geologic processes, not by weather or climate. However, future climate conditions can worsen earthquake consequences indirectly. Sea-level rise, higher groundwater levels, coastal flooding, and repeated storm damage can affect waterfront structures, seawalls, underground utilities, tunnels, and soils that may also be vulnerable to earthquake shaking. Aging infrastructure in low-lying or filled areas may experience compounding stress from both climate-related hazards and seismic shaking.

For mitigation planning, the climate connection should therefore be framed as a cascading-impact issue rather than as a change in seismic probability. The City should consider whether assets exposed to sea-level rise, groundwater changes, coastal flooding, or storm surge also overlap with areas of amplified earthquake shaking, older infrastructure, or critical lifeline systems.

4.7.7. Vulnerability and Impacts

Although Boston has a low-to-moderate probability of experiencing a damaging earthquake compared to more seismically active regions of the United States, the city remains vulnerable because of its age, density, historic building stock, extensive areas of shoreline fill, underground infrastructure, and concentration of regional lifeline systems. Earthquake impacts in Boston would likely be most severe where older buildings, critical infrastructure, and soft or filled soils overlap. The 1755 Cape Ann earthquake, which caused widespread chimney and masonry damage in Boston, remains the most relevant historic scenario for understanding the potential consequences of a damaging regional earthquake. A similar event today would affect a much larger and more complex urban environment, including dense residential neighborhoods, hospitals, tunnels, transit systems, utilities, port facilities, airport infrastructure, and historic districts.

People

Boston residents' exposure to earthquakes is shaped less by the likelihood of frequent seismic activity and more by the potential consequences of a rare but damaging event. In a Cape Ann-type earthquake scenario, the greatest life-safety risks would likely come from falling masonry, damaged chimneys, broken glass, and debris from older buildings. These hazards could affect nearby pedestrians, motorists, transit users, and building occupants, particularly in dense neighborhoods with older structures and narrow streets.

Most earthquake-related injuries in Boston would likely result from nonstructural damage and debris rather than widespread building collapse. However, residents in older or poorly maintained buildings may face higher risk if structures experience cracking, foundation

damage, partial collapse, or unsafe occupancy conditions. Temporary displacement could occur if buildings are declared unsafe or require inspection, stabilization, or repair. Older adults, people with disabilities, medically dependent residents, low-income households, renters, non-English-speaking households, people experiencing homelessness, and residents of older multifamily housing may face greater challenges evacuating damaged buildings, accessing temporary shelter, replacing essential medications or equipment, and navigating recovery programs.

Structures

Structures are among Boston's most vulnerable asset categories for earthquakes. The city contains many older buildings, including unreinforced masonry structures, historic rowhouses, older commercial buildings, churches, schools, and institutional buildings that may not have been designed or retrofitted to modern seismic standards.

In a moderate to strong earthquake similar to the 1755 Cape Ann event, these structures could experience cracked walls, damaged foundations, chimney failures, falling brick or stone, damaged façades, partial collapses, and unsafe occupancy conditions. Historic districts and older commercial corridors may face especially long recovery periods because repairs may require specialized materials, preservation-sensitive design, and costly structural retrofits.

Buildings located on artificial fill, soft soils, former tidal flats, or other unstable ground conditions may experience amplified shaking compared to structures founded on bedrock. These areas may also be more vulnerable to earthquake-related ground failure, including settlement and liquefaction, which can occur when saturated, loose soils temporarily lose strength during shaking. In Boston, this vulnerability is particularly relevant in filled waterfront and low-lying areas where groundwater is shallow and subsurface conditions may be less stable.

Because many of Boston's filled areas are located near the waterfront and contain major residential, commercial, institutional, transportation, and utility assets, earthquake impacts in these areas could result in foundation damage, utility disruption, roadway or rail impacts, and broader service interruptions beyond individual buildings.

Community Lifelines and Other Critical Facilities

Community lifelines and critical facilities are a major concern because they must remain operational during and after an earthquake. Hospitals, emergency operations facilities, police and fire stations, emergency medical services, schools, shelters, public works facilities, and government buildings may be vulnerable to structural damage, nonstructural damage, power loss, water service interruptions, communications failures, and access constraints. In a Cape Ann-type scenario, these facilities could face simultaneous demands

for emergency response, sheltering, medical care, debris clearance, building inspections, utility restoration, and public information.

Transportation infrastructure could experience both direct damage and cascading impacts. Bridges, tunnels, transit stations, elevated structures, roadways, rail corridors, port facilities, airport facilities, and ferry terminals may be affected by shaking, settlement, falling debris, damaged utilities, or required post-event inspections. Even limited damage could cause major disruption because Boston's transportation network is highly interconnected and constrained in many locations. Temporary closures of bridges, tunnels, rail lines, or arterial roadways could affect emergency response, commuter travel, goods movement, hospital access, evacuation, and sheltering operations.

Utility systems are also vulnerable. Water, wastewater, stormwater, electric, natural gas, and more may experience damage to buried pipes, conduits, substations, pump stations, manholes, tanks, transmission lines, and service connections. Earthquake-related utility damage could result in water outages, sewer backups, reduced fire suppression capacity, power interruptions, telecommunications failures, gas leaks, localized flooding, or service disruptions to hospitals, shelters, and other critical facilities. Damage to one system may also affect others; for example, power outages can interrupt pump stations, communications systems, traffic signals, elevators, and building mechanical systems.

Natural, Cultural, and Historic Resources

Natural, cultural, and historic resources may be vulnerable to earthquake impacts, particularly where they are located in older districts, waterfront areas, or filled land. Boston's historic buildings, landmarks, churches, civic buildings, museums, monuments, and historic districts are important cultural assets and may be more susceptible to earthquake damage if they include unreinforced masonry, older foundations, chimneys, towers, decorative stonework, or other nonstructural elements. Damage to these resources could be difficult and costly to repair, and some losses may be permanent if historic materials or character-defining features are destroyed.

Earthquakes may also create secondary environmental impacts. Damage to hazardous materials facilities, fuel storage areas, laboratories, industrial properties, maintenance yards, marine terminals, or transportation corridors could result in spills, fires, explosions, chemical releases, or localized contamination. In waterfront and filled areas, earthquake damage could interact with coastal flooding, sea level rise, or high groundwater conditions, increasing the complexity and cost of recovery. Climate change does not increase earthquake frequency or magnitude, but future coastal and groundwater conditions may complicate post-earthquake response in low-lying areas.

Economy and Activities that have Value to the Community

A damaging earthquake could cause significant localized and regional economic impacts. Businesses may experience building damage, inventory losses, utility outages, employee displacement, supply chain disruptions, reduced customer access, and temporary or prolonged closures. Small businesses in older masonry buildings or neighborhood commercial districts may be especially vulnerable because they may have limited financial reserves and may face extended recovery timelines if buildings require inspection, stabilization, or seismic repairs.

Damage to transportation, port, airport, transit, utility, institutional, and downtown commercial assets could create economic consequences beyond Boston's municipal boundaries. Temporary closures of tunnels, bridges, transit lines, port operations, or airport facilities could affect commuting, goods movement, tourism, emergency services, and regional commerce. Cultural and civic activities may also be disrupted if libraries, schools, museums, historic sites, houses of worship, public venues, parks, or community facilities are damaged or inaccessible.

Overall, Boston's earthquake risk is driven less by frequent seismic activity and more by the consequences of a rare but damaging event affecting a dense, historic, infrastructure-rich urban environment. Based on historic regional earthquake impacts, especially the 1755 Cape Ann event, a comparable modern earthquake could cause widespread nonstructural damage, localized structural damage, transportation and utility disruptions, debris hazards, temporary displacement, emergency service demands, and prolonged recovery needs in the most vulnerable buildings and neighborhoods.

4.8. Flooding from Precipitation

Flooding from precipitation, including both pluvial and riverine flooding, is a frequent and growing hazard in the City of Boston, occurring when rainfall exceeds the capacity of natural systems and stormwater infrastructure. High intensity storms, particularly those interacting with Boston's largely impervious surfaces, can quickly overwhelm drainage systems and lead to street flooding, basement inundation, and rising river levels. These conditions are further complicated in tidally influenced waterways, where high tides and storm surge can restrict drainage and exacerbate inland flooding. Historical data shows a significant increase in heavy precipitation events, and climate change is expected to intensify rainfall further, increasing both the frequency and severity of flooding across the city.

The probability of inland flooding is high and expected to grow, with projections indicating continued increases in rainfall intensity and expanded areas of exposure over time. Even relatively frequent storms can exceed Boston's drainage capacity, while larger storm events

can produce widespread disruptions across transportation networks and neighborhoods. Flooding is most pronounced in low lying areas, river corridors, and locations with constrained drainage systems, including parts of the South End, Back Bay, Fenway, Charlestown, and Dorchester. Modeling shows that as sea levels rise and precipitation intensifies, inland flooding will become more widespread and less dependent on specific storm types, with greater depth and extent of inundation projected by mid and late century.

The impacts of inland flooding affect people, structures, infrastructure, and the local economy, with disproportionate effects on vulnerable populations and critical systems. Residents in environmental justice communities and those living in older or low-lying housing are particularly at risk from basement flooding, property damage, and displacement. Buildings may experience damage to electrical and mechanical systems, while repeated exposure can lead to long term deterioration and increased costs. Critical infrastructure, including major roadways, public transit systems, and evacuation routes, is highly susceptible to disruption, affecting mobility and emergency response. Flooding also impacts natural and historic resources, as well as commercial districts, leading to economic losses, reduced access to services, and long-term challenges for property values and community stability. These combined impacts highlight inland flooding as a persistent and intensifying hazard requiring comprehensive planning and infrastructure adaptation.

4.8.1. Description

Flooding from precipitation, including both pluvial and riverine flooding, occurs when rainfall exceeds the ability of natural and built systems to manage water, leading to temporary inundation of streets, low-lying areas, and adjacent floodplains. During high-intensity rainstorms, stormwater moves quickly across impervious surfaces, like pavement and rooftops, where limited opportunities for infiltration can cause drainage systems to reach capacity within minutes. These storms also increase flows in rivers and streams, and when water levels rise faster than channels can convey, nearby neighborhoods can experience riverine flooding. In Boston's tidally influenced river systems, this challenge is amplified by elevated tides and storm surge, which can restrict outflow and reduce the effectiveness of stormwater infrastructure during major rain events.

Storm surge and coastal flooding are discussed in Section 4.5, however, their influence on riverine conditions highlights the interconnected nature of these hazards. In some locations, prolonged wet periods raise groundwater levels as well, contributing to basement flooding and leaving the soil saturated and unable to absorb any additional water, further exacerbating flooding. As extreme precipitation becomes more frequent with climate change, flooding from precipitation is expected to place increasing pressure on infrastructure and communities across Boston.

4.8.2. Severity

From 1958 to 2010 there was a 71% increase in the amount of precipitation that fell on the heaviest precipitation days. This magnitude and intensity of precipitation exceed the limits that Boston's infrastructure, including drainage systems, culverts, and sewers were designed to handle. Boston's stormwater drainage system is designed to manage approximately 4.8 inches of rainfall over a 24-hour period, yet even a relatively frequent 10-year, 24-hour storm can produce about 5.24 inches of rain, exceeding system capacity and leading to pooling of water on streets and localized flooding.[152,153] Short-duration cloudbursts, which are high-intensity localized downpours, can produce significant volumes of water that can exceed drainage capacity in very short periods of time, contributing to rapid street, underpass, and basement flooding.

Precipitation-driven flooding occurs when direct rainfall and runoff from rooftops, roadways, and other impervious surfaces exceed the capacity of the ground, drainage infrastructure, or nearby waterbodies to absorb or convey the water. Flood depths vary based on rainfall intensity and duration, topography, drainage capacity, soil saturation, and tidal conditions. High coastal water levels may further reduce the ability of stormwater systems and outfalls to discharge, worsening flooding in tidally influenced and low-lying areas.

Floodwater generally moves slowly where it collects in flat streets, yards, and other low-lying areas, but it may move more quickly where runoff is concentrated along sloped roadways, through underpasses, near drainage structures, or within river and stream corridors. Faster-moving water can create additional risks for pedestrians, vehicles, buildings, and infrastructure, while standing water may remain for longer periods where drainage is constrained.

Warning time for precipitation flooding can be limited. Large regional storms may be forecast one or more days in advance, but localized cloudbursts or drainage-system failures can produce flooding within minutes. The precise location, depth, and timing of this flooding may be difficult to predict, leaving residents, businesses, and emergency responders with less time to prepare than for many coastal flood events.

Figure 4-27 depicts the number of buildings and the area of land in Boston exposed to frequent stormwater flooding in the near-term and in future climate scenarios. Heavy rainfall can disrupt major transportation corridors, strain combined sewer systems, and

[152] City of Boston. (2017). *Climate Ready Boston: Climate vulnerability assessment.* https://www.boston.gov/sites/default/files/imce-uploads/2017-01/crb_-_focus_area_va.pdf
[153] Jewell, Charlie, John Sullivan, Bill McMillin. "BWSC Climate Change Risk Assessment: Findings and Mitigation/Adaptation Strategies for Wastewater and Storm Drainage." Presentation for the NEWEA Annual Conference and Exhibit. January 28, 2015.

lead to basement flooding and property damage across large portions of Boston, particularly in riverfront and low-lying areas. In Boston, where critical infrastructure, housing, and economic hubs are tightly concentrated, even localized flooding can lead to public safety and economic impacts.

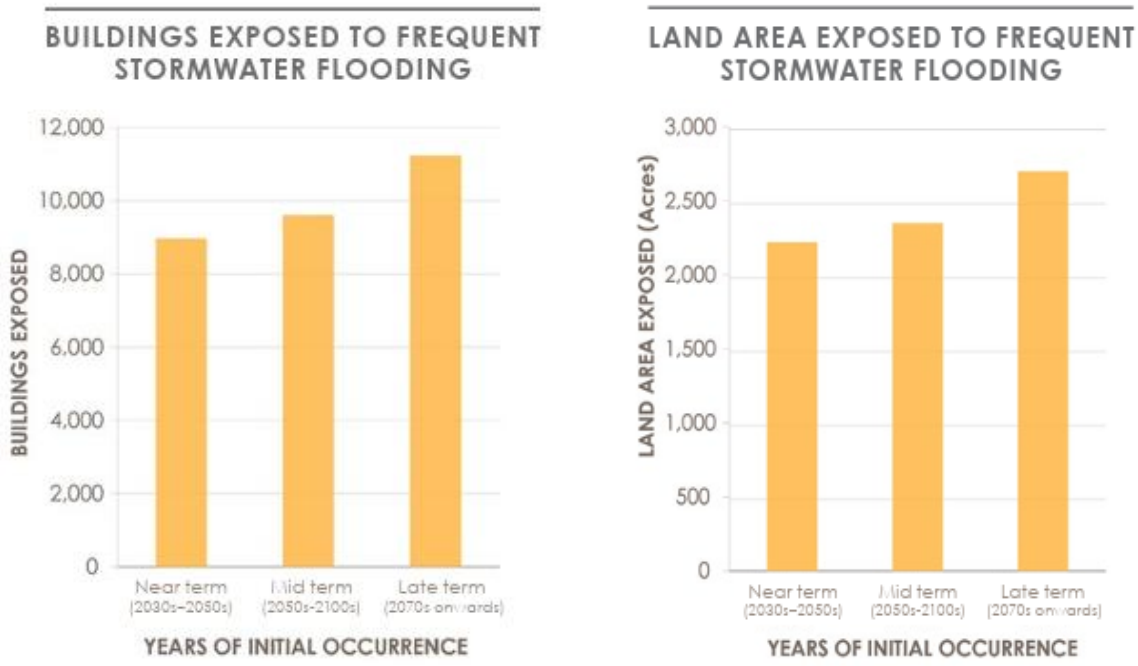


Figure 4-27. Boston Buildings and Land Area Exposed to Frequent Stormwater Flooding. Source: Climate Ready Boston, 2016.

4.8.3. Probability

Based on historic occurrences, flooding from precipitation is considered a high frequency event. Climate projections for Massachusetts indicate that short-duration, high-intensity rainfall events will continue to increase in frequency and magnitude over the coming decades.[154] In addition, the area of Boston exposed to stormwater flooding is projected to expand steadily throughout the century, with approximately 7% of the city's total land area exposed to flooding associated with the 10-year 24-hour rainfall event as soon as the 2050s. [155] Under current conditions, NOAA Atlas 14 estimates that a 10-year, 24-hour storm produces approximately 5.2 inches of rainfall in the Boston region, while a 1% annual

[154] Massachusetts Executive Office of Energy and Environmental Affairs. (2023, October 10). *ResilientMass plan: Massachusetts state hazard mitigation and climate adaptation plan.* https://www.mass.gov/doc/resilientmass-plan-2023/download

[155] City of Boston. (2016, December 7). *Climate Ready Boston: Final report.* https://www.boston.gov/sites/default/files/embed/2/20161207_climate_ready_boston_digital2.pdf

chance, 24-hour storm produces approximately 8.5 to 9 inches.[156] As rainfall intensities increase, storms that historically occurred every 10 years may begin to produce runoff more similar to what we would expect from today's 25-year storms.

In addition, as precipitation increases in intensity, the likelihood that rivers will overflow their banks also increases. In Boston's tidally influenced rivers, high tides can slow drainage and cause water to back up, further increasing the likelihood of riverine flooding during major rain events.

4.8.4. Location

Flooding from precipitation affects multiple areas across Boston, with impacts that vary based on topography, land use, drainage infrastructure, and storm intensity. To identify areas affected by inland flooding under present-day conditions, two complementary data sources were reviewed and compared. The first is the FEMA National Flood Hazard Layer, which identifies mapped flood risk areas based on federal modeling and regulatory floodplain data. The second is the Boston Water and Sewer Commission (BWSC) inundation model, which simulates surface flooding resulting from heavy precipitation and drainage system limitations. Together, these sources provide multiple perspectives, spanning observed data, regulatory mapping, and modeled projections, on where Boston is most affected by inland flooding.

FEMA Flood Hazard Risk

The FEMA National Flood Hazard Layer (NFHL) is a key source for identifying inland flood risk areas in Boston, as shown in Figure 4-28. According to FEMA flood risk maps, several areas of the city are vulnerable to inland and riverine flooding.

Along the Charles River, portions of the Esplanade and Storrow Drive are mapped within designated flood hazard zones. In the Back Bay area, sections of Storrow Drive fall within the 1 percent annual chance flood hazard zone (commonly referred to as the 100-year floodplain), while much of the adjacent Esplanade is mapped within the 0.2 percent annual chance flood hazard zone (500-year floodplain). The Muddy River corridor through the Fenway neighborhood represents another area of inland flood risk. Large portions of Fenway are located within the 0.2 percent annual chance flood zone, including major roadways such as Brookline Avenue and Boylston Street.

In Charlestown, areas adjacent to the Mystic River are also mapped within FEMA flood hazard zones. A substantial 1 percent annual chance flood zone extends across the northwestern portion of the neighborhood, spanning Route 99 and continuing beneath

[156] National Oceanic and Atmospheric Administration, National Weather Service. (2015). *NOAA Atlas 14, Volume 10: Precipitation-frequency atlas of the United States, Northeastern States.* https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html

Interstate 93. Similarly, in Allston along the Charles River, portions of Soldiers Field Road fall within the 0.2 percent annual chance flood zone, while adjacent parkland areas are mapped within the 1 percent annual chance flood zone.

Finally, in Dorchester, the major interchange at the junction of Route 3A, Route 203, and Interstate 93 is located within the 1 percent annual chance flood hazard zone. FEMA-mapped areas along Boston's coastline, which are more directly influenced by coastal storm surge and tidal flooding than by precipitation-driven inland flooding, are addressed separately in Section 4.5.

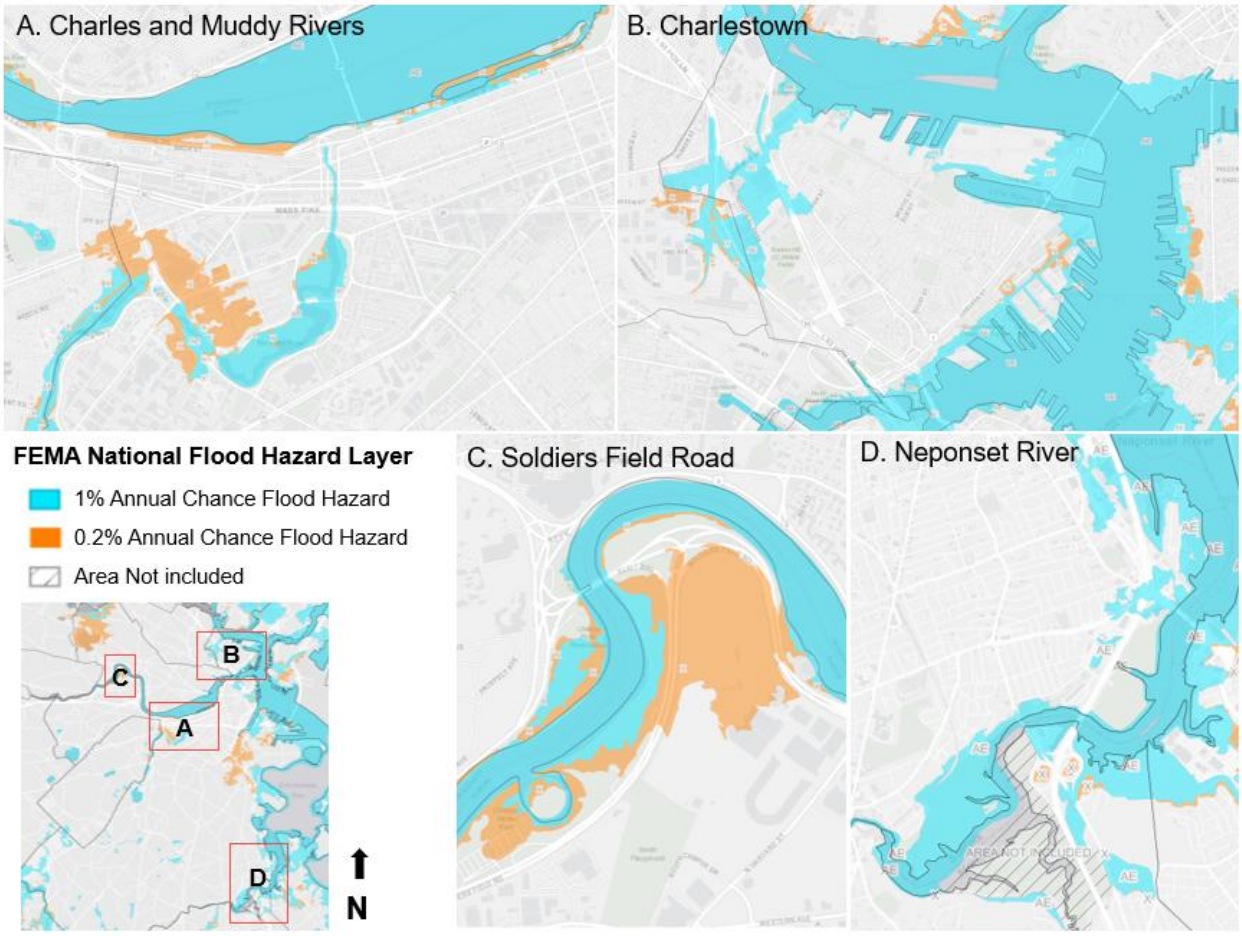


Figure 4-28. FEMA Flood Hazard Risk 2025. Source: FEMA.

BWSC Inundation Model

The Boston Water and Sewer Commission (BWSC) Inundation Model[157] was developed to simulate precipitation-driven flooding across Boston under a range of storm events. Unlike FEMA floodplain mapping, which focuses primarily on riverine and coastal flooding, the

[157] Boston Water and Sewer Commission. (n.d.). *BWSC storm viewer: Coastal stormwater discharge analysis and inundation model.* Retrieved April 13, 2026, from https://www.bwscstormviewer.com/stormapp

BWSC model evaluates surface flooding that occurs when rainfall exceeds the capacity of the stormwater drainage system, taking into account local topography and infrastructure constraints. The following maps illustrate modeled inundation under multiple storm scenarios and depict anticipated present-day (2030 planning horizon) flood extents. Subsequent subsections describe the results for each storm event in greater detail.

Thunderstorms

Modeled results from the BWSC Inundation Model indicate that even relatively frequent thunderstorm events can produce localized flooding in Boston (see Figure 4-29) under the 2030 planning scenario, which incorporates 1.3 feet of sea level rise.

For the 2-year, 6-hour thunderstorm event (1.83 inches of rainfall), flooding is generally minor and isolated, though several areas experience more substantial ponding. Notably, segments of the Massachusetts Turnpike between Bay Village and the South End, west of the Interstate 93/Massachusetts Turnpike interchange extending toward Columbus Avenue, show areas of significant flooding exceeding two feet in depth, reflecting the roadway's depressed profile below adjacent city grade and the absence of a structural cap typical of other I-90 segments in Boston. In Dorchester, marshland areas along the Neponset River riverfront are also projected to experience inundation.

Under the more intense 10-year, 6-hour thunderstorm event (3.20 inches of rainfall), these flood-prone areas expand in extent and depth, and additional locations are affected. In Dorchester, flooding extends farther inland from the Neponset River into the Neponset–Port Norfolk neighborhood. A section of Interstate 93 between the Dorchester Avenue and Boston Street overpasses is also projected to experience inundation. Along the Charles River, a small segment of Storrow Drive north of the Longfellow Bridge, adjacent to Massachusetts Eye and Ear, is modeled to flood. Nearby areas surrounding Massachusetts General Hospital are also projected to experience surface flooding.

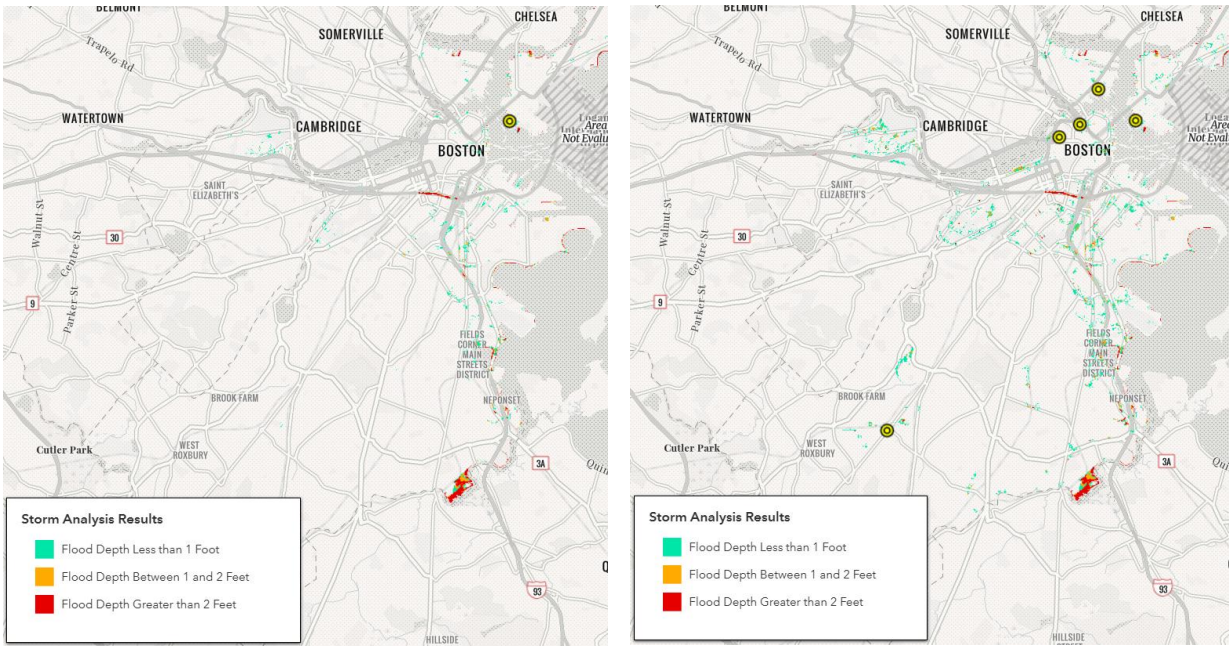


Figure 4-29. Thunderstorm Flooding for 2-year 6-hour Storm (left) and 10-year 6-hour Storm (right) with 1.3 ft of SLR for 2030. Source: BWSC Inundation Model

Nor'easters

Modeled results from the BWSC Inundation Model indicate that prolonged, high-intensity nor'easter events can produce similar patterns of flooding to that of shorter-duration thunderstorms (see Figure 4-30). Flooding was again modeled under the 2030 planning scenario, which incorporates 1.3 feet of sea level rise.

Several of the locations identified under the thunderstorm scenarios are again projected to experience inundation under a 10-year, 48-hour nor'easter event (5.84 inches of rainfall), reflecting persistent vulnerabilities under different storm types. Consistent with the thunderstorm results, the same section of the Massachusetts Turnpike, west of the Interstate 93/Massachusetts Turnpike interchange, is expected to flood. Along the Charles River, the previously identified segment of Storrow Drive just north of the Longfellow Bridge is again projected to experience inundation. Marshland areas along the Neponset River riverfront, also noted in the thunderstorm scenarios, continue to show flooding under this longer-duration event.

Additional impacts are projected in other parts of Dorchester, including flooding along the commuter rail corridor in the Franklin Field area north of Harvard Street. In Roslindale, areas surrounding Washington Street and Healy Field are also modeled to experience inundation during the 10-year nor'easter event.

Under the more severe 50-year, 48-hour nor'easter scenario (8.46 inches of rainfall), the spatial pattern of flooding is largely consistent with the 10-year event but expands slightly

in extent. Previously identified vulnerable corridors and low-lying areas experience more widespread inundation, reinforcing the susceptibility of these locations to prolonged, high-intensity precipitation events.



Figure 4-30. Nor'easter Flooding for 10-year 48-hour Storm (left) and 50-year 48-hour Storm (right) with 1.3 ft of SLR for 2030. Source: BWSC Inundation Model

Tropical Storm

Modeled results from the Boston Water and Sewer Commission (BWSC) Inundation Model indicate that the 10-year, 48-hour tropical storm event (5.84 inches of rainfall), evaluated under the 2030 planning scenario incorporating 1.3 feet of sea level rise, produces comparatively limited inland flooding in Boston (Figure 4-31).

Projected impacts are largely confined to areas previously identified as vulnerable, including marshland along the Neponset River in Dorchester and the area surrounding Healy Field in Roslindale. Unlike the modeled thunderstorm and nor'easter scenarios, no significant flooding is projected along the Massachusetts Turnpike. Overall, the tropical storm scenario reflects relatively minor inland flood impacts compared to other storm types analyzed.

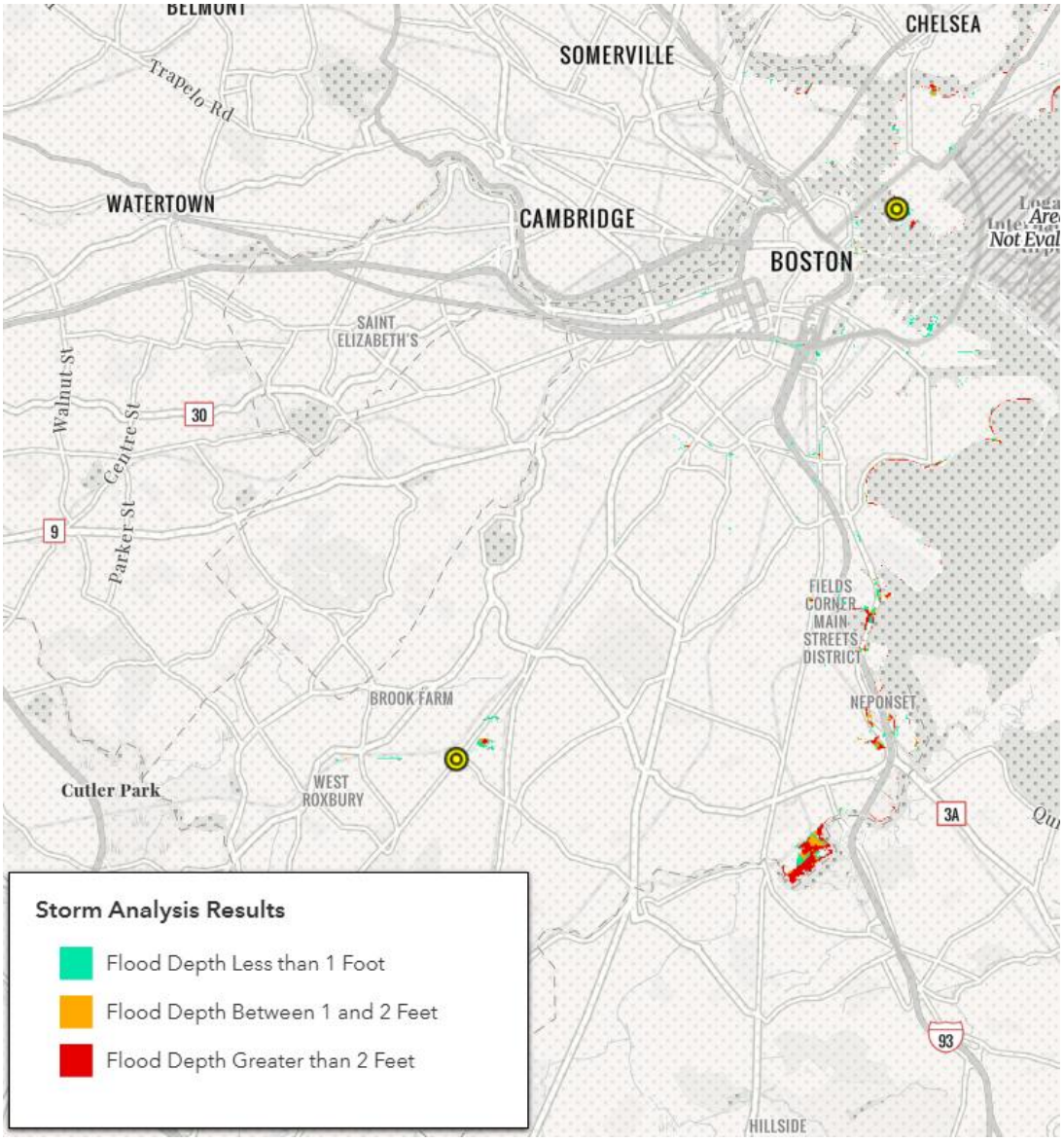


Figure 4-31. Tropical Storm Flooding for 10-year 48-hour Storm with 1.3 ft of SLR for 2030. Source: BWSC Inundation Model

Frontal Storm

Modeled results from the Boston Water and Sewer Commission (BWSC) Inundation Model indicate that the 50-year, 72-hour frontal storm event (8.46 inches of rainfall), evaluated under the 2030 planning scenario incorporating 1.3 feet of sea level rise, produces largely limited inland flooding across Boston, similar in overall extent to the modeled tropical storm scenario (Figure 4-32).

Impacts are primarily confined to previously identified vulnerable areas, including marshland along the Neponset River in Dorchester and the area surrounding Healy Field in Roslindale. However, unlike the tropical storm scenario, this event also projects significant

flooding along the same segment of the Massachusetts Turnpike between Bay Village and the South End, west of the Interstate 93/Massachusetts Turnpike interchange toward Columbus Avenue. While citywide impacts remain relatively contained, this scenario highlights the continued vulnerability of key transportation infrastructure during prolonged, high-intensity rainfall events.

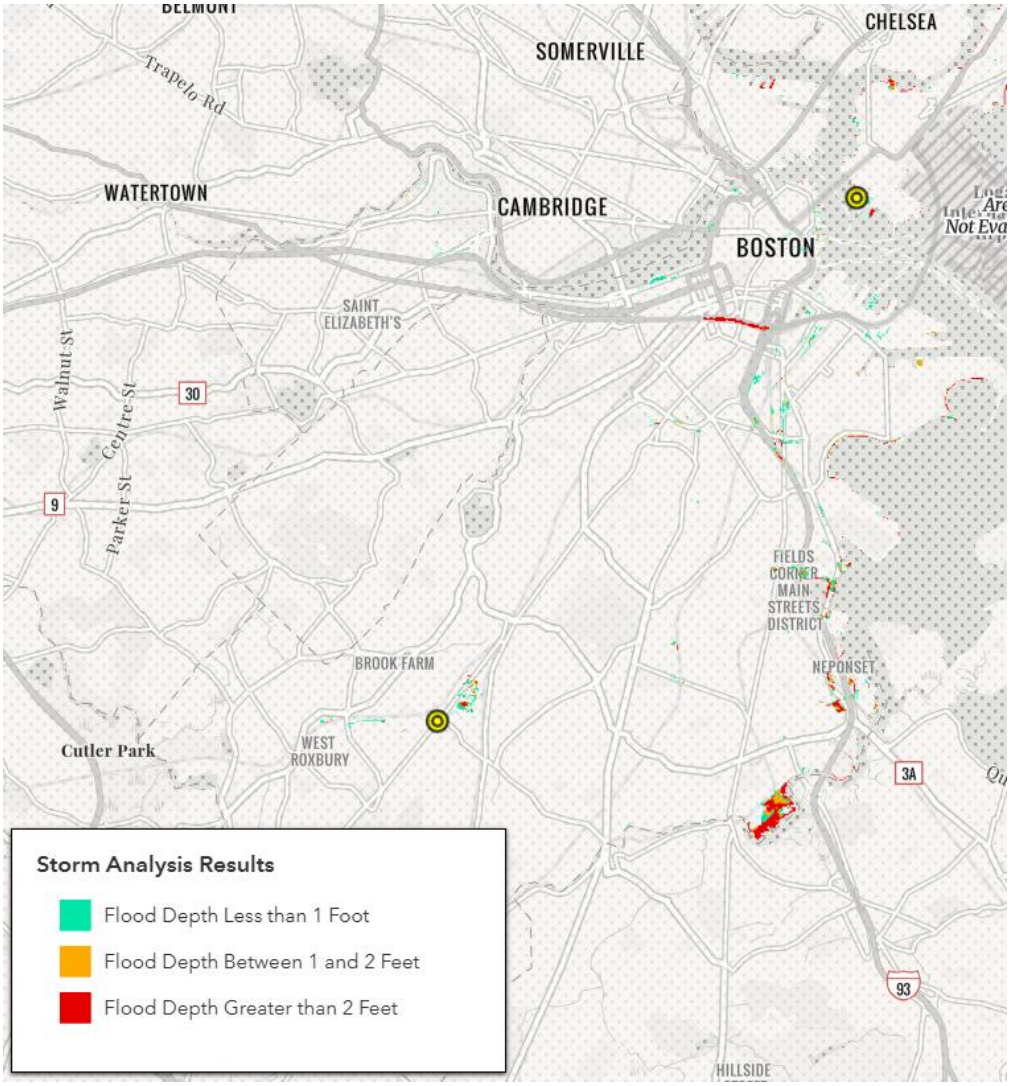


Figure 4-32. Frontal Storm Flooding for 50-year 72-hour Storm with 1.3 ft of SLR for 2030. Source: BWSC Inundation Model

4.8.5. Previous Occurrences

In recent years, Boston has experienced multiple significant flooding events. According to the NOAA Storm Events database, there have been 12 recorded flood events within Boston from 2018 to 2026 and 12 recorded occurrences of flash flooding. Many of these events have resulted in property damage and traffic disruptions.

In July and August 2023, intense downpours, in some cases with more than 1-inch of rainfall per hour, triggered flash flood warnings, flooding roadways such as Storrow Drive and Morrissey Boulevard, stalling vehicles, and contributing to sewer overflows into the Charles River and Boston Harbor. That summer was recorded as the second wettest on record in Massachusetts, with repeated storms causing basement flooding, transit delays, and widespread street inundation. More recently, additional high-intensity rainfall events in 2025 inundated portions of I-93 and other major corridors significantly disrupting the morning commute into Boston.

4.8.6. Impacts of Climate Change

Climate change is projected to significantly increase the intensity of heavy rainfall events in Massachusetts. Most projections indicate a 10-20% increase in daily precipitation intensity by 2050 and a 20-30% increase by 2100.[158] In practical terms, this means that a storm producing 5 inches of rainfall today could produce 5.5 to 6 inches by mid-century, increasing runoff volumes and peak flows across urban watersheds. As rainfall intensifies, the frequency of storms capable of overwhelming drainage systems and causing street flooding is expected to rise, particularly during short-duration, high-intensity events.

Projected increases in precipitation intensity are also expected to raise peak river flows and extend the duration of elevated water levels. In Boston's largely impervious landscape, even small increases in rainfall can produce much larger increases in runoff, since stormwater has limited opportunity to infiltrate and instead flows rapidly into rivers and drainage systems. In tidally influenced watersheds, higher downstream water levels combined with increased rainfall intensity can further compound riverine flooding risk.

4.8.7. Vulnerability and Impacts

Present Day Risk of Flooding from Precipitation

Present-day risk of flooding from precipitation in Boston is concentrated in low-lying neighborhoods, river corridors, and areas where stormwater infrastructure is prone to surcharge during heavy rainfall. Observed flooding reports and modeled results consistently identify hotspots in the South End, Back Bay, and Chinatown, as well as along the Charles River (including portions of Storrow Drive and the Esplanade), the Muddy River corridor in Fenway, the Mystic River area in Charlestown, and parts of Dorchester near the Neponset River. Major transportation assets, including segments of the Massachusetts Turnpike, Interstate 93, Soldiers Field Road, and key interchanges in Dorchester, are particularly vulnerable to ponding and roadway inundation during moderate to severe

[158] Douglas, E., Kirshen, P., Watson, C., & others. (2022, June). *Climate change impacts and projections for the Greater Boston area.* Greater Boston Research Advisory Group. https://greenribboncommission.org/wp-content/uploads/2022/06/GBRAG_report_05312022%401915.pdf

storm events. Modeling indicates that even relatively frequent thunderstorms can produce localized flooding exceeding two feet in depth in constrained corridors, while longer-duration nor'easters expand flooding across similar areas. Overall, flooding from precipitation poses recurring impacts to critical roads, low-lying residential areas, and neighborhoods adjacent to water bodies and wetlands.

Future Risk of Flooding from Precipitation

Modeled results from the BWSC Inundation Model indicate that under the 2070 planning scenario, which incorporates 4.3 feet of projected sea level rise, inland flooding patterns become broadly consistent across storm types, including thunderstorms, nor'easters, tropical storms, and frontal systems. Although rainfall intensity and duration vary among these events, projected flood extents show similar spatial distributions driven by elevated base water levels, reduced drainage capacity, and the compounding effects of precipitation and coastal backwater influences. Under these future conditions, the distinction between storm types becomes less significant than the overall increase in sea level and storm intensity.

Across all modeled storm scenarios, coastal flooding is projected to propagate farther inland in neighborhoods such as Charlestown, East Boston, North End, the Seaport District, and Government Center. Elevated sea levels increase the likelihood that coastal waters will back up into low-lying inland areas, expanding flood extents beyond today's mapped coastal floodplains.

At the same time, significant rainfall-driven flooding is projected in interior neighborhoods with limited direct coastal exposure, including the South End, Lower Roxbury, Bay Village, and Dorchester. In these areas, flooding is primarily associated with stormwater system exceedance and surface ponding but is exacerbated by higher downstream water levels that reduce outfall capacity. The combined influence of sea level rise and intense precipitation results in more extensive and deeper inundation across both coastal and inland portions of the city.

While higher-intensity and longer-duration events produce greater flood depths and incremental expansion of inundation within these same areas, the overall geographic pattern of vulnerability remains consistent across storm types. These projections indicate that by 2070, inland flooding will pose a more widespread risk to Boston than in the present day.

The following maps (Figure 4-33, Figure 4-34, and Figure 4-35) illustrate modeled flood extents for each storm type under the 2070 planning scenario. Given the focus on flooding from precipitation, these maps do not include modeled increases in storm surge relative to the baseline conditions.

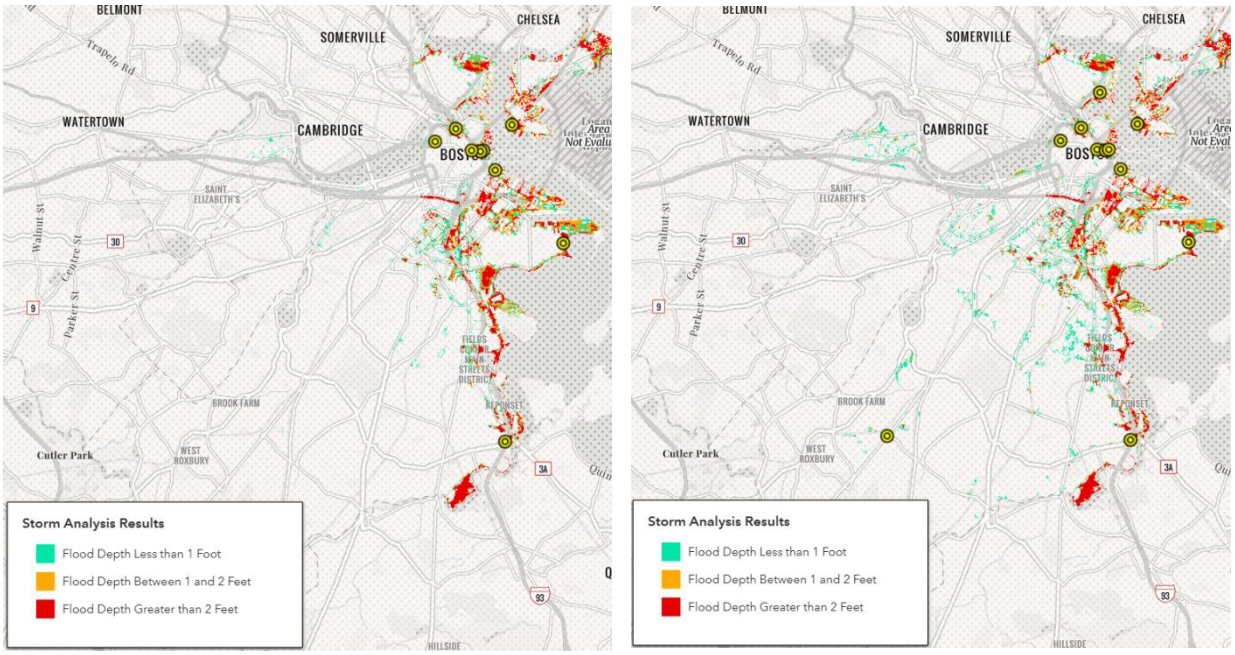


Figure 4-33. Thunderstorm Flooding for 2-year 6-hour Storm (left) and 10-year 6-hour Storm (right) with 4.3 ft of SLR for 2070. Source: BWSC Inundation Model

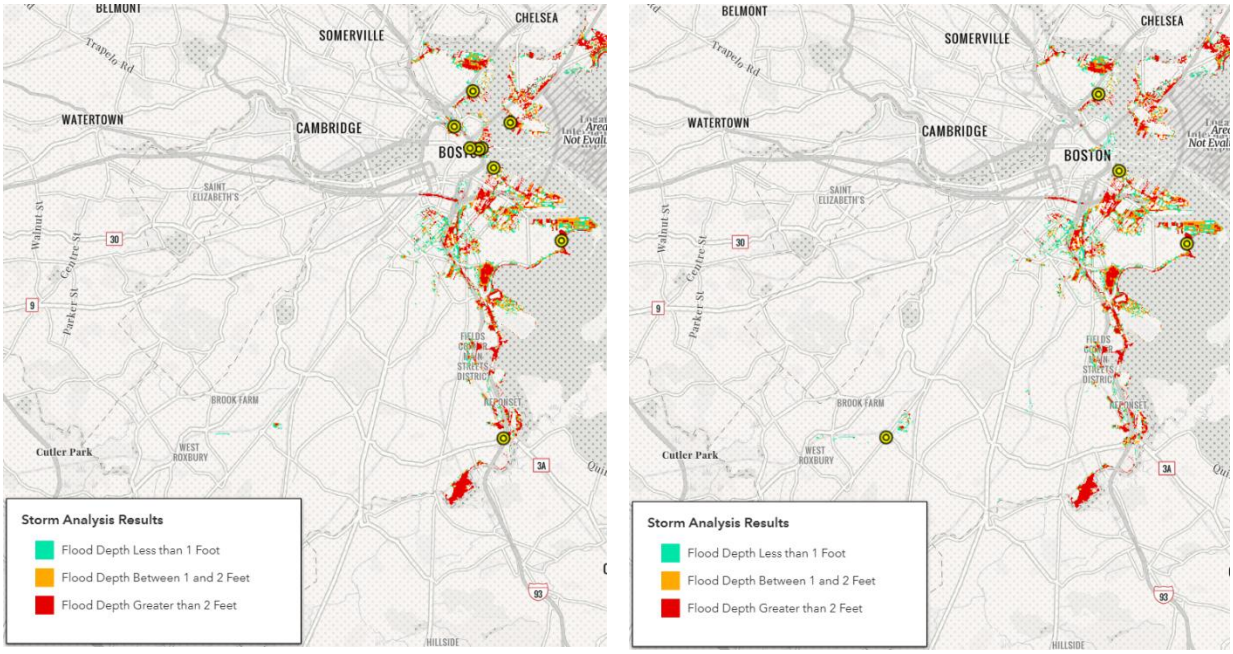


Figure 4-34. Nor'easter Flooding for 10-year 48-hour Storm (left) and 50-year 48-hour Storm (right) with 4.3 ft of SLR for 2070. Source: BWSC Inundation Model

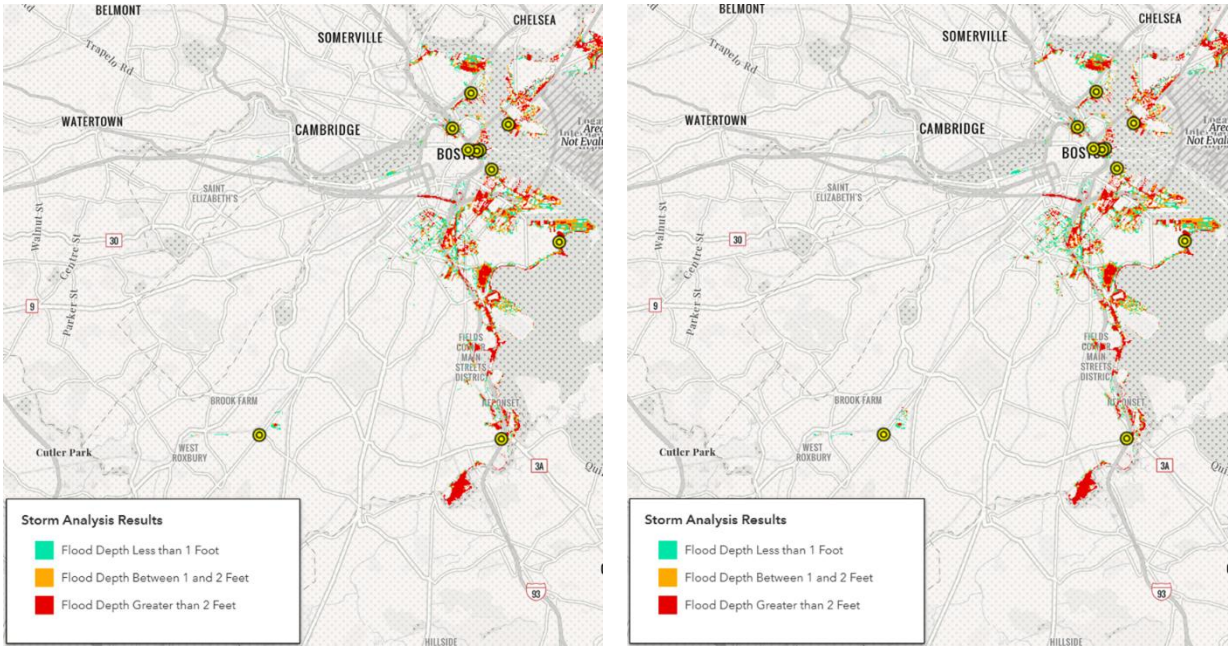


Figure 4-35. Tropical Storm Flooding for 10-year 48-hour Storm (left) and Frontal Storm Flooding for 50-year 72-hour Storm (right) with 4.3 ft of SLR for 2070. Source: BWSC Inundation Model

Impacts on Assets

People

Flooding from precipitation poses risks to residents, workers, and visitors across Boston, particularly in low-lying neighborhoods and areas with limited drainage capacity.

Much of the populations within East Boston, Charlestown, and Dorchester, where flooding from precipitation is at its most extreme, are among the Massachusetts Environmental Justice communities, indicating a heightened potential for disproportionate impacts due to existing social and economic vulnerabilities.

Basement flooding is also a recurring concern in many neighborhoods, particularly in older housing stock, where groundwater rise and sewer backups can displace residents and damage personal property. Basement flooding can particularly impact the renter population where it is more common for basement units to be retrofitted into leased apartments to maximize building area and housing stock for landlords.

What We Heard from the Community

Local Planning Team participants reported that intense rainfall in July 2023 flooded basements and garden-level units in the Back Bay and South End. Some residents who had lived in these neighborhoods for decades reportedly had not previously experienced flooding of this type.

Structures

Flooding from precipitation can result in both direct and indirect damage to buildings throughout Boston. Residential, commercial, and institutional structures located in low-lying areas or near river corridors are particularly vulnerable to surface flooding and other precipitation related issues. Even shallow flooding can cause significant damage to building systems, including electrical equipment, heating and cooling systems, and interior finishes, while repeated exposure can lead to long-term structural deterioration and mold growth.

Based on BWSC modeling, approximately 164 commercial buildings and 1,350 residential buildings are affected under the 2030 scenario, increasing to an estimated 269 commercial buildings and 2,619 residential buildings by 2070. In addition, FEMA's 0.2 percent annual chance (500-year) floodplain includes approximately 89,530 residential structures and 5,501 commercial structures, indicating a broader extent of potential exposure to all structure and asset types beyond modeled precipitation-driven flooding scenarios.

Community Lifelines and Other Critical Facilities

Flooding from precipitation can disrupt key community lifelines, including transportation, underground or at grade utilities, and emergency services.

Major roadways such as the Massachusetts Turnpike, Interstate 93, Storrow Drive, and Soldiers Field Road are particularly susceptible to flooding due to their low elevations and constrained drainage conditions. Temporary roadway closures and traffic disruptions can significantly affect regional mobility and delay emergency response times. Based on BWSC modeling, approximately 20 miles of designated evacuation routes are affected under both the 2030 and 2070 scenarios, highlighting the potential for flooding to disrupt critical evacuation and emergency access corridors.

Public transit infrastructure is also vulnerable, with flooding capable of impacting subway entrances, rail corridors, and bus routes. Based on BWSC modeling, approximately 401 miles of bus routes pass through areas of projected inundation under both the 2030 and 2070 scenarios. Additionally, between 6 and 8 miles of bike trails are expected to be affected, indicating broader impacts to multimodal transportation networks.

In addition, combined sewer systems may become overwhelmed during heavy rainfall, increasing the risk of sewer overflows and water quality impacts in the Charles River and Boston Harbor.

Critical facilities such as hospitals, schools, and public safety buildings may also experience operational disruptions if access routes are flooded or if on-site infrastructure is compromised. Based on BWSC modeling, two schools along Bremen Street in East Boston are affected under the 2030 and 2070 scenarios, while 468 education institutions fell within the FEMA 0.2 percent annual chance (500-year) floodplain.

While no medical or public safety facilities are located within the modeled BWSC inundation areas, this does not necessarily indicate they are free from risk. Approximately 105 medical facilities, and 78 public safety facilities fall within the FEMA 0.2 percent annual chance (500-year) floodplain, indicating broader potential exposure.

Food resources such as grocery stores, food pantries, and community gardens may also experience flooding, potentially disrupting food access both during and after a storm. Based on BWSC modeling, five food resources are located within the 2030 inundation areas, and nine are located within the 2070 areas.

Even outside of mapped inundation areas, prolonged periods of rainfall or high-intensity flash flooding can result in localized or minor flooding in virtually any location. Additional factors, such as deferred maintenance or localized drainage issues, may further increase the potential for impacts to these facilities over time, particularly as precipitation patterns continue to intensify.

Natural, Cultural, and Historic Resources

Flooding from precipitation can affect Boston's natural systems and cultural and historic assets. Wetlands, riverbanks, and open spaces such as the Charles River Esplanade and areas along the Neponset River may experience periodic inundation, which can alter habitat conditions and contribute to erosion or pollutant transport.

Historic neighborhoods and landmarks, particularly in areas like Back Bay, Beacon Hill, and the South End, may also be vulnerable to flooding impacts. Many historic structures include below-grade spaces and aging infrastructure that are especially susceptible to water damage. Repeated flooding can accelerate deterioration of historic materials and increase maintenance costs, posing long-term preservation challenges.

Based on BWSC modeling, an estimated 259 acres of open space are affected under the 2030 scenario, increasing to approximately 268 acres under the 2070 scenario, this number increasing ten-fold to over 5,800 acres under the FEMA 500-year scenario. Natural areas located within Boston's present and projected floodplains, including wetlands, riverbanks, waterfront buffers, parks, and open spaces, provide important flood-storage, water-quality,

erosion-control, shoreline-protection, and wildlife-habitat functions. As a result of such natural functions, these values represent areas where portions of sites may experience flooding, rather than complete inundation.

In addition, three Community Preservation Act (CPA) sites fall within the projected 2070 inland flood extent, indicating potential risks to protected cultural and historic assets over time.

Economic and Activities that have Value to the Community

Flooding from precipitation can result in significant economic impacts, including property damage, business interruptions, and increased maintenance and recovery costs. Commercial districts and employment centers located in flood-prone areas, such as Back Bay, Downtown, and the South End, may experience temporary closures, reduced customer access, and revenue losses during and after storm events.

Transportation disruptions can also have broader regional economic consequences by delaying commutes, interrupting goods movement, and reducing overall productivity. In addition, repeated flooding can increase insurance costs and reduce property values in affected areas.

4.9. Hurricanes/Tropical Cyclones

Hurricanes and tropical cyclones present a significant and wide-reaching hazard to the City of Boston, bringing a combination of high winds, heavy rainfall, storm surge, and coastal flooding. Although these storms often weaken before reaching New England, they can still produce substantial impacts across both coastal and inland areas. Boston's coastal location increases its exposure to storm surge and flooding, while dense urban development and tall buildings can amplify localized wind impacts. Historically, the region has experienced numerous tropical storms and hurricanes, and while their frequency varies, the overall probability of occurrence remains moderate to high. Climate change is expected to increase the intensity of storms and associated rainfall, while rising sea levels will further exacerbate flooding and surge impacts, increasing overall risk to the city.

The impacts of hurricanes and tropical cyclones extend across people, buildings, infrastructure, and the economy, with the potential for severe and widespread disruption. Strong winds and flooding can damage or destroy structures, displace residents, and lead to prolonged power outages and service interruptions. Modeling indicates that even moderate storms could damage thousands of buildings and displace large numbers of households, while more severe events could result in catastrophic losses and long-term housing instability. Critical infrastructure, including transportation systems, utilities, healthcare facilities, and emergency services, is highly vulnerable, particularly in

designated evacuation zones where flooding and wind damage may occur simultaneously. In addition, these events can disrupt economic activity, damage natural and cultural resources, and strain community systems, highlighting the need for comprehensive planning and resilience strategies to reduce risk and support recovery.

4.9.1. Description

Tropical cyclones (including tropical depressions, tropical storms, and hurricanes) form over the warm waters of the Atlantic Ocean, Caribbean Sea, and Gulf of America. As these systems develop, they are classified based on sustained wind speeds. Weaker storms are called *tropical depressions*, which reach maximum sustained winds of 38 mph. A *tropical storm* reaches sustained wind speeds between 39 to 73 mph, and once speeds meet or exceed 74 mph, the storm is classified as a *hurricane*.[159]

Each year, the Atlantic hurricane season runs from the beginning of June through the end of November. However, in New England, storms are more likely to occur later in the season, typically during August and September.[160] After forming in the tropics, hurricanes and tropical storms generally travel northward, losing strength once they make landfall. As a result, while inland areas may experience strong winds, heavy rainfall, and flooding during a tropical cyclone, the most severe impacts are typically felt along the coast.

4.9.2. Severity

Hurricanes are classified according to their maximum sustained wind speeds using the Saffir–Simpson Hurricane Wind Scale (Table 4-12), which ranges from Category 1 to Category 5. Hurricanes classified as Categories 3, 4, or 5 are considered "major" hurricanes and can cause devastating to catastrophic wind damage, potentially resulting in significant loss of life due to the extreme strength of their winds. The Saffir-Simpson Scale provides a general estimate of the potential severity of wind-related damage; however, it does not account for other serious hurricane hazards such as storm surge, heavy rainfall and flooding, or the potential for tornadoes. In addition, localized wind gusts can exceed the reported sustained wind speeds, leading to damage that is more severe in certain areas than suggested by the storm's overall category.

[159] NOAA. (2024, June 16). *What is the difference between a hurricane and a typhoon?* https://oceanservice.noaa.gov/facts/cyclone.html
[160] Commonwealth of Massachusetts. (n.d.). *CZ-Tip - the complete guide to online hurricane tracking for Massachusetts.* Mass.gov. https://www.mass.gov/info-details/cz-tip-the-complete-guide-to-online-hurricane-tracking-for-massachusetts

Table 4-12. Saffir-Simpson Hurricane Wind Scale[161]

Category	Winds (mph)	Potential Damage
1	74 – 95	Some: some damage to roofs, siding, and gutters is likely, with large tree branches snapping or shallow-rooted trees toppling. Power outages may occur and last a few days.
2	96 – 100	Extensive: major roof and siding damage to homes is expected, many trees snapped or uprooted and roads blocked. Widespread power outages may last days to weeks.
3 (Major)	111 – 129	Devastating: severe structural damage to homes is likely, many roads blocked by fallen trees. Power and water outages may last several days to weeks.
4 (Major)	130 – 156	Catastrophic: extensive structural damage to homes and widespread tree and power pole failure will isolate many areas. Power outages may last weeks to months, and some areas may be uninhabitable.
5 (Major)	> 157	Catastrophic: many homes will be destroyed with complete roof failure and wall collapse. Long-term power outages and isolation will make most areas uninhabitable for weeks or months.

4.9.3. Probability

Hurricanes and tropical storms occur with medium to high frequency in the Boston region. Storm activity can vary considerably from year to year: for example, six hurricanes or tropical storms occurred between 2020 and 2021, while no such storms affected the region from 2022 through 2025.[162]

4.9.4. Location

Hurricanes pose a citywide risk due to their broad geographic reach. Boston's coastal location increases its exposure, particularly to storm surge, which can overwhelm seawalls and other coastal protection measures. Simultaneously, inland neighborhoods of the city may experience flooding from rivers and heavy rain, as well as wind-related damage.

[161] NOAA. (n.d.). *Saffir-Simpson Hurricane Wind Scale.* https://www.nhc.noaa.gov/aboutsshws.php
[162] NOAA. (n.d.). *Historical Hurricane Tracks.* https://coast.noaa.gov/hurricanes/#map=4/32/-80

Wind impacts in Boston vary based on surrounding terrain conditions, as defined by exposure categories in the Massachusetts Building Code (via ASCE 7[163]). Coastal areas adjacent to open water experience the highest wind loads (Exposure D), while dense urban areas may be more sheltered (Exposure B). However, in this case, Downtown's tall buildings along the waterfront may be at risk as they can amplify wind locally through channeling and downdrafts. Boston's waterfront urban areas may experience both high regional exposure and intensified local wind effects.

4.9.5. Previous Occurrences

Hurricanes and tropical storms have affected the greater Boston region for centuries. The earliest hurricane recorded by European settlers was the Great Colonial Hurricane of 1635. More recently, historical records show that 97 hurricanes or tropical storms passed through or near Massachusetts between 1842 and 2022, according to the 2023 ResilientMass Plan. The deadliest of these events was the 1938 New England Hurricane, which caused approximately 600 deaths across the region.[164]

It is uncommon for a storm to reach Massachusetts while still classified as a hurricane; most storms weaken into tropical storms or tropical depressions before landfall. In recent decades, Boston has been impacted by several notable storms, including Hurricane Irene in 2011 and Superstorm Sandy in 2012, both of which had weakened to tropical storms by the time they reached Massachusetts. In 2021, Hurricanes Henri and Ida also affected the region after being downgraded to a tropical depression and an extratropical cyclone, respectively. Despite weakening, these storms still caused serious impacts. Hurricane Ida, for example, dropped 5 inches of rain on the Boston area, causing major flooding that closed Storrow Drive.

4.9.6. Impacts of Climate Change

Climate change is expected to influence both the intensity and impacts of tropical storms and hurricanes affecting Boston. Warmer ocean and air temperatures are likely to contribute to stronger and more intense storms, though the total number of tropical cyclones may decrease overall. While storms may become less frequent, a greater proportion are expected to reach higher intensity levels (Category 4 or 5). In addition, tropical cyclones are projected to produce heavier rainfall, increasing the risk of flooding.[165] Rising sea levels further compound these risks by amplifying coastal flooding and storm

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[163] "Surface Roughness / Exposure Categories Diagram". ASCE/SEI 7-16 (or 7-22), Chapter 26, Commentary Figure C26.7-2.

[164] Commonwealth of Massachusetts. (n.d.). *The worst Massachusetts hurricanes of the 20th century*. Mass.gov. https://www.mass.gov/info-details/the-worst-massachusetts-hurricanes-of-the-20th-century

[165] Douglas, E., & Kirshen, P. (2022). *Climate change impacts and projections for the Greater Boston area*. Greater Boston Research Advisory Group. https://greenribboncommission.org/wp-content/uploads/2022/06/GBRAG_report_05312022@1915.pdf

surge impacts. For example, a 100-year storm event occurring at high tide, combined with the approximately 21 inches of sea level rise projected for Boston by 2050, could result in an estimated $444 million in annual damages and place up to 43,000 Boston residents at risk[166].

4.9.7. Vulnerability and Impacts

Vulnerability and risk from hurricanes and tropical storms were evaluated using a combination of scenario and spatial exposure analyses. The primary analytical tool for the scenario analysis was Hazus, FEMA's regional multi-hazard loss estimation model developed in partnership with the National Institute of Building Sciences. Hazus was used to simulate hurricane scenarios and estimate potential impacts to buildings, infrastructure, population, and the local economy, providing order-of-magnitude estimates of physical damage, economic loss, and social impacts at a citywide scale. For all information from the Hazus model, please see Appendix F.

In addition, a GIS-based exposure analysis was conducted to supplement the modeling results by spatially comparing the location of key assets to the City's designated hurricane evacuation zones, Figure 4-36. This analysis identified populations, structures, critical facilities, and other valued community resources located within areas subject to storm surge and evacuation orders.

[166] City of Boston. (2021). *2021 Natural Hazard Mitigation Plan Update.* https://www.boston.gov/sites/default/files/file/2021/12/Boston%20NHMP_2021-12-08_Combined_8.pdf

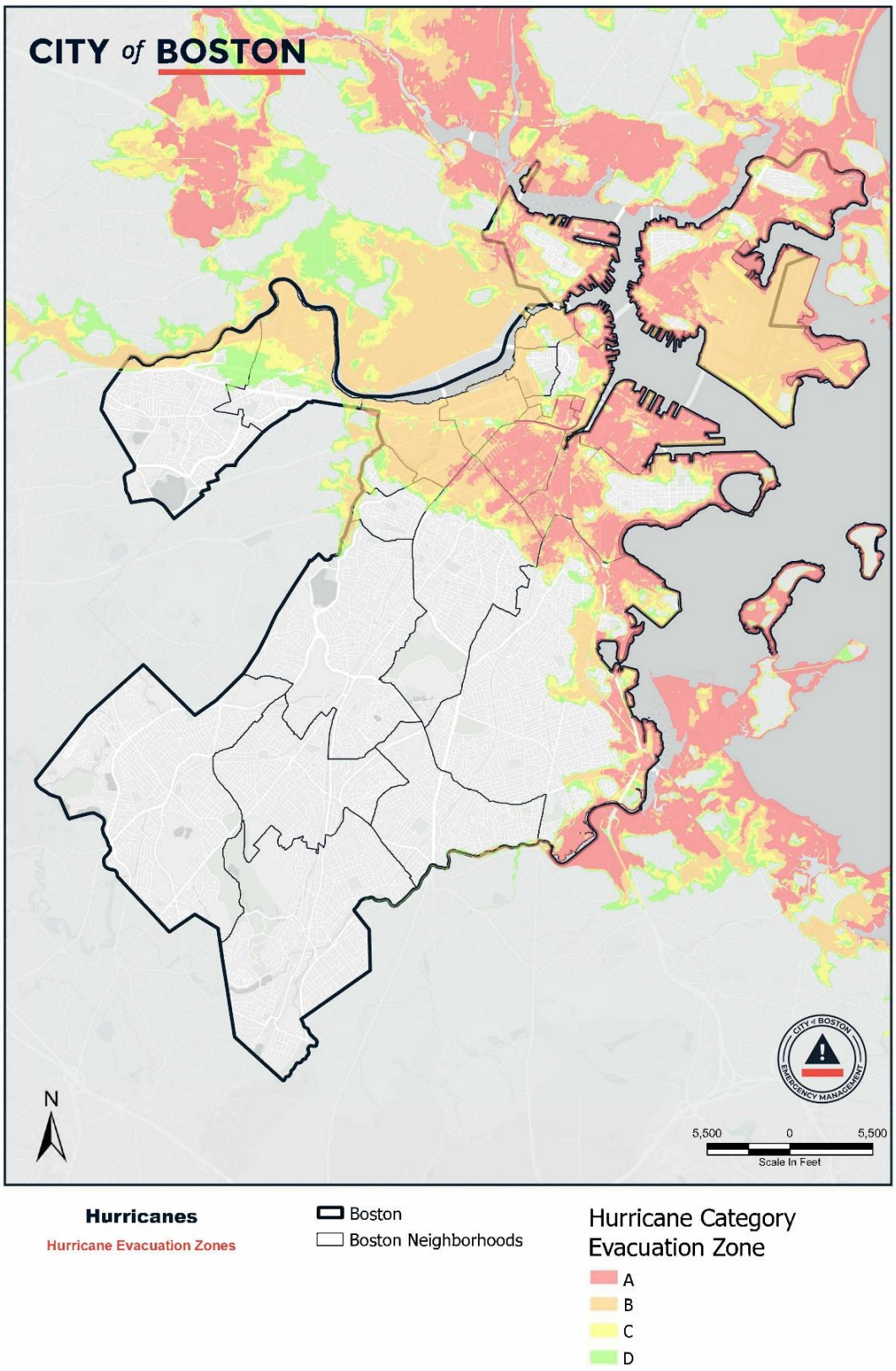


Figure 4-36. Hurricane Evacuation Zones. Source: MassGIS, Boston OEM.

People

Hurricanes and tropical storms have the potential to significantly disrupt the lives of Boston residents, resulting in loss of housing, displacement, psychological stress, physical injuries, and lost wages due to business closures and broader economic disruption. In addition to the immediate dangers posed by high winds and storm surge, prolonged power outages, impassable roads, and damage to residential buildings can make homes temporarily or permanently uninhabitable. Hazus modeling indicates that under a Category 2 hurricane scenario, approximately 1,519 households could be displaced, with an estimated 1,076 individuals seeking refuge in temporary public shelters. Under a more severe Category 4 hurricane scenario, impacts increase substantially, with an estimated 147,927 households displaced and approximately 108,028 individuals requiring temporary shelter. These estimates underscore the scale of potential housing instability and sheltering needs, as well as the cascading social and economic impacts that major storm events could have on Boston's population.

Structures

Boston's building stock represents a substantial concentration of value and potential risk. According to Hazus, there are an estimated 139,749 buildings citywide, with a total replacement value of approximately $194.7 billion (excluding contents), of which roughly 82 percent are residential structures. Hazus modeling indicates that even a moderate hurricane could result in widespread structural damage. Under a Category 2 hurricane scenario (peak wind speeds of approximately 103 mph), an estimated 8,514 buildings, more than 6 percent of the total, would sustain at least moderate damage. Of those, approximately 410 buildings could be destroyed. Residential structures account for most impacts, with an estimated 690 buildings sustaining major damage, 5,674 sustaining minor damage, and 405 destroyed. Government buildings are also affected, with an estimated 8 buildings sustaining major damage and 133 sustaining minor damage. A Category 2 hurricane would generate approximately 204,211 tons of debris, primarily brick and wood materials, along with tree debris and a small amount of reinforced concrete and steel. Total direct property damage losses, including repair and replacement of buildings and contents, are estimated at $1.87 billion, representing over 83 percent of total building-related losses.

Under a more severe Category 4 hurricane scenario (peak wind speeds of approximately 141 mph), structural impacts increase dramatically. Hazus estimates that approximately 97,235 buildings, over 69 percent of the city's total, would sustain at least moderate damage, including approximately 33,761 buildings that could be destroyed. Residential buildings again account for most losses, with an estimated 16,587 sustaining major damage, 30,970 sustaining minor damage, and 32,862 destroyed. Government facilities would also face substantial impacts, with approximately 1,002 buildings sustaining major damage, 854 sustaining minor damage, and 17 destroyed. This level of damage would generate an

estimated 3.06 million tons of debris, overwhelmingly composed of brick and wood materials. Total direct property damage losses are estimated at approximately $51 billion, representing nearly 89 percent of total modeled losses. These findings underscore the scale of potential structural damage and economic consequences associated with major hurricane events.

Essential facilities depicted in the following maps, Figure 4-37 and Figure 4-38, are based on the Hazus model dataset. Facilities shown in gray are modeled as having no expected damage under the Category 2 and 4 hurricane scenarios, while green, yellow, orange, and red symbols represent increasing levels of modeled damage. Most essential facilities fall into the gray or low-damage categories, suggesting limited direct physical damage in this scenario. This information is not the official compiled city inventory; however, it generally aligns with it and is intended to illustrate the types of structures that may be vulnerable.

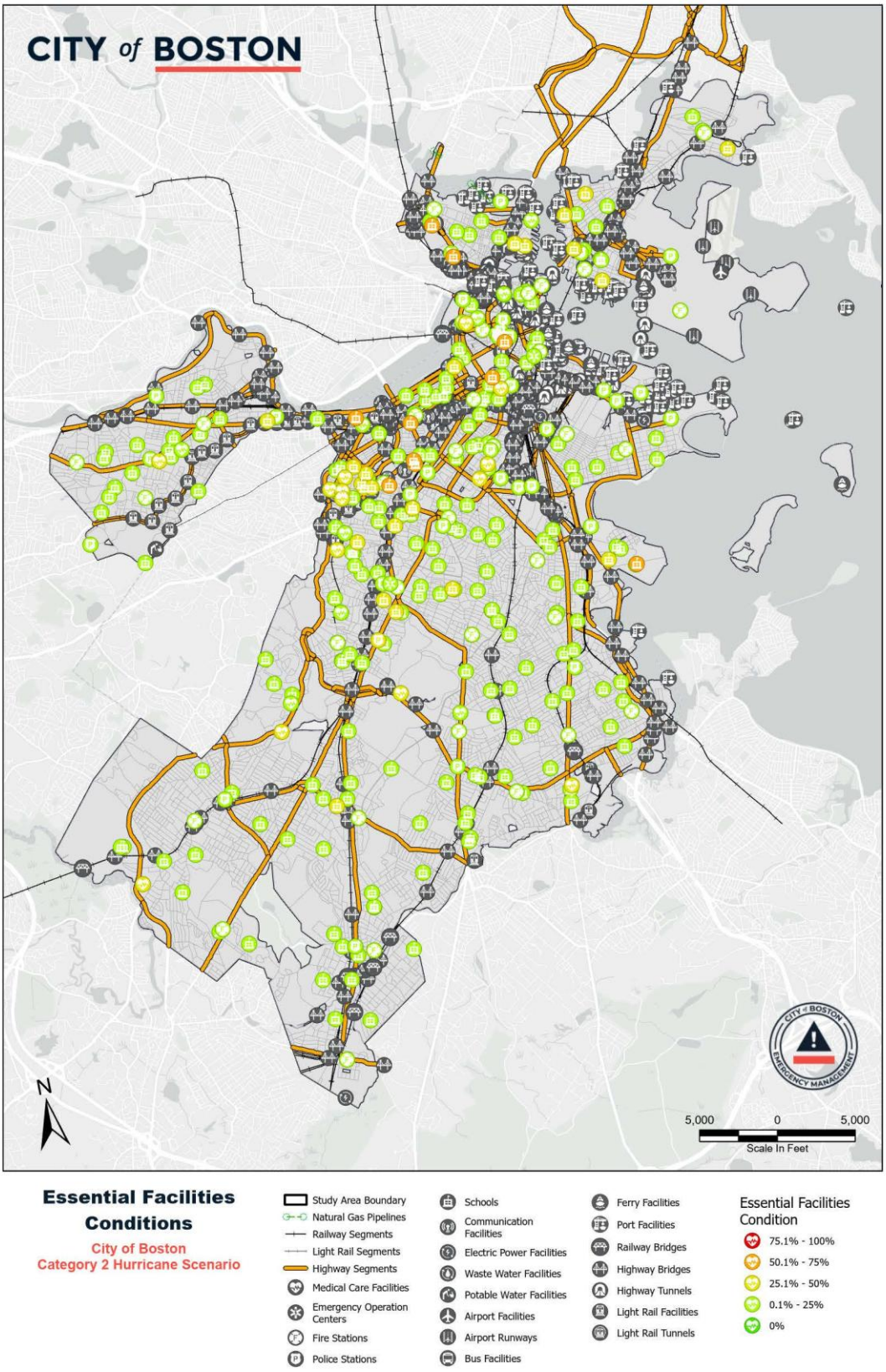


Figure 4-37. Category 2 Hurricane Scenario, Hazus Essential Facilities.

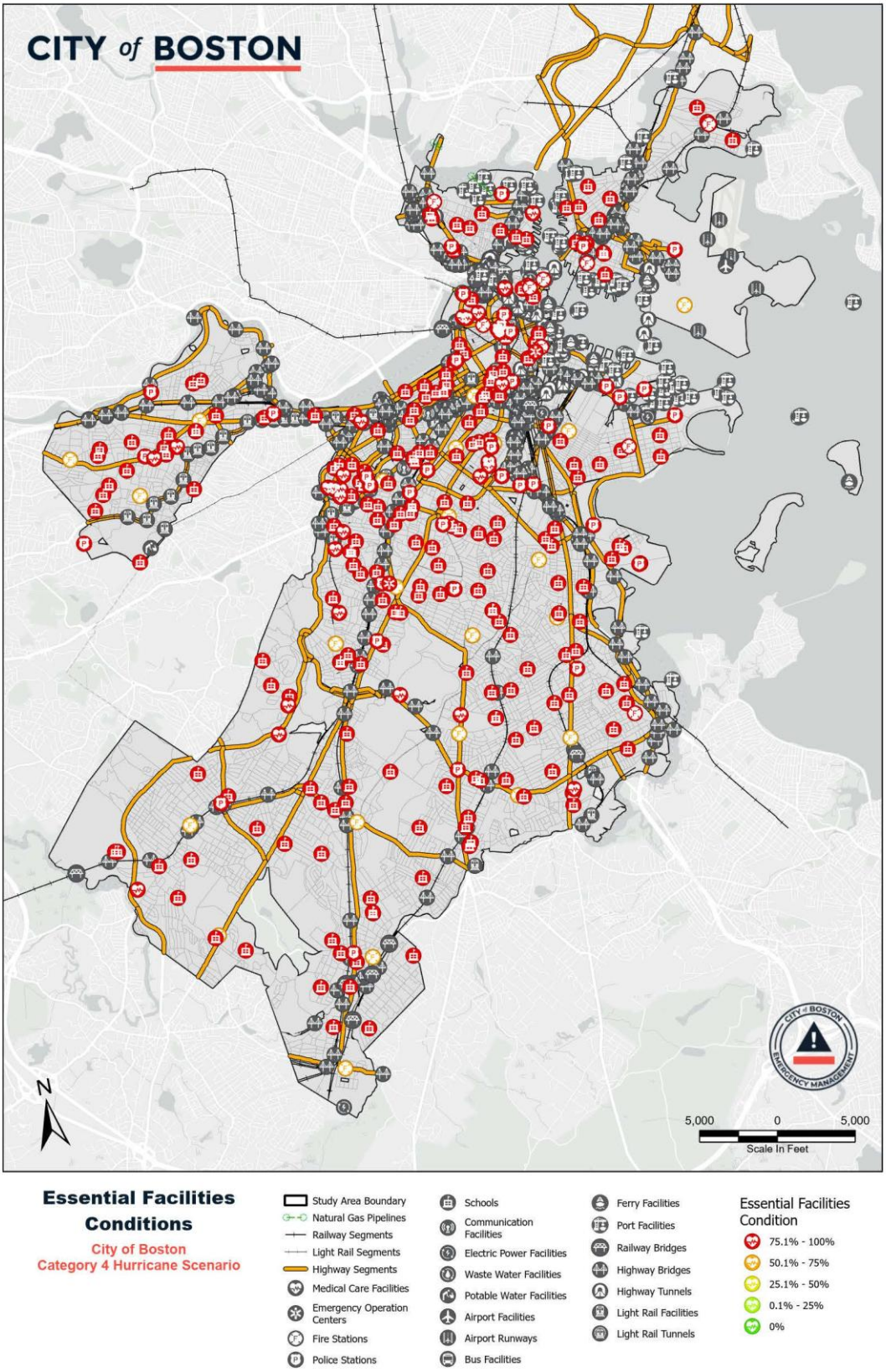


Figure 4-38. Category 4 Hurricane Scenario, Hazus Essential Facilities.

Community Lifelines and Other Critical Facilities

Hurricanes and tropical storms pose significant risk to Boston's community lifelines, particularly for assets located within the City's designated hurricane evacuation zones. Evacuation Zones A and B include areas that are expected to flood first from storm surge during a tropical storm or hurricane, with Zone A representing the highest storm surge risk. Zone C includes additional areas that may flood depending on storm track and intensity. When evacuation orders are issued, residents and workers in these zones are directed to relocate to safer areas prior to landfall. A GIS-based exposure analysis indicates that numerous critical facilities and infrastructure assets are located within these zones. Storm surge, high winds, and associated flooding could disrupt essential services at the same time that demand for those services is increasing.

Safety and Security: Many public safety facilities and service areas fall within or serve neighborhoods located in evacuation zones. Flooded roadways, debris, and downed trees could delay emergency response and evacuation operations, particularly in Zones A and B, where inundation would occur earliest. Increased call volumes combined with constrained access may strain police, fire, and emergency medical services at a critical time.

Food, Hydration, and Shelter: Educational facilities are among the assets exposed to potential flooding and wind damage. 157 educational facilities are within the hurricane evacuation zones: 26 are in Zone A, 110 in Zone B, and 121 in Zone C. Because schools often function as emergency shelters and community resource hubs, impacts to these facilities could simultaneously disrupt education, childcare, and sheltering capacity. If facilities within evacuation zones are damaged or inaccessible, the City may face challenges meeting sheltering needs for displaced residents, particularly vulnerable populations.

Additionally, food resources such as grocery stores, food pantries, and convenience stores are exposed to potential damage. 123 such locations are expected to withstand damage under a Category 2 hurricane, and 34 additional locations may experience damage from a Category 4 hurricane. Protecting these resources will be important to maintaining food access and supporting community recovery during and after hurricane events.

Health and Medical: There are several important health and medical facilities within evacuation zones, including 5 in Zone A, 37 in Zone B, and 24 in Zone C. Flooding, structural damage, or power loss at these locations could interrupt access to emergency care, routine appointments, and prescription services. Such disruptions may have life-safety implications, particularly for residents with chronic conditions or mobility limitations who depend on consistent medical support.

Energy: Electrical infrastructure is vulnerable to high winds and flooding. Power outages could affect not only residential areas but also exposed schools, health care facilities, transit assets, and public safety operations, creating cascading impacts across lifelines.

Although some critical facilities are equipped with backup power, extended outages may still disrupt operations.

Communications: Communications infrastructure located within or serving evacuation zones may be damaged by wind or flooding, limiting residents' ability to receive evacuation notices and hindering coordination among emergency responders. Service interruptions could complicate response and recovery efforts, particularly in heavily impacted coastal and low-lying neighborhoods.

Transportation: Transportation assets are highly represented within evacuation zones, including 3 subway stations in Zone A, 51 in Zone B, and 39 in Zone C. There are also 94 bus stops in Zone A, 462 in Zone B, and 327 in Zone C. Flooding of tunnels and low-lying corridors, combined with debris and downed tree limbs, could result in service suspensions and restricted roadway access. Because these systems are essential for evacuation, emergency response, and access to employment and essential services, their exposure heightens the potential for widespread and prolonged disruption.

Natural, Cultural, and Historic Resources

Hurricanes and tropical storms can have significant impacts on Boston's natural, cultural, and historic resources, resulting in both ecological and community losses. High winds, storm surge, and heavy rainfall can lead to water pollution, sedimentation, and changes in river and stream ecology, affecting aquatic habitats and the species that rely on them. Coastal and riparian erosion can alter shoreline and streambank conditions, contributing to long-term habitat loss and the degradation of natural buffers that help protect the city from future storm impacts. In urban areas, downed trees and damaged vegetation can exacerbate the urban heat island effect, reducing shade and increasing local temperatures during recovery periods.

Historic and cultural landmarks are also vulnerable during major storm events. High winds, flooding, and debris can damage or destroy buildings, monuments, public art, and other culturally significant sites, eroding irreplaceable community heritage and identity. These impacts not only pose challenges for preservation and restoration but also affect the social and economic value that these resources provide, including tourism, recreation, and neighborhood character.

Economy and Activities that have Value to the Community

Hurricanes and tropical storms have the potential to cause substantial economic disruption across Boston, affecting businesses, institutions, and community-based activities. In addition to direct physical damage to buildings, storms can interrupt business operations, reduce customer activity, increase maintenance and recovery costs, and temporarily halt community events and outdoor activities due to hazardous conditions. Power outages, transportation disruptions, and evacuation orders may further limit access to commercial

districts and employment centers, resulting in lost wages for workers and reduced revenue for businesses. Community gatherings, cultural events, and recreational activities may be postponed or canceled during and after a storm event.

Hazus modeling estimates that under a Category 2 hurricane scenario, total economic losses could reach approximately $2.24 billion, representing about 1.15 percent of the total replacement value of the region's buildings. Of this amount, an estimated $371 million is attributed to business interruption, including lost income due to the inability to operate and temporary living expenses for displaced residents. Under a more severe Category 4 hurricane scenario, total economic losses increase dramatically to an estimated $57.55 billion. In this scenario, an estimated $6.55 billion is associated with business interruption. These findings highlight not only the scale of potential direct damages but also the significant secondary economic effects that could ripple through Boston's workforce, commercial sectors, and valued community activities following a major hurricane event.

4.10. Invasive Species

Invasive species are a persistent and growing environmental hazard for the City of Boston. Non-native plants and animals that establish and spread beyond their natural ranges can disrupt ecosystems, degrade natural resources, and create long-term management challenges. While the overall severity of invasive species impacts is generally minor compared with more destructive hazards, the probability is medium to high because multiple invasive species are already present in Boston and additional species are likely to continue arriving through landscaping, trade, travel, development, and climate-related range shifts. Risk is distributed across the city's natural and landscaped areas, including parks, playgrounds, residential yards, street trees, the Charles and Neponset Rivers, the Fens, Jamaica Pond, beaches, salt marshes, and nearshore waters. Notable previous and ongoing concerns include emerald ash borer, spotted lanternfly, Japanese knotweed, water chestnut, watermilfoil, fanwort, bittersweet, and other invasive plants already being monitored or managed in and around Boston.

Climate change is expected to increase Boston's invasive species risk by stressing native ecosystems through drought, flooding, heat, wildfire, and milder winters that allow more species to survive, spread, or shift into the region. Although risks to people are generally low to moderate, invasive species can affect public health through vector-borne disease concerns and reduce quality of life by degrading community gardens, urban forests, parks, and green spaces that support recreation, food access, gathering, and mental health. Structural impacts are typically minor and slow-moving, but invasive plants can worsen erosion, destabilize streambanks, alter drainage, and contribute to localized flooding or maintenance issues. Community lifelines may be affected when invasive species reduce

tree canopy, intensify urban heat, obstruct waterways or drainage infrastructure, and weaken natural systems that help manage stormwater and protect water quality. Boston's natural, cultural, and historic resources are especially vulnerable, as invasive species can damage parks, rivers, wetlands, ponds, coastal habitats, historic landscapes, and waterfront areas. Economic impacts are expected to come from ongoing monitoring and control costs, losses to gardens and local food systems, reduced recreation and tourism value, and diminished environmental and social benefits from degraded natural areas.

4.10.1. Description

Invasive species are plants or animals that can cause serious disruptions to native ecosystems; a few common invasive species in the Boston area are shown in Figure 4-39. Invasive species are skilled survivors and competitors: they can grow faster, reproduce more often, and/or withstand a wider variety of conditions than native species. As a result, they often outnumber and overtake native species, threatening local biodiversity. Some invasive species are pests that can attack trees or crops, causing economic and ecological damage. Others may spread throughout rivers and waterways, impairing water quality and posing hazards to recreational and commercial boaters.

Emerald Ash Borer



Japanese Knotweed



Water Chestnut



Spotted Lanternfly



Figure 4-39. Examples of Invasive Species Found in and Around Boston[167]

[167] Images licensed under Creative Commons and obtained from USDA Forest Service (https://www.flickr.com/photos/natureserve/13599039423), U.S. Fish and Wildlife Service

4.10.2. Severity

The impacts of invasive species in Boston are generally minor to moderate in severity. Invasive species can reduce water quality in freshwater systems, displace native plants and animals, and affect local habitats, including parks, wetlands, and community gardens. In some locations, invasive vegetation may interfere with recreation or outdoor access, such as making rivers harder to navigate or reducing tree canopy that provides shade and cooling. While invasive species can contribute to localized environmental damage and usability concerns, they do not typically cause significant damage to public infrastructure or interrupt essential services.

4.10.3. Probability

Multiple invasive species are already present in Boston, and additional species are likely to continue arriving and spreading over time. Once established, invasive species typically cause recurring issues on an annual or multi-year basis, rather than as isolated one-time events. Human activities, such as landscaping practices, trade, and international and interstate travel, are a primary pathway for the introduction and spread of invasive species. Climate change is expected to further increase the likelihood of invasive species impacts by creating conditions that allow more species to survive and expand their ranges. As a result, invasive species issues in Boston are expected to occur with a medium to high frequency under current conditions and become even more frequent in the future.

4.10.4. Location

Invasive species pose risks across many of Boston's natural and landscaped areas. Parks, playgrounds, community gardens, residential yards, and street trees may be affected by invasive plants and insects that weaken trees and displace native and cultivated plants. Freshwater bodies and their surrounding areas, including the Charles and Neponset Rivers, the Fens, and Jamaica Pond, are vulnerable to invasive species that can alter habitat and water quality.

Boston's coastal and marine environments, including beaches, salt marshes, nearshore waters, and harbor islands, are also at risk. This risk is heightened by Boston's location as a major coastal city with an international trading harbor. Commercial shipping, cargo movement, vessel hulls, fishing and recreational boats, and the movement of goods and materials can accidentally introduce or spread invasive plants, insects, and aquatic organisms. As a result, areas near the harbor, port facilities, waterfront districts, and

(https://www.flickr.com/photos/usfwsnortheast/5951588772, https://www.flickr.com/photos/usfwsnortheast/4791162788), and the Chesapeake Bay Program (https://www.flickr.com/photos/chesbayprogram/47249041041).

connected waterways may be particularly vulnerable to the introduction and movement of invasive species.

4.10.5. Previous Occurrences

Boston is currently facing several ongoing challenges from invasive species. The examples highlighted here are non-exhaustive and represent a portion of the species that are being monitored and managed for.

The emerald ash borer, an invasive beetle first detected in the city in 2014, poses a major threat by killing nearly all infected ash trees. Since its arrival, the Boston Parks and Recreation Department has actively managed the outbreak by protecting healthy trees and removing infested ones.[168] Another notable invasive insect, the spotted lanternfly, was first reported in Massachusetts in 2021 and has been present in Boston since 2025.[169] This pest feeds on a wide variety of plants and can cause significant damage, especially to young vegetation. In aquatic environments, invasive plants such as water chestnuts, watermilfoil, fanwort, and bittersweet continue to impact the Charles River and nearby waterways. The Charles River Watershed Association and the Massachusetts Department of Conservation and Recreation have collaborated on a 5-year management plan to control the growth of these species.[170] Across Massachusetts more broadly, over 70 plant species are recognized as invasive or potentially invasive, highlighting the widespread nature of this issue.[171]

4.10.6. Impacts of Climate Change

Invasive species are expected to become a greater threat to Boston as climate change intensifies. Disturbances such as drought, floods, and wildfires are likely to become more prevalent due to climate change. These disturbances can stress native ecosystems and leave them more vulnerable to invasions from other species. In addition, invasive species may be able to expand or shift their geographic ranges in response to climate change. For example, milder winters may allow species that typically live farther south to survive in Boston, whereas colder temperatures previously limited their presence.

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[168] City of Boston. (2026, April 23). *Emerald ash borer and Boston's trees.* https://www.boston.gov/departments/parks-and-recreation/emerald-ash-borer-and-bostons-trees

[169] Cristantiello, R. (2025, September 29). *Residents asked to report lanternfly sightings as invasive species spreads through Mass.* Boston.com. https://www.boston.com/news/local-news/2025/09/29/residents-asked-to-report-lanternfly-sightings-as-invasive-species-spreads-through-mass/

[170] Charles River Watershed Association. (n.d.). *Invasive species: Restoring the river ecosystem.* https://www.crwa.org/invasive-species

[171] Commonwealth of Massachusetts. (n.d.). *Invasive plants.* Mass.gov. https://www.mass.gov/info-details/invasive-plants

4.10.7. Vulnerability and Impacts

People

Invasive species pose generally low to moderate risks to residents of Boston, with impacts that are typically indirect and localized. Vector-borne diseases carried by invasive insects can increase the prevalence of certain diseases, though these impacts are currently limited and manageable through monitoring and prevention efforts. The degradation of community gardens, urban forests, and green spaces can also have social, emotional, and mental health impacts, particularly for residents who rely on these spaces for food access, recreation, community gathering, and stress relief. These impacts tend to affect quality of life rather than safety and are more pronounced in areas with limited access to alternative green spaces.

Structures

Impacts to structures from invasive species are typically minor and occur slowly over time. Certain invasive plants, such as Japanese knotweed, can destabilize streambanks, accelerate soil erosion, and alter drainage patterns, which may increase vulnerability to localized flooding or introduce maintenance issues. Invasive species can also damage structures, roadways, and stormwater infrastructure over time, though they generally do not cause sudden structural failure or widespread infrastructure damage.

Community Lifelines and Other Critical Facilities

Invasive species can affect community lifelines and critical facilities by damaging or reducing the performance of infrastructure systems that rely on clear drainage pathways, stable rights-of-way, healthy tree canopy, and accessible public facilities. Invasive vegetation can obstruct stormwater outfalls, culverts, drainage channels, detention areas, and other stormwater infrastructure, which may reduce conveyance capacity and increase localized flooding during heavy rainfall events. Root systems and overgrown vegetation can also damage pavement, sidewalks, retaining structures, utility corridors, and transportation rights-of-way, increasing maintenance needs and potentially affecting access to critical facilities. Tree-killing insects, including emerald ash borer, can weaken or kill street trees near roads, sidewalks, power lines, public buildings, and emergency access routes, creating risks from falling limbs or tree failure during storms. Invasive species can also threaten the productivity of local farms, food forests, and community gardens, with potential impacts on food accessibility.

While invasive species impacts are typically incremental, they can increase long-term maintenance burdens, reduce infrastructure reliability, and weaken the systems that support public health, emergency access, stormwater management, and climate resilience.

Natural, Cultural, and Historic Resources

Boston's natural resources, including parks, rivers, wetlands, ponds, coastal habitats, and urban tree canopy, are highly vulnerable to invasive species. Invasive species can contribute to biodiversity loss, displacement of native species, habitat degradation, reduced ecosystem function, and long-term changes to natural landscapes. These impacts are especially relevant in areas where natural systems provide flood storage, shoreline stabilization, cooling, water quality benefits, and habitat connectivity.

Tree-killing insects are a documented driver of canopy decline in Boston and can directly affect the city's ability to advance the goals of the Urban Forest Plan and Heat Resilience Strategy, particularly in heat-burdened neighborhoods where existing canopy gaps already contribute to higher heat exposure. Invasive species also threaten cultural and historic landscapes, including historic parks, waterfronts, cemeteries, and designed landscapes that contribute to the city's character and heritage.

Economy and Activities that have Value to the Community

Invasive species generate ongoing economic impacts through the increased cost of monitoring, management, and control efforts for the City and private landowners. Localized losses to community and residential gardens, agricultural production, and aquaculture affect local food systems and livelihoods. Degraded parks, waterways, and natural areas can reduce recreational opportunities, tourism, and waterfront activities, diminishing the economic, environmental, and social benefits these spaces provide to Boston's residents and visitors.

4.11. Landslides/Mudflows

Landslides and mudflows are a low probability but locally consequential hazard in Boston, driven primarily by localized slope instability rather than large-scale mass movement. Risk is associated with steep or modified terrain, historic fill areas, unconsolidated soils, aging retaining infrastructure, and transportation embankments. While large landslides and mudflows are unlikely, intense rainfall, rapid snowmelt, coastal flooding, erosion, and prolonged soil saturation can trigger minor to moderate slope failures, erosion, retaining wall instability, roadway washouts, or sediment movement. Susceptibility is geographically limited to discrete areas such as Beacon Hill, Mission Hill, Jamaica Plain, West Roxbury, waterfront fill areas, and road or rail corridors built on embankments or cut slopes. Boston has limited documented history of large-scale landslides, but minor slope failures and erosion issues have occurred in areas with steep grades, aging infrastructure, and significant landscape modification.

Although overall exposure is limited, Boston's dense urban environment means even small slope failures can create meaningful impacts for people, structures, community lifelines, natural and historic resources, and the local economy. Residents, pedestrians, and motorists near steep slopes, retaining walls, or embankments may face localized safety risks, especially during and after heavy rainfall. Buildings near slopes or aging retaining systems may experience foundation damage or structural impacts, while roads, rail lines, utilities, and drainage systems may be disrupted by erosion, debris blockage, or slope failure. Parks, vegetated slopes, historic landscapes, and older infrastructure corridors may experience erosion or incremental degradation that can be difficult to repair. Climate change is expected to increase these risks by producing more frequent high-intensity precipitation, soil saturation, rain-on-snow events, coastal erosion, storm surge, and sea level rise, increasing maintenance costs, emergency repairs, transportation disruptions, and localized property or infrastructure damage over time.

4.11.1. Description

Landslides include rock falls, soil slippage, and slope failures that occur when land becomes unstable due to slope, soil composition, or external forces. In Boston, landslide risk is primarily associated with localized slope instability rather than large-scale mass movements.[172] Landslides may be triggered by heavy rainfall, rapid snowmelt, erosion, or soil saturation that reduces slope stability.[173] While gravity is the primary force driving landslides on steep slopes, additional contributing factors can increase risk.

Boston's slope-stability conditions are influenced by its history of landfilling and terrain alteration. Much of the city's present-day shoreline and low-lying land was created by filling tidal flats, marshes, and coves, including with material from regraded historic hills. These artificial fill areas, often underlain by soft organic or marine sediments, can have variable soil stability and drainage conditions. While large-scale landslides and mudflows are unlikely, localized erosion, instability, slope washouts, or other sediment movement may occur during intense rainfall, coastal flooding, or prolonged soil saturation.

Mudflows are considered a secondary hazard, occurring when water-saturated soil and debris move downslope. Due to Boston's relatively limited steep terrain and sediment availability, large-scale mudflows are unlikely, though localized sediment movement and slope washouts may occur during intense precipitation events.

[172] Massachusetts Executive Office of Energy and Environmental Affairs. (2023). *ResilientMass plan: Chapter 5—Risk assessment and hazard analysis.* https://www.mass.gov/doc/resilientmass-plan-chapter-5-risk-assessment-and-hazard-analysis/download

[173] U.S. Geological Survey. (2024, September 11). *U.S. landslide inventory and susceptibility map.* https://www.usgs.gov/tools/us-landslide-inventory-and-susceptibility-map

4.11.2. Severity

Landslide severity in Boston ranges from low to moderate in magnitude but high in consequence due to urban density. Low-severity events may include minor erosion, shallow soil movement, or small slope failures. Moderate-severity events could include embankment failures, roadway washouts, damage to retaining walls, or slope movement that affects buildings, utilities, or transportation routes. Due to dense development, even small landslides can disrupt roadways, utilities, and nearby buildings.[174]

4.11.3. Probability

Landslides are currently a low-probability hazard in Boston based on limited historical occurrences (Figure 4-40). Boston's hilly terrain, aging infrastructure, variable soil conditions, and increasing frequency of heavy rainfall events may increase the probability of landslides over time.

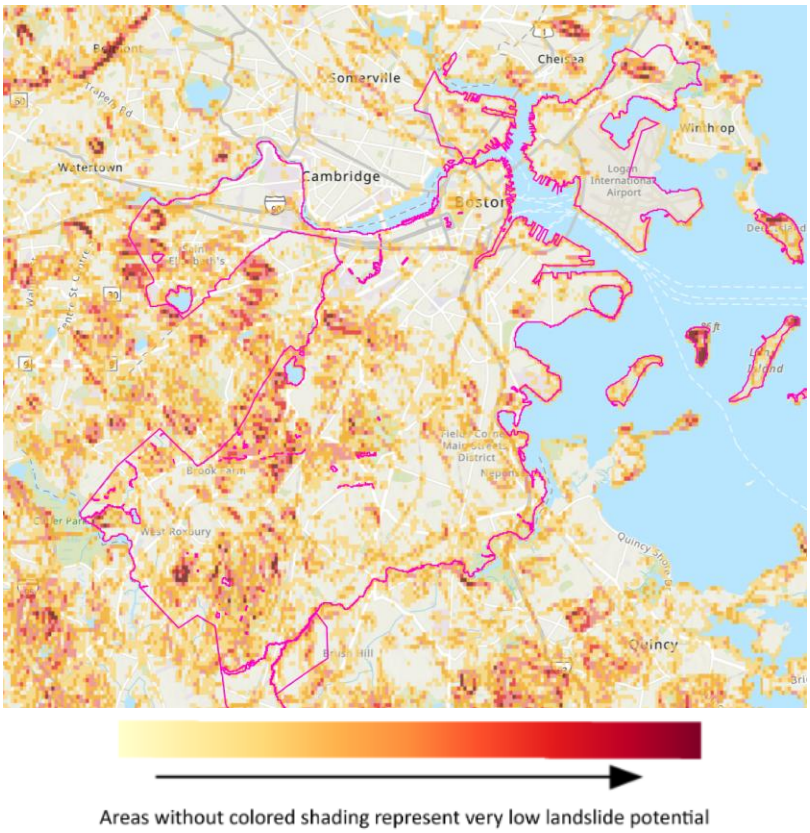


Figure 4-40. Boston Landslide Inventory and Susceptibility[175]

[174] Massachusetts Executive Office of Energy and Environmental Affairs. (2023). *ResilientMass plan: Chapter 5—Risk assessment and hazard analysis.* https://www.mass.gov/doc/resilientmass-plan-chapter-5-risk-assessment-and-hazard-analysis/download

[175] U.S. Geological Survey. (2024, September 11). *U.S. landslide inventory and susceptibility map.* https://www.usgs.gov/tools/us-landslide-inventory-and-susceptibility-map

4.11.4. Location

Landslide and mudflow hazards in Boston are geographically limited and occur in discrete, localized areas rather than across the city. Susceptibility is primarily associated with locations that have steeper slopes, modified terrain, or unconsolidated soils, including both natural hills and areas shaped by historic development. Neighborhoods such as Beacon Hill, Mission Hill, and parts of Jamaica Plain contain some of the city's more pronounced topography and are therefore more prone to localized slope instability. In addition, transportation corridors, including roadways and rail lines constructed on embankments or cut slopes, represent areas where landslide risk may be elevated due to engineered slope conditions and ongoing erosion. Waterfront areas and locations built on historic fill are also vulnerable, particularly where coastal processes such as wave action, tidal influence, or storm surge contribute to erosion and slope weakening.

The extent of landslide impacts in Boston is expected to be highly localized, typically affecting individual properties, small clusters of buildings, or limited segments of infrastructure rather than large geographic areas. Most events would likely involve minor to moderate slope failures, such as soil slippage, embankment erosion, or retaining wall instability, rather than large-scale mass movements. However, even small events can have disproportionate impacts in Boston's dense urban environment, potentially disrupting transportation routes, utilities, and drainage systems.

4.11.5. Previous Occurrences

There are limited documented large-scale landslide events within the City of Boston. However, minor slope failures, erosion issues, and localized embankment instability have occurred, particularly in areas with steep grades, aging infrastructure, or significant human modification of the landscape.

4.11.6. Impacts of Climate Change

Climate change is expected to increase landslide risk in Boston through more intense and frequent triggering conditions, even if large-scale failures remain unlikely, such as:

- More frequent high-intensity precipitation events
- Increased soil saturation and reduced slope stability
- More frequent rain-on-snow events
- Coastal flooding and erosion from storm surge and sea level rise

Additionally, rapid snowmelt and rain-on-snow events during winter months may elevate the risk of localized slope failures.

4.11.7. Vulnerability and Impacts

Although landslides are a low-probability hazard in Boston, they can still result in localized but meaningful impacts to public safety, infrastructure, and the environment. Slope failures may damage buildings, roads, utilities, and retaining structures, and can disrupt transportation and drainage systems. In some cases, displaced soil and debris may obstruct waterways or stormwater infrastructure, increasing the potential for localized flooding.

The spatial distribution of this risk is closely tied to topography, as illustrated in Figure 4-41. The map shows that much of Boston is characterized by low slopes (0–7.9 percent), particularly in coastal and filled areas; however, moderate to steep slopes (8–25 percent and greater) are concentrated in specific neighborhoods, including Jamaica Plain, Mission Hill, West Roxbury, and parts of Beacon Hill. These steeper areas are more susceptible to slope instability, particularly where natural terrain has been altered or where drainage is inadequate.

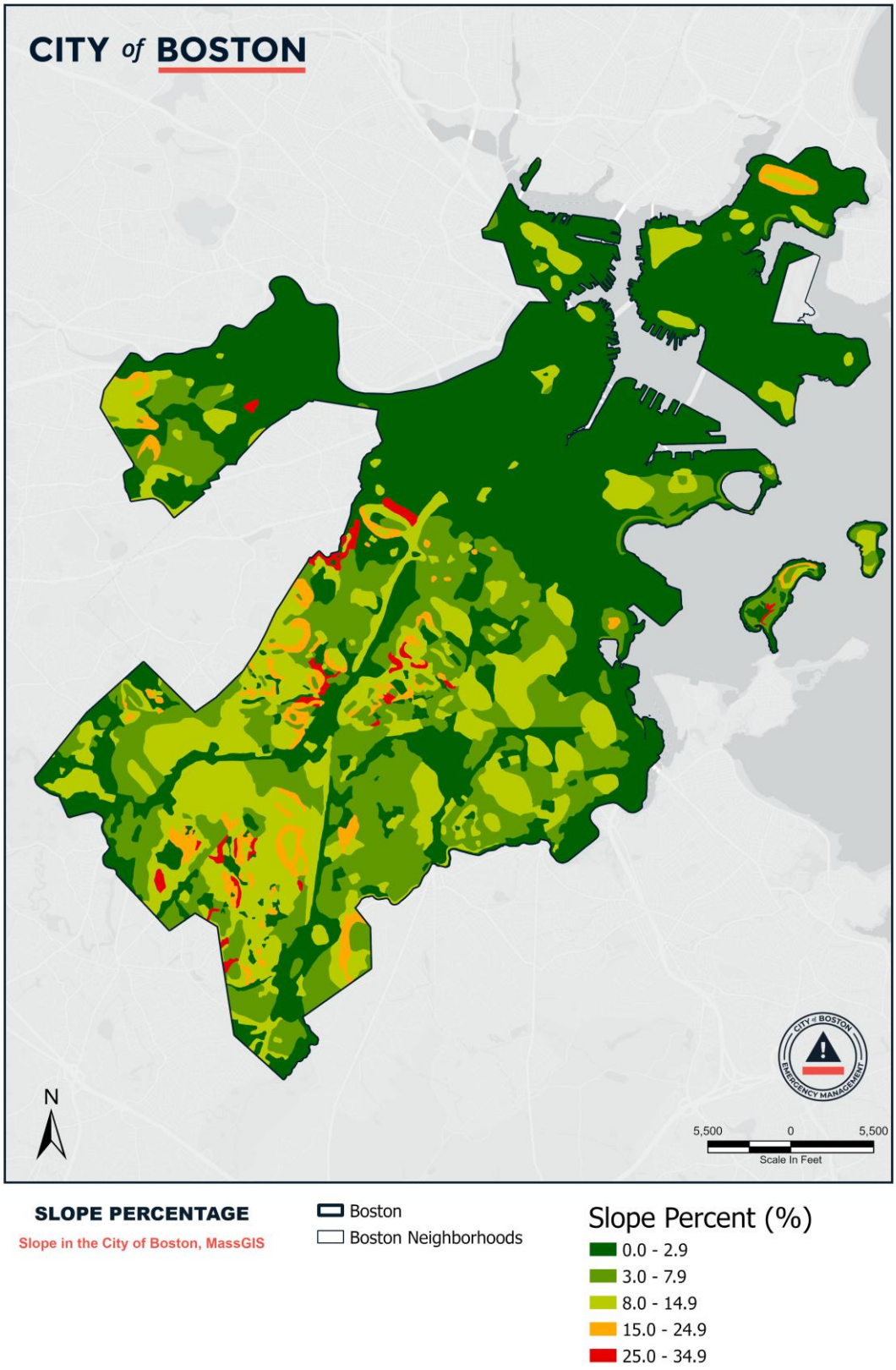


Figure 4-41. Slope percentage in the City of Boston.

Vulnerability in Boston is influenced by both natural and built conditions. Areas with steeper terrain, as well as locations with historic fill near Boston Harbor, may be more prone to instability under saturated conditions. In addition, aging retaining walls, dense development patterns, and critical infrastructure located along slopes or embankments can increase the potential consequences of even small-scale slope failures. As a result, while the overall geographic extent of landslide risk is limited, the concentration of assets in susceptible areas elevates the potential for localized impacts.

People

Boston residents' overall exposure to landslides and mudflows is relatively limited due to the localized nature of slope instability and the city's generally moderate topography. Most residents are not located in areas of significant landslide susceptibility. However, individuals living or traveling near steep slopes, retaining walls, or transportation embankments may face localized safety risks during and immediately following intense rainfall events.

Under future conditions with more frequent heavy precipitation, localized slope failures could occur with little warning, potentially impacting pedestrians, motorists, and nearby residents. While widespread displacement is unlikely, temporary access restrictions, road closures, or emergency response activities could affect mobility and safety in impacted neighborhoods. Risks to people may increase where slope instability coincides with dense development and constrained evacuation routes, particularly in hillside areas or along critical corridors.

Structures

Structures in Boston are most vulnerable to landslides in areas with steep or modified terrain, historic fill, or aging retaining infrastructure. Buildings located adjacent to slopes or supported by retaining walls may be susceptible to foundation damage, structural shifting, or localized collapse if slope failure occurs.

Historically, impacts have been limited to small-scale events such as erosion or minor wall failures. However, under a future scenario of prolonged or high-intensity rainfall, soil saturation could increase pressure on retaining systems and reduce slope stability. This may lead to localized structural damage, particularly in neighborhoods such as Jamaica Plain, Mission Hill, and Beacon Hill, as well as in areas where redevelopment has altered natural drainage or slope conditions.

While widespread structural damage is unlikely, localized failures could be costly, especially where buildings are closely spaced or rely on aging support systems.

Community Lifelines and Other Critical Assets

Community lifelines, including transportation, utilities, and drainage systems, are among the most sensitive assets to landslide impacts due to their linear nature and frequent location along slopes or embankments. Roadways, rail corridors, and utility lines may be vulnerable to erosion, slope failure, or debris blockage during heavy precipitation events.

Historically, landslides have not caused major disruptions to Boston's critical infrastructure. However, in a future scenario involving extreme rainfall, localized slope failures could temporarily disrupt key transportation routes, including streets and transit lines built on or adjacent to embankments. In addition, failure of drainage systems or retaining structures could exacerbate instability, increasing the likelihood of service interruptions or emergency repairs.

While the probability of widespread lifeline failure is low, even minor slope events could result in disproportionate impacts, particularly where infrastructure redundancy is limited.

Natural, Cultural, and Historic Resources

Natural, cultural, and historic resources in Boston may be vulnerable to landslides where they are located on or near unstable slopes or eroding landscapes. Parks, open spaces, and vegetated slopes may experience erosion, sediment displacement, and vegetation loss during heavy rainfall events.

Historic landscapes and features, particularly in areas such as Beacon Hill or along older infrastructure corridors, may also be affected by slope instability. While impacts are expected to be localized, damage to these resources may be difficult to repair or irreversible, especially where erosion alters long-standing landforms or site conditions.

Climate change may increase the frequency of conditions that contribute to slope instability, potentially leading to incremental degradation of natural and historic resources over time.

Economy and Activities that have Value to the Community

Economic impacts from landslides and mudflows in Boston are expected to be localized and episodic, primarily associated with infrastructure repair, property damage, and service disruptions. Small-scale slope failures may require road closures, debris removal, and stabilization efforts, resulting in short-term costs to the City and affected property owners.

In a future with more intense rainfall events, landslide-related impacts could increase maintenance demands on transportation infrastructure, retaining walls, and drainage systems, contributing to higher long-term capital and operational costs. Disruptions to transportation corridors may also affect local businesses and commuting patterns, particularly in densely developed areas.

While landslides are unlikely to result in large-scale economic losses, their cumulative impacts, especially when combined with other hazards, may place increasing financial pressure on infrastructure systems and municipal resources over time.

4.12. Other Severe Weather

Other severe weather in Boston includes thunderstorms that produce lightning, hail, strong winds, and heavy rainfall. These events occur most often in late spring, summer, and early fall, and can develop rapidly with limited warning. Although they are generally short in duration, they can create sudden and localized impacts to transportation systems, utilities, municipal services, outdoor public spaces, and low-lying areas with limited drainage capacity. The severity of these events generally falls within the Serious category, although more intense storms may reach Extensive levels when they cause widespread utility disruptions, road blockages, structural damage, fires, injuries, or fatalities. Lightning presents a direct public safety risk, hail can damage buildings, vehicles, and vegetation, and strong winds can down trees, damage infrastructure, and interrupt power service.

Severe thunderstorms are a high frequency hazard in Boston, with lightning occurring regularly and hail occurring less often but still presenting a notable risk. FEMA National Risk Index data cited in the document indicates that Suffolk County (comprised of Boston, Chelsea, Revere, and Winthrop) experiences an average of approximately 21 lightning events and 2 hail events each year. These hazards can affect the entire city, although impacts vary by neighborhood and local conditions. All areas are exposed to lightning and wind impacts, while low lying and highly urbanized areas may experience greater flooding impacts due to stormwater system limitations. Areas with high tree canopy or overhead utility lines may be more vulnerable to wind related damage and power outages. Previous events recorded in the NOAA Storm Events Database demonstrate the recurring nature of this hazard, including strong wind events in February and April 2020, hail and flooding in June and August 2020, a serious lightning injury at Malibu Beach in Dorchester in September 2023, and wind damage to trees and power lines in July 2025.

Climate change is expected to increase the intensity of severe weather events in Boston, even if the overall number of thunderstorms remains relatively stable. Warmer temperatures and greater atmospheric moisture can increase storm energy, contributing to stronger winds, heavier rainfall, more lightning, and greater risk of urban flooding during short duration storms. Boston's vulnerability is shaped by the rapid onset and localized nature of these events, which can make preparedness and response more difficult than for larger regional hazards. Severe thunderstorms pose risks to public safety, especially for outdoor workers, people experiencing homelessness, pedestrians, motorists, and residents near trees or exposed infrastructure. The built environment is vulnerable to wind, hail, and

rainfall impacts, particularly older buildings, roofs, windows, facades, vehicles, and exposed assets. Community lifelines, including transportation, utilities, emergency services, stormwater systems, and public transit, may experience disruptions from fallen trees, downed power lines, blocked roadways, flooding, and power outages. Overall, other severe weather represents a moderate to high risk for Boston because of its frequent occurrence, rapid onset, damage potential, and increasing intensity under future climate conditions.

4.12.1. Description

Other severe weather events in Boston primarily include thunderstorms that produce lightning, hail, strong winds, and heavy rainfall. These events are most common during the late spring, summer, and early fall months and can develop rapidly with limited warning.

- **Lightning** is a frequent hazard associated with thunderstorms and poses risks to public safety, electrical systems, and outdoor activities. In rare cases, lightning can also occur during a dry thunderstorm, posing a potential wildfire risk.
- **Hail**, while less frequent, can cause localized damage to buildings, vehicles, and vegetation.
- **Severe thunderstorms** may also generate **strong winds** capable of downing trees, damaging infrastructure, and disrupting power.

Although typically short in duration, these events can result in sudden and localized impacts affecting transportation systems, utilities, municipal services, and outdoor public spaces. Heavy rainfall during thunderstorms may also contribute to brief urban flooding, particularly in low-lying or poorly drained areas.

4.12.2. Severity

Severe thunderstorms in Boston generally fall within the Serious category but can reach Extensive levels during more intense events.

- **Lightning severity** may be described using six Lightning Activity Levels, or LALs. LAL 1 indicates no thunderstorm activity, while LAL 2 through LAL 5 represent isolated, widely scattered, scattered, and numerous thunderstorms with progressively greater lightning activity. LAL 6 represents dry thunderstorms with frequent lightning and little or no rainfall. Higher LALs increase the potential for injuries, fatalities, fires, electrical damage, and disruptions to outdoor activities.
- **Hail severity** is measured by hailstone diameter. The National Weather Service classifies hail measuring 1 inch or greater as severe. Larger hailstones can cause localized damage to roofs, windows, vehicles, infrastructure, and vegetation.
- **Severe thunderstorms** may produce wind gusts of at least 58 miles per hour. Winds of this strength can down trees and utility lines, block roads, damage buildings, and cause power outages.

- **Heavy rainfall** can increase event severity by overwhelming drainage systems and contributing to brief urban flooding in low lying or poorly drained areas.
- **Impacts** are typically short term and localized but may become more widespread during stronger events, resulting in utility disruptions, transportation impacts, infrastructure damage, and increased demands on emergency response services.

4.12.3. Probability

Severe thunderstorms occur multiple times each year in Boston, particularly during the warmer months, making this a high-frequency hazard for present day.

FEMA's National Risk Index shows that hail[176] occurs occasionally in Suffolk County, with an average of about 2 hail events each year (Figure 4-42). These events are less frequent than lightning but can still cause damage to buildings, vehicles, and outdoor areas. This indicates that hail is a less frequent but still notable hazard in Boston.

FEMA's National Risk Index shows that lightning[177] occurs regularly in Suffolk County (comprised of Boston, Chelsea, Revere, and Winthrop) with an average of about 21 lightning events each year (Figure 4-42). These events are based on lightning activity, not the number of storms, meaning a single storm can produce multiple lightning events. This shows that lightning is a frequent hazard rather than a rare occurrence in Boston.

[176] Federal Emergency Management Agency. (2024). *National Risk Index: Annualized frequency—Hail (feature layer)*. FEMA Disaster Resilience Hub. https://resilience-fema.hub.arcgis.com/
[177] Federal Emergency Management Agency. (n.d.). *National Risk Index: Lightning—Annualized frequency (map layer)*. FEMA Disaster Resilience Hub. https://resilience-fema.hub.arcgis.com/maps/8dc5ab3181cd4ed5a6534ea3ffaff8bf/about

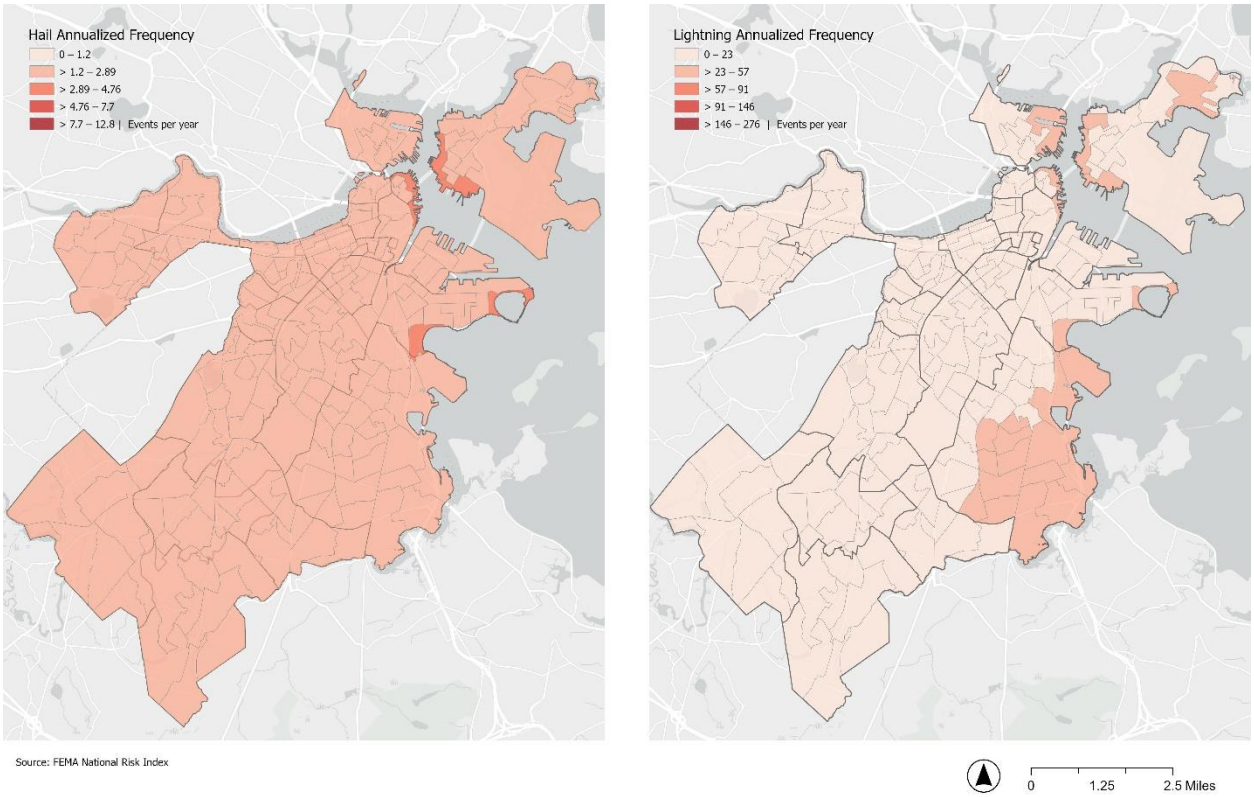


Figure 4-42. FEMA National Risk Index Annualized Frequency for Hail (left) and Lightning (right). Source: FEMA.

While climate projections suggest that the overall number of thunderstorms may remain relatively consistent in the future, the intensity of these events is expected to increase, and potentially become a more intense high frequency hazard in the future.

4.12.4. Location

Severe thunderstorms, lightning, and hail can impact the entire City of Boston, though effects are often uneven and localized.

- All neighborhoods are exposed to lightning and wind impacts.
- Low-lying and urbanized areas may experience greater flooding impacts due to stormwater limitations.
- Areas with high tree canopy or overhead utility lines may be more vulnerable to wind-related damage and outages.

4.12.5. Previous Occurrences

Boston regularly experiences thunderstorms, with several notable events involving damaging winds, lightning, and heavy rainfall. These events, while often not rising to the level of federal disaster declarations, occur frequently enough to present an ongoing hazard requiring preparedness and response planning.

- **In February 2020,** strong winds reached up to 60 mph near Pleasure Bay, with similar gusts recorded at Carson Beach and Logan Airport. These winds caused damage across the city. Scaffolding fell from a building near TD Garden and injured one person. Trees and wires were also knocked down in some areas.
- **In April 2020,** another storm brought very strong winds between 60 and 70 mph, causing additional damage in parts of the region.
- **In June 2020,** thunderstorms brought heavy rain, flash flooding, and hail. In Jamaica Plain, hail about the size of a dime was reported.
- **In August 2020,** more thunderstorms caused wind damage, hail, and some flooding, including dime-sized hail in Hyde Park.
- **In September 2023,** during a period of hot and humid weather, thunderstorms caused wind damage and flooding. During this storm, a woman was struck by lightning at Malibu Beach in Dorchester and was seriously injured, showing how dangerous lightning can be.
- **In July 2025,** multiple storms brought strong winds that damaged trees and power lines, including down power lines on Annavoy Street in Boston.

These events, which were all recorded within the NOAA Storm Events Database, show that thunderstorms in Boston can happen often and can cause damage quickly, including strong winds, hail, lightning, and flooding.

4.12.6. Impacts of Climate Change

Climate change is expected to increase the intensity of severe weather events affecting Boston. Current models and studies suggest that while the total number of thunderstorms may not increase, but the intensity of individual storms is likely to rise. Warmer temperatures and increased moisture in the atmosphere can create more energy for storms, leading to stronger winds, heavier rainfall, and more lightning during each event[178].

- Warmer air temperatures allow the atmosphere to hold more moisture, leading to heavier rainfall during thunderstorms.
- Increased atmospheric instability may contribute to more intense storm events, including stronger winds and more frequent lightning.
- Short-duration, high-intensity storms may increase the risk of urban flooding, particularly in areas with aging or undersized drainage infrastructure.
- These changes may amplify impacts on infrastructure, public safety, and emergency response systems.

[178] Federal Emergency Management Agency. (n.d.). *National Risk Index: Lightning.* FEMA Disaster Resilience Hub. https://resilience-fema.hub.arcgis.com/pages/lightning

4.12.7. Vulnerability and Impacts

Historical patterns and recent occurrences demonstrate that other severe weather hazards, particularly thunderstorms producing lightning, hail, strong winds, and heavy rainfall, pose a persistent and evolving risk to the City of Boston. While these events are typically shorter in duration and more spatially localized than large scale hazards such as Nor'easters, their frequency, unpredictability, and ability to generate concentrated impacts contribute to a moderate to high overall risk profile.

Records from the NOAA Storm Events Database and local reporting show that Boston experiences multiple severe thunderstorm events each year, with recurring impacts including downed trees, power outages, flash flooding, and occasional injuries from lightning strikes. Events documented between 2020 and 2025 illustrate a consistent pattern of damaging winds exceeding 60 mph, localized hail events, and heavy rainfall leading to temporary flooding in neighborhoods such as Jamaica Plain and Hyde Park. The September 2023 lightning strike at Malibu Beach in Dorchester, which resulted in severe injury, further highlights the life safety risks associated with these storms.

Unlike winter storms, which often provide some advance warning and affect large regions more uniformly, severe thunderstorms develop rapidly and can produce highly localized but intense impacts. This variability makes it more difficult to predict and manage the increase in risk across multiple sectors of the city.

Severe thunderstorms present direct risks to public safety, particularly due to lightning, falling trees, and hazardous travel conditions. Historical events demonstrate that lightning strikes can cause serious injuries or fatalities. Individuals who work outdoors, including construction and public works staff, face increased exposure during rapidly developing storms. People experiencing homelessness or lacking access to shelter are also particularly vulnerable to sudden weather changes. In addition, localized flooding and debris can create dangerous conditions for pedestrians and drivers, increasing the likelihood of accidents and injuries during storm events.

Boston's built environment is vulnerable to wind, hail, and heavy rainfall associated with severe thunderstorms. Strong wind gusts have repeatedly caused damage to roofs, windows, and building facades, as well as downed trees that impact residential and commercial properties (Figure 4-43). Hail events, while less frequent, contribute to property damage, particularly to roofs, vehicles, and other exposed assets. Repeated exposure to these hazards can lead to cumulative damage and increased maintenance costs over time. Older buildings and structures in areas with aging infrastructure may be more susceptible to damage, especially where maintenance or upgrades are limited.

Community lifelines, including transportation, utilities, and emergency services, are particularly sensitive to severe weather impacts. Historic events show that strong winds

frequently down trees and power lines, resulting in localized power outages and service disruptions. Blocked roadways and flooded streets can delay emergency response and restrict access to critical facilities such as hospitals and fire stations. Heavy rainfall can overwhelm stormwater systems, leading to flash flooding in low lying and highly impervious areas, which further disrupts mobility and infrastructure operations. Public transit systems, including MBTA services, may experience delays or interruptions due to debris, flooding, or power issues.



Figure 4-43. Tree across live wires in Dorchester. Source: Boston Fire, Patch Article

When compared to severe winter weather and Nor'easters, other severe weather events generally produce less widespread damage but occur far more frequently. This high frequency, combined with the potential for sudden, high impact disruptions, results in a cumulative risk that is significant over time. Historical trends indicate that Boston can expect continued recurring impacts across people, structures, and community lifelines from these events.

Looking forward, climate change is expected to increase the intensity of thunderstorms, even if their overall frequency remains relatively stable. Warmer atmospheric conditions and increased moisture are likely to produce stronger wind events, heavier rainfall, and more frequent lightning within individual storms. Based on observed historical trends and projected changes, future severe weather events in Boston are likely to cause more intense localized flooding, greater infrastructure damage, and increased strain on emergency response systems.

Overall, the historical record indicates that other severe weather hazards represent a moderate to high risk to Boston. Their frequent occurrence, rapid onset, and capacity for

localized but disruptive impacts make them an ongoing concern for city operations, infrastructure resilience, and public safety.

What We Heard from the Community

Workshop participants associated high winds with falling signs, tree limbs, and other unsecured objects, as well as concerns about downed trees and utility infrastructure blocking streets or sidewalks.

4.13. Severe Winter Weather/Nor'easters

Severe winter weather and Nor'easters are among the most consequential hazards affecting Boston because they can combine heavy snow, blizzard conditions, ice, extreme cold, strong winds, coastal flooding, and hazardous wave action. Snowstorms can reduce visibility, create dangerous travel conditions, and disrupt daily activities, while blizzards intensify these risks through sustained winds of at least 35 miles per hour and severely reduced visibility. Ice storms create additional hazards by coating roads, sidewalks, trees, and utility infrastructure with freezing rain, which can lead to power outages, structural damage, and unsafe travel conditions. Nor'easters are particularly significant for Boston because the city's coastal location exposes it to both winter precipitation and coastal impacts, including storm surge, wave action, and tidal flooding. In terms of severity, these events are generally classified as Serious to Extensive, with impacts ranging from widespread snow accumulation, school and business closures, and hazardous travel to prolonged power outages, infrastructure damage, injuries, fatalities, and extended disruption to essential services.

Severe winter weather is a high probability hazard in Boston, with winter storms occurring annually and major snowstorms or Nor'easters occurring approximately every one to five years. Although future snowfall patterns may become more variable, climate projections indicate that intense precipitation events may become more likely under certain temperature conditions, resulting in fewer but more intense winter storm events. Severe winter weather affects the entire city, including transportation networks, buildings, utilities, schools, businesses, and municipal operations. Densely developed neighborhoods face particular challenges related to snow storage and delayed removal after large storms, while coastal neighborhoods such as Downtown, the North End, East Boston, South Boston, Charlestown, and Dorchester face additional risks from storm surge, coastal flooding, and wave action. Low lying and flood prone areas are especially vulnerable when winter storms coincide with high tides. Boston's history of severe winter weather includes major events such as the 1978 Blizzard, Blizzard Nemo in 2013, Winter Storm Juno in 2015, the January 2018 Bomb Cyclone, the January 2022 blizzard, and significant winter storms in

January and February 2026. These events demonstrate that both federally declared disasters and locally significant storms can produce major transportation disruption, public safety risks, coastal flooding, and substantial municipal response demands.

Climate change is expected to alter the character of severe winter weather and Nor'easters in Boston by increasing precipitation intensity, creating more frequent mixed precipitation events, raising sea levels, and changing storm patterns. Warmer air can hold more moisture, which may contribute to heavier snowfall during colder conditions and more intense rainfall during marginal temperature events. At the same time, sea level rise is expected to amplify coastal flooding during Nor'easters, particularly when storm surge coincides with high tides. Boston's vulnerability is shaped by the interaction of snowfall, ice, extreme cold, strong winds, and coastal flooding, especially when these hazards occur together and strain emergency response, snow removal, transportation, utility, and school operations. Recent events illustrate this compound risk, including the December 2022 Nor'easter, which caused coastal flooding in East Boston, the Seaport District, and Charlestown, and the January 2024 Nor'easter, which produced mixed precipitation, icy travel conditions, school closures, snow emergency declarations, and flooding in waterfront areas. Future severe winter weather and Nor'easters are likely to continue affecting critical assets, including roadways, public transit, Logan International Airport, schools, utilities, emergency response systems, stormwater infrastructure, and coastal neighborhoods. As sea levels rise and intense precipitation becomes more likely, Boston can expect future Nor'easters to produce not only snow and wind impacts, but also more frequent and damaging coastal flooding in vulnerable areas.

4.13.1. Description

Severe winter weather in Massachusetts includes snowstorms, blizzards, ice storms, and extreme cold events, often driven by Nor'easters, intense coastal storms that form along the East Coast.

- **Snowstorms** are weather events characterized by significant snowfall accumulation over a short period of time. They can vary in intensity from light to heavy snow and may include moderate winds. Snowstorms can reduce visibility, create hazardous road conditions, and disrupt transportation and daily activities, especially when snowfall exceeds several inches.
- **Blizzards**[179] are severe snowstorms defined by a combination of heavy or blowing snow, sustained winds of at least 35 mph, and visibility of less than ¼ mile for at least three hours. Blizzards do not necessarily require heavy snowfall; strong winds

[179] National Weather Service. (n.d.). *Winter storms and blizzards.* Retrieved April 13, 2026, from https://www.weather.gov/fgz/WinterStorms

can blow existing snow and create dangerous whiteout conditions. These events pose significant risks to life and safety due to extreme travel hazards and exposure.

- **Ice storms**[180] occur when freezing rain leaves surfaces with a layer of ice, typically at least 0.25 inches thick. These events happen when warm air aloft causes precipitation to fall as rain, which then freezes upon contact with cold surfaces. Ice storms can cause widespread power outages, tree and utility line damage, and extremely hazardous travel conditions due to slick roadways and sidewalks.
- **Nor'easters**[181] are characterized by strong northeast winds, heavy snowfall or rain, coastal flooding, and hazardous wave action. These storms can last multiple days and often produce widespread impacts across large geographic areas.

In Boston, severe winter weather can result in heavy snow accumulation, icing conditions, reduced visibility, and strong winds. Nor'easters are particularly impactful due to Boston's coastal location, where storm surge and wave action can coincide with snowfall or rain, compounding hazards and increasing risks to infrastructure, transportation systems, and public safety.

4.13.2. Severity

Severe winter weather and Nor'easters in Boston are typically classified as Serious to Extensive events based on the severity scale defined in Section 4.1.

- Serious impacts include widespread snow accumulation (6–12 inches), hazardous travel conditions, school and business closures, and short-term disruptions to essential services.
- Extensive impacts occur during major Nor'easters or blizzards, where snowfall exceeds 12–24 inches, accompanied by high winds, coastal flooding, and prolonged power outages. These events can result in significant damage to public infrastructure, extended service disruptions, and potential injuries or fatalities.

The combination of snow, ice, wind, and coastal impacts makes Nor'easters among the most severe winter hazards affecting Boston.

4.13.3. Probability

Severe winter weather is a high probability hazard in Boston. Based on historical patterns and climate projections:

- **Present Frequency:** High — winter storms occur annually, with significant events (e.g., major snowstorms or Nor'easters) occurring every 1–5 years.

[180] National Weather Service. (n.d.). *Glossary of weather terms (I)*. Retrieved April 13, 2026, from https://forecast.weather.gov/glossary.php?letter=i
[181] Massachusetts Executive Office of Energy and Environmental Affairs. (n.d.). *2023 ResilientMass plan.* https://www.mass.gov/info-details/2023-resilientmass-plan

- **Future Frequency:** Medium to High — while total snowfall may become more variable, climate projections indicate an increased likelihood of intense precipitation events, including heavy snowfalls under certain temperature conditions.

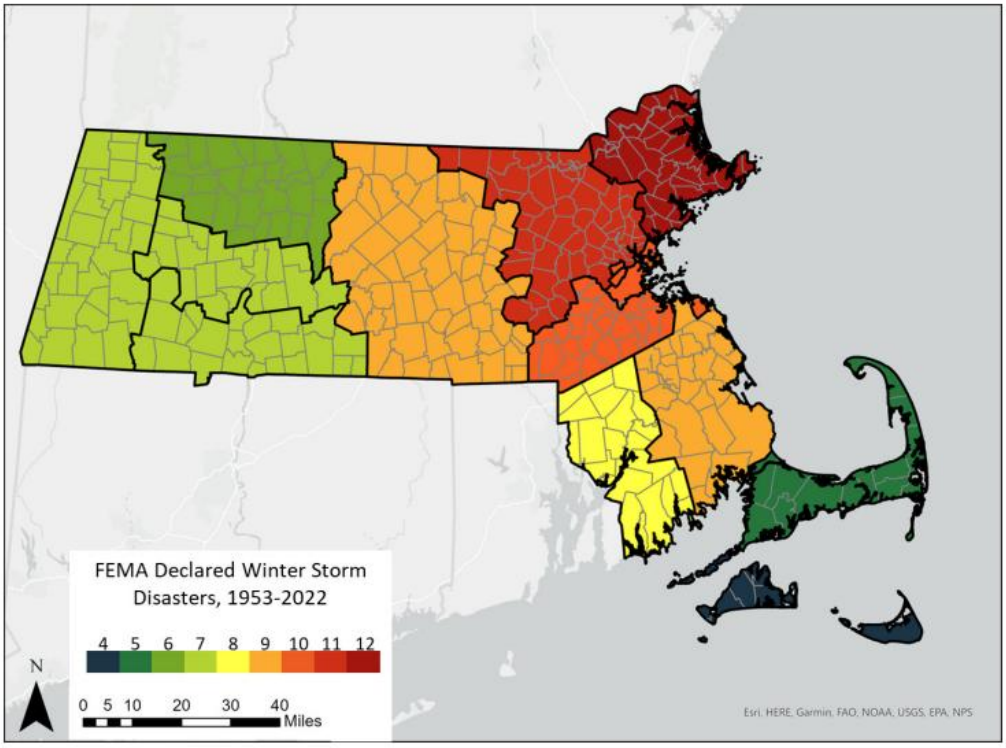
The ResilientMass Plan notes that changing climate conditions may shift storm characteristics, resulting in fewer but more intense winter storm events.

4.13.4. Location

Severe winter weather and Nor'easters have a large geographic impact affecting the entire City of Boston.

- Snowfall and ice impacts occur citywide, affecting transportation networks, buildings, and utilities.
- Densely developed areas around the city are particularly affected during storms due to challenges with limited areas for snow storage and delayed removal following large storms.
- Coastal neighborhoods—including East Boston, South Boston, Charlestown, and Dorchester—face additional risks from storm surge, coastal flooding, and wave action during Nor'easters.
- Low-lying and flood-prone areas are particularly vulnerable when winter storms coincide with high tides.

4.13.5. Previous Occurrences



Source: FEMA (2023).

Figure 4-44. Disaster declarations. Source: Figure 5.13-1 from the ResilientMass Plan (2023).

Boston has experienced numerous severe winter weather events and Nor'easters, several of which have resulted in federal disaster declarations and significant disruptions:

- **1978 Blizzard:** One of the most severe Nor'easters in Massachusetts history, producing over 27 inches of snow, widespread coastal flooding, and prolonged infrastructure shutdowns. (DR-550-MA)
- **2013 Blizzard Nemo:** Brought over 24 inches of snow and high winds, causing major transportation disruptions and power outages. (DR-4110-MA)
- **2015 Winter Storm Juno**: Resulted in significant snowfall and coastal flooding impacts across Boston. (DR-4214-MA)
- **January 2018 Nor'easter ("Bomb Cyclone"/Winter Storm Grayson):** Combined heavy snowfall with record coastal flooding, particularly impacting East Boston and downtown waterfront areas. (DR-4366-MA)

While other recent winter storms, like those most notably in January and February of 2026, have caused significant local impacts, they did not result in federal disaster declarations, reflecting FEMA thresholds rather than a lack of severity at the local scale. All events, even those that were not officially declared, demonstrate recurring patterns of high-impact winter storms, often combining multiple hazards such as snow, wind, and coastal flooding.

4.13.6. Impacts of Climate Change

Climate change is expected to continue altering the characteristics of severe winter weather and Nor'easters in Massachusetts:

- **Increased precipitation intensity:** Warmer air holds more moisture, leading to heavier snowfall during colder conditions and more intense rain during marginal temperature events. Snowpack is likely to decrease annually, but snowfall will occur with heavy intensity.
- **More frequent mixed precipitation events:** Boston may experience more rain-on-snow or ice events, increasing risks of flooding, icing, and infrastructure strain.
- **Rising sea levels:** Rising sea levels are expected to amplify the coastal flooding impacts of Nor'easters, particularly during storm surge and high tides. The U.S. Army Corps of Engineers Boston Coastal Storm Risk Management Feasibility Study[182] evaluates Nor'easters and other coastal storms under future sea level change conditions and indicates that higher baseline water levels will increase flood depths and damages associated with coastal storm events over time.
- **Changing storm patterns:** While the total number of snow events may decrease over time, the most extreme winter storms are expected to become more intense.

These changes will likely increase the complexity and impact of winter storm events, requiring adaptive planning and resilient infrastructure to manage combined risks of snow, flooding, and coastal hazards.

4.13.7. Vulnerability and Impacts

Recurring incidents have demonstrated that Boston's susceptibility increases when heavy snowfall, extreme cold, and coastal flooding coincide, straining the city's response resources and prolonging recovery efforts. Significant winter weather events occurred nearly one month apart in January and February of 2026. Although the city and its residents had only recently recovered from the late January storm, a subsequent blizzard brought 24 inches of snow and several days of operational disruptions in late February.

From 2021 through 2026, severe winter weather and Nor'easters in Boston repeatedly caused citywide transportation disruption, school and business closures, hazardous travel, coastal flooding in exposed waterfront areas, and substantial municipal response costs. The clearest recent example is the January 2022 blizzard, which dropped 23.8 inches of snow on

[182] City of Boston. (2026). *USACE draft integrated feasibility report: Boston CSRM.* https://www.boston.gov/departments/climate-resilience/usace-draft-integrated-feasibility-report-boston-csrm

Boston and brought 40-45mph winds,[183] one of the largest storms in city history and created prolonged whiteout conditions, dangerous roads, and a multi-day cleanup effort. This 2022 storm was the catalyst for initiating the City of Boston's citywide deployable flood barriers program. The city activated existing barriers and has continued to invest resources in developing more flood barriers. In February 2024, another winter storm prompted a snow emergency and closure of Boston Public Schools and municipal buildings, showing that even less extreme events still disrupt normal city operations and access to essential services.

Most recently, in early January 2026, a winter storm impacted Boston with several inches of snowfall, icy conditions, and freezing temperatures that created hazardous travel conditions and prompted school closures and localized service disruptions (Figure 4-45). While less severe than later events that season, the storm required snow and ice removal operations and highlighted the city's ongoing vulnerability to even moderate winter weather events, particularly in terms of roadway safety and transit reliability.



Figure 4-45. January (left) and February (right) 2026 winter storms in South Boston. Source: Weston & Sampson.

That storm was followed up by the February 2026 blizzard that brought approximately 17 inches of snowfall to Boston, triggering a citywide snow emergency, school and city

[183] National Oceanic and Atmospheric Administration, National Centers for Environmental Information. (n.d.). *Storm events database: Event details (event ID 1002608).* https://www.ncei.noaa.gov/stormevents/eventdetails.jsp?id=1002608

building closures, and large-scale snow removal operations (Figure 4-45). Prolonged blizzard conditions, including strong winds and reduced visibility, created hazardous travel conditions and led to widespread disruptions across transportation systems, including delays and cancellations at Logan International Airport and interruptions to MBTA services. The storm also placed significant strain on municipal resources, requiring coordinated emergency response, road clearing, and snow hauling operations over multiple days. NOAA classified the event as a major snowstorm affecting more than 115 million people nationally as it moved across the country.

Historic impacts also show that in Boston, winter storms are not limited to snow accumulation alone. Nor'easters can combine heavy snow or rain with strong winds, coastal surge, and tidal flooding, which is especially important for low-lying waterfront neighborhoods and critical transportation corridors.

The December 2022 Nor'easter produced significant coastal flooding across Boston's waterfront neighborhoods, including East Boston, the Seaport District, and parts of Charlestown. High tides combined with storm surge inundated roadways, harborwalks, and low-lying infrastructure, temporarily restricting access and disrupting transportation networks (Figure 4-46). While snowfall totals were limited, the event highlighted the growing risk of winter storms producing rain-driven flooding rather than snow impacts, placing additional strain on stormwater systems and coastal defenses. Municipal response focused on road closures, flood mitigation, and emergency management coordination in vulnerable coastal areas.

What We Heard from the Community

Workshop participants reported that major snowstorms caused significant delays to MBTA buses and institutional shuttles serving the Longwood Medical Area, illustrating how winter weather can affect access for patients, employees, and other travelers.



Figure 4-46. Flooding overtopping Bennington Street in East Boston. Source: Resilient Bennington Street Report[184]

Similarly, the January 2024 Nor'easter resulted in coastal flooding, mixed precipitation, and citywide disruptions closing out an entire month of severe winter weather conditions with several weekends of storms. Rain and snow combined to create slushy and icy conditions, complicating travel and increasing accident risk. Flooding was again reported in low-lying waterfront areas, particularly in East Boston, where storm surge and high tides overtopped vulnerable infrastructure. The event prompted school closures, snow emergency declarations, and deployment of city resources for snow removal and flood response. The combination of precipitation types also stressed drainage systems, illustrating the challenges of managing rain-on-snow and winter flooding events.

Based on these recent events, future severe winter weather and Nor'easters in Boston are likely to continue causing repeated impacts to critical assets, especially transportation systems, public schools, utilities, emergency response operations, and coastal infrastructure. Past storms show that when snowfall, high winds, and coastal flooding occur together, impacts become more severe and recovery takes longer. These historic storms therefore suggest that future events may again close major roadways, interrupt transit and school operations, strain snow removal capacity, damage or isolate waterfront assets, and increase economic costs to the City. As sea level rise continues and intense precipitation events become more likely, Boston should expect future Nor'easters to

[184] City of Boston. (2025, June). *Resilient Bennington Street and Fredericks Park project: Phase II schematic design report.* https://www.boston.gov/sites/default/files/file/2025/10/ResilientBenningtonStreetandFredericksParkProjectPhaseII_SchematicDesignReport_FINAL_June2025.pdf

produce not only snow and wind impacts, but also more frequent and more damaging coastal flooding in already vulnerable neighborhoods.

What We Heard from the Community

Participants noted that winter storms can disrupt access to essential services, including closing food pantries and making them difficult to reach even after reopening. Snow accumulation and parking constraints can also prevent home-based caregivers from reaching residents who depend on their services. Extreme cold and extreme heat create similar access challenges by making travel to obtain food, medical care, or other necessities more difficult.

4.14. Tornadoes

Tornadoes are a low probability but potentially high impact hazard for the City of Boston. They are rapidly rotating columns of air that extend from thunderstorms to the ground and are most associated with supercell thunderstorms. Tornado formation requires a combination of atmospheric conditions, including strong wind shear, warm and humid surface air, cooler air aloft, and a triggering mechanism such as a cold front or remnant storm boundary. Tornado severity is classified using the Fujita Scale, which ranges from F0 events with minor damage to F5 events capable of catastrophic destruction. In the Boston region, tornadoes are rare and are most likely to be lower intensity events, typically F0 or F1, which may cause roof damage, downed trees, power outages, and localized disruption. However, even weaker tornadoes can have significant consequences in a dense urban environment.

The probability of tornado occurrence in Boston is relatively low compared with other hazards and with more tornado prone regions of the United States. Massachusetts experiences approximately two to five tornadoes annually, and while tornadoes within the City of Boston are rare, regional activity indicates that the city cannot be considered immune. Since 1951, approximately 200 tornadoes have been recorded across Massachusetts, although there are no confirmed historical records of a tornado directly impacting Boston. Tornadoes are considered a citywide hazard because they can develop wherever severe thunderstorms occur, and their paths are highly unpredictable. Climate change may indirectly increase tornado risk by intensifying the conditions that contribute to severe thunderstorm development. Rising temperatures, increased atmospheric moisture, hotter summers, and prolonged heat waves may create greater instability and increase the likelihood of severe storm environments that could support tornado formation.

Boston's vulnerability to tornadoes is shaped by its high population density, compact development pattern, older building stock, historic structures, critical facilities, and interconnected infrastructure systems. Although historic tornado activity has been concentrated in central and western Massachusetts, the Boston metropolitan region remains exposed to potential regional severe weather events. Low intensity tornadoes could produce localized roof, window, tree, debris, transportation, and power impacts, while moderate tornadoes could cause structural damage, extended utility outages, communication disruption, resident displacement, and business interruption. High intensity tornadoes are unlikely in New England, but they represent a severe worst-case scenario involving major structural collapse, damage to hospitals and emergency response facilities, long duration service disruption, and significant economic losses. Populations with greater vulnerability include older adults, people with disabilities, low-income households, renters, residents of older or substandard housing, and individuals with limited access to emergency information. Structures may be affected by roof, facade, window, and debris damage, while community lifelines may experience cascading impacts across power, communications, transportation, water, wastewater, and MBTA systems. Economically, a tornado in Boston could result in substantial property damage, debris removal costs, emergency response costs, infrastructure repair needs, business interruption, and disruption to regional transportation and supply chains.

4.14.1. Description

Tornadoes are rapidly rotating columns of air that extend from a thunderstorm to the ground. They are most associated with supercell thunderstorms, which are powerful storms that have a spinning center.

Although only a portion of these storms produce tornadoes, they represent the primary mechanism for tornado formation in the northeastern United States. The MA SHMCAP defines a tornado as following[185]:

- Strong atmospheric winds present at both mid- and upper-altitude levels.
- Winds that shift direction with height, curving in a clockwise pattern.
- Speeds that ramp up quickly within the lowest few thousand feet of the atmosphere (for example, light winds at the ground but much faster winds a few thousand feet up).
- Hot, humid air is situated near the surface while noticeably cooler air resides higher in the atmosphere.
- A trigger such as an advancing cold front or a lingering boundary left behind by earlier showers or storms.

[185] City of Boston. (2021, December 8). *Natural hazard mitigation plan update.* https://www.boston.gov/sites/default/files/file/2021/12/Boston%20NHMP_2021-12-08_Combined_8.pdf

Tornado development requires a combination of atmospheric conditions, including strong wind shear (changes in wind speed and direction with height), warm and humid surface air, cooler air aloft, and a triggering mechanism such as a cold front or remnant storm boundary. These conditions allow for the development of rotating updrafts that can evolve into tornadoes.

4.14.2. Severity

Tornado severity is classified using the Fujita (F) Scale, which categorizes events based on estimated wind speeds and associated damage, explained in Table 4-13 below. In Boston, tornadoes are relatively rare but can still cause significant harm when they do occur. Most tornadoes reported in the region are on the lower end of the Fujita Scale, typically ranging from F0 to F1, resulting in minor to moderate damage such as downed trees, damaged roofs, and power outages. While major, high-intensity tornadoes are uncommon, even weaker tornadoes can disrupt transportation, utilities, and daily life, underscoring the importance of preparedness and resilient infrastructure in the city.

Table 4-13. NOAA Fujita Scale[186]

F-Scale	Intensity Phrase	Wind Speed (mph)	Level of Damage
F0	Gale tornado	40–72	Minor damage; small branches broken; shallow-rooted trees pushed over; light signs damaged.
F1	Moderate tornado	73–112	Roof surfaces peeled; mobile homes shifted; cars pushed off roads; attached garages damaged.
F2	Significant tornado	113–157	Roofs torn off homes; mobile homes destroyed; large trees snapped or uprooted; debris becomes airborne.
F3	Severe tornado	158–206	Roofs and some walls removed; trains overturned; widespread tree damage.
F4	Devastating tornado	207–260	Well-built homes leveled; cars thrown; heavy debris becomes dangerous missiles.

[186] National Weather Service. (n.d.). *The Fujita scale.* https://www.weather.gov/ffc/fujita

F-Scale	Intensity Phrase	Wind Speed (mph)	Level of Damage
F5	Incredible tornado	261–318	Strong homes swept away; vehicles thrown long distances; trees stripped; reinforced buildings heavily damaged.

4.14.3. Probability

Tornadoes are relatively infrequent in Massachusetts compared to other regions of the United States. On average, the state experiences between two and five tornadoes annually. In 2022, there was only one accounted for in Boston, according to NOAA.[187] While occurrences within the City of Boston are rare, regional activity demonstrates that tornadoes remain a low-probability but high-impact hazard.

4.14.4. Location

Tornadoes are considered a citywide hazard, as they can develop wherever severe thunderstorms occur. Their paths are unpredictable and can affect both densely developed urban areas and surrounding regions.

4.14.5. Previous Occurrences

Since 1951, approximately 200 tornadoes have been recorded across Massachusetts.[188] However, only a limited number have occurred in close proximity to Boston, and there are no confirmed historical records of a tornado directly impacting the city itself. Despite this, statewide damages from tornado events have exceeded $540 million, illustrating the potential for significant economic and infrastructural impacts even in regions where events are infrequent.

4.14.6. Impacts of Climate Change

Climate change is expected to influence the environmental conditions that contribute to tornado formation. Rising temperatures and increased atmospheric moisture can enhance instability, which may support more frequent or intense severe thunderstorm activity[189]. In Boston, trends such as hotter summers and prolonged heat waves may increase the

[187] Massachusetts Executive Office of Energy and Environmental Affairs. (2023, October 10). *ResilientMass plan: Massachusetts state hazard mitigation and climate adaptation plan.* https://www.mass.gov/doc/resilientmass-plan-2023/download
[188] Gannett Satellite Information Network. (n.d.). *Massachusetts tornado history*. Retrieved April 13, 2026, from https://data.burlingtonfreepress.com/tornado-archive/massachusetts/
[189] Center for Climate and Energy Solutions. (n.d.). *Tornadoes and climate change*. Retrieved April 13, 2026, from https://www.c2es.org/content/tornadoes-and-climate-change/

likelihood of conditions favorable to severe storms, thereby indirectly elevating tornado risk.

4.14.7. Vulnerability and Impacts

Historically, tornado activity in Massachusetts has been concentrated in central and western portions of the state, where terrain and atmospheric conditions are more conducive to severe storm development. The Boston metropolitan region has experienced comparatively fewer direct impacts; however, several recorded events in eastern Massachusetts demonstrate that tornadoes can and do occur within the broader region. These patterns indicate that while Boston is not a hotspot, it remains within a zone of potential exposure, particularly during severe summer thunderstorm events.

Despite the relative rarity of tornadoes in Boston, if one were to occur, all major asset classes in Boston would likely be exposed, including residential neighborhoods, commercial districts, critical facilities, and lifeline infrastructure systems. Due to the City's high population density and compact development pattern, even a localized tornado could impact a large number of people, structures, and services simultaneously. Regionally, past tornadoes have demonstrated the capacity to cause widespread damage to residential structures, transportation networks, and utility systems.

Historic Patterns

This historical pattern suggests that while Boston has not been a focal point for tornado activity, it remains susceptible to indirect impacts from regional events and cannot be considered immune. As severe weather patterns evolve, the combination of urban density and critical infrastructure exposure may amplify risk relative to past experience.

1. **Low-Intensity Tornadoes (F0–F1)**
   Although often considered minor, low-intensity tornadoes can produce notable impacts in an urban setting such as Boston:

   - Localized damage to roofs, windows, and exterior building elements
   - Downed trees and debris causing property damage and roadway obstructions
   - Short-term power outages and service interruptions
   - Disruptions to traffic flow and public transit

   Due to the City's density, even small-scale events may affect multiple neighborhoods and essential services simultaneously.

2. **Moderate-Intensity Tornadoes (F2–F3)**
   Moderate tornadoes present a more substantial risk, with the potential for widespread community impacts:

- Structural damage to residential and commercial buildings, including partial roof or wall failure
- Destruction of lightweight or non-reinforced structures
- Significant tree loss and airborne debris hazards
- Extended utility outages and communication disruptions
- Temporary displacement of residents and interruption of business operations

Historical tornado events in Massachusetts at this scale have resulted in considerable economic losses and highlight the potential for similar impacts in the Boston region.

3. **High-Intensity Tornadoes (F4–F5)**
   While rare in New England, high-intensity tornadoes represent a worst-case scenario:

   - Severe structural damage or collapse of well-built buildings
   - Extensive damage to critical facilities, including hospitals and emergency response centers
   - Long-duration disruptions to power, water, and transportation systems
   - Large-scale displacement of residents and prolonged recovery periods
   - Significant economic losses and regional impacts

   Although the likelihood of such events is low, their potential consequences are severe, particularly in a dense urban environment like Boston.

People

Social and demographic factors influence how different populations experience tornado impacts. Populations that may face increased vulnerability include:

- Elderly individuals and persons with disabilities
- Low-income households with limited resources for preparedness and recovery
- Renters and residents of older or substandard housing
- Individuals with limited access to emergency information or services

These groups may be more susceptible to both immediate impacts during a tornado event and longer-term recovery challenges.

Structures

Boston's built environment presents several characteristics that influence tornado vulnerability:

- High-density development increases the likelihood of widespread damage from even lower-intensity events

- Older and historic structures may be more susceptible to roof, façade, and window damage due to aging materials or design limitations
- Lightweight and non-reinforced structures are particularly vulnerable to moderate wind speeds
- High-rise buildings introduce unique risks, including falling debris, shattered glass, and wind tunneling effects at street level

These factors suggest that damage in Boston may be more spatially concentrated but affect a larger number of assets compared to less dense communities.

Community Lifelines and Other Critical Facilities

Critical facilities and infrastructure systems are essential to emergency response and recovery but remain vulnerable to tornado impacts. Key risks include:

- Power outages resulting from downed transmission and distribution lines
- Communication disruptions affecting emergency coordination and public information
- Transportation system impacts, including blocked roadways, damaged rail lines, and interruptions to MBTA service
- Water and wastewater system disruptions due to power loss or physical damage

Boston's infrastructure systems are highly interconnected, meaning disruptions in one sector can result in cascading impacts across multiple systems. This interdependency increases the potential for indirect and prolonged impacts following even moderate events.

Economy and Activities that Have Value to the Community

Although Boston has not experienced a direct tornado strike, historical data from Massachusetts indicate that tornadoes have caused over $500 million in damages statewide. In Boston, potential impacts could include:

- High-value property damage due to dense development patterns
- Business interruption and lost economic productivity
- Costs associated with debris removal, emergency response, and infrastructure repair
- Disruptions to regional transportation and supply chains

Given the concentration of economic activity in Boston, even a moderate event could result in disproportionately high financial losses compared to other parts of the state.

4.15. Tsunamis

Tsunamis are a low-probability but potentially high-consequence hazard for Boston, most likely originating from distant Atlantic or Caribbean events that would allow warning time,

though rare local underwater landslides could occur with little notice. While Boston has no recent documented damaging tsunami, historic Atlantic-Caribbean events such as the 1929 Grand Banks tsunami and 1918 Puerto Rico tsunami show that the risk is not zero. The most exposed areas are low-lying coastal and harbor-connected districts, including East Boston and Logan Airport, Charlestown, the Downtown and North End waterfronts, Fort Point Channel, the Seaport/South Boston Waterfront, Dorchester Bay, Morrissey Boulevard, and other filled waterfront areas. Although tsunami probability during the five-year planning cycle is rated low/rare, even a moderate event could inundate shoreline neighborhoods, damage waterfront infrastructure, disrupt utilities and transportation, and create dangerous currents, debris, and repeated surges.

Boston's tsunami vulnerability is shaped by the concentration of people, buildings, critical facilities, economic activity, and natural and cultural resources along the waterfront. Populations most at risk include residents, workers, visitors, older adults, people with disabilities, children, people with limited English proficiency, people without private vehicles, and individuals in congregate or institutional settings who may need evacuation assistance. Exposed structures include waterfront housing, commercial buildings, maritime and industrial facilities, piers, wharves, marinas, and ground-floor uses vulnerable to flooding, debris, saltwater damage, and hazardous material contamination. Community lifelines such as Logan Airport, MBTA and roadway corridors, bridges, tunnels, utilities, pump stations, emergency facilities, ferry and port terminals, and communications systems should be screened for exposure. Climate change is not expected to increase the frequency of tsunamis, but sea-level rise, erosion, groundwater rise, and more frequent tidal flooding could make future tsunami impacts more severe. Therefore, tsunami planning should be integrated with coastal flood mapping, sea-level-rise projections, evacuation planning, resilient redevelopment, and protection of shoreline parks, wetlands, historic resources, tourism, port activity, and waterfront businesses.

4.15.1. Description

A tsunami is a series of ocean waves caused by the sudden displacement of a large volume of water. Potential sources include submarine earthquakes, submarine or coastal landslides, volcanic activity, and other rapid seabed or water-column disturbances. Unlike ordinary wind-generated waves, tsunami waves can affect an entire water column and can produce rapid water-level rise and fall, strong currents, repeated surges, floating debris, scour, and damage to shoreline structures.

For Boston, the most likely tsunami sources would be far-away events in the Atlantic Ocean or Caribbean Sea. These would usually give people more time to get warnings and move to safety (Figure 4-47). Tsunamis from nearby underwater landslides or other local events are less likely, but they could happen with very little warning. The first wave may not be the

biggest, and dangerous waves and strong currents can keep happening even after the water first rises or falls.

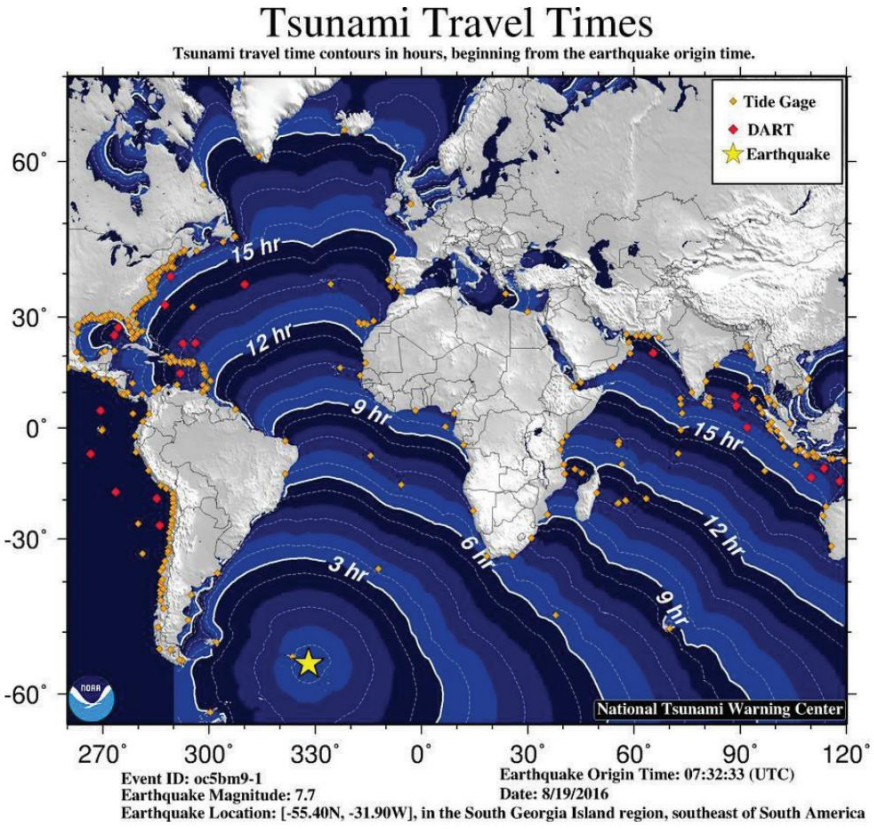


Figure 4-47. Tsunami Travel Times. Source: NOAA Tsunami Warning Center, 2016.[190]

4.15.2. Severity

The probability of a large, damaging tsunami in Boston is low, but the impacts could be severe if one does occur. A tsunami arriving in Boston could inundate low-lying coastal and waterfront areas, especially those built on fill, damaging infrastructure, businesses, and waterfront properties.[191] Because much of Boston's shoreline is densely developed, even a moderate run-up could disrupt transportation, utilities, and critical coastal facilities.

[190] National Tsunami Warning Center. (2016, August 19). *Tsunami of 19 August, 2016 (South Georgia Islands Region).* NOAA/National Weather Service. https://www.tsunami.gov/previous.events/?p=8-19-16_SouthGeorgia

[191] Massachusetts Emergency Management Agency, & Massachusetts Executive Office of Energy and Environmental Affairs. (2018, September). *Chapter 4: Risk assessment.* In *Massachusetts State Hazard Mitigation and Climate Adaptation Plan.* https://www.mass.gov/files/documents/2018/09/17/SHMCAP-September2018-Chapter4.pdf

4.15.3. Probability

The probability of a damaging tsunami affecting Boston during the five-year NHMP planning cycle is low. Tsunamis are less frequent than Boston's recurring coastal hazards such as nor'easters, coastal flooding, storm surge, and sea-level-rise-related nuisance flooding. The state's natural hazard mitigation plan notes that tsunami probability along the coast is low, and historical records show very few Atlantic tsunamis. According to that plan, East Coast tsunami events (or run-ups) have an estimated recurrence interval on the order of decades, but large, destructive tsunamis remain rare for Massachusetts.[192]

Probability should therefore be rated "Low/Rare" due to limited historical occurrence, lack of destructive Boston events, and lower Atlantic tsunami frequency compared with the Pacific basin, while still recognizing that the consequence of a rare event could be significant in exposed shoreline locations.

4.15.4. Location

The tsunami hazard area for Boston is expected to be concentrated along the coast and within low-lying areas connected to Boston Harbor, the harbor islands, river mouths, tidal channels, and waterfront fill areas. Areas most likely to be impacted are usually are coasts less than 25 feet above sea level, and within a mile of the shore. Many of the coastal neighborhoods fall within this criterion such as East Boston and Logan Airport, Charlestown waterfront, North End and Downtown waterfront, Long Wharf and Fort Point Channel, the Seaport/South Boston Waterfront, Dorchester Bay, Morrissey Boulevard, Port Norfolk/Neponset, and harbor-facing public facilities and transportation corridors.

In the absence of an adopted tsunami inundation map for Boston, MC-FRM's coastal flood vulnerability map for the 2070 1% storm should be treated only as a preliminary exposure proxy (Figure 4-48).

[192] Massachusetts Emergency Management Agency, & Massachusetts Executive Office of Energy and Environmental Affairs. (2018, September). *Chapter 4: Risk assessment.* In *Massachusetts State Hazard Mitigation and Climate Adaptation Plan.* https://www.mass.gov/files/documents/2018/09/17/SHMCAP-September2018-Chapter4.pdf

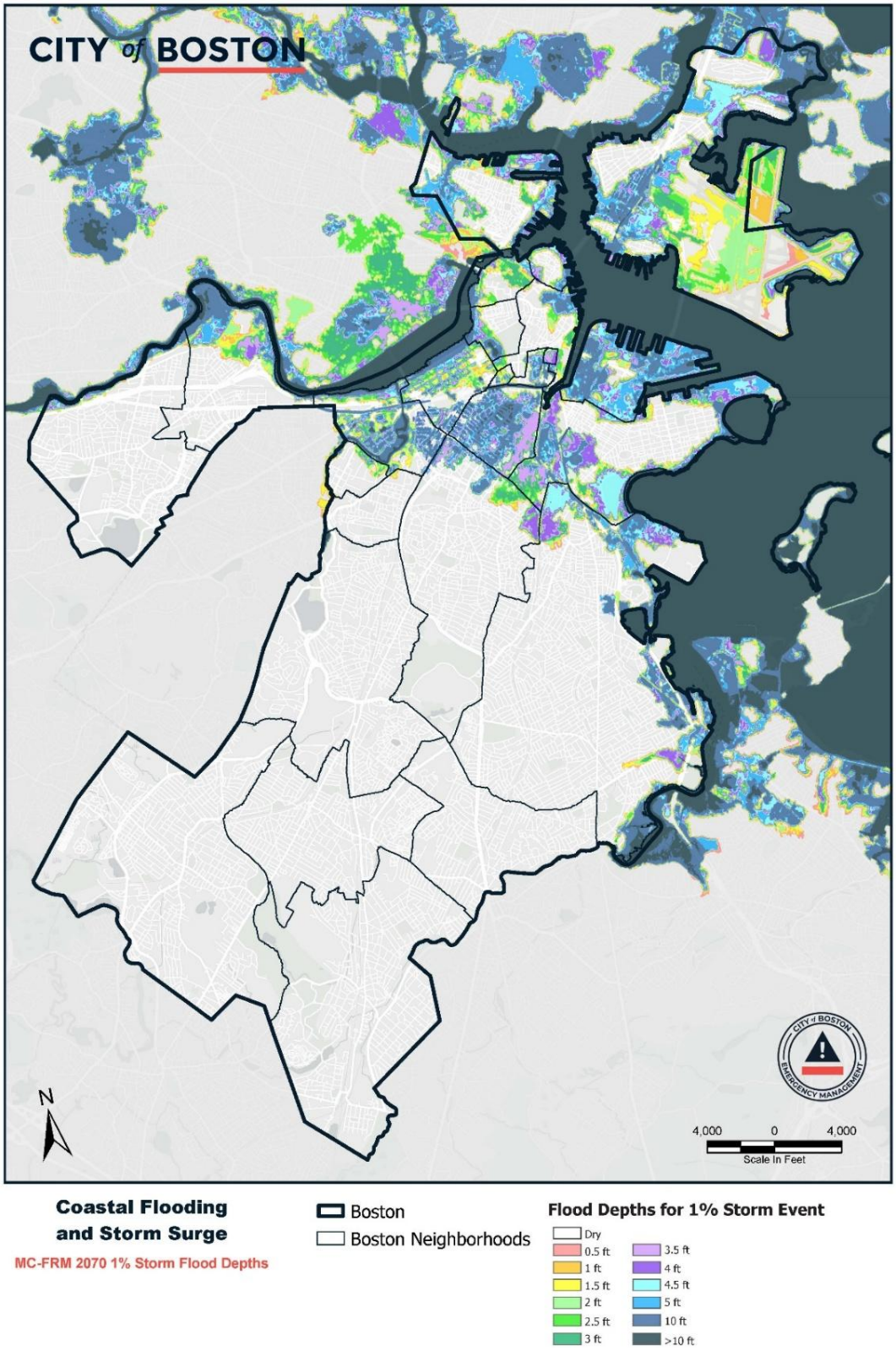


Figure 4-48. Coastal Flooding and Storm Surge inundation map as a proxy for Tsunami inundation zone.

4.15.5. Previous Occurrences

Boston has not had a well-documented damaging tsunami in recent history. Tsunamis are much less common on the U.S. Atlantic Coast than in places like Alaska, Hawaii, or the Pacific Coast. However, past events in the Atlantic Ocean and Caribbean show that tsunamis can happen and should still be considered for coastal areas like Boston.

An important event was the 1929 Grand Banks tsunami near Newfoundland, Canada,[193] which is just north of Boston and Maine on the east coast. This tsunami was caused by an offshore earthquake and underwater landslide. It caused serious damage in parts of Newfoundland and shows that damaging tsunamis can occur in the North Atlantic.

The 1918 Puerto Rico tsunami is another example of tsunami risk in the wider Atlantic-Caribbean region. NOAA records show that a magnitude 7.5 earthquake caused a tsunami that killed at least 91 people in northwestern Puerto Rico.[194]

Overall, previous occurrences show that the tsunami risk for Boston is low, but it is not zero. A tsunami affecting Boston would most likely come from a distant Atlantic or Caribbean source, giving more warning time, or from a rare local offshore disturbance, which could provide little warning.

4.15.6. Impacts of Climate Change

Climate change is not expected to increase the frequency of tsunamis because tsunamis are generally triggered by earthquakes, landslides, volcanoes, or other sudden movement of water. However, climate change can make tsunamis more damaging. As sea levels rise, the ocean starts at a higher level. This means a tsunami wave could move farther inland and flood deeper areas than it would today. Coastal erosion, higher groundwater, more frequent tidal flooding, and stress on seawalls, roads, and utilities could also make low-lying coastal areas more vulnerable.

Because of this, future tsunami planning should consider sea-level rise and how long buildings, roads, utilities, and other important infrastructure are expected to last. New or improved waterfront projects, public buildings, utilities, evacuation routes, and redevelopment areas should be checked for both coastal flood risk and tsunami risk where that information is available.

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[193] National Geophysical Data Center / World Data Service. (n.d.). *Tsunami runup information: Runup ID 8306* [Database record]. In *NCEI/WDS Global Historical Tsunami Database*. NOAA National Centers for Environmental Information. https://www.ngdc.noaa.gov/hazel/view/hazards/tsunami/runup-more-info/8306

[194] National Geophysical Data Center / World Data Service. (n.d.). *Tsunami runup information: Runup ID 8306* [Database record]. In *NCEI/WDS Global Historical Tsunami Database*. NOAA National Centers for Environmental Information. https://www.ngdc.noaa.gov/hazel/view/hazards/tsunami/runup-more-info/8306

4.15.7. Vulnerability and Impacts

Boston's vulnerability is driven by the concentration of people, buildings, infrastructure, and economic activity along the waterfront. The areas of greatest concern are those with dense development, critical infrastructure, transportation chokepoints, limited evacuation options, or populations that may need assistance receiving warnings or moving to higher ground.

People

Potential life-safety impacts include injury or death from waves that can reach up to 6-10 feet, fast-moving water, floating debris, structural damage, hazardous materials releases from damaged infrastructure, and delayed evacuation.

People at elevated risk include residents and workers in low-lying waterfront districts, visitors unfamiliar with evacuation routes, people without access to private vehicles, people with limited English proficiency, older adults, people with disabilities, children, and people living in congregate or institutional settings who may not be able to evacuate on their own accord or fast enough to get to safety.

Structures

Exposed buildings may include waterfront residential and commercial structures, industrial and maritime facilities, piers, wharves, marinas, ground-floor retail, parking areas, and structures in filled low-lying coastal districts. Likely damages include inundation of basements and first floors, damage to mechanical/electrical systems, impacts from floating debris, and contamination from saltwater or hazardous materials.

Boston's ongoing waterfront redevelopment, public-realm investments, climate resilience projects, and infrastructure upgrades may either increase or reduce future tsunami exposure. New development in low-lying coastal districts may increase exposed building value and population unless designed with elevated utilities, flood-resistant construction, redundant access, emergency warning protocols, and shoreline resilience measures. Future land use decisions should integrate tsunami screening with coastal flooding and storm surge data from MC-FRM, sea-level-rise projections, and city-wide evacuation planning.

Community Lifelines and Other Critical Facilities

Critical infrastructure that should be screened includes emergency operations and public safety facilities near the coast, hospitals and health care facilities, shelters, schools, evacuation routes, bridges, tunnels, MBTA and roadway corridors, Logan Airport, port and ferry terminals, stormwater outfalls, pump stations, wastewater and water infrastructure, electrical and telecommunications assets, fuel storage, and hazardous materials sites.

Tsunami impacts could disrupt emergency response, transportation, power, communications, wastewater and stormwater services throughout the city, fuel supply, maritime operations, and access to affected neighborhoods. A tsunami would significantly disrupt movement around the city, closing schools, businesses, and more while any damage from impacts was remediated.

Natural, Cultural, Historic Resources, the Economy, and Activities that have Value to the Community

Tsunami flooding could damage shoreline parks, beaches, wetlands, coastal habitat, historic waterfront resources, cultural institutions, and harbor-dependent businesses. Impacts may include erosion, sediment movement, saltwater intrusion, contamination, cleanup costs, loss of public access, business interruption, and temporary closure of port, tourism, and waterfront commercial activity.

4.16. Wildfires

Wildfire is a relatively low-probability hazard for Boston, but the risk is increasing as hotter temperatures, extended dry periods, drought, and low humidity create more favorable conditions for brush and wildland fires. Boston is not located in one of Massachusetts' most fire-prone forested regions, and FEMA's Wildfire National Risk Index rates the entire city as "Very Low" risk; however, recent statewide fire seasons, including the historic 2024 season, show that wildfire activity is becoming more relevant across Massachusetts. Within Boston, wildfire risk is concentrated in localized areas near parks, wetlands, underbrush, conservation land, greenways, and other vegetated or undeveloped areas, including places such as Stony Brook Reservation and areas near the Neponset River Reservation. Historically, Boston has experienced few and generally small wildfire or brush fire events, though the April 2012 fire near the Boston-Dedham border demonstrated how nearby fires can affect Boston neighborhoods through smoke and ash.

Overall vulnerability and risk remain low, with direct impacts to people, buildings, critical facilities, natural and cultural resources, and the economy expected to be localized and limited. Residents are more likely to experience indirect impacts from wildfire smoke, which can worsen asthma, cardiovascular disease, and other health conditions, especially for older adults, children, and people with pre-existing conditions. Structural impacts are expected to be minimal, though older wooden buildings and properties near large parks or urban wildlands may face slightly elevated exposure. Community lifelines such as health care, schools, transportation, utilities, and emergency services are unlikely to experience major direct damage, but smoke events could temporarily affect operations, outdoor activities, and public health demand. Climate change is expected to increase fire-weather conditions over time, making it important for Boston to monitor vegetation management,

emergency response capacity, air quality impacts, public health messaging, and future green space development while recognizing that wildfire's primary consequences for the city are likely to be smoke exposure, temporary disruption, and localized brush-fire impacts rather than widespread destruction.

4.16.1. Description

For purposes of this assessment, wildfire, brush fire, and urban conflagration are distinct fire hazards. Wildfire refers to an uncontrolled fire burning primarily through forests, grasslands, or other natural vegetation. Wildfire ignition and spread are influenced by vegetation and available fuels, ignition sources, weather conditions, and topography, as illustrated in Figure 4-49.

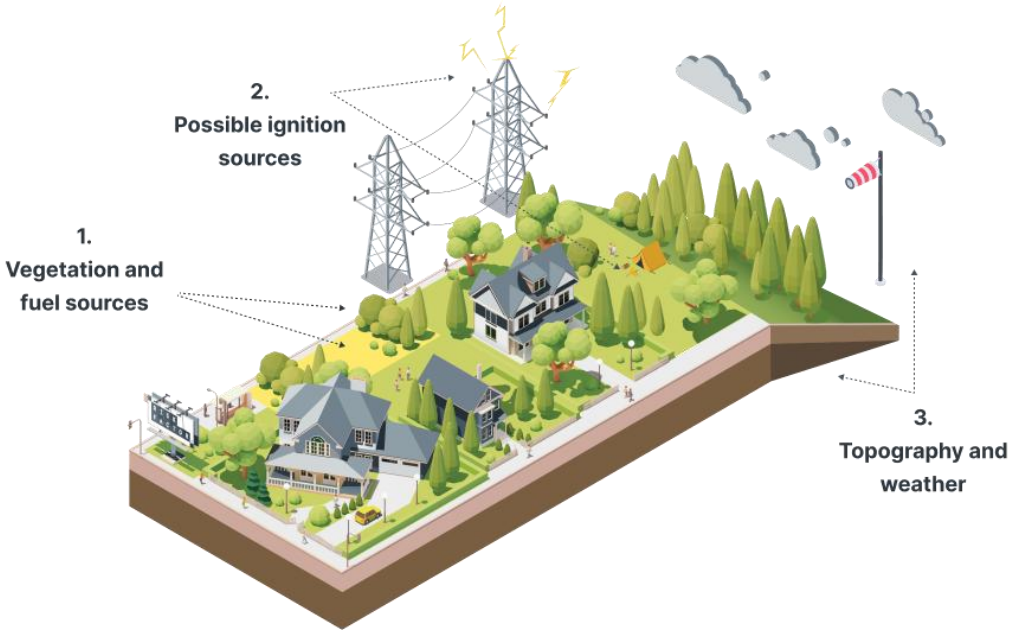


Figure 4-49. Factors Influencing Wildfire Ignition and Spread in Urban Areas[195]

In Boston, the more locally applicable wildland fire hazard is generally a brush fire occurring within parks, wetlands, reservations, greenways, or other vegetated areas. An urban conflagration is a separate structural-fire hazard in which fire spreads rapidly between buildings in a densely developed area. This profile primarily evaluates wildfire and brush fire conditions associated with vegetation, as well as smoke exposure from regional wildfires. Urban conflagration is not represented by the wildfire exposure maps or property-level risk estimates presented below and is instead managed through the City's fire prevention, building code, and emergency response capabilities.

[195] First Street. (n.d.). *Boston, MA wildfire map and climate risk report.* https://firststreet.org/city/boston-ma/2507000_fsid/fire

4.16.2. Severity

Recent fire seasons in Massachusetts have shown that extended dry periods combined with extreme heat and low humidity can elevate the risk of brush and wildfire activity. The Massachusetts Department of Conservation and Recreation (DCR) and Massachusetts Department of Fire Services (DFS) reported a "historic" 2024 fire season: about 1,300 wildfires across Massachusetts.[196]

In 2025, Boston specifically only had three reported wildfires according to the National Interagency Fire Center, all located within the Stony Brook Reservation affecting approximately 1 acre.[197]

4.16.3. Probability

Wildfires have historically been rare within the City of Boston, with fewer than 20 recorded incidents between 2001 and 2009, all of which were small in scale (0.25-9.0 acres burned) and limited in impact.[198] However, climate-change projections indicate that the number of "most dangerous fire weather days" conditions that elevate wildfire ignition and spread risk is expected to increase through mid-century.[199] According to FirstStreet, in 2026 there are 19,796 properties in Boston at risk from a wildfire. In thirty years, there will be 38,489 properties at risk.[200]

These changing conditions, driven by hotter temperatures, longer dry periods, and more frequent drought, elevate the likelihood of brush-fire ignition in Boston's vegetated areas and wildland-urban interface zones over time.[201]

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[196] Massachusetts Department of Conservation & Recreation. (2025, June 11). *State officials advise precautions ahead of potential wildfire activity* [Press release]. Mass.gov. https://www.mass.gov/news/state-officials-advise-precautions-ahead-of-potential-wildfire-activity

[197] National Interagency Fire Center. (2026, January 2). *2026 wildland fire incident locations to date* [Feature service]. ArcGIS Hub. https://data-nifc.opendata.arcgis.com/datasets/405814902c9e411cb4384c49d694e82b_0/explore?location=42.273331%2C-71.131289%2C14.53

[198] City of Boston. (2014). *Natural hazard mitigation plan: A component plan of Boston's Comprehensive Emergency Management Program.* https://www.boston.gov/sites/default/files/embed/f/final-2014-plan-update-approved-by-fema.pdf

[199] ClimateCheck. (n.d.). *Boston, MA top climate change risks: Precipitation, heat, flood.* https://climatecheck.com/massachusetts/boston

[200] First Street. (n.d.). *Boston, MA wildfire map and climate risk report.* https://firststreet.org/city/boston-ma/2507000_fsid/fire

[201] Massachusetts Executive Office of Energy and Environmental Affairs, Massachusetts Executive Office of Public Safety and Security, & Massachusetts Emergency Management Agency. (2023, October). *ResilientMass plan: 2023 Massachusetts state hazard mitigation and climate adaptation plan.* https://www.mass.gov/doc/state-hazard-mitigation-and-climate-adaptation-plan/download

While a large wildfire within Boston remains unlikely, the probability of smaller brush fires and overall wildfire-favoring weather conditions is increasing over time as the natural climate changes.

4.16.4. Location

Boston is primarily urban and densely built, and wildfire risk is concentrated in pockets adjacent to vegetated or natural-resource zones, wetlands, parks, or undeveloped greenbelt areas, specifically where wetland grasses, underbrush, or other combustible vegetation (fuel) is present (Figure 4-50).[202] Areas in the city with significant vegetation cover or near wetlands may be relatively more vulnerable.

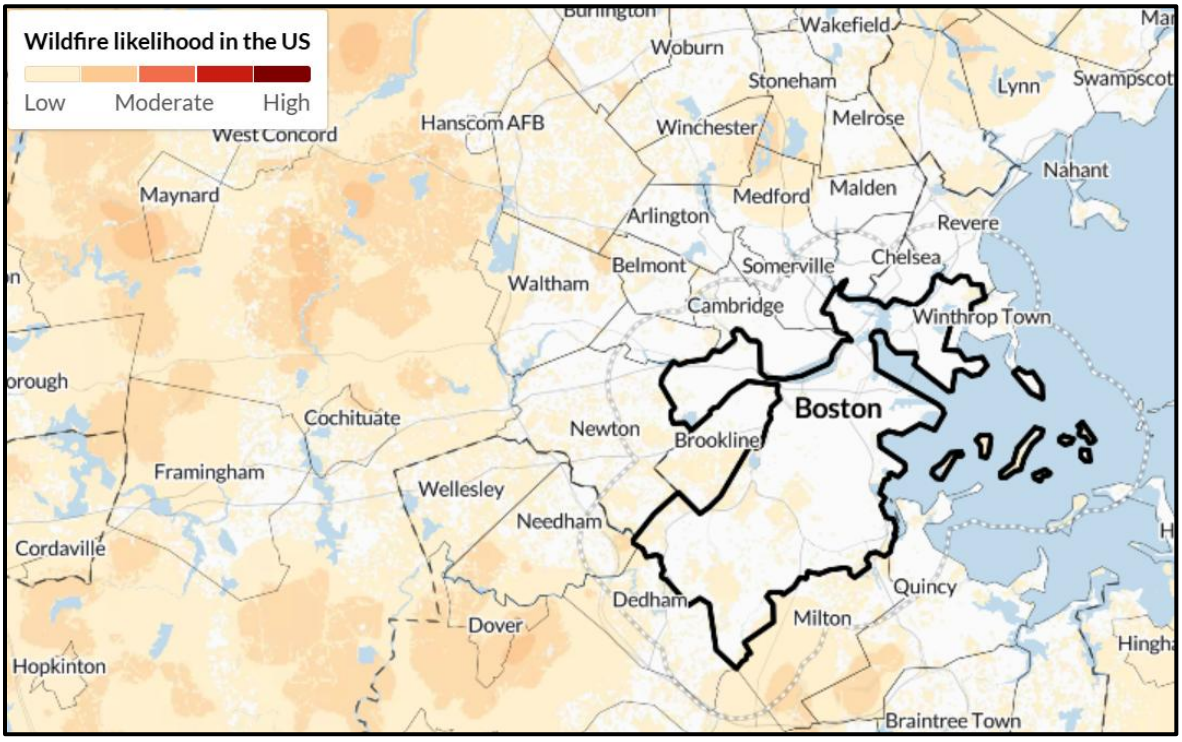


Figure 4-50. Wildfire Risk in and around Boston, USGS[203]

Increased wildfire activity elsewhere in the Commonwealth can also affect Boston residents through smoke, reduced air quality, and disruptions to recreation and regional natural resources.

[202] City of Boston. (2014). *Natural hazard mitigation plan: A component plan of Boston's Comprehensive Emergency Management Program.* https://www.boston.gov/sites/default/files/embed/f/final-2014-plan-update-approved-by-fema.pdf

[203] U.S. Forest Service. (2024, May). *Wildfire likelihood in Boston, MA* [Interactive map]. *Wildfire Risk to Communities.* https://apps.wildfirerisk.org/explore/wildfire-likelihood/25/25025/2500007000/

4.16.5. Previous Occurrences

Boston has experienced several previous wildfire occurrences in and around the city. To date, most of these fires have been relatively small and infrequent, categorizing them as brushfires. A larger event occurred in April of 2012, as documented in Table 4-14 below.

Table 4-14. Boston's Wildfire History

Date	Event	Location Notes	Burned Area or Damage	Relevance to Boston Brushfires
2001–2009	Multiple "wildfires / brush fires" (recorded in city plan)	City of Boston	Fires typically burned 0.25 – 9.0 acres; total "fewer than 20" reported wildfires over this period (Boston.gov)	Demonstrates that small-scale wildland/brush fires have occurred in Boston. Low frequency & small size but underscores potential for brush fires in vegetated park areas.
April 19, 2012	Brush fire near border of Boston	Wooded area near Dedham — along the Neponset River Reservation, bordering Boston	Fire burned 50–100 acres; smoke/ash carried into several Boston neighborhoods (West Roxbury, Hyde Park, Jamaica Plain, Mattapan, Dorchester) and beyond to Milton and Quincy (Boston.gov)	Although the fire did not start inside Boston, proximity meant Boston neighborhoods experienced ash/smoke, illustrating how regional wildfires can affect Boston's air quality and fire-hazard exposure.

Date	Event	Location Notes	Burned Area or Damage	Relevance to Boston Brushfires
April 29, 2025	Brush fire in Roslindale[204]	Stony Brook Reservation	Fire burned approximately 1 acre and took firefighters several hours to contain.	This event demonstrates the susceptibility of Boston's wooded open spaces to brushfires during dry conditions. Although the burned area was relatively limited, the fire required a sustained response to bring it under control.
September 4, 2025	Brush fire in Roslindale[205]	Stony Brook Reservation	The fire affected an area described as approximately the size of a football field, or about 1.3 acres. Firefighters used approximately 3,000 feet of hose, foam, and hand tools to contain the fire and prevent rekindling.	The event demonstrates how fires in Boston's wooded areas can require substantial firefighting resources. The fire remained localized but required an extended response to prevent its spread and possible rekindling.

4.16.6. Impacts of Climate Change

Wildfire risk is strongly influenced by how close an area is to natural vegetation; heavily built-up urban neighborhoods typically face far less threat than places situated near wildland areas. While Boston is not located within the state's most fire-prone forested regions, climate change is expected to increase the frequency of hot, dry weather that can

[204] NBC10 Boston. (2025, April 29). *Brush fire breaks out in Roslindale as breezy conditions cause elevated fire risk.* https://www.nbcboston.com/news/local/brush-fire-roslindale-fire-risk/3698951/
[205] Gaffin, A. (2025, September 4). *Two-alarm brush fire erupts in Stony Brook Reservation; firefighters use foam and 3,000 feet of hose to put it out.* Universal Hub. https://www.universalhub.com/2025/two-alarm-brush-fire-erupts-stony-brook-reservation-firefighters-use

dry out vegetation in parks, greenways, and undeveloped areas.[206] Ecosystems in and around the city that are not adapted to more frequent or intense fire conditions may experience stress or degradation. Future climate-driven fires in the state are anticipated to negatively affect ecosystems that are not resilient to shifting fire regimes.

With more frequent droughts, variations in precipitation, and prolonged heatwaves, these climate conditions in Boston can create a suitable environment for wildfire. Additionally, as Boston expands and improves parks, greenways, and other vegetated areas, wildfire and brush fire risk should be managed through proactive vegetation maintenance, fuel reduction, invasive plant control, and monitoring during drought or high fire-weather conditions.

4.16.7. Vulnerability and Impacts

According to FEMA's Wildfire National Risk Index, the entirety of the City of Boston is at "Very Low" risk of wildfire, as shown in Figure 4-51. Neighboring cities and towns are either at "Very Low" or "Relatively Low" risk as well. While the city's overall risk may be low, there are localized areas at increased risk of wildfire. According to one recent fire risk assessment, out of 336 census tracts in Boston, there are 63 tracts where more than a quarter of buildings have "significant fire risk," and 41 tracts where more than half of buildings have such fire risk, implying that certain neighborhoods may have structural vulnerability tied to proximity to vegetation.[207]

[206] ClimateCheck. (n.d.). *Boston, MA top climate change risks: Precipitation, heat, flood.* Retrieved May 19, 2026, from https://climatecheck.com/massachusetts/boston
[207] ClimateCheck. (n.d.). *Boston, MA top climate change risks: Precipitation, heat, flood.* Retrieved May 19, 2026, from https://climatecheck.com/massachusetts/boston

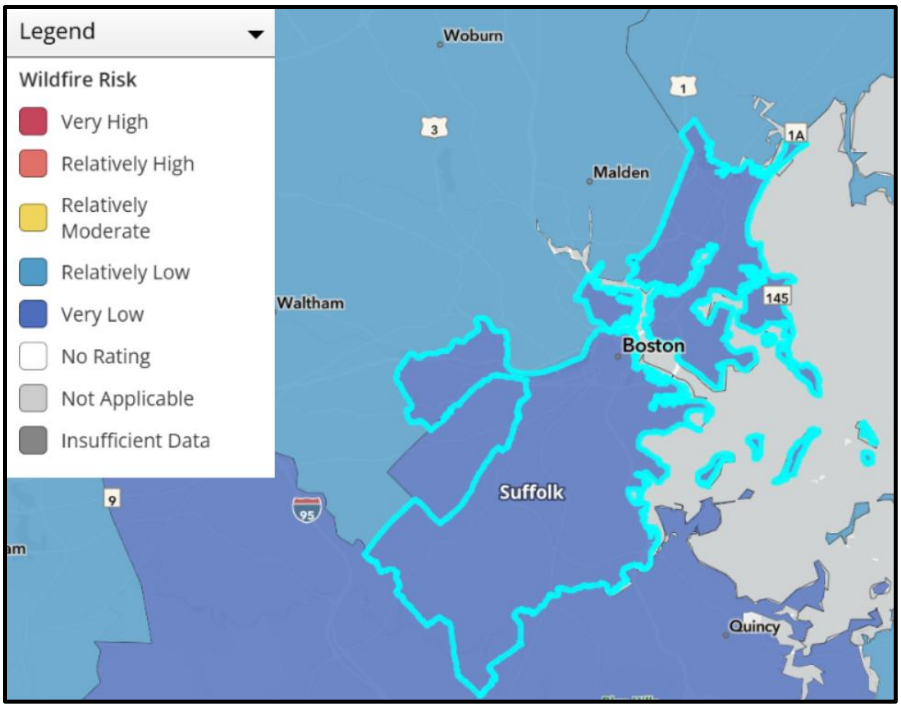


Figure 4-51. FEMA Wildfire National Risk Index

According to First Street, which assesses climate risk for cities nationwide, there are 38,489 properties in Boston, approximately 38% of all properties, that have some risk of being affected by wildfire over the next 30 years. Table 4-15 below illustrates the risk wildfire poses to different types of properties as of May 2026.

Table 4-15. Number of Properties at Risk of Wildfire[208]

Property **Type**	**Risk**	**Number of properties at risk**	**Total number of properties**
Residential	Moderate	39,093	90,767
Commercial	Moderate	2,781	12,194
Infrastructure	Moderate	81	420
Social	Moderate	199	866

[208] First Street. (n.d.). *Boston, MA wildfire map and climate risk report*. Retrieved May 19, 2026, from https://firststreet.org/city/boston-ma/2507000_fsid/fire

Impacts on Assets

People

The likelihood of wildfire directly impacting residents of Boston is low, with severe outcomes such as fatalities or widespread injury unlikely given the city's dense urban composition. Residents are more likely to experience indirect impacts, such as smoke exposure from large wildfires elsewhere in New England or even beyond the region. Wildfire smoke can irritate peoples' lungs and exacerbate health issues such as asthma and cardiovascular disease, particularly among older adults, children, and individuals with pre-existing conditions. Though unlikely, residents could lose housing and be temporarily displaced by fires, particularly in isolated incidents near urban greenspaces or wildland areas. In addition, psychological stress and anxiety may occur during smoke events or after nearby fires, even when physical damage is minimal.

Structures

The probability of wildfire-related structural damage within Boston is low, and any impacts are expected to be localized rather than widespread. The city does contain many older, wooden buildings that are more combustible, particularly outside of the downtown area. However, Boston's urban density with well-managed vegetated land, combined with the city's established fire suppression capabilities, reduce the likelihood of large-scale fires. Structures adjacent to large parks, conservation areas, or urban wildlands may experience slightly elevated exposure risk, but even in these areas, severe structural impacts are unlikely. Overall, wildfire is not expected to cause significant damage to Boston's building stock.

Community Lifelines and Other Critical Facilities

Wildfire impacts on community lifelines and critical facilities are expected to be low in likelihood and limited in severity. Direct damage to energy, communications, transportation, and water infrastructure from wildfire within the city is unlikely, though impacts on these systems are more likely outside of Boston. 119 food resources, such as food pantries and community gardens, are located within areas of potential wildfire risk in Boston. Wildfire impacts to these resources could disrupt access to food and essential supplies, particularly if these areas also experience road closures, power outages, or evacuations. Wildfire smoke from regional or distant fires may indirectly affect operations by reducing air quality, prompting precautionary service adjustments, or stressing health and emergency response systems. Health and medical services may experience increased demand due to smoke-related illnesses, while schools and childcare facilities may temporarily modify activities or close during poor air quality events as a protective measure. Major, long-term disruptions to lifelines are not anticipated.

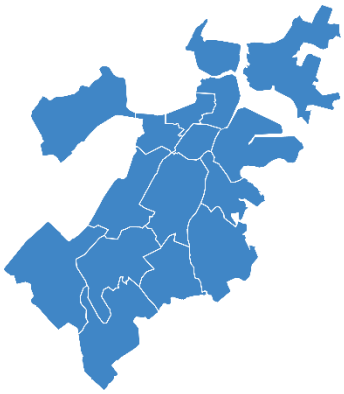
Natural, Cultural, and Historic Resources

The likelihood of significant wildfire damage to Boston's natural, cultural, and historic resources is low. Localized vegetation loss could occur in parks or natural areas under extreme conditions. Smoke from distant wildfire events may temporarily degrade air quality and contribute to environmental stress but is unlikely to cause lasting damage to ecosystems or water resources. Boston's historic and cultural assets face a low risk of wildfire damage, as most are located within developed areas with active fire protection and limited adjacent fuel sources.

Economy and Activities that Have Value to the Community

Economic impacts from wildfire in Boston are expected to be indirect and generally low in severity. Direct losses from property damage or business destruction are unlikely. However, smoke events associated with major regional or distant wildfires may result in short-term business interruptions, reduced outdoor activity, canceled events, and declines in tourism or recreation. These impacts are expected to be temporary, with limited long-term economic consequences, though repeated wildfire events could increasingly affect quality of life and public health over time.

DRAFT



CHAPTER 5:

Capabilities Assessment

5. CAPABILITIES ASSESSMENT

The Capabilities Assessment evaluates the city's ability to implement hazard mitigation strategies and reduce long-term risk to people, property, and infrastructure. This assessment identifies existing programs, policies, resources, and institutional frameworks that support mitigation efforts, while also highlighting gaps and opportunities for improvement.

The analysis includes a review of participation in the National Flood Insurance Program (NFIP), as well as a broader evaluation of local mitigation capabilities across several key areas:

1. Planning and Regulatory Tools,
2. Administrative and Technical Capacity
3. Financial Resources
4. Public Education and Outreach

Findings from the Capabilities Assessment inform the development of realistic and actionable mitigation strategies by aligning proposed actions with available resources and identifying areas where additional capacity or coordination may be needed.

5.1. National Flood Insurance Program (NFIP) Compliance

5.1.1. NFIP Participation

The City of Boston participates in the National Flood Insurance Program (NFIP) and is not suspended or on probation. Boston entered the NFIP in 1982 and remains in good standing. As of April 30, 2026, Boston currently has 5,854 active NFIP policies, representing approximately $1.64 billion in coverage and just over $5 million in annual premium and fees. There are 27 Repetitive Loss and 1 Severe Repetitive Loss (RL/SRL) properties in the community, consisting of both residential and commercial properties.

Boston does not yet participate in the Community Rating System (CRS), which is a voluntary FEMA program that "recognizes and encourages community floodplain management activities that exceed minimum NFIP standards. Communities receive credit for qualifying activities, which can translate into reduced flood insurance premiums for

residents. The city made a formal commitment to CRS enrollment in 2021 and has been building the documentation and regulatory framework needed to apply. This NHMP update constitutes a CRS-eligible Floodplain Management Plan and directly advances that effort. The Floodplain Administrator is actively leading the city's CRS preparation, including improvements to documentation procedures, post-construction elevation certificate tracking for new construction since 2023, and coordination of CRS-eligible public information activities such as Deployables Day. Boston has also advanced floodplain management through regulatory tools such as the Coastal Flood Resilience Overlay District (CFROD), which supports climate-ready development and risk reduction in areas vulnerable to coastal flooding. Together, these efforts demonstrate that Boston has already made substantial progress toward CRS participation and is continuing to build the systems needed for future enrollment.

Staff Capacity

Floodplain management is led by a full-time Floodplain Administrator (FPA) within the City of Boston's Inspectional Services Department (ISD). The FPA is a Certified Floodplain Manager (CFM), is trained in FEMA floodplain management requirements, and their primary responsibility is floodplain management. Other departments with Boston including the Planning Department, the Conservation Commission, and the Environment Department support adjacent functions such as zoning, wetlands regulation, and infrastructure planning as they relate to floodplain management. In addition, Boston Water and Sewer Commission is involved in adjacent functions around infrastructure and supporting new and redevelopment reviews.

While staffing expertise exists, the city has identified the need for improved coordination and permitting system enhancements to better track cumulative improvements and streamline interdepartmental floodplain review. These needs are reflected in mitigation strategy actions.

5.1.2. Adoption of NFIP Regulations and Higher Standards

Boston enforces floodplain development regulations and the NFIP minimum requirements through local implementation of the following:

- Massachusetts State Building Code
- Boston Zoning Code Article 25 (Flood Hazard Districts)
- Related local floodplain and environmental regulations – CFROD

The city meets all NFIP minimum standards and exceeds them in several areas, including the CFROD, which establishes more protective standards for development in coastal flood risk areas.

Floodplain standards are applied during building permit review and zoning compliance review, ensuring that new construction and substantial improvements in the Special Flood Hazard Area (SFHA) are designed to be reasonably safe from flooding and compliant with FEMA requirements.

Adoption of Latest FIRMs

Boston uses digital Flood Insurance Rate Maps (FIRMs) and the Flood Insurance Study (FIS) as the regulatory basis for floodplain management. The city has adopted the most recent effective FIRMs (July 3, 2024). FIRMs and the FIS are publicly accessible through FEMA's Map Service Center and are used directly in the city's GIS-integrated permitting system.

5.1.3. Floodplain Regulation and Enforcement

Permit Review and Development Regulation

Floodplain regulations are implemented through the City's Flood District plan review process, administered by the ISD FPA. The city provides full-service permit review, including GIS support and plan review. Engineering design is provided by the applicant's professionals, with city oversight for compliance.

When a building permit application is submitted:

5. The city's permitting system uses GIS to determine if the property is in the SFHA.
6. If located in a flood zone, the application is automatically routed for Flood District review.
7. The FPA reviews plans for compliance with NFIP standards, including elevation, floodproofing, and construction requirements.
8. Applicants receive technical guidance and design recommendations to bring projects into compliance.

Floodplain standards are also applied to new subdivisions and site development through their respective zoning and permitting processes.

Within the Planning Department, a designated resilience planner is responsible for reviewing all CFROD-related development proposals, providing an additional layer of oversight and consistency in implementation. This dedicated reviewer helps ensure that projects align with the city's evolving resilience goals and regulatory updates. For example, in 2025 the planner reviewed and approved approximately 60 CFROD applications, following roughly 80 applications in 2024, demonstrating both the volume of development activity in flood-prone areas and the city's active role in managing coastal resilience through project-level review.

Enforcement and Compliance Monitoring

Boston enforces its floodplain regulations through a permit-based approach that verifies compliance before construction begins (when applicable), conducts inspections of structures damaged by flooding events, and follows up on compliance concerns identified during FEMA's 2019 Community Assistance Visit (CAV). The city expects to resolve the remaining issues from that CAV prior to requesting another visit in 2026.

Substantial Improvement (SI) and Substantial Damage (SD)

If a project meets the threshold for substantial improvement or a structure is determined to be substantially damaged, the building must be brought into full compliance with current NFIP floodplain standards. The city has experience making SD determinations and reconstructing buildings to higher flood standards. Boston implements SI/SD requirements through its building permitting and post-disaster inspection processes.

- **Responsible official:** Floodplain Administrator (ISD)
- **When applied:** (1) During building permit review for improvements, (2) After disasters, when ISD inspectors assess damage to structures

The city is working to improve tracking of cumulative improvements through permitting system modernization and to enhance post-construction elevation documentation, both of which support SI/SD compliance and future CRS participation.

Public Information and Insurance Promotion

Public outreach on flood insurance is currently limited but includes providing flood insurance information on the City Inspectional Services webpage, sharing occasional NFIP information in ISD newsletters, and offering direct communication from the FPA during constituent interactions. The FPA has identified expanded public outreach and centralized flood information resources as opportunities for improvement and potential areas for CRS credit.

5.2. Mitigation Capabilities

This section outlines the City of Boston's current mitigation capabilities, including the plans and policies, technical and financial abilities, and community partnerships that help reduce hazard risk. It also highlights opportunities to strengthen resilience and support future mitigation efforts.

The capabilities assessment was developed through review of existing City plans, policies, regulations, programs, staffing structures, funding mechanisms, and public outreach activities, supplemented by input from City departments and the Local Planning Team. Each capability was evaluated based on its current implementation, effectiveness in

reducing hazard risk, responsible department or entity, available staffing and funding, geographic and programmatic coverage, coordination needs, and potential for expansion or improvement. Identified limitations and opportunities were then used to inform the mitigation actions presented in Chapter 6.

5.2.1. Planning and Regulatory

Planning and regulatory capabilities encompass a wide range of tools such as codes, bylaws, policies, laws, plans, and programs that guide growth and development. These capabilities play a crucial role in either supporting risk reduction or creating areas that are more vulnerable to disasters. These strategies are aimed at breaking the cycle of disaster damage and reconstruction. Additionally, effective law and regulation for disaster risk reduction are critical in shaping choices for sustainable development and building resilience to disasters.

In Boston, new development that complies with the Coastal Flood Resilience Overlay District (Article 25A), Article 37 Green Building & Climate Resiliency Guidelines, and related design guidance generally decreases long-term vulnerability (e.g., through higher design flood elevations and heat/flood adaptations); conversely, development that does not integrate these measures in flood- or heat-prone areas can increase exposure and future losses.

Existing Capabilities

The following discusses the City of Boston's current planning and regulatory capabilities to address natural hazards.

Building Code

Boston enforces the Massachusetts State Building Code through the Inspectional Services Department (ISD). The code includes requirements for wind, earthquakes, flooding, and snow, and ISD enforces these standards through permits, inspections, and violations. The State Building Code provides an effective baseline for regulating construction in FEMA-designated flood zones; however, its reliance on current regulatory flood maps and statewide minimum standards may not fully address Boston's projected sea-level rise, precipitation, groundwater, and localized stormwater risks.

ISD also provides outreach to property owners about building risks such as freeze–thaw damage, issues pre-storm advisories for construction sites, and coordinates with utilities to shut off services like electricity when buildings are flooded.

Land Use / Development Bylaws and Regulations

Boston utilizes the Zoning Code and municipal ordinances to reduce natural-hazard risk and plan for climate impacts:

- **Coastal Flood Resilience Overlay District (CFROD / Article 25A)**[209]
  Establishes mapped zoning overlay areas based on 1% annual chance storm with ~40 inches sea level rise by 2070; formalizes sea level rise design flood elevations and implementation of the City's Coastal Resiliency Guidelines for new construction and retrofits. (Boston Zoning Code; BPDA.) Article 25A is one of Boston's strongest regulatory tools because it incorporates future coastal flood conditions and higher design flood elevations into development review. Its effectiveness is geographically limited, however, to properties located within the mapped overlay district.
- **Article 25 – Flood Hazard District**
  Purpose is to protect public health and safety from flooding, preserve watercourses and adjoining lands, and reduce flood losses through development standards. (Boston Zoning Code.) Article 25 effectively supports NFIP compliance and reduces risk within the mapped Special Flood Hazard Area, but its effectiveness is limited in locations where future or localized flooding extends beyond current FEMA flood-zone boundaries.
- **Article 37 – Green Building & Climate Resiliency Guidelines**
  Requires projects to address sustainable design and preparedness for extreme events; supported by a Climate Resiliency Checklist and Sea Level Rise Flood Hazard Area mapping tool; overseen by the Interagency Green Building Committee (IGBC). (Boston Zoning Code/BPDA policy). Article 37's effectiveness varies because it does not apply equally to all smaller developments or existing development.
- **Article 80 – Development Review**
  Integrates review of a project's transportation, public realm, environmental, and historic impacts; embeds Smart Utilities coordination to advance resilient, equitable, and sustainable utility services via a Smart Utilities checklist and utility site plan during development review.
- **Climate Resilient Design Guidelines for Protection of Public Rights-of-way**[210]
  The guidelines outline a framework for assessing and implementing flood barriers to safeguard public rights-of-way throughout Boston.
- **Ordinance Protecting Local Wetlands and Promoting Climate Change Adaptation**
  Regulates wetland resource areas beyond state WPA, including Coastal and Inland Flood Resilience Zones, and incorporates forward-looking flood projections to enhance climate resilience. The wetlands ordinance full effectiveness depends on completing resource-area mapping and adopting clear performance standards.

[209] Boston Planning & Development Agency. (n.d.). *Coastal flood resilience guidelines & zoning overlay district (Article 25A).* https://www.bostonplans.org/planning-zoning/planning-initiatives/flood-resiliency-building-guidelines-zoning-over
[210] City of Boston. (2025, October 30). *Climate resilient design guidelines.* https://www.boston.gov/departments/public-works/climate-resilient-design-guidelines

- **Building Energy Reporting and Disclosure Ordinance (BERDO)**
  Requires large buildings to report energy use and emissions and demonstrate emissions-reduction actions on a five-year cycle; supports City climate goals while providing co-benefits for resilience (e.g., reduced heat exposure, backup power readiness where integrated).
- **Green Infrastructure Planning and Design Handbook (BWSC)**[211]
  It is a guide for both public and private property owners to implement Green Infrastructure techniques to manage stormwater throughout the City of Boston.
- **Green Stormwater Infrastructure Design and Implementation Guide for Parks**[212]
  The Green Stormwater Infrastructure Design and Implementation Guide is developed to support BPRD staff, collaborating city agencies, and park consultants in creating, executing, and sustaining parks that are more resilient and versatile. Its goal is to enhance park spaces for users while delivering environmental benefits through thoughtful design and maintenance practices.
- **Public Facilities Department Design Standards**[213]
  These standards are for use by the Public Facilities Department managers and standards should be used to inform decisions from the beginning of projects (site design, building orientation and massing, etc.) through the end of design, including material selection and detailing.
- **Resilient, Historic Buildings Design Guide**[214]
  The purpose of this design guide is to illustrate resilience strategies that can be incorporated into the preservation of historic properties.

These tools confirm that Boston is focused on fostering the development of new zoning and development practices that incorporate climate resilience across all projects, new construction and retrofits.

Local Plans and Policies

Local and regional plans and policies that inform and relate to the Natural Hazard Mitigation Plan (NHMP) include, but are not limited to:

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[211] Boston Water and Sewer Commission. (2022, February 7). *Boston green infrastructure planning and design handbook.* City of Boston. https://content.boston.gov/sites/default/files/file/2022/09/BWSC%20Green%20Infrastructure%20Handbook-02-07-2022.pdf

[212] Boston Parks and Recreation Department. (2022). *Boston Parks and Recreation green stormwater infrastructure design and implementation guide.* City of Boston. https://content.boston.gov/sites/default/files/file/2022/10/BPRD_GSI_Guide_reduced_0.pdf

[213] Boston Public Facilities Design Standards [PDF]. (2025, January). Google Drive. https://drive.google.com/file/d/1PebvgRW94LdN6VoMkVYI7siLvw_0qlXL/view

[214] Boston Environment Department (2018, August). *Boston resilient, historic buildings design guide: A comprehensive guide to retrofitting Boston's historic buildings to address climate change.* Boston Environment Department. https://www.boston.gov/sites/default/files/embed/file/2018-10/resilient_historic_design_guide_updated.pdf

- Climate Ready Boston[215] (citywide and neighborhood plans)
- Climate Action Plan Update[216] (2019)
- Climate Action Plan[217] (2026)
- Boston Urban Forest Plan[218] (2022)
- Heat Resilience Solutions Report[219] (2022)
- Imagine Boston 2030[220] (2017)
- Go Boston 2030[221] (2017)
- Open Space & Recreation Plan[222] (2023)
- Smart Utilities Policy[223] (2015)
- USACE Coastal Storm Risk Management (CSRM) Study (Ongoing, 2026)[224]

This list is not intended to be an exhaustive inventory of the City's expansive and evolving planning and policy framework. Rather, it highlights a focused subset of plans, policies, and programs that most directly intersect with natural hazard mitigation, climate adaptation, land use, infrastructure investment, and public-realm decision-making. As additional City initiatives are developed or updated, the NHMP should continue to be coordinated with these efforts to align mitigation actions across departments, neighborhoods, and capital planning processes.

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[215] City of Boston, & Green Ribbon Commission. (2016, December). *Climate Ready Boston: Final report.* https://www.boston.gov/sites/default/files/file/2023/03/2016_climate_ready_boston_report.pdf

[216] City of Boston. (2019, October). *Climate action plan: 2019 update.* https://www.boston.gov/sites/default/files/imce-uploads/2019-10/city_of_boston_2019_climate_action_plan_update_2.pdf

[217] City of Boston. *Boston climate action plan: Final draft* [PDF]. (2026, April). Google Drive. https://drive.google.com/file/d/1o1DsLogF2eZYLScOIoH-TrhUP5ol_pg9/view

[218] City of Boston. (2022, September). *Urban forest plan.* https://www.boston.gov/sites/default/files/file/2023/03/2022%20Urban%20Forest%20Plan%20-%20two%20pages-3.pdf

[219] City of Boston. (2025, May 7). *Heat resilience solutions for Boston.* https://www.boston.gov/departments/climate-resilience/heat-resilience-solutions-boston

[220] City of Boston. (2017, July). *Imagine Boston 2030.* https://www.boston.gov/sites/default/files/embed/file/2018-06/imagine20boston202030_pages2.pdf

[221] Boston Transportation Department. (2017, March). *Go Boston 2030: Imagining our transportation future: Vision and action plan.* City of Boston. https://www.boston.gov/sites/default/files/file/document_files/2019/06/go_boston_2030_-_full_report.pdf

[222] Boston Parks and Recreation Department. (2023, June). *Open space & recreation plan 2023–2029.* City of Boston. https://www.boston.gov/sites/default/files/file/2024/05/2023-2029%20OSRP_single%20page%20view_compressed.pdf

[223] Boston Planning & Development Agency. (2020, October 15). *Smart utilities policy for Article 80 development review: October 2020 update.* https://www.bostonplans.org/documents/planning/energy-planning/smart-utilities-policy-for-article-80-development

[224] City of Boston. (2026, June 18). *Army Corps (USACE) study partnership.* Boston.gov. https://www.boston.gov/departments/climate-resilience/climate-ready-boston-and-army-corps-partnership

Key Opportunities

Based on evaluation with the planning and regulatory capabilities, the following opportunities to strengthen the capabilities are identified and can be incorporated into the mitigation strategy:

- **Complete the wetlands ordinance implementation** by mapping newly protected resources and adopting clear performance standards.
- **Maintain and strengthen NFIP compliance** by updating Floodplain Overlay District language, pursuing FEMA flood map updates, and enrolling in the Community Rating System (CRS).
- **Standardize Article 37 review processes** and advocate for greater flexibility in the State Building Code to support higher climate adaptation standards.
- **Advance implementation of the Climate Ready Boston coastal resilience strategy** through the USACE CSRM Feasibility Study, the primary long-term vehicle for large-scale coastal flood protection, and continue to deliver near-term capital projects.

5.2.2. Administrative and Technical

Administrative and technical capabilities include the City's staff, skills, tools, and capacity to coordinate and implement hazard mitigation across agencies and partners.

Existing Capabilities

Staff Capacity and Training

Overall, departments reported that staffing levels are adequate for routine hazard preparedness and response to the extreme "common event" that the city experiences, such as coastal and inland flooding, extreme heat, and severe winter storms. However, departments reported more limited staff capacity and training related to less frequent or unfamiliar hazards, such as hurricanes, wildfires, and tsunamis. Many noted that limited staff capacity affects their ability to expand training, pursue grants, support cross-department coordination, and maintain up-to-date emergency plans.

Training varies by department. BPHC staff participate in annual hazard-vulnerability analyses but do not have a formal mitigation curriculum. Parks provides on-the-job safety training. BPS staff are well prepared for common events such as snow, rain, and heat, and would benefit from additional training for less-familiar hazards such as smoke and poor air quality.

OEM also builds staff capacity through regional exercises and emergency planning activities. In late August 2026, OEM, in partnership with the eight other jurisdictions of the Metro Boston Homeland Security Region (MBHSR), participated in a regional hurricane evacuation planning workshop and exercise. The effort was intended to strengthen staff

preparedness for large-scale evacuation events, improve coordination among neighboring jurisdictions, and support the development of a unified regional approach to evacuation planning. This regional exercise provides staff with experience preparing for less frequent, high-impact hazards that may require resources and coordination beyond routine City operations.

ISD's Floodplain Administrator is a Certified Floodplain Manager. In April 2026, City staff, including ISD and the Floodplain Administrator, contacted DCR Flood Hazard Management to request additional information regarding flooding and its potential impacts on property. This coordination resulted in a training session for ISD and Conservation Commission staff focused on NFIP floodplain management requirements, including requirements that are not directly incorporated into the State Building Code and may therefore require additional coordination during local implementation. The July 30, 2026, training strengthened staff understanding of applicable floodplain management requirements and supported improved interdepartmental coordination.

Deployable Flood Barriers

The City of Boston has demonstrated growing technical expertise in evaluating, designing, and implementing deployable and interim flood protection measures for vulnerable coastal areas. Through the Office of Climate Resilience, in collaboration with the Planning Department, the city is advancing a deployable flood barrier program that builds on the Climate Ready Boston initiative and focuses on providing near-term flood protection in prioritized, low-lying areas where permanent coastal resilience infrastructure is planned or in progress. As part of this effort, the city is developing the technical foundation needed to implement a deployable flood barrier program effectively and consistently across multiple sites. The program includes existing conditions assessments of priority locations, a toolkit of structural, non-structural, and ecosystem-based interim coastal resilience strategies, and a comprehensive technical analysis to compare potential measures based on effectiveness, cost, ease of implementation, and community and environmental impact. As priority sites are selected, the city will advance design guidance for interim flood protection measures, along with installation guidelines, standard operating procedures, and maintenance plans.

The program is intended to address immediate and near-term coastal flood risks by identifying temporary flood protection measures that can be implemented within approximately 6 to 24 months, helping to reduce risk while longer-term capital projects move through planning, design, permitting, and construction. As of 2026, there are two sites currently under construction, and two additional sites continuing their design phases. This work strengthens Boston's hazard mitigation capability by creating a repeatable framework for selecting, deploying, operating, and maintaining interim flood protection measures in areas exposed to coastal flooding.

Internal and External Communications

The City of Boston uses a comprehensive communication strategy to provide residents and municipal staff with timely, accurate, and actionable information before, during, and after emergencies.

Externally, Boston shares risk information and protective actions through several coordinated channels. The AlertBoston system delivers real-time notifications by phone call, text message, and email, allowing the city to quickly distribute warnings, evacuation instructions, shelter locations, and other critical updates. AlertBoston is available in 11 different languages, reducing barriers to access for the public.

The Office of Emergency Management also conducts preparedness workshops and community outreach events that strengthen public awareness and readiness in advance of disasters. In addition, the city publishes hazard specific guidance such as Prepare for Heat and Winter Weather safety materials. These resources explain clear protective steps residents can take and are available online and in print to reach a broad audience, including vulnerable populations.

Internally, Boston maintains strong communication capabilities to support coordination across departments during routine operations and emergency response. City departments use digital collaboration platforms including Microsoft Teams, Slack, and Google Chat to share information and coordinate daily activities. When an emergency occurs, a dedicated Slack channel is typically activated to facilitate real time coordination among departments, leadership, and response partners. This platform supports rapid situational updates, resource requests, task tracking, and coordinated decision making across agencies.

Together, these systems strengthen operational readiness by promoting transparency, improving information sharing, and supporting coordinated action during both normal operations and crisis situations.

Regional Coordination and Collaboration

As the capital city of Massachusetts, Boston is uniquely positioned to maintain strong coordination with state agencies and leverage close intergovernmental relationships. The City of Boston maintains strong regional partnerships that enhance its hazard mitigation and emergency management capabilities. Because many critical systems such as drinking water, wastewater, transportation, energy, and telecommunications extend beyond municipal boundaries, Boston works closely with neighboring jurisdictions, state agencies, utilities, and regional coalitions to assess risks, coordinate planning efforts, and implement resilience strategies.

The Boston Water and Sewer Commission coordinates closely with the Massachusetts Water Resources Authority to manage drinking water supply and wastewater treatment

operations. This partnership is essential for maintaining service continuity during extreme weather events, infrastructure disruptions, and coastal flooding. Ongoing coordination includes system monitoring, infrastructure investment planning, and emergency response protocols for water quality or system failures.

During emergency response operations, departments including the Office of Emergency Management, Boston Fire Department, Boston Police Department, and Public Works collaborate with utility providers such as National Grid and Eversource. Established communication protocols and joint operating procedures support coordinated decision making, infrastructure restoration, debris management, and public safety operations.

Boston coordinates closely with the MBTA to maintain transportation continuity before, during, and after hazard events. During emergencies, coordination supports service adjustments, station closures, bus route detours, and public messaging to minimize disruptions and maintain safe travel options for residents. The city also collaborates with the MBTA on long term resilience planning efforts, including infrastructure hardening, flood protection for tunnels and stations, and system wide climate adaptation strategies.

Regional mutual aid agreements further expand Boston's response capacity by enabling resource sharing with surrounding municipalities. Through these agreements, the city can both request and provide personnel, equipment, and technical expertise during large scale incidents. This system strengthens surge capacity and promotes a coordinated regional approach to hazard events that do not adhere to municipal boundaries. Boston maintains mutual aid capabilities through regional fire and EMS agreements with surrounding communities and emergency response partners. These agreements support surge capacity, resource sharing, and coordinated response during major incidents or disasters.

Table 5-1. Mutual Aid Agreements

Stakeholder	Mutual Aid Description
METROFIRE	Association of 34 metropolitan Boston fire departments that provide coordination of mutual aid response
Metro-Boston Homeland Security Region (MBHSR)	The Metro-Boston Homeland Security Region (MBHSR) is established through the distribution of Urban Area Security Initiative (UASI) funding and includes Boston, Brookline, Cambridge, Chelsea, Everett, Quincy, Revere, Somerville, and Winthrop. The purpose of the region is to unite these nine jurisdictions in efforts to prevent, protect against, mitigate, respond to, and recover from major disasters and emergencies. Through the MBHSR, participating communities coordinate on

Stakeholder	Mutual Aid Description
	regional planning, preparedness, training, exercising, and response capabilities. The Planning and Community Preparedness (PCP) Subcommittee further supports cross-jurisdictional collaboration on hazards such as extreme heat and cold, hurricanes, coastal and riverine flooding, and other natural and human-caused emergencies.
Ambulance Backup Services[225]	Backup mutual aid agreements with the following servicers: Action Ambulance, Alert Ambulance, American Ambulance, American Medical Response, Armstrong Ambulance, Brewster Ambulance, Cataldo Ambulance, EasCare Ambulance, Fallon Ambulance, Lifeline Ambulance, McCall's Ambulance, Professional Ambulance

OEM works closely with the Boston Region Metropolitan Planning Organization on regional hazard mitigation and extreme heat preparedness through the No-Heat Project, including development of tools to better understand heat exposure across Boston and neighboring communities. This coordination expands staff access to regional risk information and supports cross-jurisdictional preparedness for extreme heat.

Boston Public Schools also coordinates with the Boston Center for Youths and Families and other partner organizations to provide heating and cooling support at the community centers during extreme temperature events. In addition, BPS works directly with utility companies to address power outages and service disruptions affecting school facilities. These relationships support continuity of operations and protect vulnerable populations during hazard events.

Beyond emergency response, Boston participates in multi-jurisdictional resilience planning initiatives. The city is an active member of the Metro Mayors Climate Preparedness Taskforce, a collaborative effort among 17 greater Boston communities to advance regional climate adaptation strategies. Through Climate Ready Boston and collaboration with state agencies, academic institutions, and regional partners, the city also contributes to regional flood pathway analyses and coastal resilience studies. These efforts improve shared understanding of climate risks, infrastructure interdependencies, and long-term mitigation investments.

[225] Boston Emergency Medical Services. (n.d.). *Boston EMS service zone plan* [PDF]. City of Boston. https://www.cityofboston.gov/images_documents/Boston_EMS_SZP_021711%5B1%5D_tcm3-23782.pdf

Local Committees and Task Forces

Boston engages several boards, committees, and working groups that play formal roles in hazard mitigation and climate resilience.

- **Interagency Green Building Committee (IGBC),** which oversees compliance with Article 37 sustainable design and climate resiliency requirements.
- **Climate Ready Boston advisory groups**, activated during the coastal resilience planning processes.
- **Healthcare Preparedness Coalition** supporting regional health and emergency coordination.
- **Cross Agency Climate Resilience Group** comprised of various staff from city departments focused on internal coordination and updates across projects.

These groups help align policies, conduct community engagement events, and coordinate project implementation across City departments and partner organizations.

Assistance from Non-Governmental Organizations

The Boston Medical Reserve Corps (BMRC) provides trained volunteers to support public-health preparedness and response under BPHC's Office of Public Health Preparedness.

The city also partners with community-based organizations, such as food system partners coordinated by the Mayor's Office of Food Justice, to distribute resources and information during emergencies and to advance day-to-day resilience programing.

Key Opportunities

- **Increase staffing and operational capacity** across city departments to support ongoing work and prepare for future limits on capital project delivery.
- **Improve interdepartmental coordination and communication** by creating and maintaining a centralized contact directory, aligning project prioritization, and addressing challenges related to physical separation, differing communication platforms, and limited staff capacity.
- **Strengthen cross-agency collaboration on city-led projects**, including clearer coordination of efforts, for example within the green infrastructure across BWSC and the Parks and Streets departments.
- **Formalize emergency coordination procedures** among City and State departments. For example, coordination between the Boston Water and Sewer Commission and the Massachusetts Water Resources Authority, clearly defining leadership roles, operational responsibilities, and communication protocols for incidents originating in the MWRA system.

- **Enhance continuity of operations planning** by formalizing departmental roles, key contacts, and redundancies to reduce reliance on individual staff members.
- **Expand training and operational guidance** by developing and documenting playbooks, cross-training opportunities, and protocols for less frequent hazards (e.g., wildfires and tsunamis) or secondary impacts from hazards (e.g., wildfire smoke and poor air quality) to support consistent response across departments.
- **Maintain an up-to-date inventory of all active mutual aid agreements**, confirm activation procedures, and ensure they are integrated into emergency planning, training, and exercises.

5.2.3. Financial

Financial capabilities are the resources to fund mitigation actions. In Boston, funding strategies are highly dependent on the type of hazard being addressed, with distinct approaches emerging for coastal flooding, stormwater flooding, and extreme heat. This layered approach reflects both the scale of investment required and the range of available funding partners.

Existing Capabilities

Boston maintains strong financial capacity, supported by its AAA credit rating and well-established capital planning processes. The Office of Budget Management (OBM) oversees both operating and capital budgets and manages municipal risk through insurance coverage for natural hazards. In addition, various city departments regularly advance capital improvement programs that incorporate resilience objectives and apply for various grant funding opportunities to further advance this work.

Coastal Flood Risk

The City of Boston relies on a combination of local, state, federal, and emerging private funding sources. The city has allocated over $150 million in capital funding toward projects with coastal resilience components, which is then supplemented by state programs such as the Massachusetts Municipal Vulnerability Preparedness (MVP) program, Coastal Zone Management (CZM), and other Executive Office of Energy and Environmental Affairs (EEA) grants.

Within the next 10 years the city is expecting that federal partnerships, such as with the U.S. Army Corps of Engineers, will play a larger role in implementation. Under an eventual Project Partnership Agreement, the City would serve as the non-federal sponsor and would be responsible for the required local cost-share. Projections indicate that federal sources could cover approximately 65% of costs for initial large-scale projects, representing a significant capital planning commitment from the city's perspective that should be tracked for transparency as projects advance. In parallel, the city is exploring additional

mechanisms to leverage private development contributions, particularly for deployable barrier implementation and site-specific flood protection measures.

Despite these diverse sources, Boston has identified an estimated funding gap of roughly 30% for major coastal infrastructure, prompting ongoing collaboration with partners such as the Green Ribbon Commission to identify alternative funding and financing strategies.

Stormwater Flooding

Boston has established a dedicated and evolving funding mechanism through BWSC's stormwater fee which was implemented in 2024. This fee structure is based on impervious surface area and creates a direct incentive for property owners to reduce runoff through green infrastructure and other mitigation measures. This approach not only generates a stable revenue stream but also aligns private behavior with Citywide resilience goals.

Additional investments come from complementary City projects, such as those led by the Parks Department and the Streets Cabinet funded through various grant opportunities, as well as watershed-based partnerships that recognize Boston's downstream position within regional watershed systems. Private development is also expected to play a significant role in advancing stormwater mitigation projects over time.

Extreme Heat

The city is prioritizing lower-cost, faster-to-deploy interventions that can be implemented at scale without requiring large capital or grant funded investments. These include expanded tree planting in low-canopy neighborhoods, shade infrastructure in public spaces, and cooling features integrated into street design and public facilities. All improvements were made using funds that had been allocated within the city budget for right-of-way public improvements.

Boston is also shifting its resilience efforts toward a population-based equity approach, that targets resources and programs focused on heat reduction, shade and cooling resources and worker protection programs for reducing heat risk, toward vulnerable populations. In this area, financial strategies rely more heavily on operational budgets, partnerships with community organizations, and policy-driven private sector contributions, rather than large standalone capital projects.

Across all hazard types, Boston continues to leverage a wide range of grant programs, including FEMA's BRIC and HMGP programs, state MVP and CZM grants, and other federal and state funding opportunities. The City has demonstrated success in securing and deploying these funds for resilience initiatives.

Key Opportunities

- **Opportunities to strengthen Boston's financial capabilities include expanding technical support to pursue and manage competitive funding sources,** particularly federal programs such as FEMA BRIC, HMGP, and FMA, as well as state programs like MVP and CZM. Continued development of funding strategies to close the identified gaps, especially for large-scale coastal infrastructure will be critical.
- **In addition, advancing the implementation of conceptual phase resilience projects into design and construction will require more refined cost estimates, funding alignment, and coordination across agencies and partners.** Expanding innovative financing mechanisms, including public-private partnerships and developer-based contributions, may also help address long-term funding needs while aligning resilience investments with ongoing development.

5.2.4. Education and Outreach

Education and outreach programs communicate risk, promote protective actions, and build trust with residents and businesses before, during, and after emergencies.

Existing Capabilities

The City of Boston requires community and public engagement on all city led infrastructure projects as a core component of its planning and implementation process. This approach serves as an effective way to inform residents about important projects and provide regular updates on local resilience and infrastructure work taking place across neighborhoods. The City conducts outreach through a range of engagement strategies, including public meetings, neighborhood workshops, collaboration with other project related events, and tabling at community gatherings such as farmers markets. These efforts create accessible opportunities for residents to ask questions, share feedback, and learn about project goals and impacts.

In addition, Boston develops a dedicated public webpage for each project that functions as a centralized repository for materials including presentation slides, reports, fact sheets, flyers, and other resources. Together, these engagement practices promote transparency, strengthen project design through community input, and build public awareness of the City's ongoing resilience investments.

The City of Boston supports several established programs that advance public education, climate awareness, and neighborhood level leadership on resilience issues.

- **Deployables Day**[226] is an annual citywide education and training event focused on temporary flood protection and flood preparedness. The event is organized by the Office of Emergency Management (OEM), who coordinate with the Office of Climate Resilience (OCR) and other City partners to support event delivery. The event allows residents, property owners, and other stakeholders to view deployable flood barriers, learn how they function, and better understand the City's broader flood protection measures. It also provides outreach on flood safety, building-level preparedness, registration requirements for installed deployable barriers, and resources such as AlertBoston, evacuation zone information, and flood preparedness guidance. As an existing education and outreach capability, Deployables Day supports CRS Activity 330 documentation by demonstrating ongoing public outreach related to flood risk awareness, flood preparedness, and property protection. The event helps Boston increase public awareness of flood risk and supports proactive mitigation by encouraging property owners and residents to understand, plan for, and implement flood protection measures before flood events occur.
- The **Art for a Change program** is an existing education and outreach capability run through a partnership between the Office of Emergency Management and Boston Public Schools. The program teaches students about natural hazards, climate impacts, mitigation, and emergency preparedness through art-based learning. The program reached 40 students from Boston Latin and Boston Latin Academy and incorporated hazard mitigation planning, Community Emergency Response Team (CERT) elements, hands-on activities, worksheets, and creative projects to help students understand and communicate climate and hazard preparedness concepts. As a capability, the program strengthens youth engagement and community awareness, with opportunities to improve future sessions through more hands-on activities, clearer partner coordination, age-appropriate presentations, and improved logistics.

Key Opportunities

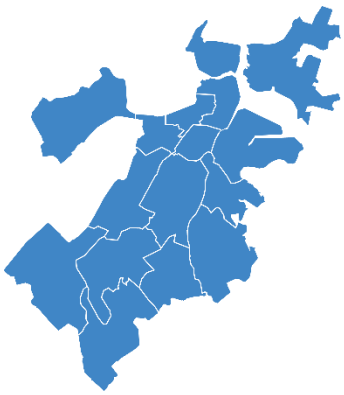
- **Improve public awareness of evacuation routes** through expanded outreach and clearer communication.
- **Expand multilingual and culturally relevant communications** across multiple platforms, including Wi-Fi–based tools such as WhatsApp.
- **Improve public communication about shelter site capabilities** by clearly sharing information on backup power, air conditioning, accessibility, and available services so residents can make informed decisions during emergencies.

[226] City of Boston. (2024, October 7). *Deployables Day, annual event.* https://www.boston.gov/departments/environment/deployables-day-annual-event

- **Strengthen internal and external communications alignment** by improving coordination across platforms and increasing visibility of preparedness resources.
- **Formalize Boston Public Schools (BPS) hazard communications** for less routine events and ensure continuity during leadership transitions.

5.2.5. Findings Summary

Overall, Boston has substantial planning, regulatory, technical, financial, and outreach capabilities to support hazard mitigation. The assessment found that many tools are actively implemented and effective but could be strengthened through improved interdepartmental coordination, expanded staffing and training, more consistent documentation and tracking, broader public outreach, completion of pending regulatory initiatives, and additional long-term funding. These findings were carried forward into the mitigation strategy so that proposed actions address identified capability gaps and build upon existing City programs.



CHAPTER 6:

Hazard Mitigation Actions

6. HAZARD MITIGATION ACTIONS

Mitigation actions are a key component of the Natural Hazard Mitigation Plan (NHMP), serving as the blueprint to reduce potential losses as identified in the Risk & Vulnerability Assessment (Chapter 4) and address gaps in Capabilities (Chapter 5). Mitigation actions encompass projects, plans, activities, and programs that will help achieve the city's hazard mitigation goals (Chapter 2) and reduce the city's vulnerability to hazards.

Mitigation actions primarily fall into the following four categories[227]:



Local Plans and Regulations: These actions include government authorities, policies or codes that influence the way land and buildings are developed and built.



Structure and Infrastructure Projects: These actions involve modifying existing structures and infrastructure to protect them from a hazard or remove them from a hazard area. This could apply to public or private structures as well as critical facilities and infrastructure.



Natural Systems Protection and Nature-based Solutions: This type of action can include green infrastructure and low impact development, nature-based solutions, Engineering with Nature and bioengineering to incorporate natural features or processes into the built environment.



Education and Awareness Programs: These types of actions keep residents informed about potential natural disasters. Many of these types of actions are eligible for funding through the FEMA HMA program.

[227] FEMA. (2025). *Local Mitigation Planning Handbook.* https://www.fema.gov/sites/default/files/documents/fema_hmd_2025-local-mitigation-planning-handbook_06122025.pdf

Through stakeholder and community engagement (Chapter 1), an implementation plan was developed to help achieve the City of Boston's natural hazard mitigation goals (Chapter 2). A prioritization framework was developed to rank and organize actions for implementation based upon the city's goals and criteria. In this chapter, Section 6.1 provides an overview of the mitigation actions developed for the 2021 NHMP, Section 6.2 details the process of action development for this 2026 NHMP, and Section 6.3 provides details on final actions and prioritization process that will guide Boston over the next five years.

6.1. Summary of Citywide Existing Mitigation Measures

6.1.1. Implementation Progress on Boston's 2021 Natural Hazard Mitigation Plan

During the spring of 2026, City of Boston staff reviewed the mitigation actions recorded in the 2021 NHMP. Staff from each department reviewed the measures for which they were responsible and determined their status: whether they were completed, deferred, cancelled, not started, or in progress. Staff also noted any revisions or changes to ongoing actions. For actions that were deferred or not started, city staff evaluated whether they were still relevant, effective, and within the city's purview.

Of the 57 mitigation actions identified in the 2021 NHMP:

- **19** were completed
- **2** were deferred
- **3** were cancelled
- **3** were not started
- **30** are currently in progress

In summary, the City of Boston has made substantial progress implementing the mitigation actions identified in the 2021 NHMP. Many actions focused on planning, policy, and capacity-building have been completed. Notable accomplishments include completion of the Muddy River Flood Control Project, implementation of the Coastal Flood Resilience Overlay District, publication of major planning documents such as the Urban Forest Plan and Franklin Park Action Plan, establishment of the Mayor's Climate Council, upgrades to the City's emergency notification system, completion of emergency shelter assessments, and the incorporation of climate resilience requirements into zoning, development review, and other local regulations. Several completed actions have transitioned from one-time planning efforts into ongoing City programs and policies that continue to support hazard mitigation and climate resilience.

Many actions remain active and are recommended for inclusion in the updated plan. Ongoing efforts are focused on reducing risks from coastal flooding, extreme heat, severe storms, and other climate-related hazards. Major initiatives underway include coastal resilience projects along Boston's waterfront, flood protection and drainage improvements, green infrastructure implementation, urban heat mitigation, backup power planning, critical facility resilience, and community preparedness programs. While many projects have advanced through planning, design, policy development, or early implementation, continued funding, coordination, and long-term investment will be needed to complete these efforts.

A small number of actions were canceled, deferred, or not initiated. In some cases, projects were determined to be infeasible, superseded by other initiatives, or outside the City's authority to implement.

Appendix G provides an action-by-action status narrative for all 57 mitigation actions included in the 2021 NHMP. For each action, the appendix describes implementation progress, explains the assigned status, identifies relevant changes since plan adoption, and indicates whether the action is recommended for inclusion in the updated mitigation strategy.

6.1.2. Citywide Adaptation Projects

Boston has moved from identifying climate hazards and developing neighborhood-level strategies toward implementing a broad portfolio of adaptation projects and programs across the city. The original Climate Ready Boston initiative established a framework for addressing extreme heat, stormwater flooding, and coastal and riverine flooding. Building on this framework, the city completed resilience plans covering all 47 miles of Boston's coastline and each of its five coastal neighborhoods, Charlestown, Dorchester, Downtown and the North End, East Boston, and South Boston. These plans identified priority flood pathways, conceptual adaptation strategies, and implementation roadmaps that continue to guide project development and investment.

Implementation is occurring incrementally, with projects at different stages of planning, feasibility analysis, design, permitting, and construction. Current efforts include:

- Construction of the climate-resilient: Ryan Playground and Barry Playground in Charlestown; Porzio Park in East Boston
- Design of Resilient Moakley Park;
- Planning and engineering for Long Wharf, Fort Point Channel, and the Raymond L. Flynn Marine Park; and
- Advancing designs for Chirstopher Columbus Park, Tenean Beach, the Lewis Street and Carlton Wharf waterfront, Bennington Street and Fredericks Park, Border Street, and the Mario Umana Academy.

Completed projects, including Langone Park and Puopolo Playground, Martin's Park, McConnell Park, and Piers Park Phase II, demonstrate how flood protection can be incorporated into parks and public spaces while also improving recreation, accessibility, waterfront connections, and neighborhood quality of life.

Boston's adaptation efforts also extend beyond the waterfront. The City's Heat Resilience Solutions[228] for Boston provides a citywide framework for reducing heat exposure, particularly in environmental justice neighborhoods, while green infrastructure, stormwater improvements, and emergency preparedness programs address flooding and extreme temperatures throughout Boston. The City's Urban Forest Plan[229] complements these efforts by establishing a long-term framework to preserve, maintain, and expand tree canopy across public and private property. The plan prioritizes proactive tree care, equitable canopy expansion in areas of greatest need, community-led decision-making, and workforce development. Increasing and maintaining healthy urban forests can help cool neighborhoods, improve air quality, manage stormwater, enhance public spaces, and provide other environmental and public health benefits.

The 2030 Climate Action Plan[230] further advances the transition from planning to implementation by calling for future climate risks to be considered in City capital projects, the closure of near-term coastal flood pathways, reductions in heat-related illness, expanded tree canopy, and greater community emergency preparedness. Collectively, these efforts reduce long-term vulnerability while supporting broader City goals related to public health, equity, environmental quality, infrastructure protection, accessible open space, green employment, and sustainable neighborhood development.

These ongoing initiatives provide the implementation foundation for the updated mitigation strategy and informed the development, consolidation, and prioritization of the actions described in the following sections.

6.2. Action Development

Mitigation actions for the 2026 NHMP were developed from a multi-faceted approach, including:

- A review of the goals and objectives set by the Executive Steering Committee (Chapter 2)

[228] City of Boston. (n.d.). *Heat resilience solutions for Boston.* https://www.boston.gov/departments/climate-resilience/heat-resilience-solutions-boston
[229] City of Boston. (n.d.). *Urban forest plan.* https://www.boston.gov/departments/parks-and-recreation/urban-forest-plan
[230] City of Boston. (n.d.). *Boston's Climate Action Plan.* https://www.boston.gov/departments/environment/boston-climate-action

- Input from stakeholders and community members through the Local Planning Team and Focus Group Workshops, Executive Steering Committee meetings, public meetings, and survey input (Chapter 1)
- A hazard risk and vulnerability assessment to determine natural hazard impacts and assets most at risk (Chapter 4)
- The city's current capabilities to mitigate and respond to natural hazard events (Chapter 5)
- The progress of actions from the 2021 NHMP (Chapter 6.1.1)
- Actions included in related plans and reports (Chapter 1 and Chapter 5)

The mitigation actions presented in this chapter include a combination of site-specific projects, policy initiatives, planning efforts, and ongoing programs designed to reduce the city's vulnerability to natural hazards. To create a more focused and manageable mitigation strategy, several related actions from previous plans and planning efforts have been consolidated into broader actions that address common goals or implementation approaches. As a result, some actions are intentionally broad and may encompass multiple projects, programs, or future initiatives, which are noted in the descriptions where possible.

Compared with the 2021 NHMP, the updated mitigation strategy reflects a shift from establishing plans, policies, assessments, and design guidance toward implementing, expanding, and maintaining resilience projects and programs. Coastal and precipitation-driven flooding remain major priorities; however, the updated actions place greater emphasis on advancing physical improvements, including coastal resilience projects, deployable and permanent flood protection, stormwater and green infrastructure, nature-based solutions, and property-level resilience measures. The updated strategy also addresses a broader range of interconnected vulnerabilities associated with extreme heat and cold, drought, groundwater, wildfire, invasive species, food-system disruptions, and other hazards that may be intensified by changing climate conditions.

The updated actions also demonstrate an increased focus on residents and communities that may experience disproportionate hazard impacts, as well as the continuity of critical infrastructure and community lifelines. Actions addressing multilingual outreach, emergency communications, evacuation planning, backup power, healthcare and utility resilience, food access, worker safety, and household-level preparedness complement larger infrastructure investments. Together, these changes reflect a more implementation-oriented, equitable, and multi-hazard approach that combines infrastructure, natural systems, public policy, emergency preparedness, and community-based programs.

Progress on all mitigation actions will be monitored and evaluated through the plan maintenance process described in Chapter 7. The following sections describe the

characteristics recorded for each action, the prioritization methodology, and the resulting 2026 mitigation strategy.

6.2.1. Overview of Mitigation Action Characteristics

Each mitigation action includes information on additional characteristics that the city will use to guide implementation efforts. The characteristics used to evaluate each mitigation action are as follows:



Natural Hazards

Actions may mitigate a single or multiple hazards, which will be indicated for each action. All the hazards discussed in Chapter 4 were addressed when developing the priority list, and there is at least one action associated with each hazard. Some actions address all hazards and are listed as such.



Associated Goals

This column lists which goals the mitigation action aims to accomplish. Some actions contribute toward more than one goal. The six goals of the NHMP are as follows:

1. Build informed, connected communities ready for natural hazards.
2. Encourage the protection of private property and buildings.
3. Create community resilience and promote neighborhood-level education and stewardship.
4. Support vulnerable populations before, during, and after hazard events.
5. Coordinate investments citywide, countywide, and statewide.
6. Enhance post-disaster recovery by fostering a collaborative mindset and increasing energy independence.



Responsible City Department and Partners

Many hazard mitigation actions and climate adaptation measures will require a multi-department strategy where several departments share responsibility. The designation of implementation responsibility was assigned based on general knowledge of the responsibility of each department. Additionally, some mitigation actions may require cooperation with outside entities, such as Massachusetts state departments, neighboring communities, regional organizations, or private

entities. In those cases, the relevant entities are included in addition to the city department.



Timeframe to Start

This column indicates whether the action is in progress. If the action is not yet in progress, the estimated time remaining until the project starts is listed.

- In progress
- Less than 1 year
- 1-2 years
- 2-5 years



Estimated Timeline for Completion

This column describes the estimated timeline until an action is completed, once it has started.

- Short-term (0-1 year)
- Medium-term (1-3 years)
- Long-term (3-5+ years)



Benefits

The City of Boston recognizes the importance of equity in hazard mitigation planning. Many actions directly or indirectly benefit different populations and communities within the city. Some of these benefits include:

- **Protection of life and public health**. Reduces injuries, deaths, heat illness, exposure to floodwater, and other hazard-related health impacts.
- **Protection of property and reduction of economic losses**. Limits damage to homes, businesses, public facilities, and cultural resources while reducing repair and recovery costs.
- **Protection of critical infrastructure and community lifelines**. Maintains transportation, utilities, emergency services, healthcare, schools, food access, and communications.
- **Equity and community resilience**. Reduces risk for socially vulnerable populations and neighborhoods that experience disproportionate hazard impacts or barriers to recovery.

- **Environmental and quality-of-life benefits**. Improves stormwater management, tree canopy, open space, air and water quality, recreation, and neighborhood conditions.

Cost

Costs listed in the mitigation action spreadsheet are estimated and are based on the cost of similar projects and professional estimates. Actual costs may vary based on the specific site, project, and scope of work. Cost estimates should be verified during the financial planning stage of a project. For the mitigation action spreadsheet, cost was classified into one of three categories:

- **High ($$$)** = Over $1M
- **Medium ($$)** = Over $100K - $1M
- **Low ($)** = Up to $100K

Technical Feasibility

The extent to which an action can be successfully implemented using existing technology, available expertise, and proven engineering, planning, or operational practices.

- High = The action relies on established engineering practices and is compatible with existing City infrastructure and operations.
- Moderate = The action is technically achievable but will require additional analysis and site-specific design.
- Low = Significant technical uncertainties or physical constraints may limit the action's effectiveness or ability to be implemented. Further study is necessary to determine whether a viable approach is available.

Funding Source

The city's general funds or capital budgets are considered a default potential funding source unless the city pursues additional funding. The identification of potential funding sources is preliminary and may vary depending on numerous factors. These factors include but are not limited to changes in grant eligibility criteria, program objectives, and funding availability. The funding sources identified are not guaranteed that a specific project will be eligible for or receive funding. Upon adoption of this plan, the local representatives responsible for implementation should begin to explore potential funding sources in more detail. Potential grants

were assigned based on eligibility and competitiveness, but the recommendations may not be comprehensive. Please note that grant eligibility and scoring criteria should also be reviewed prior to applying. Grants may also only be a source of funding for a single stage of a project. In many cases, the actions will require a combination of funding sources.

- Capital budget of the lead department
- Operating budget of the lead department
- Municipal bond
- Grant funding: refers to any monies that come from federal, state, or local grants.
- Staff time: implies that there is no additional cost associated with implementing this mitigation action other than typical staff hours.

6.2.2. Action Prioritization Process and Results

Actions were prioritized based on staff capacity, life and safety, economic factors, and the scale and equitable distribution of benefits. Priority was given to actions for which the city has sufficient staff capacity, and which are most likely to protect people and property at a large scale. Each mitigation action was evaluated using the criteria presented below.

- Is there sufficient staff to implement the project?
- Is training required for the staff to implement the project?
- Does the action advance other local objectives or plans?
- What is the scale of the overall benefit?
- Does the action build resilience for priority populations?
- Would the action mitigate economic loss and damage?
- Will the action reduce life and safety risk?

Criteria assessing whether an action satisfied a particular consideration were scored using a Yes/Maybe/No scale, with Yes assigned 2 points, Maybe assigned 1 point, and No assigned 0 points. Criteria assessing the relative level of benefits, feasibility, cost, or other implementation considerations were scored using a High/Medium/Low scale, with High assigned 2 points, Medium assigned 1 point, and Low assigned 0 points.

The individual criterion scores were summed to calculate a total score for each action, with higher scores indicating stronger alignment with the City's mitigation priorities and implementation considerations. Total scores were then used to assign each action a High, Medium, or Low priority. The priority for each action is displayed in the table below.

Table 6-1. Boston's Prioritized Mitigation Actions

Action ID	Action Title	Action Description	Priority
1	**Public education on extreme cold and preventing frozen pipes**	Provide targeted public education through BWSC and partner agencies on preparing for extreme cold events, including preventing frozen pipes, protecting plumbing systems in residential and commercial buildings, and reducing infrastructure-related service disruptions during prolonged cold periods.	Medium
2	**Expand urban canopy and implement cooling/shade infrastructure on public property and right-of-way**	Plan, expand, and maintain urban tree canopy and public cooling infrastructure (e.g., shade structures, water features, cooling corridors) across all neighborhoods, including establishing lifecycle maintenance models, standardized O&M cost frameworks, and data-driven prioritization aligned with the Citywide Heat Resiliency Study and Urban Forest Master Plan.	High
3	**Expand extreme temperature preparedness education**	Develop and deliver coordinated, citywide public education and outreach programs on extreme temperature preparedness (heat and cold), leveraging libraries, schools, community centers, and multilingual communication channels to reach vulnerable populations.	Medium
4	**Advocate for no utility shutoffs during extreme heat**	Advocate at the state level for policies that prohibit utility shutoffs during extreme heat events to protect vulnerable populations and maintain access to critical cooling resources.	Medium
5	**Green infrastructure policies, design, and maintenance**	Develop, implement, and institutionalize comprehensive green infrastructure (GI) policies, design guidelines, siting strategies, and maintenance requirements for public and private projects, including integrating GI into capital planning and ensuring long-term functionality.	Medium
6	**Expand groundwater recharge grants**	Expand and enhance BWSC's grant programs to support projects that increase groundwater recharge and reduce localized flooding impacts.	Medium

Action ID	Action Title	Action Description	Priority
7	**Resilience plan for Boston Harbor Islands**	Collaborate with federal, state, and nonprofit partners to develop and implement a long-term climate resilience and resource management plan for the Boston Harbor Islands.	Low
8	**Maintain and implement the NHMP**	Maintain, update, and implement the NHMP by coordinating across City departments and aligning local actions with state and federal programs. Track progress and use the NHMP to prioritize and guide hazard mitigation investments.	High
9	**Flood resilience projects in parks and wetlands**	Design, permit, and construct nature-based and engineered flood mitigation projects in parks and wetland systems (e.g., Moakley Park, Canterbury Brook & Boston Nature Center), improving stormwater storage, coastal resilience, and ecosystem function.	High
10	**MBTA coordination for resilience improvements and tabletop exercises**	Coordinate with the MBTA and state partners to assess vulnerabilities, implement resilience improvements at transit stations and lines, and conduct joint emergency preparedness exercises for flood and seismic risks.	High
11	**USACE partnership and coastal storm projects**	Coordinate with the U.S. Army Corps of Engineers to complete the Coastal Storm Risk Management Feasibility Study and advance to Congressional authorization, Project Partnership Agreement negotiation, and first-round project design.	High
12	**Deployable and permanent flood barriers**	Expand, deploy, and maintain both temporary and permanent flood barrier systems across vulnerable areas, including operational protocols, staffing, and maintenance programs for deployable barriers.	High

Action ID	Action Title	Action Description	Priority
13	**Property-level flood resilience assessment and retrofit program**	Following the completion of the pilot program in Port Norfolk, establish a comprehensive citywide program to provide property-level flood risk assessments, public education, technical assistance, and follow-up retrofits to reduce building-scale vulnerability.	Medium
14	**Expand rain barrel program**	Expand access to and participation in the city's rain barrel program to promote water conservation and reduce stormwater runoff.	Low
15	**Update street tree design standards**	Update and implement improved design and construction standards for sidewalks and street trees to create more hospitable growing conditions that extend tree longevity, improve resilience to urban stressors such as drought, salt, and soil compaction, and ultimately maximize the ecosystem services provided by the urban forest.	High
16	**Emergency communications and alerts**	Enhance citywide emergency communication systems, including public alerting (e.g., Wireless Emergency Alerts) and coordinated messaging strategies for infrastructure disruptions and hazard events.	Medium
17	**Stormwater mitigation programs**	Implement a comprehensive stormwater management strategy, including infrastructure upgrades, system modeling, plan implementation, regulatory updates, and public outreach programs to reduce flooding.	High
18	**Debris management and storm coordination**	Develop and implement comprehensive debris management plans and vendor coordination systems to support rapid post-storm cleanup and emergency response operations.	Low

Action ID	Action Title	Action Description	Priority
19	**Emergency exercises and evacuation planning**	Expand and refine emergency preparedness through evacuation planning, route optimization, and hazard-specific tabletop and field exercises across multiple scenarios.	High
20	**Urban Wilds and Natural Areas Strategic Plan**	Develop and implement program-level strategic plan that improves BPRD's stewardship of Urban Wilds sites for ecological resilience by identifying best management practices and ways to build staff capacity.	Medium
21	**Energy provider coordination**	Establish and maintain coordination protocols with energy providers to support emergency response operations and critical facility support during severe winter weather events.	High
22	**Map landslide/mudflow risk**	Identify, map, and monitor areas at risk for landslides and mudflows, and incorporate findings into planning and emergency preparedness activities.	Low
23	**FEMA CRS participation**	Apply for and maintain participation in FEMA's Community Rating System (CRS), including documenting eligible activities and improving floodplain management practices to reduce insurance costs.	High
24	**Food system resilience planning**	Assess and strengthen food system resilience by mapping vulnerabilities and critical assets and improving supply chain coordination and emergency food distribution strategies. Assess drainage, irrigation, stormwater, heat, drought, and invasive-species vulnerabilities affecting Boston's urban farms and community growing spaces and identify external funding and technical-assistance opportunities for green infrastructure, water conservation, and site-level resilience improvements.	High

Action ID	Action Title	Action Description	Priority
25	**Floodplain training and substantial damage planning**	Develop and implement floodplain-management training and post-disaster redevelopment and mitigation procedures following major flood events. Procedures might address substantial-damage assessments, coordinated permitting and inspections, application of flood-resistant reconstruction requirements, identification of mitigation and recovery funding, and integration of resilience measures into rebuilding and recovery decisions.	High
26	**Advance priority coastal resilience infrastructure projects**	Advance the design, permitting, and construction of priority coastal resilience projects (e.g., Fort Point Channel, Morrissey Boulevard) in coordination with state and federal partners. Ensure projects align with citywide coastal flood risk reduction strategies and established prioritization frameworks.	High
27	**Resilient building design and GI in development**	Promote resilient building design and incorporation of green infrastructure through zoning, development review, and regulatory requirements.	Medium
28	**Rutherford Ave flood mitigation**	Finalize design and enter construction phase for the Rutherford Avenue/Charlestown underpass to reduce roadway flooding and improve system reliability.	High
29	**Coastal erosion control projects**	Design and implement shoreline stabilization and coastal erosion control projects at priority locations such as Long Island and Moon Island.	Medium
30	**Critical facilities resilience and backup power**	Assess, upgrade, and retrofit municipal and critical facilities to improve resilience to hazards, including backup power, energy systems, and structural adaptations.	High
31	**Healthcare system resilience**	Continue sector-wide vulnerability assessments and resilience planning for healthcare systems.	Medium

Action ID	Action Title	Action Description	Priority
32	**Fire Prevention Division capacity**	Build capacity within the Fire Department's Fire Prevention Division to address wildfire risks and improve prevention and response capabilities.	Medium
33	**Advocate for NFIP reforms**	Advocate for reforms to the National Flood Insurance Program (NFIP) to improve affordability and effectiveness for Boston residents.	Medium
34	**Evaluate Drought-Related Water Affordability and Assistance Strategies**	Evaluate strategies to reduce the financial impacts of extended drought conditions and potential water-cost increases on vulnerable residents, community organizations, and food-producing operations. Identify available state, federal, philanthropic, or utility-funded assistance programs and provide water-conservation guidance and technical support.	High
35	**Develop Extreme Weather Workplace Safety Guidance**	Develop and distribute multilingual, sector-specific guidance and training to help employers and workers prepare for and remain safe during extreme heat, extreme cold, flooding, severe storms, wildfire smoke, and poor-air-quality events. Guidance should address worker protections, emergency communications, outdoor work, transportation disruptions, continuity of operations, and procedures for modifying or suspending unsafe work activities.	High
36	**Expand Invasive-Species Education, Monitoring, and Management**	Expand coordinated invasive-species education, early detection, reporting, and management programs. Provide training for City staff, community gardeners, land managers, and other stakeholders, with particular attention to species expected to enter or expand within the region as temperatures and growing conditions change.	High

6.3. Mitigation Strategy

The following table presents Boston's full 2026 mitigation strategy. For each action, the table identifies the hazards addressed, associated goals, responsible City departments and partners, implementation timeframe, anticipated benefits, estimated cost, technical feasibility, potential funding sources, and assigned priority. Together, these actions provide the framework that will guide Boston's hazard mitigation efforts over the next five years.

Table 6-2: Mitigation Strategy Definitions and Legend

Hazard(s) Addressed	Associated Goals	Partner Agencies	Timeframe to Start	Estimated Timeline for Completion	Benefits	Cost	Technical Feasibility	Funding Source	Overall Priority
Average / Extreme Temperatures Severe Winter Weather / Nor'easters Flooding from Precipitation Coastal Flooding and Storm Surge Coastal Erosion Changes in Groundwater Earthquakes Invasive Species Wildfires Drought Other Severe Weather Landslides / Mudflows	1. Build informed, connected communities ready for natural hazards. 2. Encourage the protection of private property and buildings. 3. Create community resilience and promote neighborhood-level education and stewardship. 4. Support vulnerable populations before, during, and after hazard events. 5. Coordinate investments citywide, countywide, and statewide. 6. Enhance post-disaster recovery by fostering a collaborative mindset and increasing energy independence.	Can any stakeholders help carry out the action, and if so, who?	In Progress Less than 1 year 1-2 years 2-5 years	Short-term Medium-term Long-term	Protection of Life and Public Health Protection of Property and Reduction of Economic Losses Protection of Critical Infrastructure and Community Lifelines Equity and Community Resilience Environmental and Quality-of-Life Benefits	$$$ = $1M $$ = Over $100k up to $1M $ = Up to $100k	Is the necessary engineering, planning, operational, or specialized expertise reasonably available to the City or through consultants and partners? High, Moderate, Low	Capital Budget Operating Budget Municipal Bond Grant Staff Time	High Medium Low

Table 6-3: Mitigation Strategies

Action #	Action Title	Action Description	Hazard(s) Addressed	Associated Goals	Responsible City Department	Partner Agencies	Timeframe to Start	Estimated Timeline for Completion	Benefits	Cost	Technical Feasibility	Funding Source	Overall Priority
1	Public education on extreme cold and preventing frozen pipes	Provide targeted public education through BWSC and partner agencies on preparing for extreme cold events, including preventing frozen pipes, protecting plumbing systems in residential and commercial buildings, and reducing infrastructure-related service disruptions during prolonged cold periods.		1 3 4	BWSC		1-2 years	Long-term		$	High	**Grant:** MVP Action Grant or EMPG or PHEP through OEM / BPHC for preparedness messaging	Medium

Action #	Action Title	Action Description	Hazard(s) Addressed	Associated Goals	Responsible City Department	Partner Agencies	Timeframe to Start	Estimated Timeline for Completion	Benefits	Cost	Technical Feasibility	Funding Source	Overall Priority
2	Expand urban canopy and implement cooling / shade infrastructure on public property and right-of-way	Plan, expand, and maintain urban tree canopy and public cooling infrastructure (e.g., shade structures, water features, cooling corridors) across all neighborhoods, including establishing lifecycle maintenance models, standardized O&M cost frameworks, and data-driven prioritization aligned with the Citywide Heat Resiliency Study and Urban Forest Master Plan.		4 5	Parks; Streets; OCR	BPS; BCYF; Public Facilities; BPDA; BPHC; Environment; DoIT	In Progress	Long-term		$$$	Moderate	**Grant:** MVP Action Grant; FEMA BRIC; U.S. Forest Service Urban & Community Forestry; Massachusetts / DCR Urban & Community Forestry Challenge Grants (when offered); Boston Tree Alliance grants for nonprofit / private-land projects	High
3	Expand extreme temperature preparedness education	Develop and deliver coordinated, citywide public education and outreach programs on extreme temperature preparedness (heat and cold), leveraging libraries, schools, community centers, and multilingual communication channels to reach vulnerable populations.		1 3 4	OEM; OCR; Environment	BCYF; BPL; BPS; BPDA	In Progress	Long-term		$	High	**Grant:** MVP Action Grant or EMPG or PHEP through OEM / BPHC for preparedness messaging	Medium
4	Advocate for no utility shutoffs during extreme heat	Advocate at the state level for policies that prohibit utility shutoffs during extreme heat events to protect vulnerable populations and maintain access to critical cooling resources.		2 4 5 6	Mayor's Office		1-2 years (Timeline for completion depends somewhat on speed of state-level action)	Medium-term		$	Moderate	**City operating budget** **Staff time** **Grant:** MVP Action Grant for research, equity analysis, and community engagement	Medium

Action #	Action Title	Action Description	Hazard(s) Addressed	Associated Goals	Responsible City Department	Partner Agencies	Timeframe to Start	Estimated Timeline for Completion	Benefits	Cost	Technical Feasibility	Funding Source	Overall Priority
5	Green infrastructure policies, design, and maintenance	Develop, implement, and institutionalize comprehensive green infrastructure (GI) policies, design guidelines, siting strategies, and maintenance requirements for public and private projects, including integrating GI into capital planning and ensuring long-term functionality.		2 4 5	Streets	BWSC; Environment; Parks; BPDA; BTD; Public Works; BPS	In Progress	Medium-term		$$	Moderate	**Capital and Operating Budget from BWSC Stormwater fees Grant:** MVP Action Grant; FEMA BRIC; Massachusetts CWSRF for eligible stormwater / GI implementation	Medium
6	Expand groundwater recharge grants	Expand and enhance BWSC's grant programs to support projects that increase groundwater recharge and reduce localized flooding impacts.		4 5	BWSC		In Progress	Short-term		$$	High	**Capital and Operating Budget from BWSC Stormwater fees Grant:** Massachusetts CWSRF; MVP Action Grant; FEMA BRIC	Medium
7	Resilience plan for Boston Harbor Islands	Collaborate with federal, state, and nonprofit partners to develop and implement a long-term climate resilience and resource management plan for the Boston Harbor Islands.	All	4 5	OCR	Boston Harbor Now; DCR; NPS	1-2 years	Medium-term		$-$$	Moderate	**Grant:** CZM Coastal Resilience Grant; NPS / Boston Harbor Islands Partnership resources (if available)	Low
8	Maintain and implement the NHMP	Maintain, update, and implement the NHMP by coordinating across City departments and aligning local actions with state and federal programs. Track progress and use the NHMP to prioritize and guide hazard mitigation investments.	All	4 5 6	OEM	All City Departments	In Progress	Short-term		$	High	**Staff Time** **Grant:** FEMA HMGP, BRIC	High

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Action #	Action Title	Action Description	Hazard(s) Addressed	Associated Goals	Responsible City Department	Partner Agencies	Timeframe to Start	Estimated Timeline for Completion	Benefits	Cost	Technical Feasibility	Funding Source	Overall Priority
9	Flood resilience projects in parks and wetlands	Design, permit, and construct nature-based and engineered flood mitigation projects in parks and wetland systems (e.g., Moakley Park, Canterbury Brook & Boston Nature Center), improving stormwater storage, coastal resilience, and ecosystem function.		4 5	OCR; Parks		In Progress	Medium-term		$$$	Moderate	**Capital Budget** **Grant:** FEMA BRIC; MVP Action Grant; CZM Coastal Resilience Grant; Federal Partnership / Cost Share: USACE	High
10	MBTA coordination for resilience improvements and tabletop exercises	Coordinate with the MBTA and state partners to assess vulnerabilities, implement resilience improvements at transit stations and lines, and conduct joint emergency preparedness exercises for flood and seismic risks.		4 5 6	OEM; Environment	MBTA	In Progress	Medium-term		$$	Moderate	**Grant:** USDOT PROTECT through the eligible transportation asset owner / MassDOT-MBTA coordination; FEMA BRIC for eligible resilience improvements; EMPG for tabletop exercises	High
11	USACE partnership and coastal storm projects	Coordinate with the U.S. Army Corps of Engineers to complete the Coastal Storm Risk Management Feasibility Study and advance to Congressional authorization, Project Partnership Agreement negotiation, and first-round project design.		5	OCR	BPDA; BWSC; Planning Dept; USACE	In Progress	Long-term		$$$	Moderate	**Capital Budget** **Staff Time** **Federal Partnership / Cost Share:** USACE	High
12	Deployable and permanent flood barriers	Expand, deploy, and maintain both temporary and permanent flood barrier systems across vulnerable areas, including operational protocols, staffing, and maintenance programs for deployable barriers.		4	OCR	OEM; BPDA; Parks	Less than 1 year	Medium-term		$$$	Moderate	**Capital Budget** **Grant:** FMA where barriers protect NFIP-insured structures	High
13	Property-level flood resilience assessment	Following the completion of the pilot program in Port Norfolk, establish a comprehensive citywide program to provide property-level flood risk assessments, public		1 2 3	ISD	OCR; OEM	1-2 years	Long-term		$$	Moderate	**Capital Budget** **Staff Time** **Grant:** MVP Action Grant	Medium

Action #	Action Title	Action Description	Hazard(s) Addressed	Associated Goals	Responsible City Department	Partner Agencies	Timeframe to Start	Estimated Timeline for Completion	Benefits	Cost	Technical Feasibility	Funding Source	Overall Priority
	and retrofit program	education, technical assistance, and follow-up retrofits to reduce building-scale vulnerability.		4 5									
14	Expand rain barrel program	Expand access to and participation in the city's rain barrel program to promote water conservation and reduce stormwater runoff.		5	Streets		In Progress	Short-term		$	High	**Grant:** Massachusetts CWSRF where structured as an eligible stormwater program; MVP Action Grant	Low
15	Update street tree design standards	Update and implement improved design and construction standards for sidewalks and street trees to create more hospitable growing conditions that extend tree longevity, improve resilience to urban stressors such as drought, salt, and soil compaction, and ultimately maximize the ecosystem services provided by the urban forest.		3 4 5	Parks; Streets	PWD	In Progress	Medium-term		$$	High	**Capital Budget** **Operating Budget** **Staff Time**	High
16	Emergency communications and alerts	Enhance citywide emergency communication systems, including public alerting (e.g., Wireless Emergency Alerts) and coordinated messaging strategies for infrastructure disruptions and hazard events.	All	1 3 4	OEM	Mayor's Press Office	1-2 years	Short-term		$$	High	**Operating Budget** **Grant:** Emergency Management Performance Grant (EMPG); Department of Homeland Security Homeland Security Grant Program (HSGP) for eligible interoperable / emergency communications capabilities	Medium
17	Stormwater mitigation programs	Implement a comprehensive stormwater management strategy, including infrastructure upgrades, system modeling, plan implementation, regulatory		1 2 3 4	BWSC	OEM	In Progress	Long-term		$$$	Moderate	**Capital Budget** **Grant:** Massachusetts CWSRF; FEMA BRIC; MVP Action Grant	High

Action #	Action Title	Action Description	Hazard(s) Addressed	Associated Goals	Responsible City Department	Partner Agencies	Timeframe to Start	Estimated Timeline for Completion	Benefits	Cost	Technical Feasibility	Funding Source	Overall Priority
		updates, and public outreach programs to reduce flooding.											
18	Debris management and storm coordination	Develop and implement comprehensive debris management plans and vendor coordination systems to support rapid post-storm cleanup and emergency response operations.	All	4 6	OEM	DCR; other partners	2-5 years	Long-Term		$$	High	**Operating Budget** **Staff Time** **Grant:** Emergency Management Performance Grant (EMPG); Hazard Mitigation Grant Program (HMGP) post-disaster planning / management costs where eligible; Urban Areas Security Initiative (UASI); Regional Catastrophic Preparedness Grants Program (RCPGP)	Low
19	Emergency exercises and evacuation planning	Expand and refine emergency preparedness through evacuation planning, route optimization, and hazard-specific tabletop and field exercises across multiple scenarios.	All	1 4	OEM		Less than 1 year	Medium-term		$$	High	**Staff Time** **Grant:** Emergency Management Performance Grant (EMPG); Department of Homeland Security Homeland Security Grant Program (HSGP) for eligible catastrophic-incident exercises; Urban Areas Security Initiative (UASI)	High
20	Urban Wilds and Natural Areas Strategic Plan	Develop and implement program-level strategic plan that improves BPRD's stewardship of Urban Wilds sites for ecological resilience by identifying best management		3	Parks	Environment	In Progress	Medium-term		$	High	**Capital Budget** **Staff Time** **Grant:** MVP Action Grant; U.S. Forest Service UCF; Massachusetts /	Medium

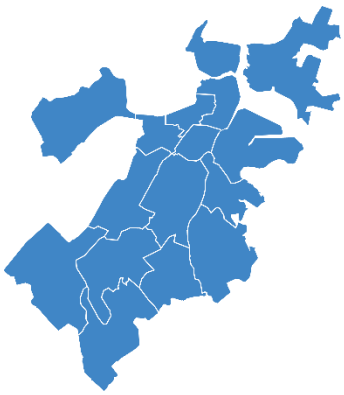
Action #	Action Title	Action Description	Hazard(s) Addressed	Associated Goals	Responsible City Department	Partner Agencies	Timeframe to Start	Estimated Timeline for Completion	Benefits	Cost	Technical Feasibility	Funding Source	Overall Priority
		practices and ways to build staff capacity.										DCR forestry grants when available; Mass Wildlife Habitat Management Grant for eligible protected land	
21	Energy provider coordination	Establish and maintain coordination protocols with energy providers to support emergency response operations and critical facility support during severe winter weather events.		1 4 5 6	OEM	Energy providers	1-2 years	Short-term		$	Moderate	**Staff Time**	High
22	Map landslide/mud flow risk	Identify, map, and monitor areas at risk for landslides and mudflows, and incorporate findings into planning and emergency preparedness activities.		2 3 4	OEM		2-5 years	Long-term		$$	Moderate	**Capital Budget** **Grant:** FEMA BRIC	Low
23	FEMA CRS participation	Apply for and maintain participation in FEMA's Community Rating System (CRS), including documenting eligible activities and improving floodplain management practices to reduce insurance costs.		2 3 4 5	ISD	OCR; BPDA; Environment	In Progress	Medium-term		$	Moderate	**Staff Time**	High

Action #	Action Title	Action Description	Hazard(s) Addressed	Associated Goals	Responsible City Department	Partner Agencies	Timeframe to Start	Estimated Timeline for Completion	Benefits	Cost	Technical Feasibility	Funding Source	Overall Priority
24	Food system resilience planning	Assess and strengthen food system resilience by mapping vulnerabilities and critical assets and improving supply chain coordination and emergency food distribution strategies. Assess drainage, irrigation, stormwater, heat, drought, and invasive-species vulnerabilities affecting Boston's urban farms and community growing spaces, and identify external funding and technical-assistance opportunities for green infrastructure, water conservation, and site-level resilience improvements.	All	3 4 5	Office of Food Justice	OCR; GrowBoston; BPDA; OEM	In Progress	Medium-term		$$	Moderate	**Operating Budget** **Staff Time** **Grant:** U.S. Department of Agriculture (USDA) Regional Food System Partnerships (RFSP) Program; MVP Action Grant; EMPG for emergency food-access / continuity planning	High
25	Floodplain training and substantial damage planning	Develop and implement floodplain-management training and post-disaster redevelopment and mitigation procedures following major flood events. Procedures might address substantial-damage assessments, coordinated permitting and inspections, application of flood-resistant reconstruction requirements, identification of mitigation and recovery funding, and integration of resilience measures into rebuilding and recovery decisions.		1 3 4	ISD	OEM	1-2 years	Short-term		$	High	**Operating Budget** **Staff Time** **Grant:** EMPG for emergency-management training elements	High
26	Advance priority coastal resilience infrastructure projects	Advance the design, permitting, and construction of priority coastal resilience projects (e.g., Fort Point Channel, Morrissey Boulevard) in coordination with state and federal partners. Ensure projects align with citywide coastal flood risk reduction strategies and established prioritization frameworks.		2 3 5	BPDA; Environment	BWSC; Parks	In Progress	Medium-term		$$$	Moderate	**Capital Budget** **Grant:** FEMA BRIC; MVP Action Grant; CZM Coastal Resilience Grant; Federal Partnership / Cost Share: USACE	High

Action #	Action Title	Action Description	Hazard(s) Addressed	Associated Goals	Responsible City Department	Partner Agencies	Timeframe to Start	Estimated Timeline for Completion	Benefits	Cost	Technical Feasibility	Funding Source	Overall Priority
27	Resilient building design and GI in development	Promote resilient building design and incorporation of green infrastructure through zoning, development review, and regulatory requirements.	All	3 4 5	BPDA	Environment; ISD; Parks	In Progress	Medium-term		$	High	**Operating Budget** **Staff Time**	Medium
28	Rutherford Ave flood mitigation	Finalize design and enter construction phase for the Rutherford Avenue / Charlestown underpass to reduce roadway flooding and improve system reliability.		4	Streets; BWSC		In Progress	Medium-term		$$$	Moderate	**Grant:** USDOT PROTECT with MassDOT coordination	High
29	Coastal erosion control projects	Design and implement shoreline stabilization and coastal erosion control projects at priority locations such as Long Island and Moon Island.		4	BPHC	DCR; BFD; BPD; DND; PFD	In Progress	Medium-term		$$-$$$	Moderate	**Operating Budget** **Capital Budget** **Federal Partnership / Cost Share:** USACE	Medium
30	Critical facilities resilience and backup power	Assess, upgrade, and retrofit municipal and critical facilities to improve resilience to hazards, including backup power, energy systems, and structural adaptations.	All	3 5 6	BPDA; OEM	Environment; BPD	In Progress	Long-term		$$$	Moderate	**Capital Budget** **Grant:** FEMA BRIC; HMGP; MassCEC Grants	High
31	Healthcare system resilience	Continue sector-wide vulnerability assessments and resilience planning for healthcare systems.	All	3 4 5	BPHC		In Progress	Short-term		$	High	**Grant:** Hospital Preparedness Program through the healthcare coalition / state recipient; EMPG; FEMA BRIC / HMGP for eligible facility mitigation	Medium
32	Fire Prevention Division capacity	Build capacity within the Fire Department's Fire Prevention Division to address wildfire risks		3 4 5	BFD		In Progress	Medium-term		$$	High	**Operating Budget** **Grant:** FEMA Assistance to	Medium

Action #	Action Title	Action Description	Hazard(s) Addressed	Associated Goals	Responsible City Department	Partner Agencies	Timeframe to Start	Estimated Timeline for Completion	Benefits	Cost	Technical Feasibility	Funding Source	Overall Priority
		and improve prevention and response capabilities.										Firefighters Grant for equipment / training	
33	Advocate for NFIP reforms	Advocate for reforms to the National Flood Insurance Program (NFIP) to improve affordability and effectiveness for Boston residents.		3 4 5	Mayor's Office	Multiple agencies	In Progress	Medium-term		$	Moderate	**Operating budget** **Staff Time**	Medium
34	Evaluate Drought-Related Water Affordability and Assistance Strategies	Evaluate strategies to reduce the financial impacts of extended drought conditions and potential water-cost increases on vulnerable residents, community organizations, and food-producing operations. Identify available state, federal, philanthropic, or utility-funded assistance programs and provide water-conservation guidance and technical support.		3 4 5	GrowBoston		1-2 years	Short-term		$	Moderate	**Operating Budget** **Staff Time** **Grant:** MVP Action Grant; CWSRF only if paired with an eligible water-efficiency or infrastructure project	High
35	Develop Extreme-Weather Workplace Safety Guidance	Develop and distribute multilingual, sector-specific guidance and training to help employers and workers prepare for and remain safe during extreme heat, extreme cold, flooding, severe storms, wildfire smoke, and poor-air-quality events. Guidance should address worker protections, emergency communications, outdoor work, transportation disruptions, continuity of operations, and procedures for modifying or suspending unsafe work activities.		1 3 4 5	GrowBoston		1-2 years	Short-term		$	High	**Operating Budget** **Staff Time** **Grant:** MVP Action Grant; CDC PHEP through BPHC for emergency public-health guidance; EMPG for continuity / emergency-management components; OSHA Susan Harwood Training Grant through an eligible nonprofit, labor, trade-association, or higher-education partner	High

Action #	Action Title	Action Description	Hazard(s) Addressed	Associated Goals	Responsible City Department	Partner Agencies	Timeframe to Start	Estimated Timeline for Completion	Benefits	Cost	Technical Feasibility	Funding Source	Overall Priority
36	Expand Invasive-Species Education, Monitoring, and Management	Expand coordinated invasive-species education, early-detection, reporting, and management programs. Provide training for City staff, community gardeners, land managers, and other stakeholders, with particular attention to species expected to enter or expand within the region as temperatures and growing conditions change.		1 3	GrowBoston		1-2 years	Short-term		$-$$	Moderate	**Operating Budget** **Staff Time** **Grant:** MVP Action Grant; USDA APHIS PPA Section 7721 through an eligible state / university / partner proposal	High



CHAPTER 7:

Plan Adoption and Maintenance

7. PLAN ADOPTION AND MAINTENANCE

This chapter describes the process the City of Boston will use to implement, monitor, maintain, and update the Natural Hazard Mitigation Plan (NHMP) following MEMA and FEMA approval and local adoption. The chapter outlines the City's approach for monitoring implementation of mitigation actions, evaluating the effectiveness of the plan, incorporating continued public participation, and integrating hazard mitigation into ongoing planning, policy, and capital improvement efforts. It also identifies the departments and committees responsible for supporting plan implementation and maintaining the NHMP over time. Together, these activities support the City's continued hazard mitigation and climate adaptation efforts while maintaining consistency with FEMA's Local Mitigation Planning requirements.

7.1. Plan Adoption

The City of Boston's 2026 NHMP was adopted by the City Council on [ADOPTION DATE]. See Appendix H for supporting documentation. The plan was approved by FEMA on [APPROVAL DATE] for a five-year period and will expire on [MONTH X, 2031]. See Appendix I for supporting documentation.

7.2. Plan Implementation and Maintenance

The NHMP is intended to serve as a living document that supports ongoing natural hazard mitigation efforts throughout the City of Boston. As hazards, climate projections, community priorities, and regulatory requirements continue to evolve, the plan should be reviewed on a regular basis so that it reflects current conditions and supports implementation of the city's mitigation strategy. Routine plan maintenance also maintains the City's eligibility for FEMA Hazard Mitigation Assistance (HMA) grant programs by meeting the federal requirement to review and update the NHMP at least once every five years.

FEMA identifies three primary components of plan maintenance:

1. Monitoring: Tracking implementation of the plan over time (Section 7.2.1)

2. Evaluating: Assessing how well the plan meets its stated purpose and goals (Section 7.2.2)
3. Updating the Plan: Reviewing and revising the plan at least once every 5 years (Section 7.2.3)

These activities provide a framework for tracking implementation of mitigation actions, reviewing the effectiveness of the NHMP, and incorporating new information or changing conditions into future updates. The City of Boston will carry out these activities through the procedures described below.

7.2.1. Plan Monitoring

Monitoring is the process of tracking implementation of the NHMP over time. FEMA identifies monitoring as a key component of plan maintenance because it provides communities with an opportunity to review implementation progress between formal plan updates, to maintain current information on mitigation activities, and document new data sources and projections (if applicable) for the evaluated hazards. Monitoring also supports future plan evaluations and updates by documenting implementation activities on a routine basis.

Monitoring of the NHMP will be lead and coordinated by the Office of Emergency Management (OEM) Planning Unit. Monitoring responsibilities may involve multiple staff, depending on the mitigation action or planning activity being reviewed.

Monitoring activities will occur annually and will be coordinated with the city's standing review of its emergency management suite of plans. During the annual monitoring process, the Executive Steering Committee (ESC) will meet to update mitigation actions and keep track of committee membership, as appropriate. Progress on plan monitoring and on mitigation actions will be kept in the city's current google sheets review tracker. Information developed through the annual monitoring process will support future plan evaluations and updates.

7.2.2. Plan Evaluation

Plan evaluation provides the City of Boston with an opportunity to determine whether the NHMP continues to reflect current conditions, effectively supports the city's natural hazard mitigation priorities, and remains responsive to changing risks and community needs. Consistent with FEMA guidance, the city will annually evaluate the plan to assess its continued effectiveness, identify needed revisions, and document information for incorporation into future plan updates.

Information collected through annual monitoring will support the evaluation process by documenting mitigation action progress, implementation challenges, emerging opportunities, and changes that may affect community vulnerability. Evaluation findings

will be used to adjust implementation priorities, strengthen mitigation programs where feasible, and inform the next comprehensive update of the NHMP.

The city will also evaluate the plan following major hazard events through its established after-action reporting process. Lessons related to hazard impacts, emergency operations, infrastructure performance, communication, and unmet community needs will be reviewed to determine whether mitigation actions, policies, procedures, or priorities should be revised.

Evaluation of future conditions will consider changing climate hazards, population growth, redevelopment, funding and regulatory opportunities, and changes in the built and natural environment. The city will periodically review updated hazard data, demographic and socioeconomic indicators, environmental justice and priority population data, development patterns, and infrastructure inventories to identify where changing conditions may increase exposure, sensitivity, or reduce adaptive capacity. This process will help Boston assess how new development may either reduce vulnerability through resilient design, green infrastructure, energy efficiency, tree canopy, stormwater management, and updated building standards, or increase risk by concentrating people and assets in hazard-prone areas. Evaluation findings will support equitable investment decisions and the expansion of regulations, programs, and capital projects as risks and opportunities evolve.

7.2.3. Plan Updates

Updating the NHMP is the process of reviewing and revising the plan to reflect current conditions, updated information, and changes that have occurred since the previous plan was adopted. FEMA requires local hazard mitigation plans to be reviewed and updated at least once every five years to maintain plan approval and continued eligibility for Hazard Mitigation Assistance (HMA) grant programs.

Consistent with this requirement, OEM will lead future NHMP updates with consultant support. Information developed through annual monitoring activities, plan evaluations, and the city's after-action report process may be incorporated into the next comprehensive plan update, as appropriate.

Future updates will provide an opportunity to incorporate new information, reflect changing conditions, and maintain consistency with FEMA planning requirements while supporting continued implementation of the city's mitigation strategy.

7.3. Continuing Public Participation

Continued public participation is an important component of maintaining the NHMP. FEMA recommends providing opportunities for the public to remain involved throughout plan implementation and future plan updates. Continued engagement provides opportunities

for the city to share information about natural hazard mitigation activities and receive public input that may be considered during future evaluations and updates of the NHMP.

Rather than establishing a separate engagement process, the City will incorporate NHMP outreach into existing public meetings and community events. Planned opportunities include the Mayor's Coffee Hours during the summer, information tables at Deployables Day and Ready Boston Field Day, and Roundtable to Resilience meetings. Feedback received through these activities may be considered during future plan evaluations and updates.

This approach builds on the City's existing education and outreach capabilities described in Chapter 5: Capabilities Assessment, including public meetings, neighborhood workshops, project-related events, and tabling at community gatherings. Deployables Day, in particular, serves as an established annual opportunity to provide information on flood preparedness, emergency resources, and hazard mitigation. Collectively, these activities will help maintain public involvement throughout implementation of the NHMP.

7.4. Integration of the Plan with Other Planning Initiatives

Integrating the NHMP with other city planning initiatives supports implementation of mitigation actions by incorporating hazard mitigation considerations into ongoing planning, policy, and investment decisions. FEMA identifies plan integration as an important component of plan maintenance because it promotes coordination among departments and helps align mitigation actions with other local planning mechanisms.

As described in the Capabilities Assessment, Boston has established a broad network of planning and regulatory tools that support hazard mitigation and climate adaptation. As these plans and initiatives are developed or updated, the NHMP should continue to coordinate with these efforts so that mitigation actions remain aligned across city departments, neighborhoods, and capital planning processes.

The city will continue to consider the NHMP during updates to related planning initiatives, including climate adaptation, comprehensive planning, transportation, parks and open space, and other applicable city plans identified in the Capabilities Assessment. These efforts include, but are not limited to, Climate Ready Boston, the Climate Action Plan, the Urban Forest Plan, Heat Resilience Solutions, Imagine Boston 2030, Go Boston 2030, and the Open Space and Recreation Plan.

Implementation of mitigation actions will also continue to be coordinated with existing planning, regulatory, and capital improvement processes, as appropriate. During annual plan maintenance activities, opportunities to further integrate mitigation actions into other

city planning mechanisms may be identified and incorporated into future updates of the NHMP.

7.5. Plan Maintenance Summary

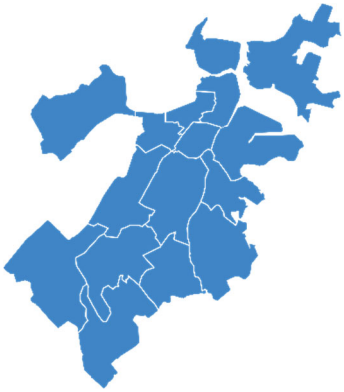
Table 7-1 summarizes the City of Boston's approach to maintaining the NHMP over time. It identifies the key plan maintenance activities described in this chapter, including monitoring, evaluating, updating, continuing public education, and integrating the plan with related City initiatives. For each activity, the table outlines the anticipated timing, general process, and primary responsible parties.

Table 7-1. Plan Maintenance Summary Table

Plan Maintenance Step	When	How	Who
Monitoring	Annually, coordinated with the City's standing review of its emergency management plans.	Review and document progress on mitigation actions, implementation challenges, new hazard information, and changes in committee membership. Plan monitoring to be done through the city's existing google sheets tracker.	Office of Emergency Management (OEM) Planning Unit, with participation from the Executive Steering Committee (ESC) and departments responsible for individual mitigation actions.

Plan Maintenance Step	When	How	Who
Evaluating	Annually and following major hazard events.	Assess whether the NHMP continues to reflect current conditions, support the City's mitigation priorities, and respond to changing risks and community needs. Review monitoring results, implementation challenges, updated hazard and demographic data, development patterns, infrastructure changes, and lessons identified through the City's after-action reporting process.	OEM Planning Unit, with input from the ESC, relevant City departments, and staff involved in after-action reporting.
Updating	At least once every five years, before the plan's FEMA approval expires.	Revise the NHMP to incorporate monitoring and evaluation findings, after-action report recommendations, updated hazard and climate information, changing community conditions, implementation progress, and current FEMA planning requirements.	OEM will lead the update with support from the ESC, relevant City departments, and a consultant, as needed.

Plan Maintenance Step	When	How	Who
Continuing Public Education	Throughout plan implementation and during future plan updates.	Incorporate NHMP outreach and opportunities for public feedback into existing events, including Mayor's Coffee Hours, Deployables Day, Ready Boston Field Day, Roundtable to Resilience meetings, neighborhood workshops, and other community events. Feedback may inform plan evaluations and updates.	OEM and other City departments and partners responsible for public outreach and community events.
Integrating the Plan	During annual maintenance activities and whenever related City plans, policies, regulations, or capital programs are developed or updated.	Consider NHMP goals and mitigation actions during updates to climate adaptation, comprehensive planning, transportation, parks and open space, and other applicable initiatives. Identify opportunities to incorporate mitigation actions into ongoing regulatory, programmatic, and capital improvement processes.	OEM, the ESC, and City departments responsible for related plans, policies, programs, and capital investments.



APPENDIX A:

Plans and Documents Reviewed

PLANS AND DOCUMENTS

State

ResilientMass Plan | 2023

The ResilientMass Plan is Massachusetts' integrated State Hazard Mitigation and Climate Adaptation strategy, designed to prepare the Commonwealth for natural hazards and climate impacts. It combines hazard mitigation and climate adaptation into one cohesive framework, identifies key risks such as flooding, sea-level rise, extreme precipitation, and heat, and outlines over 125 measurable actions for state agencies. The plan emphasizes cross-agency coordination through the ResilientMass Action Team, uses data-driven tools like an interactive action tracker and metrics dashboard, and prioritizes environmental justice and vulnerable communities. Its goal is to create a dynamic, whole-of-government approach that assesses risks, sets priorities, ensures accountability, and monitors progress toward a more resilient Massachusetts.

As the statewide natural hazard mitigation and climate adaptation plan, this plan offers a wide variety of data and climate projections relevant to the city of Boston.

Link: 2023 ResilientMass Plan | Mass.gov

ResilientCoasts Plan | 2025

The Massachusetts ResilientCoasts Plan, finalized in November 2025, is a statewide strategy to address coastal hazards such as sea-level rise, storm surge, and erosion over the next 50 years. It divides the coastline into 15 regional resilience districts to coordinate actions and prioritize nature-based solutions like wetland and dune restoration alongside infrastructure upgrades such as elevating roads and utilities. Projections show sea levels could rise by 1.3 feet by 2040 and over 4 feet by 2100, putting billions of dollars in property and infrastructure at risk. The plan outlines near-, medium-, and long-term actions, emphasizes equity and environmental justice, and estimates that every dollar invested in resilience could save $13 in avoided damages. Developed through extensive public engagement, it calls for a whole-government approach, ongoing municipal support, and the use of mapping tools and data to guide implementation, aiming to protect communities, ecosystems, and economies along Massachusetts' 1,500-mile coastline.

The plan provides critical data and climate projections, as well as prioritized adaptation strategies that will inform this NHMP by identifying coastal vulnerabilities, guiding risk

reduction measures, and aligning long-term resilience goals with statewide hazard mitigation efforts.

Link: ResilientCoasts - Final Plan

City of Boston

Boston Natural Hazard Mitigation Plan Update | 2021

In 2021, the City of Boston completed a comprehensive update to its Natural Hazard Mitigation Plan (NHMP)[1], replacing the previous 2016 plan update. The update was led by the Office of Emergency Management with broad engagement from an Executive Steering Committee, Local Hazard Mitigation Team, and public input via surveys and virtual meetings. This 2021 update assessed risks posed by flooding, sea-level rise, extreme heat, winter weather, and other hazards. The plan's development involved detailed risk and vulnerability analyses using tools like FEMA Hazus and MEMA, and focused on mitigation goals such as protecting public health, preserving critical infrastructure, and enhancing resilience by safeguarding natural resources. This plan builds upon a 2013 Climate Ready Boston Report from the Mayor's Climate Preparedness Task Force examining the preparedness of municipal facilities, operations, services, and policies for the effects of climate change.

The 2021 Boston Natural Hazard Mitigation Plan serves as the foundation for the 2025 update, providing the baseline assessments and goals that will guide the new planning cycle. It established the city's core strategies for addressing climate-related hazards and identifying critical infrastructure vulnerabilities, which the 2025 update builds upon by incorporating recent data, evolving climate projections, and lessons learned from implementation. In essence, the 2021 plan is the backbone of the process ensuring continuity while allowing the 2025 update to refine and expand Boston's resilience and risk framework for the future.

Link: Boston 2021 NHMP

Climate Ready Boston | 2016

The 2016 Climate Ready Boston report[2] builds upon the City's 2007 Climate Action Plan, as well as the 2011 and 2014 updates, and acts as a complement to efforts to reduce emissions and mitigate climate change. This report notes that Boston has faced 21 federally or state-declared disasters since 1991. With the expectation that this number will keep rising, the

[1] Boston NHMP_2021-12-08_Combined_8.pdf
[2] boston.gov/sites/default/files/file/2023/03/2016_climate_ready_boston_report.pdf

document provides updated climate forecasts, evaluates Boston's vulnerabilities, pinpoints local climate concerns, and outlines climate resilience efforts through four goals and eleven strategies.

Since its publication, the Climate Ready Boston report has served as a foundational resource for the City, guiding the design and implementation of resilience strategies across all departments. Frequently referenced in municipal planning and policy development, the updated climate forecasts, vulnerability assessments, and framework for climate resilience informs both day-to-day operations and long-term initiatives for the City of Boston. Its importance to the Natural Hazard Mitigation Plan (NHMP) process lies in its comprehensive approach to evaluating local climate risks and its actionable strategies, focusing on mitigation efforts that are grounded in the latest community priorities.

Link: Climate Ready Boston 2016 Report

Coastal Resilience Solutions Neighborhood Plans | 2017-2022

The Coastal Resilience Solutions plans[3] are neighborhood level resilience plans that outlined strategies for each of Boston's five coastal neighborhoods to address flooding risks from sea level rise and coastal storms. These plans present tailored strategies, including natural and hybrid infrastructure, enhanced public access, ecosystem restoration, green space integration, and flood barriers, to reduce flood hazards while improving connectivity, recreation, and ecological health along Boston's 47-mile coastline. This effort was part of the implementation of Climate Ready Boston initiative and has formed a cohesive blueprint that has now transitioned into the implementation stage, catalyzing both structural and nature-based projects under the City's resiliency agenda.

- East Boston and Charlestown Phase I | 2017
- South Boston | 2018
- Dorchester | 2020
- Downtown and North End | 2020
- East Boston and Charlestown Phase II | 2022

Boston's Coastal Resilience Solutions neighborhood plans provide detailed strategies for mitigating coastal flooding and sea level rise, which are critical hazards addressed in a Natural Hazard Mitigation Plan (NHMP). Reviewing these plans ensures alignment between local resilience efforts and the NHMP, strengthens risk assessments with neighborhood-specific data, and identifies projects that can be prioritized for FEMA funding. Incorporating these plans also leverages extensive community engagement and equity

[3] Coastal Resilience Planning | Boston.gov

considerations, creating a more comprehensive and actionable roadmap for hazard mitigation.

Link: Coastal Resilience Planning | Boston.gov

Heat Resilience Solutions for Boston | 2022

The City of Boston's Heat Resilience Solutions plan[4] addresses the growing threat of extreme heat, which is projected to increase significantly due to climate change. The plan identifies environmental justice neighborhoods as priority areas, recognizing that historic inequities that have contributed to higher urban heat island effects and reduced tree canopy. Using detailed heat modeling and community input, the plan outlines 26 strategies across eight action areas, including operational response, cooling networks, green infrastructure, building retrofits, and land-use planning. These strategies aim to reduce heat exposure, improve public health, and advance equity while supporting Boston's climate goals.

Incorporating this plan into the NHMP ensures alignment with climate projection data and hazard mitigation objectives as they relate to extreme heat related natural hazards and provides actionable projects that can qualify for FEMA funding.

Link: Heat Resilience Solutions for Boston | Boston.gov

City of Boston Climate Action Plan | 2026

The Boston Climate Action initiative is the City's comprehensive framework for reducing greenhouse gas emissions while preparing Boston to adapt to the impacts of climate change. Through an updated 2030 Climate Action Plan, Boston outlines strategies to cut carbon pollution from buildings, transportation, and waste, while strengthening neighborhoods against heat, flooding, and sea-level rise. Led by the Environment Department, it combines climate mitigation, resilience, and equity to guide policies and investments that support a just transition for all communities.

Understanding what is included in this plan can aid in the creation of strategies and mitigation actions to include in this NHMP plan.

Link: Boston's Climate Action Plan | Boston.gov

2023-2032 Open Space and Recreation Plan | 2023

The City of Boston's Open Space and Recreation Plan provides a comprehensive inventory of parks, recreational facilities, and conservation lands, along with an analysis of community needs, environmental data, and demographic trends. It identifies opportunities

[4] Heat Resilience Solutions for Boston | Boston.gov

for expanding and protecting open space through updated mapping and policy guidance, including Article 97 protections and zoning considerations. The plan emphasizes equitable access, neighborhood-specific strategies for maintenance and programming, and community engagement to ensure all residents benefit from high-quality green spaces. Extending through 2032, this plan serves as a critical resource for integrating open space priorities into hazard mitigation efforts, supporting resilience, public health, and climate adaptation goals.

This plan provided input on the asset inventory, planning and regulatory capabilities, and mitigation actions.

Link: Open Space and Recreation Plan | Boston.gov

Urban Forest Plan | 2022, update 2024

The Boston Urban Forest Plan provides a comprehensive framework for preserving and expanding Boston's tree canopy across both public and private land. It establishes four equity-centered goals that prioritize historically under-canopied and vulnerable neighborhoods, proactive care and preservation, community-led decision-making, and valuing trees across sectors and outlines seven key strategies ranging from expanding urban forestry management to workforce development. The plan is grounded in robust data, including a citywide street and park tree inventory, canopy change assessments, and heat vulnerability mapping, with tailored neighborhood-level strategies to address inequities and strengthen climate resilience through improved air quality, heat mitigation, and stormwater management.

This plan provided input on vulnerability and risks related to extreme heat natural hazards, as well as provided mitigation actions.

Link: Urban Forest Plan | Boston.gov

PLAN Initiatives by BPDA

Neighborhood planning initiatives serve as neighborhood-specific master plans that guide zoning, design, mobility, resilience, and community development, providing a blueprint for equitable growth and climate-adaptive investment across Boston's diverse districts. Recent plans include PLAN: East Boston and PLAN: Downtown, which address land use, transportation, housing, and public realm improvements while integrating climate adaptation measures such as flood protection, heat mitigation, and green infrastructure. These plans were developed through extensive community engagement and provide actionable frameworks for future development that align with hazard mitigation goals. Incorporating these initiatives into the NHMP ensures consistency with long-term neighborhood planning and supports resilience-focused investments.

- PLAN: East Boston | 2024
- PLAN: Downtown | 2025
- PLAN: Mattapan | 2023
- PLAN: Nubian Square | 2023
- PLAN: Newmarket, the 21st Century Economy Initiative | 2023
- PLAN: Glover's Corner, Dorchester | 2023
- PLAN: South Boston Dorchester Avenue | 2022
- PLAN: Nubian Square: Parcel P3 | 2023
- PLAN: Charlestown | 2023
- PLAN: JP/Rox | 2017

Each of these plans integrates various resiliency strategies with land use and development policies demonstrating planning and regulatory capabilities and providing and implementing important neighborhood scale mitigation actions.

Imagine Boston 2030 | 2017

Imagine Boston 2030 is the City's first comprehensive plan in over 50 years. The plan was designed to guide growth and investment through the 2030 planning horizon while addressing climate resilience, equity, and quality of life. The plan sets a vision for a thriving, inclusive, and sustainable Boston by focusing on housing, transportation, economic development, and environmental stewardship. Key components include strategies for climate adaptation alongside goals for reducing greenhouse gas emissions and improving social equity. By linking land use, infrastructure, and resilience planning, Imagine Boston 2030 provides a framework that complements the NHMP, by aligning hazard mitigation actions with the long-term development and climate goals.

- **Imagine Boston Waterfront | 2016** This assessment and vision was undertaken as part of the City's comprehensive plan. This plan sets a vision for the future of the waterfront in response to identified challenges and opportunities.

This plan provided input on inclusive and equitable engagement and planning processes and mitigation actions.

Link: Imagine Boston 2030 | Boston.gov

GoBoston 2030 ReVisioned | 2017

Go Boston 2030 is the City of Boston's long-range transportation plan, designed to create a safe, reliable, and equitable transportation system by 2030. The plan outlines strategies to improve mobility, reduce congestion, and expand access to sustainable transportation options such as walking, biking, and transit. It emphasizes climate resilience and emissions reduction through investments in public transit, complete streets, and green

infrastructure, while prioritizing equity and safety for all users. Go Boston 2030 provides a framework for transportation improvements that complement hazard mitigation by reducing vulnerability, supporting emergency access, and promoting sustainable urban growth. To date the plan has 30 projects in implementation, 11 projects in design, and 17 projects that have not yet been started.

Link: Go Boston 2030 ReVisioned | Boston.gov

Boston Water and Sewer Commission (BWSC) Plans and Studies

- **2d Inundation Model** Predicts the extent and duration of flood inundation within the City of Boston for a variety of wet weather events and sea level rise scenarios, to inform infrastructure adaptation and resiliency planning and coastal flood protection strategy. *This model is undergoing an update during this FY25 NHMP Update. An updated version should be available in 2026 and will expand upon the original model to identify inland areas of Boston that will be prone to flooding.*

  Link: Home | BWSC Storm Viewer

- **Capital Improvement Program | 2023-2025** Three-year plan for the water distribution and wastewater collection systems. Covers stormwater/sewer facilities planning to bolster infrastructure for increased precipitation and sea-level rise.

  Link: 2023-2025 CIP FINAL PDF.pdf

- **Capital Improvement Program | 2024-2026** Program to outline planned investments to maintain and upgrade the City's water, sewer, and stormwater infrastructure, with a focus on system reliability, regulatory compliance, and water quality improvements.
  Link: 2024-2026 CIP.pdf

- **Capital Improvement Program | 2025-2027** The final plan for the water distribution and wastewater collection systems. Includes stormwater detention facility design, emergency sewer repair contracts, and CCTV inspections for aging pipe systems.

  Link: 2025-2027 Final CIP.pdf

- **Coastal Stormwater Discharge Analysis | 2024** Evaluates challenges of storm drain systems under storm surge, rising tides, and sea-level rise and proposes conceptual adaptations to maintain stormwater discharge in extreme tide events.

  Link: Coastal Stormwater Discharge Analysis Project | Boston Water and Sewer Commission

All of these plans and studies address capabilities and actions for stormwater, inland flooding, and coastal flooding control, focusing on the city's water and wastewater infrastructure.

Regional Stakeholders

Massachusetts Bay Transit Authority (MBTA) Focus 40 | 2019

A long-term investment strategy for MassDOT and the MBTA that responds to shifting demographics, climate impacts, and emerging technologies, encouraging more innovative approaches to Greater Boston's future transit needs. The plan outlines key goals (p.9) and program areas, including a dedicated resilience program (p.29). Focus40 is shaped by the MBTA Strategic Plan and draws on a range of internal and external planning efforts, such as the Plan for Accessible Transit Infrastructure and the GoBoston 2030 Vision and Action Plan.

Link: https://www.mbtafocus40.com/focus40theplan

MassDOT Statewide Climate Change Adaptation Plan

MassDOT completed climate projection maps and the Extreme Temperature Impact Assessment; ongoing actions are guided by the statewide ResilientMass Plan.

These plans identify vulnerabilities in transportation assets and provide strategies to mitigate risks from extreme heat, flooding, and other climate hazards.

Link: https://www.mass.gov/info-details/2023-resilientmass-plan

Lower Mystic Regional Climate Assessment | 2021

The Resilient Mystic Collaborative completed its two-part vulnerability assessment, analyzing critical infrastructure interdependencies and impacts on vulnerable residents. Findings inform ongoing regional resilience projects and planning.

These assessments identify critical infrastructure interdependencies and impacts on vulnerable populations, informing targeted resilience planning and mitigation actions.

Link: https://resilient.mysticriver.org/lower-mystic-vulnerability-assessments

POLICIES AND REGULATIONS

City of Boston

Metro Boston Climate Preparedness Task Force Commitment | 2025

A commitment by the 17 communities in the Metro Mayors Coalition to work collaboratively to improve climate change resilience and sustainability and reduce greenhouse gas emissions.

This commitment guides collaborative actions across communities to enhance climate resilience, sustainability, and hazard mitigation regionally, helping to inform the mitigation actions in this plan.

Link: https://www.mapc.org/wp-content/uploads/2025/05/MetroMayorsClimateSummit_CommitmentDocument.pdf

Boston Smart Utilities Policy | 2020

Integrates smart utility technologies into Article 80 Development Review and BPDA guidelines to strengthen Boston's utility infrastructure against climate impacts such as flooding, heat, and severe storms. The 2020 policy expands on the original framework by refining implementation requirements, improving coordination among utility providers, and enhancing strategies that lower long-term costs, reduce construction-related disruptions, and support a more resilient, efficient infrastructure network. These guidelines support resilient utility infrastructure by integrating climate-smart technologies into planning and development processes, reducing vulnerability to flooding, heat, and severe storms.

Link: https://www.bostonplans.org/getattachment/7b87a301-95da-4723-b3a9-02bfebd1b109

Climate Resilient Design Standards & Guidelines for Public Rights-of-Way | 2018

In tandem with the Climate Ready Boston initiative, the Climate Resilient Design Guidelines and Standards were established to protect the city's public right-of-way from the projected 40 inches of sea level rise by 2070. This document established the basis for climate resilient flood barriers, such as berms, Harborwalks, seawalls, and deployable flood barriers within the City. The guidelines include a set of standards for design, cost, and operations and maintenance demands.

These guidelines inform city planning and regulatory capabilities and actionable mitigation measures, as they are related to coastal and inland flooding natural hazards.

Link: Climate Resilient Design Standards and Guidelines | Boston Public Works Department

Boston Zoning Code Articles

- **Article 25 A - Coastal Flood Resilience Overlay District | 2021** Effective since 2021, this code requires new developments and retrofits to implement measures that reduce damage and displacement from coastal storms and sea level rise. This overlay requires new developments and retrofits to implement measures that reduce damage and displacement from coastal storms and sea level rise, establishing consistent standards for project review. This zoning overlay informs city planning and regulatory capabilities related to coastal and inland flooding natural hazards.

  Link: Coastal Flood Resilience Overlay District | City of Boston Planning Department

- **Article 32 – Groundwater Conservation Overlay District** The purpose of this article is to prevent the deterioration of and promote the restoration of groundwater levels in the City of Boston.

  Link Article 32: Groundwater Conservation Overlay District | City of Boston Planning Department

- **Article 37 – Green Buildings and Net Zero Carbon** The purposes of this article are to ensure that Proposed Projects through the Article 80 Review Process are designed, developed, and managed to minimize and mitigate adverse environmental impacts; to promote sustainable development; and to minimize and mitigate the impacts of Greenhouse Gas Emissions.

  Link Article 37: Green Buildings and Net Zero Carbon | City of Boston Planning Department

- **Article 80 – Climate Change Review Policy | 2017** Projects subject to Article 80B Large Project, 80C Planned Development Area, and 80D Institutional Master Plan review must analyze near and long-term project impacts on the surrounding environment and Boston's greenhouse gas inventory including consideration of future climate conditions.
  Link: Article 80: https://www.bostonplans.org/getattachment/a4bea764-5e44-40e8-90cc-152370838320

These documents provide updated guidance for waterfront and other development projects in areas vulnerable to sea level rise, flooding, and other climate impacts. They

include checklists and standards for analyzing proposals within the framework of climate resilience and have been incorporated into the Article 80 Development Review Process. The 2025 updates to Articles 37 and 32, as well as ongoing modernization of Article 80 procedures, ensure that Boston's development review continues to reflect current climate and sustainability priorities.

These codes and guidelines provide standards for development in areas vulnerable to flooding and climate impacts, demonstrating regulatory capabilities within the city.

Regional Stakeholders

Massport Floodproofing Design Guide | 2025

Part of Massport's broader Resiliency Program, this guide provides floodproofing standards to be used across capital planning, design, and real estate development to strengthen infrastructure and operations against current and future flood risks. The 2025 guide builds on the original framework by incorporating the latest climate data and modeling, refining design criteria, and expanding strategies to better protect Massport facilities from worsening coastal and storm-related hazards.

Link: https://www.massport.com/sites/default/files/2024-12/Massport-Floodproofing-Design-Guide-January-2025.pdf

Massport Sustainability and Resiliency Design Standards and Guidelines (SRDSGs) | 2025

Designed for architects, engineers, planners, and contractors involved in capital projects for Massport or on Massport properties, these guidelines support the integration of sustainability principles. The SRDSGs build on the foundation of the 2018 guidelines and draw insights from Climate Ready Boston and the 2014 Climate Action Plan. These guidelines ensure sustainability and resilience are incorporated into Massport capital projects, aligning design and planning with climate adaptation principles.

Link: https://www.massport.com/sites/default/files/2025-01/2025-Massport-Sustainability-Design-Guidelines-FINAL.pdf

University of Massachusetts (UMass) Boston Sustainable Solutions Lab Climate Adaptation Finance and Governance Study | 2018

Provides six targeted recommendations to advance resilience financing and support the implementation of Imagine Boston 2030 and Climate Ready Boston.

This study provides financing strategies that may be utilized for the mitigation actions within this plan.

Link: https://scholarworks.umb.edu/cgi/viewcontent.cgi?article=1009&context=ssl

Feasibility of Harbor-wide Barrier Systems: Preliminary Analysis for Boston Harbor | 2018

Research from the Sustainable Solutions Lab at UMass Boston shows that shore-based climate adaptation strategies offer substantial benefits compared to a citywide harbor approach.

This analysis demonstrates the advantages of shore-based climate adaptation strategies over a full harbor barrier, informing resilient coastal planning.

Link: https://scholarworks.umb.edu/cgi/viewcontent.cgi?article=1001&context=ssl

ADDITIONAL RESOURCES

Age-Friendly Boston Action Plan | 2025

The Age Strong Commission conducted a comprehensive Needs Assessment from August to December 2024, partnering with UMass researchers to gather input through 22 focus groups and a 29-question survey in 12 languages, ensuring accessibility for diverse senior populations. The resulting 2026–2029 Area Plan focuses on four key areas—healthcare, transportation, housing, and social opportunities—to guide strategies addressing the needs of older Bostonians.

This plan identifies the needs of older residents and guides strategies for healthcare, housing, transportation, and social engagement to enhance resilience.

Link: FFY26-29 Area Plan submission_UPDATED Oct 2025

City of Cambridge Hazard Mitigation Plan | 2025

The City of Cambridge 2025 Hazard Mitigation Plan identifies Cambridge's risks from flooding, wind, winter storms, earthquakes, and other natural hazards and outlines strategies to reduce harm to life, property, and infrastructure. It was developed with stakeholder and resident input to guide mitigation actions and maintain eligibility for state and federal hazard-mitigation funding.

This plan identifies natural hazard risks and outlines mitigation strategies to reduce impacts on life, property, and critical infrastructure. As a neighboring city, this plan provides a baseline reference of updated climate data and projections.

Link: cambridgema.gov/-/media/Files/CDD/Climate/hazardmitigationplan/CambridgeMANHMPFeb2025.pdf

City of Cambridge Climate Change Vulnerability Assessment | 2021

The 2021 Resilient Cambridge Plan builds on the city's Climate Change Vulnerability Assessment to identify risks from heat, flooding, and sea-level rise, providing strategies to enhance resilience across neighborhoods and critical infrastructure. It guides climate adaptation planning through prioritized actions for vulnerable populations, infrastructure upgrades, and community preparedness.

These assessments provide climate risk analysis and resilience strategies, supporting adaptation planning for heat, flooding, and sea-level rise.

Link: https://www.cambridgema.gov/Departments/CommunityDevelopment/ResilientCambridgePlan

MWRA Master Plan | 2018

The 2018 Master Plan focus on rehabilitating or replacing existing MWRA infrastructure, while also addressing the need for redundancy in the Metropolitan Tunnels to ensure reliability, security, and operational flexibility.

These guidelines direct investment and rehabilitation of water and wastewater infrastructure to maintain system reliability and mitigate flood- and climate-related hazards.

Link: https://www.mwra.com/about-mwra/reports-publications/master-plan

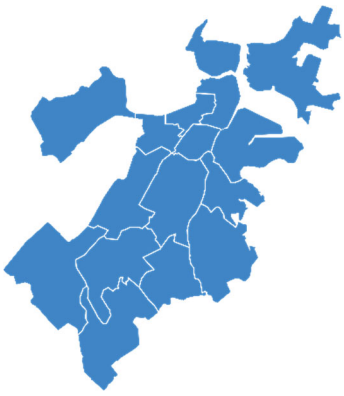
Boston Creates (Arts and Culture Plan) | 2016

With a 2025 status update, including expanded support for local artists, and embedding these goals into long-term city planning, this ten-year strategy focuses on cultural infrastructure, sustainability, equity and accessibility.

This plan supports the integration of arts and culture into climate adaptation and community resilience planning by promoting inclusive and adaptive public spaces.

Link: bccp.pdf

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APPENDIX B:

Executive Steering Committee Materials

Executive Steering Committee

Name	Email	Department/Agency	Title
Christopher Osgood	chris.osgood@boston.gov	Office of Climate Resilience	Director
Logan Grant	logan.grant@boston.gov	Inspectional Service Department	Floodplain Administrator
Sean Edelman	sean.edelman@boston.gov	Office of Budget Management	Assistant Director Capital
Adrian Jordan	adrian.jordan@boston.gov	Office of Emergency Management	Chief
Chase Berkeley	berkeleyc@bwsc.org	Boston Water and Sewer Commission	Chief of Operations
Brooke Majewski	brooke.majewski@boston.gov	Environment	Climate Policy Manager
Ed Laurenti	laurentie@bwsc.org	Boston Water and Sewer Commission	Project Director, Emergency Preparedness
Shani Fletcher	shani.fletcher@boston.gov	GrowBoston: Office of Urban Agriculture	Director
Mellissa Honeywood	mellissa.honeywood@boston.gov	Office of Food Justice	Deputy Director
Maggie Owens	maggie.owens@boston.gov	Parks Department	Planning Project Manager
Chrysanthy Tiggas	ctiggas@bphc.org	Office of Public Health Preparedness, Boston Public Health Commission	Associate Director of Emergency Operations

Executive Steering Committee

Name	Email	Department/Agency	Title
Janine Barros	jbarros@bphc.org	Office of Public Health Preparedness, Boston Public Health Commission	Senior Planner
Ky'Ron Owens	kyron.owens@boston.gov	Office of Emergency Management	Communications Director

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55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

November 10, 2025

Mikayla Teixeira
UASI Planning Unit Supervisor
City of Boston, Office of Emergency Management
85 Bragdon Street
Boston, MA 02119

Re: **Boston FY25 Natural Hazard Mitigation Plan Update,** ESC Kickoff

Dear 2025 NHMP Executive Steering Committee:

Please see the agenda for the Monday November 10th Executive Steering Committee Kickoff Meeting below. The meeting will be held in person from 1:00-2:00pm at City Hall in Room 900. Let us know if you have any questions.

Agenda:

- Project Team Introductions
- Natural Hazard Mitigation Plan Overview
  - What is an NHMP?
  - Why does it matter?
- FEMA's Updated Guidance
  - What has changed regarding new requirements and focus areas from the previous HMP Update in 2021
- Establishing Updated Mitigation Goals
- Next steps
  - What to expect moving forward
  - Important dates

Sincerely,

WESTON & SAMPSON ENGINEERS, INC.

Madison Biasin
Resiliency Planner II

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Biasin, Madison

Subject: Natural Hazard Mitigation Plan Update Kick Off Meeting: Executive Steering Committee
Location: 1 City Hall Square room 900, Boston, MA 02108, USA

Start: Mon 11/10/2025 1:00 PM
End: Mon 11/10/2025 2:00 PM

Recurrence: (none)

Meeting Status: Accepted

Organizer: Mikayla Teixeira

Categories: BOSTON HMP

Please join the Office of Emergency Management's Planning Unit at the Kick Off Meeting for our Natural Hazard Mitigation Plan Update. We will be discussing the goals of this project, defining roles and responsibilities of Executive Steering Committee Members, and reviewing the project timeline.

Please arrive ready to provide status updates on previous mitigation actions (spreadsheet attached).

The participation of the Executive Steering Committee is crucial to the success of this project, so thank you in advance for your participation in this effort. Please feel free to reach out with any questions you may have ahead of the meeting.

Best,
Mikayla Teixeira, Planning Unit Supervisor, OEM

When

Monday Nov 10, 2025 · 1pm – 2pm (Eastern Time - New York)

Location

Attachments

2021 Hazard Mitigation...

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1 City Hall Square room 900, Boston, MA 02108, USA
View map

Guests

Mikayla Teixeira - organizer
biasin.madison@wseinc.com
moonan.janet@wseinc.com
Matthew Kearney
Adrian Jordan
seidel.robin@wseinc.com
Logan Grant
Kendall Bobula
Allen Ryan
John Tiano
View all guest info

Reply for biasin.madison@wseinc.com

Yes | No | Maybe

More options

Invitation from Google Calendar

You are receiving this email because you are an attendee on the event.

Forwarding this invitation could allow any recipient to send a response to the organizer, be added to the guest list, invite others regardless of their own invitation status, or modify your RSVP. Learn more

CITY of BOSTON

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NATURAL HAZARD MITIGATION PLAN

Kickoff Meeting | November 10, 2025

Sign-in Sheet

NAME	DEPARTMENT	TITLE
Maggie Owens	Boston Parks and Rec	Planning PM
Janet Mosnan	Weston & Sampson	
John Tiano	Boston OEM	EM Planner
Allen Ryan	Boston OEM	EM Planner
Matt Kearney	Boston OEM	Deputy Chief
Jackeline Newell	BOSTON OEM	GIS Analyst
Yi an BS	Boston OEM	Program Manage
Kendall Bobula	BOSTON OEM	Disaster plan & prep

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CITY of BOSTON

NATURAL HAZARD MITIGATION PLAN

Kickoff Meeting | November 10, 2025

Sign-in Sheet

NAME	DEPARTMENT	TITLE
CHASE BERKELEY	BWSC - OPS	CHIEF OF OPERATIONS
Logan Grant	ISD	Floodplain Administrator
KRISTIN COLLINS	OEM	D.R. Regional Catastrophic Preparedness Grant Program
Madison Biasin	WSE	Resiliency Planner / Project Manager
Chrystanny Tiggas	OPHP - BPHC	CTiggas@BPHC.org
Ky'Ron Owens	OEM	Comms Dir
Sean Edelman	OBM	Asst Dir Capital Planning
Brooke Majewski	Environment	Climate Policy & Planning Program Manager

CITY of BOSTON

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NATURAL HAZARD MITIGATION PLAN

Kickoff Meeting | November 10, 2025

Sign-in Sheet

NAME	DEPARTMENT	TITLE
Mellissa Honeywood	Mayor's Office of Food Justice	Deputy Director
Nayeli Rodriguez	Office of Climate Resilience	Deputy Director
Chris Osgood	"	Director
Lucy Perkins	Siler Climate Consulting	Director of Climate Resilience
Mikayla Teixeira	OEM	PLANNING UNIT SUPERVISOR

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CITY of BOSTON

NATURAL HAZARD MITIGATION PLAN

Executive Steering Committee
Kickoff Meeting | November 10, 2025

Weston & Sampson



LoPresti Park, photo by Weston & Sampson

AGENDA

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01 Introductions

02 Hazard Mitigation Plan General Overview

03 FEMA's Updated Guidance

04 Establishing Updated Mitigation Goals

05 Next Steps

MEET THE TEAM

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Weston & Sampson



Robin Seidel, AIA
Principal In Charge



Madison Biasin
Project Manager



Janet Moonan, PE
Senior Technical Leader

Office of Emergency Management



Mikayla Teixeira
Project Manager



Allen Ryan
Project Team



John Tiano
Project Team

Siler Climate Consulting



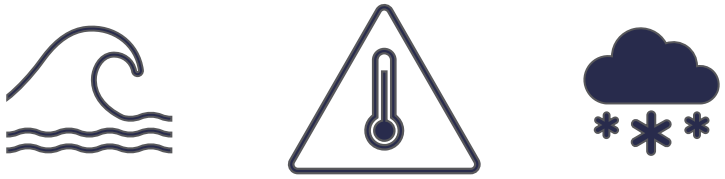
Peyton Siler Jones
Stakeholder Engagement



Lucy Perkins
Stakeholder Engagement

What is Natural Hazard Mitigation?

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The effort to reduce impacts from natural hazards such as flooding, extreme temperatures, and winter weather...



...through planning, policy, education, infrastructure projects, and more.

Purpose of Natural Hazard Mitigation Plan (NHMP)

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01 **Identify natural hazards** that pose the greatest risk to Boston.

02 **Assess vulnerability** of residents, infrastructure, and critical facilities.

03 Develop **strategies and projects** to minimize or eliminate future hazard impacts.

04 **Strengthen coordination** across City departments, regional agencies, and community partners.

05 **Maintain eligibility** for FEMA mitigation grants and federal disaster recovery funding.

Executive Steering Committee Responsibilities

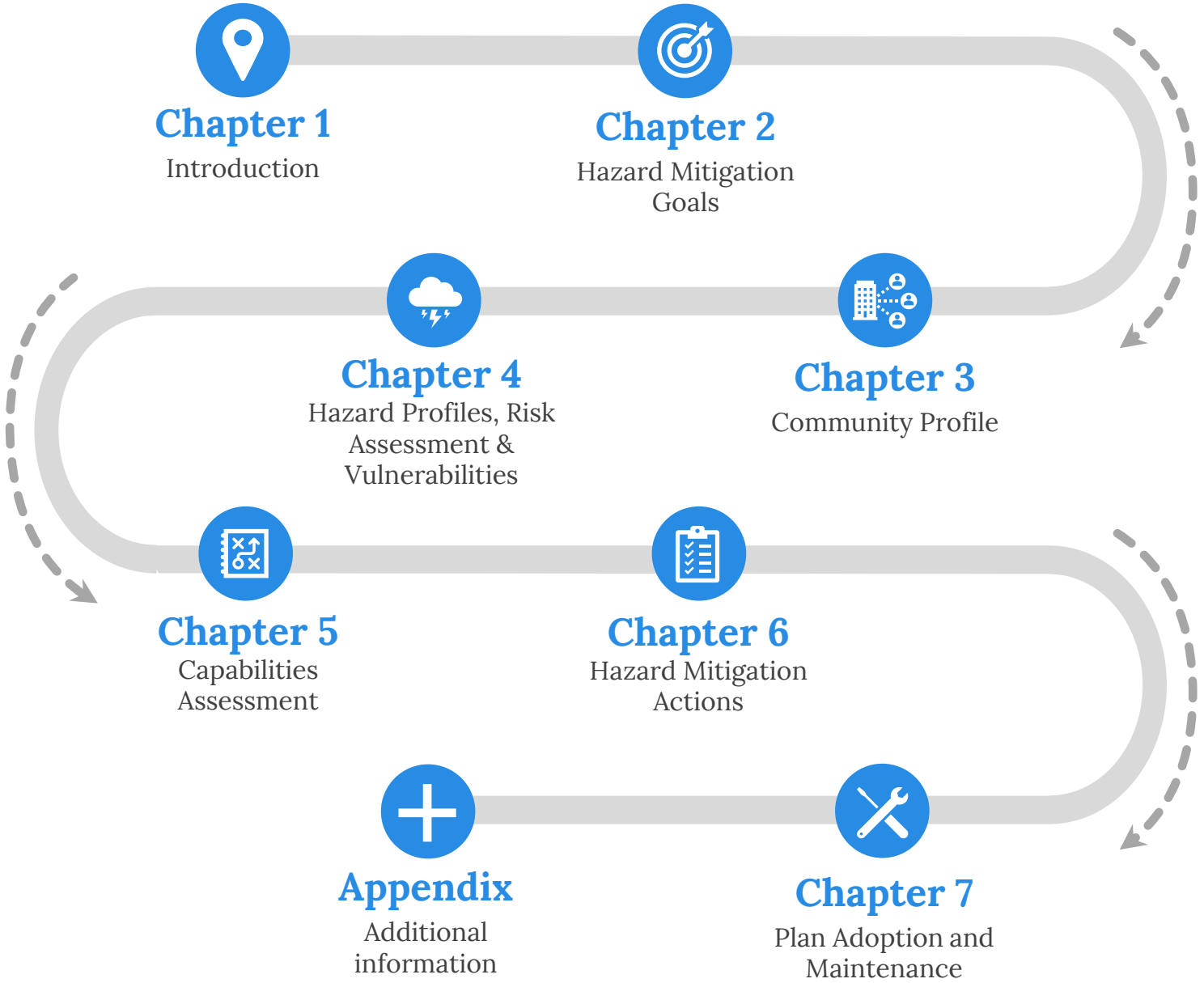
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The purpose of the Executive Steering Committee is to guide overall plan development and approval. This includes participation in the following activities:

1. **Executive Steering Committee Meetings (4)**
   - One in-person (kickoff), three (3) virtual
   - 1 to 1.5 hours each
   - Approximately every 2-3 months (Nov., Jan., April, June)
2. **Review of & input on targeted requests (e.g., outreach/engagement, LPT approach/invites/materials, capabilities, etc.)**
3. **Review of draft chapters**
4. **Supporting presentation to public and presentation to City Council for adoption as necessary**

NHMP OVERVIEW

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**Change from 2018, updated to follow ResilientMass Plan*

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HAZARD PROFILES



Flooding from Precipitation



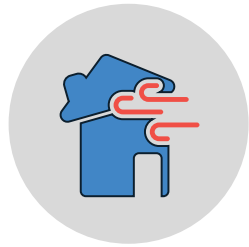
Coastal Flooding and ***Storm Surge***



Coastal Erosion



Hurricanes / Tropical Cyclones



Tsunamis



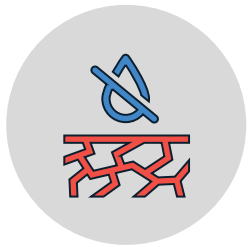
Changes in Groundwater



Severe Winter Weather / Nor'easters



Average/ Extreme Temperatures



Drought ***(including groundwater impacts)***



Wildfire



Earthquakes



Landslides/ ***Mudflows***



Tornadoes



Invasive Species



Other Severe Weather

VALUE OF HAZARD MITIGATION PLANNING

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EVERY $1 spent on mitigation

SAVES $6 on disaster recovery

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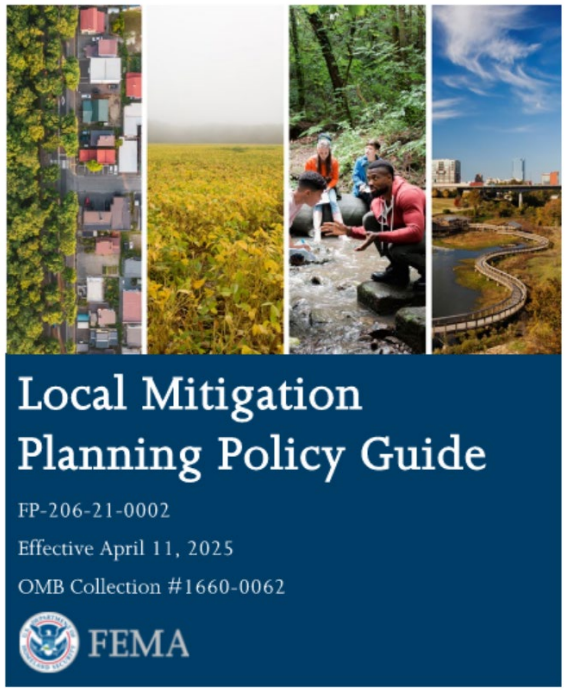


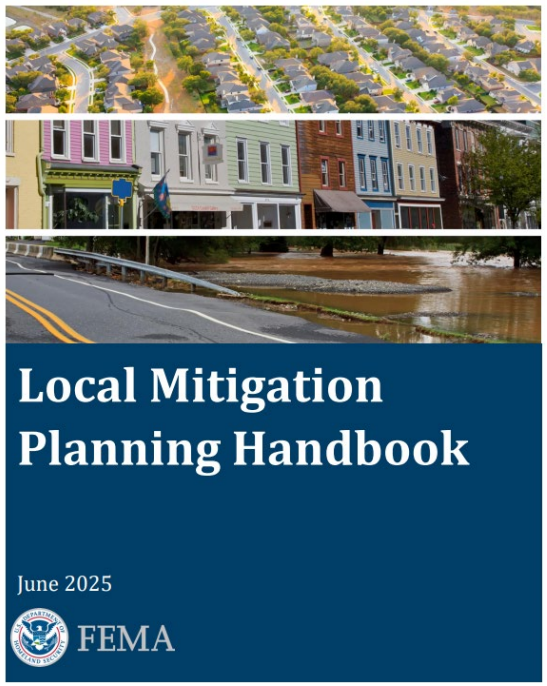
Boston City Hall, photo by Weston & Sampson

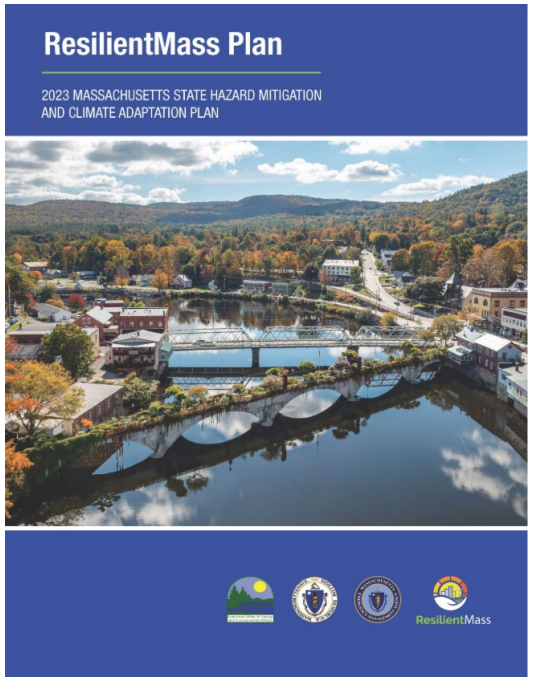
FEMA's Updated Guidance 2025

REQUIREMENTS & CONSISTENCY

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FEDERAL

- FEMA updated Local Mitigation Planning Policies and Guidance (released April 2022, revised April 2023, revised April 2025)
- FEMA Local Mitigation Planning Handbook (released May 2023, revised June 2025)

STATE

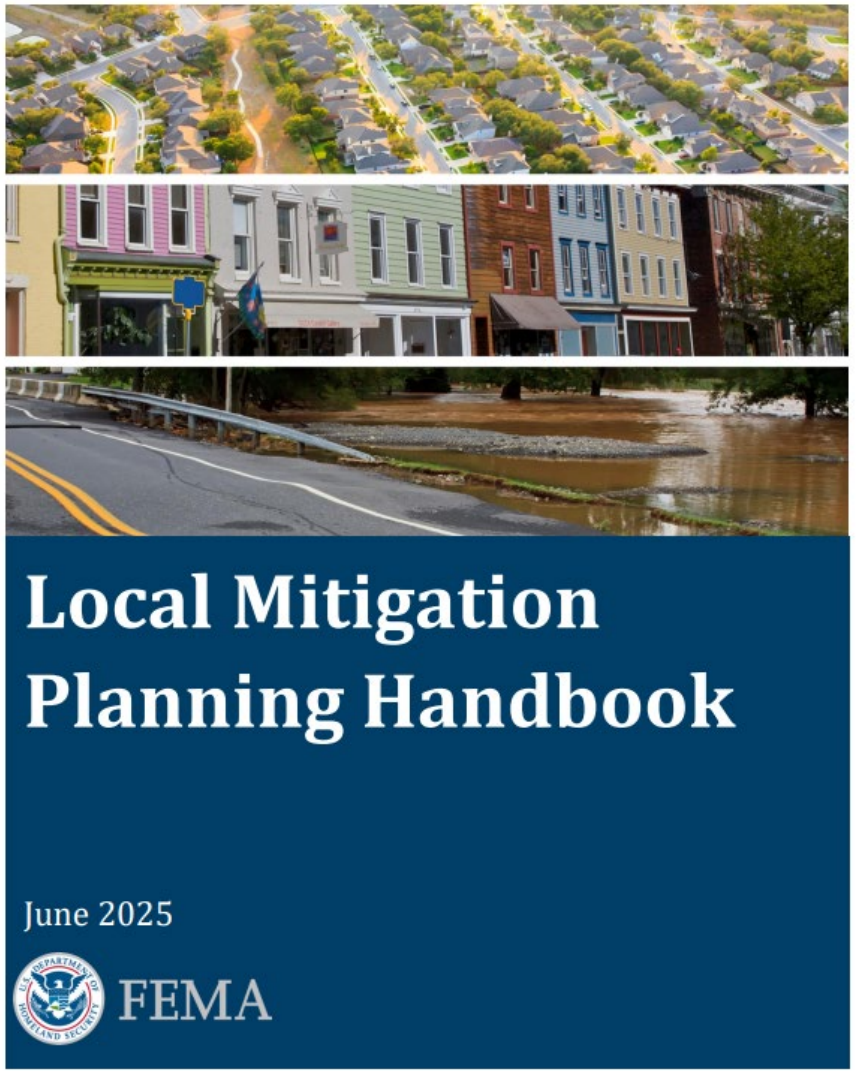
- State adopted the 2023 ResilientMass Plan (2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan)

REQUIREMENTS & CONSISTENCY

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2025 Updates Include:

- Removal of “social vulnerability” from requirements.
- Mention of climate change is removed from guidance.
- No requirement to assess or prioritize mitigation actions based on community vulnerability or underserved populations.



REVISED FACILITY / ASSET INVENTORY

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Revised requirements for asset inventory.

Previous was "critical assets."

Assets now include, but are not limited to:

- People
- Structures
- Community Lifelines and Other Critical Facilities
- Natural, Historic, and Cultural Resources
- Economy
- Activities that have value to the community

<u>Assets also include</u>

Repetitive Loss Structures

Land Use Changes & Future Potential Development

CAPABILITIES ASSESSMENT

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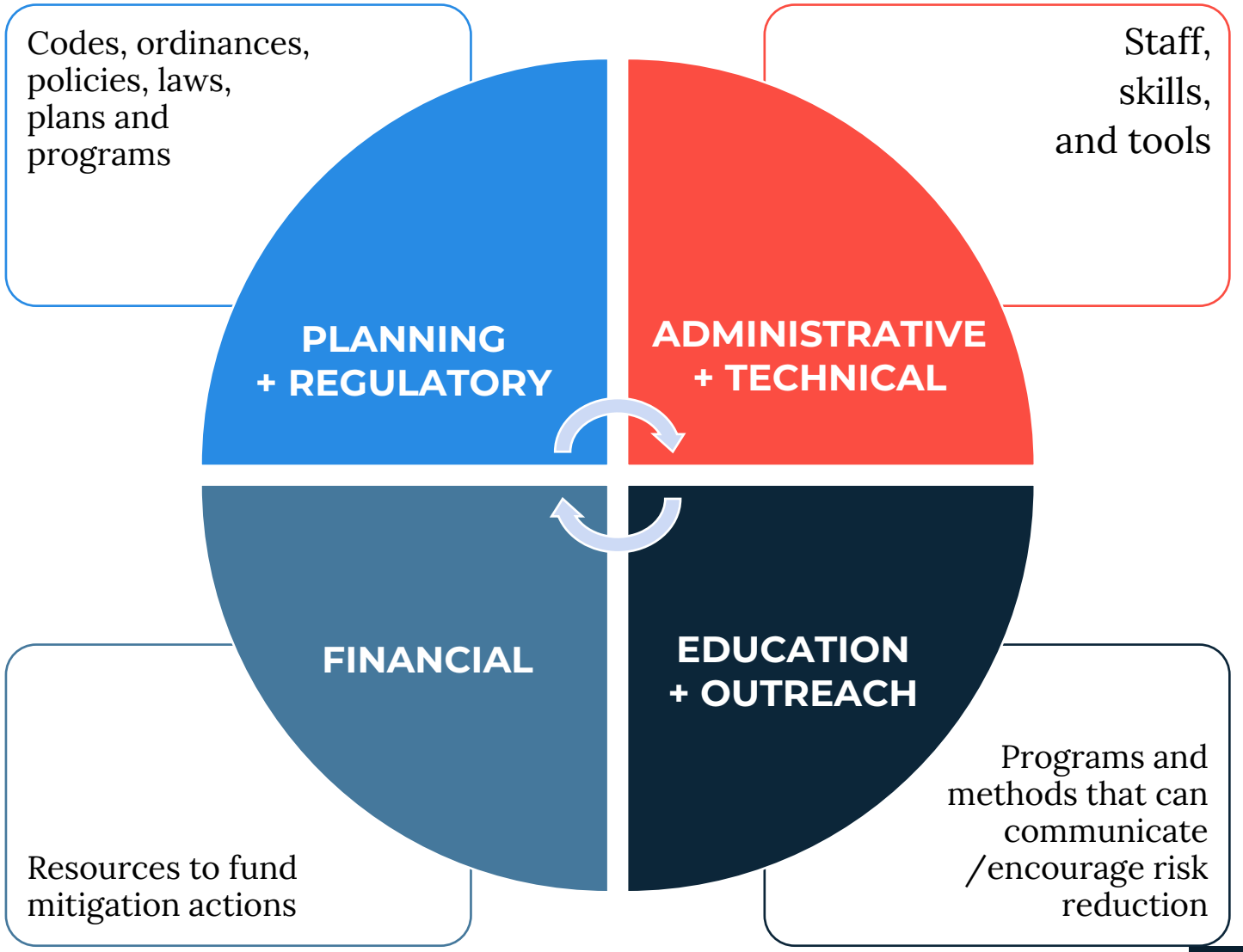
Increased emphasis on Capabilities Assessment

Intent:

- Identify and assess existing authorities, policies, programs, and resources and capabilities to use or modify local tools to reduce losses and vulnerability from profiled hazards.

Consistency:

- National Flood Insurance Program (NFIP) and tie to Community Rating System (CRS)

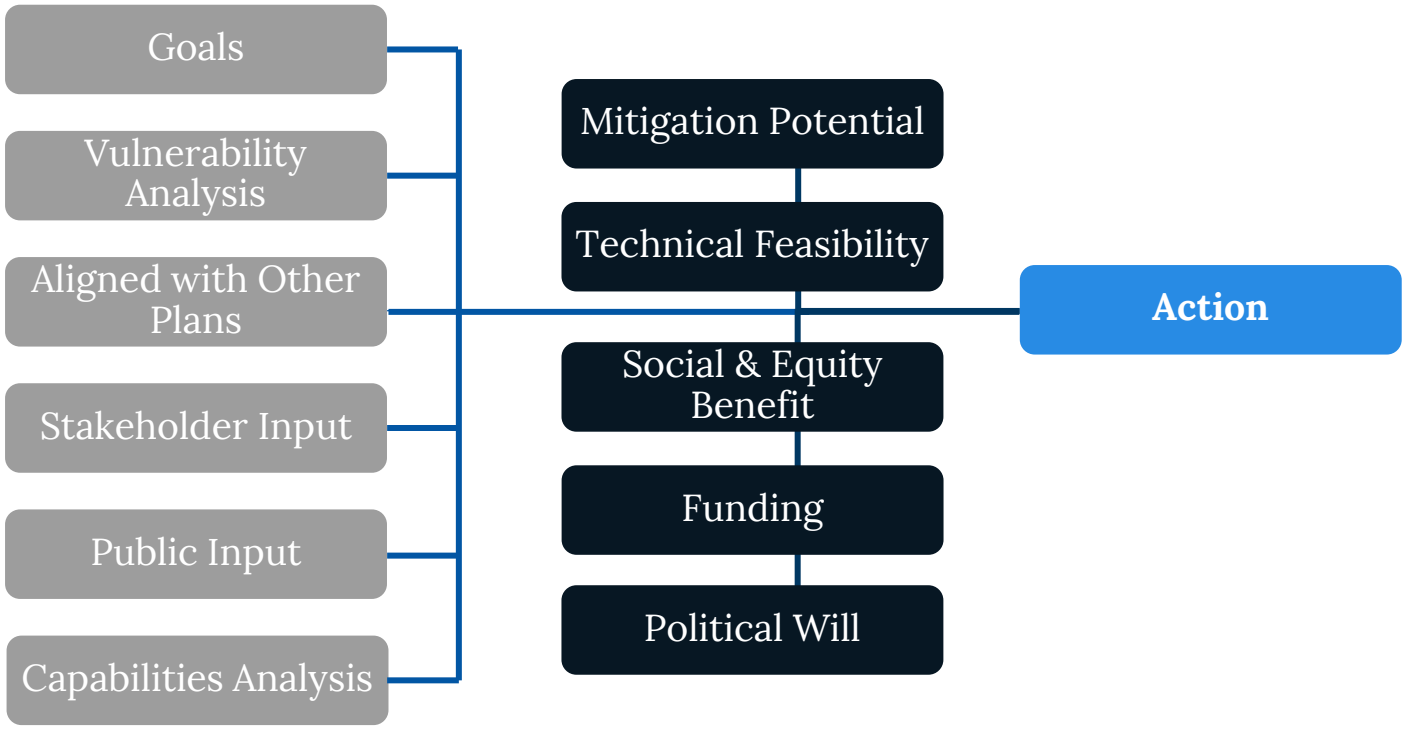


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MITIGATION ACTIONS

More details required to document Mitigation Actions

Intent: The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment.



Additional details include:

- One or more actions per hazard
- Robust prioritization process
- Specific funding ideas including grants, loans, departments funding, etc.
- Details on implementation including responsibility and timelines

ENHANCED PLAN MAINTENANCE AND IMPLEMENTATION

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- **Intent:**
  - **Living document** that guides actions over time. Having a process for maintaining the plan reflects the recognition that things change.
  - **Track progress** on implementing the mitigation strategy.
  - **Revisit** at regular intervals to keep it relevant.
- **Schedule** with procedures for ensuring the plan's implementation, updating, and revision.
- Identify a **Champion** to organize future meetings and to track progress.
- Identify potential **future** planning and budgeting efforts that will **require coordination.**



HIGH HAZARD POTENTIAL DAM REQUIREMENTS

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To be eligible for HHPD grant funding, HMPs must:



Engage Stakeholders
Include dam safety agencies and use data like EAPs, inundation maps, and modeling tools.



Set Mitigation Goals
Define long-term goals to reduce dam-related vulnerabilities.



Assess Dam Risks
Identify HHPDs, describe risks, and map inundation zones and cascading impacts.



Prioritize Actions
Link actions to goals and explain how they're evaluated.

*Not applicable to Boston

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Boston City Hall, photo by Weston & Sampson

Establishing Updated Mitigation Goals

2021 NATURAL HAZARD MITIGATION GOALS

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Equitably protect the health and safety of the public through awareness, preparedness, and connections.

Invest in protecting properties and structures.

Increase in resilience by protecting and enhancing natural resources.

Ensure that essential services and infrastructure will function during and after a hazard event and prepare for essential services for projected climate change.

Implement hazard mitigation and climate adaptation projects that meet strategic priorities.



See handout for expanded goals and objectives list.

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FEMA RECOMMENDED GOALS

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Common goals include:

- Minimize loss of life, injury and damage to property, the economy and the environment from natural hazards.
- Build and enhance local mitigation capabilities to ensure the safety and resilience of all community members. Reduce damage to public buildings and ensure continuity of emergency services.
- Maintain the jurisdiction's natural and man-made systems that protect against natural hazards.
- Increase cooperation and coordination among private entities, local agencies, state agencies and federal agencies.
- Protect natural, historic and cultural resources.

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What goals come to mind when you think of Hazard Mitigation Planning?

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What goals come to mind when you think of Hazard Mitigation Planning?

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2021 NATURAL HAZARD MITIGATION GOALS

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Equitably protect the health and safety of the public through awareness, preparedness, and connections.



See handout for expanded goals and objectives list.

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Does this goal still reflect Boston's priorities? (Goal 1)

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Does this goal still reflect Boston's priorities? (Goal 1)

0 1 7

Yes

100 %

No

0 %

Maybe

0 %

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If needed, how should we update the wording? (Goal 1)

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If needed, how should we update the wording? (Goal 1)

0 0 1

- Use phrases like at risk populations to known hazards
- Protecting vulnerable communities
- Write at a 8th grade reading level

2021 NATURAL HAZARD MITIGATION GOALS

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Invest in protecting properties and structures.



See handout for expanded goals and objectives list.

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Does this goal still reflect Boston's priorities? (Goal 2)

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Does this goal still reflect Boston's priorities? (Goal 2)

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If needed, how should we update the wording? (Goal 2)

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If needed, how should we update the wording? (Goal 2)

0 0 5

- Be more specific about the role of community groups and how the city coordinates with them
- It encourages the public to make the investments but from a city perspective, it can fall under an alternative goal
- Maybe say something about social capitol as infrastructure
- It’s extremely vague. Invest how? Why? Which properties?
- Investing in communities, not just property or structures

2021 NATURAL HAZARD MITIGATION GOALS

DRAFT

Increase in resilience by protecting and enhancing natural resources.



See handout for expanded goals and objectives list.

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Does this goal still reflect Boston's priorities? (Goal 3)

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Does this goal still reflect Boston's priorities? (Goal 3)

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If needed, how should we update the wording? (Goal 3)

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2021 NATURAL HAZARD MITIGATION GOALS

DRAFT



Ensure that essential services and infrastructure will function during and after a hazard event and prepare for essential services for projected climate change.

See handout for expanded goals and objectives list.

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Does this goal still reflect Boston's priorities? (Goal 4)

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DRAFT

Does this goal still reflect Boston's priorities? (Goal 4)

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Yes



100 %

No

0 %

Maybe

0 %

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If needed, how should we update the wording? (Goal 4)

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2021 NATURAL HAZARD MITIGATION GOALS

DRAFT



Implement hazard mitigation and climate adaptation projects that meet strategic priorities.

See handout for expanded goals and objectives list.

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Does this goal still reflect Boston's priorities? (Goal 5)

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DRAFT

Does this goal still reflect Boston's priorities? (Goal 5)

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If needed, how should we update the wording? (Goal 5)

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Are we missing other City priorities in the stated goals?

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2021 NHMP MITIGATION ACTIONS UPDATE

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ID	Mitigation Action	Est. Year of Completion	Priority	Responsibility	Status	Progress & Achievements	Barriers or Reasons for Lack of Completion	Include in Updated Plan?	Updates or Revisions to Action	Updated Est. Year of Completion
A1	Emergency Shelter Assessment and Improvements	2025	High	**OEM**, BCYF, BPS						
A2	Establish Flood Protection Overlay Districts	2025	High	**BPDA,** Environment Department						
A3	Implement Recommended Actions in Boston's Citywide Heat Resiliency Study	2022 Complete study	High	BPDA, BPHC, **Environment Department**, OEM, Parks and						
A4	Improve the Resiliency of the Boston Marine Industrial Park and Long Wharf Improvements	2024 Complete analysis and construction	High	**BPDA**						
A5	Adapt Morrissey Boulevard for Flood Resilience	2030	High	BPDA, **DCR, MassDOT**						
A6	Address Vulnerabilities to Tidal Flooding at McCormack and Dever Schools	2035	High	**BPS**						
A7	Finalize the Design and Construct the Coastal Resilience Barriers at the Carlton and Lewis Mall Flood Pathways in East Boston	2027	High	**BPDA**						
A8	Implement Climate Ready Boston and Continue to Develop Strategies that Integrate Various Natural Hazards	2030	High	BPDA, BTD, **Environment Department**, Parks and Recreation, Public Works						
A9	Muddy River Flood Control	2023	High	**Army Corp of Engineers**, DCR, Parks and Recreation, Town of Brookline						
A10	Prepare Parks and Outdoor Facilities for Climate Change	2026 Finalize construction of park projects list in additional context	High	Environment Department, **Parks and Recreation**						
A11	Expand Citywide Climate Readiness Education, Engagement, and Leadership Development Campaigns	2025 Will eventually be an operational capacity and captured in Ch. 5	High	BPDA, Environment Department, **OEM**						
A12	Implement an Action Plan to Enhance Boston's Urban Tree Canopy and Protect Residents From the Impacts of Extreme Heat	2022 Finish Urban Forest Master Plan	High	Environment Department, **Parks and Recreation**						
A13	Promote Resilience in Buildings and Encourage Green Infrastructure in Site Design	2025	High	**BPDA**, Environment Department, ISD, Parks and						
A14	Rutherford Ave/Charlestown Underpass – Manage Tunnel to Reduce Flood Impacts	2029	High	**Parks and Recreation**						

Information Needs:

- Action's status
- Progress & achievements
- Barriers
- Relevance to 2025 update
- Updates (if any)

Deadline:

- before Thanksgiving, November 25th



Boston City Hall, photo by Weston & Sampson

NEXT STEPS

NEXT STEPS

- Completed **updated 2021 NHMP mitigation actions list** by November 25th
- W&S to **finalize the goals** and complete Chapter 2: Hazard Mitigation Goals
- Review part of **Chapter 1: Introduction** and **Chapter 2: Hazard Mitigation Goals**
- Begin **Capabilities Assessment**, W&S to send out a survey to be completed by December 19th
- January ESC Meeting, date TBD



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Boston City Hall, photo by Weston & Sampson

Q&A

TWO: HAZARD MITIGATION GOALS

At its February 8, 2021 meeting, the Boston Hazard Mitigation Executive Steering Committee meeting established the goals and objectives for natural hazard mitigation planning in Boston. The committee reviewed and confirmed the goals at their subsequent meeting.

1 Equitably protect the health and safety of the public through awareness, preparedness, and connections.

- Provide programming to support educated, connected, empowered communities and individuals in pursuing operational preparedness, adaptation planning, and emergency response by coordination with Climate Ready Boston.
- Promote systems that encourage preparedness and that provide early warning communications prior to and during an emergency through Boston's Office of Emergency Management.
- Increase community engagement and outreach by providing support to organizations and agencies that provide services to vulnerable populations.
- Identify possible barriers to evacuating in an organized and efficient manner and develop systems and services for people that have limited ability to evacuate.

2 Invest in protecting properties and structures.

- Provide educational resources for residents, businesses, public officials, developers, and contractors on measures that can be taken to make buildings and properties more resilient to natural threats.
- Create a regulatory environment, financial incentives, services, and other approaches to integrate climate resilience and hazard mitigation into proposed and existing buildings and developments.
- Increase the number of buildings insured for flooding and other hazards through education and outreach.
- Increase the number of business owners and operators with business-continuity plans that incorporate a range of natural hazards and climate change.
- Encourage solutions that are innovative, protect neighborhood character, and protect the natural environment.
- Provide information to property owners and developers regarding natural hazards when planning for new development and significant redevelopment projects.



3 Increase resilience by protecting and enhancing natural resources.

- Identify and utilize the capacity of natural areas to buffer natural disasters.
- Encourage the use of green infrastructure and low-impact development approaches in new development and redevelopment and measure the performance of such infrastructure and approaches over time.
- Preserve and restore the functions of natural resource systems such as wetlands and tree canopy.
- Create a waterfront for Bostonians that is climate-resilient and has the stewardship needed to thrive in future years.
- Envision and create an accessible and equitable open space system for Boston's future.
- Promote livability and healthy environments.



4 Ensure that essential services and infrastructure will function during and after a hazard event and prepare essential services for projected climate change.

- Mitigate natural hazards posing risks to public health services and critical networks (such as sanitation, transportation, energy, water, wastewater, debris removal, digital systems, communications, hospitals, and emergency services) and provide redundancy.
- Assess and improve operational capacity to prepare, respond, and recover, such as through availability and capacity of key service providers and employees.
- Lessen secondary impacts from hazard events, such as the release of pollutants, with a particular focus on fuel storage facilities, waste management sites, and stormwater infrastructure.
- Deepen coordination with regional, state, and federal authorities on public and private infrastructure activities through the Metro Mayors Climate Preparedness Taskforce and other relevant coordinating entities.
- Understand priorities and capabilities of state agencies, surrounding communities, and private entities to allow for resource sharing, mutual aid, and entering into agreements, like memoranda of understanding.
- Create redundancy in protection, response, and recovery by working at multiple scales, including with regional and state agencies, neighboring communities, and private entities.
- Integrate hazard mitigation and climate adaption into City initiatives and plans and streamline interdepartmental communication.



5 Implement hazard mitigation and climate adaptation projects that meet strategic priorities.

- Develop an asset management plan and condition inventory of existing mitigation structures, both public and private.
- Develop and practice an operations and deployment plan of public and private active hazard mitigation structures, like deployable barriers.
- Prioritize new hazard mitigation and climate adaptation structures with multiple co-benefits to society and mitigate the inequitable impacts of natural hazards.
- Invest in strategies that expedite preparedness, response, and recovery of socially vulnerable neighborhoods and local businesses.
- Give first consideration to nature-based strategies, while recognizing hard infrastructure improvements will need to be a part of the solution.
- Design hazard mitigation and climate adaptation structures that allow for adaption over time.
- Leverage hazard mitigation and climate adaptation as a tool for equitable economic development.
- Monitor and measure emerging risks across the City and how investments have reduced risk exposure over time.
- Incorporate community involvement in design and decision making in each phase of the emergency management cycle.
- Add hazard mitigation and climate adaptation projects into the Capital Investment Plans for City Departments represented on the Executive Steering Committee and advocate that other departments to do the same.
- Improve and centralize systems for documenting hazard impacts, necessary operational improvements, implementation of the NHMP, and other hazard mitigation metrics such as the cost of damages, number of insured properties, mitigation-related improvements to private property, and the impact of mitigation measures on health and safety.
- Create stable and reliable funding mechanisms to support implementation of hazard mitigation and climate adaptation.

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Client:	City of Boston
Project Name:	FY25 NHMP Update
Project Number:	ENG25-1200
Date:	November 10, 2025
Time:	1:00 PM
Location:	In person at City Hall in Room 900

Discussion focused on reviewing the 2021 NHMP mitigation goals. Key points are summarized below.

Goal #1

- Improve accessibility:
  - Target ~5th–8th grade reading level.
  - Translate materials into top 12 languages.
- Identify and provide resources needed for preparedness.
- Emphasize equity:
  - Reconsider reliance on FEMA framing/language.
  - Prioritize protection of vulnerable populations.
  - Focus on at-risk communities and hazard exposure.

Goal #2

- Clarify overlaps with other goals (especially Goals #2 and #5).
- Distinguish between:
  - Public vs. private responsibilities.
  - Public vs. non-public property.
- Address policy tools such as zoning.
- Consider system-level risks:
  - Food systems, transportation, and other critical networks.
- Strengthen regional collaboration.
- Improve goal clarity:
  - Ensure goals capture priorities and nuances.
  - Clarify how different populations (e.g., non-property owners) are represented.
  - Revisit structure/numbering if needed.

Goal #3

- Focus areas:
  - Green stormwater infrastructure (GSI), wetlands, and canopy.
- Reconsider framing of “natural resources.”

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- Expand education and outreach:
    - Tailor messaging to neighborhoods and local contexts.

Goal #4

- Potential overlap with Goal #2:
    - Consider combining or better aligning these goals.
- Clarify focus areas:
    - Public vs. private roles.
    - Actions before, during, and after hazard events.

Goal #5

- Overlaps with Goals #2 and #4—needs clearer separation and definition.
- May function as an overarching or cross-cutting goal:
    - Applies across all projects.
    - Difficult to track as a stand-alone goal in current form.
- Key themes:
    - Increase energy resilience and independence.
    - Emphasize regional collaboration.
    - Address supply chain gaps through regional thinking.
- Improve measurability:
    - Develop clear performance metrics.

DRAFT

55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

January 15, 2025

Mikayla Teixeira
UASI Planning Unit Supervisor
City of Boston, Office of Emergency Management
85 Bragdon Street
Boston, MA 02119

Re: Boston FY25 Natural Hazard Mitigation Plan Update, ESC Meeting #2

Dear 2025 NHMP Executive Steering Committee:

Please see the agenda for the Thursday January 15th Executive Steering Committee Meeting below. The meeting will be held in person from 2:00-3:30pm virtually on Zoom. Let us know if you have any questions.

Agenda:

- Natural Hazard Mitigation Plan Overview
  - What is an NHMP?
  - Role of the ESC
- Capabilities Assessment
  - Roundtable discussion about survey responses
  - Taking the Survey if you have not yet
- Review of the Community Profile
  - In depth discussion about the FEMA required asset categories. This will be heavily focused on how to present the assets within the plan and to be sure important assets are not missing from the final inventory.
- Next steps
  - Reviewing of Chapters
  - Important upcoming dates

Sincerely,

WESTON & SAMPSON ENGINEERS, INC.

Madison Biasin
Resiliency Planner II

DRAFT

Biasin, Madison

Subject: Boston NHMP Update ESC Meeting #2: Capabilities Assessment and Asset Inventory
Location: https://us06web.zoom.us/j/82949369948?pwd=Ml96MQAdFRiNdBGY9hjxfgB45bUEZO.1

Start: Thu 1/15/2026 2:00 PM
End: Thu 1/15/2026 3:30 PM

Recurrence: (none)

Meeting Status: Meeting organizer

Organizer: Biasin, Madison
Required Attendees: Adrian Jordan; berkeleyc@bwsc.org; Brooke Majewski; Christopher Osgood; Tiggas, Chrysanthy; Kendall Bobula; laurentie@bwsc.org; Logan Grant; Maggie Owens; Matthew Kearney; Ma, Wenling; Mellissa Honeywood; Moonan, Janet; Sean Edelman; Shani Fletcher; Sullivan, John P; Seidel, Robin; Mikayla Teixeira
Optional Attendees: Hemond, Olivia; Barros, Janine

Categories: BOSTON HMP

Attaching the agenda for this afternoon's meeting. See you all later!

Hello everyone!

Reaching out on behalf of the Boston NHMP Update Team. **Please join us for the 2nd Executive Steering Committee Meeting where we will be discussing the responses to the Capabilities Assessment Survey and the compiled Asset Inventory.** An agenda will follow prior to the meeting.

Please reach out if you have any questions!

Madison

Weston & Sampson is inviting you to a scheduled Zoom meeting.

Join Zoom Meeting
https://us06web.zoom.us/j/82949369948?pwd=Ml96MQAdFRiNdBGY9hjxfgB45bUEZO.1

Meeting ID: 829 4936 9948
Passcode: 799374

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One tap mobile
+16469313860,,82949369948#,,,,*799374# US
+19292056099,,82949369948#,,,,*799374# US (New York)

Join instructions
https://us06web.zoom.us/meetings/82949369948/invitations?signature=DuMpQ7uFp6CXAjiU8rNoG9qw9s-_Scm7N5dpjfpITHI



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CITY of BOSTON

NATURAL HAZARD MITIGATION PLAN

Executive Steering Committee
Meeting #2 | January 15, 2026

Weston & Sampson



LoPresti Park, photo by Weston & Sampson

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AGENDA

01 NHMP Overview

02 Capabilities Assessment Update

03 Review of Community Profile

04 Next Steps

NHMP and the Role of the ESC

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Purpose of NHMP is...

01 **Identify natural hazards** that pose the greatest risk to Boston.

02 **Assess vulnerability** of residents, infrastructure, and critical facilities.

03 Develop **strategies and projects** to minimize or eliminate future hazard impacts.

04 **Strengthen coordination** across City departments, regional agencies, and community partners.

05 **Maintain eligibility** for FEMA mitigation grants and federal disaster recovery funding.

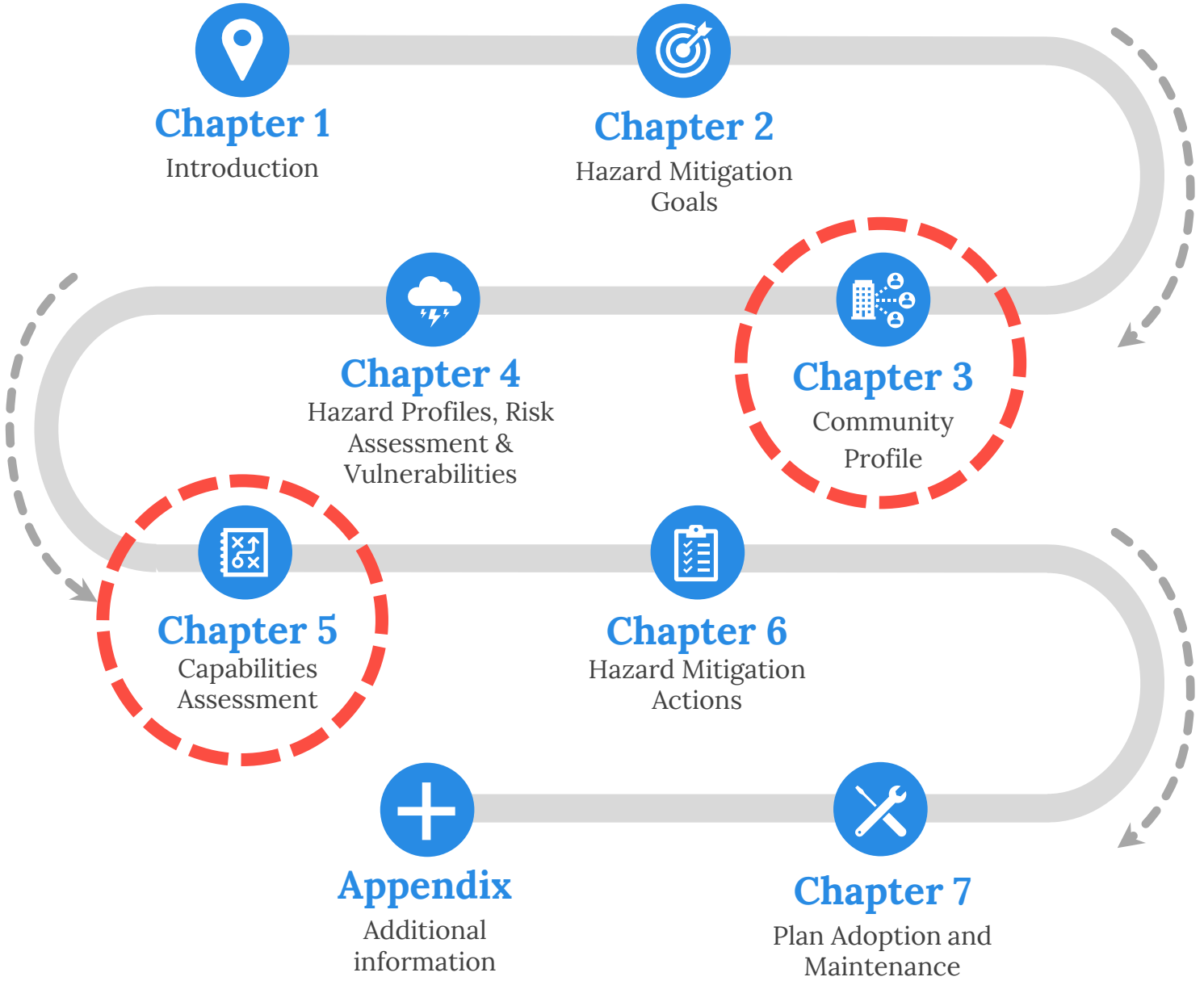
Purpose of Executive Steering Committee is...

To guide overall plan development and approval, and to participate in the following activities:

1. ESC Meetings (4) to provide input at critical moments within plan development
2. Review of & provide input on targeted requests (*e.g., outreach/engagement, LPT approach/invites/materials, capabilities, etc.*)
3. Review of draft chapters
4. Supporting presentation to public and presentation to City Council for adoption as necessary

NHMP OVERVIEW

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REMINDER OF NATURAL HAZARD PROFILES

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Flooding from Precipitation



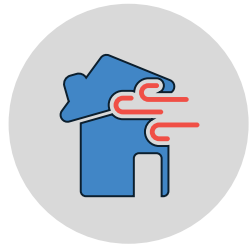
Coastal Flooding and Storm Surge



Coastal Erosion



Hurricanes / Tropical Cyclones



Tsunamis



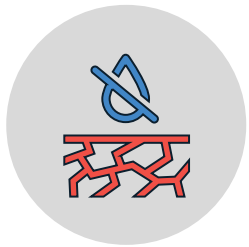
Changes in Groundwater



Severe Winter Weather / Nor'easters



Average/ Extreme Temperatures



Drought (including groundwater impacts)



Wildfire



Earthquakes



Landslides/ Mudflows



Tornadoes



Invasive Species



Other Severe Weather

QUESTIONS?

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Discussion Topics:

- NHMP and the planning process
- ESC role and responsibilities
- Chapter 1: Introduction
- Chapter 2: Hazard Mitigation Goals



Boston City Hall, photo by Weston & Sampson

Capabilities Assessment

CAPABILITIES ASSESSMENT

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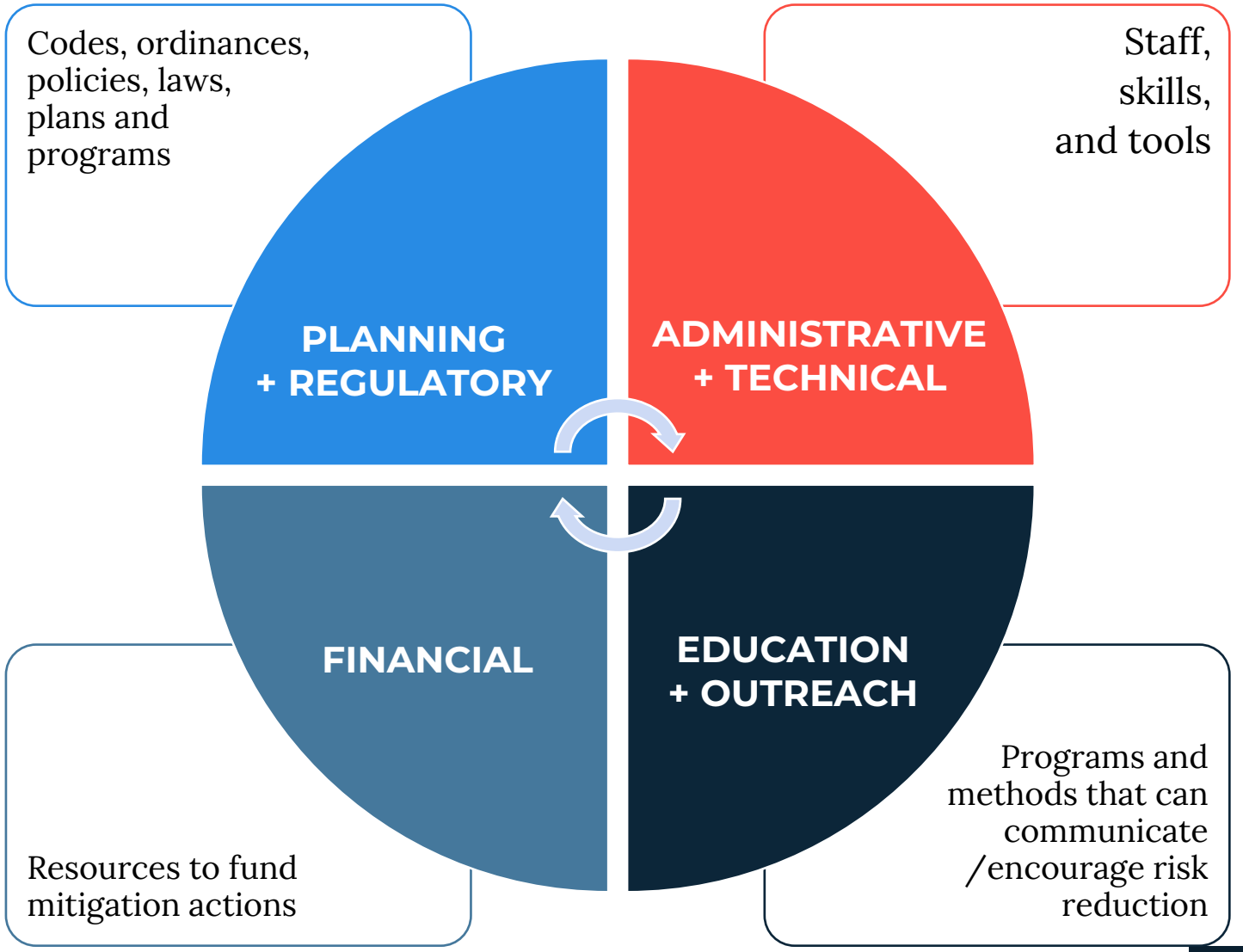
Increased emphasis on Capabilities Assessment

Intent:

- Identify and assess existing authorities, policies, programs, and resources and capabilities to use or modify local tools to reduce losses and vulnerability from profiled hazards.

Consistency:

- National Flood Insurance Program (NFIP) and tie to Community Rating System (CRS)



PLANS, POLICIES, CODES, OR ORDINANCES

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What plans, policies, codes, or ordinances, specifically in Boston do you reference when developing projects or planning efforts that address reduction of risk from natural hazards?

- Climate Ready Boston Plans
- City's HIRA , existing hazard annexes
- Massachusetts Stormwater Handbook
- Streets Green Infrastructure Policy
- Smart Utilities Policy (Green Infrastructure section)
- BWSC Site Plan Review - Stormwater Permit Regulations (GI/LID)
- BWSC Stormwater detention study
- BPDA Article 32 - Groundwater Conservation Overlay District
- OGI Community Flood Mapping
- Heat Resiliency Solutions for Boston
- Urban Forest Plan
- Public Tree Protection Ordinance
- Climate Action Plan
- Hazard Mitigation Plan
- Healthcare Preparedness Coalition (HPC) Framework for the Annual Hazard Vulnerability Analysis (HVA)
- Boston Zoning (particularly Article 25)
- Massachusetts Building Code
- Miscellaneous policies, guidance, sub-programs, etc. of the National Flood Insurance Program

ASSESSMENT QUESTIONS

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Training in Hazard Mitigation

What improvements can be made to address or enhance capacity and capabilities to address hazard mitigation in your department?

Improving Capabilities

Are staff in your department trained in hazard mitigation?

TAKING THE SURVEY

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Capabilities Assessment Survey

City of Boston FY25 Natural Hazard Mitigation Plan Update

The **capability assessment** gathers information on resources and tools Boston has that can be used to reduce risk from natural hazards now and in the future. As defined by FEMA, capabilities include existing laws, policies, programs, staff, funding, and other resources that can help carry out hazard mitigation activities. The mitigation actions to be developed later in the Natural Hazard Mitigation Plan development process are partially informed by the capabilities and gaps identified through this assessment.

As a reminder, **natural hazards** include extreme temperatures, winter weather, flooding (inland and coastal), drought, wildfires/brushfires, tornados, nor'easters, hurricanes, tsunamis, earthquakes, and even invasive species.

Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards and their effects. In other words, hazard mitigation refers to proactive efforts—like planning, policy changes, infrastructure projects, or education programs—that aim to lessen the impact of disasters before they occur, rather than responding afterward.

This survey is due by **Friday December 19, 2025.**

Individual meetings to be scheduled with a few departments.

We still want to hear from you!

https://tinyurl.com/BosNHMPCapabilities

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Boston City Hall, photo by Weston & Sampson

Community Profile

OVERVIEW OF ASSET CATEGORIES

Categories based on the **FEMA Local Mitigation Planning Handbook** (2025) and **Local Mitigation Planning Policy Guide** (2025)

DRAFT

People



- **Underserved** communities
- **Socially vulnerable** populations

Structures



- Existing **buildings** and **infrastructure**
- Future or planned **developments**

Community Lifelines and Other Critical Facilities



- Fundamental **services** and **facilities** in the community
- Support **response planning** and **operations**
- Essential to human **health** and **safety** or to **economic security**

Natural, Historic, and Cultural Resources



- **Environmental** and **natural resources**
- **Historic resources** that tell the story of your community
- Assets of the **local culture** that are unique or cannot be replaced

Economy



- Major **employers, economic sectors,** and **commercial centers**

Activities that Have Value to the Community



- **Activities** that are important to the community
- Long-standing **traditions, seasonal markets, tourists**

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Join at slido.com
#NHMPAssets

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Given the categories described, what top 5 to 10 assets come to mind when you think of fostering extreme weather resilience in Boston?

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DRAFT

Given the categories described, what top 5 to 10 assets come to mind when you think of fostering extreme weather resilience in Boston?

0 0 9

(1/2)

- Extreme weather warnings
- Personal preparedness actions that are affordable
- expanding the park system to support growing population and access
- Trust in government
- clean catch basins
- City staff and resources, including regulatory tools (building code etc.) Private sector developers State and federal partners Media
- coverage of hazards / mitigation / lack thereof Infrastructure - storm sewers, flood walls and similar barriers
- food storage facilities
- Community organizations / non profits
- shade clean water sources
- Relationships with our partners
- lighting in the evenings for park programming and recreation
- Sewer system, public transit, electrical grid, gas pipelines, emergency food orgs

Given the categories described, what top 5 to 10 assets come to mind when you think of fostering extreme weather resilience in Boston?

0 0 9

(2/2)

- Private sector partners
- City programming
- farms community gardens roads grocery stores
- Parks that perform a variety of functions: heat resiliency through tree canopy + shade structures + spray play + drinking fountain , flood resilience through GSI + coastal infrastructure,
- The City’s EOC
- streets stormdrains sewers electricity communication
- Public transportation
- Boston water and sewage
- Electrical grid

METHODOLOGY OF ASSET INVENTORY

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Gathered information from a variety of sources including:

- City of Boston – various departments
- MassGIS
- MassDOT/USDOT
- BWSC
- MBTA
- Massport
- MAPC (MassBuilds)

Assets are described **narratively and spatially**

Some assets are summarized by type and count due to the large number of assets, not everything can be shown spatially.

OVERVIEW OF ASSET CATEGORIES

DRAFT

People



- **Underserved** communities
- **Socially vulnerable** populations

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Categories based on the **FEMA Local Mitigation Planning Handbook** (2025) and **Local Mitigation Planning Policy Guide** (2025)

PEOPLE

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DATA

- American Community Survey (ACS), 2023

QUESTIONS

- Additional equity data Boston uses or prefers to use.
- Alignment with City messaging and priorities

BOSTON		MASSACHUSETTS	
AGE			
14% Under 18	**13%** 65 and over	**19%** Under 18	**18%** 65 and over
EDUCATION			
55.8% Bachelor's degree or higher		**47.8%** Bachelor's degree or higher	
SOCIAL			
26.6% Foreign-born	**2.3%** Veteran	**34.3%** Speak language other than English at home	**18.1%** Foreign-born	**4.1%** Veteran	**25.3%** Speak language other than English at home
INCOME			
$96,931 Median household income	**15.6%** Poverty rate	**$99,858** Median household income	**10.4%** Poverty rate
HOUSING			
314 K Housing units	**36%** Owner-occupancy rate	**$703 K** Median value of owner-occupied housing units	**3.05 M** Housing units	**62%** Owner-occupancy rate	**$571 K** Median value of owner-occupied housing units
HEALTH INSURANCE			
3.05% Uninsured	**23.2%** Medicaid	**2.65%** Uninsured	**18.5%** Medicaid

OVERVIEW OF ASSET CATEGORIES

Categories based on the **FEMA Local Mitigation Planning Handbook** (2025) and **Local Mitigation Planning Policy Guide** (2025)

DRAFT

People



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COMMUNITY LIFELINES

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Safety and Security
Law Enforcement/Security, Fire Service, Search and Rescue, Government Service, Community Safety



Hazardous Materials
Facilities, HAZMAT, Pollutants, Contaminants



Food, Hydration, Shelter
Food, Hydration, Shelter, Agriculture



Energy
Power Grid, Fuel



Health and Medical
Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management



Transportation
Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime



Water Systems
Potable Water Infrastructure, Wastewater Management



Communications
Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch

COMMUNITY LIFELINES

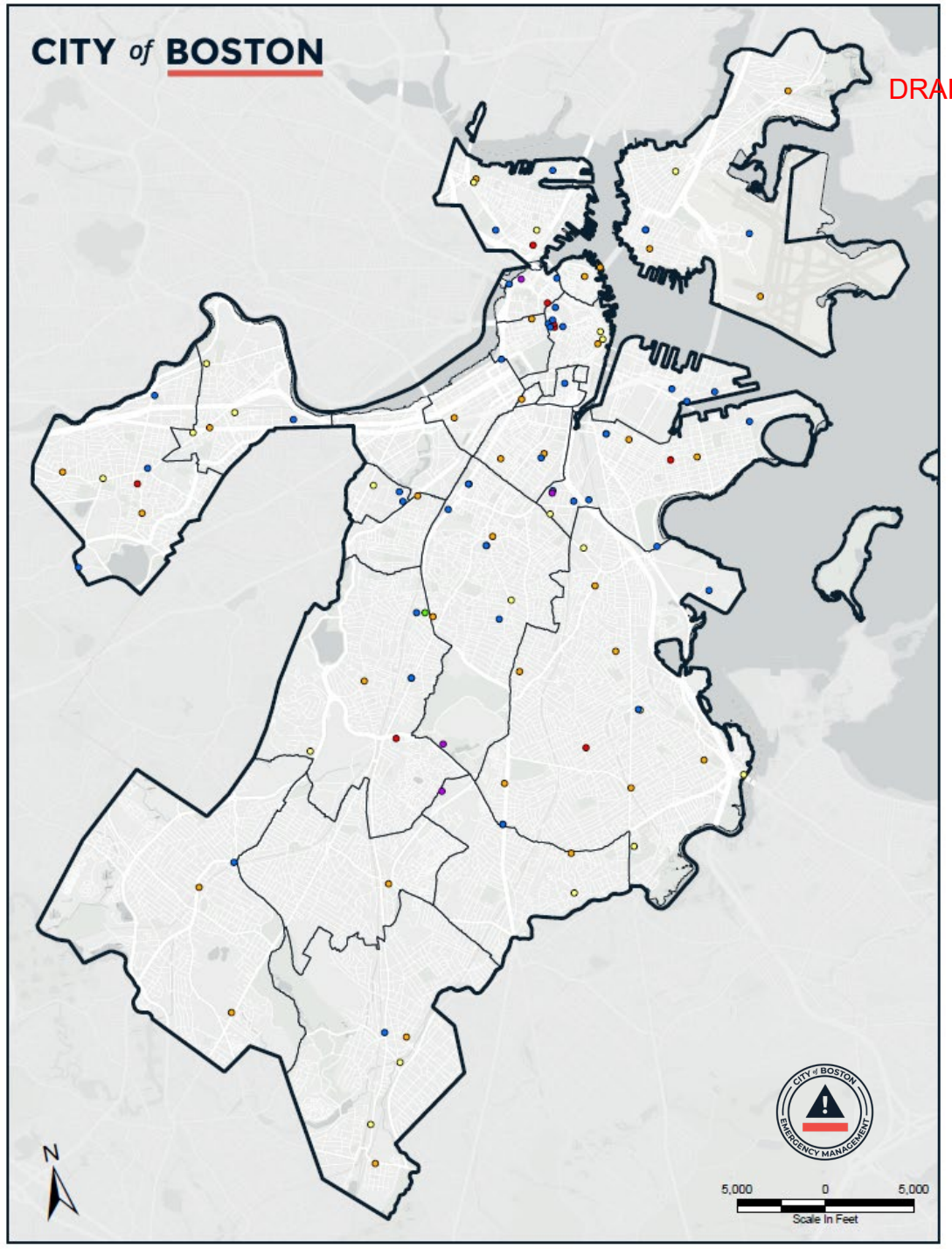
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Safety and Security

Law Enforcement/Security, Fire Service, Search and Rescue, Government Service, Community Safety

DATA

- OEM
- MassGIS



COMMUNITY LIFELINES

DRAFT

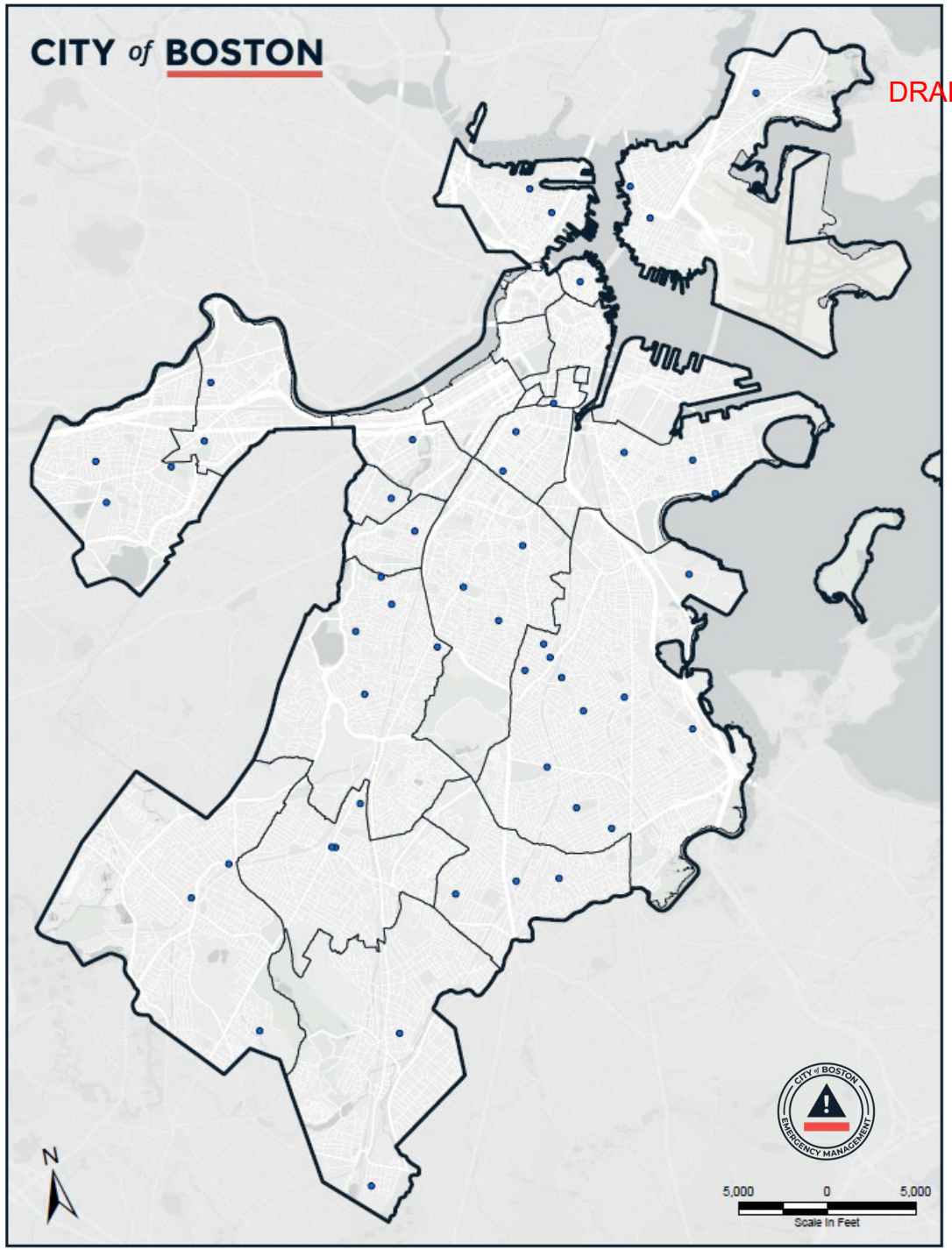
Food, Hydration, Shelter
Food, Hydration, Shelter, Agriculture

DATA

- OEM Neighborhood Emergency Shelters

QUESTIONS

- Additional data - Homeless shelters, food banks, community gardens



COMMUNITY LIFELINES

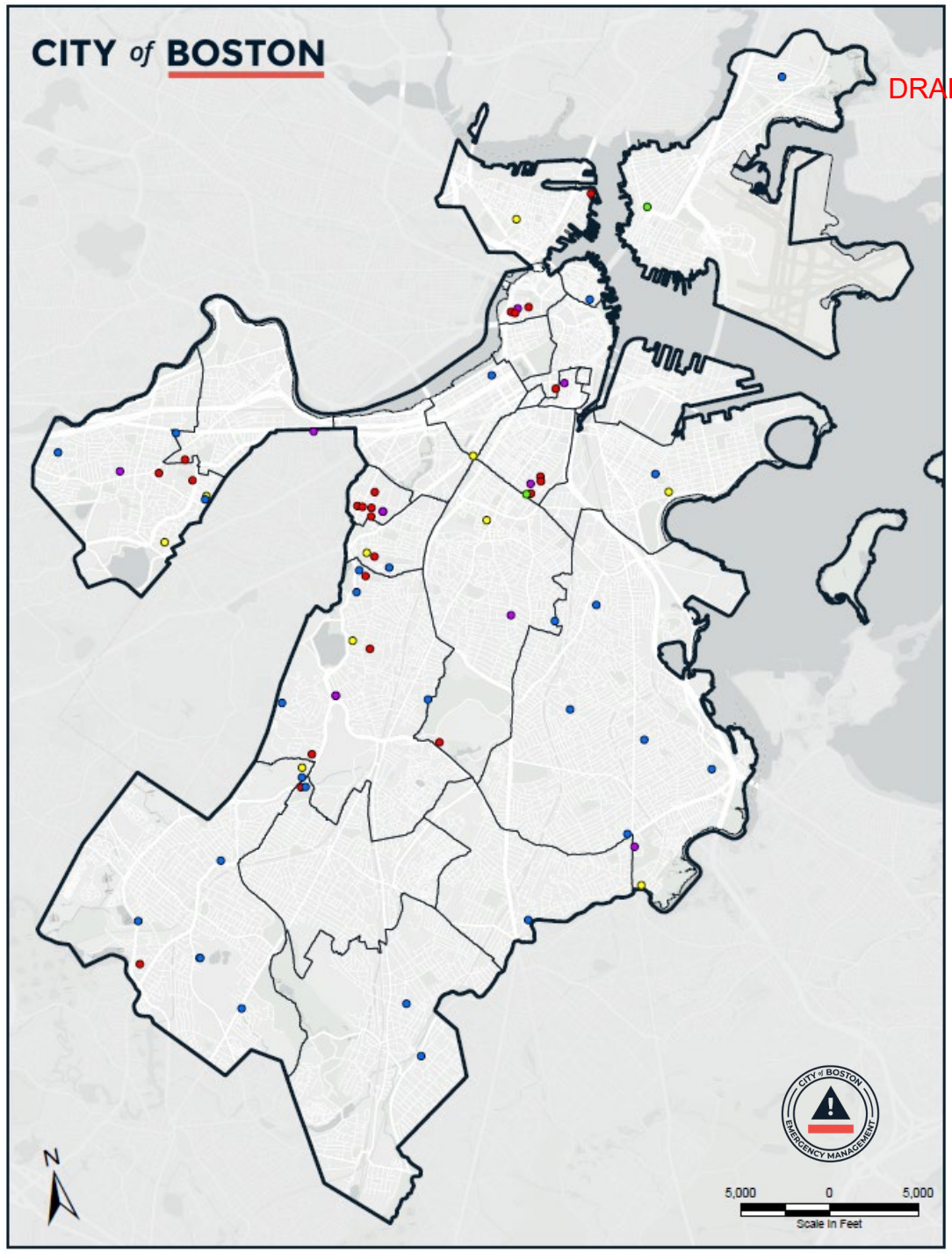
DRAFT

Health and Medical

Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management

DATA

- MassGIS Hospitals, Nursing Homes, Health Centers, Dialysis Centers, Assisted Living



COMMUNITY LIFELINES



Water Systems
Potable Water Infrastructure, Wastewater Management

DATA

- BWSC – need approval for use.

Includes:

- Drinking water (e.g. miles of mains, critical valves, booster stations, etc.)
- Stormwater (e.g. miles of piping, storage, green infrastructure, etc.)
- Wastewater (e.g. miles of combined and separate sewer, treatment plants, pump stations, etc.)

COMMUNITY LIFELINES



Hazardous Materials
Facilities, HAZMAT, Pollutants, Contaminants

Includes:

- Activity Use Limitation Sites
- Tier Classified Oil and Hazardous Waste Sites (MGL 21 E)
- DEP Bureau of Air and Waste Major Facilities
- Solid waste dispersion and disposal
- Underground storage tanks

DATA

- MassDEP

COMMUNITY LIFELINES



Energy
Power Grid, Fuel

Includes:

- Petroleum Product Terminals
- Power Plants
- Natural gas providers
- Electricity providers

DATA

- US Energy Atlas
- MassGIS

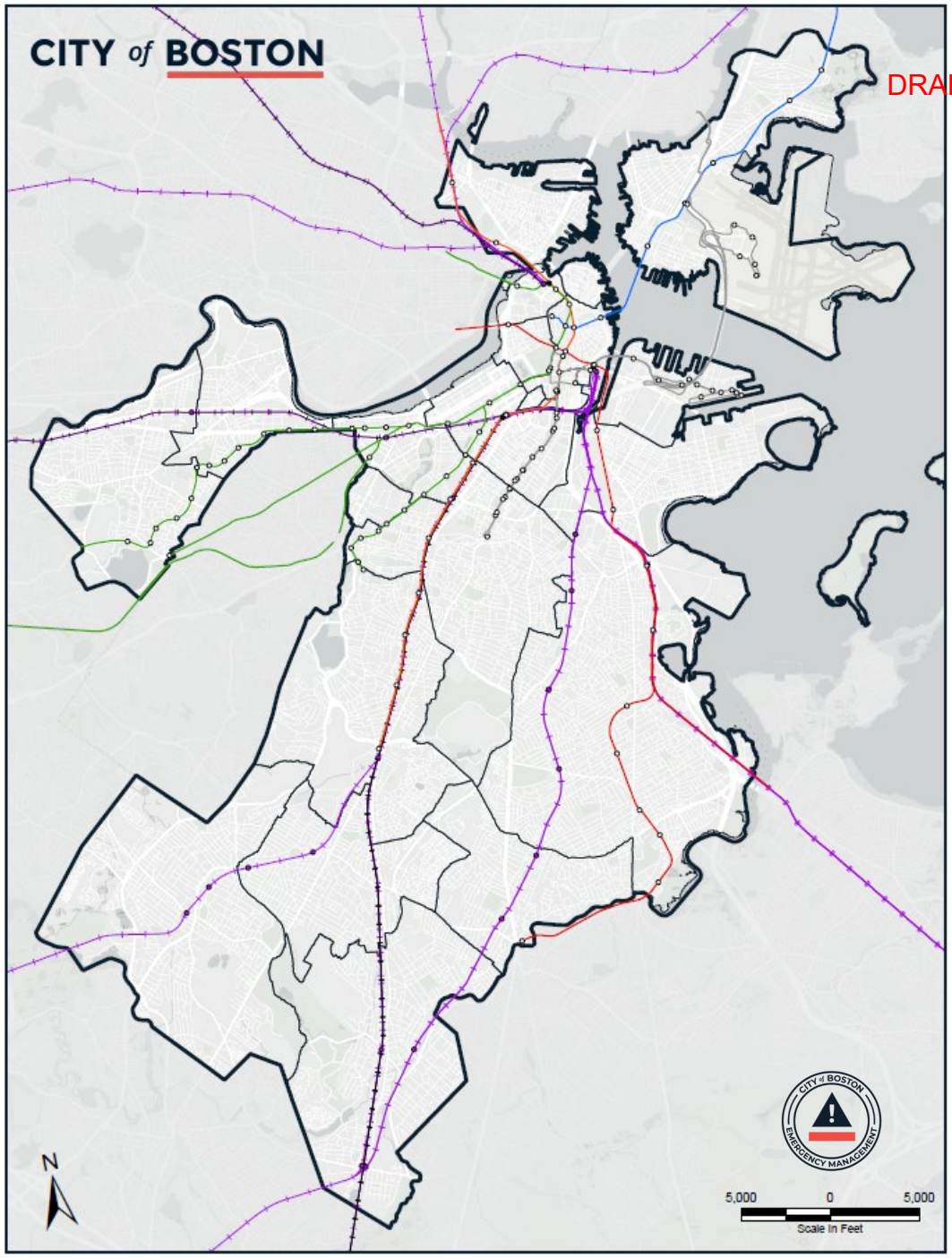
COMMUNITY LIFELINES

Transportation

Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime

DATA

- MassDOT
- USDOT
- MassGIS (e.g., ports)



COMMUNITY LIFELINES

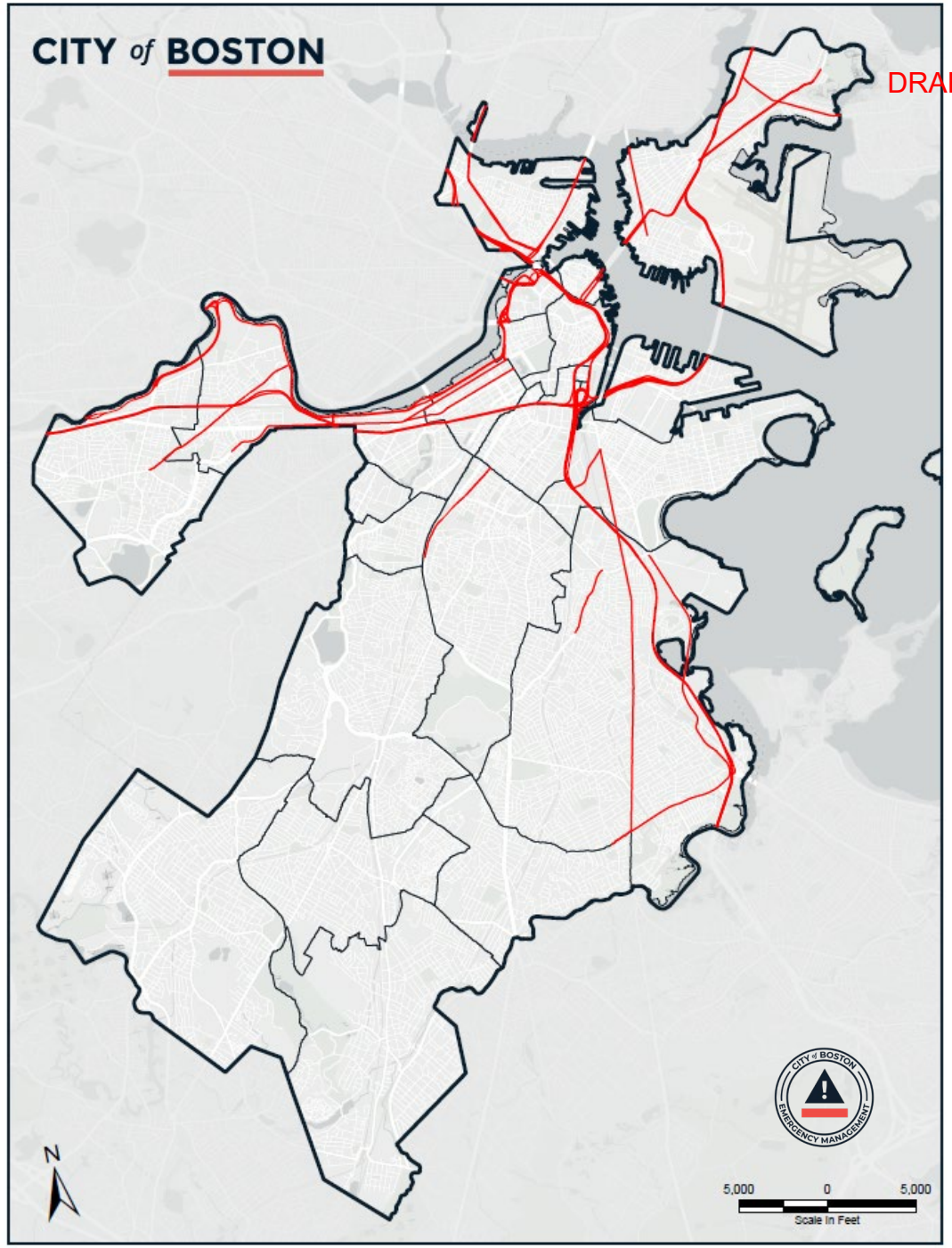
DRAFT

Transportation

Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime

DATA

- OEM



COMMUNITY LIFELINES



Communications
Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch

QUESTIONS

- Tell us more about how the City communicates internally during natural hazard events

Includes:

- Cable providers
- Wi-Fi sites
- AlertBoston – texts, emails, phone calls

OTHER CRITICAL FACILITIES

DRAFT

Critical Facility Type	Count
Education	274
Licensed Child Care Programs	207
Place of Worship	187
Public Libraries	29
Ice Rinks	20
Courthouses	10
Dams	6
City Hall	1

DATA

- MassGIS
- City of Boston
- OEM

OVERVIEW OF ASSET CATEGORIES

DRAFT

People



- **Underserved** communities
- **Socially vulnerable** populations

Structures



- Existing **buildings** and **infrastructure**
- Future or planned **developments**

Community Lifelines and Other Critical Facilities



- Fundamental **services** and **facilities** in the community
- Support **response planning** and **operations**
- Essential to human **health** and **safety** or to **economic security**

Natural, Historic, and Cultural Resources



- **Environmental** and **natural resources**
- **Historic resources** that tell the story of your community
- Assets of the **local culture** that are unique or cannot be replaced

Economy



- Major **employers, economic sectors,** and **commercial centers**

Activities that Have Value to the Community



- **Activities** that are important to the community
- Long-standing **traditions, seasonal markets, tourists**

Categories based on the **FEMA Local Mitigation Planning Handbook** (2025) and **Local Mitigation Planning Policy Guide** (2025)

STRUCTURES

DRAFT

The City of Boston contains:

86,846 residential buildings

399 buildings at Logan Airport

673 government buildings

27 deployable flood barriers

1,122 industrial and **5,995 commercial** buildings

and **4,720** institutional buildings

Building Use Type	Count
Commercial	5,995
Condo Main	11,277
Exempt / Institutional	4,720
Garage	13,070
Industrial	1,122
Logan Airport	399
Other	11,144
Residential 1 Family	31,235
Residential 2 Family	18,283
Residential 3 Family	14,743
Residential 4-6 Units	2,893
Residential 7+ Units	8,415
Mixed Res. / Comm.	3,780
Residential Lot	827
Tank	32
Government	673
Total Number of Buildings	128,608

DATA

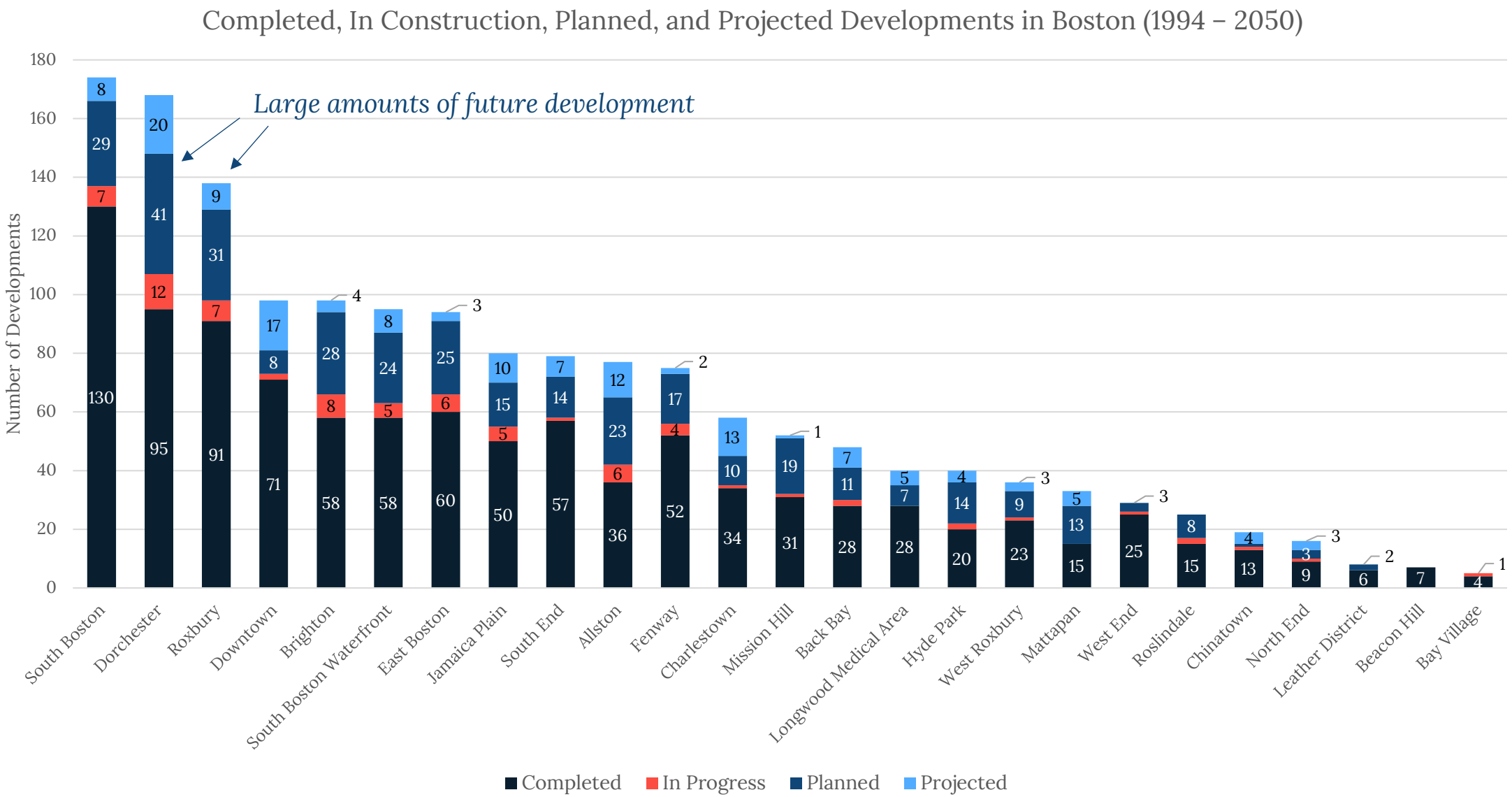
- OEM – Structures

QUESTIONS

- Missing infrastructure types
  - Seawalls, tide gates, etc.
- Planned future infrastructure projects to highlight? (flood protection, etc.)

LAND USE CHANGES AND FUTURE DEVELOPMENT

DRAFT



Source: MassBuilds

LAND USE CHANGES AND FUTURE DEVELOPMENT

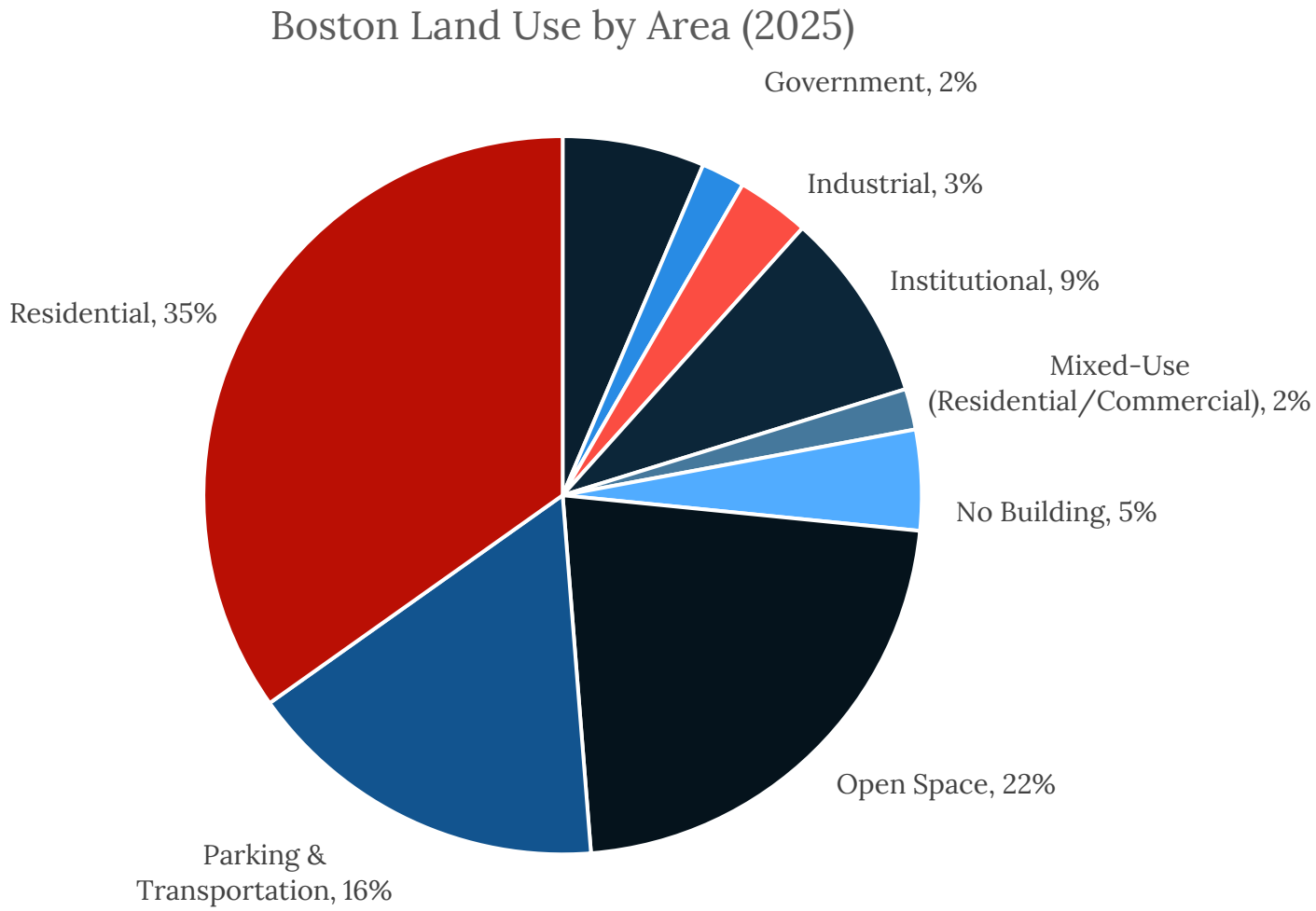
DRAFT

DATA

- MassBuilds
- OEM - Parcels

QUESTIONS

- Other sources of data we should be using?
- Future anticipated land use changes?
- Have you become more or less resilient because of past and projected land use changes?



Source: OEM FY25 Parcels

OVERVIEW OF ASSET CATEGORIES

Categories based on the **FEMA Local Mitigation Planning Handbook** (2025) and **Local Mitigation Planning Policy Guide** (2025)

DRAFT

People



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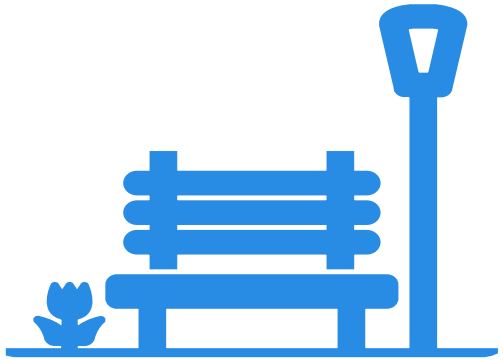
Activities that Have Value to the Community



- **Activities** that are important to the community
- Long-standing **traditions, seasonal markets, tourists**

NATURAL, CULTURAL, HISTORIC RESOURCES

DRAFT



Environmental and **natural resources** add to a community's identity and quality of life



Historic resources tell the story of your community through time



Cultural resources are aspects of the local culture that are unique or irreplaceable

NATURAL RESOURCES

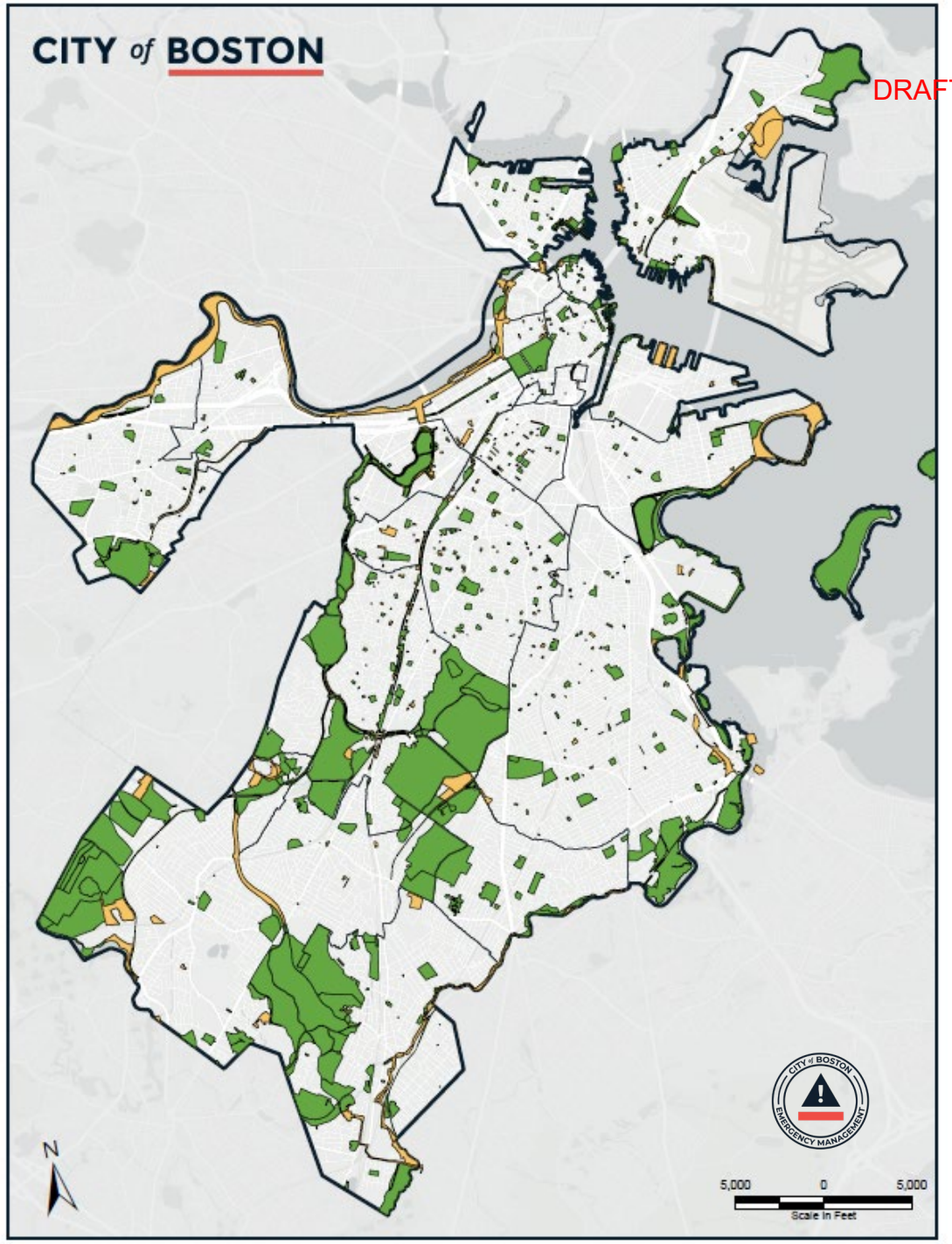
Cultural Resource Type	Count
Parks	568
NHESP Certified Vernal Pools	19
NHESP Priority Habitats of Rare Species	11
Areas of Critical Environmental Concern	3

DATA

- MassGIS
- City of Boston

QUESTIONS

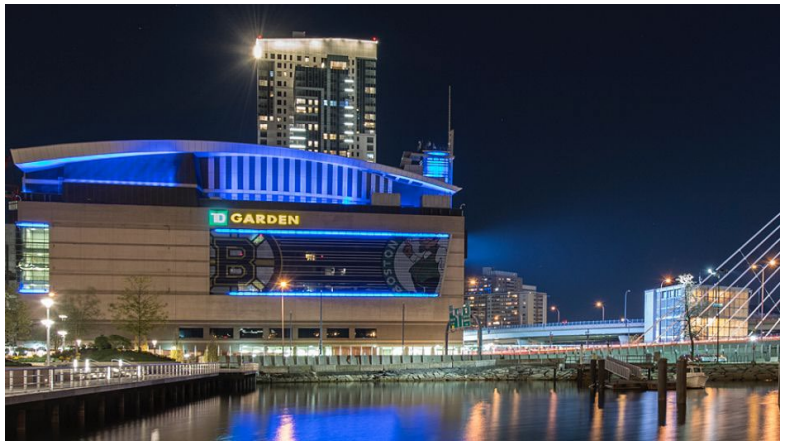
- Natural resources to highlight in narrative?



CULTURAL RESOURCES

DRAFT

Cultural Resource Type	Count
Museum	46
Concert Hall	16
Stadium	6



TD Garden(Source: TD Garden)



Isabella Stewart Gardner Museum (Source: Isabella Stewart Gardner Museum)



Boston Symphony Hall (Source: Webb Transportation)

DATA

- OEM

QUESTIONS

- Cultural resources to highlight in narrative?

HISTORIC RESOURCES

Historical Resource Type	Count
Community Preservation Act (CPA) Projects	195
National Register of Historic Places	9,339
State Register of Historic Places	794 areas & 17,424 sites

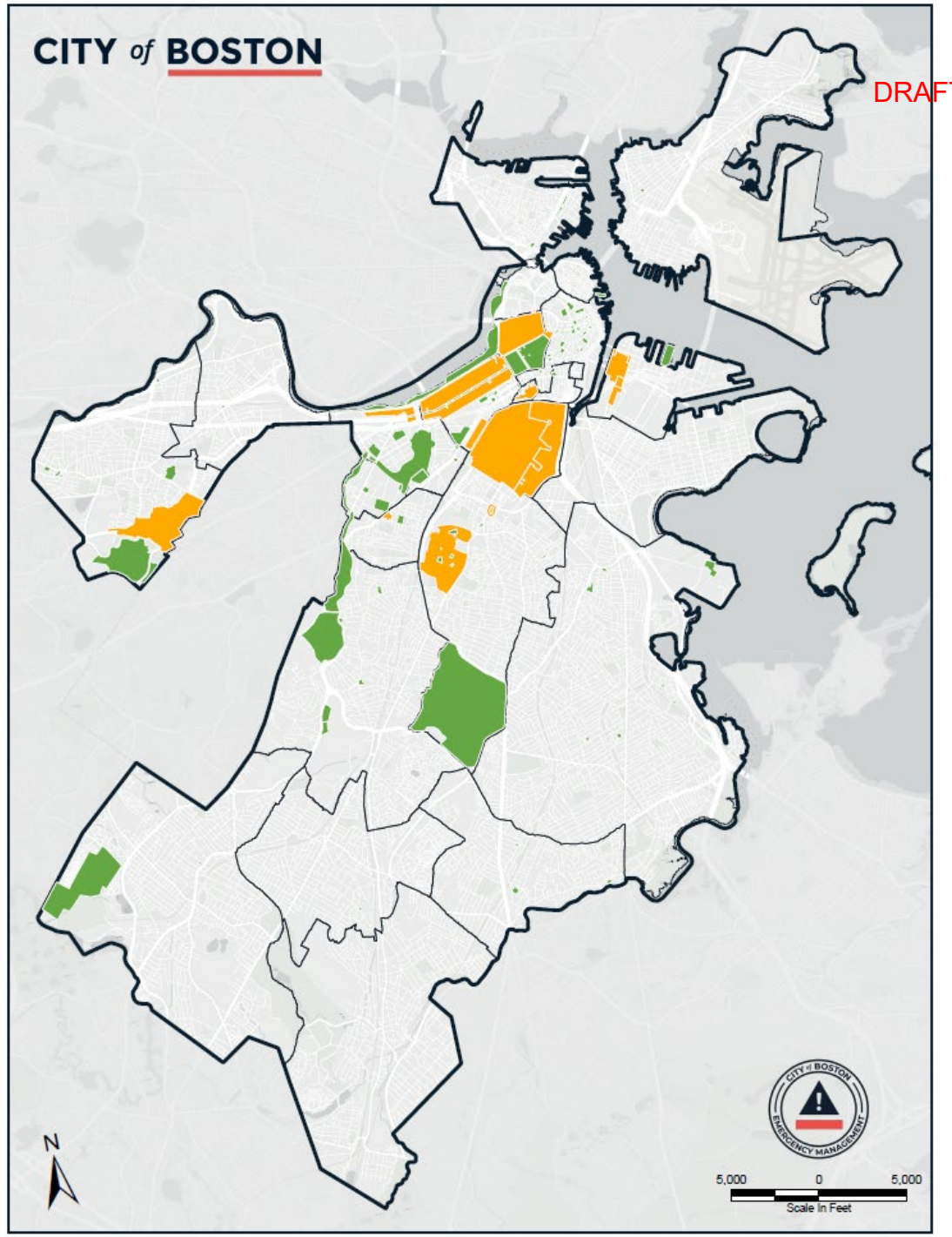
DATA

- MassGIS - CPA Projects, MHC Historic Inventory

QUESTIONS

- Historic resources to highlight in narrative?

The City also has ten historic districts containing architecturally or historically significant communities



OVERVIEW OF ASSET CATEGORIES

Categories based on the **FEMA Local Mitigation Planning Handbook** (2025) and **Local Mitigation Planning Policy Guide** (2025)

DRAFT

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DRAFT

ECONOMY

DATA

- City reports (*Imagine Boston 2030, Boston's Economy 2024, Boston's People and Economy*)
- External reports (*100 Resilient Cities: Boston*)

QUESTIONS

- Additional reports to reference

ECONOMIC HIGHLIGHTS

Boston's Gross City Product (GCP) was **$168.2 billion** in 2022 (Boston's Economy 2024)

Boston had **685,805 payroll jobs** in mid-2023, above the pre-pandemic peak (Boston's Economy 2024)

Boston is expected to have more than **900k total jobs by 2050**, a 25% increase from 2014 (Imagine Boston 2030)

MAJOR EMPLOYERS

Healthcare
Financial Services
Tourism

Education
Technology
Professional Services

State and Federal Government
Small Businesses

MARITIME INDUSTRY

The Port of Boston generated **$8.2 billion** of economic value in 2018 (Economic Impact of the Port of Boston, 2019)

the Port creates approximately **66,000 jobs** (Economic Impact of the Port of Boston, 2019)

Each year, about **2.3 million** metric tons of cargo pass through the Port (Economic Impact of the Port of Boston, 2019)

PANDEMIC IMPACTS AND RECOVERY

15.7% unemployment rate at the height of the pandemic (Boston's Economy 2024)

100,000+ jobs lost between February and April 2020 (Boston's Economy 2024)

3.2% unemployment rate in 2023, 0.4% below the national rate (Boston's Economy 2024)

OVERVIEW OF ASSET CATEGORIES

Categories based on the **FEMA Local Mitigation Planning Handbook** (2025) and **Local Mitigation Planning Policy Guide** (2025)

DRAFT

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DRAFT

ACTIVITIES THAT HAVE VALUE TO THE COMMUNITY



Local Food Festival (Source: Boston Local Food)



Harborfest (Source: Boston Harborfest)



Pride Parade (Source: Boston.com)



Lunar New Year Festival (Source: TheScopeBoston.org)



Saint Anthony's Feast (Source: The Boston Calendar)



Walk for Hunger (Source: Project Bread)

DRAFT

ACTIVITIES THAT HAVE VALUE TO THE COMMUNITY

DATA

- Permits and Licenses provided by the City

QUESTIONS

- Additional activities we should highlight?



Boston Marathon (Source: WBUR)

Activities range from annual celebrations and century-old traditions to once-in-a-generation global events



FIFA World Cup 2026 (Source: Gillette Stadium)

DRAFT
Do not edit
How to change the design



Given everything we have discussed today, have you thought of additional assets that would foster extreme weather resilience in Boston?

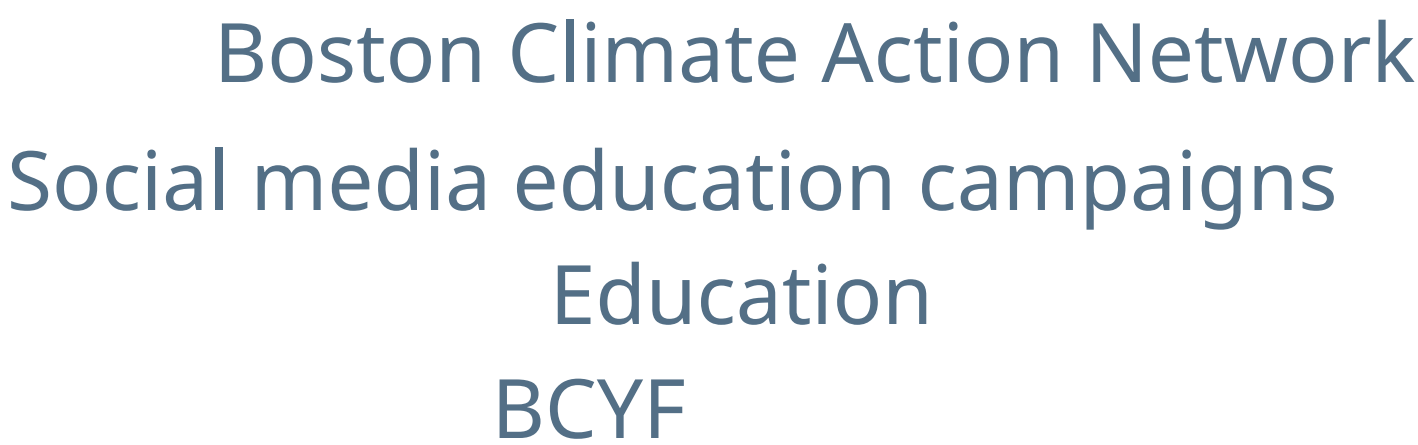
The Slido app must be installed on every computer you're presenting from

slido

DRAFT

Given everything we have discussed today, have you thought of additional assets that would foster extreme weather resilience in Boston?

0 0 3



DRAFT



Boston City Hall, photo by Weston & Sampson

Next Steps

NEXT STEPS

- **Capabilities Assessment**, W&S to begin sending out requests for additional interviews.
- **Engagement kicking off** – Workshops and Street Teams
- Review of **Chapter 3: Community Profile**
- **Next ESC Meeting, April 1st** – Discussing Natural Hazard Profiles, Risks and Vulnerability





Boston City Hall, photo by Weston & Sampson

Q&A

Client:	City of Boston
Project Name:	FY25 NHMP Update
Project Number:	ENG25-1200
Date:	January 15, 2026
Time:	2:00 PM
Location:	Microsoft Teams

Attendees

- Jennie Moonan | W&S
- Madison Biasin | W&S
- Olivia Hemond | W&S
- Mikayla Teixeira | OEM
- Kendall Bobula | OEM
- Matthew Kearney | OEM
- Maggie Owens | BPRD
- Logan Grant | ISD
- Janine Barros | BPHC
- Shani Fletcher | GrowBoston/MOH
- Sean Edelman | OBM
- John Sullivan | BWSC
- Chase Berkeley | BWSC OPS
- Mellissa Honeywood | Boston OFJ

NHMP Overview

- Overview of the NHMP purpose and FEMA requirements under the current update led by the City of Boston in coordination with FEMA guidance.
- Discussion of the ESC role and overall planning structure.

Capabilities Assessment

Key updates since last plan

- FEMA guidance updates introduce a more structured capabilities assessment component.
- Discussion of missing or relevant plans, policies, and regulatory frameworks, including:

  - Sewer use regulations (BWSC)
  - BWSC inundation modeling tools
  - State-level hazard mitigation planning (e.g., Resilient Massachusetts Plan)
  - City fossil fuel-free executive order
  - Massachusetts State Building Code
  - Conservation Commission regulations / Wetlands Protection Act
  - Chapter 87 Shade Tree Protection Law
  - BPDA regulatory frameworks
  - BPRD Green Stormwater Infrastructure guidance

Training and capacity building

- ISD staff noted floodplain administration training and expanded inspector training efforts.
- OEM provides FEMA and federal technical assistance trainings (including climate adaptation courses).
- Discussion of need for improved cross-department understanding of hazard mitigation scope and terminology.
- Suggested focus areas for training:
  - Post-disaster response roles and procedures
  - Shared understanding of mitigation vs. resilience activities
  - Clarifying scope across departments and partner organizations

Broader framing of mitigation

- Discussion on whether mitigation includes partner-led resilience actions (e.g., food systems, community organizations).
- Agreement that NHMP should reflect whole-community resilience, with partner actions likely captured in the mitigation action inventory.

Community Profile Review

General considerations

- Emphasis on clear communication of hazard status, infrastructure conditions, and closures to improve public awareness and preparedness.
- Need for consistent education on risk levels across agencies and the public.
- Importance of validating housing and demographic data using multiple sources (e.g., Census + MOH data cross-check).

People & Housing

- Recommendation to highlight the proportion of Boston residents living in flood-prone areas relative to Massachusetts overall.
- Suggestion to “ground-truth” housing data with City housing authorities (MOH).
- Consideration of external populations that support Boston systems (regional workforce dependencies).
- Clarification needed on whether large public events should be incorporated under “People” category (e.g., protests, cultural events, large gatherings).
- Youth programs, summer employment programs, and sports programs identified as relevant population-serving activities.

Safety & Security / Government Facilities

- Inclusion of key civic buildings (e.g., City Hall, 1010 Massachusetts Ave) discussed as relevant critical assets.
- Deployable flood barriers confirmed as part of Structures category.

DRAFT

- Continued coordination needed to avoid duplication with existing inundation mapping datasets.

Food, Water, and Lifelines

- Food access expanded to include:
  - Urban farms and food forests (distinct from community gardens)
  - Grocery stores, corner stores, and bodegas (with discussion of appropriate level of detail for mapping)
  - USDA SNAP retailer locator as a potential dataset source
- BPRD confirmed parks data availability (drinking fountains, spray features, bathrooms) via GIS systems and Analyze Boston.
- Water system assets: hydrants and catch basins already publicly available; point-based mapping preferred over network lines.

Health and Medical

- Clarification needed on whether urgent care is fully captured under existing health center datasets.
- Potential additional datasets: CMS-certified facilities.
- Mental health facilities suggested as a possible inclusion area.
- Open question (not resolved): whether morgue locations should be included for extreme event planning scenarios.

Energy and Hazards

- Inclusion of gas stations and MATEP infrastructure noted.
- Gas regulator stations identified as potential hazard-related infrastructure (one noted near Grove granite blasting site).
- Question raised about rail lines carrying hazardous materials through the city; specific locations may require further verification.

Transportation and Evacuation

- Recommendation to include evacuation zones, particularly coastal/hurricane evacuation zones, and frame consistently as “Coastal Evacuation” zones.
- Consideration of bike lanes and EV charging infrastructure as part of transportation resilience.

Communications

- City communications systems include:
  - Internal Slack channels
  - Department-specific radio frequencies (Police, Fire, BWSC, Public Works, EMS)
  - Workforce alert systems for City employees
  - AlertBoston system (multi-language emergency communications)
  - Wireless Emergency Alert authority (limited municipal capability in Massachusetts)
- Mobile and temporary infrastructure discussed:
  - Cell on Wheels (COWs)
  - Cell on Light Truck (COLTs)
  - Land Mobile Radio Network (LMRN) systems
- Boston 311 confirmed as non-emergency public service line relevant to resilience communications.

Structures and Coastal Resilience

- Discussion of seawalls, tide gates, and deployable flood barrier systems (City currently operating multiple units).
- Ongoing coastal resilience planning includes both hard infrastructure and landscape changes.
- Coordination noted with Office of Climate Resilience (OCR) initiatives as evidence of increasing adaptive capacity.

Open Space and Natural Systems

DRAFT

- Open space recommended as a single umbrella category (parks and green space not necessarily differentiated).
- Upcoming canopy coverage and change data expected in Feb–March.

Economy and Social Systems

- Economy section should remain high-level but reflect key sectors such as food service employment.
- Discussion of valuing parks and public spaces as economic assets.
- Houses of worship noted as important community infrastructure (included under critical facilities).

Activities and Community Use

- Consider inclusion of:
  - Public gatherings and cultural events
  - Youth sports and recreation programs
  - City-run summer jobs programs
  - Cultural events (e.g., Pride, AAPI events), with consistency considerations if included

Key Data and Mapping Inputs

- FEMA evacuation zone datasets referenced (coastal/hurricane zones).
- USDA SNAP retailer locator identified for food access mapping.
- BPRD GIS datasets confirmed available via enterprise systems and Analyze Boston.
- Canopy coverage dataset update expected Q1 2026.
- MOH housing data suggested for validation of Census-based datasets.

Upcoming Meeting

- April 1, 2026 – Discuss natural hazard profiles, risks and vulnerability

Action Items

W&S to:

- Circulate additional interview requests for capabilities assessment
- Draft Community Profile updates (Chapter 3)
- Clarify dataset sources for health, housing, and critical facilities
- Review FEMA guidance on land use / land cover classification consistency

City of Boston to:

- Provide additional departmental input on capabilities and missing plans

Boston NHMP Update ESC Meeting #3: Hazards, Risks, and Vulnerability (virtual)

DRAFT

Organizer Allen Ryan <james.ryan@boston.gov>

Sent Mon 1/26/2026 11:47 AM

Time Wednesday, April 1, 2026 10:30 AM-12:00 PM

Location https://us06web.zoom.us/j/82035479766?pwd=zGdYyR6yBm33fhOaS5JrwT6gPZCYHB.1

Response Accepted Change Response

invite.ics
6 KB

This event has been updated

Changed: attachments

Hi all,

On behalf of the Boston Natural Hazard Mitigation Plan (NHMP) Update Team, please join us for the 3rd Executive Steering Committee Meeting where will be discussing Hazards, Risks, and Vulnerabilities.

This meeting will be hosted fully virtual with a Zoom link attached below. An agenda will be shared prior to this meeting.

Please reach out with any questions!

Thanks,Allen

--

Join Zoom Meeting
https://us06web.zoom.us/j/82035479766?pwd=zGdYyR6yBm33fhOaS5JrwT6gPZCYHB.1

Meeting ID: 820 3547 9766
Passcode: 277297

One tap mobile
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+13052241968,,82035479766#,,,,*277297# US

Join instructions
https://us06web.zoom.us/meetings/82035479766/invitations?signature=uzRkB8bkyfdWXBXU0DppalDzyVw1qkXtlAYHCNvHmfg

When
Wednesday Apr 1, 2026 · 10:30am – 12pm (Eastern Time - New York)

Location
https://us06web.zoom.us/j/82035479766?pwd=zGdYyR6yBm33fhOaS5JrwT6gPZCYHB.1
View map

Guests
Allen Ryan - organizer
hemond.olivia@wseinc.com
Christopher Osgood
Kendall Bobula
Jackeline Newell
Mellissa Honeywood
ctiggas@bphc.org
John Tiano
Sean Edelman
Biasin, Madison
laurentie@bwsc.org
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Adrian Jordan
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Logan Grant
Seidel, Robin
sullivanjp@bwsc.org
jbarros@bphc.org
Shani Fletcher
Brooke Majewski
Kyron Owens
berkeleyc@bwsc.org
Maggie Owens
Max Rome
View all guest info

Reply for biasin.madison@wseinc.com

Yes | No | Maybe

Attachments CHANGED

ESC Meeting Agenda_033...

DRAFT

55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

March 30, 2025

City of Boston, Office of Emergency Management
85 Bragdon Street
Boston, MA 02119

Re: **Boston FY25 Natural Hazard Mitigation Plan Update, ESC Meeting #3**

Dear 2025 NHMP Executive Steering Committee:

Please see the agenda for the Wednesday April 1st Executive Steering Committee Meeting below. The meeting will be held virtually from 10:30am-12:00pm. Let us know if you have any questions.

Agenda:

- Natural Hazard Mitigation Plan Overview
  - Refresher on why we are gathering
- Vulnerability and Impacts
  - What do these mean in the context of an NHMP
- Review of Hazard Profiles
  - Reviewing data, risks, and impacts for all 15 hazards
  - Discussions on the impacts of each hazard on city assets
- Next steps
  - Review of Chapters
  - Last ESC Meeting on May 13th in-person at the Civic Pavillion to develop mitigation actions

Sincerely,

WESTON & SAMPSON ENGINEERS, INC.

Madison Biasin
Resiliency Planner II

DRAFT



CITY of BOSTON

NATURAL HAZARD MITIGATION PLAN

Executive Steering Committee
Meeting #3 | April 1, 2026

Weston & Sampson

NHMP AND THE ROLE OF THE ESC

DRAFT

Purpose of NHMP is...

01 **Identify natural hazards** that pose the greatest risk to Boston.

02 **Assess vulnerability** of residents, infrastructure, and critical facilities.

03 Develop **strategies and projects** to minimize or eliminate future hazard impacts.

04 **Strengthen coordination** across City departments, regional agencies, and community partners.

05 **Maintain eligibility** for FEMA mitigation grants and federal disaster recovery funding.

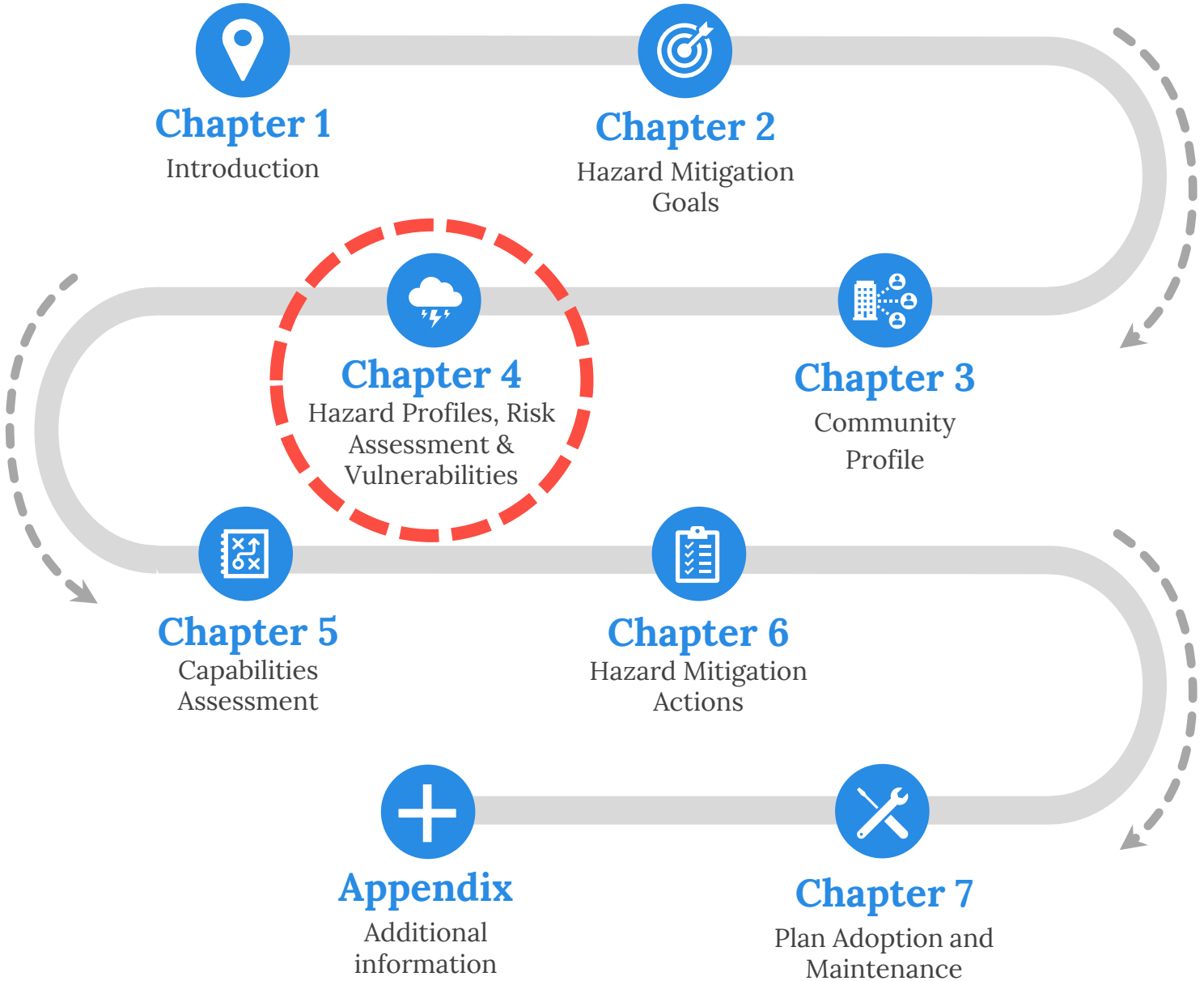
Purpose of Executive Steering Committee is...

To guide overall plan development and approval, and to participate in the following activities:

1. ESC Meetings (4) to provide input at critical moments within plan development
2. Review of & provide input on targeted requests (*e.g., outreach/engagement, LPT approach/invites/materials, capabilities, etc.*)
3. Review of draft chapters
4. Supporting presentation to public and presentation to City Council for adoption as necessary

NHMP OVERVIEW

DRAFT



REMINDER OF NATURAL HAZARD PROFILES (15)

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Flooding from Precipitation



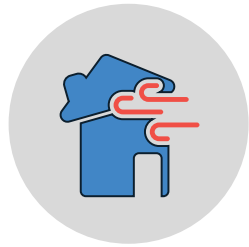
Coastal Flooding and Storm Surge



Coastal Erosion



Hurricanes / Tropical Cyclones



Tsunamis



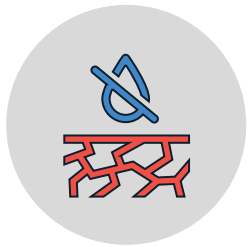
Changes in Groundwater



Severe Winter Weather / Nor'easters



Average/ Extreme Temperatures



Drought (including groundwater impacts)



Wildfire



Earthquakes



Landslides/ Mudflows



Tornadoes



Invasive Species



Other Severe Weather

OVERVIEW OF ASSET CATEGORIES

Categories based on the **FEMA Local Mitigation Planning Handbook** (2025) and **Local Mitigation Planning Policy Guide** (2025)

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People



- **Underserved** communities
- **Socially vulnerable** populations

Structures



- Existing **buildings** and **infrastructure**
- Future or planned **developments**

Community Lifelines and Other Critical Facilities



- Fundamental **services** and **facilities** in the community
- Support **response planning** and **operations**
- Essential to human **health** and **safety** or to **economic security**

Natural, Historic, and Cultural Resources



- **Environmental** and **natural resources**
- **Historic resources** that tell the story of your community
- Assets of the **local culture** that are unique or cannot be replaced

Economy



- Major **employers, economic sectors,** and **commercial centers**

Activities that Have Value to the Community



- **Activities** that are important to the community
- Long-standing **traditions, seasonal markets, tourists**

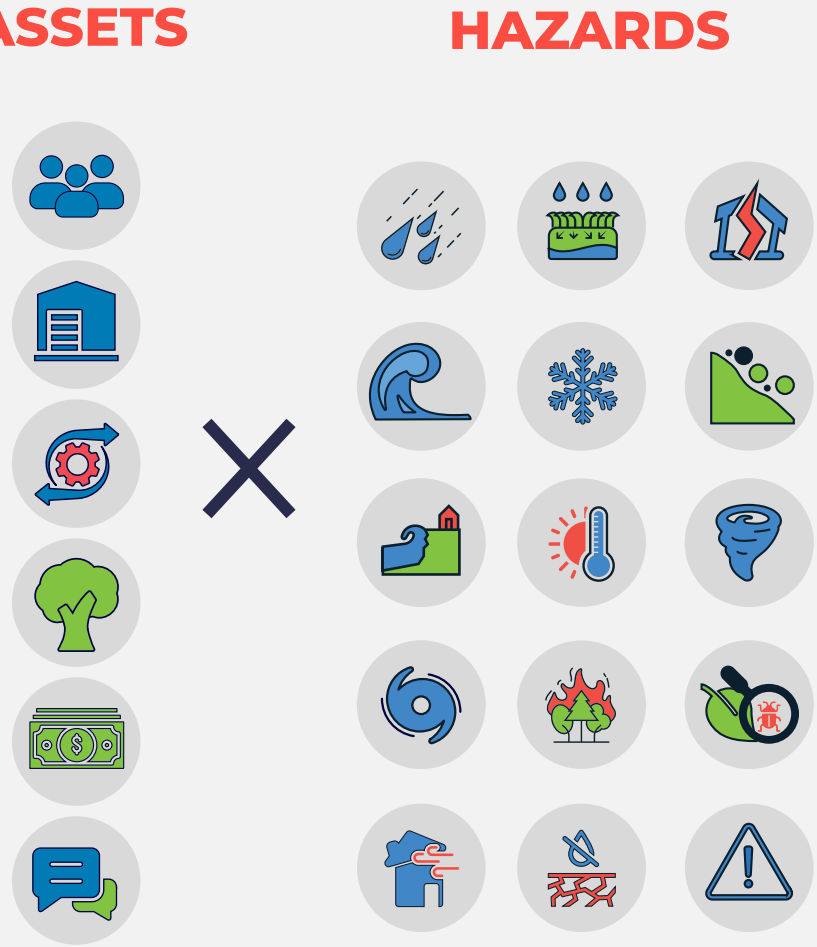
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Boston City Hall, photo by Weston & Sampson

HAZARDS, RISKS, AND VULNERABILITY

INTRODUCTION



"Vulnerability is a description of which assets, including structures, systems, populations and other assets as defined by the entity, **within locations identified to be hazard prone, are at risk** from the effects of the identified hazard(s)."

FEMA

Use information from Hazard Profiles and Asset Inventory.

Vulnerability: Define what parts of the city are most likely to be affected

Impacts: The potential consequences

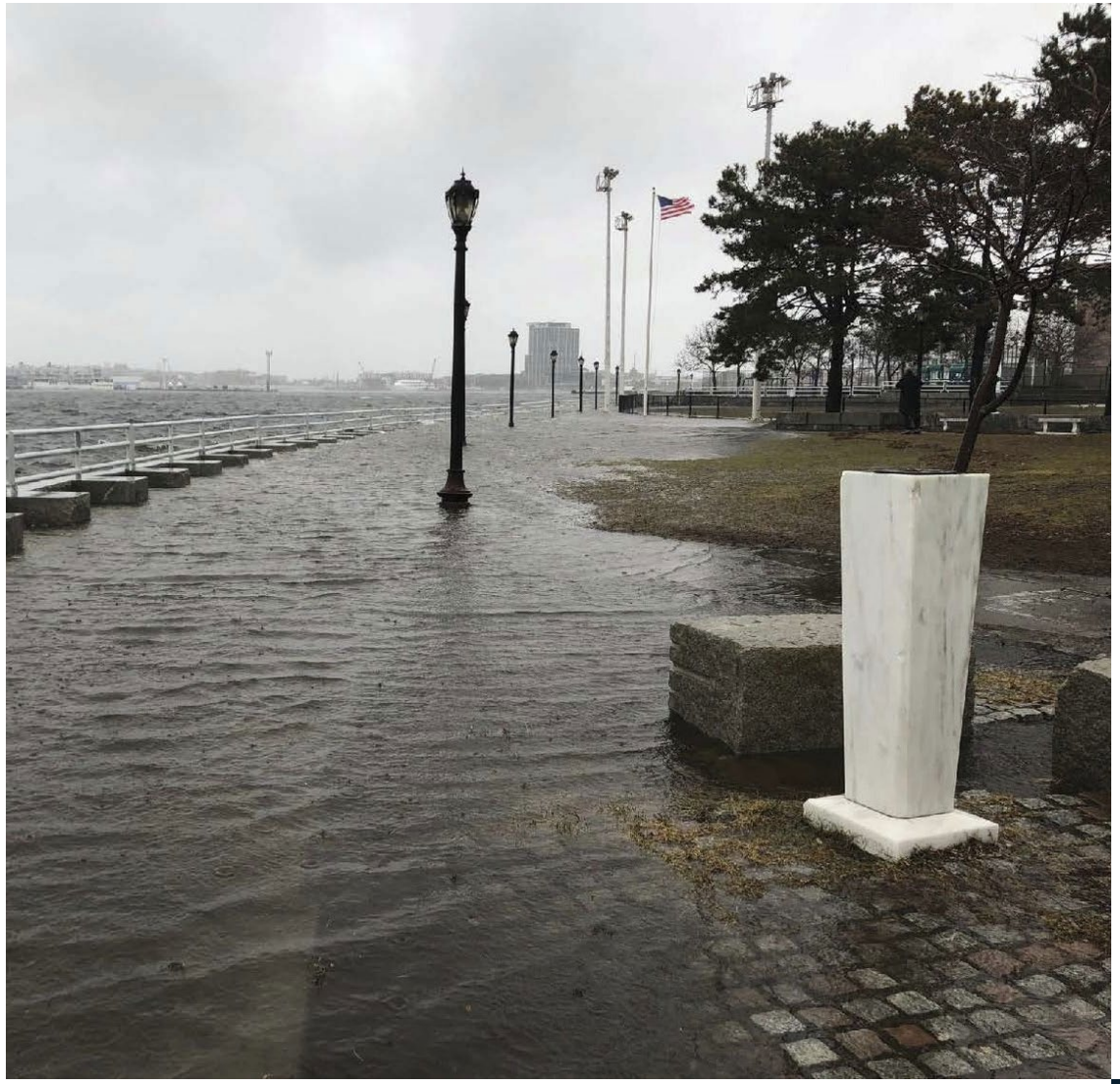
VULNERABILITY VS. IMPACT

Vulnerability pertains to how likely an asset will be impacted, and how significant that impact will be.

- For example: If your asset is within a 100-year floodplain, there is a 1 in 100 chance your asset will flood every year. The impact of flooding in this case is likely to be substantial.

Impact pertains to what happens when your asset is impacted by a hazard

- For example: Flooding can prevent access to buildings. It can cause interruptions to business. It can post a risk to life and safety of Boston residents. Flooding can damage critical assets and technology.

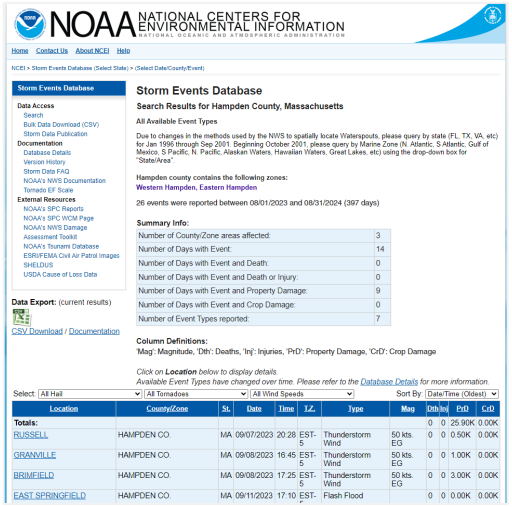


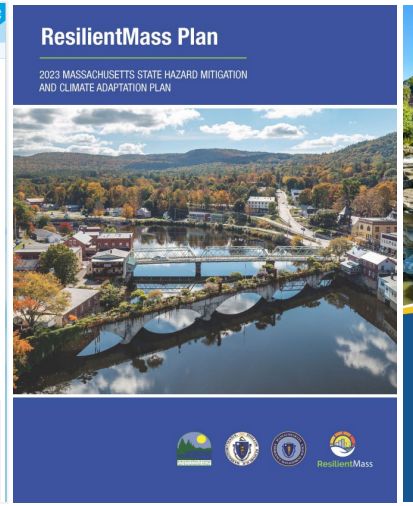
Source: Weston & Sampson

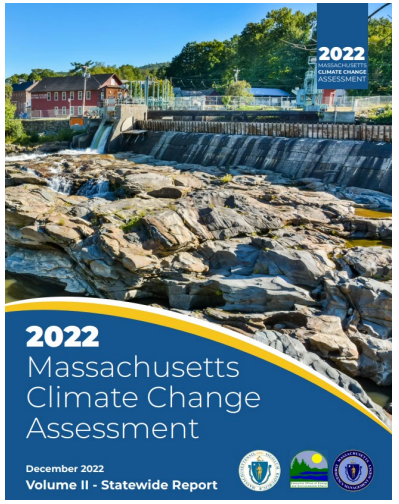
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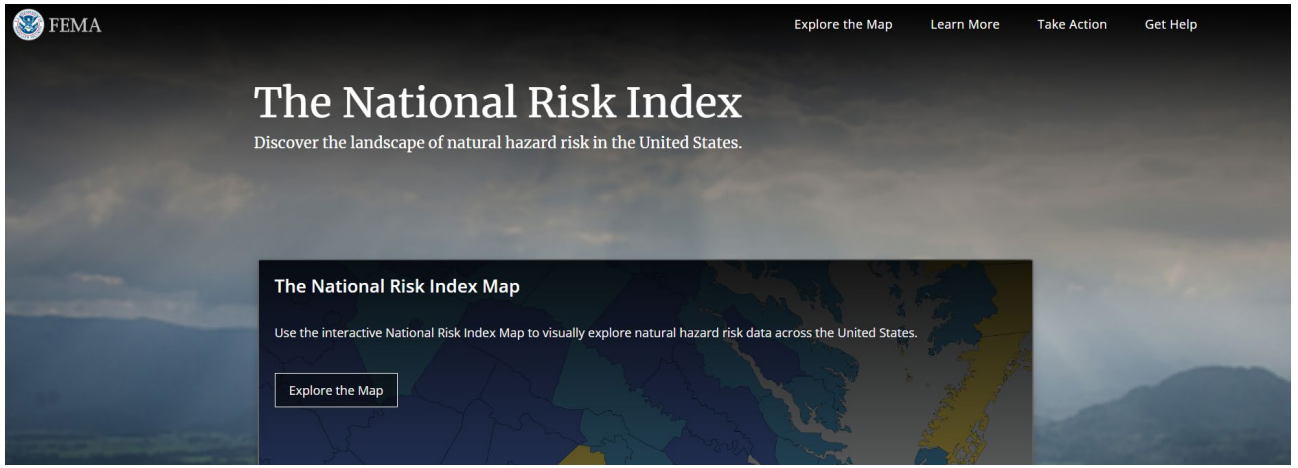
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- 2023 ResilientMass Plan (MA State HMP)
- 2022 MA Climate Change Assessment
- Massachusetts Coast Flood Risk Model (MC-FRM)
- FEMA National Risk Index
- NOAA Storm Events Database
- ResilientMass Climate and Hazards Viewer
- MassMapper Data
- Boston Heat Resilience Study
- BWSC Inundation Model
- CZM Coastal Erosion Viewer
- Northeast-Midwest Wildfire Risk Explorer
- MDAR Invasive Pest Dashboard









FEMA REQUIREMENTS REVIEW

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Identifies the natural hazards that can affect Boston and associated risk:

1. **Description of Natural Hazard:** Based on 2023 ResilientMass Plan
2. **Severity:** Likely magnitude
3. **Probability:** Present and future frequency
4. **Location:** How much of Boston is likely to be affected
5. **Previous Occurrences:** Historical occurrences of each hazard
6. **Impacts of Climate Change:** How climate change affects each hazard
7. **Vulnerability and Impacts:** Where and how is Boston most vulnerable? What are the impacts on community assets due to each natural hazard?

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Boston City Hall, photo by Weston & Sampson

STORMS, FLOODING, AND HIGH WINDS

FLOODING FROM PRECIPITATION

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- **Flooding from Precipitation:** Non-coastal flooding, includes riverine flooding and stormwater flooding due to rain.

Stormwater Flooding:

- Poor and undersized drainage
- High amounts of impervious surface
- Undersized culverts

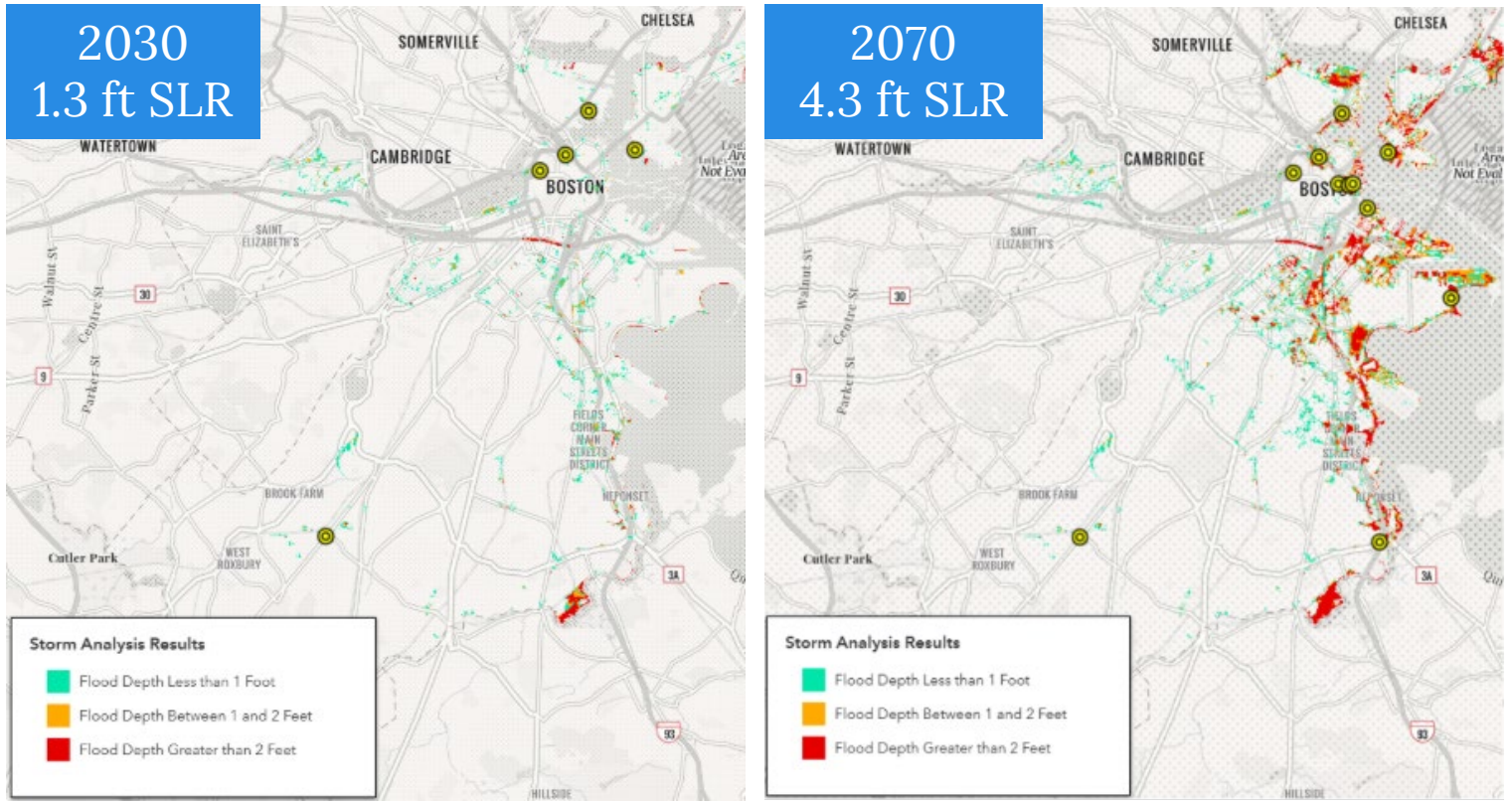
Riverine Flooding:

- Overtopping of banks along rivers and other waterbodies

Ice Jams:

- accumulation of ice that acts as a natural dam and restricts the flow of a body of water

Thunderstorm Flooding from 10-year 6-hour Storm



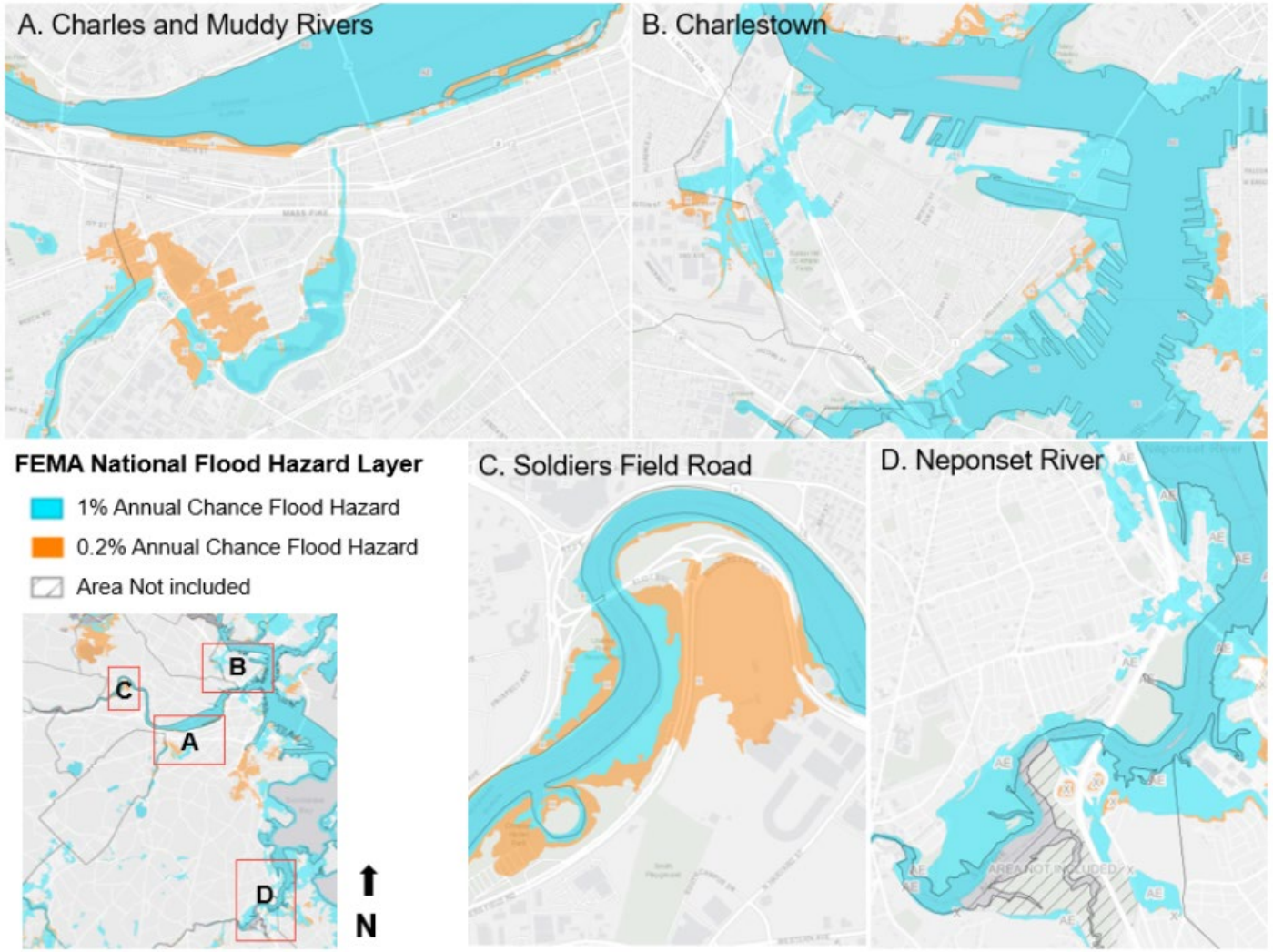
Source: BWSC Inundation Model

FLOODING FROM PRECIPITATION

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FEMA Flood Zones
Geographic areas that FEMA has defined according to varying levels of flood risk

- **500-year Storm:** 0.2% annual chance of occurring
- **100-year Storm:** 1% annual chance of occurring



Source: FEMA National Flood Hazard Layer

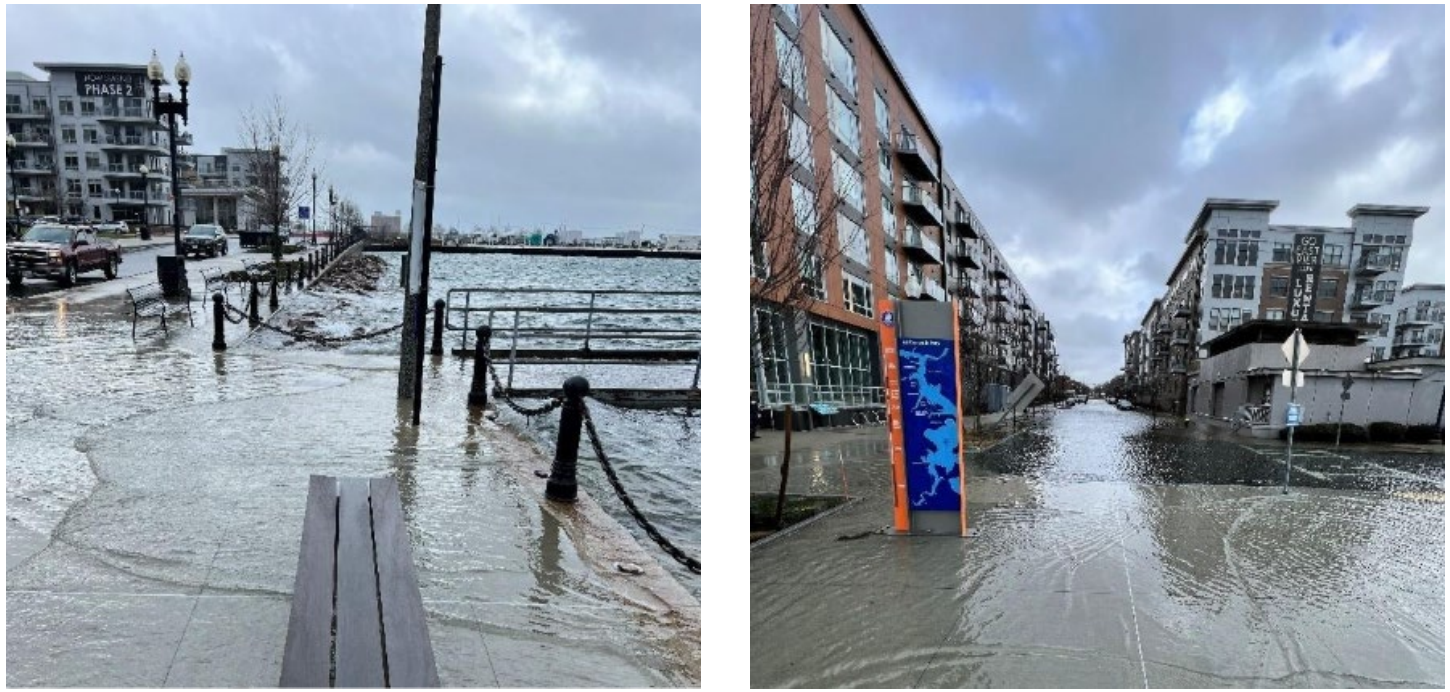
COASTAL FLOODING AND STORM SURGE

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- **Coastal Flooding:** Ocean waters inundate land, primarily due to high astronomical tides, sea level rise, wave action, and storm surge.

Previous Occurrences Include:

- Jan 2018
- Mar 2018
- Oct 2018
- Nov 2018
- Jan 2019
- Oct 2019
- Apr 2020
- Sept 2020
- Dec 2020
- Feb 2021
- Jul 2021
- Jan 2022
- Dec 2022
- Jan 2023
- Jan 2024
- Mar 2024
- Apr 2024



December 2022 flooding at Lewis Mall in East Boston. Source: Weston & Sampson

COASTAL FLOODING AND STORM SURGE

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Geographic areas that FEMA has defined according to varying levels of flood risk

- **500-year Storm:** 0.2% annual chance of occurring
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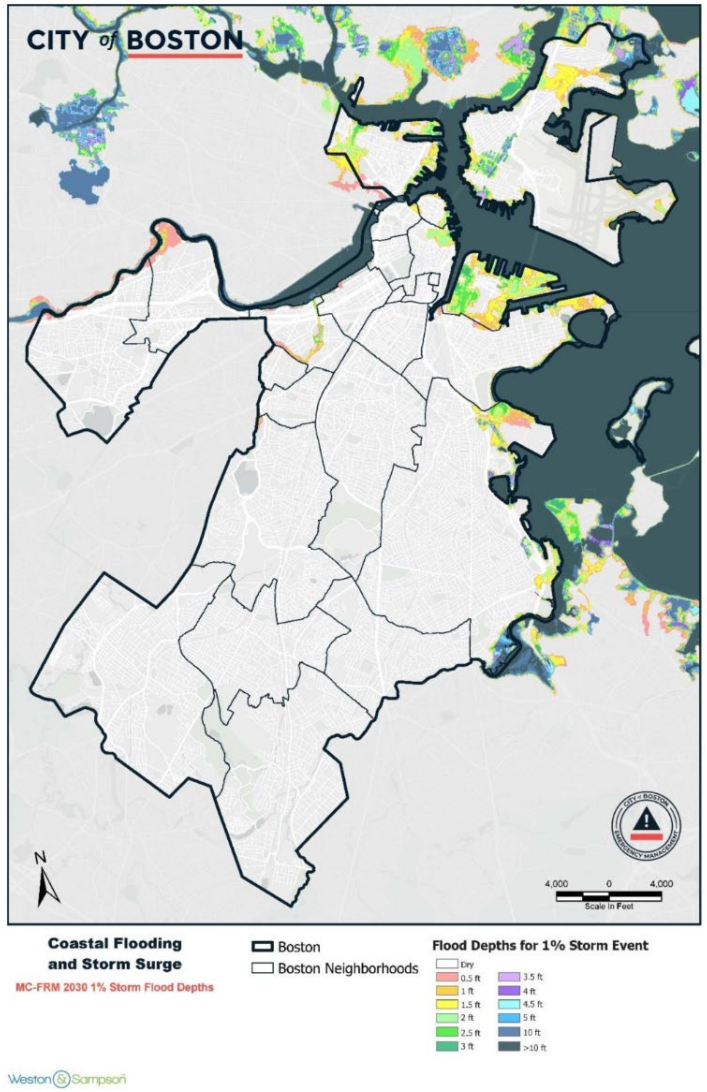
Source: FEMA National Flood Hazard Layer

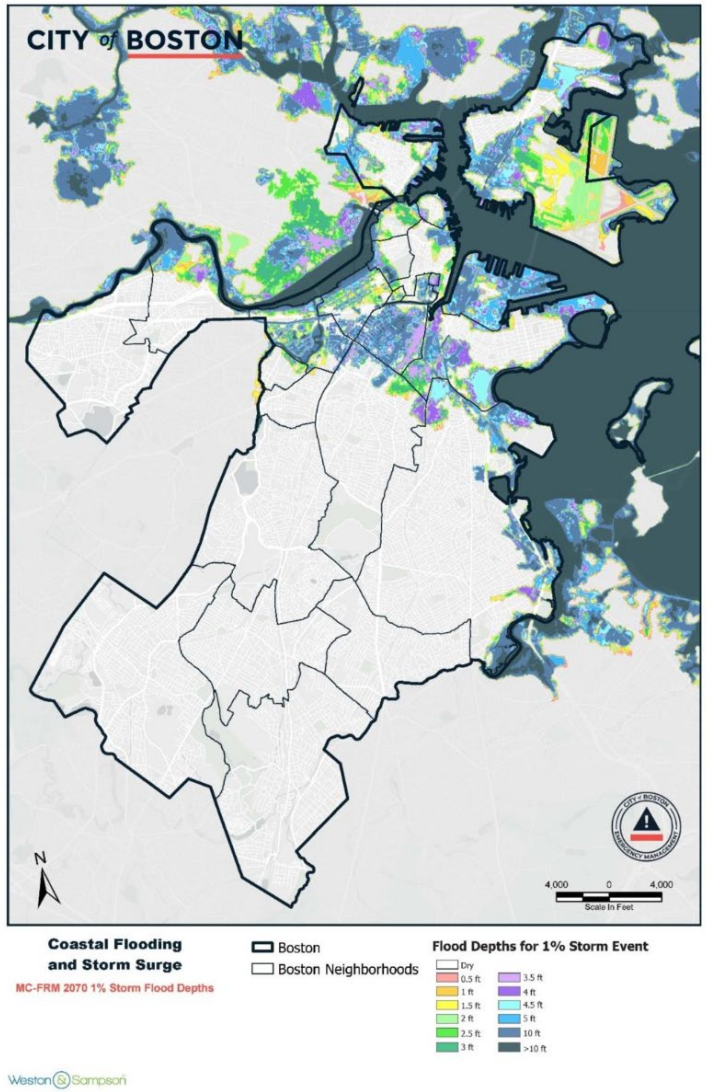
COASTAL FLOODING AND STORM SURGE

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MC-FRM

Massachusetts Coast Flood Risk Model



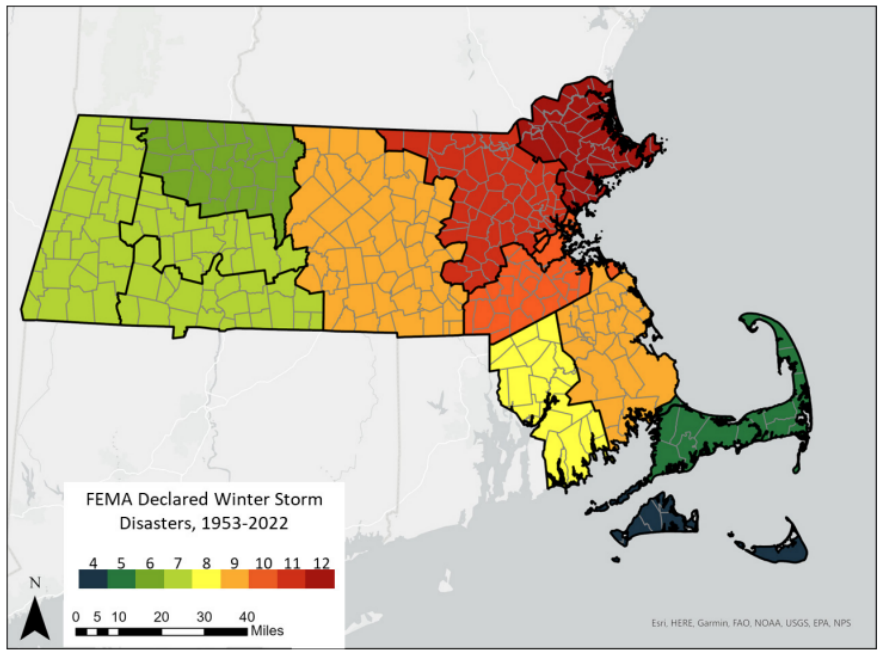


Source: MC-FRM 2030 and 2070 1% Storm Coastal Flood Depths

SEVERE WINTER WEATHER/NOR'EASTERS

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- **Severe Winter Storms:** heavy snow, ice accumulation, freezing temps & wind chill
- **Nor'easter:** Storms or wind blowing from the northeast
- **Ice Storms:** occur when freezing rain creates a half inch of ice accretion



Source: FEMA (2023).

Figure 5.13-1. FEMA winter storm–related declared disasters by county, 1953 to 2022.

Source: ResilientMass Plan (2023)

FEMA Disaster Declarations

- **2013 Blizzard Nemo:** Brought over 24 inches of snow and high winds, causing major transportation disruptions and power outages. *(DR-4110-MA)*
- **2015 Winter Storm Juno**: Resulted in significant snowfall and coastal flooding impacts across Boston. *(DR-4214-MA)*
- **January 2018 Nor'easter ("Bomb Cyclone"/Winter Storm Grayson):** Combined heavy snowfall with record coastal flooding, impacting East Boston and downtown waterfront areas. *(DR-4366-MA)*

January 2026 Winter Storm, Winter Storm Fern
February 2026 Nor'easter, Winter Storm Hernando

HURRICANES/TROPICAL CYCLONES

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- **Tropical Storms:** Maximum sustained wind speed 39 mph or higher
- **Hurricanes:** Maximum sustained wind speed 74 mph or higher
- **Extreme Wind:** Damaging wind, often occurring during hurricanes and tropical storms, that can cause threat to life and property.

High Wind Threats:	
Extreme	Sustained wind speeds greater than 58 mph
High	Sustained speeds of 40 to 57 mph
Moderate	Sustained speeds of 26 to 39 mph
Low	Sustained wind speeds of 21 to 25 mph
Very Low	Sustained wind speeds around 20 mph
Non-threatening	Breezy conditions

HURRICANES/TROPICAL CYCLONES

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97 hurricanes/tropical cyclones passed through Massachusetts from 1842 to 2022.

Notable recent storms include:

2011: Hurricane Irene

2012: Hurricane Sandy

2020: Hurricane Isaias

2021: Hurricane Henri

2021: Hurricane Ida

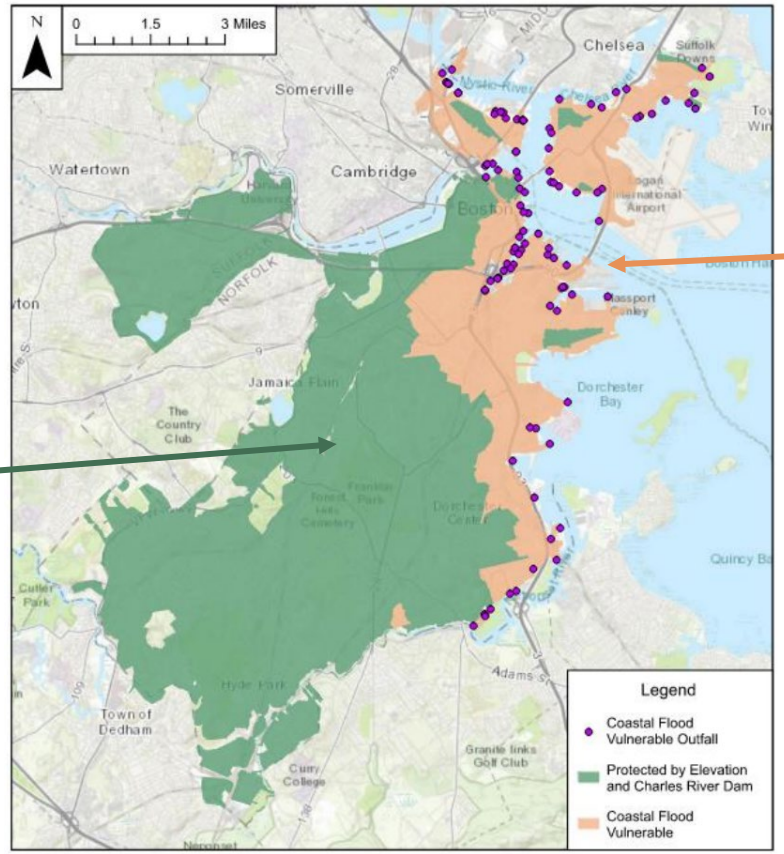
Climate change is expected to increase the intensity and impacts of hurricanes and tropical cyclones

TSUNAMIS

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- **Tsunamis:** Large ocean waves generated by sudden displacement of water, often due to undersea earthquakes, landslides, or volcanic activity.

Western portion of Boston: Less exposed to tsunamis due to higher elevation and protection from Charles River Dam, may be directly/indirectly impacted



Source: BWSC Coastal Stormwater Discharge Analysis

Eastern portion of Boston: Most exposed to potential tsunamis, most directly impacted

Tsunamis on the East Coast are **rare**; only a few have been documented over the past 200 years

TORNADOES

DRAFT

- **Tornados:** A funnel-shaped vortex of violently rotating wind advancing beneath a large storm system.

Massachusetts experiences an average of **two to five tornadoes per year.**

Since 1951, Massachusetts has experienced 200 tornadoes, and **only two were notably close** to the City of Boston. The total damage to date amounts to $544,708,420.

Historically, there has **not been a tornado** in the City of Boston.

DISCUSSION



From these hazards (flooding from precipitation, severe winter weather, coastal flooding, hurricanes, tsunamis, tornadoes)…

What **impacts** do you expect to see on:

- Different assets?
- Neighborhoods?
- Vulnerable populations?

Impacts on Assets (Example)

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People	Structures
The elderly and infirmed populations are of particular concern during these events, being shut in during storms, not being able to shovel, icy sidewalks, etc.	**3,470 buildings** in Boston are within the FEMA 100-year flood zone
Community Lifelines and Other Critical Facilities	**Natural, Cultural, and Historic Resources**
Disruptions to transportation, MBTA stations within flood risk zones. Delays to operations at MBTA stations when they flood or maintenance crews are busy putting up barriers.	Historic sites may become damaged, degraded, or destroyed **due to not being able to withstand** high winds, snow load, or flooding. Flooding may **accelerate erosion** and degradation of coastal ecosystems.
Economy and Activities that have Value to the Community	
Community events and recreational activities often canceled or postponed due to unsafe conditions. "Heavy blizzards are among the **most costly and disruptive** weather events for Massachusetts communities."[1]	

1. *Massachusetts State Hazard Mitigation and Adaptation Plan." 2018. P4-226*

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From these hazards (flooding from precipitation, severe winter weather, coastal flooding, hurricanes, tsunamis, tornadoes)...

What impacts do you expect to see on:
- Different assets?
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From these hazards (flooding from precipitation, severe winter weather, coastal flooding, hurricanes, tsunamis, tornadoes)... What impacts do you expect to see on: - Different assets? - Neighborhoods? - Vulnerable populations?

- Unhoused Bostonians
- Nursing homes. Assisted living locations
- Busses and MBTA
- Power stations /MATEP
- Morrisey blvd
- Combined sewer overflow
- Floating trash/hazmat
- Difficulty navigating the City for vulnerable populations (winter weather, flooding, wind)
- flooding and power outages
- at pantries, grocery stores, corner stores, and other food retail points
- Basement units
- Delays in food supply. Loss of food in the home due to power outages.
- Reduced emergency travel times
- Impacts on critical assets outside of Boston (e.g. the New England Produce Center at Island End)
- Coastal erosion

From these hazards (flooding from precipitation, severe winter weather, coastal flooding, hurricanes, tsunamis, tornadoes)... What impacts do you expect to see on: - Different assets? - Neighborhoods? - Vulnerable populations?

(2/2)

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- Downed trees, flooded streets
- Transportation and mobility
- Challenges for hard to evacuate populations / populations in need of shelter
- More potholes , issues with sidewalks for accessibility
- flooding and wind damage to crops in gardens and farms and food forests

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Boston City Hall, photo by Weston & Sampson

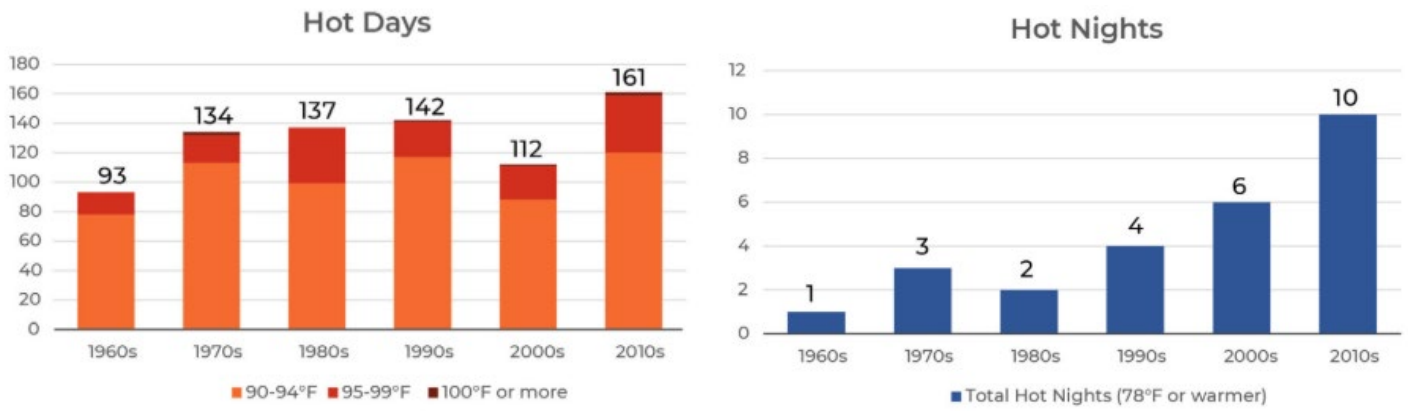
EXTREME HEAT AND SEVERE WEATHER

AVERAGE/EXTREME TEMPERATURES

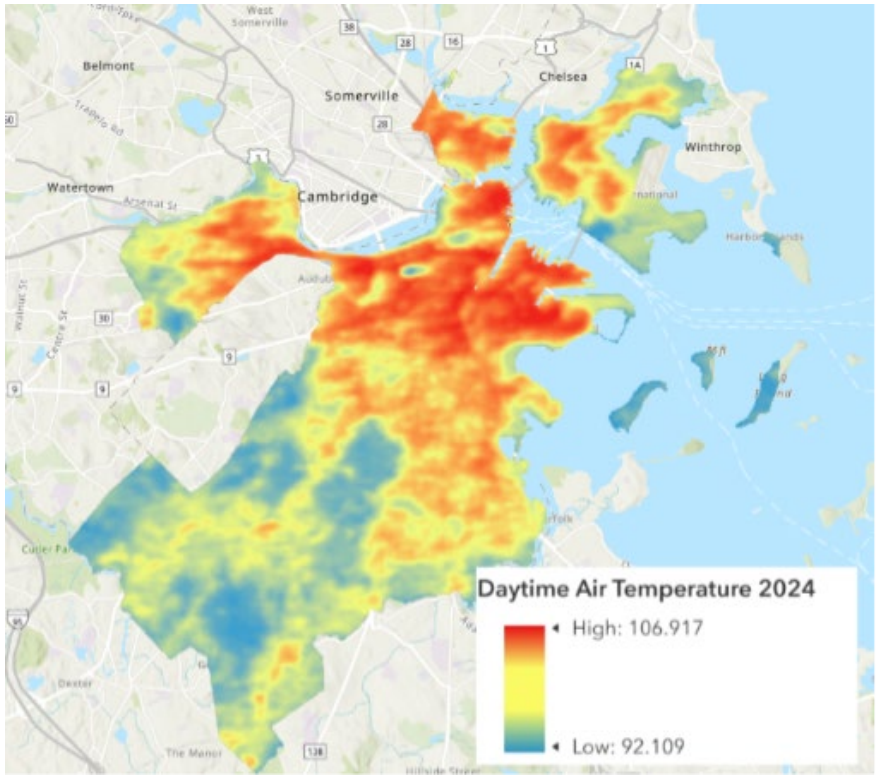
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- **Extreme Temperatures:** Very high or low temperatures that can affect human health and the natural and built environments.

In the last decade, Boston experienced more hot days and nights than any decade in the previous 50 years:



Source: Boston Heat Resilience Plan

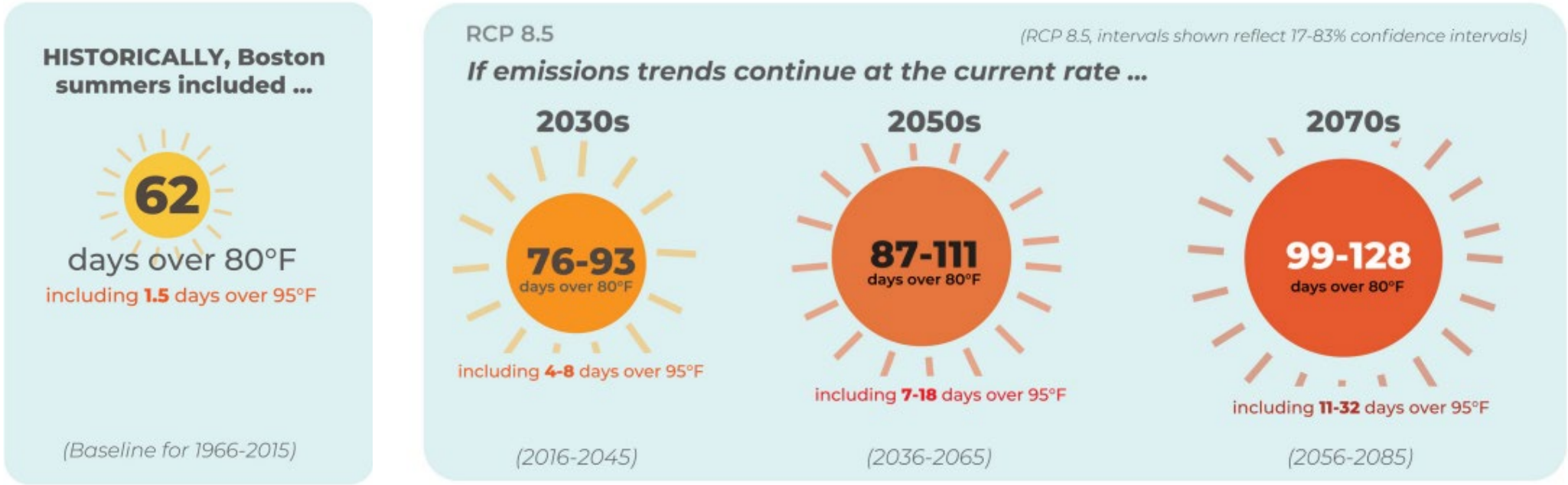


Source: Boston Heat Map Explorer

AVERAGE/EXTREME TEMPERATURES

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Extreme heat is becoming an increasing concern in Boston as climate change leads to more frequent hot days, longer-lasting heat waves, and rising summer temperatures.



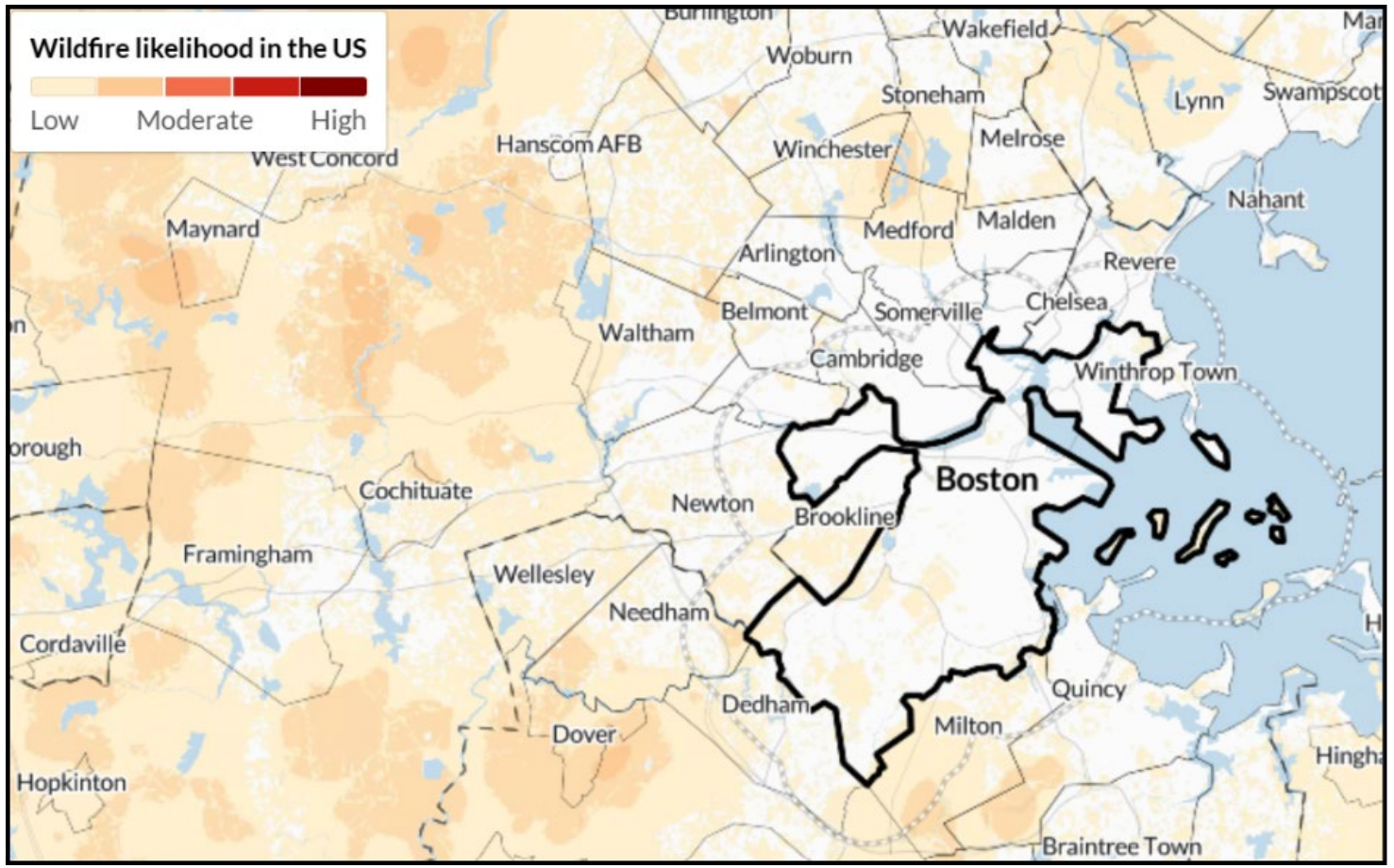
Source: Boston Heat Resilience Plan

WILDFIRES

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Brushfire: An unplanned, destructive fire that spreads quickly over woodland, brush, or an urban environment.

Wildfire: A fire that spreads rapidly through natural areas and are difficult to contain.



Source: USDA Forest Service Wildfire Risk to Communities

WILDFIRES

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Boston's Wildfire History				
Date	**Event**	**Location Notes**	**Burned Area or Damage**	**Relevance to Boston Brushfires**
2001–2009	Multiple "wildfires / brush fires" (recorded in city plan)	City of Boston	Fires typically burned 0.25 – 9.0 acres; total "fewer than 20" reported wildfires over this period (Boston.gov)	Demonstrates that small-scale wildland/brush fires have occurred in Boston. Low frequency & small size — but underscores potential for brush fires in vegetated park areas.
April 19, 2012	Brush fire near border of Boston	Wooded area near Dedham — along the Neponset River Reservation, bordering Boston	Fire burned 50–100 acres; smoke/ash carried into several Boston neighborhoods (West Roxbury, Hyde Park, Jamaica Plain, Mattapan, Dorchester) and beyond to Milton and Quincy (Boston.gov)	Although the fire did not start inside Boston, proximity meant Boston neighborhoods experienced ash/smoke — illustrating how regional wildfires can affect Boston's air quality and fire-hazard exposure.

DROUGHT

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- **Drought:** A prolonged period of very low rainfall, leading to a shortage of water.

Northeast MA Declarations of Drought (2020 – 2025)

Year	Months with Any Drought (Mild+)	Months with Significant Drought	Months with Critical Drought
2020	5	4	0
2021	2	0	0
2022	6	4	3
2023	0	0	0
2024	5	3	2
2025	6	5	1

Source: Mass.gov History of Drought Declarations in Massachusetts

Boston has experienced notable drought periods in 2016–2017, 2020, 2022, 2024, and 2025

DROUGHT

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Rising temperatures and changes in precipitation patterns are expected to **increase the length, frequency, and intensity of droughts.**

Urban agriculture, drinking water supplies, aquatic ecosystems, wildlife habitat, and economic activity are all vulnerable to drought in Massachusetts.

Projected **Consecutive Dry Day Events** in Boston Harbor

Baseline	2030	2050	2070	2090
31	31	32	32	33

Projected **Annual Number of Days without Rain** in Boston Harbor

Baseline	2030	2050	2070	2090
192	185	192	194	198

Source: MA Climate Change Assessment 2022

*Future projections presented for four time periods are identified in the table by their central year: 2030 (near-term, 2020–2039); 2050 (mid-century, 2040–2059); 2070 (mid-late century, 2060–2079); and 2090 (end of century, 2080–2099).

OTHER SEVERE WEATHER

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High Winds:
Strong air currents that can cause damage to structures, trees, and power lines.

Thunderstorms:
Weather systems characterized by lightning, thunder, heavy rain, and sometimes hail or strong winds.

Extreme Precipitation:
Intense rainfall or snowfall that can lead to flooding, landslides, or other severe impacts.

DISCUSSION

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From these hazards (average / extreme temperatures, wildfire, drought, other severe weather)…

What **impacts** do you expect to see on:

- Different assets?
- Neighborhoods?
- Vulnerable populations?

Impacts on Assets (Example)

People	Structures
Increased rate of heat-related illness, particularly among older adults and residents without A/C.	Increased strain on HVAC systems, leading to higher failure rates and costly retrofits.
Community Lifelines and Other Critical Facilities	**Natural, Cultural, and Historic Resources**
Elevated electricity demand (heat) or gas demand (cold), straining energy grid and resources.	Heat stress on urban trees and green spaces, reducing canopy cover and diminishing natural cooling benefits.
Economy and Activities that have Value to the Community	
Reduced productivity and increased occupational health risks, particularly for outdoor industries and summer tourism.	

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From these hazards (average / extreme temperatures, wildfire, drought, other severe weather)...

What impacts do you expect to see on:
- Different assets?
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- Vulnerable populations?

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From these hazards (average / extreme temperatures, wildfire, drought, other severe weather)... What impacts do you expect to see on: - Different assets? - Neighborhoods? - Vulnerable populations?

(1/3)

- Events on city hall plaza (little shade) during severe heat
- Brown outs
- Extreme heat can result in cyanobacteria blooms and restrict recreation when it is most needed (turtle pond)
- Homeless population and day shelters during heat
- tree canopy street due to heat and drought
- tree canopy reduction due to fire
- Cascading affects of extreme heat on other protective actions. Like changes in a response to a haz mat incident or civil disturbances
- It’s possible downtown be abandoned on heat emergency days and pushing workers to stay home.
- Heat Islands - some neighborhoods are hotter than others
- Extreme temperature's impact

From these hazards (average / extreme temperatures, wildfire, drought, other severe weather)... What impacts do you expect to see on: - Different assets? - Neighborhoods? - Vulnerable populations?

(2/3)

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on our unsheltered populations, and the policy / program changes it requires during the day time.

- farm workers vulnerable to heat stroke and other health impacts
- urban ag crops dying due to lack of water, crops in greenhouses and high tunnels overheating
- Extreme temperature's impact on outdoor workers (and, for example, the need for heat illness prevention plans)
- Huge impact on what food can be grown in the city and region. More energy used to keep people and perishable food items cool.
- Heat will have major impacts the health of school children, may restrict access to recess, outdoor recreation, sports. Across neighborhoods.
- Extreme temperatures leading to increased energy use by residential buildings,

From these hazards (average / extreme temperatures, wildfire, drought, other severe weather)... What impacts do you expect to see on: - Different assets? - Neighborhoods? - Vulnerable populations?

(3/3)

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many of which are very old with inefficient climate systems

- Air quality alerting confusion on protective actions



Boston City Hall, photo by Weston & Sampson

LANDSHIFT CHANGES

LANDSLIDES/MUDFLOWS

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- **Landslide/mudflow:** Sliding of a mass of earth, rock, or mud down a steep slope.



Source: U.S. Landslide Inventory and Susceptibility

Landslides are common in New England but are mostly limited to mountainous and hilly terrain.

Boston's hilly terrain, aging infrastructure, variable soil conditions, and increasing frequency of heavy rainfall events may **incrementally increase landslide likelihood** over time

EARTHQUAKES

DRAFT

- **Earthquake:** A sudden or violent shaking of the ground as a result of volcanic activity or movements within the earth's crust.

Number of Felt Earthquakes in Massachusetts		
Years of Earthquake Record	Number of Earthquakes Felt	Years with Damaging Earthquakes
1668-2016	408	1727, 1755

Source: Weston Observatory of Boston College

Earthquake impacts would vary across the city.

Neighborhoods located on **filled land** are more likely to experience **amplified ground shaking** and face a higher risk of structural damage compared to areas anchored on bedrock.

CHANGES IN GROUNDWATER

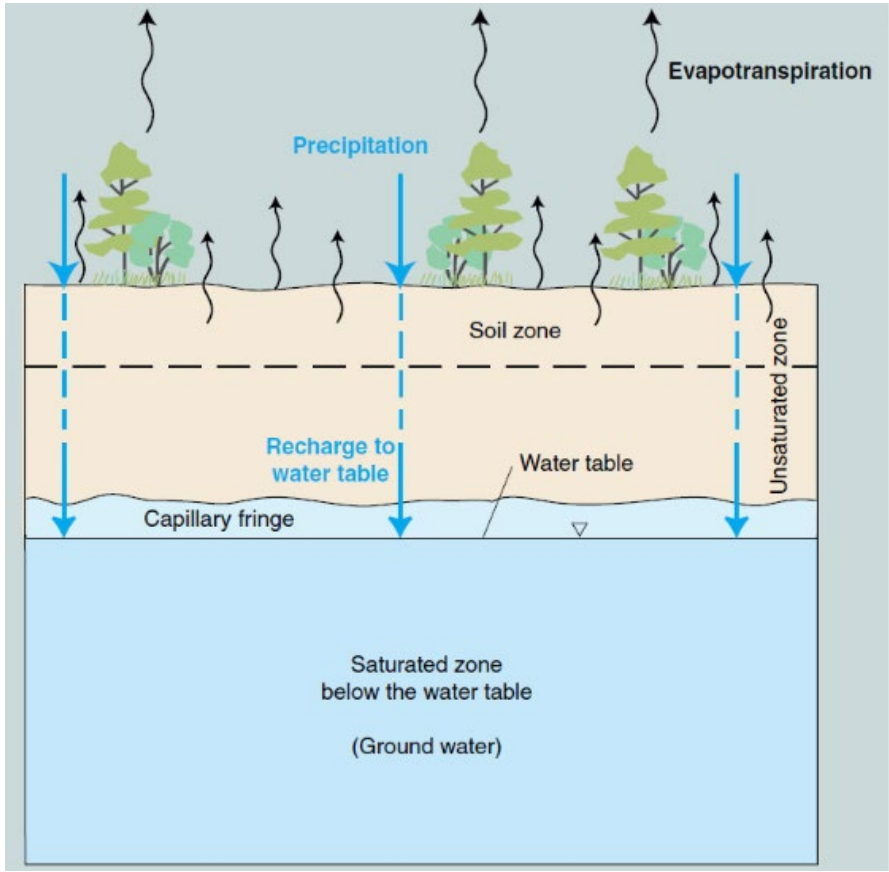
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- **Changes in Groundwater:** Groundwater levels are the height of the water table below the ground surface. This height can change depending on a multitude of conditions.

Massachusetts faces three main groundwater risks:

- Rising groundwater levels
- Groundwater resource depletion
- Groundwater contamination from pollution, salinity, and sea level rise

These issues vary by location and season.



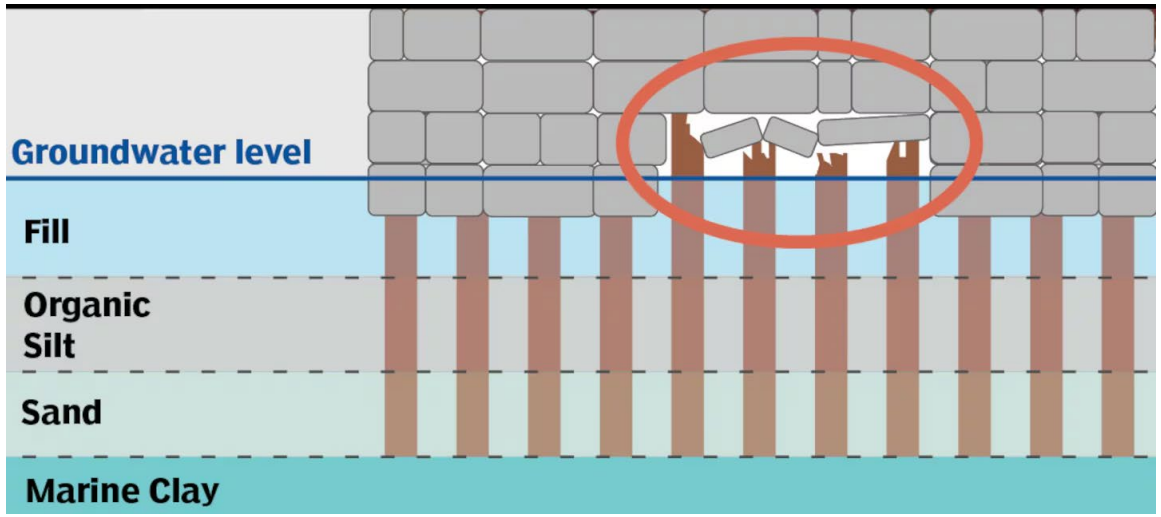
Source: USGS Groundwater Model

CHANGES IN GROUNDWATER

DRAFT

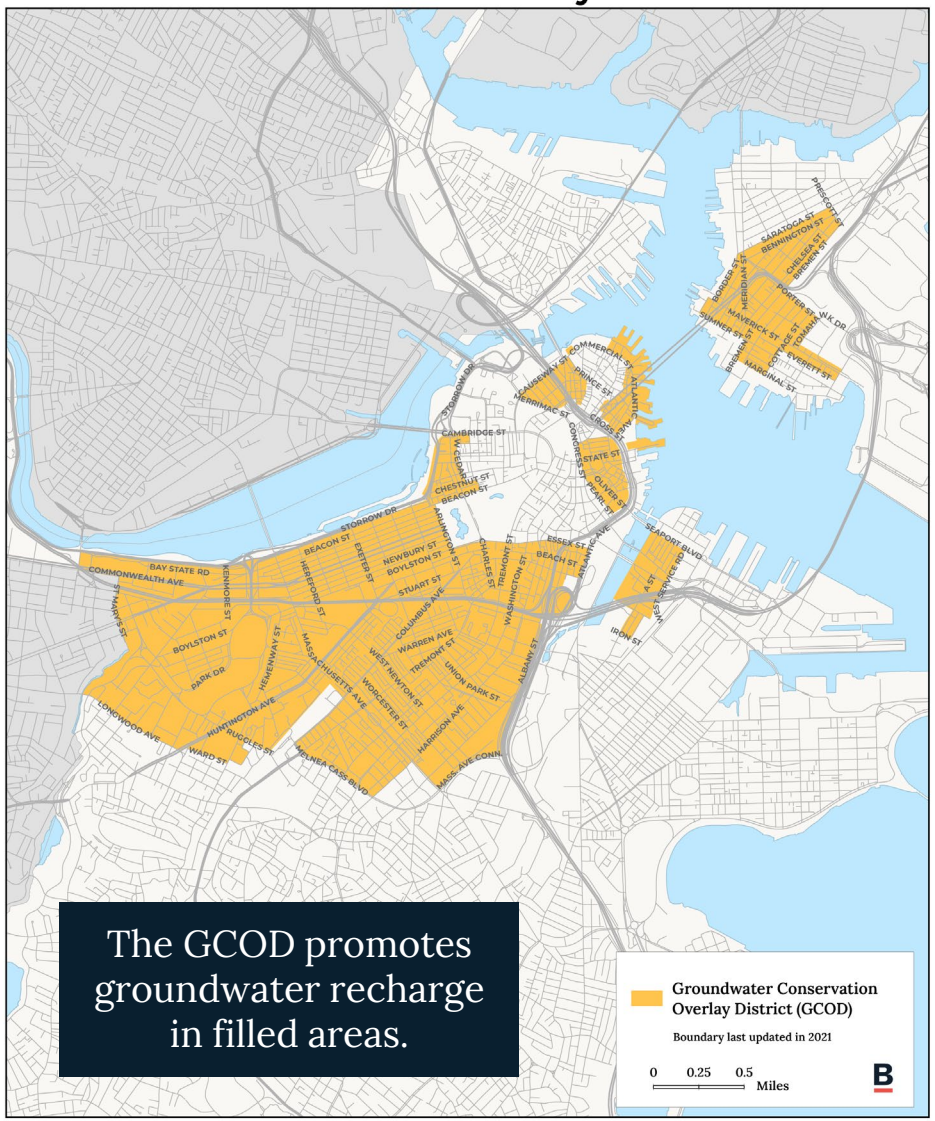
Many historic rowhouses in Boston, built on wood piles in the 1800s, **require sufficiently high groundwater** to keep the piles submerged.

Lower groundwater levels can cause wood pilings to **deteriorate**, potentially damaging or destabilizing buildings.



Source: Boston Globe via Boston Groundwater Trust

Groundwater Conservation Overlay District

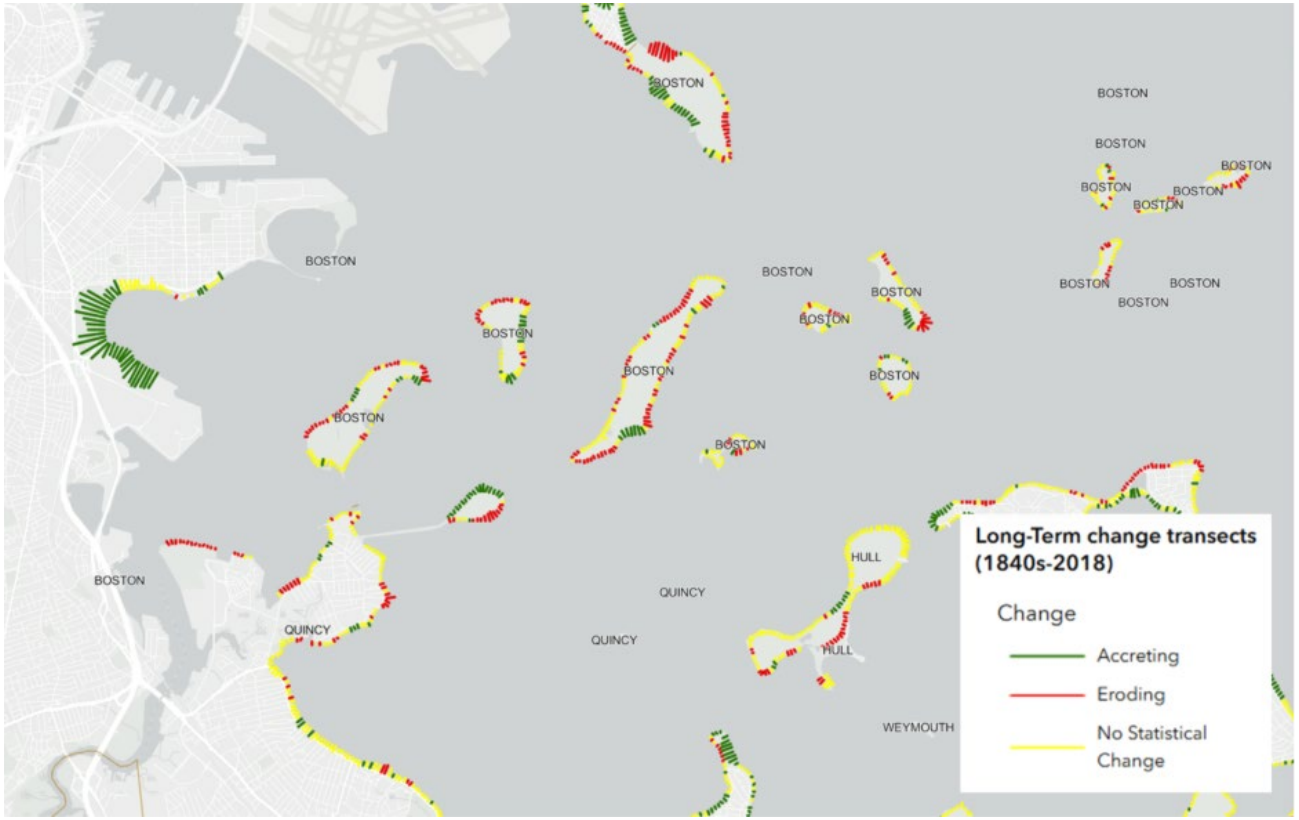


Source: City of Boston Planning Department

COASTAL EROSION

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- **Coastal Erosion:** The loss of coastal land and sediments over time, due to natural factors and/or human impacts.



Source: CZM Coastal Erosion Viewer



Eroding shoreline at Thompson Island.
Source: City of Boston

INVASIVE SPECIES

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- **Invasive Species:** A non-native organism (disease, parasite, plant, or animal) that spreads and can cause harm to the environment, economy, or human health.

Invasive species impacting Boston include:









Emerald Ash Borer

- First detected in Boston in 2014
- Kills ash trees
- Actively managed by Parks Department

Spotted Lanternfly

- First reported in MA in 2021, in Boston in 2025
- Causes damage to a variety of plants

Japanese Knotweed & Water Chestnut

- Found along Charles River and other waterways
- Alter aquatic ecosystems and degrade water quality
- Require active management; CRWA, DCR, Boston Parks Dept. collaborate on invasives removal along the Charles

DISCUSSION

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From these hazards (landslides / mudflows, earthquakes, changes in groundwater, coastal erosion, invasive species)...

What **impacts** do you expect to see on:

- Different assets?
- Neighborhoods?
- Vulnerable populations?

Impacts on Assets (Example)

People	Structures
Temporary displacement of residents due to unsafe housing conditions and utility disruptions.	Damage to foundations and underground structures due to soil instability or liquefaction in filled land areas (e.g., Back Bay, Seaport).
Community Lifelines and Other Critical Facilities	**Natural, Cultural, and Historic Resources**
Damage to transportation infrastructure such as bridges, tunnels, and MBTA lines, limiting emergency response and regional mobility.	Potential release of hazardous materials from damaged industrial or waterfront facilities, impacting local waterways and ecosystems.
Economy and Activities that have Value to the Community	
Business interruption and economic losses from damaged commercial districts and prolonged infrastructure outages.	

DRAFT
Do not edit
How to change the design



From these hazards (landslides / mudflows, earthquakes, changes in groundwater, coastal erosion, invasive species)...

What impacts do you expect to see on:
- Different assets?
- Neighborhoods?
- Vulnerable populations?

The Slido app must be installed on every computer you're presenting from

slido

From these hazards (landslides / mudflows, earthquakes, changes in groundwater, coastal erosion, invasive species)... What impacts do you expect to see on: - Different assets? - Neighborhoods? - Vulnerable populations?

(1/2)

0 0 5

- Capability to actually asses all the buildings that might need it at the time
- coastal erosion affecting marine ecosystem including food sources
- Higher insurance rates
- groundwater changes affecting stormwater drainage patterns?
- invasive plant species crowding out native species, leading to reduced plant diversity and increased risks to maintaining tree canopy
- Change in home buying trends?
- mosquito born disease
- accelerated land subsidence
- groundwater impacts shifting buried utilities
- rise in new agricultural pests affecting agricultural crops
- groundwater changes impacting water retention in agriculture and wooded

From these hazards (landslides / mudflows, earthquakes, changes in groundwater, coastal erosion, invasive species)... What impacts do you expect to see on: - Different assets? - Neighborhoods? - Vulnerable populations?

(2/2)

0 0 5

areas as well as soil quality and composition

- Undermined / unstable retaining walls

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Boston City Hall, photo by Weston & Sampson

Next Steps

NEXT STEPS

- **Review of Chapter 4**: Hazard Profiles, coming in sections to the ESC
- Chapter 5: Capabilities Assessment, forthcoming
- **Next ESC Meeting #4:** May 13th, 10:30am-12pm **in-person** at the Civic Pavilion – Mitigation Actions



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Boston City Hall, photo by Weston & Sampson

Q&A

DRAFT

Client:	City of Boston
Project Name:	FY25 NHMP Update
Project Number:	ENG25-1200
Date:	April 1, 2026
Time:	10:30 AM
Location:	Zoom

Attendees

- Jennie Moonan | W&S
- Madison Biasin | W&S
- Olivia Hemond | W&S
- Allen Ryan | OEM
- Chris Osgood | Office of Climate Resilience
- John Tiano | OEM
- John Sullivan | BWSC
- Adrian Jordan | OEM
- Ky'Ron Owens | OEM
- Max Rome | OGI
- Kendall Bobula | OEM
- Sean Edelman | OBM
- Shani Fletcher | GrowBoston/MOH
- Mellissa Honeywood | Boston OFJ

Storms, Flooding, and High Winds

- Updated findings from the U.S. Army Corps of Engineers on projected economic losses and property damage are anticipated in July 2026; relevant information will be incorporated into the HMP as appropriate.
- Dam failure risk was identified as a concern; dams are included in the asset inventory and will also be addressed in the hazard analysis.
- FEMA floodplain mapping is based on regional-scale modeling and is not highly granular at the site level.
- The HMP uses publicly available datasets applied at a planning scale through spatial analysis of hazards and City assets.

- Potential mitigation actions may include site-specific studies to better refine localized flood risks.
- The Neponset River dams were identified as a specific area of concern, with ongoing coordination efforts noted.
- Critical infrastructure vulnerabilities were identified, including:
    - Morrissey Boulevard
    - Power stations
    - Bus infrastructure
    - MBTA facilities
- The location of emergency shelters and fire stations relative to mapped flood zones may warrant further evaluation.
- Extreme flooding scenarios previously considered unlikely should be considered in planning, given recent events in other regions.

Extreme Heat and Severe Weather

- The City's role during poor air quality events is largely limited to public communication and information sharing.
- Extreme heat impacts on schools include cancellation of outdoor activities and events.
- Schools may need contingency plans for outdoor programming due to increasing frequency of heat events.
- Concerns were raised about aging school facilities and the reliability of air conditioning systems.
- Aging buildings more broadly contribute to increased vulnerability during heat events.
- Residents may seek relief in privately owned, air-conditioned buildings during extreme heat.
- Tree canopy stress resulting from prolonged heat was identified as an emerging concern.
- Major outdoor events (e.g., marathons) may be affected by extreme temperature conditions.
- Drought impacts to groundwater levels within the Groundwater Conservation Overlay District (GCOD) were noted, including risks to wood pile-supported foundations.
- Increased snow removal costs were discussed as a financial impact, more appropriately addressed in the Capabilities Assessment section.

Land Shift Changes

- Seismic events are infrequent and may not be immediately recognized when they occur.
- Japanese knotweed was identified as a significant and expanding invasive species concern.
- Tree of heaven was noted as a lesser concern compared to other invasive species.
- Observations of shifting home-buying trends included:
    - Movement away from coastal areas
    - Potential influence of insurance-related constraints
    - In higher-value markets, insurance considerations may have limited influence on purchasing decisions.

DRAFT

55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

May 7, 2026

City of Boston, Office of Emergency Management
85 Bragdon Street
Boston, MA 02119

Re: **Boston FY25 Natural Hazard Mitigation Plan (NHMP) Update, Final ESC Meeting**

Dear 2025 NHMP Executive Steering Committee:

Please see the agenda for the 4th Executive Steering Committee (ESC) Meeting below. The meeting will be held in person at the Civic Pavilion. Please let us know if you have any questions.

Meeting Date: Wednesday May 13, 2026
Time: 10:30 AM – 12:00 PM
Location: In person at the Civic Pavillion, 5 Congress Street, Boston, MA

Agenda:

- Brief Overview of Mitigation Actions
  - What are they and why are they important?
- Mitigation Action Development Activity
  - Please be prepared to have small group discussions and to develop actions for the 15 various hazards.
- Mitigation Action Prioritization Activity
  - All actions will be prioritized in high, medium, and low priority list.
- Next steps
  - Review of Chapters – Hazard Profiles and Capabilities Assessment
  - Role of ESC in filling out information as the action list develops
  - Public and Local Planning Team engagement

Preparation:

1. *The final list of mitigation actions should be reflective of what the city has in terms of upcoming projects.* Please be prepared with an understanding of what your department has upcoming and what you may want funding for in the future.

2. There are still several outstanding actions from the previous plan and will need to be carried over into the next plan. *Please review the status of those that have not been completed and provide relevant information:* 2021 Mitigation Actions Tracker

Sincerely,
WESTON & SAMPSON ENGINEERS, INC.

Madison Biasin
Resiliency Planner II

DRAFT

Biasin, Madison

Subject: Boston NHMP Update ESC Meeting #4: Mitigation Actions
Location: Civic Pavilion, 5 Congress St, Boston, MA 02203, USA

Start: Wed 5/13/2026 10:30 AM
End: Wed 5/13/2026 12:00 PM

Recurrence: (none)

Meeting Status: Accepted

Organizer: Allen Ryan

This event has been updated

Changed: description, attachments

Description CHANGED

Hi all,

On behalf of the Boston Natural Hazard Mitigation Plan (NHMP) Update Team, please join us for the 4th Executive Steering Committee Meeting where will be discussing Mitigation Actions.

This meeting will be hosted in person at the Civic Pavilion adjacent to City Hall. An agenda has been attached to the meeting invitation.

During the meeting, the Steering Committee will participate in an activity to develop mitigation actions for each identified hazard. Participants will then report out on their top actions before collectively identifying actions for prioritization within the NHMP update process.

If you are unable to attend, please designate a representative from your department to participate on

Attachments CHANGED

ESC #4 Meeting Agenda.pdf

your behalf ensure departmental representation from all at this important stage of the NHMP update.

Please reach out with any questions!

Thanks,
Allen

When

Wednesday May 13, 2026 · 10:30am – 12pm (Eastern Time - New York)

Location

Civic Pavilion, 5 Congress St, Boston, MA 02203, USA
View map

Guests

Allen Ryan - organizer
Adrian Jordan
berkeleyc@bwsc.org
Biasin, Madison
Brooke Majewski
Christopher Osgood
ctiggas@bphc.org
hemond.olivia@wseinc.com
jbarros@bphc.org
John Tiano
Kendall Bobula
Kyron Owens
laurentie@bwsc.org
Logan Grant
Maggie Owens
maw@bwsc.org
Mellissa Honeywood
moonan.janet@wseinc.com
Sean Edelman
Seidel, Robin
Shani Fletcher
sullivanjp@bwsc.org
Max Rome
Nayeli Rodriguez
Peggy Zhang

DRAFT

Sarah Herbert
View all guest info

Reply for biasin.madison@wseinc.com

Yes	No	Maybe
More options		

Invitation from Google Calendar

You are receiving this email because you are an attendee on the event.

Forwarding this invitation could allow any recipient to send a response to the organizer, be added to the guest list, invite others regardless of their own invitation status, or modify your RSVP. Learn more

CITY of BOSTON

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NATURAL HAZARD MITIGATION PLAN

ESC Meeting #4 | May 13, 2026

Sign-in Sheet

NAME	DEPARTMENT	TITLE
Janet Moonan	WSE	Associate
Kenlack Bdula	OEM	Dir of Plan/Prep
John Tian	OEM	EM Planner
Allen Ryan	OEM	EM Planner
Olivia Hemond	WSE	Environmental Scientist
Madison Biasin	WSE	Resiliency Planner
CHASE BERKELEY	BWSC	CHIEF OF OPERATIONS
Logan Grant	ISD	Floodplain Administrator

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CITY of BOSTON

NATURAL HAZARD MITIGATION PLAN

ESC Meeting #4 | May 13, 2026

Sign-in Sheet

NAME	DEPARTMENT	TITLE
Max Rome	Office Of Green Infrastructure	Director
Maggie Owens	Parks and Rec	Planning Project Manager
Nayeli Rodriguez	Office of Climate Resilience	Deputy Dir.



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CITY of BOSTON

NATURAL HAZARD MITIGATION PLAN

ESC Meeting #4
May 13, 2026

Weston & Sampson

WHAT IS THE MITIGATION STRATEGY?

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Serves as the **long-term blueprint for reducing the potential losses** identified in the risk assessment.

GOALS

What long term goals do you want to achieve?

ACTIONS

What specific actions will local government, community organizations, and others take to reduce risk to hazards?

ACTION PLAN

How will the actions be prioritized and implemented?

MITIGATION GOALS

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Implement strategic and equitable hazard mitigation planning by building a comprehensive and adaptable approach that integrates social, economic, and environmental solutions focused on minimizing risks that guide long term effective resilience planning.

Build **informed, connected communities** ready for natural hazards.



Encourage the **protection of private property** and buildings.



Create **community resilience** and promote neighborhood-level education and stewardship.





Support vulnerable populations before, during, and after hazard events.



Coordinate investments citywide, countywide, and statewide.



Enhance post-disaster recovery by fostering a collaborative mindset and increasing energy independence.

MITIGATION ACTIONS

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A measure, project, plan, or activity proposed to reduce or eliminate current and future vulnerabilities described in the risk assessment.

Local Plans and Regulation

These actions include government authorities, policies or codes that influence the way land and buildings are developed and built.

Structure and Infrastructure Projects

These actions involve modifying existing structures and infrastructure to protect them or remove them from a hazard area.

Natural Systems Protection

This action can include GI and low impact development, NBS, and more to incorporate natural features/processes into the built environment.

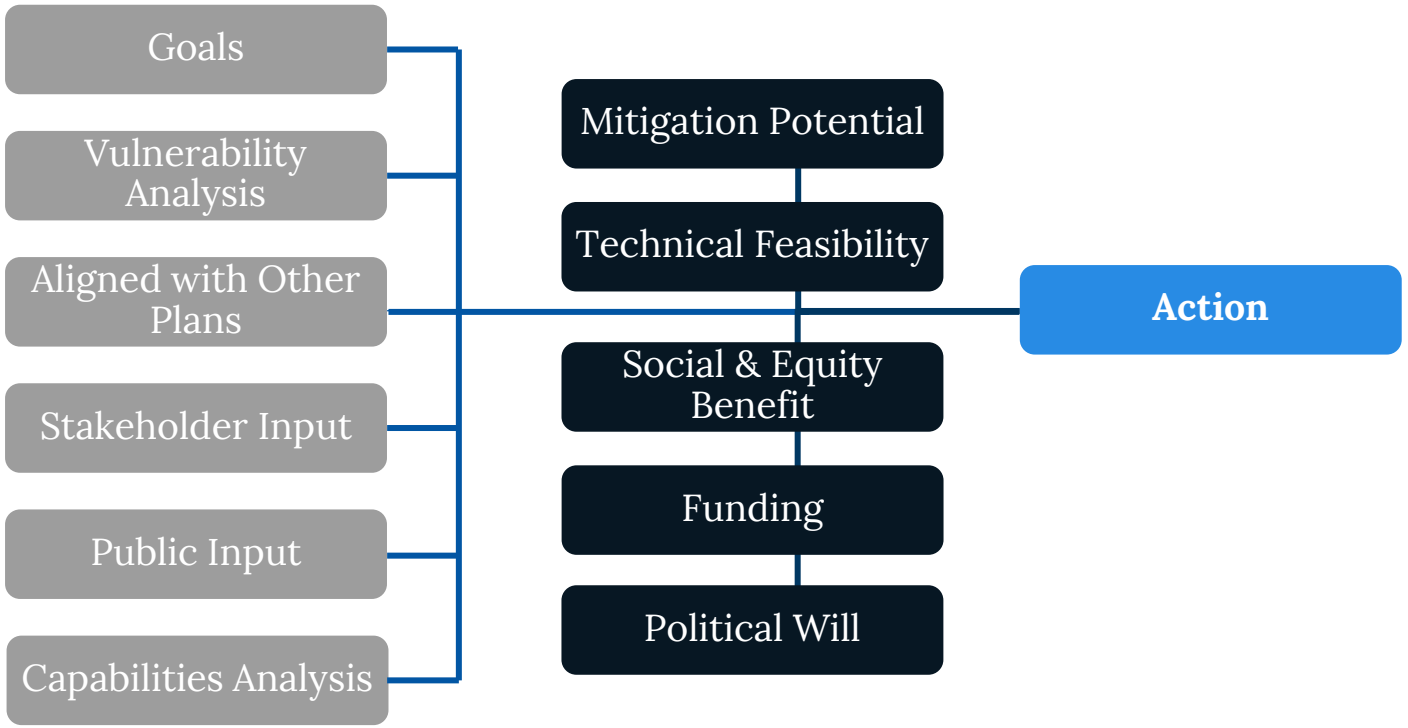
Education and Awareness Programs*

These actions keep residents informed about potential natural hazard events and impacts.

*Many of these types of actions are eligible for funding through the FEMA HMA program.

CONSIDERATIONS FOR MITIGATION ACTIONS

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Additional details include:

- One or more actions per natural hazard
- Robust prioritization process
- Specific funding ideas including grants, loans, department's funding, etc.
- Details on implementation including responsibility and timelines

MITIGATION ACTION PLAN

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Matrix including the following:

- Action ID
- Description
- Hazard(s) Addressed
- Goal Alignment
- Responsible and Coordinating Bureaus and Agencies
- Timeframe
- Benefits
- Costs ($ - $$$$$ scale)
- Technical Feasibility
- Potential Funding Sources
- Prioritization (High, Medium, Low)

Action ID	Description	Hazard(s) Addressed	Goal Alignment	Responsible Agencies	Timeframe	Benefits	Costs	Technical Feasibility	Funding Source	Prioritization

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Boston City Hall, photo by Weston & Sampson

Mitigation Actions Development

2021 MITIGATION ACTIONS TO CARRY FORWARD

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ID	Mitigation Action	Est. Year of Completion	Priority	Responsibility	Status	Progress & Achievements	Barriers or Reasons for Lack of Completion	Include in Updated Plan?	Updates or Revisions to Action	Updated Est. Year of Completion
A1	Emergency Shelter Assessment and Improvements	2025	High	**OEM**, BCYF, BPS						
A2	Establish Flood Protection Overlay Districts	2025	High	**BPDA,** Environment Department						
A3	Implement Recommended Actions in Boston's Citywide Heat Resiliency Study	2022 Complete study	High	BPDA, BPHC, **Environment Department**, OEM, Parks and						
A4	Improve the Resiliency of the Boston Marine Industrial Park and Long Wharf Improvements	2024 Complete analysis and construction	High	**BPDA**						
A5	Adapt Morrissey Boulevard for Flood Resilience	2030	High	BPDA, **DCR, MassDOT**						
A6	Address Vulnerabilities to Tidal Flooding at McCormack and Dever Schools	2035	High	**BPS**						
A7	Finalize the Design and Construct the Coastal Resilience Barriers at the Carlton and Lewis Mall Flood Pathways in East Boston	2027	High	**BPDA**						
A8	Implement Climate Ready Boston and Continue to Develop Strategies that Integrate Various Natural Hazards	2030	High	BPDA, BTD, **Environment Department**, Parks and Recreation, Public Works						
A9	Muddy River Flood Control	2023	High	**Army Corp of Engineers**, DCR, Parks and Recreation, Town of Brookline						
A10	Prepare Parks and Outdoor Facilities for Climate Change	2026 Finalize construction of park projects list in additional context	High	Environment Department, **Parks and Recreation**						
A11	Expand Citywide Climate Readiness Education, Engagement, and Leadership Development Campaigns	2025 Will eventually be an operational capacity and captured in Ch. 5	High	BPDA, Environment Department, **OEM**						
A12	Implement an Action Plan to Enhance Boston's Urban Tree Canopy and Protect Residents From the Impacts of Extreme Heat	2022 Finish Urban Forest Master Plan	High	Environment Department, **Parks and Recreation**						
A13	Promote Resilience in Buildings and Encourage Green Infrastructure in Site Design	2025	High	**BPDA**, Environment Department, ISD, Parks and						
A14	Rutherford Ave/Charlestown Underpass – Manage Tunnel to Reduce Flood Impacts	2029	High	**Parks and Recreation**						

Information Needs:

- Action's status
- Progress & achievements
- Barriers
- Relevance to 2026 update (Include?)
- If yes, updates to action description/ timeline/ responsibility (if any)

30 mins

ACTION DEVELOPMENT

Mitigation Actions Matrix

City of Boston 2026 Natural Hazard Mitigation Plan Update

Weston & Sampson

Hazards	Action #1	Action #2	Action #3
Average / Extreme Temperatures			
Changes in Groundwater			
Coastal Erosion			
Coastal Flooding and Storm Surge			
Drought			
Earthquakes			
Flooding from Precipitation			
Hurricanes / Tropical Cyclones			

Mitigation Actions Matrix

City of Boston 2026 Natural Hazard Mitigation Plan Update

Weston & Sampson

Hazards	Action #1	Action #2	Action #3
Invasive Species			
Landslides / Mudflows			
Other Severe Weather			
Severe Winter Weather / Nor'easters			
Tornadoes			
Tsunamis			
Wildfires			

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Boston City Hall, photo by Weston & Sampson

Next Steps

NEXT STEPS

- **Review of Chapter 4:** Hazard Profiles, coming in sections to the ESC
  - Round 1 – review done
  - Round 2 – review due by May 18th
  - Round 3 – WSE wrapping up
- **Chapter 5:** Capabilities Assessment, forthcoming
- **Chapters 6 and 7** will be started following this meeting
- **Virtual Local Planning Team Meetings:** Additional department staff, and local, and regional stakeholders
  - June 3rd, 12pm
  - June 10th, 6pm



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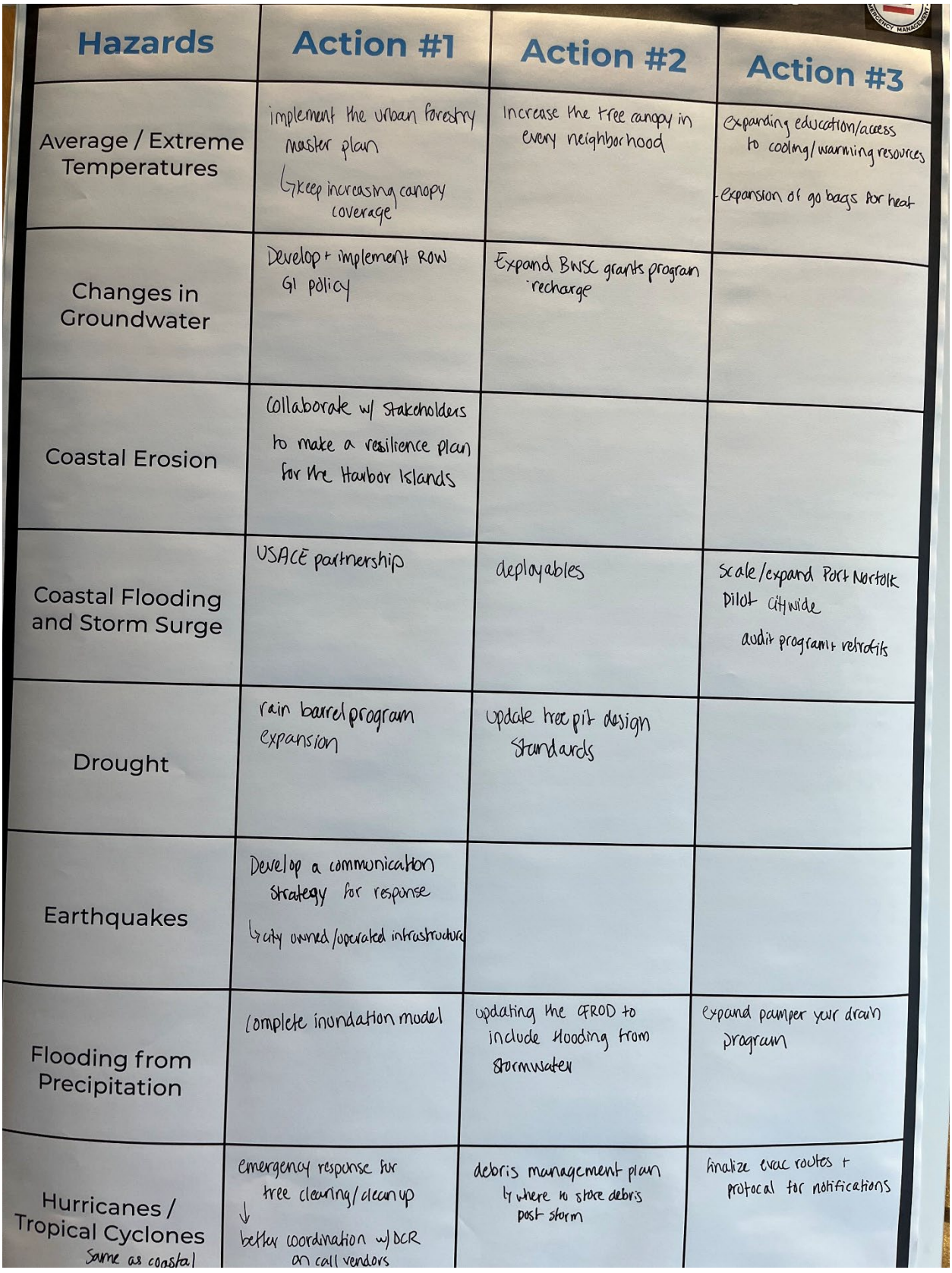
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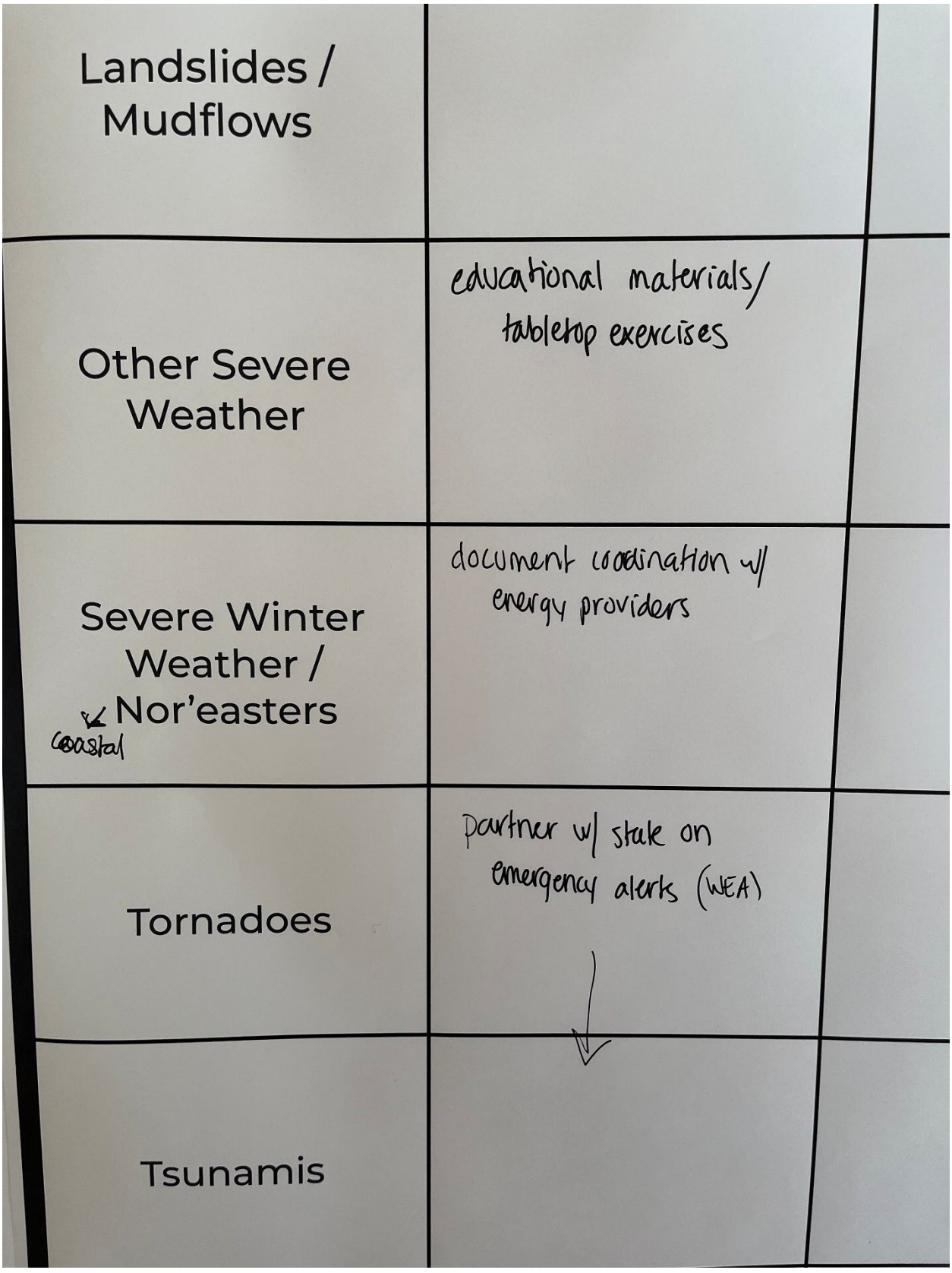
Mitigation Actions Matrix

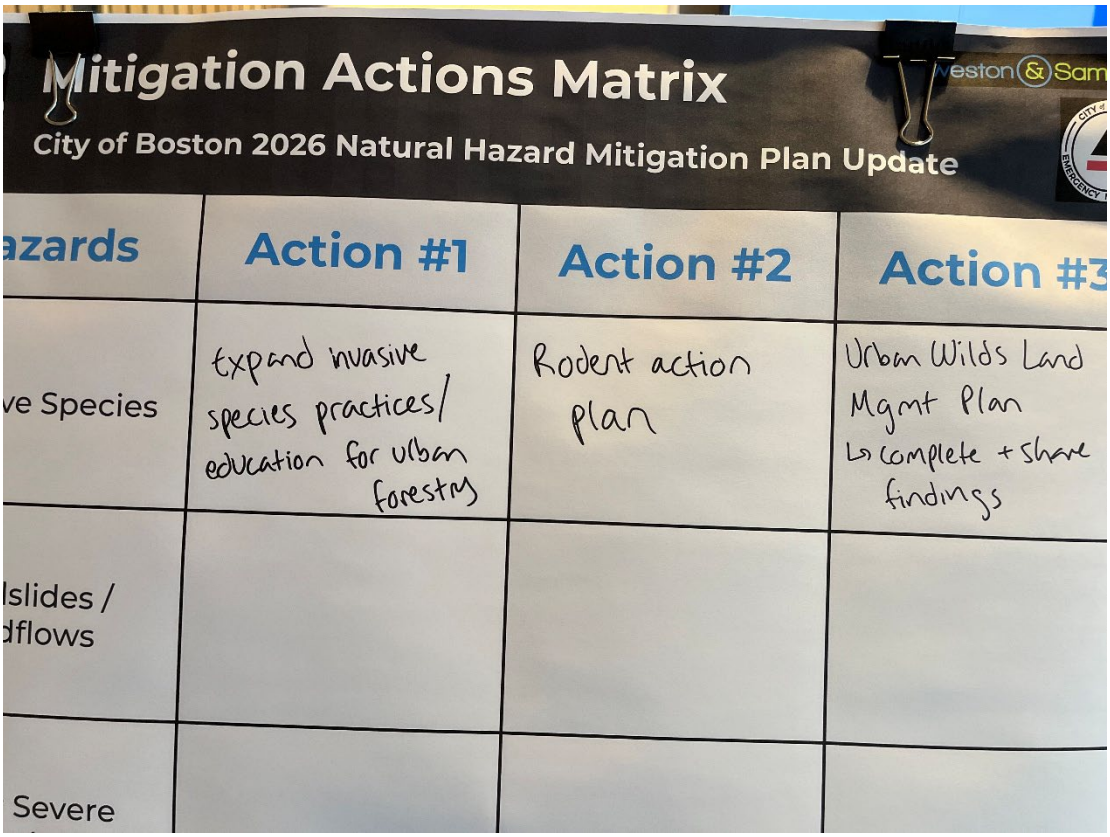
City of Boston 2026 Natural Hazard Mitigation Plan Update

Hazards	Action #1	Action #2	Action #3
Invasive Species	expand invasive species practices/ education for urban forestry	Rodent action plan	Urban Wilds Land Mgmt Plan ↳ complete + share findings
Landslides / Mudflows			
Other Severe Weather			
Severe Winter Weather / Nor'easters			
Tornadoes			
Tsunamis			
Wildfires	Urban Wilds Land Mgmt Plan? ↳ include wildfire?		



Hazards	Action #1	Action #2	Action #3
Average / Extreme Temperatures	implement the urban forestry master plan ↳keep increasing canopy coverage	Increase the tree canopy in every neighborhood	Expanding education/access to cooling/warming resources -Expansion of go bags for heat
Changes in Groundwater	Develop + implement ROW GI policy	Expand BWSC grants program recharge	
Coastal Erosion	Collaborate w/ stakeholders to make a resilience plan for the Harbor Islands		
Coastal Flooding and Storm Surge	USACE partnership	deployables	Scale/expand Port Norfolk Pilot citywide audit program + retrofits
Drought	rain barrel program expansion	Update tree pit design standards	
Earthquakes	Develop a communication strategy for response ↳city owned/operated infrastructure		
Flooding from Precipitation	Complete inundation model	updating the CFROD to include flooding from stormwater	expand pamper your drain program
Hurricanes / Tropical Cyclones Same as coastal	emergency response for tree clearing/clean up ↓ better coordination w/DCR on call vendors	debris management plan ↳where to store debris post storm	finalize evac routes + protocal for notifications

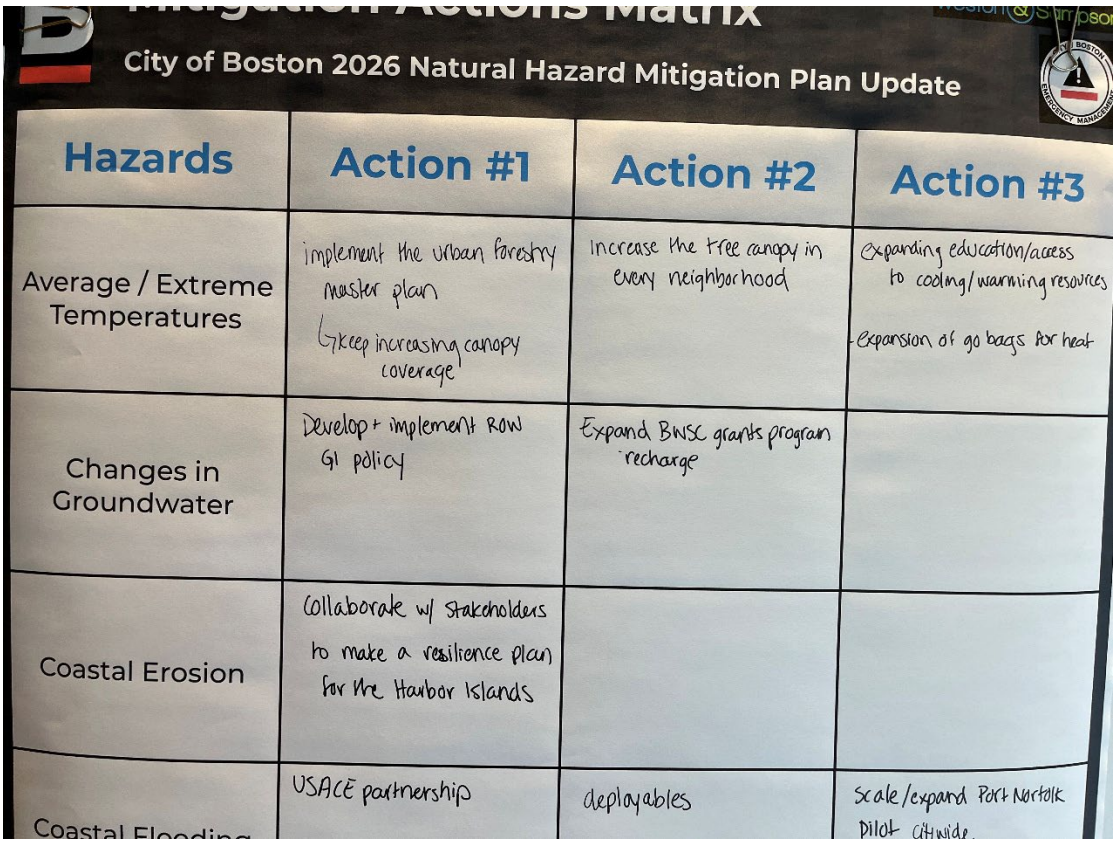

Landslides / Mudflows
Other Severe Weather
educational materials/ tabletop exercises
Severe Winter Weather / Nor'easters
coastal
document coordination w/ energy providers
Tornadoes
partner w/ state on emergency alerts (WEA)
Tsunamis



Mitigation Actions Matrix

City of Boston 2026 Natural Hazard Mitigation Plan Update

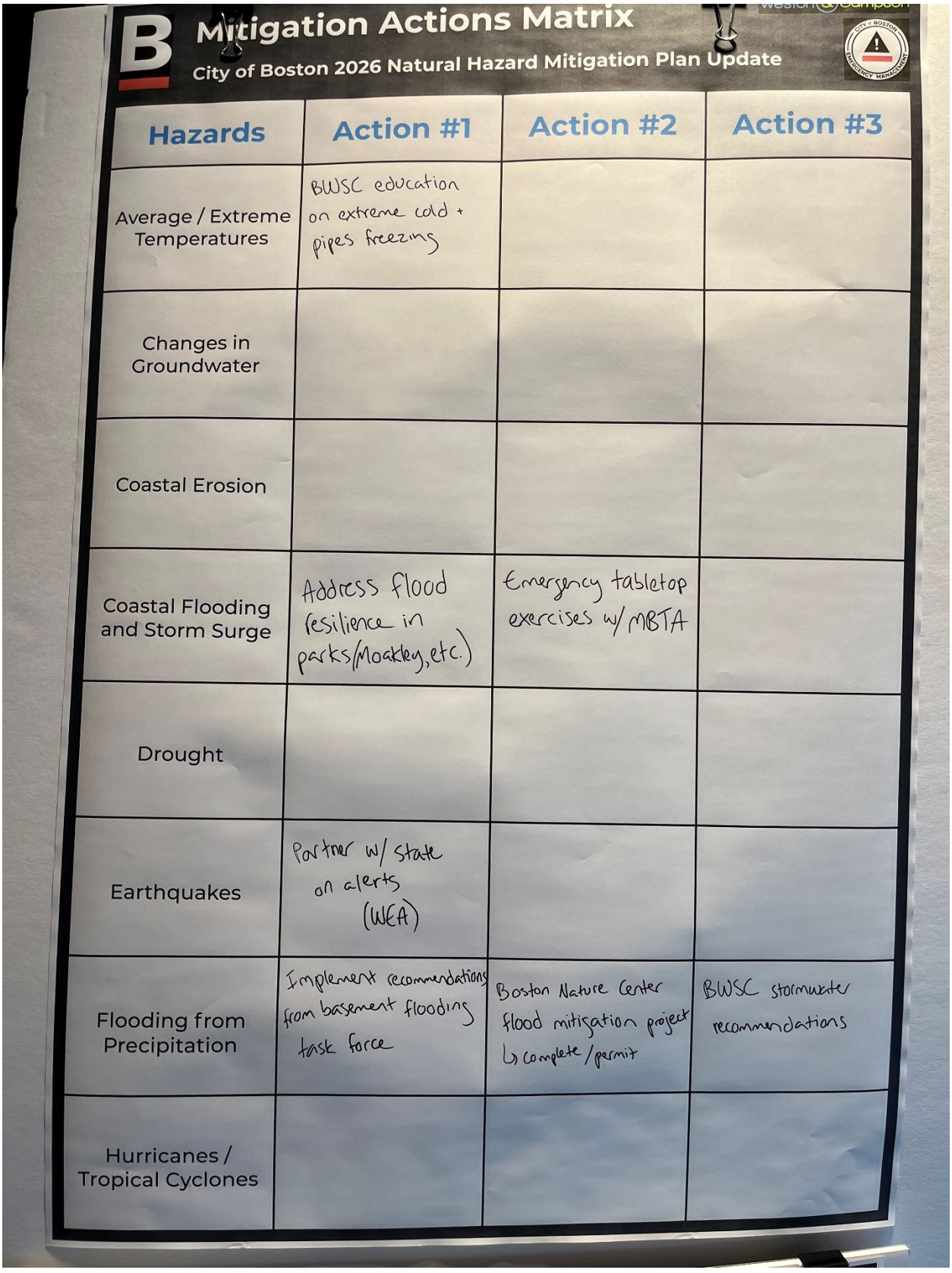
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Severe			



Mitigation Actions Matrix

City of Boston 2026 Natural Hazard Mitigation Plan Update

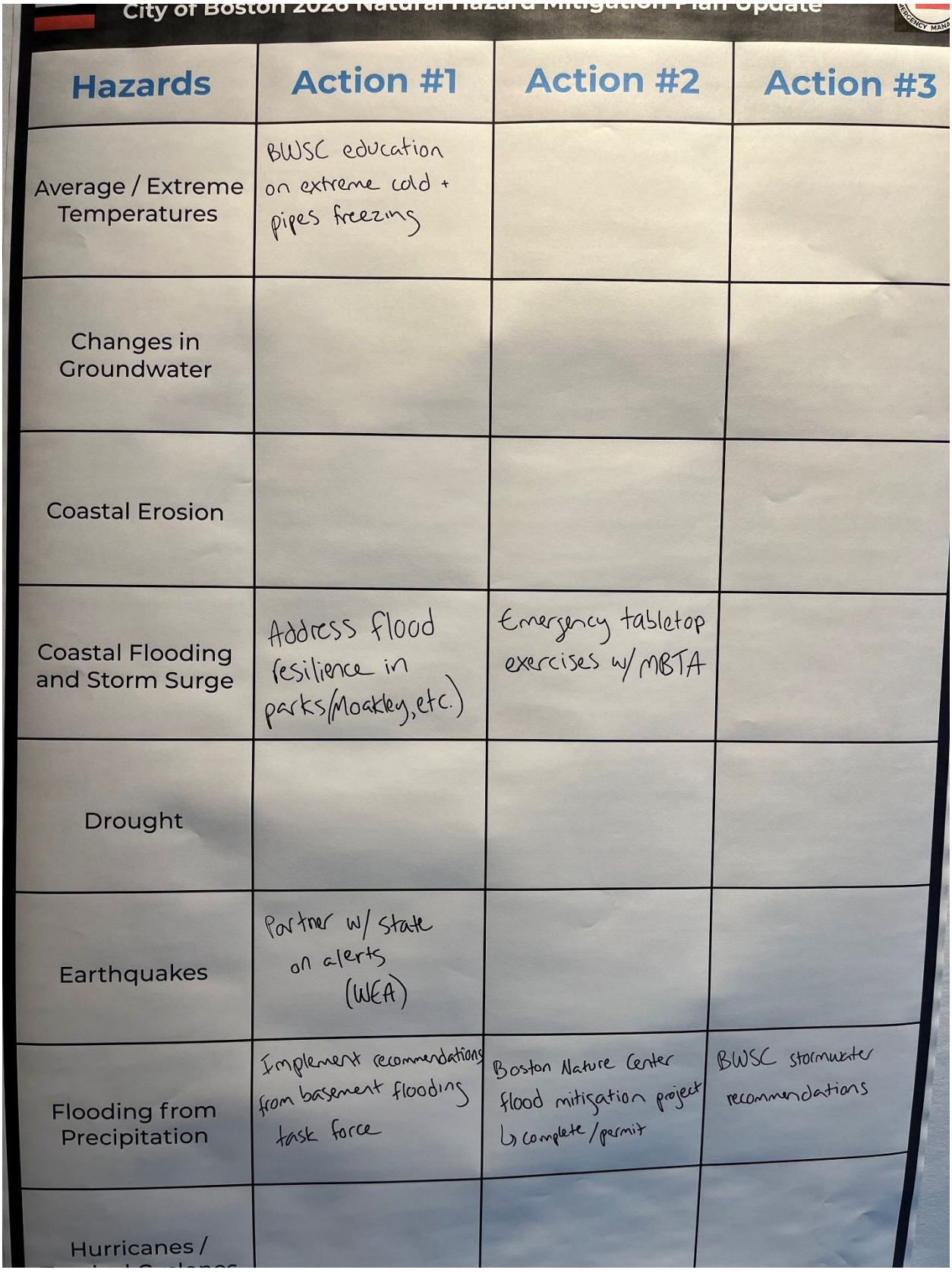
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Coastal Flooding	USACE partnership	deployables	scale/expand Port Norfolk Pilot citywide



Mitigation Actions Matrix

City of Boston 2026 Natural Hazard Mitigation Plan Update

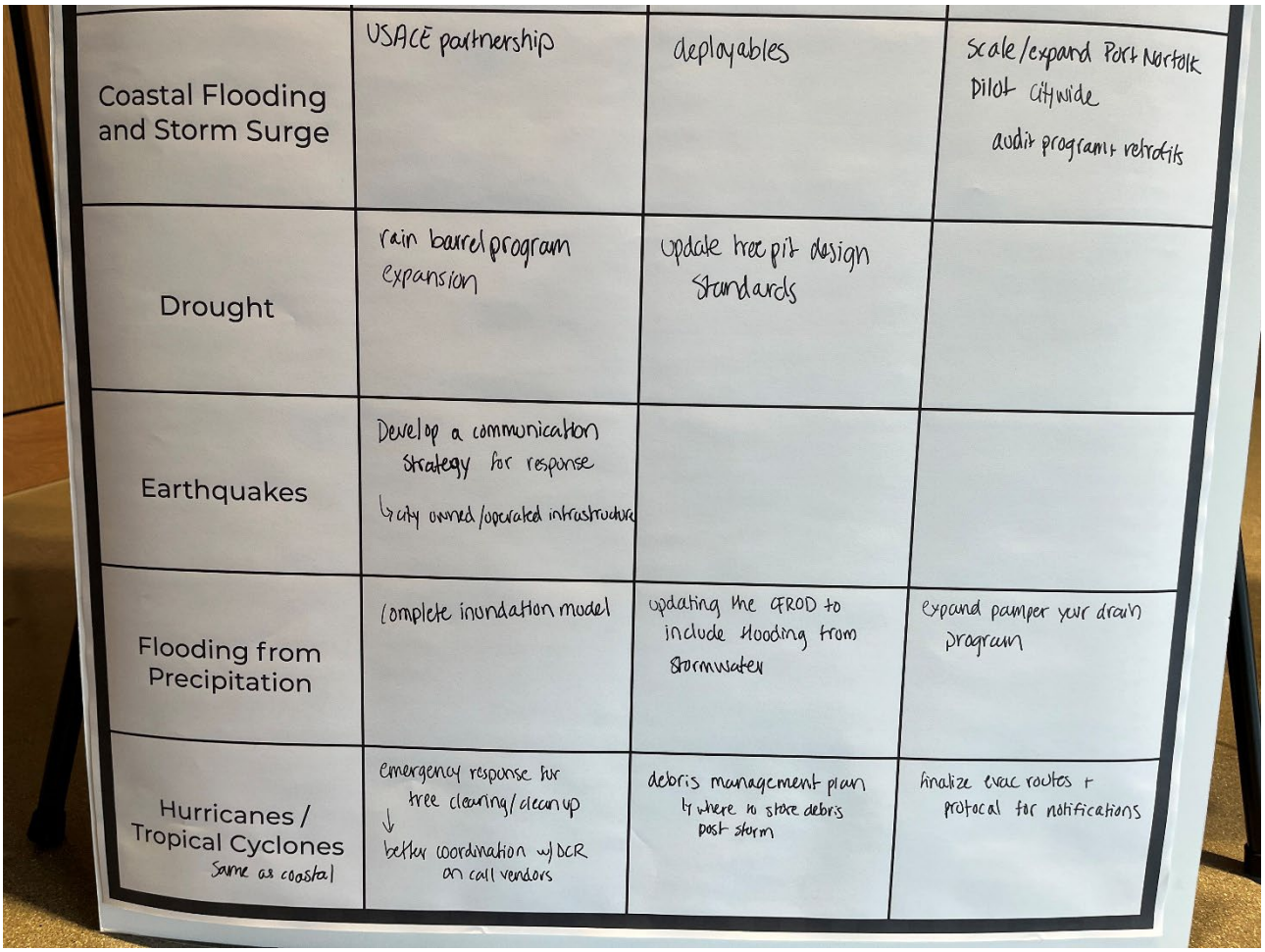
Hazards	Action #1	Action #2	Action #3
Average / Extreme Temperatures	BWSC education on extreme cold + pipes freezing		
Changes in Groundwater			
Coastal Erosion			
Coastal Flooding and Storm Surge	Address flood resilience in parks (Moakley, etc.)	Emergency tabletop exercises w/ MBTA	
Drought			
Earthquakes	Partner w/ State on alerts (WEA)		
Flooding from Precipitation	Implement recommendations from basement flooding task force	Boston Nature Center flood mitigation project ↳ complete / permit	BWSC stormwater recommendations
Hurricanes / Tropical Cyclones			



City of Boston 2026 Natural Hazard Mitigation Plan Update

Hazards	Action #1	Action #2	Action #3
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Hurricanes /			

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Coastal Flooding and Storm Surge	USACE partnership	deployables	Scale/expand Port Norfolk Pilot citywide audit programs + retrofits
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DRAFT

Client:	City of Boston
Project Name:	FY25 NHMP Update
Project Number:	ENG25-1200
Date:	May 13, 2026
Time:	10:30 AM
Location:	In person at the Civic Pavillion, 5 Congress Street, Boston, MA

Discussion focused on mitigation actions for the City of Boston for each identified natural hazard. Key points are summarized below.

Average / Extreme Temperatures

- Address both indoor and outdoor heat and cold through policy and programming.
- Advance the Urban Forest Master Plan:
  - Increase tree canopy citywide, with focus on neighborhood equity.
  - Support Climate Action Plan goal of 30% canopy cover.
  - Prevent further canopy loss and expand canopy on both public and private property.
- Incorporate built environment strategies:
  - Expand green infrastructure and open space access.
  - Evaluate impacts of paving and impervious surfaces.
- Strengthen utility and infrastructure approaches:
  - Require utility coordination (e.g., undergrounding where applicable) through Article 80 for new development.
  - Advocate at the state level for utility shutoff moratoriums during extreme temperature events.
- •Expand cooling and heating support:
  - Increase awareness of and access to cooling/heating centers (potential OEM coordination).
  - Explore distribution of cooling kits (expanded “go-bag” model).
  - Address barriers to AC use (e.g., operating costs), even where units are available.
  - Align with existing policies (e.g., BPHC AC prescriptions, Mayor’s Office initiatives).
- Advance building and energy strategies:
  - Expand energy-efficiency retrofit programs (including partnerships with BHA).
  - Highlight co-benefits of retrofits for affordability and resilience.
- Consider additional cooling strategies:
  - Evaluate feasibility of hydrant misters and misting stations (noting maintenance challenges).
- Address extreme cold risks:
  - Mitigate impacts such as frozen pipes (noted widespread issues in winter 2025–2026).

- Expand public education (e.g., preventative measures like dripping taps).

Changes in Groundwater

- Coordinate with the Groundwater Commission:
  - Monitor groundwater wells and flagged recharge areas.
  - Align with existing tools such as the Groundwater Conservation Overlay District.
- Strengthen policies that support groundwater recharge:
  - Advance green infrastructure through initiatives like the GI Streets Policy (Action A17).
  - Prioritize recharge alongside stormwater management.
- Address key risks and concerns:
  - Salt intrusion from runoff.
  - Sea-level rise impacts on groundwater levels.
- Improve data and planning tools:
  - Expand mapping of impervious surfaces and stormwater flooding to inform recharge strategies.
- Leverage existing systems and partnerships:
  - Coordinate with BWSC on billing, infrastructure, and program implementation.
- Action items:
  - Expand and implement stormwater grant programs with BWSC.
  - Shift program focus more toward groundwater recharge, in addition to flood mitigation.

Coastal Erosion

- Not a widespread issue in Boston; limited to a few localized areas.
- Align with and leverage actions from the 2023 ResilientMass Plan for coastal erosion and resilience strategies.
- Focus on priority areas, particularly the Harbor Islands:
  - Continue developing a resilience planning framework.
  - Collaborate across agencies and stakeholders to advance a Harbor Islands resilience plan.

Coastal Flooding & Storm Surge

- Consider whether to group resiliency plans to improve coordination and consistency.
- Highlight major partnerships and planning efforts:
  - Reference USACE collaboration and ongoing studies addressing regional coastal flooding.
- Expand use of deployable flood protection measures:
  - Track and evaluate pilot efforts (e.g., Kendall) for potential broader application.
- Advance residential-scale resilience programs:
  - Pilot home flood risk assessments and scale citywide.
  - Expand audit programs and fund property-level retrofits (e.g., through FMA funding).
  - Evaluate effectiveness and applicability of flood kits (NYC model may not be suitable).
  - Explore additional funding sources (e.g., “Reggie” fund).
- Coordinate and leverage existing investments:
  - Compile and align ongoing coastal resilience and capital projects (including parks).

- Strengthen emergency preparedness:
    - Conduct interagency emergency exercises (e.g., tabletop exercise with MBTA).

Drought

- Water supply is not currently a major constraint for Boston.
- Focus on landscape- and infrastructure-based resilience strategies:
    - Expand and maintain tree canopy (key priority).
    - Advance updates to street tree design standards (Office of Green Infrastructure).
    - Integrate drought resilience into green stormwater infrastructure (GSF).
- Continue and enhance water conservation programs:
    - Maintain and expand the rain barrel program.
- Emphasize tree-focused actions:
    - Support tree health and survival during dry periods.
    - Increase planting and maintenance strategies adapted to drought conditions.
- Policy consideration:
    - Evaluate whether and how Boston should align with or adopt regional drought restrictions in the future.

Earthquakes

- Maintain and strengthen emergency coordination:
    - OEM to manage key contact lists and prioritize community safety response.
    - ISD serves as the lead agency for building-related response and coordination.
- Enhance communication and public preparedness:
    - Develop a dedicated communications strategy for earthquake events.
    - Utilize AlertBoston for rapid notifications (e.g., evacuation guidance, hazard alerts).
    - Pre-develop hazard-specific message templates for quick deployment.
- Expand public education resources:
    - Add an earthquake preparedness page to the city website with accessible guidance.
- Reinforce existing regulatory framework:
    - Continue implementation and enforcement of seismic design standards in the building code.

Flooding from Precipitation

- Advance modeling and planning:
    - Complete the citywide flooding model in partnership with BWSC.
    - Use results to establish a unified flood district that integrates coastal and stormwater flooding data.
- Address development and land use impacts:

    - Monitor how changing development patterns and increasing impervious cover affect flooding risk and distribution.
- Implement existing programs and studies:
    - Advance recommendations from the Basement Flooding Task Force.
    - Pursue actions outlined in BWSC's stormwater detention plan.
- Promote public awareness and maintenance:
    - Continue initiatives like "Pamper Your Drain" to reduce localized flooding.
- Leverage ongoing and completed projects:
    - Build on completed efforts such as the Muddy River Restoration.
    - Advance priority projects (e.g., Boston Nature Center / Canterbury Brook design and permitting).
- Coordinate infrastructure and resilience investments:
    - Align capital and green infrastructure projects to reduce stormwater flooding risk.

Hurricanes / Tropical Cyclones

- Coordinate with existing flood resilience efforts:
    - Align actions with coastal flooding and precipitation-based flooding strategies.
- Support climate mitigation:
    - Continue efforts to reduce greenhouse gas emissions to limit long-term risk.
- Improve response and recovery operations:
    - Strengthen emergency response protocols for tree debris and cleanup.
    - Enhance coordination with DCR, including exploring joint procurement opportunities.
- Advance debris management:
    - Build on OEM's existing debris management plan.
    - Develop a more comprehensive, citywide debris management strategy.
- Strengthen evacuation planning:
    - Finalize evacuation routes.
    - Establish clear notification and communication procedures for evacuations.

Invasive Species / Pests

- Coordinate with Urban Forestry Division:
    - Develop action items and incorporate their expertise.
    - Share and review climate vulnerability findings.
- Strengthen pest management programs:
    - Review and potentially expand ISD's rodent control plan.
    - Monitor and address emerging concerns (e.g., ticks).
- Advance land management planning:
    - Integrate invasive species and pest management into the Urban Wilds Management Plan.

Landslides / Mudflows

- Low-risk, small-scale issue in Boston.

- Align with applicable actions from the state resilience plan.

Other Severe Weather

- Detection and monitoring:
  - No existing lightning detection system identified.
- Coordination and planning:
  - Engage Parks Department for potential strategies.
  - OEM to expand educational materials and preparedness efforts.
  - Incorporate a broader range of severe weather scenarios into tabletop exercises.

Severe Winter Weather / Snow

- Address operational and infrastructure challenges:
  - Sidewalk clearing and parking management are key concerns.
  - Coordinate with Streets Department on winter operations.
- Manage overlapping risks:
  - Incorporate coastal flooding risks associated with nor'easters.
- Mitigate environmental impacts:
  - Address salting impacts on water quality, groundwater recharge, and surface waters.
- Strengthen utility coordination:
  - Document and formalize coordination with energy providers (e.g., Eversource via municipal hub).

Tornadoes

- Enhance emergency communications:
  - Utilize Wireless Emergency Alerts (WEA).
  - Develop pre-scripted hazard messages (can be shared across hazards such as earthquakes and tsunamis).

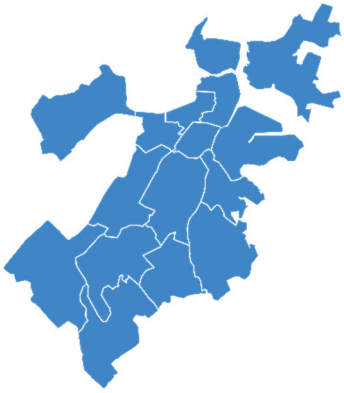
Tsunami

- Very low risk for Boston.
- Consider infrastructure vulnerabilities:
  - Generator elevation requirements exist for some new construction but not most older buildings.
  - Address within Coastal Flood Resilience Overlay District (CFROD) framework.

Wildfires

- Primarily an urban and wildland-urban interface concern (e.g., Urban Wilds areas).
- Advance prevention and management strategies:
  - Integrate into land management planning for vulnerable areas.
  - Explore potential use of controlled burns where appropriate.
- Coordinate with Fire Department on risk assessment, response, and mitigation strategies.

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APPENDIX C:

Local Planning Team Materials

Local Planning Team

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Join Our Local Planning Team!

We invite you to participate in the development of Boston's Natural Hazard Mitigation Plan as a valued member of the local planning team. Your expertise and perspective are critical to identifying risks, setting priorities, and advancing strategies that strengthen resilience across the City of Boston.

Get Involved in the Planning Process

Community Profile

Review the City of Boston's asset inventory, including critical facilities, infrastructure, and community resources. Provide input on whether key assets are accurately represented and identify any gaps.

Hazards, Risks, and Vulnerabilities

Explore hazard profiles, including data on climate-related risks such as flooding, extreme heat, and severe storms. Share insights on impacts, trends, and community vulnerabilities to help refine the analysis.

Mitigation Actions

Discuss proposed strategies and actions to reduce risk and improve resilience. Give feedback on priorities and opportunities to strengthen the City's mitigation efforts.

Virtual Sessions

The project team will be offering **two one-hour long virtual meeting sessions**. The meetings will be identical in content, providing an overview of the project and allowing for discussion and polling input on the planning process.

To sign up, please register through the links below for the date that works best for you!

Webinar Option 1: June 3, 2026
12:00 PM EST

Register for June 3rd here:
https://us06web.zoom.us/webinar/register/WN_FaRrB9XORhiaoj-5HCaqFw

Webinar Option 2: June 10th, 2026
6:00PM EST

Register for June 10th here:
https://us06web.zoom.us/webinar/register/WN_Wfna8eyPSLi8H2LpfNHFPA

After registering, you will receive a confirmation email containing information about joining the webinar.

Contact:

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DRAFT

City of Boston Natural Hazard Mitigation Plan



Weston & Sampson

CITY of BOSTON EMERGENCY MANAGEMENT

DRAFT

From: Allen Ryan
Subject: Boston NHMP Local Planning Team Invitation - June 3 & June 10
Date: Wednesday, April 8, 2026 9:06:09 AM
Attachments: Bos NHMP LPT Webinar Invite_June 2026.pdf

Hello,

We invite you to join our Local Planning Team and participate in an upcoming virtual workshop as part of the City of Boston's Natural Hazard Mitigation Plan (NHMP) update. The plan is being prepared through Boston's Office of Emergency Management. You are receiving this invitation because you have been identified as a valued local planning stakeholder. Some of you may have participated in the previous planning process in 2021, while others are newly engaged in this update. **Whether you are returning or joining for the first time, your expertise and perspective are essential to helping identify risks, set priorities, and develop strategies that strengthen resilience across Boston.**

The project team will be hosting two identical one-hour virtual sessions. Each session will provide an overview of the planning process and include opportunities for discussion and interactive input.

Workshop Options:

- **Option 1:** Wednesday, June 3, 2026 at 12:00 PM (EST)
  Register for Option 1 here: https://us06web.zoom.us/webinar/register/WN_FaRrB9XORhiaoj-5HCaqFw

- **Option 2:** Wednesday, June 10, 2026 at 6:00 PM (EST)

  Register for Option 2 here: https://us06web.zoom.us/webinar/register/WN_Wfna8eyPSLi8H2LpfNHFPA

After registering, you will receive a confirmation email with details on how to join the webinar.

The workshop will focus on the following areas:

- **Community Profile:** Reviewing Boston's assets, infrastructure, and critical facilities
- **Hazards, Risks, and Vulnerabilities:** Exploring climate-related risks such as flooding, extreme heat, and severe storms
- **Mitigation Actions:** Discussing strategies and priorities to reduce risk and improve resilience

Your participation will help make sure the plan reflects local knowledge, priorities, and needs.

Please reach out if you have any questions. We hope you can join us and contribute to shaping a more resilient Boston.

Thank you!

--

Allen Ryan, MPA, AEM® (*pronouns he/him/his*)
Emergency Management Planner
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CITY of BOSTON

NATURAL HAZARD MITIGATION PLAN

Local Planning Team
June 3, 2026

Weston & Sampson

MEET THE TEAM

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Office of Emergency Management



Kendall Bobula
Director of Planning and Preparedness



Allen Ryan
Emergency Management Planner



John Tiano
Emergency Management Planner

Weston & Sampson



Robin Seidel, AIA
Principal In Charge



Madison Biasin
Project Manager



Janet Moonan, PE
Senior Technical Leader



Boston City Hall, photo by Weston & Sampson

What is a Natural Hazard Mitigation Plan?

Purpose of Natural Hazard Mitigation Plan (NHMP)

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01 **Identify natural hazards** that pose the greatest risk to Boston.

02 **Assess vulnerability** of residents, infrastructure, and critical facilities.

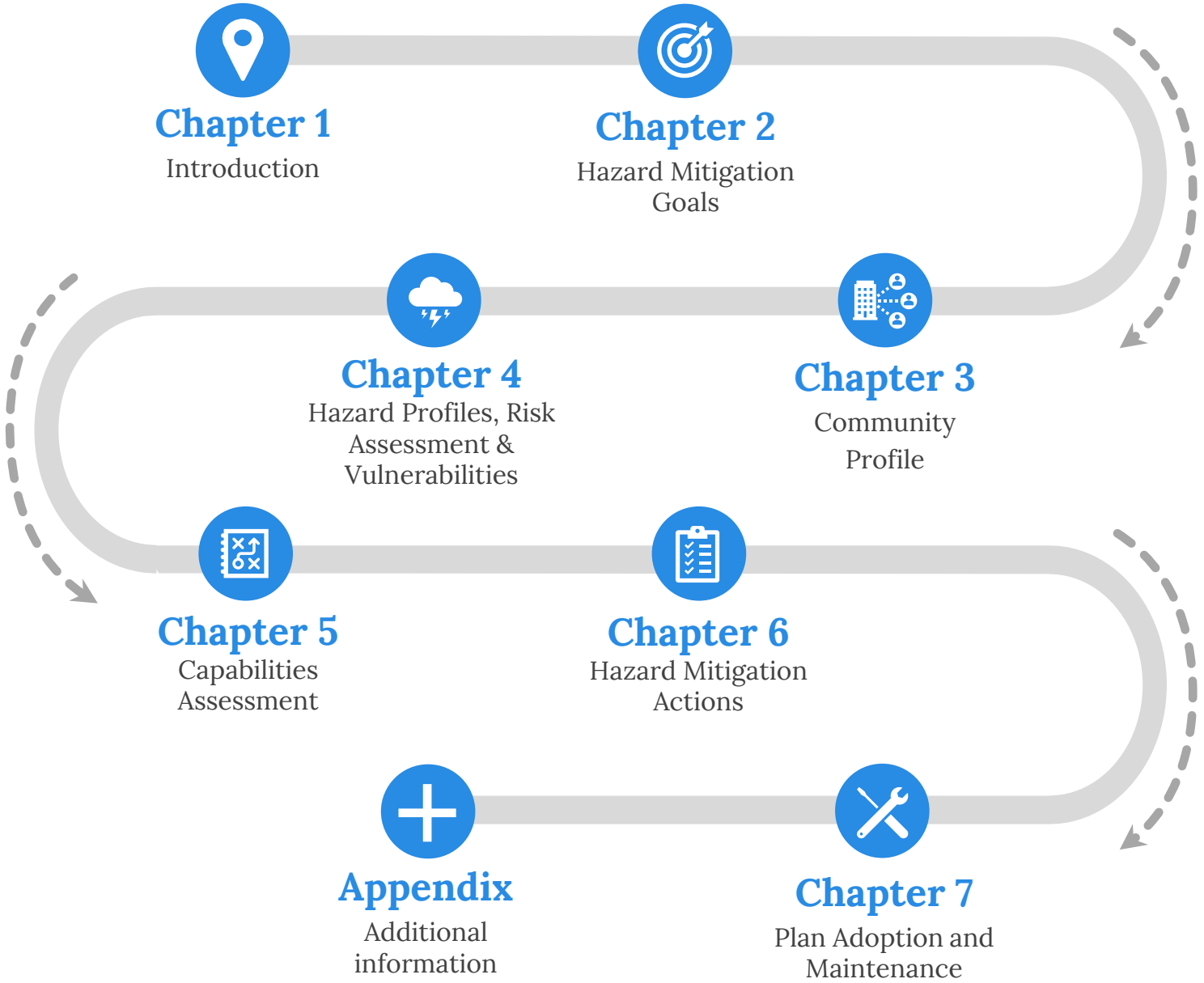
03 Develop **strategies and projects** to minimize or eliminate future hazard impacts.

04 **Strengthen coordination** across City departments, regional agencies, and community partners.

05 **Maintain eligibility** for FEMA mitigation grants and federal disaster recovery funding.

NHMP OVERVIEW

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VALUE OF HAZARD MITIGATION PLANNING

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EVERY $1 spent on mitigation

SAVES $6 on disaster recovery

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Hazard Mitigation Goals

MITIGATION GOALS

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Implement strategic and equitable hazard mitigation planning by building a comprehensive and adaptable approach that integrates social, economic, and environmental solutions focused on minimizing risks that guide long term effective resilience planning.

Build **informed, connected communities** ready for natural hazards.



Encourage the **protection of private property** and buildings.



Create **community resilience** and promote neighborhood-level education and stewardship.





Support vulnerable populations before, during, and after hazard events.



Coordinate investments citywide, countywide, and statewide.



Enhance post-disaster recovery by fostering a collaborative mindset and increasing energy independence.



Boston City Hall, photo by Weston & Sampson

Community Profile

OVERVIEW OF ASSET CATEGORIES

Categories based on the **FEMA Local Mitigation Planning Handbook** (2025) and **Local Mitigation Planning Policy Guide** (2025)

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People



- **Underserved** communities
- **Socially vulnerable** populations

Structures



- Existing **buildings** and **infrastructure**
- Future or planned **developments**

Community Lifelines and Other Critical Facilities



- Fundamental **services** and **facilities** in the community
- Support **response planning** and **operations**
- Essential to human **health** and **safety** or to **economic security**

Natural, Historic, and Cultural Resources



- **Environmental** and **natural resources**
- **Historic resources** that tell the story of your community
- Assets of the **local culture** that are unique or cannot be replaced

Economy



- Major **employers, economic sectors,** and **commercial centers**

Activities that Have Value to the Community



- **Activities** that are important to the community
- Long-standing **traditions, seasonal markets, tourists**

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Do not edit
How to change the design



When you think of Boston, what assets are most important to you?

The Slido app must be installed on every computer you're presenting from

slido

When you think of Boston, what assets are most important to you?

0 2 3

(1/3)

- Third spaces to gather
- Multimodal infrastructure
- Waterfront and our harbor walks
- Affordable housing
- people - diverse populations
- Agencies that deliver meals on wheels - Ethos and Chinese Golden Age Center
- smaller neighborhood communities
- Senior centers/meal cafes for older adults
- Commercial Buildings
- Farmers markets
- Historic neighborhoods built on filled land and supported on wood piles
- Green Infrastructure / Green Spaces
- waterfront
- Critical infrastructure, emergency response, communications transportation
- Green spaces
- Bike infrastructure (protected bike lanes)
- Healthcare facilities, universities
- Transportation

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When you think of Boston, what assets are most important to you?

0 2 3

(2/3)

- Response of public safety
- Support Services and Accessibility for AFN
- Parks and open spaces, the waterfront and Harborwalk, historic areas, the MBTA, the airport, walking paths
- Parks
- Food forest parks
- Transportation
- Public transportation, streets
- Trees & parks
- Open green spaces, especially with rest stops
- Schools, parks and greenspaces
- Transportation infrastructure and healthcare
- Parks
- Transportation
- Walkability
- State Park facilities
- Historical assets, transportation network
- Transportation!
- Infrastructure
- Built environment including critical infrastructure, historic locations and population

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When you think of Boston, what assets are most important to you?

0 2 3

(3/3)

- green spaces
- Historic built environment
- Transportation and infrastructure.

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Hazards, Risks, and Vulnerabilities

**Change from 2018, updated to follow ResilientMass Plan*

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WHAT ARE NATURAL HAZARDS?



Flooding from Precipitation



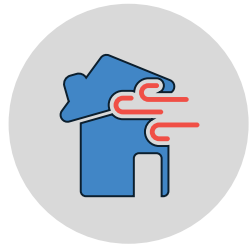
Coastal Flooding and ***Storm Surge***



Coastal Erosion



Hurricanes / Tropical Cyclones



Tsunamis



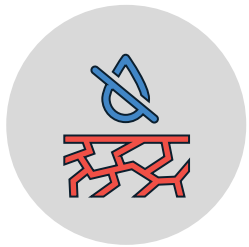
Changes in Groundwater



Severe Winter Weather / Nor'easters



Average/ Extreme Temperatures



Drought ***(including groundwater impacts)***



Wildfire



Earthquakes



Landslides/ ***Mudflows***



Tornadoes



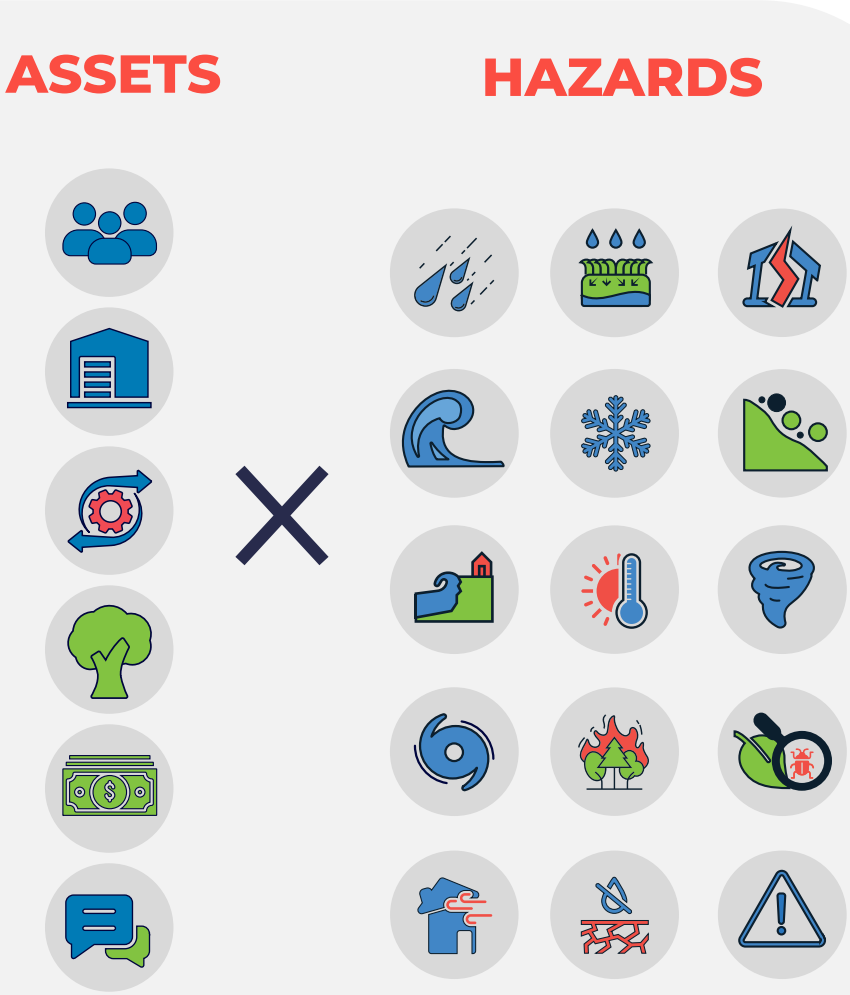
Invasive Species



Other Severe Weather

VULNERABILITY VS. IMPACTS

DRAFT



"Vulnerability is a description of which assets, including structures, systems, populations and other assets as defined by the entity, **within locations identified to be hazard prone, are at risk** from the effects of the identified hazard(s)."

FEMA

Use information from Hazard Profiles and Asset Inventory.

Vulnerability: Define what parts of the city are most likely to be affected

Impacts: The potential consequences

Recent Natural Hazard Events

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January 2026.
Photos by Weston & Sampson

In 2024, Boston had **12 days above 90°F** (more than **double** the 2023 count).

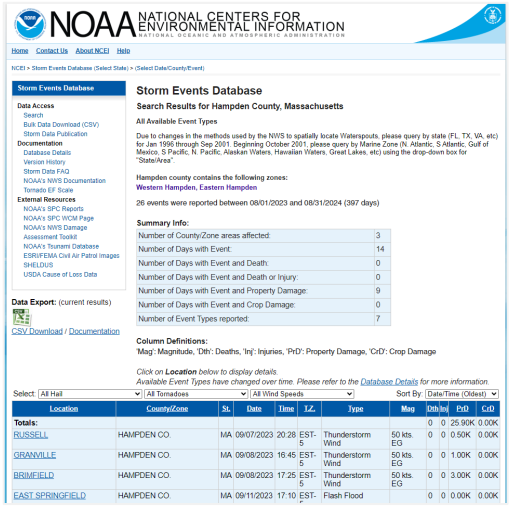
Summer 2023 brought over **20 inches of rain**, making it the **second-rainiest** summer ever recorded.

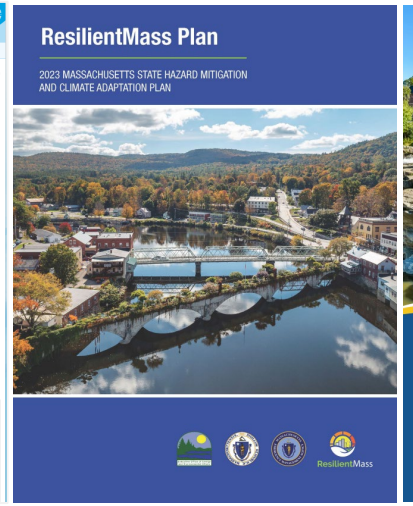
During January 2026, Boston received at least **16.1 inches** of snow. In February 2026, some areas received up to **24 inches**.

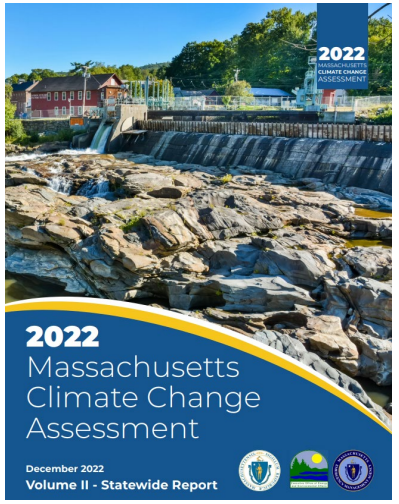
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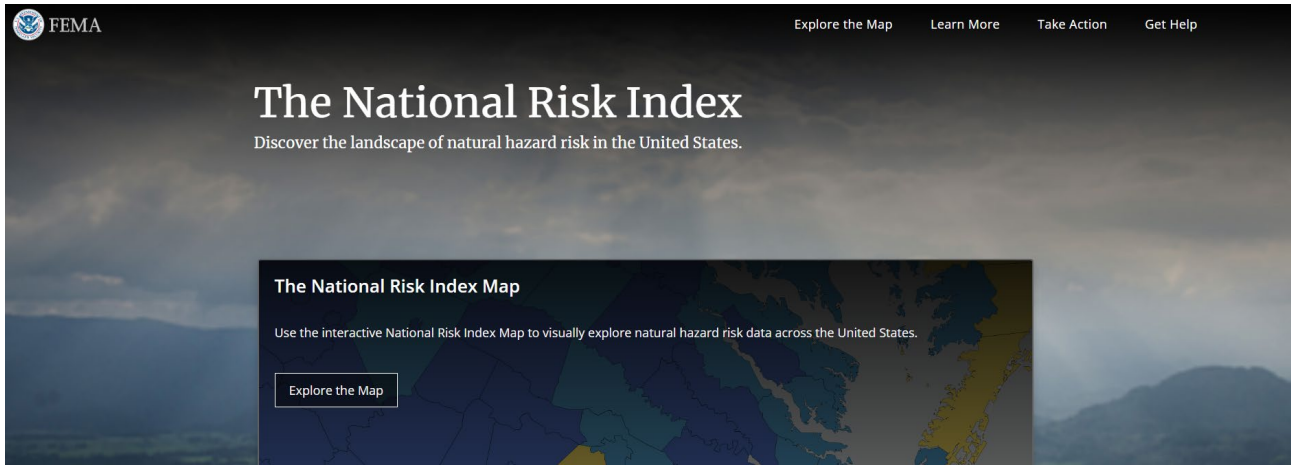
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- 2023 ResilientMass Plan (MA State HMP)
- 2022 MA Climate Change Assessment
- Massachusetts Coast Flood Risk Model (MC-FRM)
- FEMA National Risk Index
- NOAA Storm Events Database
- ResilientMass Climate and Hazards Viewer
- MassMapper Data
- Boston Heat Resilience Study
- BWSC Inundation Model
- CZM Coastal Erosion Viewer
- Northeast-Midwest Wildfire Risk Explorer
- MDAR Invasive Pest Dashboard









FLOODING FROM PRECIPITATION

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- **Flooding from Precipitation:** Non-coastal flooding, includes riverine flooding and stormwater flooding due to rain.

Stormwater Flooding:

- Poor and undersized drainage
- High amounts of impervious surface
- Undersized culverts

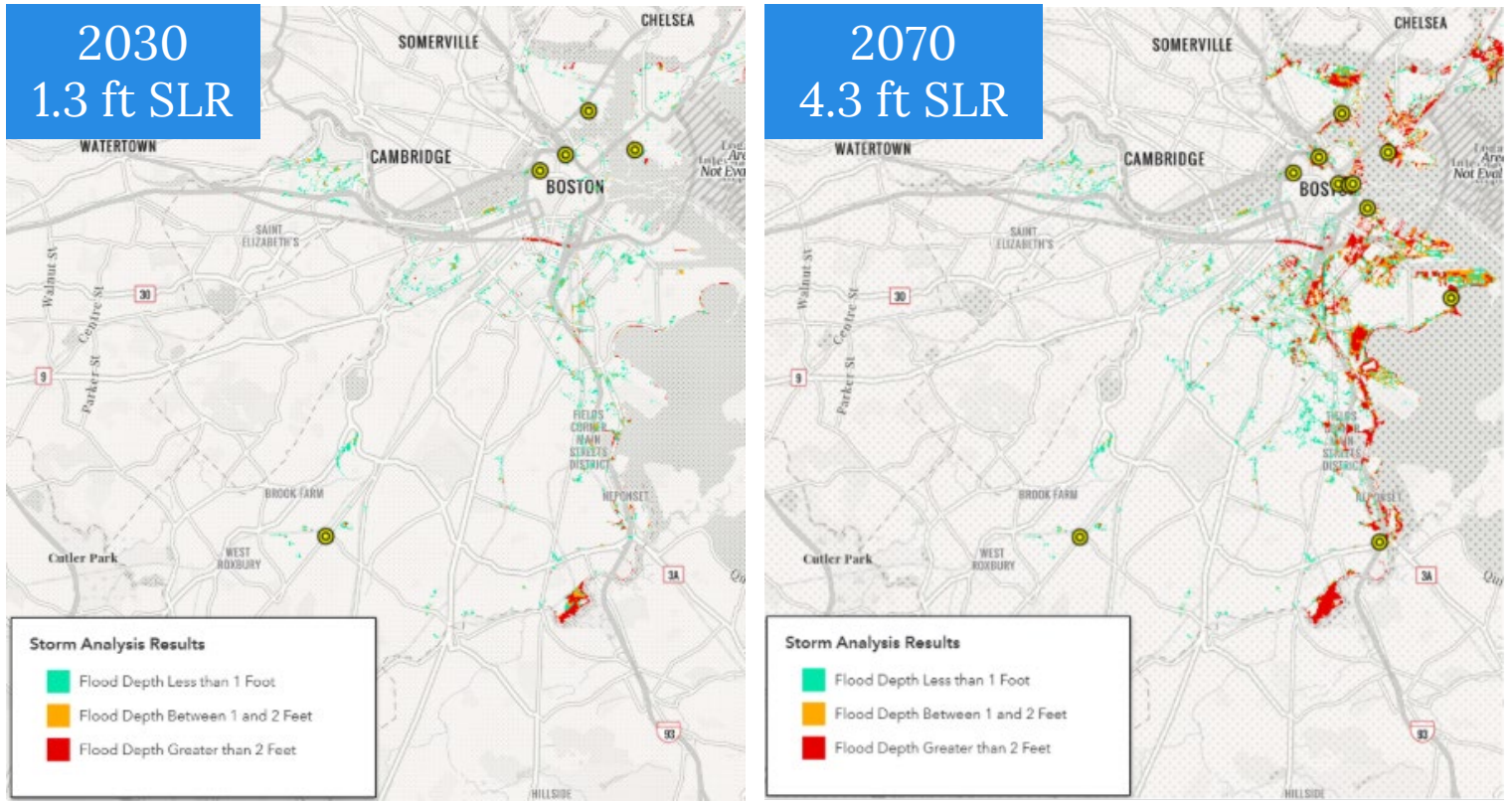
Riverine Flooding:

- Overtopping of banks along rivers and other waterbodies

Ice Jams:

- accumulation of ice that acts as a natural dam and restricts the flow of a body of water

Thunderstorm Flooding from 10-year 6-hour Storm



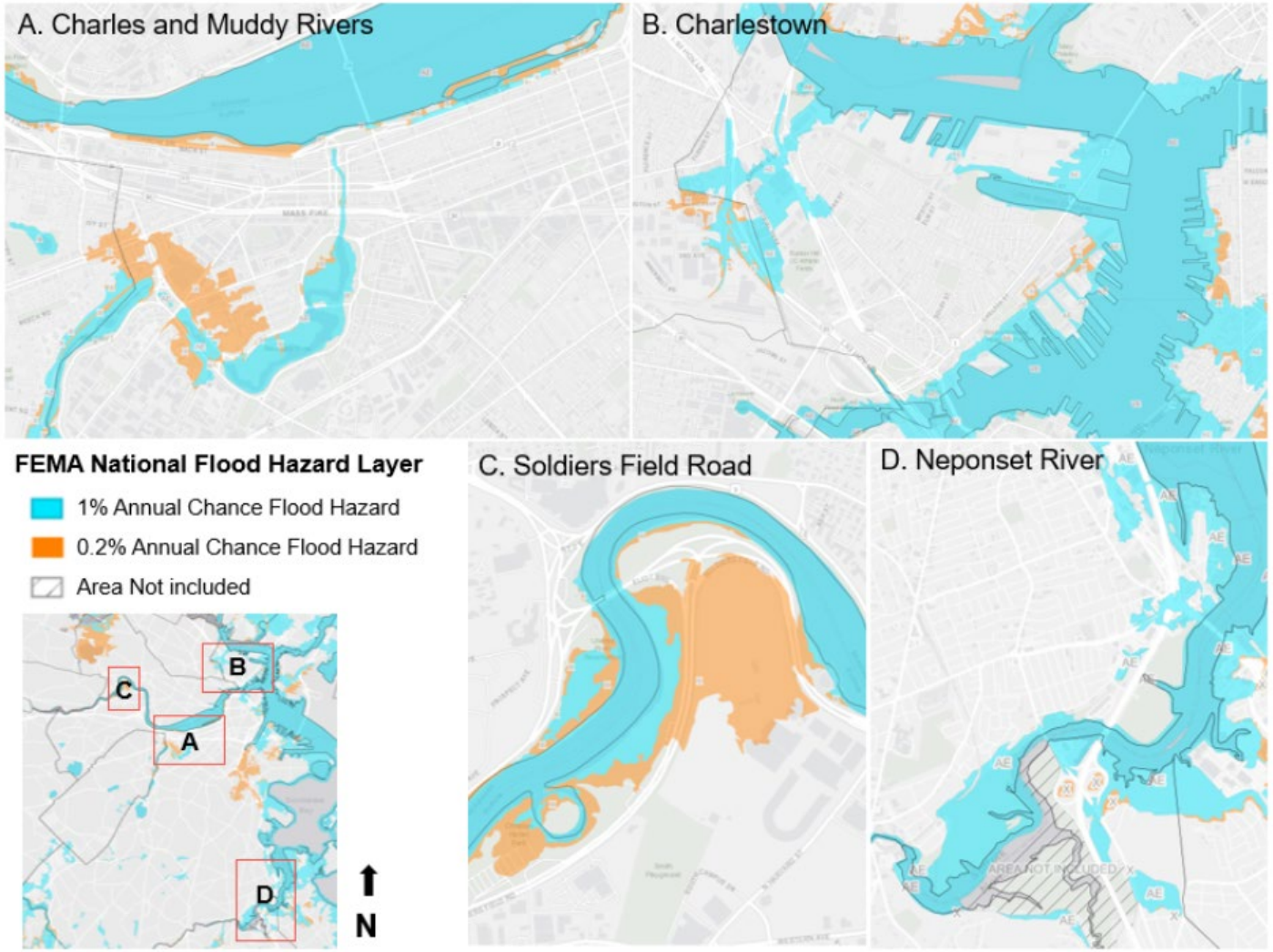
Source: BWSC Inundation Model

FLOODING FROM PRECIPITATION

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FEMA Flood Zones
Geographic areas that FEMA has defined according to varying levels of flood risk

- **500-year Storm:** 0.2% annual chance of occurring
- **100-year Storm:** 1% annual chance of occurring



Source: FEMA National Flood Hazard Layer

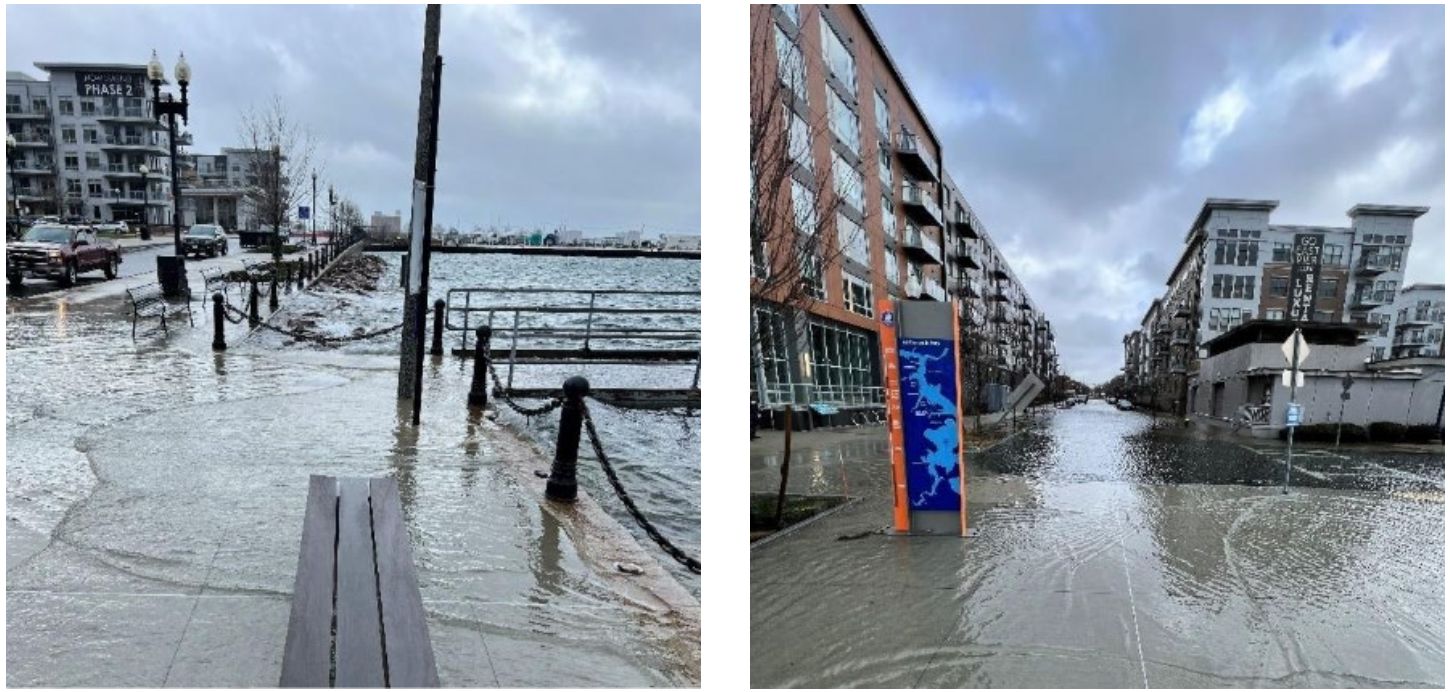
COASTAL FLOODING AND STORM SURGE

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- **Coastal Flooding:** Ocean waters inundate land, primarily due to high astronomical tides, sea level rise, wave action, and storm surge.

Previous Occurrences Include:

- Jan 2018
- Mar 2018
- Oct 2018
- Nov 2018
- Jan 2019
- Oct 2019
- Apr 2020
- Sept 2020
- Dec 2020
- Feb 2021
- Jul 2021
- Jan 2022
- Dec 2022
- Jan 2023
- Jan 2024
- Mar 2024
- Apr 2024



December 2022 flooding at Lewis Mall in East Boston. Source: Weston & Sampson

COASTAL FLOODING AND STORM SURGE

DRAFT

FEMA Flood Zones
Geographic areas that FEMA has defined according to varying levels of flood risk

- **500-year Storm:** 0.2% annual chance of occurring
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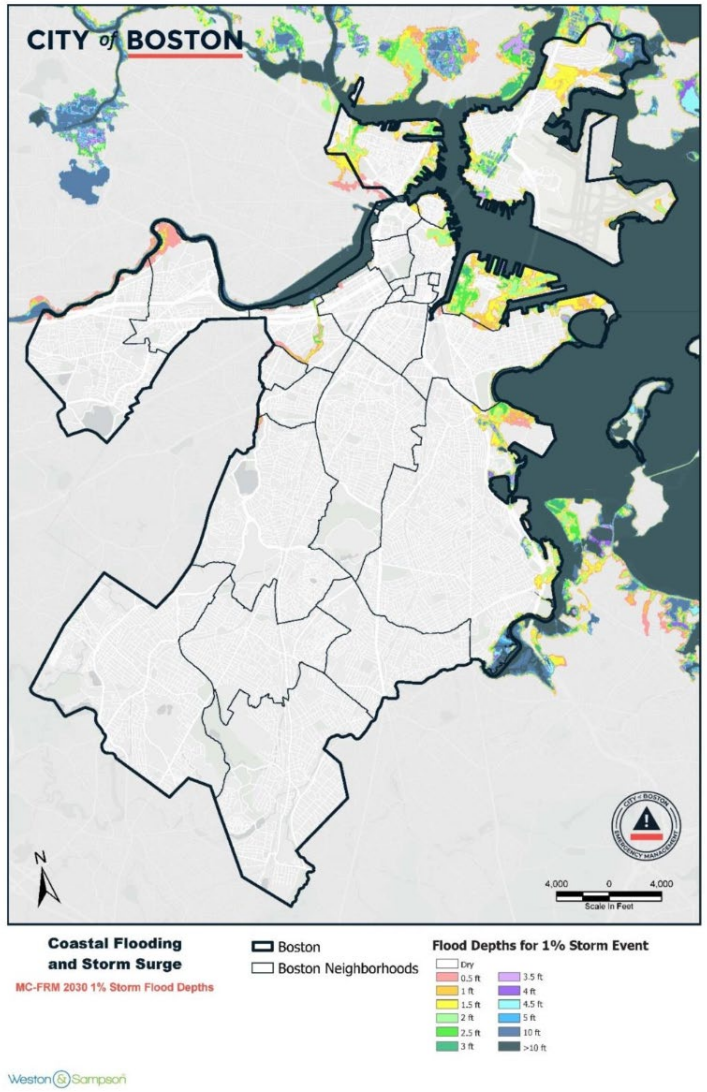
Source: FEMA National Flood Hazard Layer

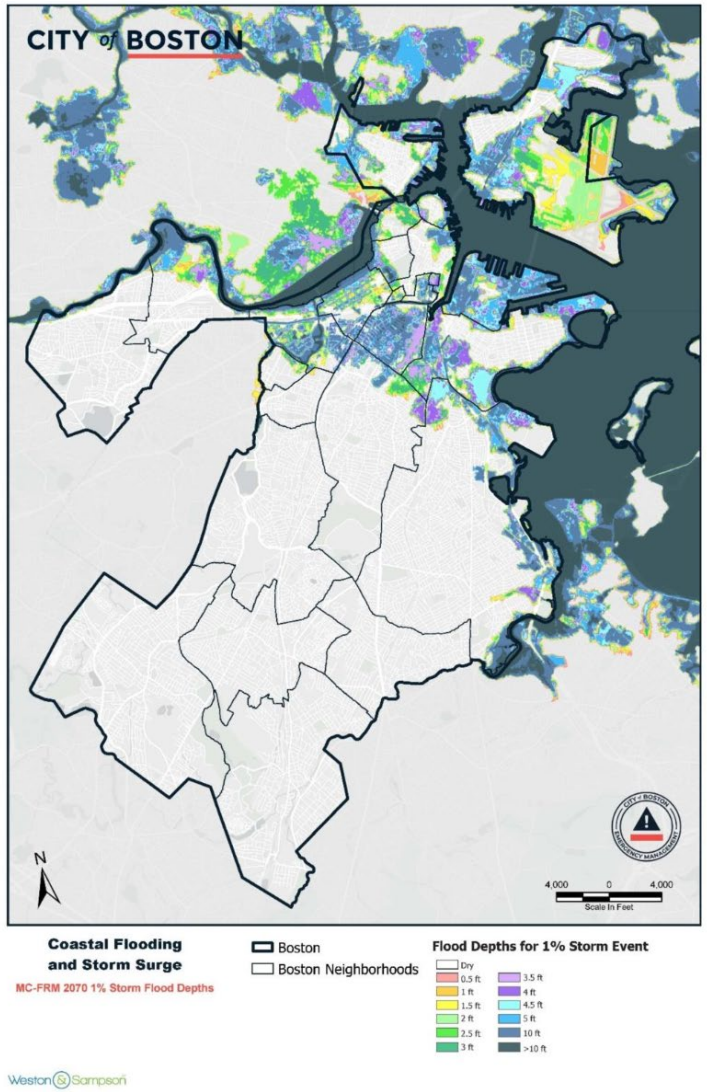
COASTAL FLOODING AND STORM SURGE

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MC-FRM

Massachusetts Coast Flood Risk Model



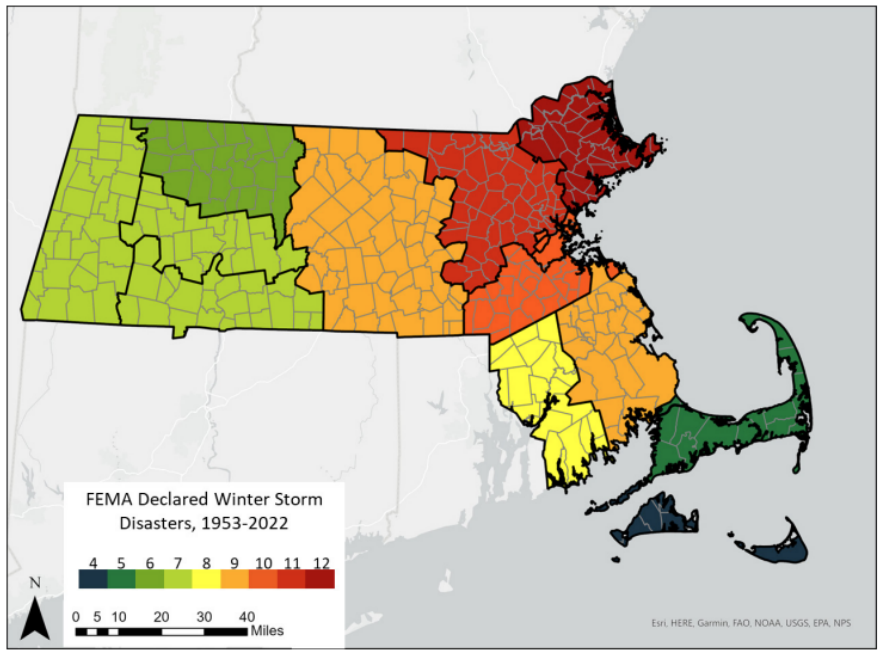


Source: MC-FRM 2030 and 2070 1% Storm Coastal Flood Depths

SEVERE WINTER WEATHER/NOR'EASTERS

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- **Severe Winter Storms:** heavy snow, ice accumulation, freezing temps & wind chill
- **Nor'easter:** Storms or wind blowing from the northeast
- **Ice Storms:** occur when freezing rain creates a half inch of ice accretion



Source: FEMA (2023).

Figure 5.13-1. FEMA winter storm–related declared disasters by county, 1953 to 2022.

Source: ResilientMass Plan (2023)

FEMA Disaster Declarations

- **2013 Blizzard Nemo:** Brought over 24 inches of snow and high winds, causing major transportation disruptions and power outages. *(DR-4110-MA)*
- **2015 Winter Storm Juno**: Resulted in significant snowfall and coastal flooding impacts across Boston. *(DR-4214-MA)*
- **January 2018 Nor'easter ("Bomb Cyclone"/Winter Storm Grayson):** Combined heavy snowfall with record coastal flooding, impacting East Boston and downtown waterfront areas. *(DR-4366-MA)*

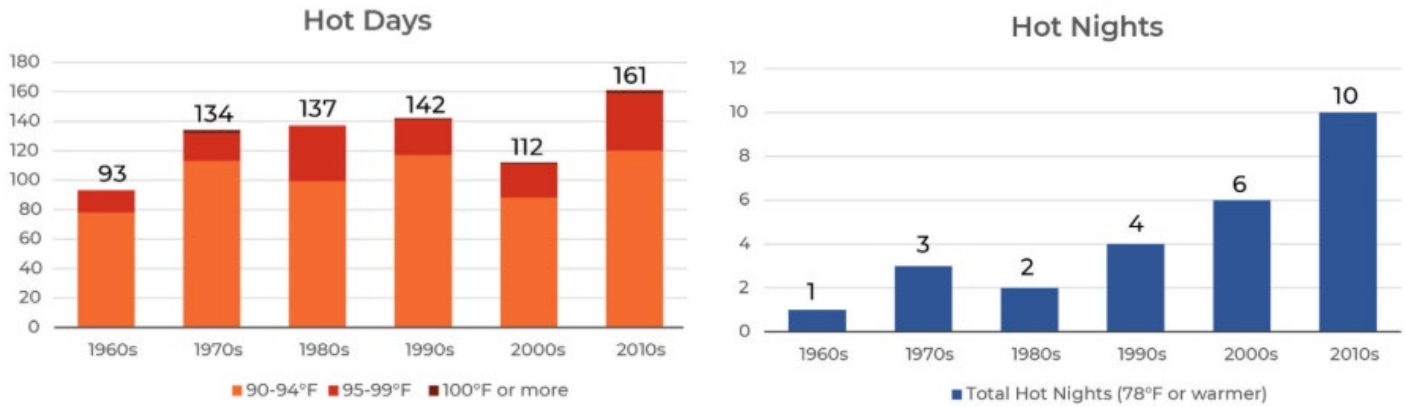
January 2026 Winter Storm, Winter Storm Fern
February 2026 Nor'easter, Winter Storm Hernando

AVERAGE/EXTREME TEMPERATURES

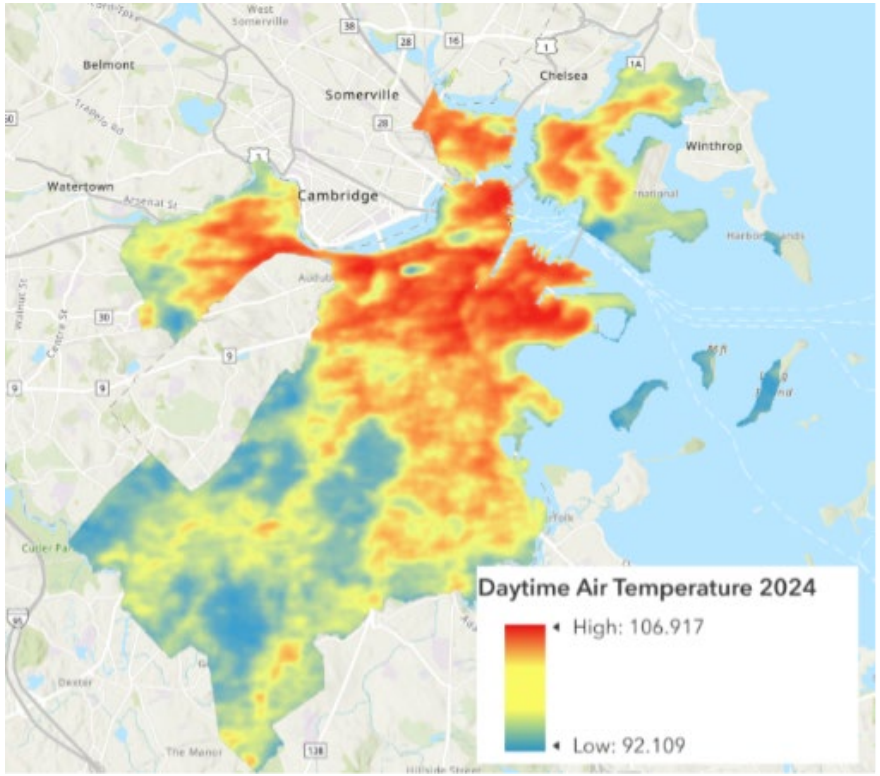
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- **Extreme Temperatures:** Very high or low temperatures that can affect human health and the natural and built environments.
- **Average Temperatures:** Long-term climate normals, typically calculated over a 30-year period

In the last decade, Boston experienced more hot days and nights than any decade in the previous 50 years:



Source: Boston Heat Resilience Plan

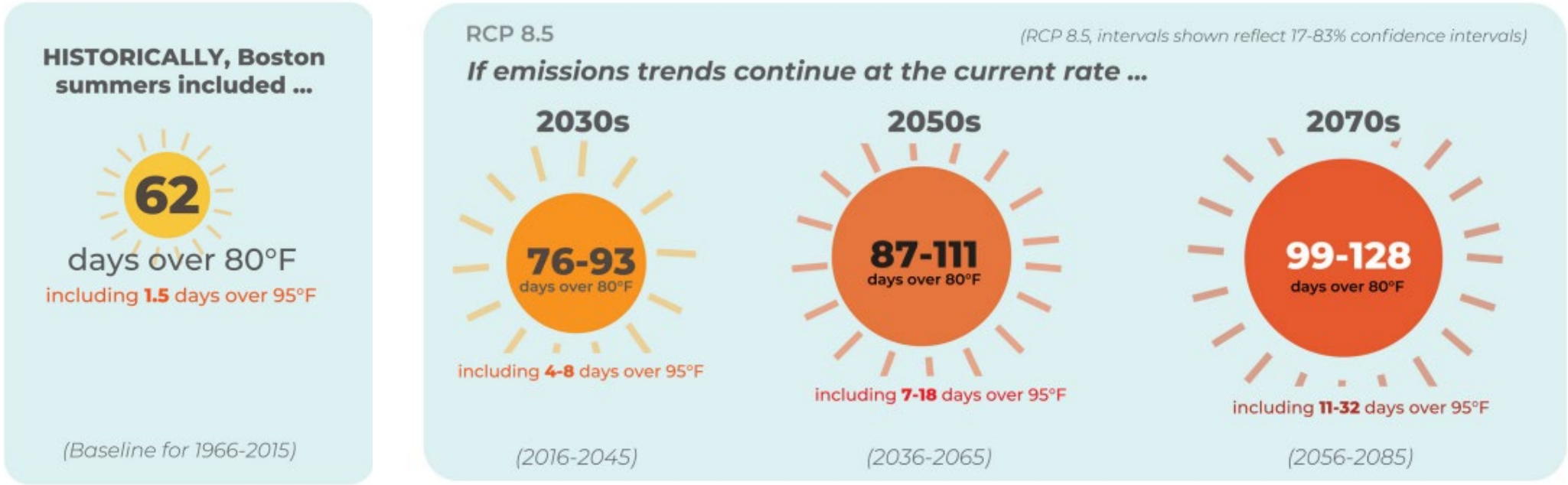


Source: Boston Heat Map Explorer

AVERAGE/EXTREME TEMPERATURES

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Extreme heat is becoming an increasing concern in Boston as climate change leads to more frequent hot days, longer-lasting heat waves, and rising summer temperatures.



Source: Boston Heat Resilience Plan

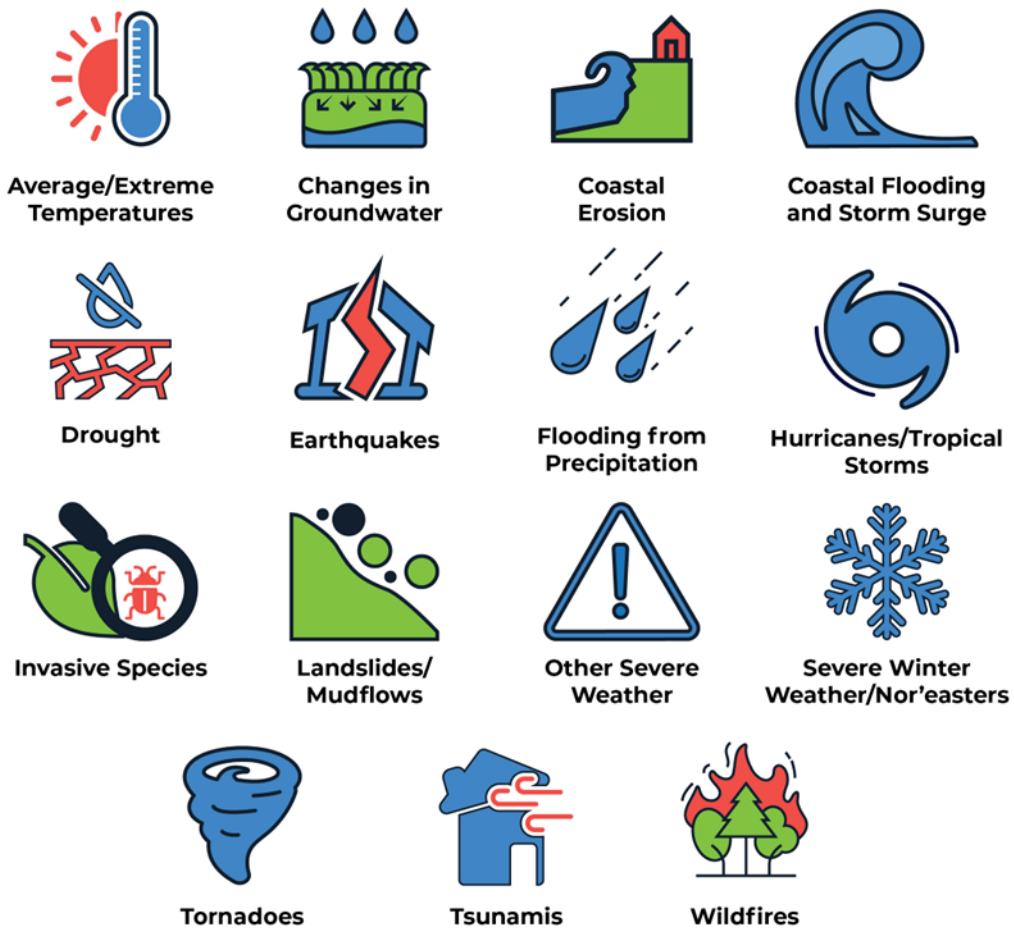
DISCUSSION

We want to hear from you!

Tell us a story about extreme weather events in Boston.

- These may be something you dealt with specifically or something you are aware of that impacted the community.
- How did this event impact emergency response, city staff, the residents, businesses, etc.?

Think about:



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Do not edit
How to change the design



Tell us a story about extreme weather events in Boston. These may be something you dealt with specifically or something you are aware of that impacted the community.

How did this event impact emergency response, city staff, the residents, businesses, etc.?

The Slido app must be installed on every computer you're presenting from

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Tell us a story about extreme weather events in Boston. These may be something you dealt with specifically or something you are aware of that impacted the community. How did this event impact emergency response, city staff, the residents, businesses, etc.?

0 1 4

(1/6)

- Coastal flooding is relatively brief (only during high tide) but having a bounce back plan for these areas that aren't flood proofed yet is crucial
- Space savers during the winter
- The rush to clear snow off the street means snow farms are not always in good locations relative to wetlands leading to preventable pollution
- Landlord/ tenants rights to having a broken Ac repaired
- Meeting community members in parks, some took into A.C. in their house
- People who rely on home based care can't receive services when the caregivers can't park
- Since the City took off the ability to track snow plows it's harder to see when

Tell us a story about extreme weather events in Boston. These may be something you dealt with specifically or something you are aware of that impacted the community. How did this event impact emergency response, city staff, the residents, businesses, etc.?

0 1 4

(2/6)

streets would be plowed. This it felt like it took forever to clear everything up

- Not enough cooling centers
- Winter storms closed Food Pantries and made it very difficult for people to access once reopened. Heat also makes getting food very difficult
- Hard to ride bike to work when no protected lanes, and no tree cover over the lanes Vs Southwest Cooridor is much cooler and safer to ride on in hot days
- Park flooding is a huge issue
- Going to parks like Franklin park or smaller pocket parks with big trees. The forest so much cooler in the summer heat.
- Winter of 2015 was brutal. Regular

Tell us a story about extreme weather events in Boston. These may be something you dealt with specifically or something you are aware of that impacted the community. How did this event impact emergency response, city staff, the residents, businesses, etc.?

0 1 4

(3/6)

blizzard problems but also decreased revenue for businesses and workers, missed school for students, and mental health issues

- Intense rainfall events in July 2023 flooded some basements and garden level units in the Back Bay and South End. Residents here for decades never experienced this in prior years.
- Extreme winter weather creating transportation issues and creating workforce and patient and student access. Extreme heat causing populations to seek shelter in areas of refuge. Extreme heat combined with high humidity causing HVAC and other major infrastructure issues
- Severe winter weather events trigger a home delivered

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Tell us a story about extreme weather events in Boston. These may be something you dealt with specifically or something you are aware of that impacted the community. How did this event impact emergency response, city staff, the residents, businesses, etc.?

0 1 4

(4/6)

meal response to older adults - additional meals get delivered by the City's partner agencies ahead of the storms so consumers have sufficient nutrition.

- Flood impacting wheelchair user from accessing sidewalk and safely getting across.
- Street parking impacts during winter storms
- The major snow storms
- this past winter - in particular the Feb storm - impacted the Longwood medical center. Buses - both MBTA & shuttles were significantly delayed
- In the community, it's become so expensive to heat and cool peoples homes
- Schools shutdowns due to the extreme weather
- My street is small in Jamaica Plain.

Tell us a story about extreme weather events in Boston. These may be something you dealt with specifically or something you are aware of that impacted the community. How did this event impact emergency response, city staff, the residents, businesses, etc.?

0 1 4

(5/6)

Took days to get plowed this past winter, made it harder to leave the house for work, etc.

- Heavy snow impacting the clearing of safe routes to school for kids.
- Flooding and extreme weather effecting transportation
- Due to the increase extreme heat days and heat advisories, we have been activating on-campus cooling centers far more frequently impacting our resources
- Really hot days the last few years, going to a food forest for shade and cool, and I got to pick some food too like rasberries and blueberries!
- Extreme winter weather required several days

Tell us a story about extreme weather events in Boston. These may be something you dealt with specifically or something you are aware of that impacted the community. How did this event impact emergency response, city staff, the residents, businesses, etc.?

0 1 4

(6/6)

of school and business shutdowns



Boston City Hall, photo by Weston & Sampson

Mitigation Actions

WHAT IS THE MITIGATION STRATEGY?

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Serves as the **long-term blueprint for reducing the potential losses** identified in the risk assessment.

GOALS

What long term goals do you want to achieve?

ACTIONS

What specific actions will local government, community organizations, and others take to reduce risk to hazards?

ACTION PLAN

How will the actions be prioritized and implemented?

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MITIGATION ACTIONS

A measure, project, plan, or activity proposed to reduce or eliminate current and future vulnerabilities described in the risk assessment.

Local Plans and Regulation

These actions include government authorities, policies or codes that influence the way land and buildings are developed and built.

Structure and Infrastructure Projects

These actions involve modifying existing structures and infrastructure to protect them or remove them from a hazard area.

Natural Systems Protection

This action can include GI and low impact development, NBS, and more to incorporate natural features/processes into the built environment.

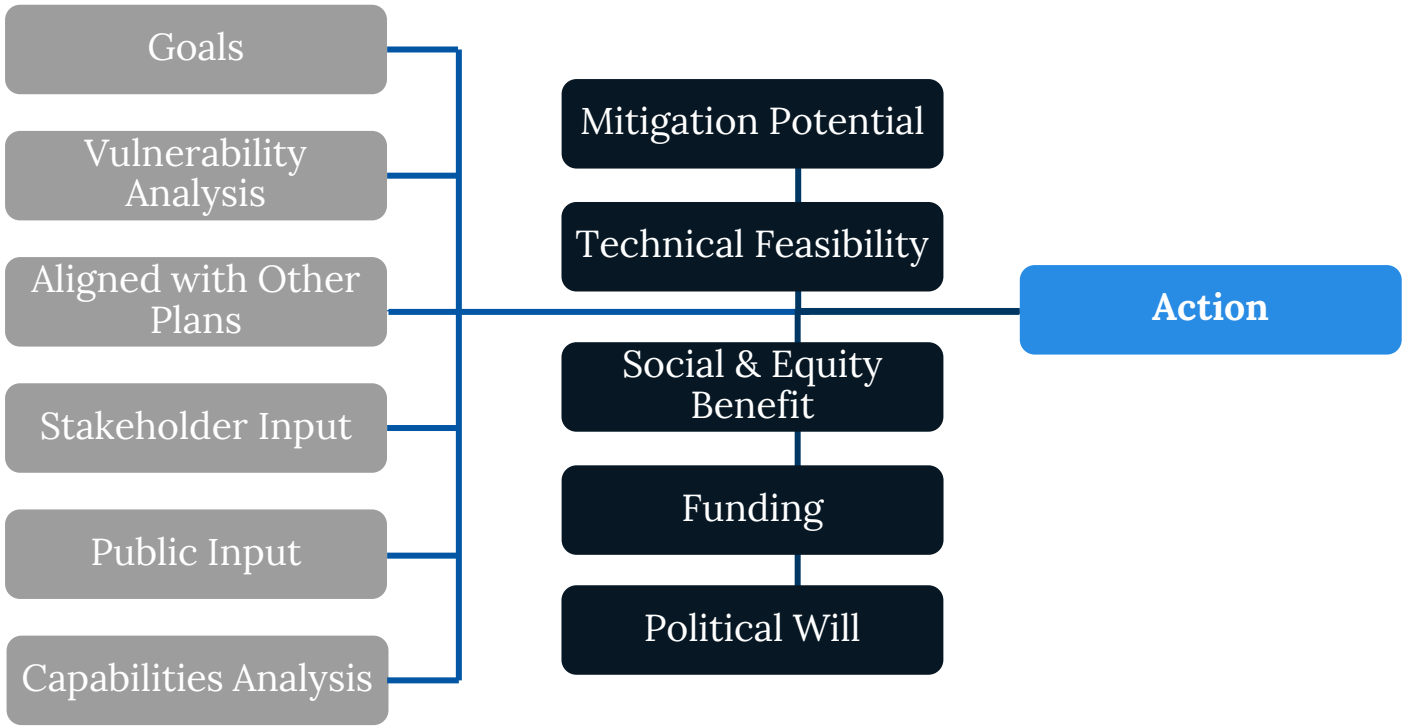
Education and Awareness Programs*

These actions keep residents informed about potential natural hazard events and impacts.

*Many of these types of actions are eligible for funding through the FEMA HMA program.

CONSIDERATIONS FOR MITIGATION ACTIONS

DRAFT



Additional details include:

- One or more actions per natural hazard
- Robust prioritization process
- Specific funding ideas including grants, loans, department's funding, etc.
- Details on implementation including responsibility and timelines

MITIGATION ACTION PLAN

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Matrix including the following:

- Action ID
- Description
- Hazard(s) Addressed
- Goal Alignment
- Responsible and Coordinating Bureaus and Agencies
- Timeframe
- Benefits
- Costs ($ - $$$$$ scale)
- Technical Feasibility
- Potential Funding Sources
- Prioritization (High, Medium, Low)

Action ID	Description	Hazard(s) Addressed	Goal Alignment	Responsible Agencies	Timeframe	Benefits	Costs	Technical Feasibility	Funding Source	Prioritization

MITIGATION ACTION EXAMPLES

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Addressing Hazard Mitigation

Are there hazard mitigation projects, plans, or ideas that you think Boston should be considering?

Schools, Housing, & Vulnerable Populations

- Flood protection and back-up power for buildings serving vulnerable residents

Coastal Impacts, Flooding Risks, & Natural Systems

- Seawall rehabilitation and drainage improvements

Energy, Utilities, & Communication Systems

- Energy demand assessments

City Operations & Emergency Response Services

- Climate upgrades to municipal buildings and city emergency facilities

Community Education, Involvement, & Workforce Training

- Citywide climate education and engagement

Building Design, Flood Policy, & Business Support

- Integrate resilience into local regulations

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Are there hazard mitigation projects, plans, or ideas that you think Boston should be considering?

The Slido app must be installed on every computer you're presenting from

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Are there hazard mitigation projects, plans, or ideas that you think Boston should be considering?

0 0 9

(1/4)

- Alerting people to severely bad air quality days and what actions to take.
- Evacuation routes (and strategies for non drivers)
- Keeping an eye on fire risks if we continue to be in a drought... invasive species and grasses may be most prone to burn. Drought can also exacerbate challenges for newly planted invasive species
- More parks. More community-run assets. Community resilience (knowing and trusting your neighbors) = climate reslience.
- More community benefits from development that include funding initiatives to help residents deal with snow and heat.
- incentivize nature based strategies to property owners
- Family preparedness education
- Are we trying more wetlands or northern mangroves, not just sea walls?
- More partnerships with community organizations that can

Are there hazard mitigation projects, plans, or ideas that you think Boston should be considering?

0 0 9

(2/4)

expand cooling stations during extreme heat

- Can people call 311 to opt into alerts?
- Heat corridors with shade structures around neighborhoods with high heat vulnerability
- Misting tents for farmer's markets
- Not allowing non-permeable surfaces! on any size project. Disregard the previous one
- More food forest parks! Provide shade, cool, food, neighbors getting to know each other to help each other weather events, and on the front lines of climate change. e.g., Some neighbors tried muscadine grapes at Ellington Food Forest in Dorchester (grapes that typically only grow in the south) and they are getting the most food from those grapes. These neighbors are spreading the word, creating more food-resilience by more informed growing as the climate changes.
- Better communication and

Are there hazard mitigation projects, plans, or ideas that you think Boston should be considering?

0 0 9

(3/4)

planning around snow removal would be amazing. Maybe looping in main streets organizations to help with that.

- Improved communication network/app to notify of transportation delays and alternatives - which buses/trains are running and when, etc
- Only allowing non-permeable paving... On any size project.
- Is there consideration for any earth friendly turf fields, like the one done at Daly Field, for City parks or fields to help mitigate flooding and how that impacts usage for schools and community.
- Heat mitigation - misting and water stations particularly where trees are not available
- A non opt in notification system?
- Free emergency kits along with public info campaign to promote best practices
- Yes - climate readiness checks of homes. City can offer free checks of homes for

Are there hazard mitigation projects, plans, or ideas that you think Boston should be considering?

(4/4)

0 0 9

snow/ice buildup, flooding risks, and climate control. Education about needs of homes during disasters.

- Additional locations to absorb flooding and act as as ground cooling near the water (ocean and rivers)
- Additional coastal and inland flooding resiliency infrastructure projects.
- More trees and density of plantings, like in parks that cool things. Think Franklin park in the woods, vs 1 tree with no understory.
- Notification system? Via text? Does this already exist?

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Boston City Hall, photo by Weston & Sampson

Questions?

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Weston & Sampson
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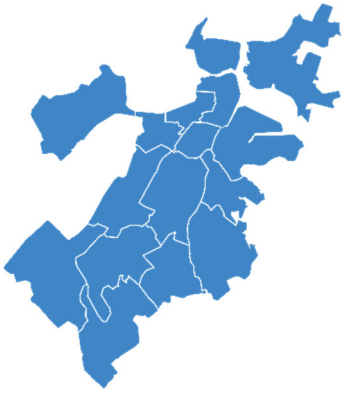
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Alice Brown	alice.brown@boston.gov

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APPENDIX D:

Engagement Materials

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How have natural hazards affected your neighborhood or daily life?

¿Cómo han afectado los desastres naturales a su vecindario o a su vida cotidiana?

Storms, Flooding, High Winds
Tormentas, inundaciones, vientos fuertes

Extreme Heat and Severe Weather
Calor extremo y clima severo

Landshift Changes
Cambios en los movimientos de tierra



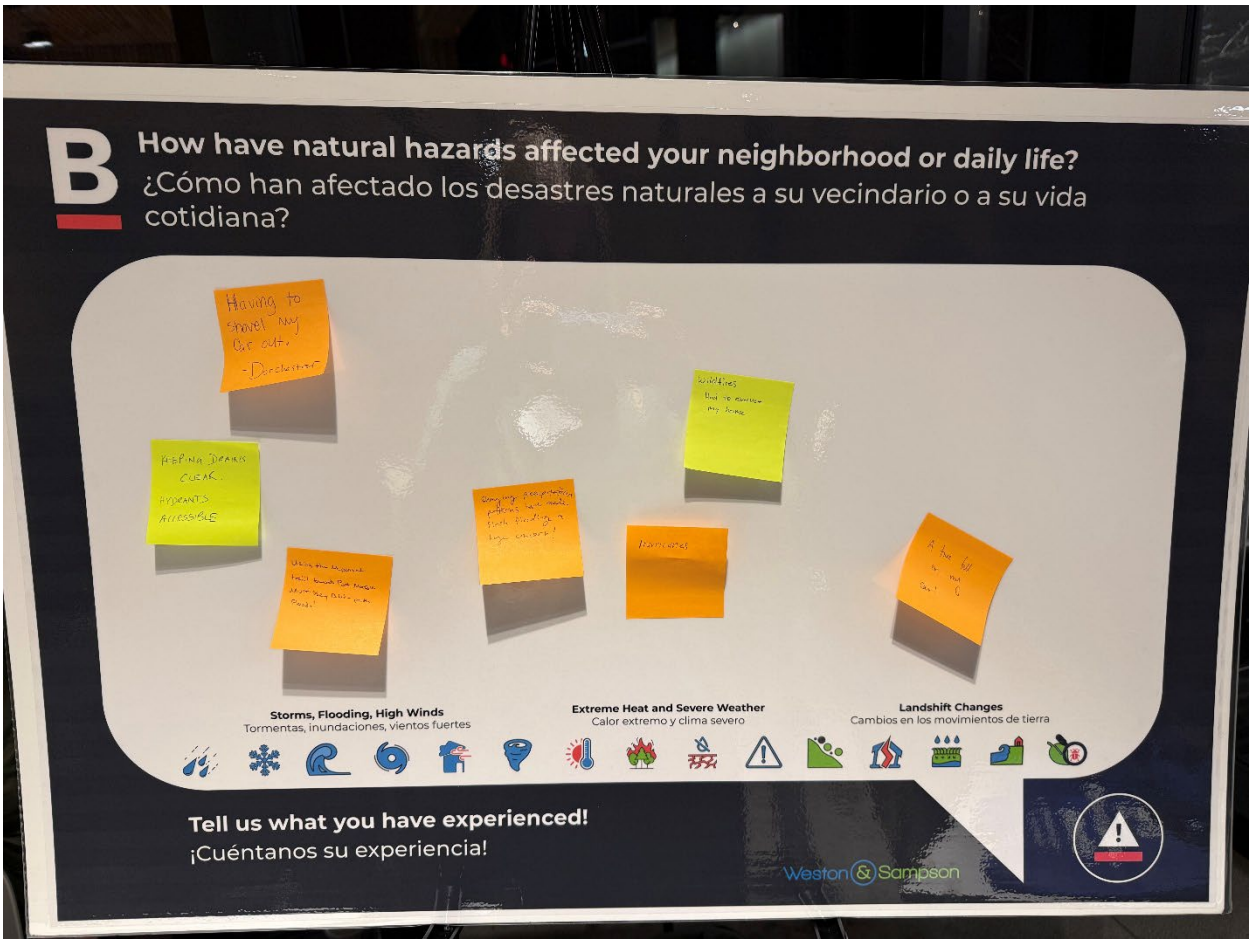
Tell us what you have experienced!

¡Cuéntanos su experiencia!

Weston & Sampson




Hazard Mitigation Planning
TAKE THE HOUSEHOLD PREPAREDNESS SURVEY
Deployable


B
How have natural hazards affected your neighborhood or daily life?
¿Cómo han afectado los desastres naturales a su vecindario o a su vida cotidiana?
Having to shovel my car out. -Declayton
KEEPING DRAINS CLEAR. HYDRANTS ACCESSIBLE
Storms, Flooding, High Winds
Tormentas, inundaciones, vientos fuertes
Extreme Heat and Severe Weather
Calor extremo y clima severo
Landshift Changes
Cambios en los movimientos de tierra
Tell us what you have experienced!
¡Cuéntanos su experiencia!
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NHMP Update Focus Group Outline and Script

Impact on Process

Information and insight gathered through the focus groups can inform the following:
(1) Chapter 3: Community Profiles
(2) Chapter 4: Hazard Profiles, Risk and Vulnerability Assessment
(3) Chapter 5: Capabilities Assessment

Focus groups targeted on priority populations offered in partnership with organizations. Focus groups should foster a discussion that allows for storytelling and lived experiences to be shared within the space. The facilitator should be sure to capture quotes, challenges, hardships, stories about lived experiences, etc. referring to natural hazards and assets.

Goals

Gauge older adults' knowledge of local hazards, emergency procedures, and available resources. How do they view hazard mitigation planning? Do they know what it is?

Understand how mobility, health concerns, or housing situations may be affected by hazards (e.g., extreme weather, power outages, flooding) and how that impacts their livelihoods and day to day life.

Understand their level of concern about access to resources such as shelters, transportations, or what they do in the case of an emergency. Do they have nearby relatives or care to call/help in the event of an emergency? If not, do they rely on neighbors, friends, community groups, etc.?

Deliverables

- Agendas, slide decks, worksheets, sign in sheets, etc.
- Compiled notes and stories for the technical team following the completion of each focus group

Key Messages (PowerPoint Slides)

1. Introduce team and what is an NHMP?
2. What City is doing to prepare better for emergencies…
3. How this can benefit older adults/residents…
4. Climate projections – recent natural hazard events…
    a. Ask room: what hazards are you most concerned about?
5. Questions for discussion:
    a. How have natural hazards affected you?
    b. What do you do to prepare for extreme weather/natural disasters?
    c. What additional help or resources would help you feel better prepared?

Small Group Script for Facilitators

1. How have natural hazards affected you or your community? *[Follow up questions] When did this occur? What were the impacts you experienced?*
    a. Average/Extreme Temperatures
    b. Changes in Groundwater
    c. Coastal Erosion
    d. Coastal Flooding and Storm Surge
    e. Drought
    f. Earthquakes
    g. Flooding from Precipitation
    h. Hurricanes/Tropical Cyclones
    i. Invasive Species
    j. Landslides/Mudflows
    k. Other Severe Weather
    l. Severe Winter Weather/Nor'easters
    m. Tornadoes
    n. Tsunamis
    o. Wildfires
2. What existing programming or resources do you use in the event of a natural hazard/disaster?
    a. What do you do to prepare for extreme weather/natural disasters? *(Examples could include: Stock up on food? Make an evacuation plan? Follow weather alerts?)*
        i. City resources
            1. **AlertBoston** for emergency alerts
            2. **OEM website** [boston.gov/emergency] on hurricane preparedness, emergency kit preparedness
            3. **OEM Emergency Resources Map** (find your nearest emergency shelter, cooling center, splash pad, learn hurricane evac zones and evac routes)
        ii. Ready.gov

    b. What has been helpful during a natural hazard event?
    c. What has been helpful after natural hazards have occurred?
3. What additional help do you need to feel better prepared for future hazard events?
    a. City resources
    b. Other ideas

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Notetaking Worksheet

Hazards of concern	How hazard impacted you/community
Existing Assets/Resources Used	**Assets/Resources Needed**
Quotes (about experience/impact; resources):	

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Resumen y guion del grupo de discusión sobre la actualización del NHMP

Impacto en el proceso

La información y los conocimientos recopilados a través de los grupos de discusión pueden servir de base para lo siguiente:

(1) Capítulo 3: Perfiles de la comunidad
(2) Capítulo 4: Perfiles de peligros, evaluación de riesgos y vulnerabilidades
(3) Capítulo 5: Evaluación de capacidades

Los grupos focales dirigidos a poblaciones prioritarias se ofrecen en colaboración con otras organizaciones. Los grupos focales deben fomentar un debate que permita compartir historias y experiencias vividas en el espacio. El moderador debe asegurarse de recopilar citas, retos, dificultades, historias sobre experiencias vividas, etc., en relación con los peligros naturales y los activos.

Objetivos

Evaluar los conocimientos de las personas mayores sobre los riesgos locales, los procedimientos de emergencia y los recursos disponibles. ¿Cómo ven la planificación de la mitigación de riesgos? ¿Saben en qué consiste?

Comprender cómo la movilidad, los problemas de salud o las condiciones de vivienda pueden verse afectados por los riesgos (por ejemplo, condiciones meteorológicas extremas, cortes de electricidad, inundaciones) y cómo eso repercute en sus medios de vida y en su día a día.

Comprender su nivel de preocupación por el acceso a recursos como refugios, medios de transporte o qué hacer en caso de emergencia. ¿Tienen familiares cercanos o personas a las que llamar o que les ayuden en caso de emergencia? Si no es así, ¿dependen de vecinos, amigos, grupos comunitarios, etc.?

Resultados

- Agendas, presentaciones, hojas de trabajo, hojas de registro, etc.
- Notas y relatos recopilados para el equipo técnico tras la finalización de cada grupo de discusión.

Mensajes clave (diapositivas de PowerPoint)

1. Presentar al equipo y explicar qué es un NHMP.
2. Qué está haciendo la ciudad para prepararse mejor para las emergencias...
3. Cómo esto puede beneficiar a las personas mayores/residentes...
4. Proyecciones climáticas: eventos naturales recientes...
    a. Preguntar a los asistentes: ¿qué peligros les preocupan más?

5. Preguntas para el debate:
    a. ¿Cómo le han afectado los desastres naturales?
    b. ¿Qué hace para prepararse para condiciones meteorológicas extremas/desastres naturales?
    c. ¿Qué ayuda o recursos adicionales le ayudarían a sentirse mejor preparado?

Guion para facilitadores de grupos pequeños
1. ¿Cómo le han afectado a usted o a su comunidad los peligros naturales? [Preguntas de seguimiento] ¿Cuándo ocurrió esto? ¿Cuáles fueron los impactos que experimentó?
    a. Temperaturas medias/extremas
    b. Cambios en las aguas subterráneas
    c. Erosión costera
    d. Inundaciones costeras y marejadas ciclónicas
    e. Sequía
    f. Terremotos
    g. Inundaciones por precipitaciones
    h. Huracanes/Ciclones tropicales
    i. Especies invasoras
    j. Deslizamientos de tierra/Corrientes de lodo
    k. Otros fenómenos meteorológicos extremos
    l. Fenómenos meteorológicos invernales extremos/tormentas del noreste
    m. Tornados
    n. Tsunamis
    o. Incendios forestales
2. ¿Qué programas o recursos existentes utiliza en caso de desastre o catástrofe natural?
    a. ¿Qué hace para prepararse para fenómenos meteorológicos extremos o desastres naturales? (Algunos ejemplos podrían ser: ¿Abastecerse de alimentos? ¿Elaborar un plan de evacuación? ¿Seguir las alertas meteorológicas?)
        i. Recursos de la ciudad
            1. **AlertBoston** para alertas de emergencia
            2. **Sitio web de la OEM** [boston.gov/emergency] sobre preparación para huracanes y preparación de kits de emergencia
            3. **Mapa de recursos de emergencia de la OEM** (encuentre el refugio de emergencia, el centro de refrigeración o la zona de juegos acuáticos más cercanos, conozca las zonas de evacuación por huracanes y las rutas de evacuación).
        ii. Ready.gov

b. ¿Qué le ha resultado útil durante un desastre natural?
c. ¿Qué le ha resultado útil después de que ocurra un desastre natural?
3. ¿Qué ayuda adicional necesita para sentirse mejor preparado para futuros desastres?
    a. Recursos de la ciudad
b. Otras ideas

Notetaking Worksheet

Riesgos preocupantes	Cómo le afectó el riesgo a usted/a la comunidad
Activos/recursos existentes utilizados	Activos/recursos necesarios
Citas (sobre la experiencia/el impacto; los recursos):	

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NATURAL HAZARD MITIGATION PLAN

Brighton Senior Center Workshop | March 18, 2026

Sign-in Sheet

NAME	DEPARTMENT (Neighborhood)	TITLE
Martha Villanueva	Brighton Mass.	
Olga Davila	Brighton Ma	
Tracie McCray	Massachusetts	
Loretta Carey	Brookline	
Helen Margolis	Brighton	
LUIZA FISCH	Chestnut Hill	
FARIDEH MODIRI	Brighton	
Ellen Bletzer	Brighton	

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NATURAL HAZARD MITIGATION PLAN

Brighton Senior Center Workshop | March 18, 2026

Sign-in Sheet

NAME	DEPARTMENT	TITLE
Ana diSanto	City	
Harvey Yee		
Olga Daniels		
Richard Dornan		
Haydee Yeskutis		

- property clears sidewalks

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- comes to senior center when its too hot
- electric bill goes up
- local library
- 1 ac in window unit

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Small Group Script for Facilitators

- some intersections were not clear

1. How have natural hazards affected you or your community? [Follow up questions]
   When did this occur? What were the impacts you experienced?
   a. Average/Extreme Temperatures
   b. Changes in Groundwater
   c. Coastal Erosion
   d. Coastal Flooding and Storm Surge
   e. Drought
   f. Earthquakes
   g. Flooding from Precipitation
   h. Hurricanes/Tropical Cyclones
   i. Invasive Species
   j. Landslides/Mudflows
   k. Other Severe Weather
   l. Severe Winter Weather/Nor'easters
   m. Tornadoes
   n. Tsunamis
   o. Wildfires

- very hard to find parking should out people late
- doctors can't go
- no mail - medications can't access
- no power - wind
- physical strain
- expensive to hire people to shovel
- mentally/depression elderly more "snow storm hostage"

2012

2015 4 big storms every week February snow was cleared fast

2. What existing programming or resources do you use in the event of a natural hazard/disaster?
   - Uhlily underground not much power outage
   a. What do you do to prepare for extreme weather/natural disasters? *(Examples could include: Stock up on food? Make an evacuation plan? Follow weather alerts?)*
      - senior center gives boxes of food
      i. City resources
         1. **AlertBoston** for emergency alerts
         2. **OEM website** [boston.gov/emergency] on hurricane preparedness, emergency kit preparedness
         3. **OEM Emergency Resources Map** (find your nearest emergency shelter, cooling center, splash pad, learn hurricane evac zones and evac routes)

      natural weather radio at home
      newsline once in a while

      ii. Ready.gov
   b. What has been helpful during a natural hazard event?
   c. What has been helpful after natural hazards have occurred?

      - friends help neighbors

3. What additional help do you need to feel better prepared for future hazard events?
   a. City resources
   b. Other ideas

hot/humid - adjust schedule early morning
snow - stuck inside

- when windy check loose siding
- fortunate to not get water pooling

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Notetaking Worksheet

Hazards of concern	How hazard impacted you/community
Allston Street – Winner's park (near wesley house in Allston	extreme weather cold/heat snow rain
Existing Assets/Resources Used	**Assets/Resources Needed**
rest at local YMCA	- senior center - public transit (watertown/kenmore

Quotes (about experience/impact; resources):

sidewalk was not clear

snowed in for weeks → had to get food delivery

Market street island all ice → neighbors helped him up

Mayor Wu tree program

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Notetaking Worksheet

Hazards of concern	How hazard impacted you/community
- snow and ice - flooding - extreme heat/heat islands - extreme cold	- makes it difficult to get places (especially walking) - becomes so hot outside that it's difficult to get out of the house / unsafe - unsafe to be outside in cold. - hard to get to the bus
Existing Assets/Resources Used	**Assets/Resources Needed**
- 311 - Alert Boston - senior center - public transportation	- more snow removal / salt - more enforcement in parks to keep them clean. - repairing of sidewalks. - more documentation/info at senior centers and BCYF.

Quotes (about experience/impact; resources):

- "I get my information from the city website and local news."
- "I really just look outside and make my own judgment on it if it is safe."

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Springfield

Notetaking Worksheet

Carol → 50's
BOB → 1991

Hazards of concern	How hazard impacted you/community
Snow → mountain of snow fire hydrant covered w/ snow ↳ call 311 driving walking → sidewalks falling trees → Block the T Ice on Cables → Put them underground?	driveway blocked or blocked view Tape Window X
Existing Assets/Resources Used	**Assets/Resources Needed**
called city → ONS Liaison gas detector & Carbon Monoxide Buy Food, Candles Flashlights National Grid & Eversource Text MSG watch The TV, 3x day Press Conference → watch TV & Text my husband,	Clear driveway Last week Emergency Meal → BOX Tuna, crackers, coco, Juice 2 granola Bars, Emergency Radios

Quotes (about experience/impact; resources):

→ Not happening – only sometimes

Snow farm – flooding → where does the water go.

NO power outages – NO issues

Never off gas heat

* gas detector Co &

NO Alligators, snakes, Tornados,

National grid → leak in Basement

* heat
* flooding

gas explosions

winter fires

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Notetaking Worksheet

Hazards of concern	How hazard impacted you/community
Snow – visibility driving - sidewalk clearing (takes a long time) Gas hazards w/ heating snowmelt causing flooding (requires drains not being blocked) Hurricanes (Carol, Bob)	- minimal power outages - no heat issues w/ gas - feel pretty safe overall - tree hazards – block roads, T, etc. - telephone poles falling down
Existing Assets/Resources Used	**Assets/Resources Needed**
311 - have called Allston/Brighton liason gas detector/CO detector Flashlights/candles Stock up food TV press conferences for weather news/advice National Grid/Eversource texts Emergency meal	Emergency radio - goes off automatically
Quotes (about experience/impact; resources):	

WHO BUT W.B.MASON

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East Boston senior center
2/19/2026

Sign In:

NAME

Luz Medina
Gloria Cardona
Priscila Rodriguez
Blanca Gil
Rosa Mary Giraldo
Olga Blanco
Maria E. Garcia
ESTER TRINIDAD
Josefina Osorio
OSCAR HILARIO
Nohemi Carvajal P.
Margarita Herrera
Mayauela Peluso
Sofia Morales
Martha Jeanine F
Lucy Argento
Noah Carbone
Judith Takdjerad
Judith Lyons
YE MYINT.
JOE STEFANO JR
Loretta Buda

Attendance

24 people - English and Spanish-speaking residents

Notetaking Worksheet

Hazards of concern	**How hazard impacted you/community**
Two people used to live in East Boston, but now in Revere. Neither has experienced flooding. Both have experienced extreme heat and cold.	Heat affected them more than the cold. Heat or Cold: Sometimes can't do the same activities. Heat - Felt confined to their home. One has central air and an in-ground pool. Can't enjoy outdoor spaces even in their home during extreme heat.
Existing Assets/Resources Used	**Assets/Resources Needed**
For information: • AlertBoston • Social media One Revere resident noted the streets and sidewalks were well cleared of snow and salted. Recognized warming and cooling centers were available.	When prompted with information about tree planting and flood mitigation projects, residents saw value in them.

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Small Group Script for Facilitators

1. How have natural hazards affected you or your community? [Follow up questions] *When did this occur? What were the impacts you experienced?*
   a. Average/Extreme Temperatures
   b. Changes in Groundwater
   c. Coastal Erosion
   d. Coastal Flooding and Storm Surge
   e. Drought
   f. Earthquakes
   g. Flooding from Precipitation
   h. Hurricanes/Tropical Cyclones
   i. Invasive Species
   j. Landslides/Mudflows
   k. Other Severe Weather
   l. Severe Winter Weather/Nor'easters
   m. Tornadoes
   n. Tsunamis
   o. Wildfires
2. What existing programming or resources do you use in the event of a natural hazard/disaster?
   a. What do you do to prepare for extreme weather/natural disasters? (*Examples could include: Stock up on food? Make an evacuation plan? Follow weather alerts?*)
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         3. **OEM Emergency Resources Map** (find your nearest emergency shelter, cooling center, splash pad, learn hurricane evac zones and evac routes)
      ii. Ready.gov
   b. What has been helpful during a natural hazard event?
   c. What has been helpful after natural hazards have occurred?
3. What additional help do you need to feel better prepared for future hazard events?
   a. City resources
   b. Other ideas

driving on no plowed lanes

[how do ambulances do it?]

(snowstorm 2026)

→ 3 weeks to clear front of building

→ Crosswalks → MBTA clearing of walkways

→ using city resources to request plowing "311 is a joke"

→ have used 311 successfully but who listens?

extreme temps and the elderly riding → on really hot days waiting in the tunnels is a hazard → have requested services for help and get nothing

using city councellors as resources

been in home for 47 years on Meridian St. by snow removal was not ~~[illegible]~~ curb to curb

Crossing kids in puddles by school skid leak of hydrant

city/school blaming each other

Cleaning drains from leaves and debris to reduce stormwater

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CIM pilot program

Notetaking Worksheet

"not everyone in this age bracket have really explored the neighborhoods"

Hazards of concern	How hazard impacted you/community
heat - "its not just hot 9-5 M-F" - not open on Saturdays "I just don't feel we have the spaces to step in and get out of the heat"	high winds (signs/entrance way flags not secure extreme cold → going through shores heat brings level of exhaustion
Existing Assets/Resources Used	**Assets/Resources Needed**
- calling 311 snow removal extreme heat	heat waves → AC senior center is good in heat waves clearing hydrants main Boston Public Library

need to sit / get water etc.

understand resources and assets available

historic/cultural assets too

Quotes (about experience/impact; resources):

high tides affecting certain neighborhoods
(neighbors needing sump pumps
people w/ storage near their cars end up w/ stuff wet

check w/ management to prepare for storms
is garage dry? can I put trash out?

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Notetaking Worksheet

Hazards of concern	How hazard impacted you/community
- extreme temps.	- heat affects more than the cold • sometimes can't do same activities Heat; felt confined to their home - can't enjoy outdoor areas even in their own home
Existing Assets/Resources Used	**Assets/Resources Needed**
- plowing of streets/sidewalks - salting of sidewalks - Alert Boston - Alerts from Mayor online • social media	- areas of shade • planting of trees
Quotes (about experience/impact; resources):	

NHMP → Natural Hazard Mitigation Plan

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Notetaking Worksheet

Hazards of concern	How hazard impacted you/community
Flooding - severe cold, snow - invasive species - extreme heat	- Basement flooding abt 2 years ago - plumbers busy, didn't know what to do - can be stressful to park, clean snow, transportation to work - roaches, mice - heat
Existing Assets/Resources Used	**Assets/Resources Needed**
	- Assistance in snow clean up - Trash Assistance in snow storm - roads are very narrow
Quotes (about experience/impact; resources):	
"When it snows the parking gets challenging and I worry about damaging my property.	

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Notetaking Worksheet

Riesgos preocupantes	Cómo le afectó el riesgo a usted/a la comunidad
DEMASIADO NIVE ENLACALLE	NOSEPUEDECAMINAR
Activos/recursos existentes utilizados	**Activos/recursos necesarios**
MAS ENPLEADO POCROLIN PIAR LA ocrias	RECURSO Para LINPIAR LA Nieve
Citas (sobre la experiencia/el impacto; los recursos):	
ENPLEADO LINPIAR LA BASURA ENLACALLE	

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Notetaking Worksheet

Hazards of concern	How hazard impacted you/community
Severe Winter Weather Average extreme (hot)	Difficulties walking → especially those with physical imparities. pipes older and many people didn't have hot water
Existing Assets/Resources Used	**Assets/Resources Needed**
Lack of education about resources or places to contact in case of emergencies.	Air conditioner (Senior Center) Dry air (heart conditions) respiratory " Due to old buildings lack of resources (City)

Quotes (about experience/impact; resources):

Heater extremely hot couldn't control the equiptment and needed an HVAC technician to come and due repairs.

→ Many streets were not clean and it was difficult to walk especially bus stations. (Stop do not have heating system)

→ floods → Snow melted, turn into water basement was full of water nobody to call.

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Notetaking Worksheet

Hazards of concern	How hazard impacted you/community
1978 - Blizzard - high floods, shelter in high school - 1 month fire department aid walking in snow/ice, risk of falling thru '11/'12 - Winthrop - flooding, difficult to walk through 95/96 - snow caught by surprise foot - risk to elderly + kids didn't clear snow well this past storm (streets, sidewalks, ice)	homeless people - sleeping in train stations, dangerous in winter Bridge in Lawrence - fires under, electricity one woman reported falling in the most recent snow, hit her head
Existing Assets/Resources Used	**Assets/Resources Needed**
call emergency services/911 hot/cold temps - apartments w/ owner that controls temp ↓ outdoors ↘ layers, ↘ don't go out avoid drink liquids what temp do Dr's recommend? expense of paying gas in winter call Uber, family that lives nearby, prepare in advance/get groceries, etc.)	enough warning time prevention measures information about where risks are → TV, prevention, consistent when required to evacuate, needs to be mandated risks of indoor fire (candles) educate on prevention/reduce risks to yourself ↘ advance notice usually sufficient
Quotes (about experience/impact; resources): get creative if no resources (candles to help heat food)	

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NATURAL HAZARD MITIGATION PLAN

East Boston Senior Center
Engagement Meeting | February 19, 2026

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LoPresti Park, photo by Weston & Sampson

AGENDA

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01 Introductions
Presentaciones

02 What is a Natural Hazard Mitigation Plan?
¿Qué es un Plan de Mitigación de Riesgos Naturales?

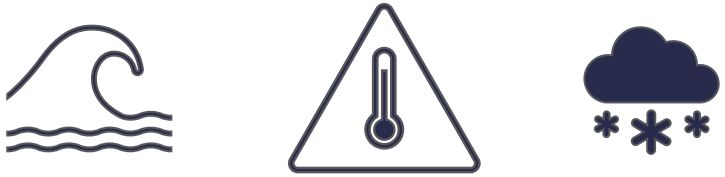
03 Why does this matter?
¿Por qué es importante?

04 Small Group Discussions
Debates en Grupos Pequeños

05 Q&A
Preguntas y respuestas

What is Natural Hazard Mitigation?
¿Qué es la mitigación de riesgos naturales?

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The effort to reduce impacts to the community from natural hazards such as flooding, extreme temperatures, and winter weather...

El esfuerzo por reducir los impactos en la comunidad derivados de fenómenos naturales como inundaciones, temperaturas extremas y condiciones meteorológicas invernales...



...through planning, policy, education, infrastructure projects, and more.

...a través de la planificación, las políticas, la educación, los proyectos de infraestructura y mucho más.

Purpose of a Natural Hazard Mitigation Plan (NHMP)
Objetivo de un Plan de Mitigación de Riesgos Naturales (NHMP)

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01 **Identify natural hazards** that pose the greatest risk to Boston.
Identificar los peligros naturales *que suponen un mayor riesgo para Boston.*

02 **Assess vulnerability** of residents, infrastructure, and critical facilities.
Evaluar la vulnerabilidad *de los residentes, las infraestructuras y las instalaciones críticas.*

03 Develop **strategies and projects** to minimize or eliminate future hazard impacts.
Desarrollar ***estrategias y proyectos*** *para minimizar o eliminar los impactos futuros de los peligros.*

04 **Strengthen coordination** across City departments, regional agencies, and community partners.
Fortalecer la coordinación *entre los departamentos municipales, las agencias regionales y los socios comunitarios.*

05 **Maintain eligibility** for FEMA mitigation grants and federal disaster recovery funding.
Mantener la elegibilidad *para las subvenciones de mitigación de FEMA y los fondos federales para la recuperación en caso de desastres.*

Why This Matters to the City Of Boston
Por qué es importante para la ciudad de Boston

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The City of Boston experiences natural disasters that **threaten infrastructure, residents, businesses, and transportation services**.

This plan will evaluate these natural disasters and guide the City in preparing and building a resilient community.

La ciudad de Boston sufre desastres naturales que ***amenazan las infraestructuras, los residentes, las empresas y los servicios de transporte****.*

Este plan evaluará estos desastres naturales y guiará a la ciudad en la preparación y construcción de una comunidad resiliente.



Natural Disasters included in Boston's NHMP

Desastres naturales incluidos en el NHMP de Boston

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Flooding from Precipitation
Inundaciones por precipitaciones



Coastal Erosion
Erosión costera



Severe Winter Weather / Nor'easters
Clima invernal severo / Tormentas del noreste



Tsunamis
Tsunamis



Coastal Flooding and Storm Surge
Inundaciones costeras y marejadas ciclónicas



Hurricanes / Tropical Cyclones
Huracanes / Ciclones tropicales

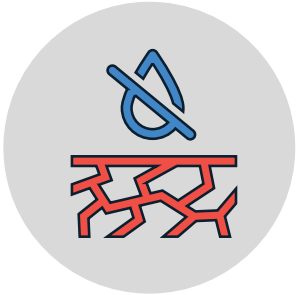


Changes in Groundwater
Cambios en las aguas subterráneas

Natural Disasters included in Boston's NHMP

Desastres naturales incluidos en el NHMP de Boston

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Drought
Sequía



Earthquakes
Terremotos



Tornadoes
Tornados



Invasive Species
Especies invasoras



Average/ Extreme Temperatures
Temperaturas medias/extremas



Wildfire
Incendio forestal



Landslides/ Mudflows
Deslizamientos de tierra/flujos de lodo



Other Severe Weather
Otras condiciones meteorológicas adversas

Recent Natural Hazard Events
Eventos recientes de peligros naturales

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January 2026.
Photos by Weston & Sampson

In 2024, Boston had **12 days above 90°F** (more than **double** the 2023 count).
En 2024, Boston tuvo ***12 días con temperaturas superiores a los 90°F*** *(más del* ***doble*** *que en 2023).*

Summer 2023 brought over **20 inches of rain**, making it the **second-rainiest** summer ever recorded.
El verano de 2023 trajo más ***de 20 pulgadas de lluvia****, lo que lo convirtió en* ***el segundo verano más lluvioso*** *jamás registrado.*

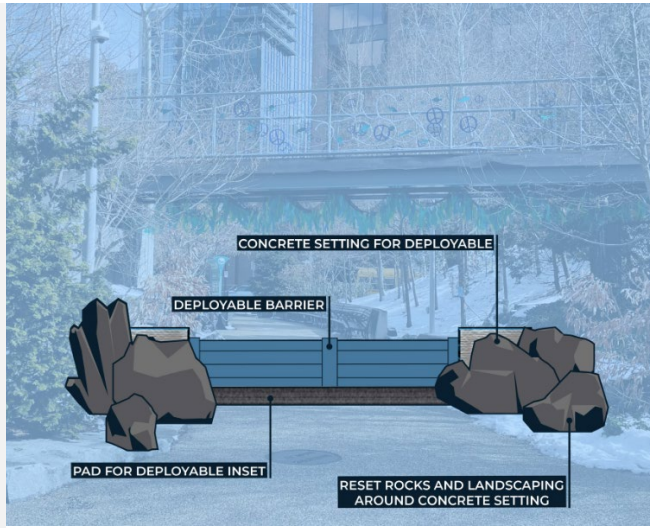
During the most recent winter storm, Boston received at least **16.1 inches** of snow.
Durante la última tormenta invernal, Boston recibió al menos ***16,1 pulgadas*** *de nieve.*

Boston 25 News

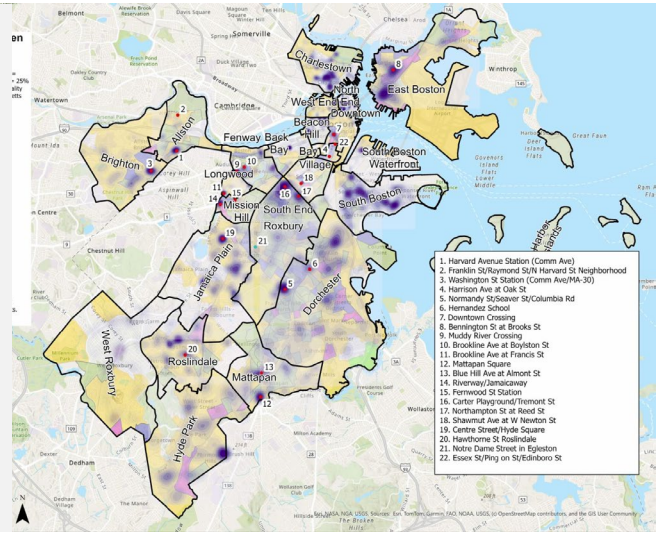
City Projects to Address Hazards

DRAFT

Interim Flood Deployables Project
Office of Emergency Management (OEM)



Community Based Flood Resilience and Green Infrastructure
Office of Green Infrastructure (OGI)



Resilient East Boston
Planning Department



Resilient Border Street
Office for Community Resilience (OCR)



How this Plan Benefits the City
Cómo beneficia este plan a la ciudad

DRAFT

Mitigation Actions Examples
Ejemplos de medidas de mitigación

Schools, Housing, & Vulnerable Populations

- Flood protection for schools
- Back-up power for buildings serving vulnerable residents

Coastal Impacts, Flooding Risks, & Natural Systems

- Seawall rehabilitation
- Drainage improvements

Energy, Utilities, & Communication Systems

- Energy demand assessments

Escuelas, viviendas y poblaciones vulnerables

- *Protección contra inundaciones para escuelas.*
- *Energía de reserva para edificios que prestan servicio a residentes vulnerables.*

Impactos costeros, riesgos de inundaciones y sistemas naturales

- *Rehabilitación del dique marítimo.*
- *Mejoras en el drenaje.*

Energía, servicios públicos y sistemas de comunicación

- *Evaluaciones de la demanda energética*

How this Plan Benefits the City
Cómo beneficia este plan a la ciudad

DRAFT

Mitigation Actions Examples
Ejemplos de medidas de mitigación

City Operations & Emergency Response Services

- Climate upgrades to municipal buildings and city emergency facilities

Community Education, Involvement, & Workforce Training

- Citywide climate education and engagement

Building Design, Flood Policy, & Business Support

- Integrate resilience into local regulations

Operaciones municipales y servicios de respuesta ante emergencias.

- *Mejoras climáticas en edificios municipales e instalaciones de emergencia de la ciudad.*

Educación comunitaria, participación y formación de la fuerza laboral.

- *Educación y compromiso climático en toda la ciudad.*

Diseño de edificios, política de inundaciones y apoyo empresarial

- *Integrar la resiliencia en las normativas locales.*

Engaging Residents Across the City
Involucrar a los residentes de toda la ciudad

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Workshops: Like this one!
Talleres: *¡Como este!*

Public Survey: Focused on experiences with natural hazards
Encuesta pública: *Centrada en experiencias con riesgos naturales*

Events: Attending events hosted by City departments
Eventos: *Asistir a eventos organizados por los departamentos municipales*

Fall 2025: Plan start
Otoño de 2025: *Inicio del plan*

Winter-Spring 2026: Engagement with public and priority populations
Invierno-primavera de 2026: *Compromiso con la población en general y con los grupos prioritarios*

Summer 2026: Plan adoption by City Council, submit for approval by MEMA/FEMA
Verano 2026: *Aprobación del plan por parte del Ayuntamiento, presentación para su aprobación por parte de MEMA/FEMA*

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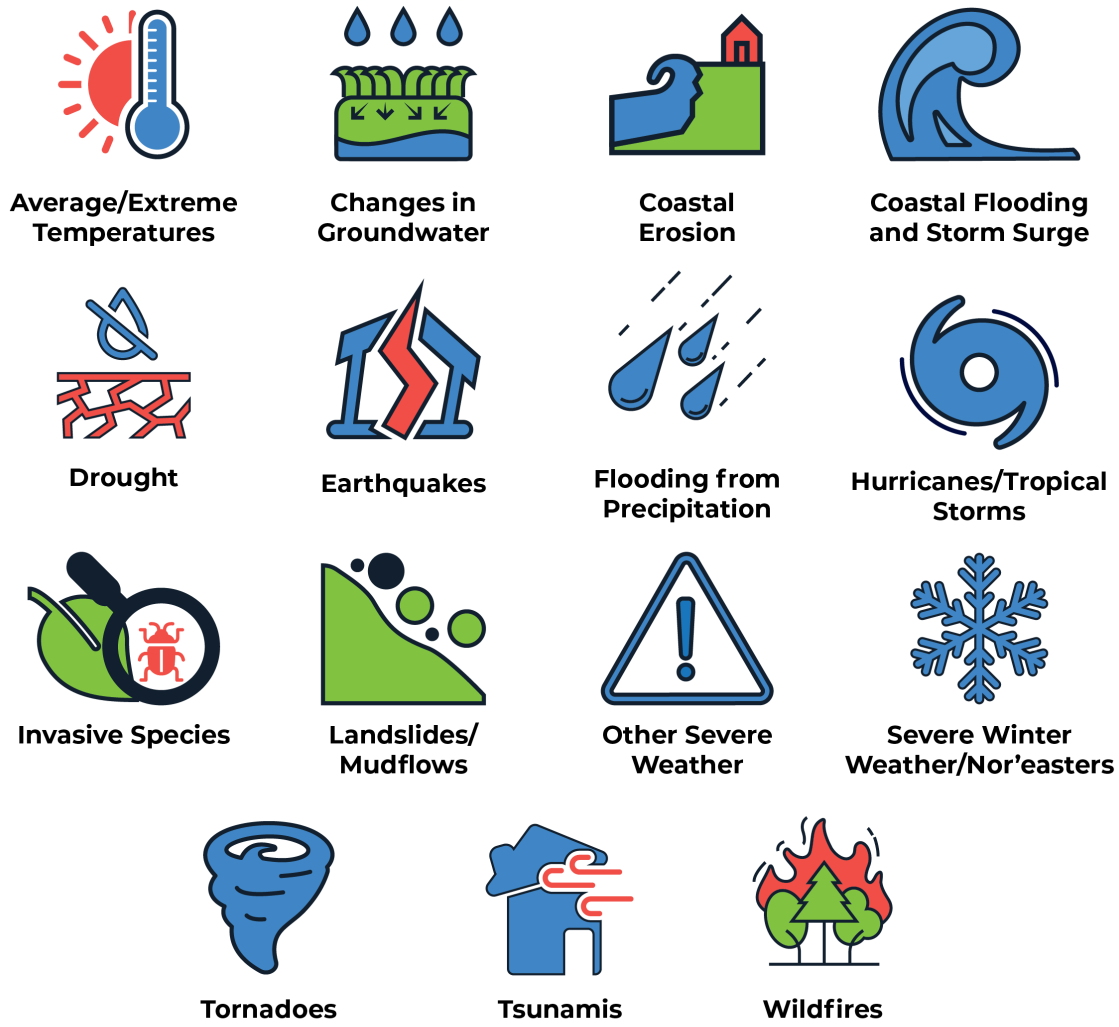
Boston City Hall, photo by Weston & Sampson

GROUP DISCUSSIONS
DISCUSIONES EN GRUPO

Small Group Questions
Preguntas para grupos pequeños

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- **How have natural hazards affected you or your community?** *¿Cómo le han afectado a usted o a su comunidad los peligros naturales?*
- **What existing programming or resources do you use in the event of a natural hazard/disaster?** *¿Qué programas o recursos existentes utiliza en caso de peligro natural o desastre?*
- **What additional help do you need to feel better prepared for future hazard events?** *¿Qué ayuda adicional necesita para sentirse mejor preparado para futuros peligros naturales?*





Boston City Hall, photo by Weston & Sampson

Q&A

Help Shape Boston's Climate Future!

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Be a part of Boston's Natural Hazard Mitigation Plan Update and help shape how the city prepares for flooding, extreme heat, winter storms, and more.



Take the survey
tinyurl.com/BostonNHMP-Survey

Learn more
tinyurl.com/BostonNHMP

SWIPE TO LEARN MORE

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What is a NHMP?

A Natural Hazard Mitigation Plan (NHMP) is a planning strategy to aid municipal, county, and state governments in understanding how to reduce the risks, vulnerabilities, and impacts associated with natural hazards to better protect people, homes, businesses, and critical infrastructure.

Goals of this NHMP:

- Implement **strategic and equitable** hazard mitigation planning
- Build a **comprehensive and adaptable** planning approach focused on minimizing risks
- Guide **long-term, effective** resilience planning

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DEFINITIONS



Natural Hazards are environmental phenomena that have the potential to impact societies and the human environment.



Hazard Mitigation is the effort to reduce impacts from natural hazards through planning, policy, education, infrastructure projects, and more.



Resilience is the ability to withstand and swiftly recover from an extreme event. Ideally, resilient systems "bounce forward" to create healthier, greener, and more equitable systems and spaces.

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BENEFITS OF A NATURAL HAZARD MITIGATION PLAN



Increasing public awareness of natural hazards.



Efficiency through collaboration.



Directing resources towards greatest vulnerabilities.



Unlocking federal funding opportunities.

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WHAT RISKS DOES BOSTON FACE?

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This Natural Hazard Mitigation Plan **evaluates 15 hazards** to provide a comprehensive assessment of risk. Boston is most affected by natural hazards related to flooding and extreme temperature due to its coastal location and urban conditions.



Average/Extreme Temperatures



Changes in Groundwater



Coastal Erosion



Coastal Flooding and Storm Surge



Drought



Earthquakes



Flooding from Precipitation



Hurricanes/ Tropical Storms



Invasive Species



Landslides/ Mudflows



Other Severe Weather



Severe Winter Weather/Nor'easters



Tornadoes



Tsunamis



Wildfires

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LEARN MORE AND SHARE YOUR THOUGHTS!

Complete the survey to share your experiences with past natural hazard events and provide input on potential actions to help make the city more resilient to future risks.



Take the survey here: **tinyurl.com/BostonNHMP-Survey**



Learn more about Boston's Natural Hazard Mitigation Plan: **tinyurl.com/BostonNHMP**

B

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Timestamp	Please select your language.	What neighborhood do you live in?	Which of the following natural hazards have impacted you or your community in the last 5-10 years? Select all that apply.	How did these events impact you or your community? (For example, damaged my property, roads were affected, went to a shelter/family/friend's house, medical/health emergency)
2/4/2026 20:18:46	English	East Boston	Average/Extreme Temperatures, Coastal Flooding and Storm Surge, Flooding from Precipitation, Severe Winter Weather/Nor'easters	
2/4/2026 20:25:17	English	East Boston	Average/Extreme Temperatures, Coastal Erosion, Coastal Flooding and Storm Surge, Flooding from Precipitation, Severe Winter Weather/Nor'easters	Impossible to get around the city
2/5/2026 13:55:58	English	South Boston	Coastal Erosion, Invasive Species, Severe Winter Weather/Nor'easters	Driving on dangerous roads
2/5/2026 14:34:19	English	South Boston	Average/Extreme Temperatures, Severe Winter Weather/Nor'easters	roads were affected by snow
3/31/2026 14:11:30	English	Longwood Medical Area	Average/Extreme Temperatures, Flooding from Precipitation, Severe Winter Weather/Nor'easters	
4/1/2026 10:06:10	English	Dorchester	Average/Extreme Temperatures, Coastal Erosion, Coastal Flooding and Storm Surge, Flooding from Precipitation, Severe Winter Weather/Nor'easters	Flooded roads due to tidal flooding/precipitation resulting in road closure of major roads, damage to car, felled trees in front of home, have seen houseless people experience heat illness
4/14/2026 18:13:18	English	Jamaica Plain	Average/Extreme Temperatures, Drought, Severe Winter Weather/Nor'easters	Largely damaged roads creating massive pit holes and cracking cement
4/14/2026 21:57:09	English	South Boston Waterfront	Changes in Groundwater, Coastal Flooding and Storm Surge, Flooding from Precipitation, Severe Winter Weather/Nor'easters	Roads were impassable and damage to buildings
4/29/2026 8:38:17	English	Fenway	Average/Extreme Temperatures, Severe Winter Weather/Nor'easters	Roads and sidewalks affected by snow.
5/12/2026 12:28:06	English	Roxbury	Average/Extreme Temperatures, Flooding from Precipitation, Other Severe Weather, Severe Winter Weather/Nor'easters, Tornadoes, Wildfires	Health impacts, cars stuck in flood water, burst pipes
7/25/2026 17:26:50	English	South Boston Waterfront	Average/Extreme Temperatures, Severe Winter Weather/Nor'easters	

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Where should the City focus most when planning for emergencies and disasters? Please rank 1-5, from least to most important. [Schools, Housing, & Vulnerable Populations]	Where should the City focus most when planning for emergencies and disasters? Please rank 1-5, from least to most important. [Coastal Impacts, Flooding Risks, & Natural Systems]	Where should the City focus most when planning for emergencies and disasters? Please rank 1-5, from least to most important. [Energy, Utilities, & Communication Systems]	Where should the City focus most when planning for emergencies and disasters? Please rank 1-5, from least to most important. [City Operations & Emergency Response Services]
5 - Most important	5 - Most important	5 - Most important	5 - Most important
3	4	3	5 - Most important
3	3	2	2
4	3	4	5 - Most important
2	3	5 - Most important	4
5 - Most important	4	4	5 - Most important
4	3	4	3
4	5 - Most important	4	4
5 - Most important	5 - Most important	5 - Most important	4
5 - Most important	4	4	5 - Most important
3	5 - Most important	5 - Most important	4

DRAFT

Where should the City focus most when planning for emergencies and disasters? Please rank 1-5, from least to most important. [Community Education, Involvement, & Workforce Training]	Where should the City focus most when planning for emergencies and disasters? Please rank 1-5, from least to most important. [Building Design, Flood Policy, & Business Support]	Schools, Housing, & Vulnerable Populations	Coastal Impacts, Flooding Risks, & Natural Systems
5 - Most important	5 - Most important	Flood protection for Schools – Prevent school flooding through building upgrades and site improvements.	Tunnel flood mitigation improvements – Reduce flooding risks in tunnels and underground infrastructure.
2	1 - Least important	Back-up power for buildings serving vulnerable residents – Keep shelters, senior housing, and care facilities powered during emergencies.	Tunnel flood mitigation improvements – Reduce flooding risks in tunnels and underground infrastructure.
2	3	Flood protection for Schools – Prevent school flooding through building upgrades and site improvements.	Tunnel flood mitigation improvements – Reduce flooding risks in tunnels and underground infrastructure.
2	2	Back-up power for buildings serving vulnerable residents – Keep shelters, senior housing, and care facilities powered during emergencies.	Storrow Drive drainage improvements – Improve stormwater drainage to reduce roadway flooding.
1 - Least important		Back-up power for buildings serving vulnerable residents – Keep shelters, senior housing, and care facilities powered during emergencies.	Seawall rehabilitation – Strengthen coastal defenses against storm surge and sea level rise.
3	4	Back-up power for buildings serving vulnerable residents – Keep shelters, senior housing, and care facilities powered during emergencies.	Wetlands inventory and protection plan – Protect wetlands that help absorb floodwaters naturally.
4	2	Public housing climate upgrades – Improve safety and comfort in public housing during heat, floods, and outages.	Seawall rehabilitation – Strengthen coastal defenses against storm surge and sea level rise.
3	4	Public housing climate upgrades – Improve safety and comfort in public housing during heat, floods, and outages.	Seawall rehabilitation – Strengthen coastal defenses against storm surge and sea level rise.
1 - Least important	5 - Most important	Flood protection for Schools – Prevent school flooding through building upgrades and site improvements.	Wetlands inventory and protection plan – Protect wetlands that help absorb floodwaters naturally.
5 - Most important	4	Public housing climate upgrades – Improve safety and comfort in public housing during heat, floods, and outages.	
5 - Most important	5 - Most important	Back-up power for buildings serving vulnerable residents – Keep shelters, senior housing, and care facilities powered during emergencies.	Wetlands inventory and protection plan – Protect wetlands that help absorb floodwaters naturally.

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Energy, Utilities, & Communication Systems	City Operations & Emergency Response Services	Community Education, Involvement, & Workforce Training	Building Design, Flood Policy, & Business Support
Citywide energy demand assessment – Reduce power outages by managing peak electricity demand.	Police facility resilience improvements – Keep police stations functional during climate hazards.	Community advisory boards and partnerships – Involve residents in long-term climate planning.	Integrate resilience into local regulations – Require climate-ready design in new development.
IT and communications vulnerability assessment – Ensure internet and emergency systems work during disasters.	Fire Prevention Division capacity building – Strengthen fire prevention services for climate-related risks.	Infrastructure coordination committee – Align utilities and agencies on resilient infrastructure projects.	NFIP reform advocacy – Improve flood insurance affordability and risk awareness.
Citywide energy demand assessment – Reduce power outages by managing peak electricity demand.	Fire Prevention Division capacity building – Strengthen fire prevention services for climate-related risks.	Resilience workforce development pathways – Train workers for climate adaptation and resilience jobs.	Integrate resilience into local regulations – Require climate-ready design in new development.
Citywide energy demand assessment – Reduce power outages by managing peak electricity demand.	Climate upgrades to municipal buildings – Ensure city facilities remain operational during emergencies.	Citywide climate education and engagement – Help residents prepare for climate and hazard risks.	Advocate for state building code updates – Strengthen building standards for climate risks.
Citywide energy demand assessment – Reduce power outages by managing peak electricity demand.	Fire Prevention Division capacity building – Strengthen fire prevention services for climate-related risks.	Infrastructure coordination committee – Align utilities and agencies on resilient infrastructure projects.	Advocate for state building code updates – Strengthen building standards for climate risks.
IT and communications vulnerability assessment – Ensure internet and emergency systems work during disasters.	Climate upgrades to municipal buildings – Ensure city facilities remain operational during emergencies.	Citywide climate education and engagement – Help residents prepare for climate and hazard risks.	NFIP reform advocacy – Improve flood insurance affordability and risk awareness.
Citywide energy demand assessment – Reduce power outages by managing peak electricity demand.	Climate upgrades to municipal buildings – Ensure city facilities remain operational during emergencies.	Citywide climate education and engagement – Help residents prepare for climate and hazard risks.	Integrate resilience into local regulations – Require climate-ready design in new development.
IT and communications vulnerability assessment – Ensure internet and emergency systems work during disasters.	Climate upgrades to municipal buildings – Ensure city facilities remain operational during emergencies.	Cabinet-level climate preparedness taskforce – Improve coordination across city departments.	NFIP reform advocacy – Improve flood insurance affordability and risk awareness.
Citywide energy demand assessment – Reduce power outages by managing peak electricity demand.	Climate upgrades to municipal buildings – Ensure city facilities remain operational during emergencies.	Cabinet-level climate preparedness taskforce – Improve coordination across city departments.	NFIP reform advocacy – Improve flood insurance affordability and risk awareness.
Citywide energy demand assessment – Reduce power outages by managing peak electricity demand.	Fire Prevention Division capacity building – Strengthen fire prevention services for climate-related risks.	Community advisory boards and partnerships – Involve residents in long-term climate planning.	Support climate resilience programs for businesses and institutions – Help organizations reduce climate risks.
IT and communications vulnerability assessment – Ensure internet and emergency systems work during disasters.	Fire Prevention Division capacity building – Strengthen fire prevention services for climate-related risks.	Citywide climate education and engagement – Help residents prepare for climate and hazard risks.	Integrate resilience into local regulations – Require climate-ready design in new development.

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If you wish to receive updates about this project and be entered into a raffle for a gift card, please provide your email address. If you win this, we will notify you via email.	Other Comments or Questions?
Yes	
Ldenson@longwoodcollective.org	
Ready.thomasj@gmail.com	
dietlrm@gmail.com	
	Educate comminitity partners and city departments on these initiates so the can respond in an informed way.
	I'd like to see legislation or policy that requires companies/buildings to prepare their employees in case of an emergency where they would have to evacuate the building. Further, I've just read the Unthinkable by Amanda Ripley and believe it would be integral in helping city officials discover how best to educate the general population in case of emergency and what communication methods/styles are most effective.



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CITY of BOSTON

NATURAL HAZARD MITIGATION PLAN

Boston Public Schools – Art for Change

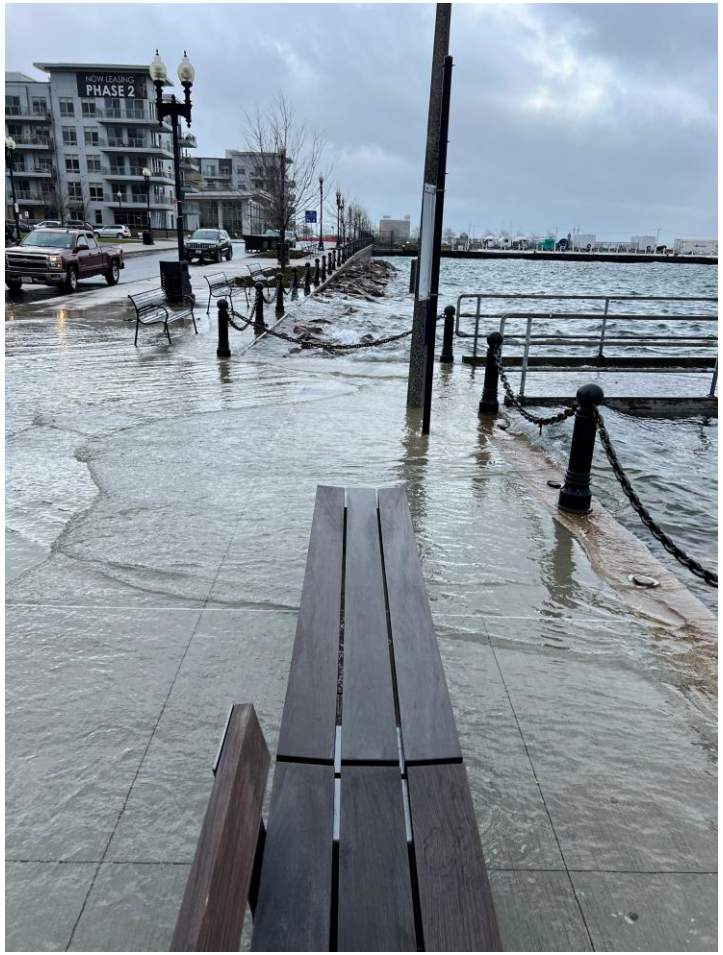
April 22, 2026

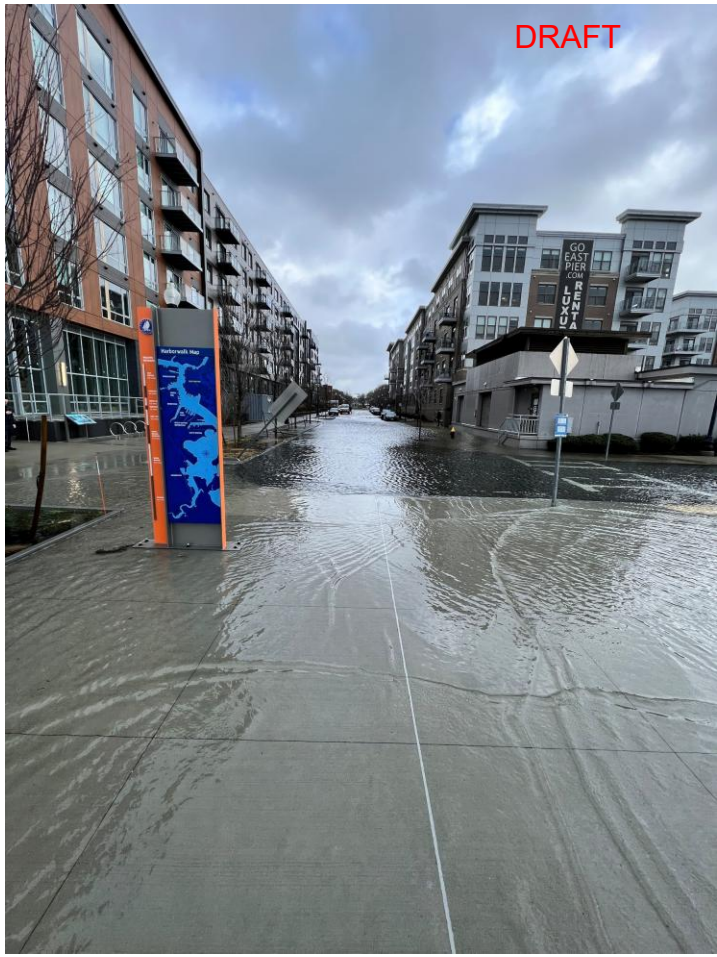
Weston & Sampson

What are Natural Hazards?

- **Natural hazards** are natural events that can harm people, damage buildings, and affect important places or items.
- Many natural hazards can be predicted and often happen again and again in the same areas because of local weather patterns or the land itself.

- This includes impacts such as:
  - Injuring people
  - Damaging buildings or neighborhoods
  - Disrupting daily commutes to work or school





December 2022 flooding in East Boston.

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Types of Natural Hazards in Boston



Flooding from Precipitation



Coastal Flooding and Storm Surge



Coastal Erosion



Hurricanes / Tropical Cyclones



Tsunamis



Changes in Groundwater



Severe Winter Weather / Nor'easters



Average/ Extreme Temperatures



Drought (including groundwater impacts)



Wildfire



Earthquakes



Landslides/ Mudflows



Tornadoes



Invasive Species



Other Severe Weather

DRAFT

What natural hazard events have you experienced?



Turn to a neighbor and talk about the types of hazards you have experienced in the past year.

Think about different natural hazard events in each season and how they have impacted you, your family, and community.

Recent Natural Hazard Events

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January 2026.
Photos by Weston & Sampson

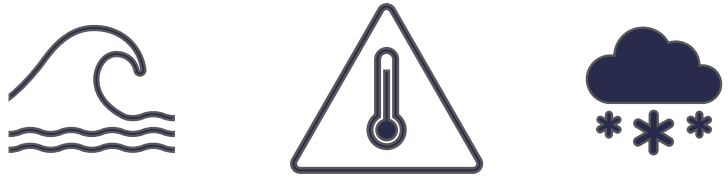
In 2024, Boston had **12 days above 90°F** (more than **double** the year before).

Summer 2023 brought over **20 inches of rain**, making it the **second-rainiest** summer ever recorded.

During the most recent winter storm, Boston received at least **16.1 inches** of snow. *Boston 25 News*

What is Natural Hazard Mitigation?

DRAFT



Natural hazard mitigation is the effort to reduce impacts to the community from natural hazards such as flooding, extreme temperatures, and winter weather…



…through planning, policy, education, infrastructure projects, and more.

Planning Ahead Is Better Than Reacting

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Often, people and governments react to natural hazards after they happen instead of planning ahead, referred to as **mitigation**, to reduce their impacts due to money, availability, and knowledge.

Mitigation	Response
Happens **before** a hazard	Happens **during** or **after** a hazard
Focuses on **prevention**	Focuses on **reaction**
Prepares communities ahead of time to reduce damage	Helps people stay safe in the moment

Why This Matters to the City Of Boston

DRAFT

The City Boston experiences natural hazards that threaten infrastructure, residents, businesses, and transportation services.

The **Boston Natural Hazard Mitigation Plan** will evaluate these natural hazards and guide the City in preparing for future natural hazard events.



Today's Activity: Plan for a Safer School



What are we doing today?

We will create a hazard mitigation plan for a school. For the answers, base them off your current school.

We'll think about:

- What hazards could affect the school
- What people and places are most important to protect
- How we can plan ahead before a hazard occurs

Let's Compare

Schools can be thought of as mini cities because they include people, buildings, and shared spaces, just like a community.

Component of a hazard mitigation plan	Parts of a school system
Community	School campus
People	Students, teachers, staff
Buildings	Classrooms, gym, cafeteria



A hazard mitigation plan works the same way for a school as it does for a whole community. **It helps protect people and places by planning ahead.**

Chapter 1. Identify Hazards
What could go wrong at your school?

What types of natural hazards can impact your school?

Think about where your school is located and the types of hazards that could impact it now and in the future.



Chapter 2. Identify Assets

What do you want to protect at your school?

What parts of your school are important to protect and make your school unique?

Think about elements of your school campus, people, and buildings.







Chapter 3. Determine Vulnerability
What should we prioritize protecting?

What parts of a school may need extra protection?

Think about parts of the school building that may need work done or how certain natural hazards may damage a building.



Chapter 4. Actions
What Can We Do to Make a School Safer?

What are some actions we can take to make the school prepared?

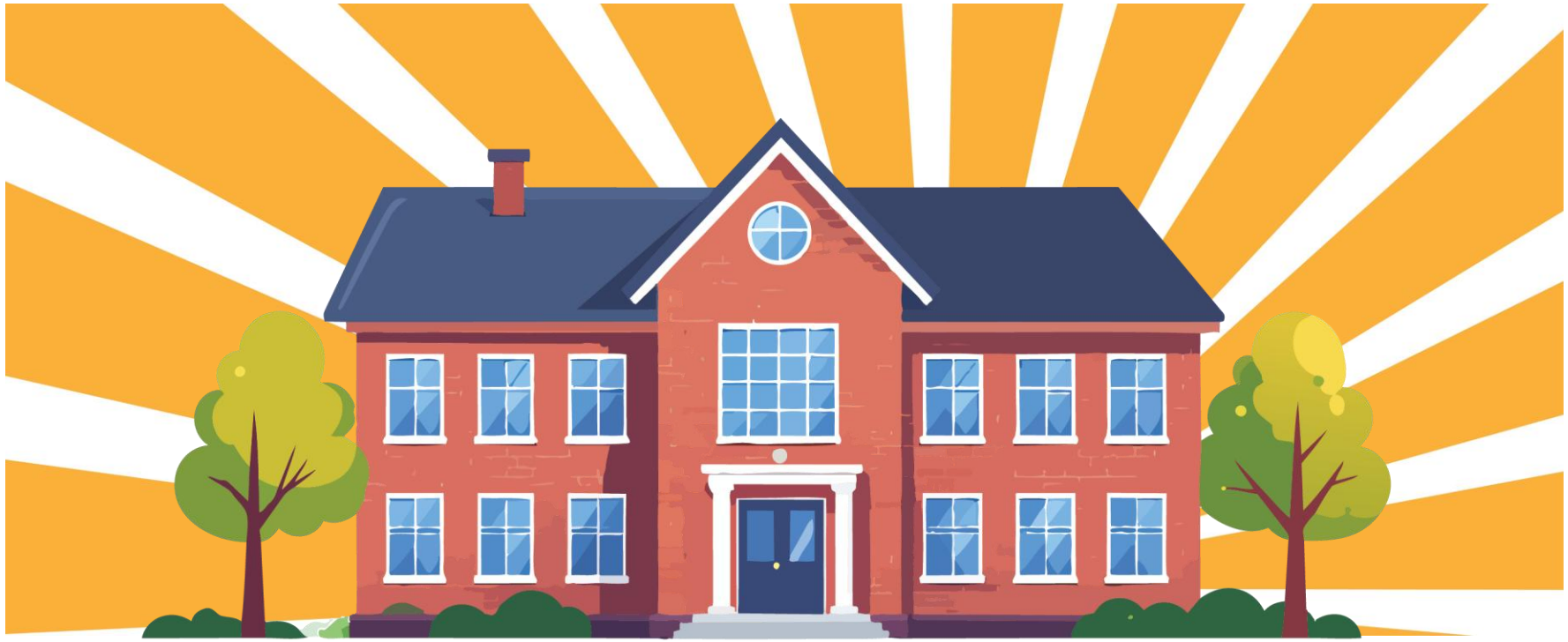
Think about steps you can take to make a school safer.



Chapter 5. Maintaining the Plan
Who can help maintain this plan?

How can the plan remain relevant to future generations?

Think of some ways to monitor actions for this plan and provide feedback for future school students and teachers.



Natural hazard mitigation plans help prepare for different types of hazards. In this chapter, you will share how your school is impacted by flooding. **Use the fill-in-the-blank sections to identify previous hazard events at your school.** Don't worry if you need to leave some sections blank.

Definition

Flooding is defined as _____

_____

_____ .

Past Experiences at My School

Year of Flood	Location of Flood Impacts	Impact on School

When Flooding Happens

Flooding at our school usually happens during _____

_____

_____ .

Natural hazard mitigation plans help prepare for different types of hazards. In this chapter, you will share assets associated with your school. **Use the fill-in-the-blank sections to identify important assets at your school.** Don't worry if you need to leave some sections blank.

Definition

Assets are defined as _____

_____

_____ .

School Asset List

The following people, places, and items should be protected during extreme rainfall, wind, flooding, or storms:

School Asset Name	Why It's Important

Chapter 3. Determine Vulnerability

School Natural Hazard Mitigation Plan Exercise

Natural hazard mitigation plans help prepare for different types of hazards. In this chapter, you will share what you believe your school should prioritize protecting during a natural hazard event. **Use the fill-in-the-blank sections to determine vulnerable locations at your school.** Don't worry if you need to leave some sections blank.

Definition

Vulnerability is defined as _____

_____

_____ .

School Vulnerability

Using the picture of the school below, circle locations that may be vulnerable during extreme rainfall, wind, flooding, or storms. Feel free to provide additional information on why it may be impacted.



Natural hazard mitigation plans help prepare for different types of hazards. In this chapter, you will develop actions to help prepare your school. **Use the fill-in-the-blank sections to create mitigaation actions for your school.** Don't worry if you need to leave some sections blank.

Definition

Resilience is defined as _____

_____

_____ .

Actions

The following actions will help people, places, and items to be protected during extreme rainfall, wind, flooding, or storms:

Action for the School	Why It's Important for Resilience

Chapter 5. Maintaining the Plan

School Natural Hazard Mitigation Plan Exercise

CITY of BOSTON DRAFT

Weston & Sampson

Natural hazard mitigation plans help prepare for different types of hazards. In this chapter, you will write steps to maintaing your school's hazard mitigation plan. **Use the fill-in-the-blank sections to build a maintenance plan for your school.** Don't worry if you need to leave some sections blank.

Step 1: This plan will be checked every _____ year(s).

Step 2: This plan should be reviewed by the following people:

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

Step 3: The following things need regular maintenance to reduce damage from extreme rainfall, wind, flooding, or storms

- ☐ _____
- ☐ _____
- ☐ _____
- ☐ _____

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CITY of BOSTON

NATURAL HAZARD MITIGATION PLAN

Cross-Agency Climate Resilience Meeting
April 28, 2026

Weston & Sampson

MEET THE TEAM

DRAFT

Office of Emergency Management



Kendall Bobula
Director of Planning and Preparedness



Allen Ryan
Emergency Management Planner



John Tiano
Emergency Management Planner

Weston & Sampson



Robin Seidel, AIA
Principal In Charge



Madison Biasin
Project Manager



Janet Moonan, PE
Senior Technical Leader

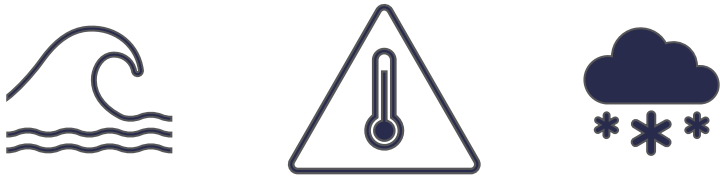


Boston City Hall, photo by Weston & Sampson

What is a Natural Hazard Mitigation Plan?

What is Natural Hazard Mitigation?

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The effort to reduce impacts from natural hazards such as flooding, extreme temperatures, and winter weather…



…through planning, policy, education, infrastructure projects, and more.

Purpose of Natural Hazard Mitigation Plan (NHMP)

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01 **Identify natural hazards** that pose the greatest risk to Boston.

02 **Assess vulnerability** of residents, infrastructure, and critical facilities.

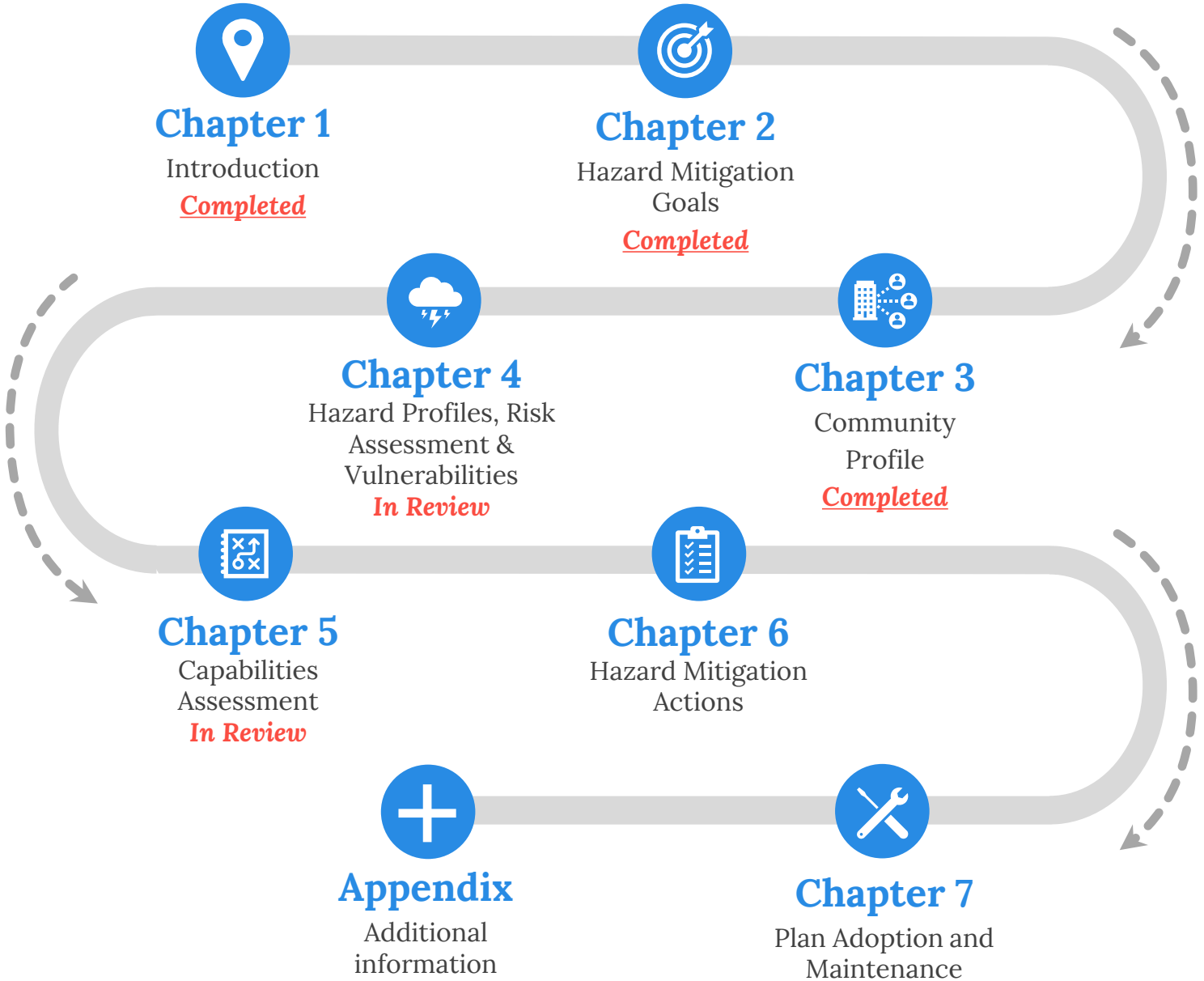
03 Develop **strategies and projects** to minimize or eliminate future hazard impacts.

04 **Strengthen coordination** across City departments, regional agencies, and community partners.

05 **Maintain eligibility** for FEMA mitigation grants and federal disaster recovery funding.

NHMP OVERVIEW

DRAFT



**Change from 2018, updated to follow ResilientMass Plan*

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HAZARD PROFILES



Flooding from Precipitation



Coastal Flooding and ***Storm Surge***



Coastal Erosion



Hurricanes / Tropical Cyclones



Tsunamis



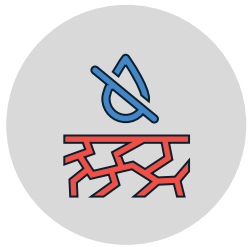
Changes in Groundwater



Severe Winter Weather / Nor'easters



Average/ Extreme Temperatures



Drought ***(including groundwater impacts)***



Wildfire



Earthquakes



Landslides/ ***Mudflows***



Tornadoes



Invasive Species



Other Severe Weather

VALUE OF HAZARD MITIGATION PLANNING

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EVERY $1 spent on mitigation

SAVES $6 on disaster recovery

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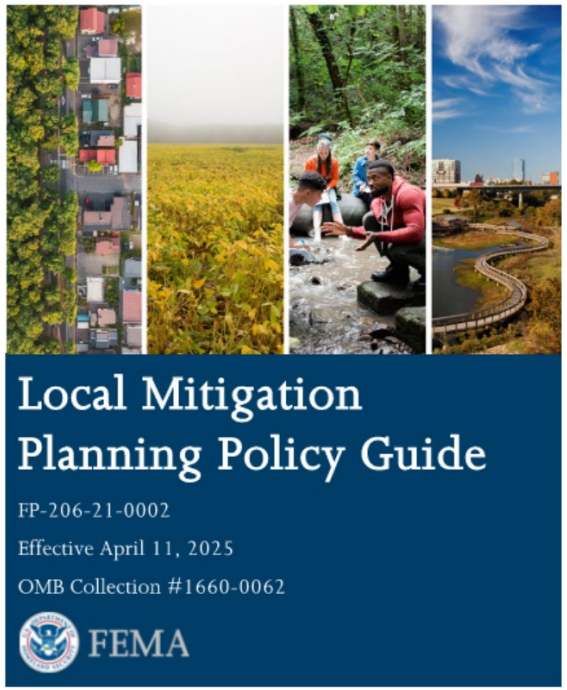


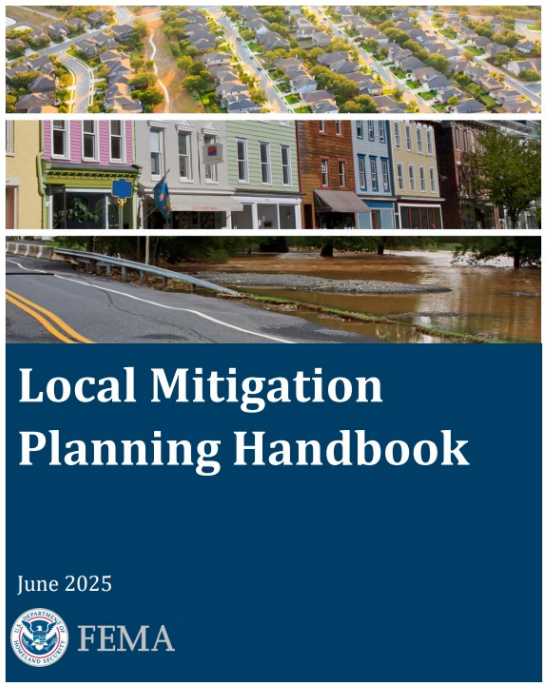
Boston City Hall, photo by Weston & Sampson

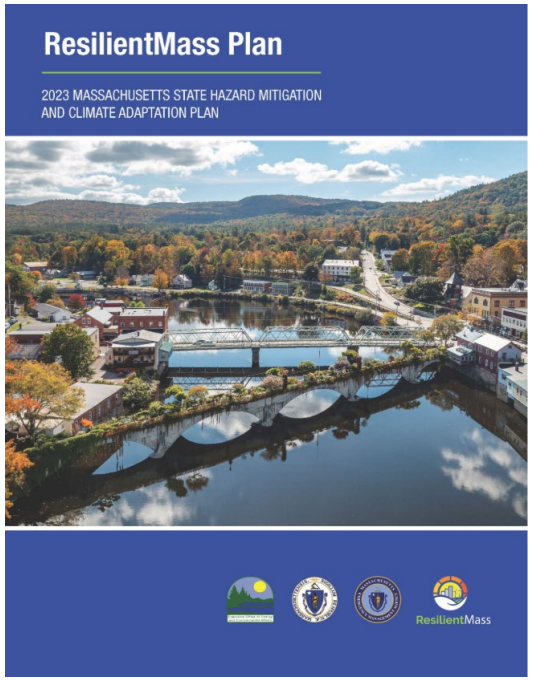
FEMA's Updated Guidance 2025

REQUIREMENTS & CONSISTENCY

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FEDERAL

- FEMA updated Local Mitigation Planning Policies and Guidance (released April 2022, revised April 2023, revised April 2025)
- FEMA Local Mitigation Planning Handbook (released May 2023, revised June 2025)

STATE

- State adopted the 2023 ResilientMass Plan (2023 Massachusetts State Hazard Mitigation and Climate Adaptation Plan)

REQUIREMENTS & CONSISTENCY

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2025 Updates Include:

- Removal of “social vulnerability” from requirements.
- Mention of climate change is removed from guidance.
- No requirement to assess or prioritize mitigation actions based on community vulnerability or underserved populations.



Local Mitigation Planning Handbook

June 2025

FEMA

REVISED FACILITY / ASSET INVENTORY

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Assets now include, but are not limited to:

Assets also include

Repetitive Loss Structures

Land Use Changes & Future Potential Development

People



- **Underserved** communities
- **Socially vulnerable** populations

Structures



- Existing **buildings** and **infrastructure**
- Future or planned **developments**

Community Lifelines and Other Critical Facilities



- Fundamental **services** and **facilities** in the community
- Support **response planning** and **operations**
- Essential to human **health** and **safety** or to **economic security**

Natural, Historic, and Cultural Resources



- **Environmental** and **natural resources**
- **Historic resources** that tell the story of your community
- Assets of the **local culture** that are unique or cannot be replaced

Economy



- Major **employers, economic sectors,** and **commercial centers**

Activities that Have Value to the Community



- **Activities** that are important to the community
- Long-standing **traditions, seasonal markets, tourists**

CAPABILITIES ASSESSMENT

DRAFT

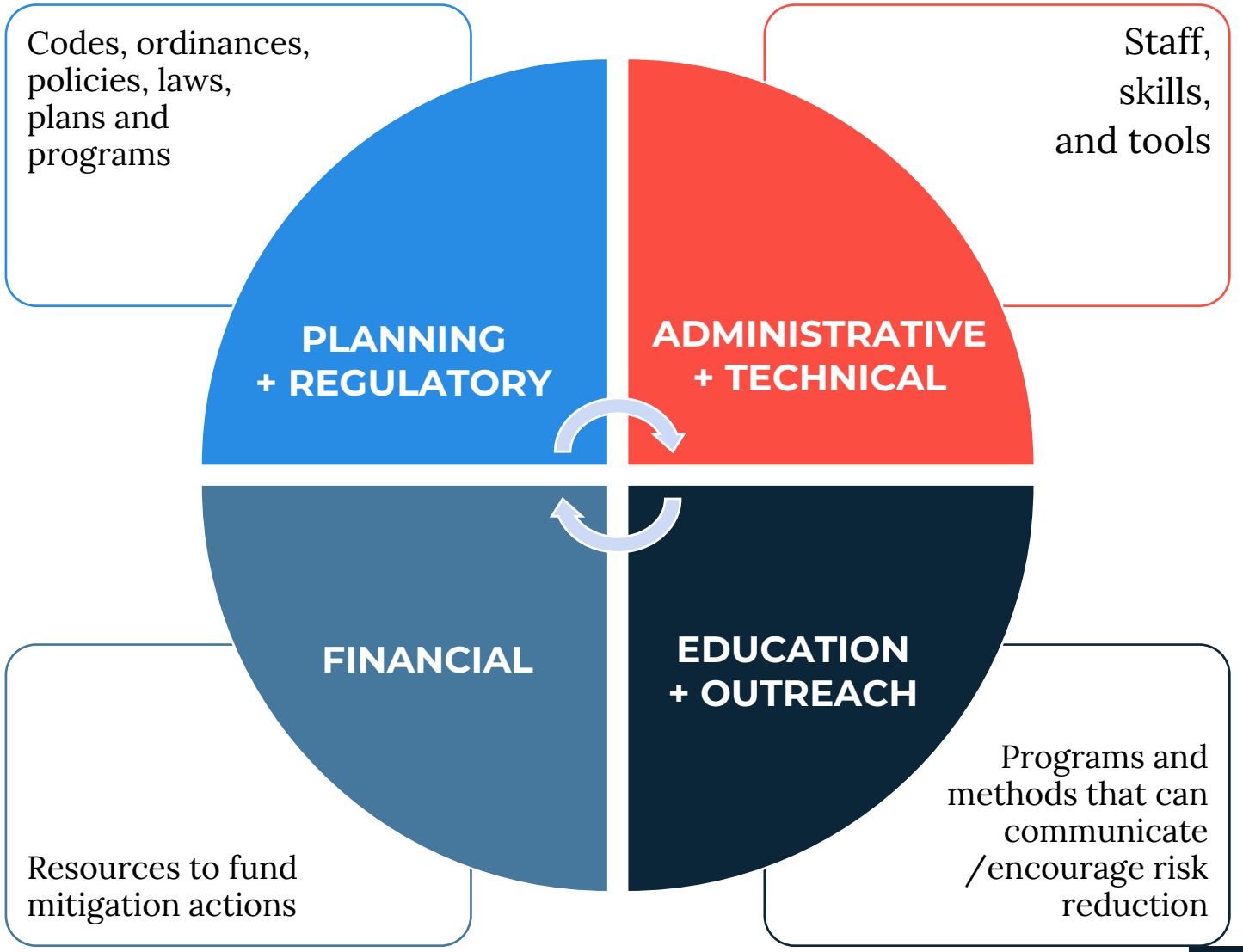
Increased emphasis on Capabilities Assessment

Intent:

- Identify and assess existing authorities, policies, programs, and resources and capabilities to use or modify local tools to reduce losses and vulnerability from profiled hazards.

Consistency:

- National Flood Insurance Program (NFIP) and tie to Community Rating System (CRS)

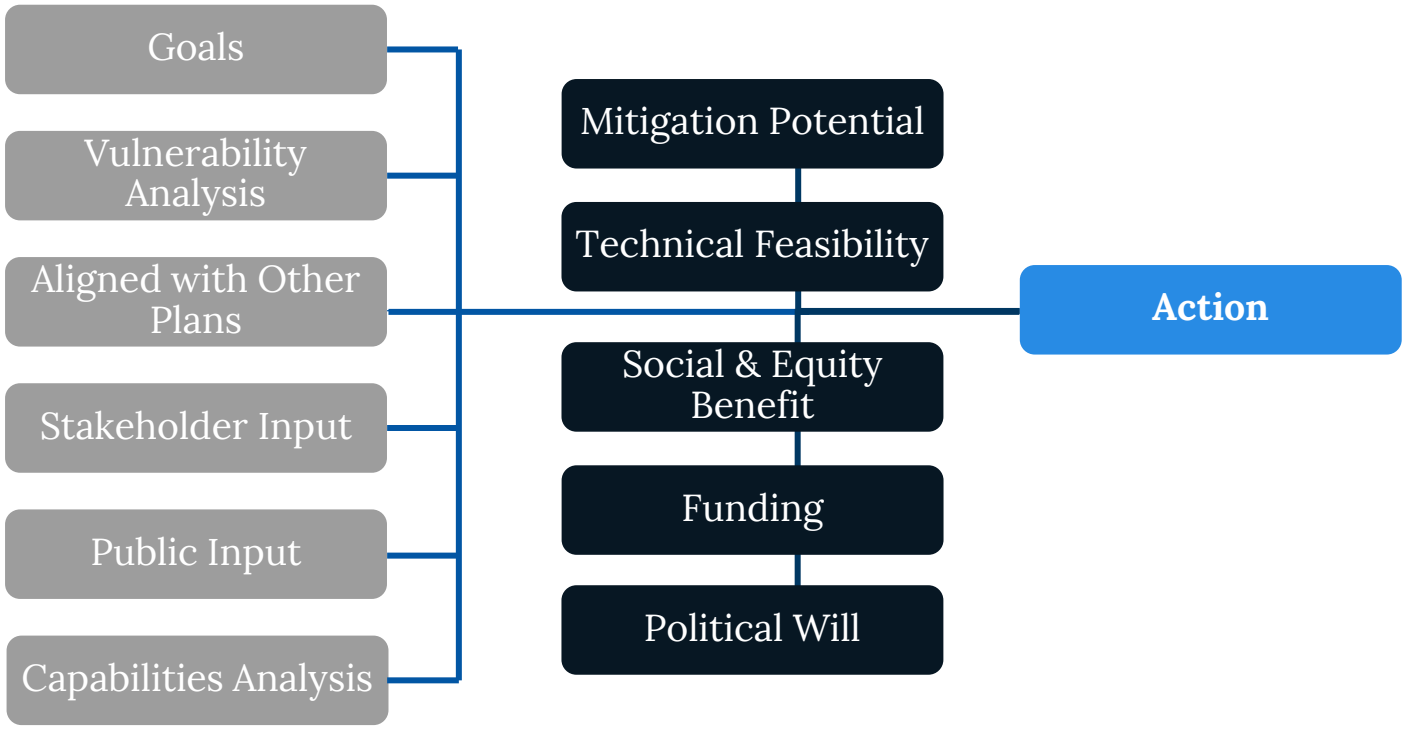


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MITIGATION ACTIONS

More details required to document Mitigation Actions

Intent: The mitigation strategy serves as the long-term blueprint for reducing the potential losses identified in the risk assessment.



Additional details include:

- One or more actions per hazard
- Robust prioritization process
- Specific funding ideas including grants, loans, departments funding, etc.
- Details on implementation including responsibility and timelines

ENHANCED PLAN MAINTENANCE AND IMPLEMENTATION

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- **Intent:**
  - **Living document** that guides actions over time. Having a process for maintaining the plan reflects the recognition that things change.
  - **Track progress** on implementing the mitigation strategy.
  - **Revisit** at regular intervals to keep it relevant.
- **Schedule** with procedures for ensuring the plan's implementation, updating, and revision.
- Identify a **Champion** to organize future meetings and to track progress.
- Identify potential **future** planning and budgeting efforts that will **require coordination.**



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Boston City Hall, photo by Weston & Sampson

Hazard Mitigation Goals

HAZARD MITIGATION GOALS

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In your opinion, do these goals **reflect Boston's hazard mitigation and climate resilience priorities**?

If no, do you have an edit or suggestion?



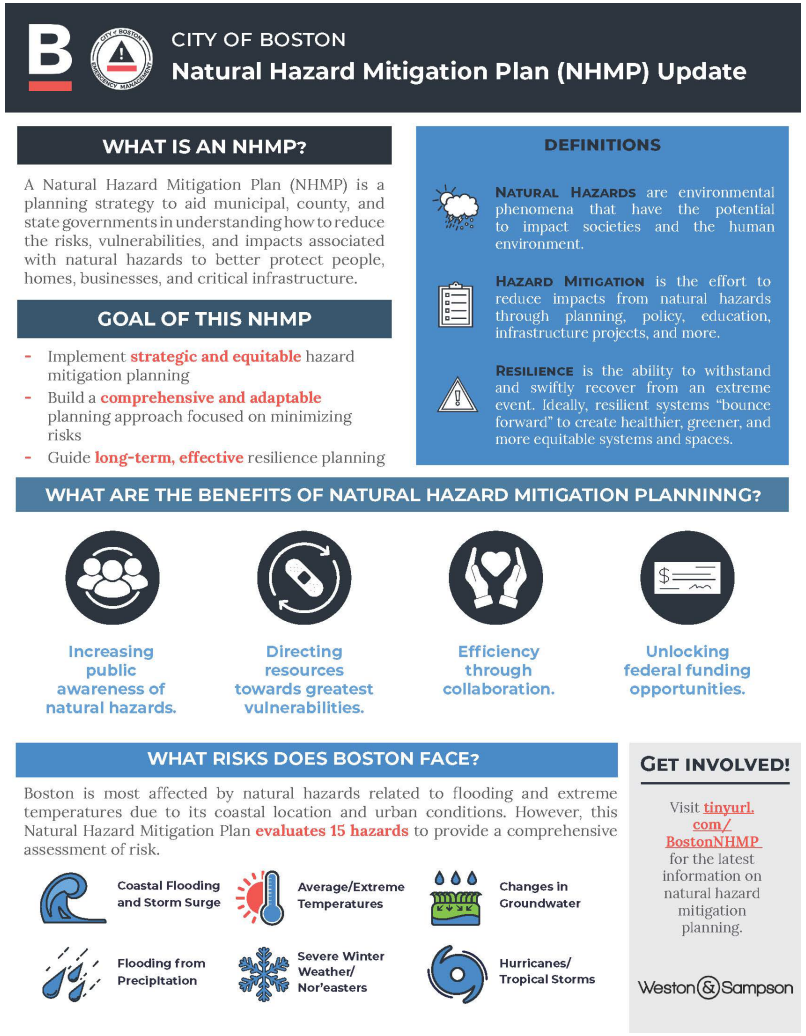


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Engagement

Website and Social Media Outreach

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Boston NHMP 2026 Update Public Survey

The City of Boston's Office of Emergency Management is updating the 2021 Natural Hazard Mitigation Plan (NHMP). This involves looking at Boston's historic hazards and future climate change projections to pinpoint vulnerable areas and develop strategies to mitigate damage from extreme events. Learn more about the project details online at tinyurl.com/BostonNHMP. Your experiences of previous natural hazard events and ideas for becoming more resilient are critical to understanding vulnerability across Boston's neighborhoods!

La Oficina de Gestión de Emergencias de la ciudad de Boston está actualizando el Actualización del Plan de Mitigación de Riesgos Naturales (NHMP) 2021. Esto implica analizar los riesgos históricos de Boston y las proyecciones futuras del cambio climático para identificar las zonas vulnerables y desarrollar estrategias para mitigar los daños causados por fenómenos extremos. Para obtener más información sobre los detalles del proyecto, visite tinyurl.com/BostonNHMP. ¡Sus experiencias con fenómenos naturales anteriores y sus ideas para aumentar la resiliencia son fundamentales para comprender la vulnerabilidad de los barrios de Boston!

* Indicates required question

Notice of accomodations

English: Interpretation, translation, and disability accommodation services are available to you at no cost. If you need them, please contact us at kyron.owens@boston.gov, or 617-635-4680.

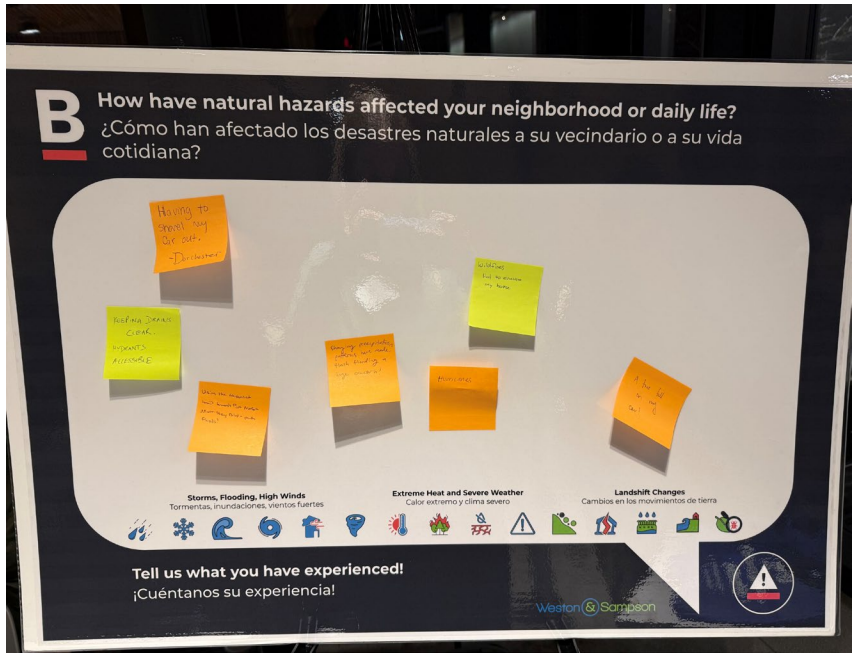
Spanish - Español: Hay servicios de interpretación, traducción y adaptaciones para discapacidades a su disposición sin costo alguno. Si los necesita, por favor póngase en contacto con nosotros mandando un correo electrónico a kyron.owens@boston.gov, o llamando al 617-635-4680.

Haitian Creole -Kreyòl ayisyen: Sèvis entèpretasyon, tradiksyon, ak sèvis akomodasyon pou andikape disponib pou ou gratis. Si w bezwen sèvis sa yo, tanpri kontakte nou nan kyron.owens@boston.gov 617-635-4680.

Traditional Chinese - 繁體中文: 我們可以為您提供免費的口譯, 筆譯, 和殘疾人士合理照

Public Engagement Events

- **Office of Green Infrastructure Event**
- **Focus Groups**
  - East Boston Senior Center
  - Brighton Senior Center
- **OEM RCPGP –** Art for a Change with BPS
- **Public Meeting TBD**











Boston City Hall, photo by Weston & Sampson

Community Profile

OVERVIEW OF ASSET CATEGORIES

Categories based on the **FEMA Local Mitigation Planning Handbook** (2025) and **Local Mitigation Planning Policy Guide** (2025)

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People



- **Underserved** communities
- **Socially vulnerable** populations

Structures



- Existing **buildings** and **infrastructure**
- Future or planned **developments**

Community Lifelines and Other Critical Facilities



- Fundamental **services** and **facilities** in the community
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- Major **employers, economic sectors,** and **commercial centers**

Activities that Have Value to the Community

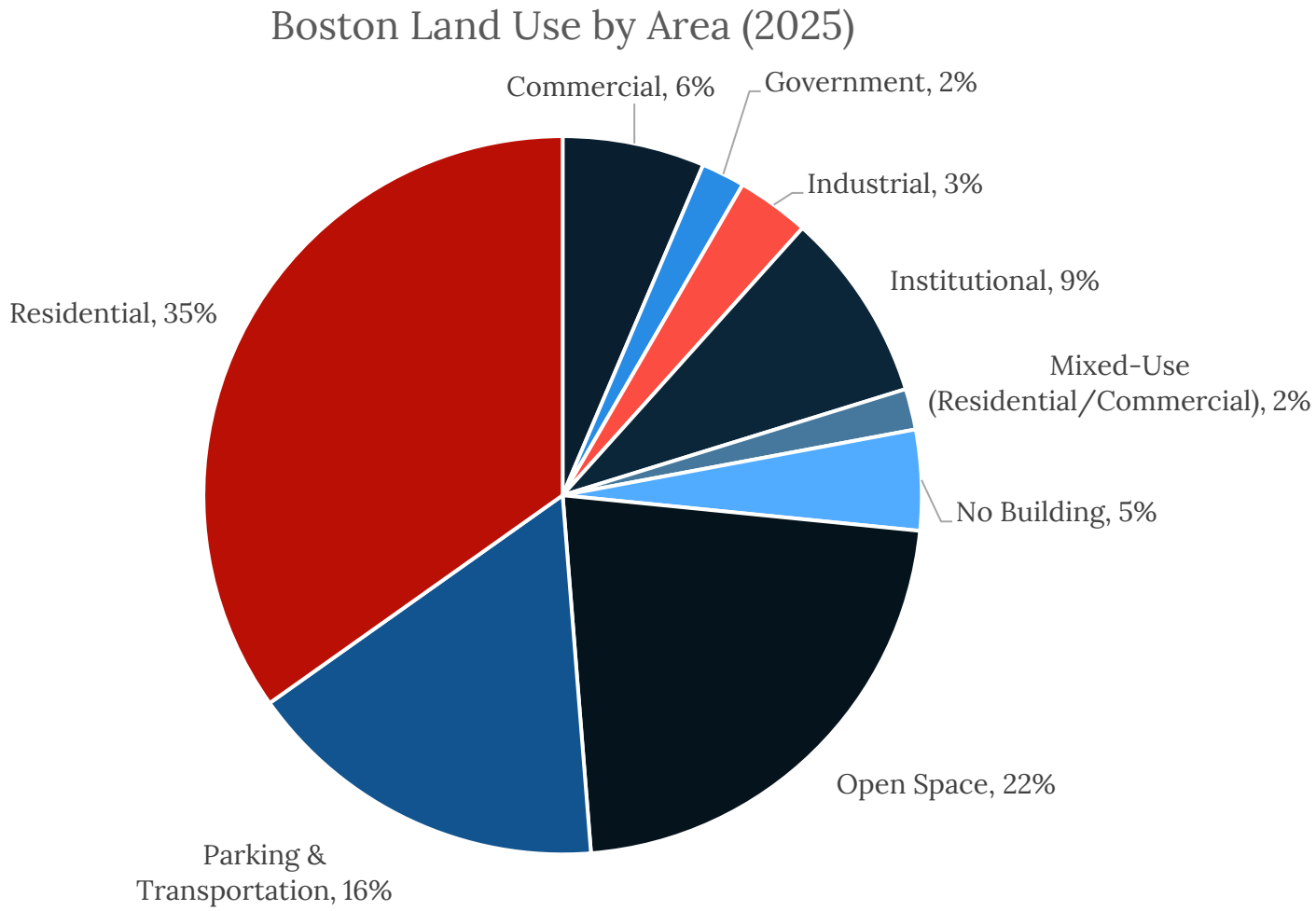


- **Activities** that are important to the community
- Long-standing **traditions, seasonal markets, tourists**

LAND USE CHANGES AND FUTURE DEVELOPMENT

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Has Boston **become more or less resilient** because of past and projected land use changes?



Source: OEM FY25 Parcels

COMMUNITY LIFELINES

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Safety and Security
Law Enforcement/Security, Fire Service, Search and Rescue, Government Service, Community Safety



Hazardous Materials
Facilities, HAZMAT, Pollutants, Contaminants



Food, Hydration, Shelter
Food, Hydration, Shelter, Agriculture



Energy
Power Grid, Fuel



Health and Medical
Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management



Transportation
Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime



Water Systems
Potable Water Infrastructure, Wastewater Management



Communications
Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch

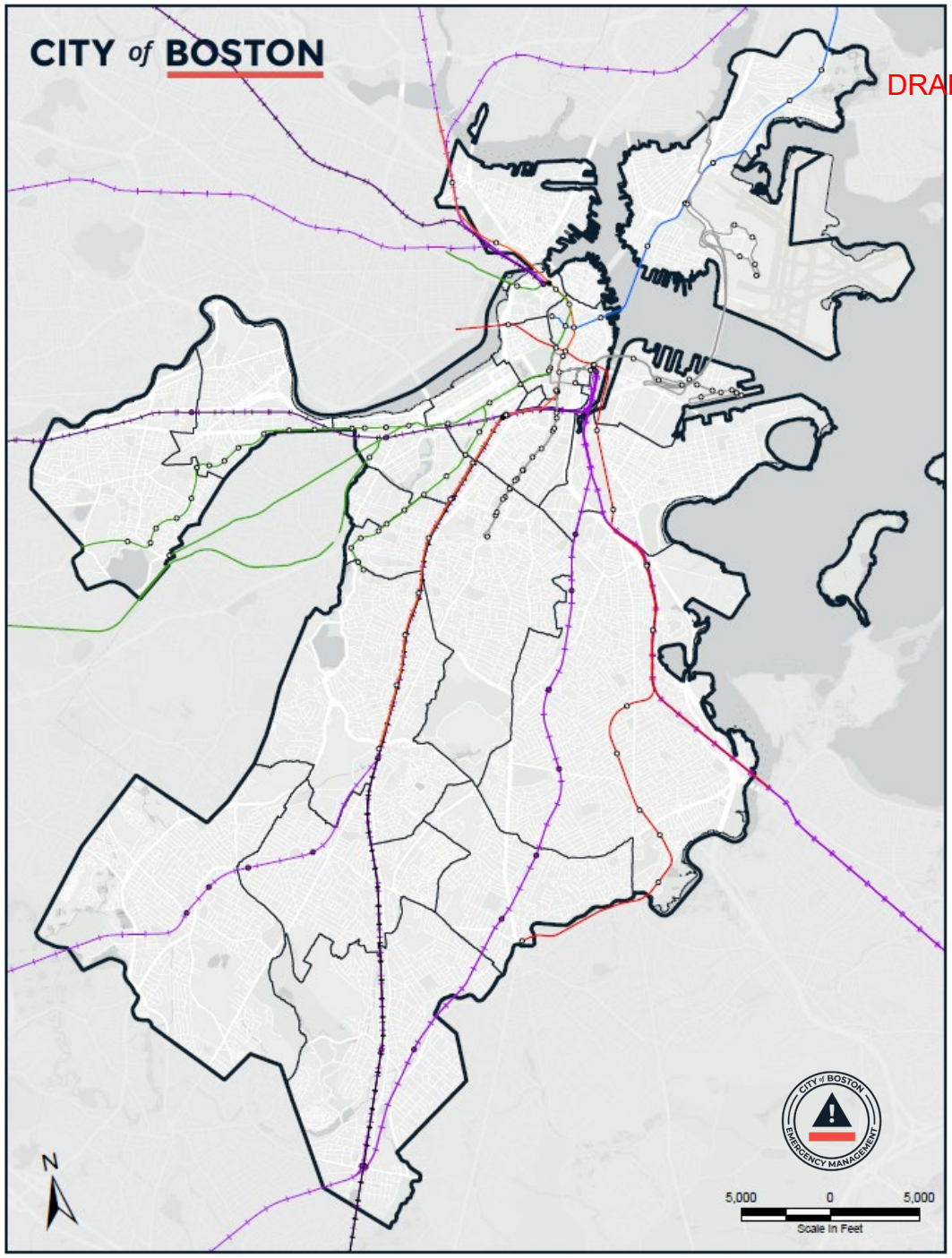
COMMUNITY LIFELINES

Transportation

Highway/Roadway/Motor Vehicle, Mass Transit, Railway, Aviation, Maritime

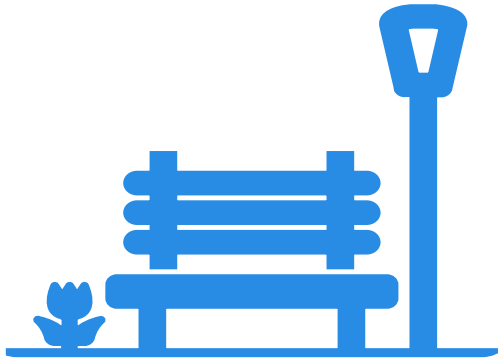
DATA

- MassDOT
- USDOT
- MassGIS (e.g., ports)



NATURAL, CULTURAL, HISTORIC RESOURCES

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Environmental and **natural resources** add to a community's identity and quality of life



Historic resources tell the story of your community through time



Cultural resources are aspects of the local culture that are unique or irreplaceable

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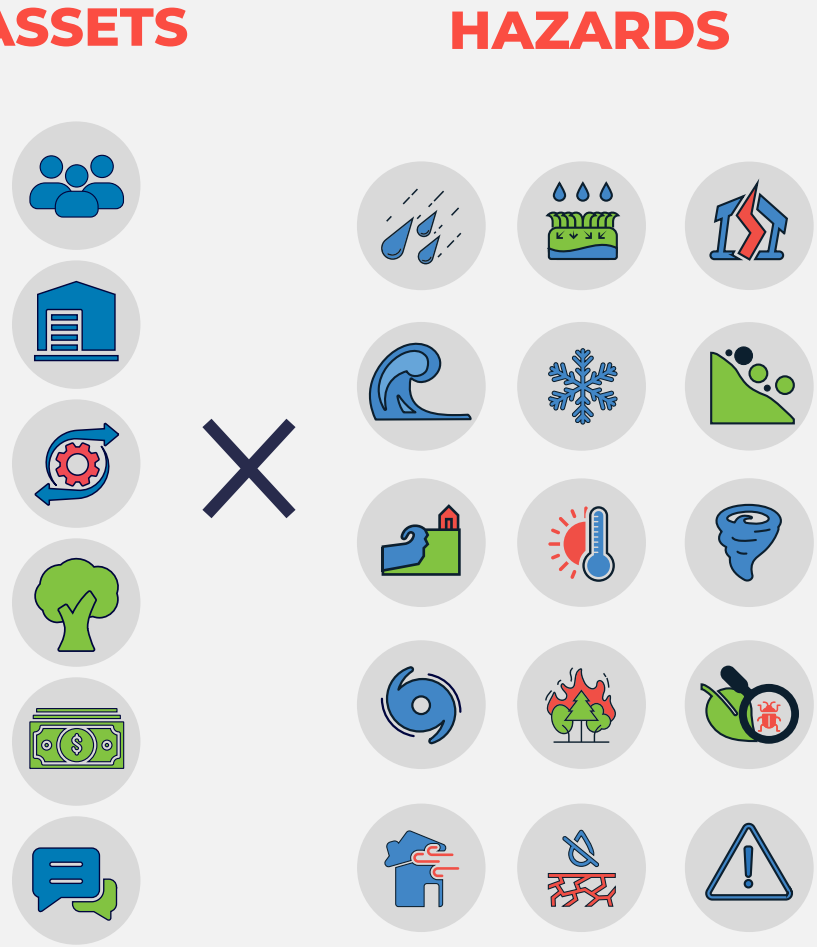


Boston City Hall, photo by Weston & Sampson

Hazards, Risks, and Vulnerabilities

VULNERABILITY VS. IMPACTS

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"**Vulnerability is a description of which assets,** including structures, systems, populations and other assets as defined by the entity, **within locations identified to be hazard prone, are at risk** from the effects of the identified hazard(s)."

FEMA

Use information from Hazard Profiles and Asset Inventory.

Vulnerability: Define what parts of the city are most likely to be affected

Impacts: The potential consequences

FLOODING FROM PRECIPITATION

DRAFT

- **Flooding from Precipitation:** Non-coastal flooding, includes riverine flooding and stormwater flooding due to rain.

Stormwater Flooding:

- Poor and undersized drainage
- High amounts of impervious surface
- Undersized culverts

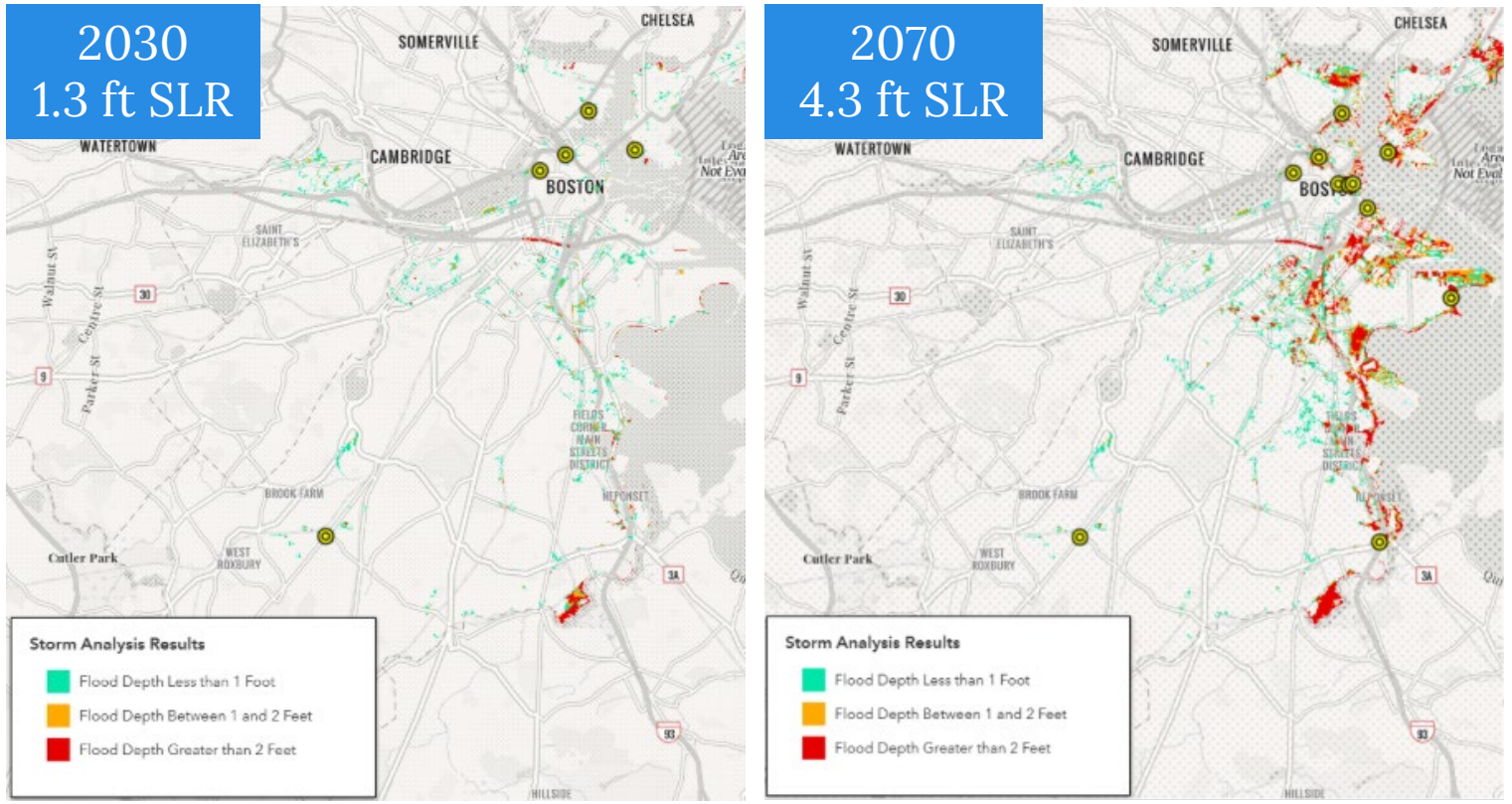
Riverine Flooding:

- Overtopping of banks along rivers and other waterbodies

Ice Jams:

- accumulation of ice that acts as a natural dam and restricts the flow of a body of water

Thunderstorm Flooding from 10-year 6-hour Storm



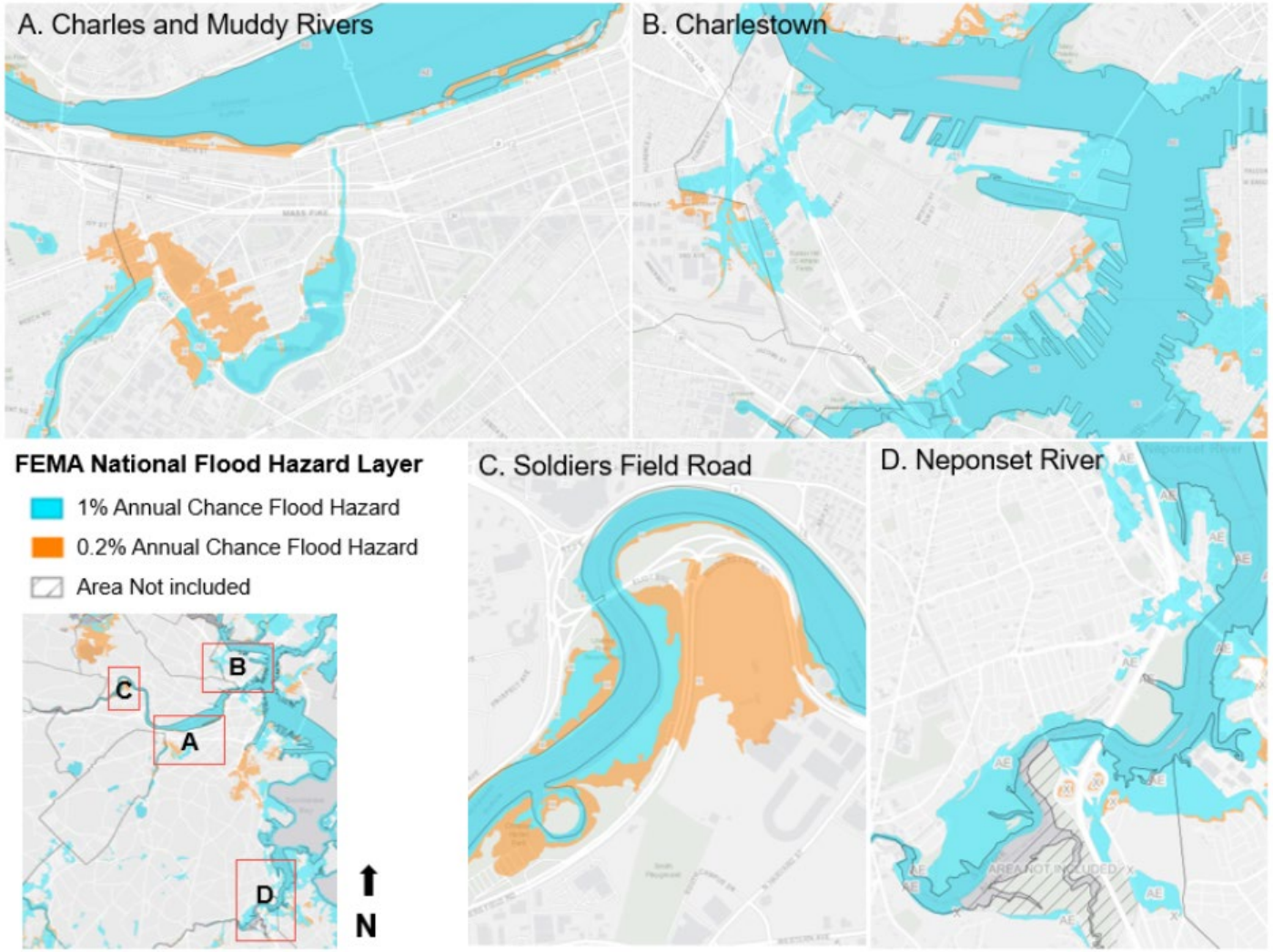
Source: BWSC Inundation Model

FLOODING FROM PRECIPITATION

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FEMA Flood Zones
Geographic areas that FEMA has defined according to varying levels of flood risk

- **500-year Storm:** 0.2% annual chance of occurring
- **100-year Storm:** 1% annual chance of occurring



Source: FEMA National Flood Hazard Layer

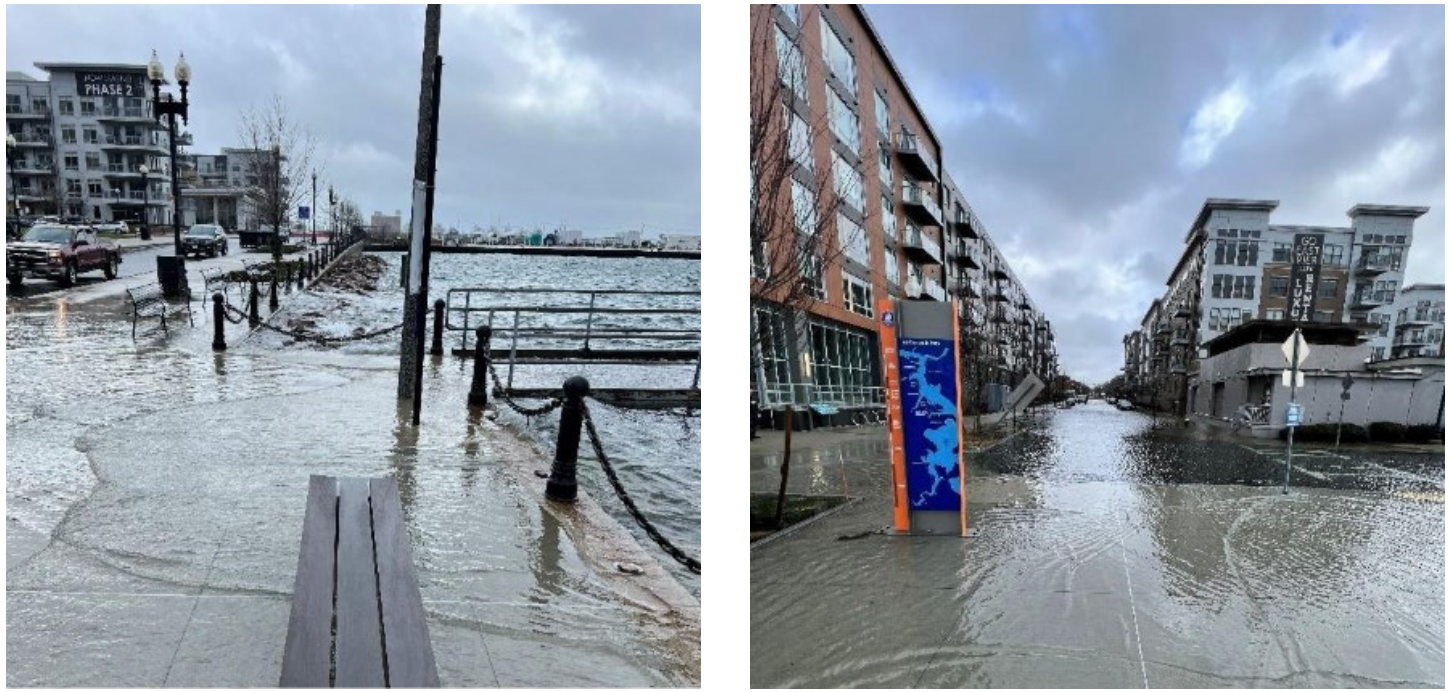
COASTAL FLOODING AND STORM SURGE

DRAFT

- **Coastal Flooding:** Ocean waters inundate land, primarily due to high astronomical tides, sea level rise, wave action, and storm surge.

Previous Occurrences Include:

- Jan 2018
- Mar 2018
- Oct 2018
- Nov 2018
- Jan 2019
- Oct 2019
- Apr 2020
- Sept 2020
- Dec 2020
- Feb 2021
- Jul 2021
- Jan 2022
- Dec 2022
- Jan 2023
- Jan 2024
- Mar 2024
- Apr 2024



December 2022 flooding at Lewis Mall in East Boston. Source: Weston & Sampson

COASTAL FLOODING AND STORM SURGE

DRAFT

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Geographic areas that FEMA has defined according to varying levels of flood risk

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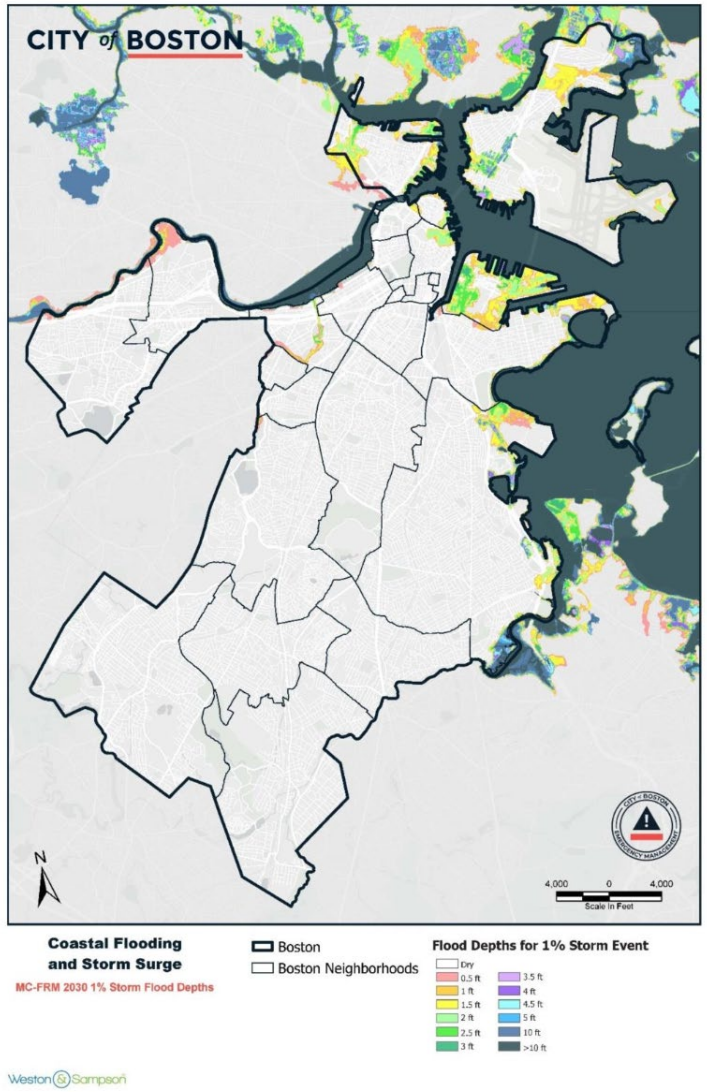
Source: FEMA National Flood Hazard Layer

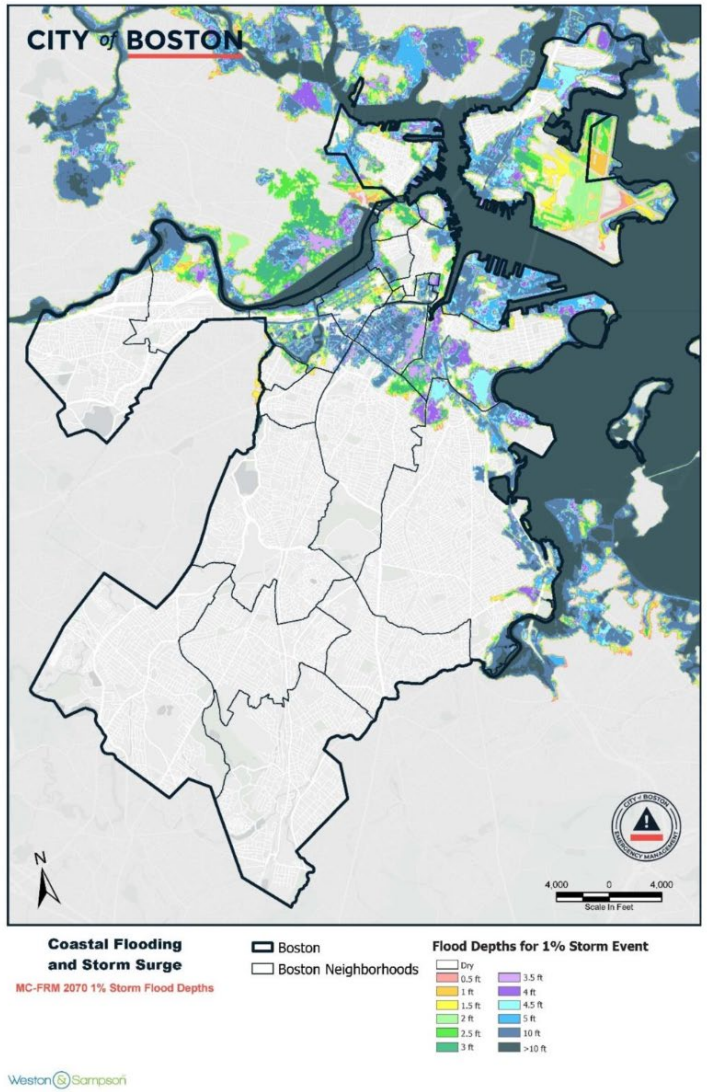
COASTAL FLOODING AND STORM SURGE

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MC-FRM

Massachusetts Coast Flood Risk Model



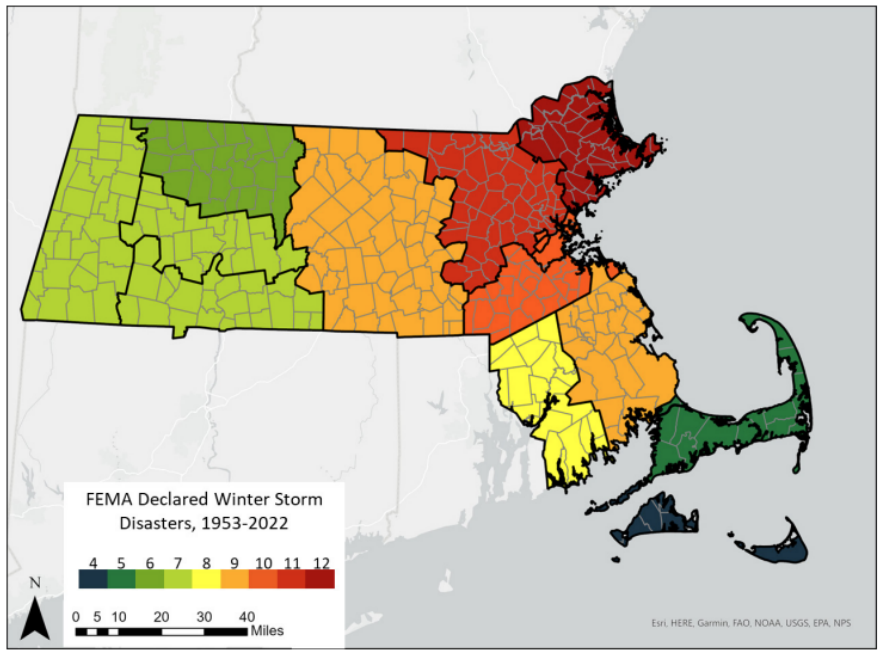


Source: MC-FRM 2030 and 2070 1% Storm Coastal Flood Depths

SEVERE WINTER WEATHER/NOR'EASTERS

DRAFT

- **Severe Winter Storms:** heavy snow, ice accumulation, freezing temps & wind chill
- **Nor'easter:** Storms or wind blowing from the northeast
- **Ice Storms:** occur when freezing rain creates a half inch of ice accretion



Source: FEMA (2023).

Figure 5.13-1. FEMA winter storm–related declared disasters by county, 1953 to 2022.

Source: ResilientMass Plan (2023)

FEMA Disaster Declarations

- **2013 Blizzard Nemo:** Brought over 24 inches of snow and high winds, causing major transportation disruptions and power outages. *(DR-4110-MA)*
- **2015 Winter Storm Juno**: Resulted in significant snowfall and coastal flooding impacts across Boston. *(DR-4214-MA)*
- **January 2018 Nor'easter ("Bomb Cyclone"/Winter Storm Grayson):** Combined heavy snowfall with record coastal flooding, impacting East Boston and downtown waterfront areas. *(DR-4366-MA)*

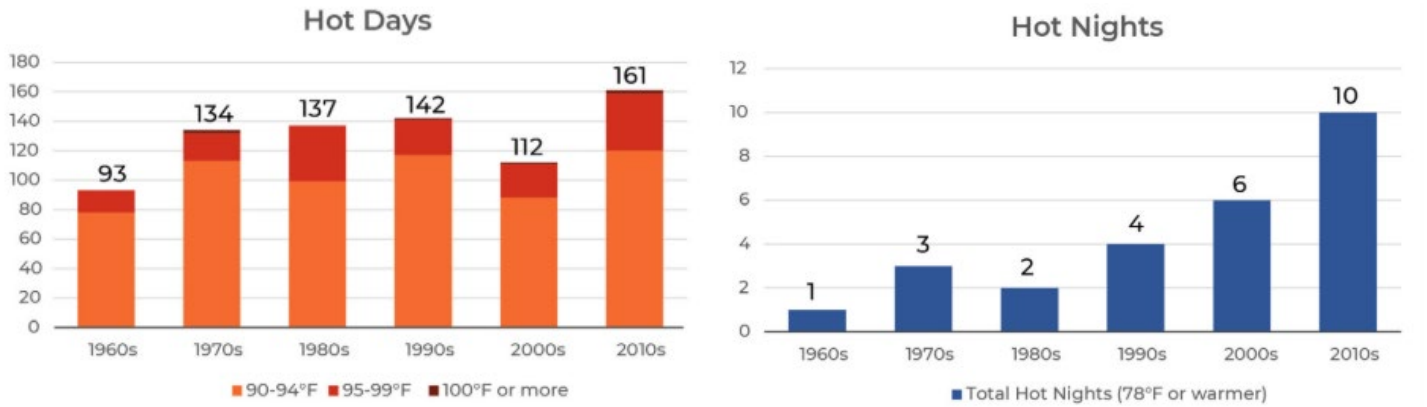
January 2026 Winter Storm, Winter Storm Fern
February 2026 Nor'easter, Winter Storm Hernando

AVERAGE/EXTREME TEMPERATURES

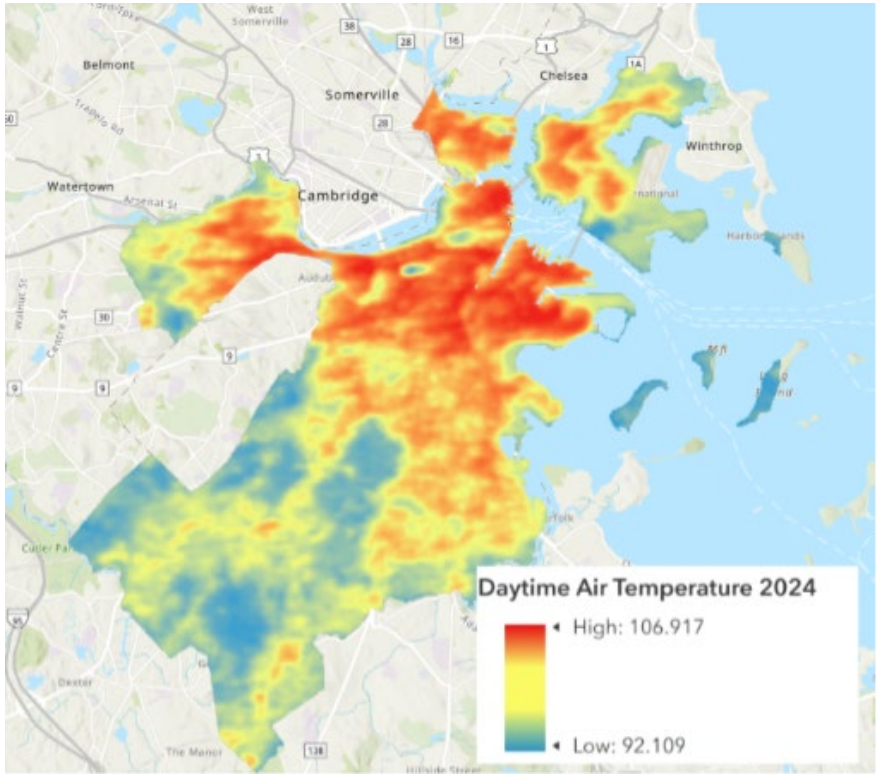
DRAFT

- **Extreme Temperatures:** Very high or low temperatures that can affect human health and the natural and built environments.
- **Average Temperatures:** Long-term climate normals, typically calculated over a 30-year period

In the last decade, Boston experienced more hot days and nights than any decade in the previous 50 years:



Source: Boston Heat Resilience Plan

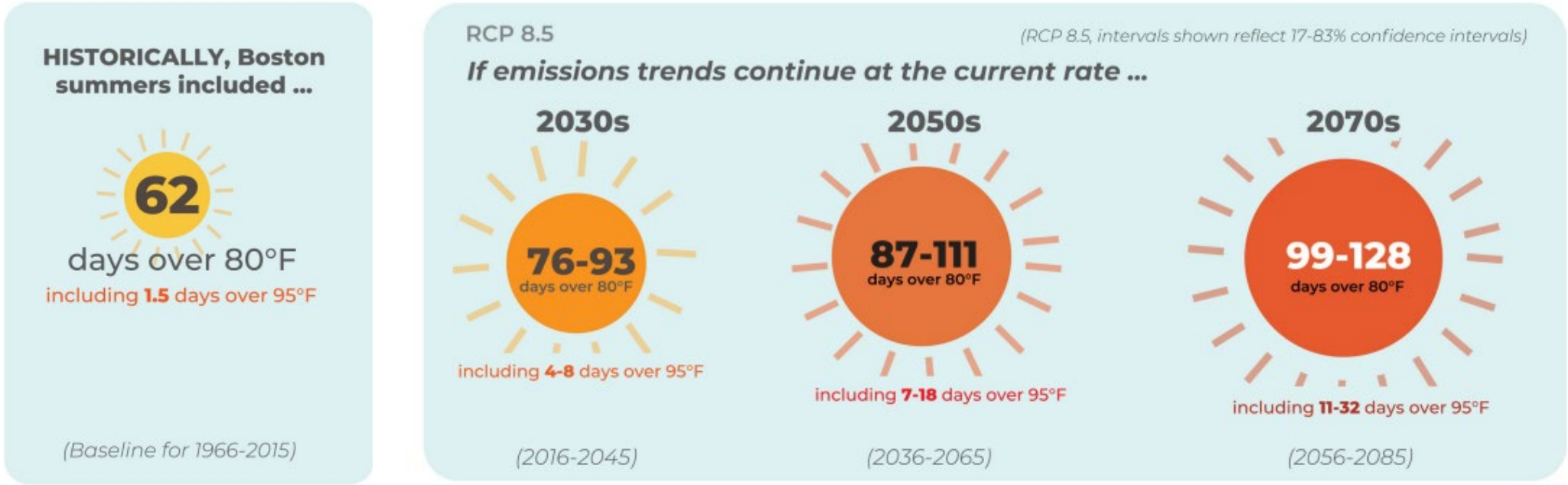


Source: Boston Heat Map Explorer

AVERAGE/EXTREME TEMPERATURES

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Extreme heat is becoming an increasing concern in Boston as climate change leads to more frequent hot days, longer-lasting heat waves, and rising summer temperatures.



Source: Boston Heat Resilience Plan

IMPACTS



From these hazards (flooding from precipitation, severe winter weather, coastal flooding, average/extreme temperatures)…

What **impacts** do you expect to see on:

- Different assets?
- Neighborhoods?
- Vulnerable populations?

Impacts on Assets (Example)

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People	Structures
The elderly and infirmed populations are of particular concern during these events, being shut in during storms, not being able to shovel, icy sidewalks, etc.	**3,470 buildings** in Boston are within the FEMA 100-year flood zone **Increased strain** on HVAC systems, leading to higher failure rates in older building stock
Community Lifelines and Other Critical Facilities	**Natural, Cultural, and Historic Resources**
Disruptions to transportation, MBTA stations within flood risk zones. Delays to operations at MBTA stations when they flood or maintenance crews are busy putting up barriers. Elevated electricity demand (heat) or gas demand (cold), **straining energy grid and resources**.	Historic sites may become damaged, degraded, or destroyed **due to not being able to withstand** high winds, snow load, or flooding. **Heat stress** on urban trees and green spaces, **reduces canopy cover** and diminishes natural cooling benefits.
Economy and Activities that have Value to the Community	
Community events and recreational **activities often canceled or postponed** due to unsafe conditions (rain, cold, heat, snow). "Heavy blizzards are among the **most costly and disruptive** weather events for Massachusetts communities."[1]	

1. *Massachusetts State Hazard Mitigation and Adaptation Plan." 2018. P4-226*

DRAFT



Boston City Hall, photo by Weston & Sampson

Capabilities Assessment

PLANNING AND REGULATORY

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What plans, policies, codes, or ordinances, specifically in Boston do you reference when developing projects or planning efforts that address reduction of risk from natural hazards?

- Climate Ready Boston Plans
- City's HIRA , existing hazard annexes
- Massachusetts Stormwater Handbook
- Streets Green Infrastructure Policy
- Smart Utilities Policy (Green Infrastructure section)
- BWSC Site Plan Review - Stormwater Permit Regulations (GI/LID)
- BWSC Stormwater detention study
- BPDA Article 32 - Groundwater Conservation Overlay District
- OGI Community Flood Mapping
- Heat Resiliency Solutions for Boston
- Urban Forest Plan
- Public Tree Protection Ordinance
- Climate Action Plan
- Hazard Mitigation Plan
- Healthcare Preparedness Coalition (HPC) Framework for the Annual Hazard Vulnerability Analysis (HVA)
- Boston Zoning (particularly Article 25)
- Massachusetts Building Code
- Miscellaneous policies, guidance, sub-programs, etc. of the National Flood Insurance Program

ADMINISTRATIVE AND TECHNICAL

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Improving Capabilities

Are staff in your department trained in hazard mitigation?

More than 50% of responses to the capabilities survey indicated one of the following:

- Staff were **not trained** in hazard mitigation.
- The responder **was not aware** of any training.
- Staff **had exposure** but were not formally trained.
- **Some staff** in the department were trained, but not all.

ADMINISTRATIVE AND TECHNICAL

DRAFT

Addressing Hazard Mitigation

What improvements can be made to address or enhance capacity and capabilities to address hazard mitigation in your department?

Planning to Implementation

- What barriers (funding, permitting, coordination) are slowing delivery?

Shared Responsibility

- Is hazard mitigation clearly owned across all departments?
- How can departments better coordinate across watershed boundaries?
- How well are city departments aligned with state and regional entities (e.g., MBTA, MassDOT, utilities)?

Workforce & Capacity

- Do we have enough internal staff and expertise to deliver on resilience goals?

FINANCIAL

Funding Hazard Mitigation

What funding sources is your department most commonly using to fund hazard mitigation and resilience related work?

Capital budgets, grants, etc.

City

- Capital Budget Planning
- City related taxes and fees

State

- Municipal Vulnerability Preparedness Program (MVP)
- CZM Coastal Resilience Grant Program
- Additional EEA Grants

Federal

- Building Resilient Infrastructure and Communities Program (BRIC)
- Hazard Mitigation Grant Program (HMGP)

EDUCATION AND OUTREACH

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Educating the Public

Does your department run any citywide public engagement events related to resilience/hazard mitigation?

- **Deployables Day**
- Public Engagement events like **meetings, tabling events**, etc. on City led projects
- **BPS Art for Change Program** focused on understanding Hazard Mitigation through art

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Boston City Hall, photo by Weston & Sampson

Mitigation Actions

2021 NHMP MITIGATION ACTIONS UPDATE

DRAFT

ID	Mitigation Action	Est. Year of Completion	Priority	Responsibility	Status	Progress & Achievements	Barriers or Reasons for Lack of Completion	Include in Updated Plan?	Updates or Revisions to Action	Updated Est. Year of Completion
A1	Emergency Shelter Assessment and Improvements	2025	High	**OEM**, BCYF, BPS						
A2	Establish Flood Protection Overlay Districts	2025	High	**BPDA,** Environment Department						
A3	Implement Recommended Actions in Boston's Citywide Heat Resiliency Study	2022 Complete study	High	BPDA, BPHC, **Environment Department**, OEM, Parks and						
A4	Improve the Resiliency of the Boston Marine Industrial Park and Long Wharf Improvements	2024 Complete analysis and construction	High	**BPDA**						
A5	Adapt Morrissey Boulevard for Flood Resilience	2030	High	BPDA, **DCR, MassDOT**						
A6	Address Vulnerabilities to Tidal Flooding at McCormack and Dever Schools	2035	High	**BPS**						
A7	Finalize the Design and Construct the Coastal Resilience Barriers at the Carlton and Lewis Mall Flood Pathways in East Boston	2027	High	**BPDA**						
A8	Implement Climate Ready Boston and Continue to Develop Strategies that Integrate Various Natural Hazards	2030	High	BPDA, BTD, **Environment Department**, Parks and Recreation, Public Works						
A9	Muddy River Flood Control	2023	High	**Army Corp of Engineers**, DCR, Parks and Recreation, Town of Brookline						
A10	Prepare Parks and Outdoor Facilities for Climate Change	2026 Finalize construction of park projects list in additional context	High	Environment Department, **Parks and Recreation**						
A11	Expand Citywide Climate Readiness Education, Engagement, and Leadership Development Campaigns	2025 Will eventually be an operational capacity and captured in Ch. 5	High	BPDA, Environment Department, **OEM**						
A12	Implement an Action Plan to Enhance Boston's Urban Tree Canopy and Protect Residents From the Impacts of Extreme Heat	2022 Finish Urban Forest Master Plan	High	Environment Department, **Parks and Recreation**						
A13	Promote Resilience in Buildings and Encourage Green Infrastructure in Site Design	2025	High	**BPDA**, Environment Department, ISD, Parks and						
A14	Rutherford Ave/Charlestown Underpass – Manage Tunnel to Reduce Flood Impacts	2029	High	**Parks and Recreation**						

Information Needs:

- Action's status
- Progress & achievements
- Barriers
- Relevance to 2025 update
- Updates (if any)

MITIGATION ACTIONS

DRAFT



Addressing Hazard Mitigation

What **future actions or projects** has your department discussed related to hazard mitigation and/or resilience?

Schools, Housing, & Vulnerable Populations

- Flood protection and back-up power for buildings serving vulnerable residents

Coastal Impacts, Flooding Risks, & Natural Systems

- Seawall rehabilitation and drainage improvements

Energy, Utilities, & Communication Systems

- Energy demand assessments

City Operations & Emergency Response Services

- Climate upgrades to municipal buildings and city emergency facilities

Community Education, Involvement, & Workforce Training

- Citywide climate education and engagement

Building Design, Flood Policy, & Business Support

- Integrate resilience into local regulations

DRAFT



Boston City Hall, photo by Weston & Sampson

Plan Maintenance

PLAN MAINTENANCE

Plan maintenance ensures the document **remains current, actionable, and aligned with evolving hazards, priorities, and funding opportunities**.





Boston City Hall, photo by Weston & Sampson

Questions?

OEM
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Weston & Sampson
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DRAFT

Attendees - 30

Meeting Notes

Hazard Mitigation Goals - In your opinion, do these goals reflect Boston's hazard mitigation and climate resilience priorities? If no, do you have an edit or suggestion?

- Mention of public property anywhere?

Land Use/Structures - Has Boston become more or less resilient because of past and projected land use changes?

-

Hazard Impacts - What impacts do you expect to see on:

1. Different assets?
2. Neighborhoods?
3. Vulnerable populations?

- Lost work time due to travel impairment

Training -
looks different by department
Knowledge gained over time

Shared responsibility - responsibility diversified across departments

Katherine-> Public Schools - not shared expectations across the city with all departments about how and when to use this in the decision making we are doing every day (infrastructure and operations)

Robbie - OLCA, would love to receive training in hazard mitigation

Funding

- Barr foundation
- MassCEC Green School works grants
- Article80 process - through review of new developments negotiate resilience with private developers - either kick in cash or build something

Education

- Year 2 of the Pamper your Drain
    - More groups of boy scouts and girls scouts getting badges
        - Also taking CPR classes
    - Teaching people about inland flooding on their street, claim a drain through BWSC - 160 drains

- Art for Change - 50 students, hazard awareness, emergency preparedness, understanding of impacts, until help arrives (CPR/Stop the bleed)
    - Translated everything into art work
    -

Zoom Meeting Comments:

Alice Brown 2:20 PM
Redesign of waterfront parks has made neighborhoods more resilient

Kate Roosa (she/her) | Office of Climate Resilience 2:21 PM
New Codman Square park has permanent (aka built-in) cooling towers, setting a good example for more heat resilience (plus pool improvements, too).
*pool improvements city wide, not at Codman Square

Kate Roosa (she/her) | Office of Climate Resilience 2:30 PM
Do you quantify lost work time (economic) due to impaired travel conditions (similar to cancelled social events)?

Ben Matusow 2:31 PM
When looking at the flood maps do you account for any planned resilience projects?

Zoe Davis (OCR): Heat resilience coordination with other departments (OEM, Parks, Facilities, BCYF, BPHC, etc.)

Robbie Adams, OLCA 2:38 PM
I work in the Office of Language & Communication Access and so there is no an obvious connection to these issues but I would love to learn about hazard mitigation training that I can take because we do help make sure that information that other departments put out are done so in the City of Boston's threshold languages.

Katherine Walsh (BPS): Not shared expectations on how to use NHMP for operations planning. How do we hold departments accountable?

Katherine H. Walsh 2:46 PM
MassCEC Green School Works grants

Zoe Davis, OCR
Boston Foundation
Barr Foundation

Tyler Torres, Planning
Article 80 Mitigation process

Nancy Smith, OEM
Pamper Your Drain

Katherine H. Walsh 2:52 PM
That's awesome, thank you for supporting students!

Kate Roosa (she/her) | Office of Climate Resilience 2:55 PM
[We have several big projects under our Boston CSRM partnership with USACE]]
This is likely going to be included in the project list by exec. comm.

CITY OF BOSTON

Natural Hazard Mitigation Plan (NHMP) Update

DRAFT

WHAT IS AN NHMP?

A Natural Hazard Mitigation Plan (NHMP) is a planning strategy to aid municipal, county, and state governments in understanding how to reduce the risks, vulnerabilities, and impacts associated with natural hazards to better protect people, homes, businesses, and critical infrastructure.

GOAL OF THIS NHMP

- Implement **strategic and equitable** hazard mitigation planning
- Build a **comprehensive and adaptable** planning approach focused on minimizing risks
- Guide **long-term, effective** resilience planning

DEFINITIONS

Natural Hazards are environmental phenomena that have the potential to impact societies and the human environment.

Hazard Mitigation is the effort to reduce impacts from natural hazards through planning, policy, education, infrastructure projects, and more.

Resilience is the ability to withstand and swiftly recover from an extreme event. Ideally, resilient systems "bounce forward" to create healthier, greener, and more equitable systems and spaces.

WHAT ARE THE BENEFITS OF NATURAL HAZARD MITIGATION PLANNINNG?

Increasing public awareness of natural hazards.

Directing resources towards greatest vulnerabilities.

Efficiency through collaboration.

Unlocking federal funding opportunities.

WHAT RISKS DOES BOSTON FACE?

Boston is most affected by natural hazards related to flooding and extreme temperatures due to its coastal location and urban conditions. However, this Natural Hazard Mitigation Plan **evaluates 15 hazards** to provide a comprehensive assessment of risk.

- **Coastal Flooding and Storm Surge**
- **Average/Extreme Temperatures**
- **Changes in Groundwater**
- **Flooding from Precipitation**
- **Severe Winter Weather/ Nor'easters**
- **Hurricanes/ Tropical Storms**

GET INVOLVED!

Visit tinyurl.com/BostonNHMP for the latest information on natural hazard mitigation planning.

Weston & Sampson

مدينة Boston
تحديث خطة التخفيف من أخطار الكوارث الطبيعية (NHMP)

DRAFT

ما هي NHMP؟

خطة التخفيف من أخطار الكوارث الطبيعية (NHMP) هي إطار تخطيطي واستراتيجي يساعد الحكومات المحلية وحكومات المقاطعات والولايات على فهم كيفية الحد من المخاطر ونقاط الضعف والآثار الناجمة عن الظواهر الطبيعية، بما يضمن حماية أفضل للسكان والمساكن والشركات والبنية التحتية الحيوية.

أهداف NHMP

- تنفيذ **تخطيط استراتيجي وعادل** للحد من الأخطار
- بناء **نهج تخطيطي شامل ومرن** يركز على تقليل المخاطر إلى أدنى حد ممكن
- توجيه جهود التخطيط **طويلة الأمد** لتعزيز القدرة على الصمود بفعالية

التعريفات

الأخطار الطبيعية هي ظواهر بيئية قد تؤثر في المجتمعات والبيئة العمرانية والبشرية.

التخفيف من الأخطار: مجموعة من الجهود والإجراءات الهادفة إلى تقليل آثار الكوارث الطبيعية، وذلك من خلال التخطيط، ووضع السياسات، والتوعية، وتنفيذ مشاريع البنية التحتية، وغيرها من التدابير.

القدرة على الصمود: هي القدرة على تحمّل الأحداث المتطرفة والتعافي منها بسرعة وكفاءة. والنظام المرن لا يكتفي بالعودة إلى وضعه السابق، بل يسعى إلى "التعافي المتقدم" من خلال بناء أنظمة ومساحات أكثر صحةً واستدامةً وعدالة.

ما أهمية التخطيط للتخفيف من أخطار الكوارث الطبيعية؟

- رفع مستوى وعي المجتمع بالأخطار الطبيعية.
- توجيه الموارد نحو الفئات والمناطق الأكثر عرضة للمخاطر.
- تعزيز الكفاءة من خلال التعاون.
- إتاحة فرص الحصول على تمويل اتحادي.

ما أبرز المخاطر التي تواجه مدينة BOSTON؟

نظرًا لموقعها الساحلي وطبيعتها العمرانية الكثيفة، تتأثر مدينة Boston بشكل رئيسي بالأخطار المرتبطة بالفيضانات ودرجات الحرارة المرتفعة أو المنخفضة بشكل متطرف. ومع ذلك، تقوم هذه الخطة **بتقييم 15 نوعًا من الأخطار** لضمان تقديم تحليل شامل ودقيق للمخاطر المحتملة.

- الفيضانات الساحلية وارتفاع منسوب العواصف
- متوسط ودرجات الحرارة القصوى
- تغيّرات منسوب المياه الجوفية
- الفيضانات الناتجة عن هطول الأمطار
- العواصف الشتوية الشديدة/ عواصف نوريستر
- الأعاصير/والعواصف الاستوائية

ساهم معنا!

للاطلاع على أحدث المعلومات حول خطة التخفيف من أخطار الكوارث الطبيعية، تفضل بزيارة tinyurl.com/BostonNHMP.

Weston & Sampson

CIDADE DE BOSTON

Atualização do Plano de Mitigação de Catástrofes Naturais (NHMP)

DRAFT

O QUE É UM NHMP?

Um Plano de Mitigação de Catástrofes Naturais (NHMP) é uma estratégia de planejamento para auxiliar as administrações dos municípios, condados e estados para compreender como reduzir os riscos, vulnerabilidades e impactos associados a catástrofes naturais para proteger melhor as pessoas, lares, empresas e infraestrutura crítica.

OBJETIVO DESTE NHMP

- Implementar um planejamento de mitigação de catástrofes **estratégico e equitativo**
- Desenvolver uma abordagem planejada **abrangente e adaptável** focada na minimização de riscos
- Orientar o planejamento de resiliência **eficaz e de longo prazo**

DEFINIÇÕES

CATÁSTROFES NATURAIS são fenômenos ambientais que têm o potencial de afetar sociedades e o ambiente humano.

A MITIGAÇÃO DE CATÁSTROFES é o esforço para reduzir o impacto das catástrofes por meio de planejamento, políticas, educação, projetos de infraestrutura e outras iniciativas.

RESILIÊNCIA é a capacidade de suportar e recuperar-se de um evento extremo. Idealmente, sistemas resilientes "quicam", criando sistemas e espaços mais saudáveis, mais verdes e mais justos.

QUAIS SÃO AS VANTAGENS DO PLANEJAMENTO DE MITIGAÇÃO DE CATÁSTROFES?

Aumentar a conscientização do público sobre catástrofes naturais.

Direcionar recursos para as maiores vulnerabilidades.

Eficiência por meio da colaboração.

Liberar oportunidades de financiamento federal.

QUAIS RISCOS BOSTON ENFRENTA?

Boston é mais afetada por catástrofes relacionadas com inundações e temperaturas extremas, devido à sua localização costeira e condições urbanas. Entretanto, este Plano de Mitigação de Catástrofes Naturais **avalia 15 perigos** para proporcionar uma análise abrangente de riscos.

- **Inundações costeiras e surto de tempestade**
- **Temperaturas médias/extremas**
- **Alterações nas águas subterrâneas**
- **Inundações devido à chuva**
- **Condições severas de inverno/Ciclones extratropicais**
- **Furacões/ Tempestades tropicais**

PARTICIPE!

Acesse tinyurl.com/BostonNHMP para as informações mais recentes sobre o planejamento de mitigação de catástrofes naturais.

Weston & Sampson

Sidadi di Boston
Atualizason di Planu di Mitigason di Dizastri Natural (NHMP)

DRAFT

KUZE KI Ê UN NHMP?

Un Planu di Mitigason di Dizastri Natural (NHMP) é un stratéjia di planiamentu pa djuda governus munisipal, distrital y stadual a kunpriende formas pa riduzi riskus, vulnerabilidadis y impaktus asosiadus a dizastri natural, ku ojetivu di pruteje psoas, rezidênsias, emprezas y infraestruturas krítikas di midjor forma.

OBIJETIVU DES NHMP

- Implementason **di un planiamentu stratéjiku** y ekitativu di mitigason di riskus
- Kria un abordajen di planiamentu **abranjenti y adaptável**, fokadu na minimizason di riskus.
- Gia pa un planiamentu di reziliênsia **efikas i a longu prazu**

DIFINISON

Dizastris natural é un fenómenus ambiental ki ten potensial di afeta sosiedadis y ambienti umanu.

Mitigason di riskus é sforsu pa riduzi impaktus di dizastris natural através di planejamentu, pulítiku, idukason, prujetus di infraestrutura y mutu más.

Reziliênsia é kapasidadi di rizisti y rikupera rapidamenti di un iventu xtremu. Idialmenti, sistemas rezilientis "Ta avansa pa frenti" pa kriar sistemas y spasus más saudável, más ikolójiku y más ekitativu.

KUZE KI É BENEFÍSIUS DI PLANIAMENTU DI MITIGASON DI RISKUS DI DIZASTRIS NATURAL?

Aumentu di sensibilizason di públiku en rilason á dizastris natural.

Diresionamentu di rikursus pa vulnerabilidadis más grandi.

Efisiênsia atravéz di kolaborason.

Disblokeiu di oportunidadis di finansiamentu federal.

KI RISKUS KI BOSTON TA INFRENTA?

Boston é sidadi más afetadu pa dizastri natural rilasionadus ku inundason y tempraturas xtremas dividu à si lokalizason kosteru i kondison urbanu. Nu intantu, es Planu di Mitigason di Riskus pa Dizastris Natural ta **avalia 15 riskus** pa furnese un avaliason abranjenti di riskus.

- **Inundason kosteru y Tempestadis**
- **Temperaturas Médias/Xtremus**
- **Alterason di Águas Subterânias**
- **Inundason Kauzadus pa Presipitason**
- **Kondison Meteorolójikus Severus na Invernu Tempestadis di nordesti**
- **Furakon/ Tempestadi Tropikal**

Ben Faze Parti!

Vizita tinyurl.com/BostonNHMP pa konsulta informason más risentis sobri planiamentu di mitigason di riskus di dizastris natural.

Weston & Sampson

La Ciudad de Boston
Plan de Mitigación de Riesgos Naturales (actualizado)

DRAFT

¿CUÁL ES ESTE PLAN?

Un Plan de Mitigación de Riesgos Naturales es una estrategia de planificación que ayuda a los gobiernos municipales, de condado y estatales a comprender cómo reducir los riesgos, las vulnerabilidades y los impactos asociados con los riesgos naturales, con el objetivo de proteger mejor a las personas, viviendas, empresas y la infraestructura crítica.

OBJETIVO DE ES ESTE PLAN

- Implementar una planificación **estratégica y equitativa** de mitigación de riesgos
- Desarrollar un enfoque **integral y adaptable** de planificación, enfocado en la reducción de Riesgo
- Promover una planificación de resiliencia **eficaz y a largo plazo**

DEFINICIONES

Los riesgos naturales son fenómenos ambientales que pueden afectar a la sociedad y al entorno humano.

La mitigación de peligros es el esfuerzo por reducir los impactos de los riesgos naturales mediante planificación, políticas, educación, proyectos de infraestructura y otros medios.

La resiliencia es la capacidad de resistir y recuperarse rápidamente de un evento extremo. idealmente, los sistemas resilientes "avanzan" para crear sistemas y espacios más saludables, verdes y equitativos.

¿CUÁLES SON LOS BENEFICIOS DE ESTE PLAN?

Aumentar la concienciación pública sobre estos peligros.

Dirigir recursos hacia las mayores vulnerabilidades.

Eficiencia a través de la colaboración.

Desbloqueando oportunidades federales de búsqueda.

¿QUÉ RIESGOS AFRONTA BOSTON?

Boston se enfrenta a riesgos naturales relacionados con inundaciones y temperaturas extremas, debido a su ubicación costera y su entorno urbano. Este Plan de Mitigación de Riesgos Naturales (actualizado) **analiza 15 peligros** para ofrecer una evaluación integral de riesgos.

- **Inundaciones costeras y marejadas ciclónicas**
- **Temperaturas promedio y extremas**
- **Cambios en las aguas subterráneas**
- **Inundaciones por precipitaciones**
- **Clima invernal severo y tormentas del noreste**
- **Huracanes y tormentas tropicales**

¡Participa!

Visite **tinyurl.com/BostonNHMP** para obtener la información más reciente sobre la planificación de la mitigación de riesgos naturales.

Weston & Sampson

VILLE DE BOSTON

Mise à jour du plan d'atténuation des risques naturels (NHMP)

DRAFT

QU'EST CE QU'UN NHMP ?

Un plan d'atténuation des risques naturels (NHMP) est une stratégie de planification visant à aider les administrations municipales, départementales et régionales à comprendre comment réduire les risques, les vulnérabilités et les impacts liés aux risques naturels afin de mieux protéger les personnes, les habitations, les entreprises et les infrastructures critiques.

OBJECTIFS DE CE NHMP

- Mettre en œuvre **une planification stratégique et équitable** de l'atténuation des risques
- Élaborer une **approche de planification complète et adaptable** axée sur la minimisation des risques
- Guide **pour une planification efficace et à long terme** de la résilience

DÉFINITIONS

LES RISQUES NATURELS sont des phénomènes environnementaux susceptibles d'avoir un impact sur les sociétés et l'environnement humain.

LA PRÉVENTION DES RISQUES consiste à réduire les impacts des risques naturels grâce à la planification, à la mise en place de politiques, à l'éducation, à des projets d'infrastructure, etc.

LA RÉSILIENCE est la capacité à résister à un événement extrême et à s'en remettre rapidement. Idéalement, les systèmes résilients « rebondissent » pour créer des systèmes et des espaces plus sains, plus écologiques et plus équitables.

QUELS SONT LES AVANTAGES DE LA PLANIFICATION DE L'ATTÉNUATION DES RISQUES NATURELS ?

Sensibilisation accrue du public aux risques naturels.

Affecter les ressources aux personnes les plus vulnérables.

L'efficacité grâce à la collaboration.

Débloquer les possibilités de financement fédéral.

QUELS RISQUES BOSTON COURT-IL ?

Boston est la ville la plus touchée par les risques naturels liés aux inondations et aux températures extrêmes en raison de sa situation côtière et de ses conditions urbaines. Cependant, ce plan d'atténuation des risques naturels **évalue 15 risques** afin de fournir une évaluation complète des risques.

- **Inondations côtières et ondes de tempête**
- **Températures moyennes/ extrêmes**
- **Changements dans les eaux souterraines**
- **Inondations dues aux précipitations**
- **Conditions météorologiques hivernales rigoureuses/ Tempêtes du nord-est**
- **Ouragans/ Tempêtes tropicales**

IMPLIQUEZ-VOUS !

Rendez-vous sur tinyurl.com/BostonNHMP pour obtenir les dernières informations sur la planification de la prévention des risques naturels.

Weston & Sampson

Vil Boston
Mizajou Plan pou Diminye Dezas Natirèl (NHMP)

DRAFT

KISA KI YON NHMP?

Yon Plan Rediksyon Danje Natirèl (NHMP) se yon estrateji planifikasyon pou ede gouvènman minisipal, konte ak eta yo konprann kijan pou diminye risk, vilnerabilite ak enpak ki asosye ak danje natirèl pou pi byen pwoteje moun, kay, biznis ak enfrastrikti kritik.

OBJEKTIF NHMP SA A

- Aplike **planifikasyon** estratejik ak ekitab pou diminye danje
- Devlope **yon apwòch** planifikasyon konplè ak adaptab ki konsantre sou minimize risk yo
- Gide **planifikasyon** rezilyans efikas alontèm

DEFINISYON

Danje natirèl yo se fenomèn anviwònman ki gen potansyèl pou afekte sosyete yo ak anviwònman imen an.

Rediksyon Danje se efò pou diminye enpak danje natirèl yo atravè planifikasyon, politik, edikasyon, pwojè enfrastrikti, ak plis ankò.

Rezilyans se kapasite pou reziste epi refè rapidman apre yon evènman ekstrèm. Idealma, sistèm rezistan yo "rebondi pou pi devan" pou kreye sistèm ak espas ki pi an sante, ki pi vèt, epi ki pi ekitab.

KI BENEFIS PLANIFIKASYON POU REDUI DANJE NATIRÈL?

Ogmante konsyantizasyon piblik la sou danje natirèl yo.

Dirije resous yo nan direksyon pi gwo vilnerabilite yo.

Efikasite atravè kolaborasyon.

Debloke opòtinite finansman federal yo.

KI RISK BOSTON AP AFWONTE?

Boston se moun ki pi afekte pa danje natirèl ki gen rapò ak inondasyon ak tanperati ekstrèm akòz pozisyon kotyè li a ak kondisyon iben li yo. Sepandan, Plan Rediksyon Danje Natirèl sa a evalye 15 danje pou bay yon **evalyasyon** konplè sou risk yo.

- **Inondasyon kotyè ak vag tanpèt**
- **Tanperati Mwayèn/ Ekstrèm**
- **Chanjman nan Dlo Anba Tè**
- **Inondasyon akòz presipitasyon**
- **Move tan ivè grav/ Nòdès**
- **Siklòn/Tanpèt twopikal yo**

PATISIPE!

Vizite tinyurl.com/BostonNHMP pou jwenn dènye enfòmasyon yo sou planifikasyon pou diminye danje natirèl.

Weston & Sampson

город Бостон

Обновление Плана по смягчению последствий стихийных бедствий (NHMP)

DRAFT

ЧТО ТАКОЕ NHMP?

План по смягчению последствий стихийных бедствий (NHMP) — это стратегия планирования, призванная помочь муниципальным, окружным и государственным органам власти понять, как снизить риски, уязвимость и последствия, связанные со стихийными бедствиями, для лучшей защиты людей, домов, предприятий и критически важной инфраструктуры.

ЦЕЛЬ ЭТОГО NHMP

- Внедрить **стратегическое и справедливое** планирование мер по смягчению последствий стихийных бедствий
- Разработать **комплексный и адаптируемый** подход к планированию, ориентированный на минимизацию рисков
- Стремление к **долгосрочному и эффективному** планированию устойчивости

ОПРЕДЕЛЕНИЯ

Стихийные бедствия — это явления окружающей среды, которые потенциально могут оказывать воздействие на общество и окружающую среду человека.

Снижение рисков стихийных бедствий — это усилия по уменьшению последствий стихийных бедствий посредством планирования, политики, образования, инфраструктурных проектов и многого другого.

Устойчивость — это способность выдерживать экстремальные события и быстро восстанавливаться после них. В идеале, устойчивые системы «возвращаются в строй», создавая более здоровые, экологичные и справедливые системы и пространства.

В ЧЕМ ПРЕИМУЩЕСТВА ПЛАНИРОВАНИЯ МЕР ПО СМЯГЧЕНИЮ ПОСЛЕДСТВИЙ СТИХИЙНЫХ БЕДСТВИЙ?

Повышение осведомленности общественности об опасностях, связанных со стихийными бедствиями.

Направление ресурсов в наиболее уязвимые места.

Повышение эффективности за счет сотрудничества.

Раскрытие возможностей для получения федерального финансирования.

С КАКИМИ РИСКАМИ СТАЛКИВАЕТСЯ БОСТОН?

Бостон больше всего страдает от стихийных бедствий, связанных с наводнениями и экстремальными температурами, из-за своего прибрежного расположения и урбанизированных условий. Однако данный план по смягчению последствий стихийных бедствий **оценивает 15 видов опасностей,** чтобы обеспечить всестороннюю оценку риска.

- **Прибрежные наводнения и штормовые приливы**
- **Средние/ экстремальные температуры**
- **Изменения в грунтовых водах**
- **Наводнения, вызванные осадками**
- **Суровая зимняя погода/северо-восточные штормы**
- **Ураганы/ тропические штормы**

Присоединяйтесь!

Для получения самой свежей информации о планировании мер по смягчению последствий стихийных бедствий посетите tinyurl.com/BostonNHMP.

Weston & Sampson

波士顿市
自然灾害减缓计划（NHMP）更新

DRAFT

什么是 NHMP?

自然灾害减缓计划（NHMP）是一项规划性策略，旨在帮助市、县和州政府了解如何减少自然灾害带来的的风险、脆弱性和影响，从而更好地保护民众、房屋、企业和关键基础设施。

NHMP 目标

- 实施兼顾**战略高度与公平正义**的减灾规划
- 构建以风险最小化为核心的**全面且灵活**的规划方法
- 指导**长期有效**的韧性规划

定义

自然灾害 是指有可能对社会和人类环境造成影响的自然现象。

减灾 是指通过规划、政策、教育、基础设施项目等手段来减少自然灾害影响的行动。

韧性 是指抵御极端事件并迅速恢复的能力。理想的韧性系统能够实现“回弹跃迁”，从而创造更健康、更绿色、更公平的体系和空间。

自然灾害减缓规划有哪些效益?

- **提高公众对自然灾害的认识**
- **将资源向最脆弱地区倾斜**
- **以通力协作来提升效率**
- **获得联邦资金支持**

波士顿面临哪些风险?

波士顿因其沿海地理位置和城市环境，极易受洪水和极端气温等自然灾害的影响。这份自然灾害减缓计划**评估了 15 种灾害**，从而提供全面的风险评估。

- 沿海洪水和风暴潮
- 平均/极端气温
- 地下水变化
- 暴雨洪水
- 严寒冬季天气/东北风暴
- 飓风/热带风暴

参与进来!

请访问 tinyurl.com/BostonNHMP 了解有关自然灾害减缓规划的最新信息。

Weston & Sampson

Magaalada Boston

Cusboonaysiinta Qorshaha Yaraynta Khatarta Masiibooyinka Dabiiciga ah (NHMP)

DRAFT

Waa maxay NHMP?

Qorshaha Yaraynta Khatarta Masiibooyinka Dabiiciga ah (NHMP) waa istaraatiijiyad qorsheyn oo ka caawisa dawladaha degmooyinka, gobollada, iyo kuwa heer gobol (state) inay fahmaan sida loo yareeyo khataraha, nuglaanta, iyo saameynta la xiriirta masiibooyinka dabiiciga ah si si wanaagsan loogu ilaaliyo dadka, guryaha, ganacsiyada, iyo kaabayaasha muhiimka ah.

UJEEDDADA NHMP-KAN

- Hirgelinta **qorsheyn istaraatiiji ah oo caddaalad ku dhisan** oo lagu yaraynayo khataraha masiibooyinka
- Dhisidda hannaan qorsheyn **dhammaystiran oo la jaanqaadi kara isbeddelka** kuna wajahan yaraynta khataraha
- Hagidda **muddada-dheer oo wax ku ool ah** qorsheynta adkaysiga

Qeexitaanno

Masiibooyinka Dabiiciga ah waa ifafaale deegaan oo awood u leh inay saameeyaan bulshooyinka iyo deegaanka aadanaha.

Yaraynta Khatarta Masiibooyinka waa dadaal lagu dhimayo saameynta masiibooyinka planning, policy, education, infrastructure, iyo waxyaabo kale.

Resilience is the ability to withstand and swiftly recover from an extreme event. Sida ugu habboon, nidaamyada adkaysiga leh "hore ayay u boodaan" si ay u abuuraan nidaamyo iyo goobo ka caafimaad badan, ka cagaaran, oo caddaalad badan.

Waa maxay faa'iidooyinka qorsheynta yaraynta khatarta masiibooyinka dabiiciga ah?

Kordhinta wacyiga bulshada ee ku saabsan masiibooyinka dabiiciga ah.

U jeedinta kheyraadka greatest vulnerabilities.

Hufnaan lagu gaaro wada-shaqeyn.

Unlocking federal funding opportunities.

Waa maxay khataraha ay Boston wajahdo?

Boston waxaa si weyn u saameeya natural hazards related to flooding and extreme temperatures daran sababo la xiriira goobteeda xeebeed iyo xaaladaha magaalo. Si kastaba ha ahaatee, Qorshahan Yaraynta Khatarta Masiibooyinka Dabiiciga ah **qiimeeya 15 khatarood** si loo bixiyo qiimeyn khatar oo dhammaystiran.

- **Fatahaad Xeebeedyada iyo Kacitaanka Biyaha Duufaannada**
- **Heerkul Dhexdhexaad / Aad u Daran**
- **Isbeddellada Biyaha Dhulka Hoostiisa**
- **Fatahaad ka dhalata Roobab**
- **Cimilo Jiilaal oo Daran / Nor'easters**
- **Hurricanes / Duufaanno Kulaylaha (Tropical Storms)**

Ka qayb qaado!

Booqo tinyurl.com/BostonNHMP si aad u hesho macluumaadkii ugu dambeeyay ee ku latest information on natural hazard mitigation planning.

Weston & Sampson

波士頓市
自然災害減緩計畫(NHMP)更新

DRAFT

什麼是 NHMP?

自然災害減緩計畫(NHMP)是一項規劃性策略，旨在幫助市、縣和州政府瞭解如何減少自然災害帶來的的風險、脆弱性和影響，從而更好地保護民眾、房屋、企業和關鍵基礎設施。

NHMP 目標

- 實施兼顧**戰略高度與公平正義**的減災規劃
- 構建以風險最小化為核心的**全面且靈活**的規劃方法
- 指導**長期有效**的韌性規劃

定義

自然災害 是指有可能對社會和人類環境造成影響的自然現象。

減災 是指通過規劃、政策、教育、基礎設施專案等手段來減少自然災害影響的行動。

韌性 是指抵禦極端事件並迅速恢復的能力。理想的韌性系統能夠實現“回彈躍遷”，從而創造更健康、更綠色、更公平的體系和空間。

自然災害減緩規劃有哪些效益?

提高公眾對自然災害的認識

將資源向最脆弱地區傾斜

以通力協作來提升效率

獲得聯邦資金支持

波士頓面臨哪些風險?

波士頓因其沿海地理位置和城市環境，極易受洪水和極端氣溫等自然災害的影響。這份自然災害減緩計畫**評估了 15 種災害**，從而提供全面的風險評估。

- 沿海洪水和風暴潮
- 平均/極端氣溫
- 地下水變化
- 暴雨洪水
- 嚴寒冬季天氣/東北風暴
- 颶風/熱帶風暴

積極參與!

請訪問 tinyurl.com/BostonNHMP 瞭解有關自然災害減緩規劃的最新資訊。

Weston & Sampson

Thành Phố Boston

Bản Cập Nhật Kế Hoạch Giảm Thiểu Thảm Họa Tự Nhiên (NHMP)

DRAFT

NHMP LÀ GÌ?

Kế Hoạch Giảm Thiểu Thảm Họa Tự Nhiên (NHMP) là một chiến lược quy hoạch nhằm hỗ trợ chính quyền đô thị, quận và tiểu bang hiểu được cách giảm bớt các nguy cơ, các điểm dễ bị tổn thương và tác động liên quan tới thiên tai để bảo vệ con người, nhà cửa, doanh nghiệp và cơ sở hạ tầng trọng yếu hiệu quả hơn.

MỤC TIÊU CỦA NHMP NÀY

- Thực hiện quy hoạch **chiến lược và công bằng** về giảm thiểu thảm họa
- Xây dựng cách tiếp cận **toàn diện và thích ứng** tập trung vào việc giảm tối đa các rủi ro
- Hướng dẫn lập quy hoạch khả năng chống chịu **lâu dài, hiệu quả**

ĐỊNH NGHĨA

Thảm Họa Tự Nhiên là các hiện tượng môi trường có khả năng ảnh hưởng tới xã hội và môi trường của con người.

Giảm Thiểu Thảm Họa là nỗ lực giảm bớt các tác động do các thảm họa tự nhiên gây ra thông qua quy hoạch, chính sách, giáo dục, các dự án cơ sở hạ tầng v.v.

Khả năng chống chịu là khả năng đứng vững và nhanh chóng phục hồi sau một sự kiện cực đoan. Về mặt lý tưởng, các hệ thống có khả năng chống chịu sẽ "vượt lên trước" để tạo ra các hệ thống và không gian lành mạnh hơn, xanh hơn và công bằng hơn.

LẬP KẾ HOẠCH GIẢM THIỂU THẢM HỌA TỰ NHIÊN MANG LẠI NHỮNG LỢI ÍCH GÌ?

Nâng cao nhận thức của công chúng về các thảm họa tự nhiên.

Định hướng sử dụng các nguồn lực hỗ trợ cho những khu vực dễ bị tổn thương nhất.

Tính hiệu quả thông qua sự phối hợp.

Mở ra các cơ hội tài trợ của liên bang.

BOSTON PHẢI ĐỐI MẶT VỚI NHỮNG NGUY CƠ NÀO?

Boston chịu ảnh hưởng nhiều nhất từ các thảm họa thiên nhiên liên quan đến lũ lụt và nhiệt độ cực đoan do có vị trí ven biển và các điều kiện đô thị. Tuy nhiên, Kế Hoạch Giảm Thiểu Thảm Họa Thiên Nhiên này **đánh giá 15 thảm họa** để đưa ra bản đánh giá rủi ro toàn diện.

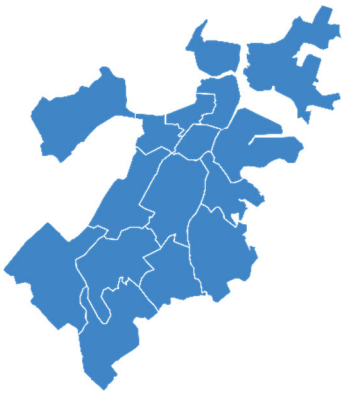
- **Ngập Lụt Ven Biển và Nước Dâng Do Bão**
- **Nhiệt Độ Trung Bình/ Cực Đoan**
- **Thay Đổi liên quan tới Nước Ngầm**
- **Ngập Lụt Do Nước Mưa**
- **Thời Tiết Mùa Đông Khắc Nghiệt/Bão Mạnh**
- **Bão Xoáy/ Bão Nhiệt Đới**

Hãy tham gia!

Truy cập tinyurl.com/BostonNHMP để biết thông tin mới nhất về việc lập kế hoạch giảm thiểu thảm họa tự nhiên.

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APPENDIX E:

City-Owned Buildings in the Flood Zone

Boston City-Owned Properties in the Flood Zone

DRAFT

Building Name	Street Address	Postal Code	Flood Zone	Flood Insurance Status
Jamaica Pond Pavillion	507 Jamaicaway and Pond Street	02130	FEMA-A	Insured
Jamaica Pond Boathouse	507 Jamaicaway and Pond Street	02130	FEMA-A	Insured
Mt. Hope Cemetery Administration Building	355 Walk Hill Street	2126	FEMA-A	Insured
Draper Pool	5279 Washington Street	2132	FEMA-A	Insured
Greenhouse #2	1 Franklin Park Road	2121	FEMA-A	Not insured under primary coverage
DIV 1 - DIST 1 - ENGINE 9 LADDER 2	239 Sumner Street	2128	FEMA-AE	Insured
DIV 1 - DIST 3 - Marine Unit	50 Battery Street	2109	FEMA-AE	Insured
Fire Alarm Office	59 Fenway	2115	FEMA-AE	Insured
Previous Area A-7 Station	69 Paris Street	2128	FEMA-AE	Insured
BPD Harbor Patrol	Black Falcon Avenue	2210	FEMA-AE	Insured
Faneuil Hall	Faneuil Hall Square	2109	FEMA-AE	Insured
Boston City Hall	1 City Hall Square	2108	FEMA-AE	Insured
East Boston Welfare Building	154 Maverick Street	2128	FEMA-AE	Not insured under primary coverage
Pino Community Center	86 Boardman Street	2128	FEMA-AE	Insured
Orient Heights Senior Center	7 Bayswater Street	2128	FEMA-AE	Insured
Umana (Mario) Academy / Harborside CC* (sep bldg)	312 Border Street	2128	FEMA-AE	Insured
Ruth Batson Academy	315 Mount Vernon Street	2125	FEMA-AE	Insured
Alighieri Dante Montessori School	37 Gove Street	2128	FEMA-AE	Insured
Dever, Paul	325 Mount Vernon Street	2125	FEMA-AE	Insured
Guild (Curtis) Elementary School	195 Leyden Street	2128	FEMA-AE	Insured
EAST BOSTON HEALTH CENTER	79 Paris Street	2128	FEMA-AE	Insured
Curley Community Center / L St. Beach	1663 Columbia Road	2127	FEMA-AE	Insured
Back Bay Fens Maintenance Yard	438 Park Drive	2215	FEMA-AE	Insured
Courageous Boathouse	1st Ave and 3rd St	2129	FEMA-AE	Not insured under primary coverage
Paris Street Community Center	112 Paris Street	2128	FEMA-AE	Insured
Paris Street Pool	113 Paris Street	2128	FEMA-AE	Insured
Columbus Park Day Care & Garage	1187 Columbia Road	2127	FEMA-AE	Insured
Will McDonough Field House	1187 Columbia Road	2127	FEMA-AE	Insured
Golden Age Community Center	382 Main Street	2129	FEMA-AE	Insured
N004-E.BOSTON MUNI.	40 Porter Street	2128	FEMA-AE	Not insured under primary coverage
N005-E.BOSTON MUNI.	166 London Street	2128	FEMA-AE	Not insured under primary coverage
East Boston Early Education Center	35 Gove Street	2128	FEMA-AE	Insured
Ambulance 15	512 Main Street	2129	FEMA-AE	Insured
Back Bay Fens Maintenance Yard	438 Park Drive	2215	FEMA-AE	Insured
Saunders Stadium	Joe Moakley Park	2127	FEMA-AE	Insured
CNY, Building 123	Charlestown Navy Yard	2129	FEMA-AE	Not insured under primary coverage
CNY, Pier 4	Charlestown Navy Yard	2129	FEMA-AE	Not insured under primary coverage
CNY, Pier 10	Charlestown Navy Yard	2129	FEMA-AE	Not insured under primary coverage
CNY, Pier 11	Charlestown Navy Yard	2129	FEMA-AE	Not insured under primary coverage
CNY, Pier 3	Charlestown Navy Yard	2129	FEMA-AE	Not insured under primary coverage
CNY, Pier 5	Charlestown Navy Yard	2129	FEMA-AE	Not insured under primary coverage
East Boston Branch Library	365 Bremen Street	2128	FEMA-AE	Insured
City Hall Pavilion	5 Cambridge Street	2114	FEMA-AE	Insured
12 Channel Street	12 Channel Street	2210	FEMA-AE	Insured
Former Fire Station	260 Summer Street	2210	FEMA-AE	Not insured under primary coverage
DIV 1 - DIST 6 - ENGINE 2 LADDER 19	700 East 4th Street	2127	FEMA-X	Insured
DIV 1 - DIST 4 - ENGINE 3; H2; Special Unit	618 Harrison Avenue	2118	FEMA-X	Insured
DIV 1 - DIST 3 - ENGINE 4 LADDER 24	200 Cambridge Street	2114	FEMA-X	Insured

Boston City-Owned Properties in the Flood Zone

DRAFT

Building Name	Street Address	Postal Code	Flood Zone	Flood Insurance Status
DIV 1 - DIST 1 - ENGINE 5	360 Saratoga Street	2128	FEMA-X	Insured
DIV 1 - DIST 4 - ENGINE 7 LADDER 17	200 Columbus Avenue	2116	FEMA-X	Insured
DIV 1 - DIST 3 - ENGINE 8 LADDER 1	392 Hanover Street	2109	FEMA-X	Insured
DIV 2 - DIST 7 - ENGINE 14 LADDER 4; Safety Dvsn	174 Dudley Street	2119	FEMA-X	Insured
DIV 2 - DIST 8 - ENGINE 16	9 Gallivan Boulevard	2124	FEMA-X	Insured
DIV 2 - DIST 7 - ENGINE 17 LADDER 7 (OLD)	7 Parish Street	2122	FEMA-X	Not insured under primary coverage
DIV 2 - DIST 8 - ENGINE 18 LADDER 6	1884 Dorchester Avenue	2124	FEMA-X	Insured
DIV 2 - DIST 8 -ENGINE 20	301 Neponset Avenue	2122	FEMA-X	Insured
DIV 2 - DIST 7 - ENGINE 21	641 Columbia Road	2125	FEMA-X	Insured
DIV 1 - DIST 4 - ENGINE 22; W-25; Hazmat	700 Tremont Street	2118	FEMA-X	Insured
DIV 2 - DIST 7 - ENGINE 24 LADDER 23 Parking Lot	36 Washington Street	2121	FEMA-X	Insured
Spare Vehicle Storage - Quonset Hut		2127	FEMA-X	Not insured under primary coverage
DIV 1 - DIST 11 - ENGINE 29 LADDER 11	138 Chestnut Hill Avenue	2135	FEMA-X	Insured
DIV 2 - DIST 12 - ENGINE 30 LADDER 25	1940 Centre Street	2132	FEMA-X	Insured
DIV 1 - DIST 3 - ENGINE 32 LADDER 9	525 Main Street	2129	FEMA-X	Insured
DIV 1 - DIST 4 - ENGINE 33 LADDER 15	941 Boylston Street	2115	FEMA-X	Insured
DIV 2 - DIST 9 - ENGINE 37 LADDER 26	560 Huntington Avenue	2115	FEMA-X	Insured
DIV 1 - DIST 6 - ENGINE 39 LADDER 18; H7	272 D Street	2127	FEMA-X	Insured
DIV 1 - DIST 11 - ENGINE 41 LADDER 14	460 Cambridge Street	2134	FEMA-X	Insured
DIV 2 - DIST 9 - ENGINE 42 Rescue 2; Tech Rescue	1870 Columbus Avenue	2119	FEMA-X	Insured
DIV 2 - DIST 12 - ENGINE 48 LADDER 28	60 Fairmount Avenue	2136	FEMA-X	Insured
DIV 2 - DIST 12 - ENGINE 49	209 Neponset Valley Parkway	2136	FEMA-X	Insured
DIV 1 - DIST 3 - ENGINE 50	34 Winthrop Street	2129	FEMA-X	Insured
DIV 1 - DIST 11 - ENGINE 51	425 Faneuil Street	2135	FEMA-X	Insured
DIV 2 - DIST 8 - ENGINE 52 - LADDER 29	975 Blue Hill Avenue	2124	FEMA-X	Insured
DIV 2 - DIST 12 - ENGINE 53 LADDER 16F	945 Canterbury Street	2131	FEMA-X	Insured
DIV 2 - DIST 12 - ENGINE 55	5115 Washington Street	2132	FEMA-X	Insured
DIV 1 - DIST 1 - ENGINE 56 LADDER 21	1 Ashley Street	2128	FEMA-X	Insured
BFD Training Academy	Moon Island Road	2171	FEMA-X	Insured
BFD Headquarters	115 Southampton Street	2118	FEMA-X	Insured
DIV 1 - DIST 4 - HIGH PRESSURE STATION	175 Kneeland Street	2111	FEMA-X	Insured
Mattapan Branch New	1350 Blue Hill Avenue	2126	FEMA-X	Insured
BFD Arson/Maintenance; EMS Ambulance 10	900 Massachusetts Avenue	2118	FEMA-X	Insured
ENGINE 42 Temporary Trailers while new bldg under constrctn	125 Amory Street	2119	FEMA-X	Not insured under primary coverage
DIV 2 - DIST 9 - ENGINE 28 Tower LADDER 10; Tech Rescue	746 Centre Street	2130	FEMA-X	Insured
DIV 1 - DIST 6 - Eng 10; Tech Res 1; Tow Lad 3; J-20; H8 Haz Mat; Amb1-P1	125 Purchase Street	2110	FEMA-X	Insured
Area A-7 Station	338 East Eagle Street	2128	FEMA-X	Insured
Area B-3 Station/Ambulance 3	1163 Blue Hill Avenue	2124	FEMA-X	Insured
Old Area C-6 Station - Old Evidence Storage	273 D Street	2127	FEMA-X	Not insured under primary coverage
Area B-2 Station (old)	135 Dudley Street	2119	FEMA-X	Not insured under primary coverage
Area C-11 Station	40 Gibson Street	2122	FEMA-X	Insured
Anticorruption Unit	1960 Washington Street	2118	FEMA-X	Not insured under primary coverage
Area E-5 Station	1708 Centre Street	2132	FEMA-X	Insured
Area E-18 Station	1249 Hyde Park Avenue	2136	FEMA-X	Insured
Area D-4 Station	650 Harrison Avenue	2118	FEMA-X	Insured
Area D-14 Station	301 Washington Street	2135	FEMA-X	Insured
K-9 Unit	165 Allandale Street	2119	FEMA-X	Insured
Police Shooting Range Building	Moon Island Road	2171	FEMA-X	Insured
Police Academy (Fairmont School)	85 Williams Avenue	2136	FEMA-X	Insured
Area C-6 Station/Ambulance 6	101 West Broadway	2127	FEMA-X	Insured
Area E-13 Station/Ambulance 13	3345 Washington Street	2130	FEMA-X	Insured
Police Headquarters	1199 Tremont Street	2120	FEMA-X	Insured

Boston City-Owned Properties in the Flood Zone

DRAFT

Building Name	Street Address	Postal Code	Flood Zone	Flood Insurance Status
Curtis Hall Community Center	20 South Street	2130	FEMA-X	Insured
Roslindale Community Center	6 Cummins Highway	2131	FEMA-X	Insured
Hyde Park Community Center	1179 River Street	2136	FEMA-X	Insured
Tobin Community Center	1481 Tremont Street	2120	FEMA-X	Insured
Mirabella Poolhouse	475 Commercial Street	2109	FEMA-X	Insured
Veronica Smith Senior Center	20 Chestnut Hill Avenue	2135	FEMA-X	Insured
Vine Street Community Center	337 Dudley Street	2119	FEMA-X	Insured
Animal Control Shelter	26 Mahler Road	2131	FEMA-X	Insured
COBAC - Archive Center	201 Rear Rivermoor Street	2132	FEMA-X	Insured
Abiel Smith School -- Museum of African American History	46 Joy Street	2114	FEMA-X	Insured
Back-up IT site	1 Summer Street	2110	FEMA-X	Insured
Boston Adult Tech Academy	20 Church Street	2116	FEMA-X	Insured
Hawkins Street Offices	43 Hawkins Street	2114	FEMA-X	Insured
Home for Women	41 New Chardon Street	2114	FEMA-X	Insured
North Street - HR Training Center	152 North Street	2109	FEMA-X	Not insured under primary coverage
95 Magazine Storage	95 Magazine Street	2119	FEMA-X	Insured
White Stadium	Franklin Park Road	2121	FEMA-X	Not insured under primary coverage
Shelburne Community Center - Community Academy	2730 Washington Street	2119	FEMA-X	Insured
Menino Community Center	125 Brookway Road	2131	FEMA-X	Insured
Flaherty Pool	160 Florence Street	2131	FEMA-X	Insured
Gallivan Community Center	61 Woodruff Way	2126	FEMA-X	Insured
Berkshire Partners Blue Hill Boys & Girls Club	15 Talbot Avenue	2124	FEMA-X	Insured
Johnson Community Center	68 Annunciation Road	2120	FEMA-X	Insured
Nazzaro Community Center	30 North Bennet Street	2113	FEMA-X	Insured
Orchard Gardens Community Center (Boys and Girls Club of Boston)	2 Dearborn Street	2119	FEMA-X	Insured
James Michael Curley House	350 Jamaicaway	2130	FEMA-X	Insured
Edgerley Family South Boston Boys & Girls Club	240 West Sixth Street	2127	FEMA-X	Insured
Central Library - Bolyston Building	700 Boylston Street	2116	FEMA-X	Insured
Kirstein - Project Central	20 City Hall Square	2108	FEMA-X	Insured
Adams Street Branch	690 Adams Street	2122	FEMA-X	Insured
Grove Hall Branch (Former)	5 Crawford Street	2121	FEMA-X	Not insured under primary coverage
Brighton Branch	40 Academy Hill Road	2135	FEMA-X	Insured
Charlestown Branch	179 Main Street	2129	FEMA-X	Insured
Codman Square Branch	690 Washington Street	2111	FEMA-X	Insured
Connolly Branch	433 Centre Street	2130	FEMA-X	Insured
East Boston Branch	276 Meridian Street	2128	FEMA-X	Not insured under primary coverage
Egleston Square Branch	2044 Columbus Avenue	2119	FEMA-X	Insured
Faneuil Branch Library	419 Faneuil Street	2135	FEMA-X	Insured
Fields Corner Branch	1520 Dorchester Avenue	2122	FEMA-X	Insured
Hyde Park Branch	35 Harvard Avenue	2136	FEMA-X	Insured
Jamaica Plain Branch	12 Sedgwick Street	2130	FEMA-X	Insured
Lower Mills Branch	27 Richmond Street	2124	FEMA-X	Insured
Mattapan Branch (Former)	10 Hazleton Street	2126	FEMA-X	Not insured under primary coverage
North End Branch	25 Parmenter Street	2113	FEMA-X	Insured
Chinatown Branch	2 Boylston Street	2116	FEMA-X	Insured
Roslindale Branch	4238 Washington Street	2131	FEMA-X	Insured
South Boston Branch	646 East Broadway	2127	FEMA-X	Insured
South End Branch	685 Tremont Street	2118	FEMA-X	Not insured under primary coverage
West End Branch	151 Cambridge Street	2114	FEMA-X	Insured
West Roxbury Branch	1961 Centre Street	2132	FEMA-X	Insured
Roxbury Branch Library	65 Warren Street	2119	FEMA-X	Insured
Bird Street Community Center	500 Columbia Road	2125	FEMA-X	Insured

Boston City-Owned Properties in the Flood Zone

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Building Name	Street Address	Postal Code	Flood Zone	Flood Insurance Status
Charlestown Service Building	380 Bunker Hill Street	2129	FEMA-X	Not insured under primary coverage
Honan Allston Branch	300 North Harvard Street	2134	FEMA-X	Insured
GIBSON ST OFFICE BLDG	58 Gibson Street	2122	FEMA-X	Insured
CHARLESTOWN BRIDGE STORAGE	North Washington Street	2129	FEMA-X	Not insured under primary coverage
Hancock St. Municipal Building	170 Hancock Street	2125	FEMA-X	Insured
MCCARDLE DRAWBRIDGE (Meridian St Bridge)	Meridian Street	2128	FEMA-X	Not insured under primary coverage
EAST BOSTON MAINTENANCE YRD Trailer - D-9	338 East Eagle Street	2128	FEMA-X	Insured
ALFORD ST. DRAWBRIDGE	Alford Street	2129	FEMA-X	Not insured under primary coverage
CONGRESS STREET BRIDGE	Congress Street	2210	FEMA-X	Not insured under primary coverage
Inpatient Facility - Menino Pavilion? Check			FEMA-X	Not insured under primary coverage
Ambulance 4	25 Harvard Street	2111	FEMA-X	Insured
Ambulance 9 & 14 (Harvard campus)	287 Western Avenue	2134	FEMA-X	Insured
Finland Office	774 Albany Street	2118	FEMA-X	Insured
F,G & H Building - 820 Harrison Ave	820 Harrison Avenue	2118	FEMA-X	Not insured under primary coverage
EMS Fleet Maintenance	61 Shirley Street	2119	FEMA-X	Insured
Paramedic 3 (Carney Hospital)	2100 Dorchester Avenue	2124	FEMA-X	Insured
MATERNITY (OB-GYN) BUILDING - 91 East Concord	91 E Concord Street	2118	FEMA-X	Not insured under primary coverage
Mechanical Plant - 750 Albany	750 Albany Street	2118	FEMA-X	Not insured under primary coverage
SURGICAL BUILDING - 85 East Concord	85 E Concord Street	2118	FEMA-X	Not insured under primary coverage
AMBULATORY CARE CENTER -"ACC" - 850 Harrison Ave	850 Harrison Avenue	2118	FEMA-X	Not insured under primary coverage
Dowling Building - 771 Albany	771 Albany Street	2118	FEMA-X	Not insured under primary coverage
Mallory Building & Garage	764 Albany Street	2118	FEMA-X	Insured
Upham's Corner Municipal Building/Upham's Corner Library	500 Columbia Road	2125	FEMA-X	Insured
Powerhouse	Long Island Road	2171	FEMA-X	Not insured under primary coverage
Lab & Morgue	Long Island Road	2171	FEMA-X	Not insured under primary coverage
Nurses Home	Long Island Road	2171	FEMA-X	Not insured under primary coverage
WARDS A & B	Long Island Road	2171	FEMA-X	Insured
MORRIS BUILDING	Long Island Road	2171	FEMA-X	Insured
NICHOLS BUILDING	Long Island Road	2171	FEMA-X	Insured
10. DIV 2 - DIST 8 - FIRE Brigade (Engine 54) Long Island Hospital	Long Island Road	2171	FEMA-X	Insured
Long Island Garage	Long Island Road	2171	FEMA-X	Insured
Tobin Building	Long Island Road	2171	FEMA-X	Insured
Incinerator	Long Island Road	2171	FEMA-X	Not insured under primary coverage
Laundry Building	Long Island Road	2171	FEMA-X	Insured
Chapel	Long Island Road	2171	FEMA-X	Insured
SEWAGE PLANT	Long Island Road	2171	FEMA-X	Not insured under primary coverage
Old Power Plant Laundry Building	205 River Street	2126	FEMA-X	Insured
Power Plant 205A River St	249 River Street	2126	FEMA-X	Insured
EMS vehicle depot	249 River Street	2126	FEMA-X	Insured
Building A	249 River Street	2126	FEMA-X	Not insured under primary coverage

Boston City-Owned Properties in the Flood Zone

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Building Name	Street Address	Postal Code	Flood Zone	Flood Insurance Status
Building B	249 River Street	2126	FEMA-X	Not insured under primary coverage
Building C	249 River Street	2126	FEMA-X	Not insured under primary coverage
Building E 209 River St	249 River Street	2126	FEMA-X	Insured
Building I	249 River Street	2126	FEMA-X	Not insured under primary coverage
FOLEY BUILDING	249 River Street	2126	FEMA-X	Not insured under primary coverage
Food Pantry; Kitchen Dining	213 River Street	2126	FEMA-X	Insured
Entre Familia Office and Daycare	211 River Street	2126	FEMA-X	Insured
Transitions Building	201 River Street	2126	FEMA-X	Insured
Administration Building - 26 Court Street	26 Court Street	2108	FEMA-X	Insured
Quincy Upper School (Arlington)	152 Arlington Street	2116	FEMA-X	Insured
Haley Modular Classroom	570 American Legion Highway	2131	FEMA-X	Insured
Boston Latin School	78 Avenue Louis Pasteur	2115	FEMA-X	Insured
Boston Latin Academy	205 Townsend Street	2121	FEMA-X	Insured
Brighton High School	25 Warren Street	2135	FEMA-X	Insured
Albert D Holland School of Technology - Grove Hall Lib and Comm Ctr	60 Washington Street	2121	FEMA-X	Insured
Charlestown High & CC** (sep bldg)	240 Medford Street	2129	FEMA-X	Insured
Snowden International High School	150 Newbury Street	2116	FEMA-X	Insured
TechBoston Academy	9 Peacevale Road	2124	FEMA-X	Insured
East Boston High School	86 White Street	2128	FEMA-X	Insured
Eliot K-8 Innovation School - Upper	585 Commercial Street	2109	FEMA-X	Insured
Madison Park Complex Bldgs # 1,2,3 (OBryant),4,7 and Garage	75 Malcolm X Boulevard	2120	FEMA-X	Insured
New Mission High School	655 Metropolitan Avenue	2136	FEMA-X	Insured
English High School & Jamacia Plain CC (same bldg)	144 McBride Street	2130	FEMA-X	Insured
Eliot K-8 Innovation School - Intermediate	173 Salem Street	2113	FEMA-X	Insured
South Boston Educational Complex	95 G Street	2127	FEMA-X	Insured
West Roxbury Education Complex and Community Center	1205 VFW Parkway	2132	FEMA-X	Insured
Carter (William E. School)	396 Northampton Street	2118	FEMA-X	Insured
Freeport Bus Yard	12 Hoyt Street	2125	FEMA-X	Insured
Readville Bus Yard	31 Industrial Drive	2136	FEMA-X	Insured
Mel H. King Middle School	50 Saint Marys Street	2215	FEMA-X	Insured
Washington Bus Yard	1988 Washington Street	2118	FEMA-X	Insured
Community Academy of Science and Health	11 Charles Street	2122	FEMA-X	Insured
Curley (Mary) School	493 Centre Street	2130	FEMA-X	Insured
Dearborn STEM Academy	36 Winthrop Street	2119	FEMA-X	Insured
Edison (Thomas) Elementary School	60 Glenmont Road	2135	FEMA-X	Insured
Horace Mann School for the Deaf Hard of Hearing	28 Walker Street	2129	FEMA-X	Insured
Boston Collaborative High School (previous Gavin, Patrick)	215 Dorchester Street	2127	FEMA-X	Insured
Holmes (Oliver) Elementary School	40 School Street	2124	FEMA-X	Insured
Sarah Roberts School	105 Cummins Highway	2131	FEMA-X	Insured
Young Achievers K-8 School	20 Outlook Road	2126	FEMA-X	Insured
Higginson-Lewis 3-8 School	131 Walnut Avenue	2119	FEMA-X	Insured
Mel H. King Elementary / South End Acdemy	90 Warren Street	2119	FEMA-X	Insured
ROGERS, WILLIAM	15 Everett Street	2136	FEMA-X	
Hernandez Dual Language Elementary	61 School Street	2119	FEMA-X	Insured
Lyndon (Patrick) K-8 School	20 Mount Vernon Street	2132	FEMA-X	Insured
Boston Green Academy	20 Warren Street	2135	FEMA-X	Insured
Boston International High School / Newcomers Academy	100 Maxwell Street	2124	FEMA-X	Insured
Timilty Middle School	205 Roxbury Street	2119	FEMA-X	Insured
Boston Day-Evening Academy	20 Kearsarge Avenue	2119	FEMA-X	Insured
Henderson Inclusion Upper	18 Croftland Avenue	2124	FEMA-X	Insured
Adams Elementary School	165 Webster Street	2128	FEMA-X	Insured

Boston City-Owned Properties in the Flood Zone

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Building Name	Street Address	Postal Code	Flood Zone	Flood Insurance Status
Muniz (Margarita) Academy	20 Child Street	2130	FEMA-X	Insured
Baldwin Early Learning Pilot Academy	121 Corey Road	2135	FEMA-X	Insured
Bates (Phineas) Elementary School	426 Beech Street	2131	FEMA-X	Insured
Beethoven Elementary School	5125 Washington Street	2132	FEMA-X	Insured
Blackstone Elementary & CC (same bldg)	380 Shawmut Avenue	2118	FEMA-X	Insured
Bradley (Manassah) Elementary School	110 Beachview Road	2128	FEMA-X	Insured
Channing (William) Elementary School	35 Sunnyside Street	2136	FEMA-X	Insured
Chittick (James) Elementary	154 Ruskindale Road	2136	FEMA-X	Insured
Clap, Roger Elementary	35 Harvest Street	2125	FEMA-X	Insured
Condon (James) K-8 School & CC (same bldg)	200 D Street	2127	FEMA-X	Insured
Conley (George) Elementary School	450 Poplar Street	2131	FEMA-X	Insured
Curley (James) K-8	40 Pershing Road	2130	FEMA-X	Insured
Dickerman, Quincy - Roxbury Prep Charter	206 Magnolia Street	2121	FEMA-X	Insured
Eliot K-8 Innovation School - Lower	16 Charter Street	2113	FEMA-X	Insured
Ellis (David) Elementary School	302 Walnut Avenue	2119	FEMA-X	Insured
Emerson, Ralph W./Dudley St Neighborhood School - DSNS	6 Shirley Street	2119	FEMA-X	Insured
Endicott, William E.	2 McLellan Street	2121	FEMA-X	Insured
Everett (Edward) Elementary	71 Pleasant Street	2125	FEMA-X	Insured
Kennedy Academy for Health Careers (9-10) - Farragut	10 Fenwood Road	2115	FEMA-X	Insured
Lee Academy (previously Fifield, Emily)	25 Dunbar Avenue	2124	FEMA-X	Insured
Community Academy (previously Fuller, Margaret)	25 Glen Road	2130	FEMA-X	Insured
Gardner Pilot Academy	30 Athol Street	2134	FEMA-X	Insured
Lyon High School (Previously Garfield)	95 Beechcroft Street	2135	FEMA-X	Insured
Another Course to College (Previously Greenwood, Elihu)	612 East Metropolitan Avenue	2136	FEMA-X	Insured
Greenwood (Sarah) K-8 School	186 Glenway Street	2121	FEMA-X	Insured
Grew (Henry) Elementary School	40 Gordon Avenue	2136	FEMA-X	Insured
Hale (Nathan) Elementary School	51 Cedar Street	2119	FEMA-X	Insured
Haley Pilot School	570 American Legion Highway	2131	FEMA-X	Insured
Hamilton, Alexander - Bais Yaakov	198 Strathmore Road	2135	FEMA-X	Insured
Harvard-Kent Elementary School	50 Bunker Hill Street	2129	FEMA-X	Insured
Mildred Avenue K-8 School	5 Mildred Avenue	2126	FEMA-X	Insured
Hennigan K-8 School / West Zone Early Learning Center & CC (same bldg)	200 Heath Street	2130	FEMA-X	Insured
Orchard Gardens K-8	906 Albany Street	2119	FEMA-X	Insured
Higginson (Henry) Inclousion School	160 Harrishof Street	2119	FEMA-X	Insured
UP Academy Holland & Holland CC (same bldg)	85 Olney Street	2121	FEMA-X	Insured
Hurley (Joseph) K-8 School	70 Worcester Street	2118	FEMA-X	Insured
Jackson Mann Complex & CC* (sep bldg)	40 Armington Street	2134	FEMA-X	Insured
Frederick Building	270 Columbia Road	2121	FEMA-X	Insured
Kennedy (John F) Elementary School	7 Bolster Street	2130	FEMA-X	Insured
Kennedy (Patrick J) Elementary School	343 Saratoga Street	2128	FEMA-X	Insured
Kenny Elementary School	19 Oakton Avenue	2122	FEMA-X	Insured
Kilmer (Joyce) Lower School (K-3)	35 Baker Street	2132	FEMA-X	Insured
Lee (Joseph) K-8 School & Perkins CC (2 bldg)	155 Talbot Avenue	2124	FEMA-X	Insured
Kilmer (Joyce) Upper School (4-8)	140 Russett Road	2132	FEMA-X	Insured
Manning Elementary School	130 Louders Lane	2130	FEMA-X	Insured
UP Academy Dorchester & Marshall CC (same bldg)	35 Westville Street	2124	FEMA-X	Insured
Mason Elementary School	150 Norfolk Avenue	2119	FEMA-X	Insured
Mather Elementary School	1 Parish Street	2122	FEMA-X	Insured
Mattahunt Elementary School & CC** (sep bldg)	100 Hebron Street	2126	FEMA-X	Insured
Mendell Elementary School	164 School Street	2130	FEMA-X	Insured
Mozart Elementary School	236 Beech Street	2131	FEMA-X	Insured
Murphy (R.J) K-8 School & Leahy-Holloran BCC (same bldg)	1 Worrell Street	2122	FEMA-X	Insured
O'Donnell (Hugh) Elementary	33 Trenton Street	2128	FEMA-X	Insured
Henderson Inclusion Lower	1669 Dorchester Avenue	2124	FEMA-X	Insured
Quincy School Upper - New Bldg	900 Washington Street	2111	FEMA-X	Insured
Ohrenberger Modular Classroom	175 West Boundary Road	2132	FEMA-X	Insured

Boston City-Owned Properties in the Flood Zone

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Building Name	Street Address	Postal Code	Flood Zone	Flood Insurance Status
Ohrenbergeer, William School & CC (same bldg)	175 West Boundary Road	2132	FEMA-X	Insured
Otis (James) Elementary School	218 Marion Street	2128	FEMA-X	Insured
Boston Teachers Union Pilot School	25 Walk Hill Street	2130	FEMA-X	Insured
Perkins (Michael) Elementary School	50 Burke Street	2127	FEMA-X	Insured
Perry (Oliver) Elementary School	745 East 7th Street	2127	FEMA-X	Insured
Philbrick (John) Elementary School	40 Philbrick Street	2131	FEMA-X	Insured
Quincy (Josiah) Elementary & Chinatown CC (same bldg)	885 Washington Street	2111	FEMA-X	Insured
Roosevelt K-8 School (2-8)	95 Needham Road	2136	FEMA-X	Insured
Russell (William) Elementary	750 Columbia Road	2125	FEMA-X	Insured
Shaw-Taylor Elementary School (K-1)	429 Norfolk Street	2124	FEMA-X	Insured
STONE, LUCY - Roxbury Prep Charter	22 Regina Road	2124	FEMA-X	Insured
Sumner (Charles) School	15 Basile Street	2131	FEMA-X	Insured
Shaw-Taylor Elementary School (2-6)	1060 Morton Street	2126	FEMA-X	Insured
Tobin K-8 School	40 Smith Street	2120	FEMA-X	Insured
Trotter K-6 School	135 Humboldt Avenue	2121	FEMA-X	Insured
Tynan (Joseph) Elementary & Tynan CC** (sep bldg)	650 East 4th Street	2127	FEMA-X	Insured
Warren-Prescott K-8 School	50 School Street	2129	FEMA-X	Insured
Winship Elementary School	54 Dighton Street	2135	FEMA-X	Insured
Winthrop Elementary School	35 Brookford Street	2125	FEMA-X	Insured
Warren-Prescott Extension	8 Pearl Street	2129	FEMA-X	Insured
Food and Nutritional Services - Central Food Facility	370 Columbia Road	2125	FEMA-X	Insured
Quincy Upper School - Modular Clas	900 Washington Street	2111	FEMA-X	Not insured under primary coverage
Snowden HS Classroom and Office	140 Clarendon Street	2116	FEMA-X	Insured
Strand Theatre	543 Columbia Road	2125	FEMA-X	Insured
Special Operations - Truck Unit - Ambulance 2 Paramed 2	364 Warren Street	2119	FEMA-X	Insured
Sam Adams Park	Faneuil Hall	2109	FEMA-X	Not insured under primary coverage
Haynes Early Education Center	263 Blue Hill Avenue	2119	FEMA-X	Insured
Ellison-Parks Early Education Center	108 Babson Street	2126	FEMA-X	Insured
Main House/Horizons House	249 River Street	2126	FEMA-X	Insured
BPD Peer Support	249 River Street	2126	FEMA-X	Insured
Barron Building	515 Hyde Park Avenue	2131	FEMA-X	Insured
B STREET FOOTBRIDGE	B Street	2210	FEMA-X	Not insured under primary coverage
BELGRADE AVE. BRIDGE	Belgrade Avenue	2131	FEMA-X	Not insured under primary coverage
Administration Building	Long Island Road	2171	FEMA-X	Insured
B,C & D Building			FEMA-X	Not insured under primary coverage
Carpentry Shop	249 River Street	2126	FEMA-X	Not insured under primary coverage
Cottage	249 River Street	2126	FEMA-X	Not insured under primary coverage
Building D	249 River Street	2126	FEMA-X	Not insured under primary coverage
MacGilvary	Long Island Road	2171	FEMA-X	Insured
Building F	249 River Street	2126	FEMA-X	Not insured under primary coverage
Northampton Square Garage	700 Massachusetts Avenue	2118	FEMA-X	Insured
Harvard Street Neighborhood Health Center - Food Bank	895 Blue Hill Avenue	2124	FEMA-X	Insured
4. High-Rise Residential (Building 1)	35 Northampton Street	2118	FEMA-X	Not insured under primary coverage
Hobby Shop	Long Island Road	2171	FEMA-X	Not insured under primary coverage
Woods Mullen Shelter	794 Massachusetts Avenue	2118	FEMA-X	Insured

Boston City-Owned Properties in the Flood Zone

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Building Name	Street Address	Postal Code	Flood Zone	Flood Insurance Status
9. Low-Rise Residential (Building 4)	850 Harrison Avenue	2118	FEMA-X	Not insured under primary coverage
North End Community Health Center	332 Hanover Street	2113	FEMA-X	Insured
Miranda Creamer Bldg	785 Albany Street	2118	FEMA-X	Insured
Curley	Long Island Road	2171	FEMA-X	Not insured under primary coverage
35 Northampton Street	35 Northampton Street	2118	FEMA-X	Insured
ICHARDS BUILDING	Long Island Road	2171	FEMA-X	Insured
Central Library - McKim Building	225 Dartmouth Street	2116	FEMA-X	Insured
Franklin Park Greenhouse	1 Franklin Park Road	2121	FEMA-X	Insured
Fairview Administration Building	28 Fairview Avenue	2136	FEMA-X	Insured
Evergreen Cemetery Administration	2060 Commonwealth Avenue	2135	FEMA-X	Insured
Devine Golf Course	1 Circuit Drive	2124	FEMA-X	Insured
George Wright Golf Course Clubhouse	420 West Street	2136	FEMA-X	Insured
FR PK Golf Cart Building	1 Franklin Park Road	2121	FEMA-X	Insured
Franklin Park Crew Garages	1 Franklin Park Road	2121	FEMA-X	Insured
Doherty/Gibson (Townfield) Field House	1545 Dorchester Avenue	2124	FEMA-X	Insured
Boston Common Visitors Center	147 Tremont Street	2111	FEMA-X	Insured
Public Garden Tool House	Charles Street	2122	FEMA-X	Insured
Mirabella Pool	475 Commercial Street	2109	FEMA-X	Not insured under primary coverage
Franklin Park Admin Building	1 Franklin Park Road	2121	FEMA-X	Insured
Boston Common Maintenance Building	115 Tremont Street	2108	FEMA-X	Insured
Franklin Park Trades	1 Franklin Park Road	2121	FEMA-X	Insured
Franklin Park Building 3 (Storage)	1 Franklin Park Road	2121	FEMA-X	Insured
Frog Pond Pavilion	38 Beacon Street	2108	FEMA-X	Insured
Mt. Hope Cemetery Maintenance Building	355 Walk Hill Street	2126	FEMA-X	Insured
GRW COMMUNITY RESOURCE CENTER	Franklin Park Road	2121	FEMA-X	Insured
BRIGHTON Office - D4	315 Western Avenue	2135	FEMA-X	Insured
Garage D-7/ Ambulance 11	58 Gibson Street	2122	FEMA-X	Insured
Hancock St. Salt Shed	160 Hancock Street	2125	FEMA-X	Insured
Street Lighting Division Warehouse - OLD	327 Forest Hills Street	2130	FEMA-X	Insured
Street Sweeper Storage	174 West 2nd Street	2127	FEMA-X	Insured
The Great hall in Codman Square	6 Norfolk Street	2124	FEMA-X	Insured
Old State House	206 Washington Street	2109	FEMA-X	Insured
North Street - Printing Plant	174 North Street	2113	FEMA-X	Not insured under primary coverage
Campbell Resource Center	1216 Dorchester Avenue	2125	FEMA-X	Insured
Roosevelt K-8 School (K1-1) (Hemenway School)	30 Millstone Road	2136	FEMA-X	Insured
ROXBURY MAINTENANCE BUILDING D-2&10	280 Highland Street	2119	FEMA-X	Insured
BMC Spark Center	249 River Street	2126	FEMA-X	Insured
Lyon K-8 School	50 Beechcroft Street	2135	FEMA-X	Insured
Mel H. King Prep High School	97 Peterborough Street	2215	FEMA-X	Insured
Madison Park Complex Bldg #5-6 - Science - Music	75 Malcolm X Boulevard	2120	FEMA-X	Insured
GRW Boston Nature Center	500 Walk Hill Street	2131	FEMA-X	Insured
Julie's Family Learning Program	133 Dorchester Street	2127	FEMA-X	Insured
Charlestown Community Health Center	73 High Street	2129	FEMA-X	Insured
GRW Hyde Park Resource Center	26 Central Avenue	2136	FEMA-X	Insured
VETERANS CEMETARY AND MEMORIAL	89 Walk Hill Street	2130	FEMA-X	Not insured under primary coverage
Deer Park Maintenance Building	115 Boylston Street	2116	FEMA-X	Insured
Roche Community Center	1716 Centre Street	2132	FEMA-X	Insured
PARKMAN HOUSE	33 Beacon Street	2108	FEMA-X	Insured
Cassidy Field House	381 Chestnut Hill Street	2136	FEMA-X	Insured
Franklin Park Horse Stables	1 Franklin Park Road	2121	FEMA-X	Insured
George Wright Maintenance Garage	420 West Street	2136	FEMA-X	Insured
Franklin Park Garage	1 Franklin Park Road	2121	FEMA-X	Insured
125 Magazine Street	125 Magazine Street	2119	FEMA-X	Insured
1010 Mass Ave	1010 Massachusetts Avenue	2118	FEMA-X	Insured
GIBSON ST Salt Shed	58 Gibson Street	2122	FEMA-X	Insured

Boston City-Owned Properties in the Flood Zone

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Building Name	Street Address	Postal Code	Flood Zone	Flood Insurance Status
Hyde Park Maint	58 Dana Avenue	2136	FEMA-X	Insured
ROXBURY SALTSHED D-2&10	280 Highland Street	2119	FEMA-X	Insured
West Roxbury Salt Shed	200 Gardner Street	2215	FEMA-X	Insured
MASS AVE. BUILDING	700 Massachusetts Avenue	2118	FEMA-X	Insured
BUILDING 6/SAFE HOUSE	Long Island Road	2171	FEMA-X	Not insured under primary coverage
Boston Police Evidence And Supply Management	1555 Hyde Park Avenue	2136	FEMA-X	Insured
Walsh Community Center (PAL gym)	533 East Broadway	2127	FEMA-X	Insured
Norwood Facility	136 Access Road	2062	FEMA-X	Not insured under primary coverage
N001-Roxbury Muni.	30 Ruggles Street	2120	FEMA-X	Not insured under primary coverage
N002-BRIGHTON MUNI.	398 Market Street	2135	FEMA-X	Not insured under primary coverage
N003-ALLSTON MUNI.	115 Harvard Avenue	2134	FEMA-X	Not insured under primary coverage
N006-W.ROXBURYMUNI.	737 Centre Street	2130	FEMA-X	Not insured under primary coverage
N007-ROXBURY MUNI.	350 Centre Street	2130	FEMA-X	Not insured under primary coverage
N008-W. ROXBURY MUNI.	10 Taft Hill Terrace	2131	FEMA-X	Not insured under primary coverage
N009-W. ROXBURY MUNI.	711 South Street	2131	FEMA-X	Not insured under primary coverage
N010-W. ROXBURY MUNI.	39 Corey Street	2132	FEMA-X	Not insured under primary coverage
N011-HYDE PARK MUNI.	1269 Hyde Park Avenue	2136	FEMA-X	Not insured under primary coverage
N012-HYDE PARK MUNI.	37 Winthrop Street	2136	FEMA-X	Not insured under primary coverage
N013-DORCHESTER MUNI.	451 River Street	2126	FEMA-X	Not insured under primary coverage
N014-DORCHESTER MUNI.	23 Fairway Street	2126	FEMA-X	Not insured under primary coverage
N015-DORCHESTER MUNI.	254 Bowdoin Street	2122	FEMA-X	Not insured under primary coverage
N016-DORCHESTER MUNI.	8 Belden Street	2125	FEMA-X	Not insured under primary coverage
N018-S.BOSTON MUNI.	450 West Broadway	2127	FEMA-X	Not insured under primary coverage
N019-DORCHESTER MUNI.	16 Hamlet Street	2125	FEMA-X	Not insured under primary coverage
N020-DORCHESTER MUNI.	191 Adams Street	2122	FEMA-X	Not insured under primary coverage
N021-S.BOSTON MUNI.	650 East Broadway	2127	FEMA-X	Not insured under primary coverage
N022-DORCHESTER MUNI.	730 Dudley Street	2125	FEMA-X	Not insured under primary coverage
N023-DORCHESTER MUNI.	20 Georgia Street	2121	FEMA-X	Not insured under primary coverage
N024-W.ROXBURY MUNI.	3087 Washington Street	2119	FEMA-X	Not insured under primary coverage
N025-ROXBURY MUNI.	14 Roxbury Street	2119	FEMA-X	Not insured under primary coverage
N026-E.BOSTON MUNI.	36 Bennington Street	2128	FEMA-X	Not insured under primary coverage
N027-DORCHESTER MUNI.	25 Blue Hill Avenue	2119	FEMA-X	Not insured under primary coverage
N028-ROXBURY MUNI.	44 Warren Avenue	2116	FEMA-X	Not insured under primary coverage

Boston City-Owned Properties in the Flood Zone

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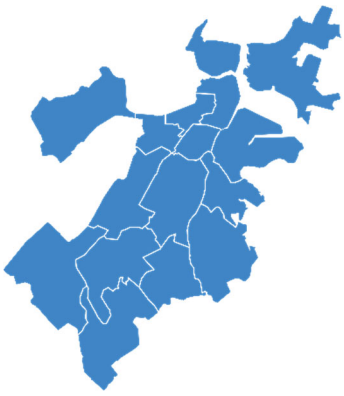
Building Name	Street Address	Postal Code	Flood Zone	Flood Insurance Status
N029-ROXBURY MUNI.	2196 Washington Street	2119	FEMA-X	Not insured under primary coverage
N030-ROXBURY MUNI.	353 Dudley Street	2119	FEMA-X	Not insured under primary coverage
N031-DORCHESTER MUNI.	629 Washington Street	2124	FEMA-X	Not insured under primary coverage
31 Bowker St	31 Bowker Street	2114	FEMA-X	Insured
Area A-1 Station; SORI Unit	40 New Sudbury Street	2114	FEMA-X	Insured
King (Martin Luther) Elementary School	77 Lawrence Avenue	2121	FEMA-X	Insured
Parker Hill Branch Library	1497 Tremont Street	2120	FEMA-X	Insured
Wards C & D	Long Island Road	2171	FEMA-X	Insured
Fenway High School	67 Alleghany Street	2120	FEMA-X	Insured
Ambulance 16, Paramedic 16	330 Brookline Avenue	2115	FEMA-X	Insured
GREATER EGLESTON COMMUNITY HIGH SCHOOL	80 School Street	2119	FEMA-X	Insured
Snowden High - YMCA	140 Clarendon Street	2116	FEMA-X	Not insured under primary coverage
Family Justice Center	989 Commonwealth Avenue	2215	FEMA-X	Insured
Ambulance 5, Paramedic 5 (Faulkner Hosp)	1153 Centre Street	2130	FEMA-X	Insured
Ambulance Seven (Massport)	200 Prescott Street	2128	FEMA-X	Insured
Mystic Boat Ramp			FEMA-X	Not insured under primary coverage
Dudley Town Square	Dudley Towne Road	2119	FEMA-X	Not insured under primary coverage
Elm Hill Park	550 Warren Street	2121	FEMA-X	Not insured under primary coverage
Harriet Tubman Square	Harriet Tubman Square	2118	FEMA-X	Not insured under primary coverage
West Roxbury Garage	200 Gardner Street	2215	FEMA-X	Insured
Boston Arts Academy	174 Ipswich Street	2215	FEMA-X	Insured
Head Start & Children's Services	82 Savin Street	2119	FEMA-X	Insured
Pumphouse	Long Island Road	2171	FEMA-X	Not insured under primary coverage
Water tower	Long Island Road	2171	FEMA-X	Insured
Parkman Bandstand	139 Tremont Street	2108	FEMA-X	Insured
American Legion Field House	Condor Street	2128	FEMA-X	Not insured under primary coverage
Greenhouse #3	1 Franklin Park Road	2121	FEMA-X	Not insured under primary coverage
Billings Field House	369 Lagrange Street	2132	FEMA-X	Insured
Garvey Field House	340 Neponset Avenue	2122	FEMA-X	Insured
Flour Bakery		2114	FEMA-X	Insured
City Emergency Operations Center, EMS Special Ops	85 Bragdon Street	2119	FEMA-X	Insured
Moon Island Gate House	Moon Island Road	2171	FEMA-X	Insured
Area A-15 Charlestown Police Station	20 Vine Street	2129	FEMA-X	Insured
Area B-2 Station	2400 Washington Street	2119	FEMA-X	Insured
Health Careers Academy	10 Fenwood Road	2115	FEMA-X	Not insured under primary coverage
Adams/King Park	470 Adams Street	2122	FEMA-X	Not insured under primary coverage
Bruce C Bolling Municipal Building	2300 Washington Street	2119	FEMA-X	Insured
N032 West Roxbury Municipal Parking Lot	490 Centre Street	2130	FEMA-X	Not insured under primary coverage
N033 Robury Municipal Parking Lot	3042 Washington Street	2119	FEMA-X	Not insured under primary coverage
N034 West Roxbury Municipal Parking Lot	1891 Centre Street	2132	FEMA-X	Not insured under primary coverage
Fairview Garage	28 Fairview Avenue	2136	FEMA-X	Insured
Field House	611 Columbia Road	2125	FEMA-X	Not insured under primary coverage
Dudley Street Neighborhood School	6 Shirley Street	2119	FEMA-X	Insured

Boston City-Owned Properties in the Flood Zone

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Building Name	Street Address	Postal Code	Flood Zone	Flood Insurance Status
Recruit Investigations and Bike Unit	79 Freeport Street	2122	FEMA-X	Insured
North Street - Front section of building	128 North Street	2109	FEMA-X	Not insured under primary coverage
Old Area D-4 Station	7 Warren Street	2119	FEMA-X	Not insured under primary coverage
Dearborn Annex	25 Ambrose Street	2119	FEMA-X	Not insured under primary coverage
Old Police Headquarters	154 Berkeley Street	2116	FEMA-X	Not insured under primary coverage
Safety Division	127 Mount Vernon Street	2125	FEMA-X	Not insured under primary coverage
Lafayette Garage	1 Avenue de Lafayette	2111	FEMA-X	Insured
Chittick Modular Classrooms	154 Ruskindale Road	2136	FEMA-X	Insured
BRIGHTON Garage - D4	315 Western Avenue	2135	FEMA-X	Insured
BRIGHTON Salt Shed - D4	315 Western Avenue	2135	FEMA-X	Insured
Mason Pool	176 Norfolk Avenue	2119	FEMA-X500	Insured
400 Frontage Road	400 Frontage Road	2118	FEMA-X500	Insured
400A Frontage Road	400 Frontage Road	2118	FEMA-X500	Insured
NEW SCHOOL to be built at 189 Paris Street	189 Paris Street	2128	FEMA-X500	Not insured under primary coverage
McKay K-8 School	122 Cottage Street	2128	FEMA-X500	Insured
Men's Shelter and Engagement Center	110 Southampton Street	2118	FEMA-X500	Insured
Tow Lot - Meter Shop	200 Frontage Road	2118	FEMA-X500	Insured
300 Frontage Road	300 Frontage Road	2118	FEMA-X500	Insured
EMS Seaport Station	34 Drydock Avenue	2210	AE	Insured

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APPENDIX F:

Hazus Model Output: Hurricanes

Weston & Sampson
3955 Faber Place Drive, Suite 200, North Charleston, SC 29405
Tel: 843.881.9804

DRAFT

MEMORANDUM

TO: City of Boston

FROM: Jacob Coffman, Lucas Hernandez, Madison Biasin

DATE: March 24, 2026

SUBJECT: City of Boston Hazus Analysis – Category 2 Hurricane

---

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Massachusetts (Suffolk County)

Note: Appendix A contains a complete listing of the counties contained in the region. The geographical size of the region is 52.42 square miles and contains 207 census tracts. There are over 7 thousand households in the region and a total population of 675,654 people. The distribution of population by State and County is provided in Appendix B.

There are an estimated 139,749 buildings in the region with a total building replacement value (excluding contents) of 194,747 million dollars. Approximately 82% of the buildings are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 139,749 buildings in the region which have an aggregate total replacement value of 194.75 billion dollars.

Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report:

Scenario Name:	Boston Category 2
Type:	Probabilistic
Peak Wind Speed:	102.89 (46.0 m/s)

Building Damage

General Building Stock Damage

Hazus estimates that about 8,514 buildings will be at least moderately damaged. This is over 6% of the total number of buildings in the region. There are an estimated 410 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

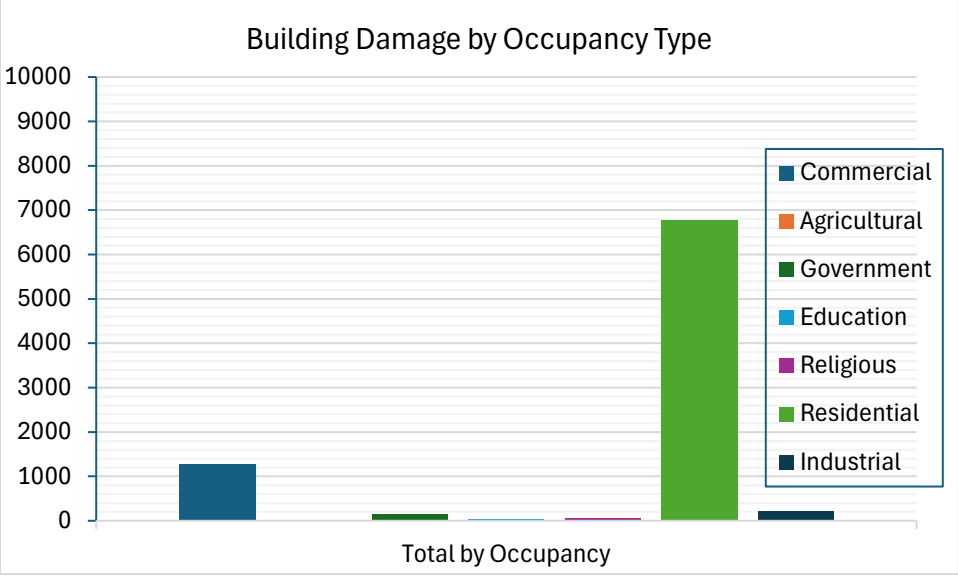


Figure 1. At Least Moderately Damaged Buildings by Occupancy Type

Table 2: Expected Building Damage by Occupancy: Category 2 Hurricane

	None		Affected		Minor		Major		Destroyed	
Occupancy	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
COM	14850.10	79.99	2440.63	13.15	1139.71	6.14	130.78	0.70	2.76	0.01
AGR	113.41	79.87	16.26	11.46	7.63	5.37	4.31	3.04	0.36	0.26
GOV	2177.33	81.70	345.96	12.98	133.31	5.00	8.37	0.31	0.00	0.00
EDU	341.89	74.49	71.01	15.47	44.18	9.63	1.87	0.41	0.04	0.01
REL	1123.09	83.50	164.04	12.20	52.71	3.92	5.05	0.38	0.07	0.01
RES	84988.10	74.19	22800	19.90	5674.26	4.95	690.44	0.60	405.18	0.35
IND	1699.51	77.89	268.89	12.32	165.79	7.60	46.66	2.14	1.13	0.05
Total	105293.47		26106.82		7217.63		887.52		409.56	

Table 3: Expected Building Damage by Building Type: Category 2 Hurricane

	None		Affected		Minor		Major		Destroyed	
Building Type	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
CONCRETE	1106.96	80.68	193.43	14.10	66.35	4.84	5.24	0.38	0	0.00
MASONRY	11516.6	80.45	2030.48	14.18	695.55	4.86	63.56	0.44	8.79	0.06
STEEL	5576.72	65.22	1414.48	16.54	1463.34	17.11	96.15	1.12	0.29	0.00
WOOD	88661.23	76.76	21666.14	18.76	4082.87	3.53	722.94	0.63	377.81	0.33
MH	0	0.00	0	0	0	0	0	0	0	0

Essential Facility Damage

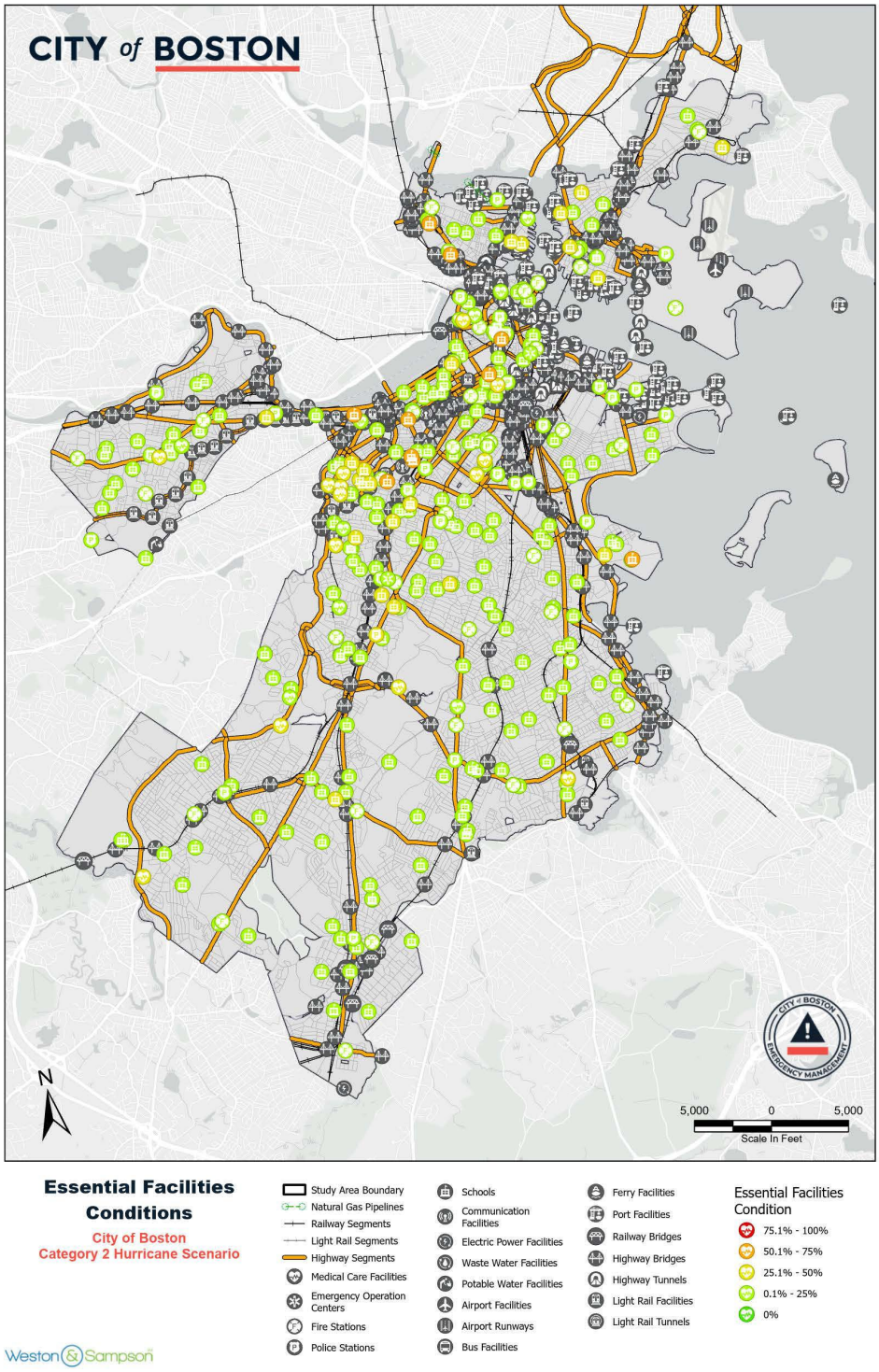


Figure 2. Thematic Map of Essential Facilities

Induced Hurricane Damage

Debris Generation

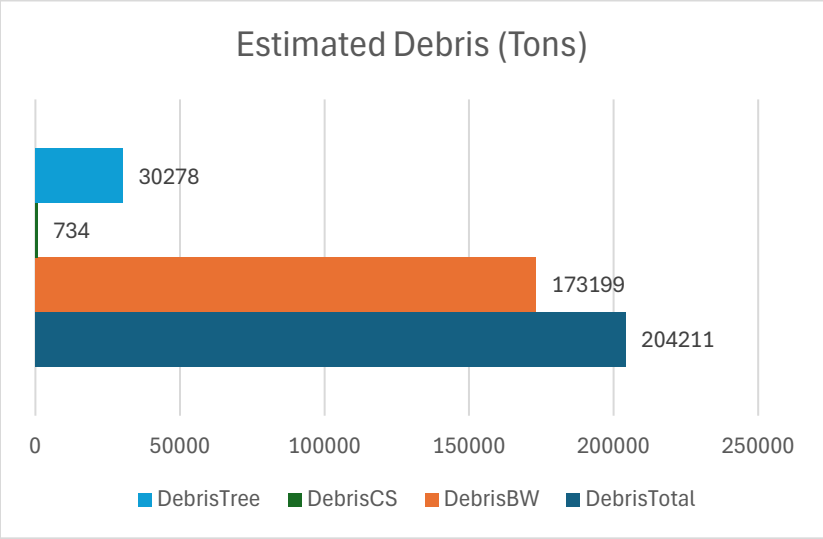


Figure 3. Estimated Debris in Tons

Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into three general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, and c) Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris. The model estimates that a total of 204,211 tons of debris will be generated. Of the total amount, 30,278 tons (14.83%) is Tree Debris. Of the remaining debris Brick/Wood comprises 173,199 tons (84.81%), and Reinforced Concrete/Steel comprises 734 tons, 0.36% of the total debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 8,169 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

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Social Impact

Shelter Requirement

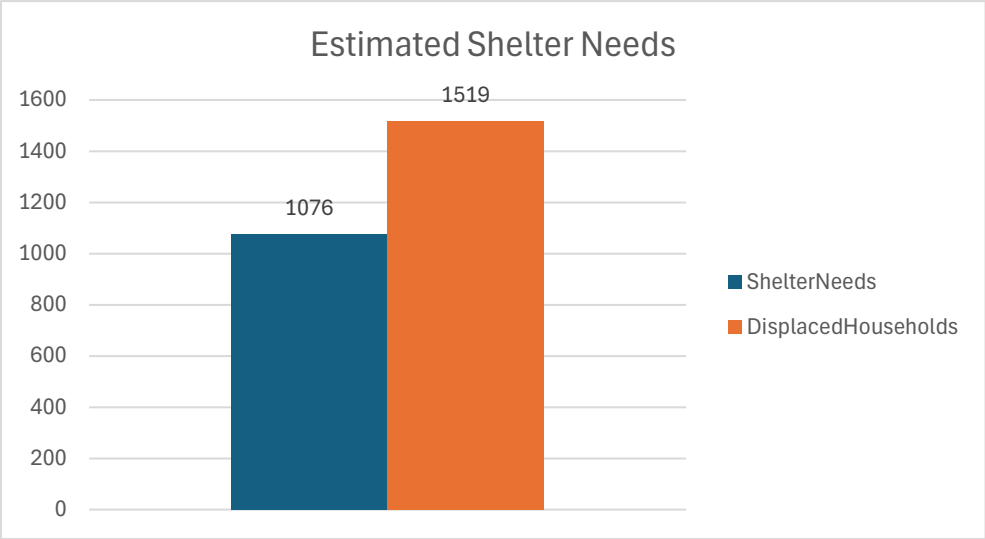


Figure 4. Estimated Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 1,519 households to be displaced due to the hurricane. Of these, 1,076 people (out of a total population of 675,654) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the hurricane is 2.24 billion dollars, which represents 1.15 % of the total replacement value of the region's buildings.

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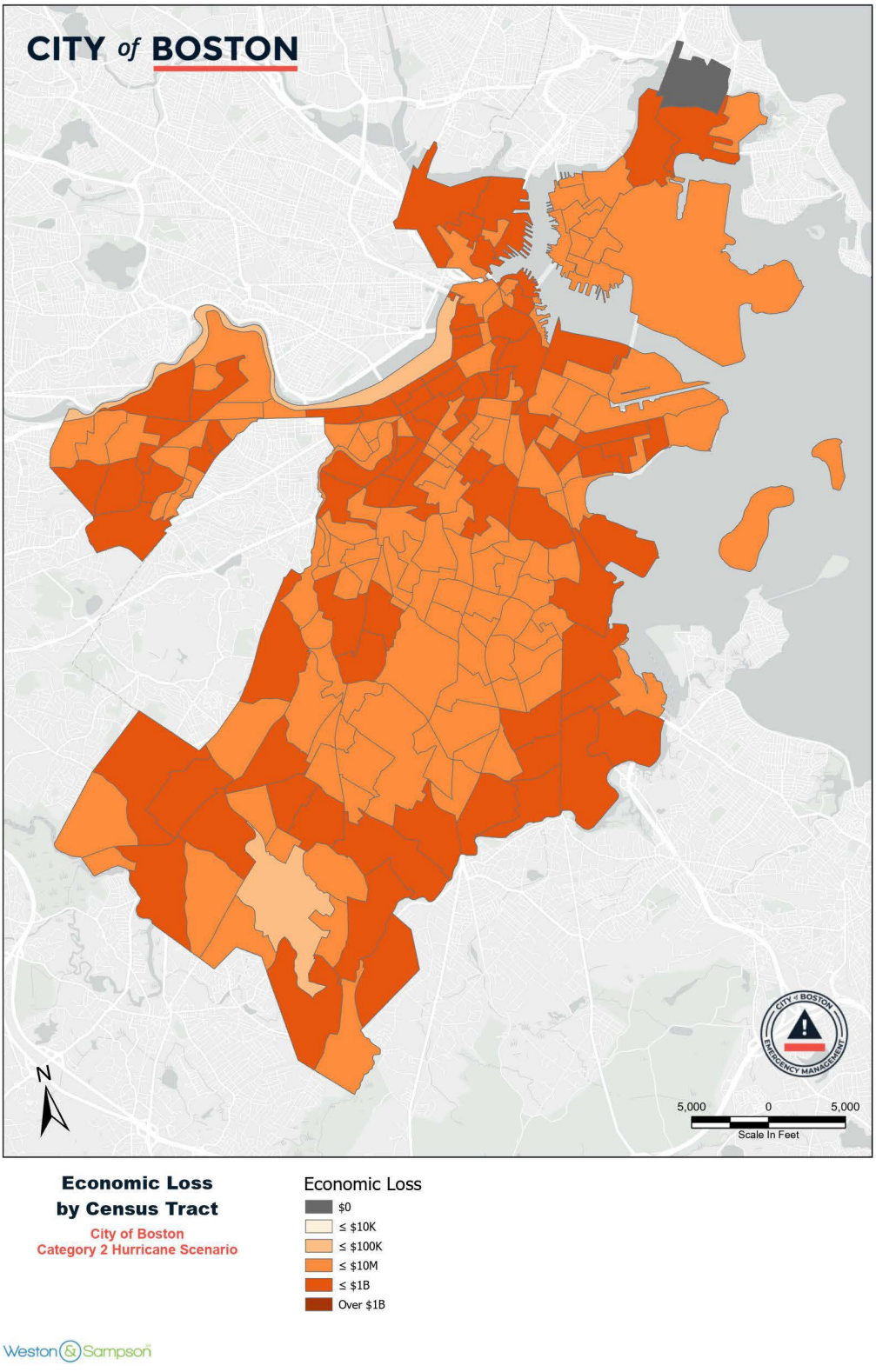


Figure 5. Economic Loss by Census Tract

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane. The total property damage losses were 1.87 billion dollars, or 83.39% of the total losses. 16.61% or 371 million dollars of the estimated losses were related to the business interruption of the region.

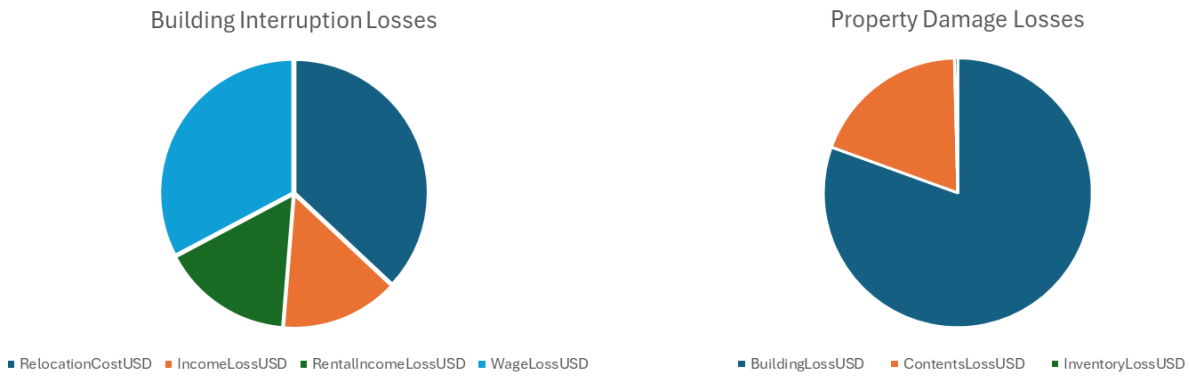


Figure 6. Loss by Building Interruption Type (left) and Building Damage Type (right)

CITY of BOSTON

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Essential Facilities Conditions

City of Boston
Category 2 Hurricane Scenario

- Study Area Boundary
- Natural Gas Pipelines
- Railway Segments
- Light Rail Segments
- Highway Segments
- Medical Care Facilities
- Emergency Operation Centers
- Fire Stations
- Police Stations
- Schools
- Communication Facilities
- Electric Power Facilities
- Waste Water Facilities
- Potable Water Facilities
- Airport Facilities
- Airport Runways
- Bus Facilities
- Ferry Facilities
- Port Facilities
- Railway Bridges
- Highway Bridges
- Highway Tunnels
- Light Rail Facilities
- Light Rail Tunnels

Essential Facilities Condition

- 75.1% - 100%
- 50.1% - 75%
- 25.1% - 50%
- 0.1% - 25%
- 0%

N

5,000 0 5,000
Scale In Feet

Weston & Sampson

CITY of BOSTON

DRAFT

N

5,000 0 5,000

Scale In Feet

Economic Loss by Census Tract

City of Boston
Category 2 Hurricane Scenario

Economic Loss

- $0
- ≤ $10K
- ≤ $100K
- ≤ $10M
- ≤ $1B
- Over $1B

Weston & Sampson

Weston & Sampson
3955 Faber Place Drive, Suite 200, North Charleston, SC 29405
Tel: 843.881.9804
DRAFT

MEMORANDUM

TO: City of Boston

FROM: Jacob Coffman, Lucas Hernandez, Madison Biasin

DATE: March 24, 2026

SUBJECT: City of Boston Hazus Analysis – Category 4 Hurricane

---

General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency and the National Institute of Building Sciences. The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The hurricane loss estimates provided in this report are based on a region that includes 1 county(ies) from the following state(s):

- Massachusetts (Suffolk County)

Note: Appendix A contains a complete listing of the counties contained in the region. The geographical size of the region is 52.42 square miles and contains 207 census tracts. There are around 270,000 thousand households in the region and a total population of 675,654 people. The distribution of population by State and County is provided in Appendix B.

There are an estimated 139,749 buildings in the region with a total building replacement value (excluding contents) of 194,747 million dollars. Approximately 82% of the buildings are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 139,749 buildings in the region which have an aggregate total replacement value of 194.75 billion dollars.

Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report:

Scenario Name:	Boston Category 4
Type:	Probabilistic
Peak Wind Speed:	140.92 mph (63.0 m/s)

Building Damage

General Building Stock Damage

Hazus estimates that about 97,235 buildings will be at least moderately damaged. This is over 69% of the total number of buildings in the region. There are an estimated 33,761 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

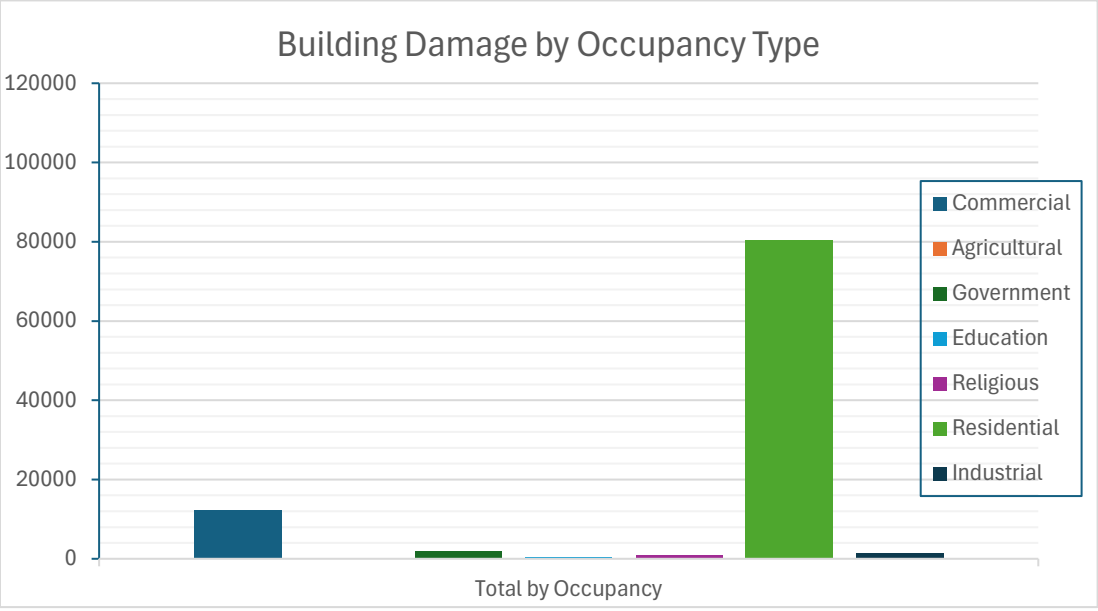


Figure 1. At Least Moderately Damaged Buildings by Occupancy Type

Table 2: Expected Building Damage by Occupancy: Category 4 Hurricane

	None		Affected		Minor		Major		Destroyed	
Occupancy	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
COM	2867.01	15.44	3508.23	18.90	6077.72	32.74	5407.20	29.13	703.84	3.79
AGR	23.18	16.32	31.49	22.18	37.17	26.17	30.13	21.22	20.03	14.11
GOV	361.25	13.56	431.21	16.18	853.59	32.03	1002.32	37.61	16.63	0.62
EDU	47.27	10.30	63.37	13.81	172.64	37.61	165.59	36.08	10.14	2.21
REL	229.27	17.05	296.04	22.01	417.42	31.03	374.63	27.85	27.64	2.05
RES	9487.29	8.28	24652.38	21.52	30969.89	27.03	16586.87	14.48	32861.57	28.69
IND	316.19	14.49	365.97	16.77	663.35	30.40	715.79	32.80	120.70	5.53
Total	13331.46		29348.69		39191.78		24282.53		33760.55	

Table 3: Expected Building Damage by Building Type: Category 4 Hurricane

	None		Affected		Minor		Major		Destroyed	
Building Type	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
CONCRETE	154.88	11.29	171.86	12.53	419.45	30.57	625.52	45.59	0.28	0.02
MASONRY	1797.66	12.56	2051.03	14.33	4257.21	29.74	5418.83	37.85	790.28	5.52
STEEL	598.25	7.00	657.37	7.69	3752.04	43.88	3428.90	40.10	114.45	1.34
WOOD	12142.42	10.51	27951.52	24.20	30301.81	26.23	13506.76	11.69	31608.50	27.36
MH	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Essential Facility Damage

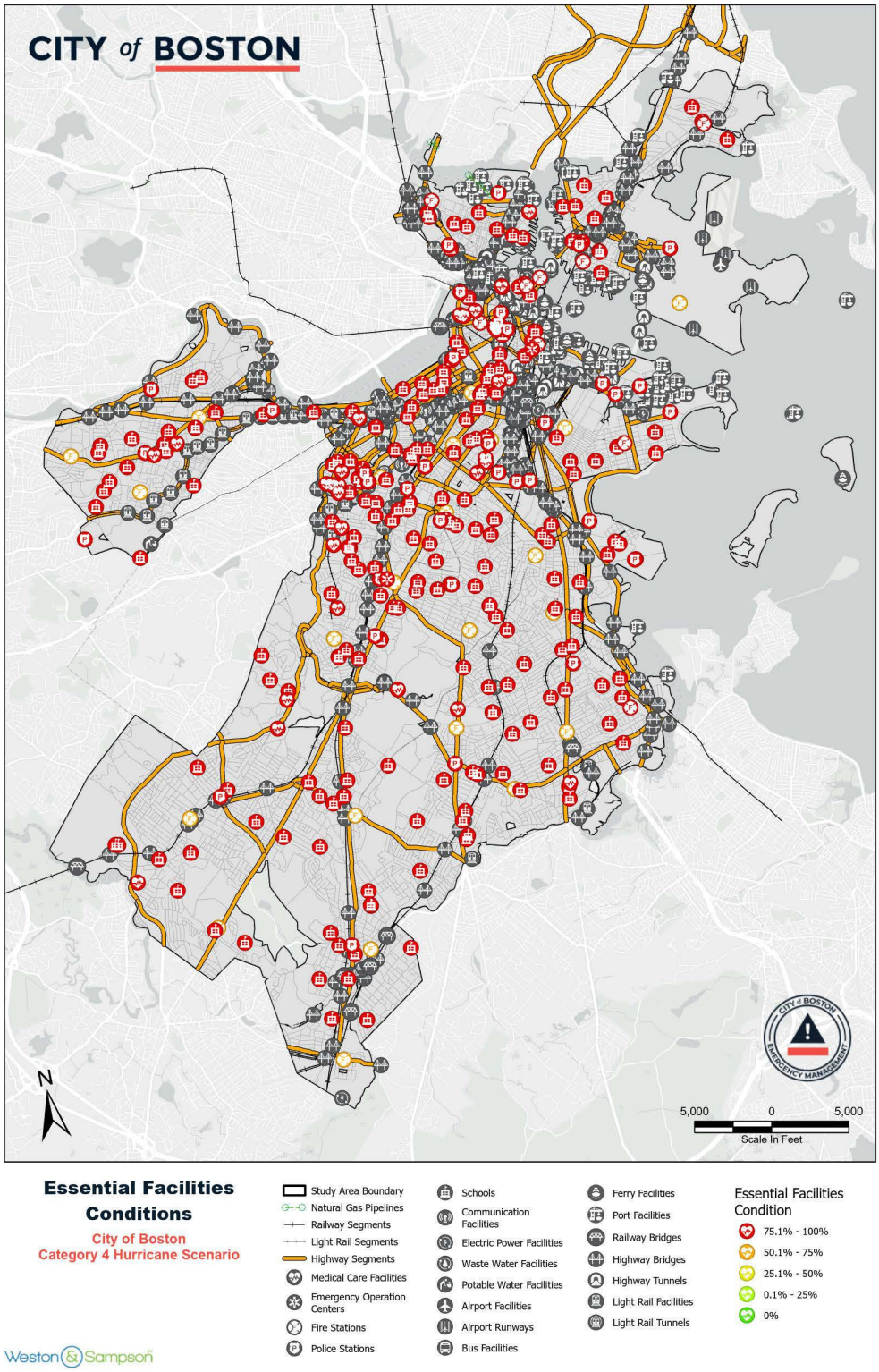


Figure 2. Thematic Map of Essential Facilities

Induced Hurricane Damage

Debris Generation

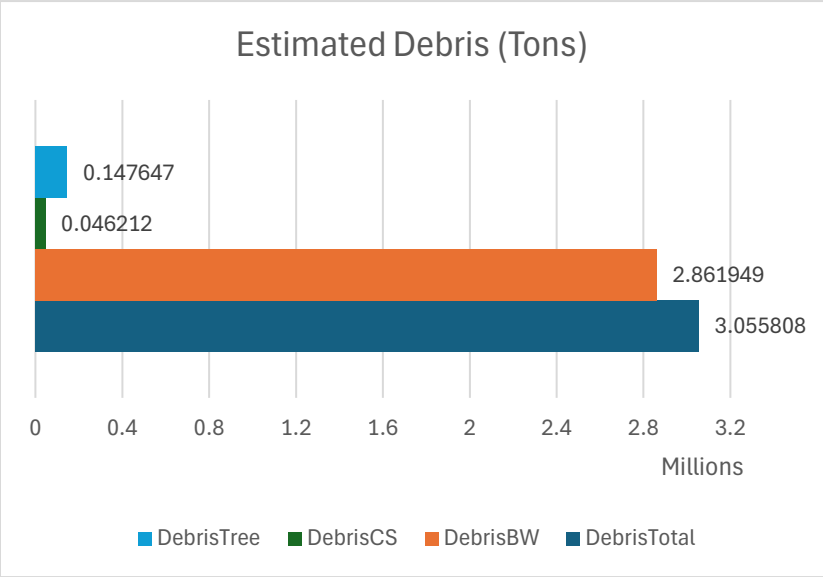


Figure 3. Estimated Debris in Millions of Tons

Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into three general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, and c) Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris. The model estimates that a total of 3.06 million tons of debris will be generated. Of the total amount, 0.15 million tons (4.83%) is Tree Debris. Of the remaining debris Brick/Wood comprises 2.86 million tons (93.66%), and Reinforced Concrete/Steel comprises 0.05 million tons 1.51 % of the total debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 122,233 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

Social Impact

Shelter Requirement

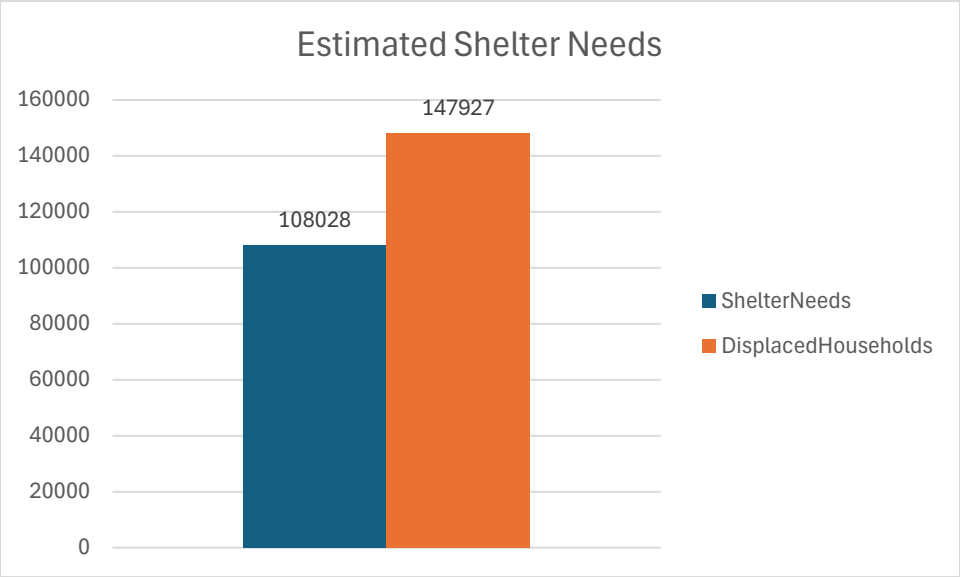


Figure 4. Estimated Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 147,927 households to be displaced due to the hurricane. Of these, 108,028 people (out of a total population of 675,654) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the hurricane is 57.55 billion dollars, which represents 29.55 % of the total replacement value of the region's buildings.

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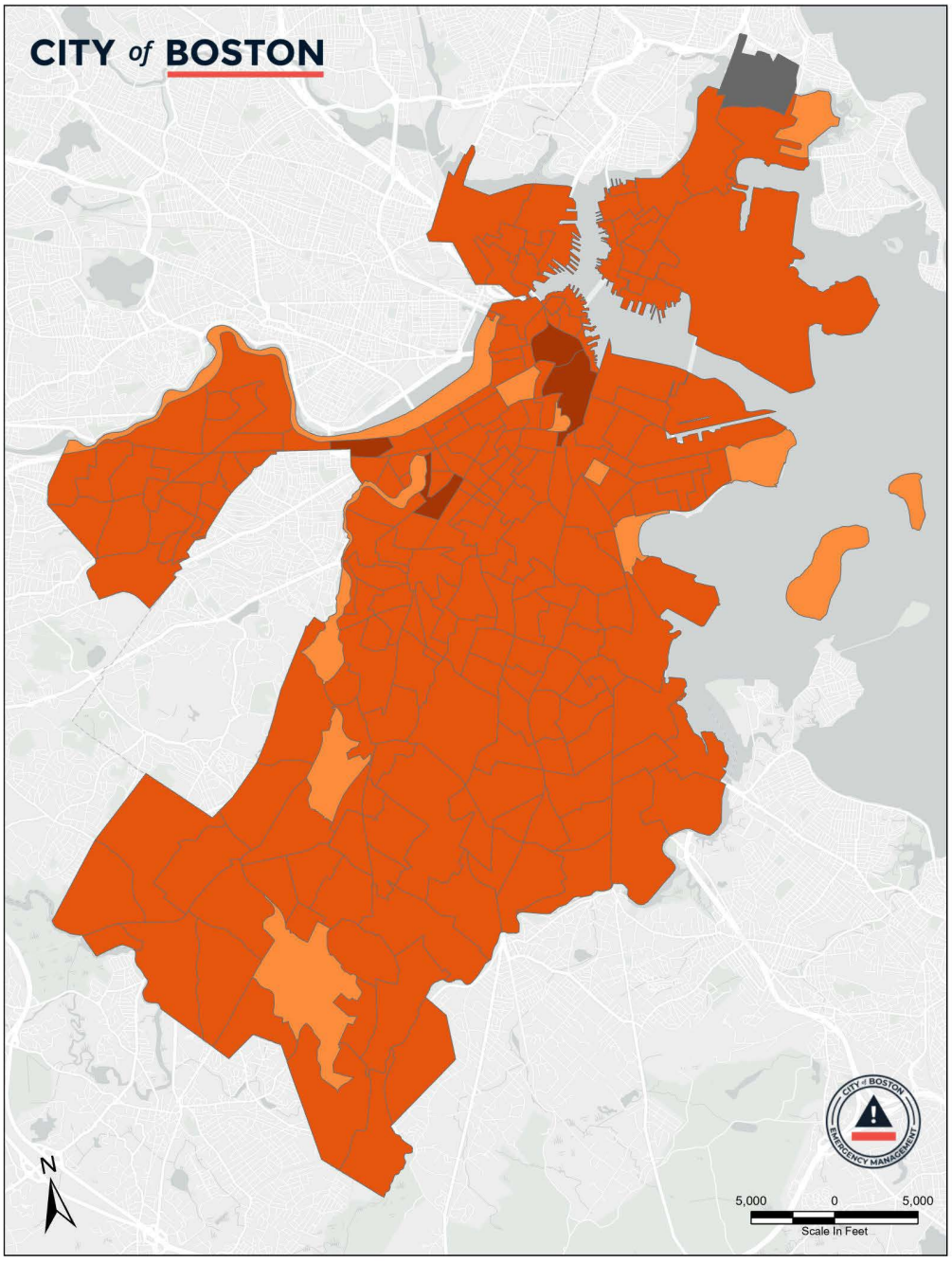


Figure 5. Economic Loss by Census Tract

Building-Related Losses

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane. The total property damage losses were 51 billion dollars, or 88.61% of the total losses. 11.39% or 6.55 billion dollars of the estimated losses were related to the business interruption of the region.

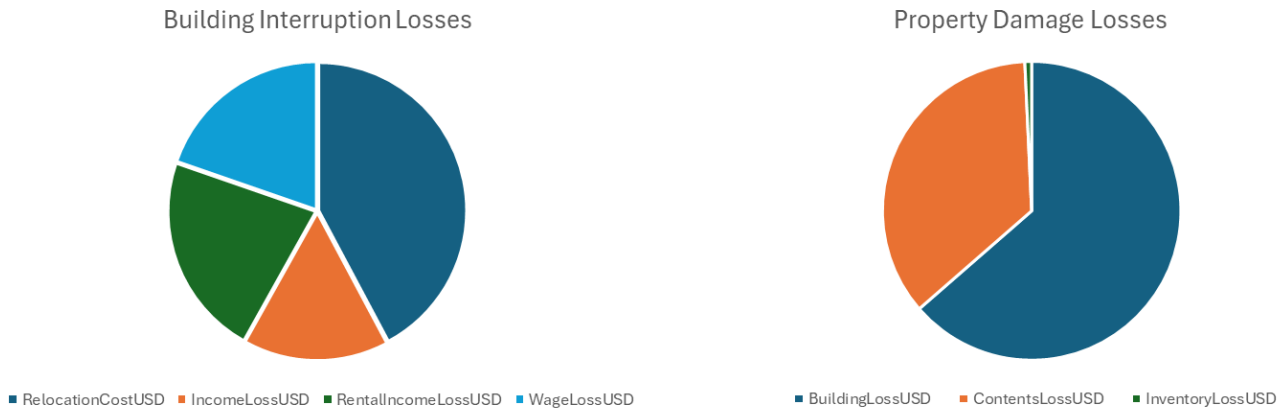


Figure 6. Loss by Building Interruption Type (left) and Building Damage Type (right)

CITY of BOSTON

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N

5,000 0 5,000

Scale In Feet

Essential Facilities Conditions

City of Boston
Category 4 Hurricane Scenario

- Study Area Boundary
- Natural Gas Pipelines
- Railway Segments
- Light Rail Segments
- Highway Segments
- Medical Care Facilities
- Emergency Operation Centers
- Fire Stations
- Police Stations
- Schools
- Communication Facilities
- Electric Power Facilities
- Waste Water Facilities
- Potable Water Facilities
- Airport Facilities
- Airport Runways
- Bus Facilities
- Ferry Facilities
- Port Facilities
- Railway Bridges
- Highway Bridges
- Highway Tunnels
- Light Rail Facilities
- Light Rail Tunnels

Essential Facilities Condition

- 75.1% - 100%
- 50.1% - 75%
- 25.1% - 50%
- 0.1% - 25%
- 0%

Weston & Sampson

CITY of BOSTON

DRAFT

N

5,000 0 5,000

Scale In Feet

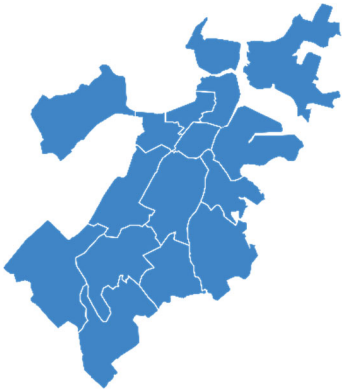
Economic Loss by Census Tract

City of Boston
Category 4 Hurricane Scenario

Economic Loss

- $0
- ≤ $10K
- ≤ $100K
- ≤ $10M
- ≤ $1B
- Over $1B

Weston & Sampson



APPENDIX G:

Previous Action Progress

2021 Boston NHMP Mitigation Actions

ID	Mitigation Action	Responsibility	Status	Include in Updated Plan?	Notes
A1	Emergency Shelter Assessment and Improvements	**OEM**, BCYF, BPS	Complete	No	Assessments were completed for all BCYF sites in Spring of 2025, BPS facility walkthroughs were conducted in 2020.
A2	Establish Flood Protection Overlay Districts	**BPDA,** Environment Department	In Progress	Yes with Revisions	The Coastal Flood Resilience Overlay District has been implemented and is currently in effect. The district will likely be updated within the next five years; however, additional updates are dependent on the completion of the Boston Water and Sewer Commission (BWSC) inundation model, which is still pending.
A3	Implement Recommended Actions in Boston's Citywide Heat Resiliency Study	BPDA, BPHC, **Environment Department**, OEM, Parks and Recreation	In Progress	Yes	The study has been completed, and the implementation of recommendations is ongoing. Progress has been limited by the lack of a designated program owner responsible for permanent shade infrastructure within the public right-of-way (ROW).
A4	Improve the Resiliency of the Boston Marine Industrial Park and Long Wharf Improvements	**BPDA**	In Progress	Yes with Revisions	Design work for both of these projects has advanced.
A5	Adapt Morrissey Boulevard for Flood Resilience	BPDA, **DCR, MassDOT**	In Progress	Yes with Revisions	MassDOT, DCR and the City collaborated on a draft design that is currently being refined by the State. Progress has also been supported by the release of the Morrissey Boulevard study by MassDOT. The ongoing U.S. Army Corps of Engineers (USACE) Coastal Storm Risk Management (CSRM) study for the Dorchester waterfront may provide additional information relevant to future design assumptions.
A6	Address Vulnerabilities to Tidal Flooding at McCormack and Dever Schools	**BPS**	Canceled	No	Dever Elementary School is approved to close at the end of the 2025–2026 school year, and the former BCLA-McCormack site is now advancing through the Ruth Batson Academy capital planning/Massachusetts School Building Authority (MSBA)process, where tidal flood resilience considerations should be incorporated into the broader campus planning and design effort that is ongoing.
A7	Finalize the Design and Construct the Coastal Resilience Barriers at the Carlton and Lewis Mall Flood Pathways in East Boston	**BPDA**	In Progress	Yes with Revisions	The design and permitting phases are to be completed by 2027. Construction is TBD.
A8	Implement Climate Ready Boston and Continue to Develop Strategies that Integrate Various Natural Hazards	BPDA, BTD, **Environment Department**, Parks and Recreation, Public Works	In Progress	Yes with Revisions	Progress has been made on multiple Climate Ready Boston (CRB) recommendations. The U.S. Army Corps of Engineers (USACE) Coastal Storm Risk Management (CSRM) partnership, initiated in 2022, has become the primary long-term implementation mechanism for advancing CRB coastal resilience goals. Continued through new USACE action.
A9	Muddy River Flood Control	**Army Corp of Engineers**, DCR, Parks and Recreation, Town of Brookline	Complete	No	Completed and currently in the 5-year maintenance period.

2021 Boston NHMP Mitigation Actions

ID	Mitigation Action	Responsibility	Status	Include in Updated Plan?	Notes
A10	Prepare Parks and Outdoor Facilities for Climate Change	Environment Department, **Parks and Recreation**	In Progress	Yes	Implementation of this action is ongoing through a variety of park and open space improvement projects. Completed milestones include the Codman Square cooling tower and continued operation and maintenance of cooling and water features. Progress is underway at Ryan Playground, which includes measures to address a flood pathway, and permitting for improvements at Moakley Park is anticipated by the end of 2025. Federal funding has been secured for the design phase of improvements at Christopher Columbus Park. Additional resilience measures, including tree planting, improved access to water, green infrastructure, stormwater management features, and drainage improvements at Circuit Drive in Franklin Park, continue to be incorporated into projects citywide.
A11	Expand Citywide Climate Readiness Education, Engagement, and Leadership Development Campaigns	BPDA, Environment Department, **OEM**	Complete	No	Implementation is ongoing through recurring public engagement and climate preparedness programs, including Deployables Day, Roundtables to Resilience, and Art for Change. These efforts will continue beyond 2025.
A12	Implement an Action Plan to Enhance Boston's Urban Tree Canopy and Protect Residents From the Impacts of Extreme Heat	Environment Department, **Parks and Recreation**	Complete	No	The City of Boston advanced this action through the publication of its Urban Forest Plan in 2022, which establishes a citywide framework for preserving, managing, and expanding Boston's urban tree canopy.
A13	Promote Resilience in Buildings and Encourage Green Infrastructure in Site Design	**BPDA**, Environment Department, ISD, Parks and Recreation	In Progress	Yes with Revisions	The Coastal Flood Resilience Overlay District (CFROD) has been implemented and is now being applied to development projects in areas at risk from coastal flooding.
A14	Rutherford Ave/Charlestown Underpass – Manage Tunnel to Reduce Flood Impacts	**Parks and Recreation**	In Progress	Yes	PWD has done some work on the underpass to reduce stormwater flooding; it has also advanced designs for the roadway's reconstruction.
A15	Franklin Park Action Plan and Resilience	**Parks and Recreation**	Complete	No	The City of Boston published the Franklin Park Action Plan in 2022.
A16	Continue to Develop a Resilience Assessment and Education Program for Property Owners and Tenants	**Environment Department**, ISD	In Progress	Yes with Revisions	Progress has been made in developing resilience assessment resources and educational materials for property owners and tenants. Implementation and outreach efforts are ongoing. Continued efforts through new revised action.
A17	Develop Design Guidelines for Green Infrastructure on Public and Private Property	**BWSC,** Environment Department, **Parks and Recreation**	In Progress	Yes with Revisions	Standards and guidance have been developed for streets through the Office of Green Infrastructure (OGI) and for parks through the Boston Park and Recreation Department's Green Stormwater Infrastructure Guide. However, citywide green stormwater infrastructure standards have not yet been established.
A18	Emergency Evacuation Route Improvements and Outreach	**OEM**	In Progress	No	Consensus has been reached on an updated evacuation route network, including simplified routes, revised signage language, and development of an evacuation PSA to support public outreach upon implementation.
A19	Emergency Notification System Upgrades for Increased Access	**OEM**	Complete	No	The City now has a contracted vendor with increased language capabilities that now meets all of the City's required languages for critical information dissemination.

2021 Boston NHMP Mitigation Actions

ID	Mitigation Action	Responsibility	Status	Include in Updated Plan?	Notes
A20	Maintain and Update the NHMP	BPDA, BWSC, Environment Department, Office of Budget Management, Office of Public Health and Preparedness, **OEM**, Parks and Recreation, Public Works	In Progress	Yes	OEM is currently leading the update of the NHMP.
A21	Physical Adaptations and Operational Changes to the MBTA Stations and Service Lines to Address Climate Impacts and Earthquake Risk	Environment Department, **MBTA**	In Progress	Yes	Green roofs have been implemented on 30 bus shelters along a corridor highly impacted by extreme heat. However, expansion of similar infrastructure remains constrained by unresolved ownership, permitting, contractual, and maintenance responsibilities within the public right of way.
A22	Building Resiliency around the Fort Point Channel Area	**BPDA**, BWSC- Stormwater Storage, Parks and Recreation- Flood Barrier	In Progress	Yes with Revisions	Project designs have advanced, and construction is anticipated to begin in 2026-2027.
A23	Continue to Pursue Boston's Admission to the NFIP Community Rating System	**BPDA, Environment Department, ISD**	In Progress	Yes with Revisions	Progress has been made through the hiring of a Floodplain Administrator and implementation of permitting changes. However, further advancement has been limited by restrictive program requirements and challenges coordinating with FEMA.
A24	Determine a Consistent Evaluation Framework for Flood Defense Prioritization	BPDA, **Environment Department**	In Progress	Yes	This action has been implemented and continues to be refined through ongoing resilience initiatives. Efforts such as the Interim Flood Protection Program, CFROD, and the Army Corps CSRM program have been incorporated and advanced the objectives of this action.
A25	Moon Island Seawall Rehabilitation to Mitigate Coastal Hazards	BFD, BPD, DND, **PFD**	In Progress	No	Contracting bid for construction released Summer 2026.
A26	Stabilize Coastal Bank Along the Eastern Side of Long Island	**BPHC,** DCR	In Progress	Yes	This action remains in progress. The City has continued to identify stabilization of the coastal bank along the eastern side of Long Island as a high-priority coastal resilience action intended to reduce erosion, protect infrastructure, and support the long-term resilience of Long Island.
A27	Update Storm Ready Certification with National Weather Service	**OEM**	Complete	No	The plan was completed in 2022 and is scheduled for renewal in May 2026.
A28	Citywide Energy Demands Assessment Update and Reduce Stress on Grid Demand During Peak Usage	BPDA, **Environment Department**	In Progress	No	Action has been adjusted into various proponents of others project within the Environment Department. This action as it stands has been superseded by other department priorities.
A29	Develop a Green Infrastructure Location Plan for Public Lands and Public Right of Way and Implement Green Infrastructure Pilot Projects	BPDA, BTD, **BWSC**, Environment Department, Parks and Recreation, Property Management, Public Works, BPS	In Progress	Yes with Revisions	The BWSC Stormwater Program was implemented in 2024. Continued progress will require ongoing coordination and planning aligned with BWSC capital improvement funding, as well as the development of a consistent pipeline of eligible projects.
A30	Feasibility Assessment of District Energy Solutions for Large Scale Developments	**BPDA**, Environment Department, BPHC	Complete	No	Boston Smart Utilities Policy was adopted in 2018 and requires developments larger than 1.5 million square feet to compile an Advanced Energy Systems Feasibility Assessment. Requirement is active and ongoing.

2021 Boston NHMP Mitigation Actions

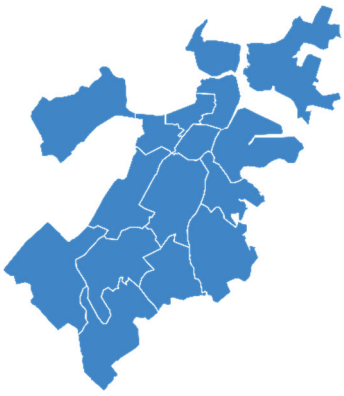
ID	Mitigation Action	Responsibility	Status	Include in Updated Plan?	Notes
A31	Implement the Findings of the Tunnel Vulnerability Assessment and Flood Mitigation Feasibility Study	**MassDOT**	Deferred	No	Not within purview of the City to complete.
A32	Introduce Hazard Mitigation and Resiliency Into Regulations and Ordinances at the Local Level and Advocate for Changes at the State Level	**BPDA**, Environment Department, Parks and Recreation	Complete	No	The City has incorporated hazard mitigation and resiliency considerations into local policies, standards, and zoning regulations, including the Smart Utilities Policy, Climate Resilient Design Standards and Guidelines for Public Rights-of-Way, Article 25A Coastal Flood Resilience Overlay District, Article 32 Groundwater Conservation Overlay District, Article 37 Green Buildings and Net Zero Carbon, and Article 80 Climate Change Review Policy. These tools require or encourage consideration of future climate conditions, coastal flooding, sea level rise, stormwater impacts, groundwater protection, and resilient infrastructure design as part of planning and development review.
A33	Public Housing Vulnerability Assessments and Adaptations	**DND** (applicant for funding) in collaboration with **BHA** (implementation)	Complete	No	BHA conducted a 2025 audit of BHA's public housing units. BHA's Climate Hazard and Risk Mitigation (CHARM) project to begin Summer 2026.
A34	Storrow Drive Reconstruction and Drainage Improvements	**DCR**, MassDOT	Deferred	No	Not within purview of the City to complete.
A35	Assess the Risk of Water-reactive Chemicals Stored in Flood-prone Buildings to Mitigate Flood Hazards	**BFD HAZMAT** and BFD LEPC	Not Started	No	Action has been determined to no longer be a priority.
A36	Build Capacity of Fire Prevention Division	**BFD**	In Progress	Yes	Boston continues to strengthen fire prevention through inspections, education, and enforcement. In 2023, BFD implemented a requirement that fire prevention program managers on construction sites complete NFPA training.
A37	Convene a Cabinet Level Climate Preparedness Taskforce	**Mayor's Office** and Departments represented within the Cabinets	Complete	No	Climate Council created in 2024 by Mayor Wu.
A38	Develop and Deploy an Environmental Sensors Strategy to Track Performance Against Climate Goals Across the City	BPDA, **Environment Department**, MONUM	In Progress	Yes	A number of flood and air quality sensors have been implemented throughout the City by OEM, DoIT and external partners.
A39	Conduct a Study on the Vulnerability of the City Solar Storm Electromagnetic Pulses (EMPs)	**OEM**	Not Started	No	Conducting research on this topic has not been a priority.
A40	Develop a Sustainable Operating Model for Green Infrastructure on Public Land and Rights of Way	**Environment Department** in consultation with Public Works	In Progress	Yes	Significant progress has been made through OGI.
A41	Engage Across the Greater Boston Region to Develop Additional Regional Climate Adaptation and Natural Hazard Resilience Measures Critical to Boston's Resilience	BPDA, **Environment Department**	Complete	No	Boston has implemented Coastal Resilience Plans for the whole shoreline, a Citywide Heat Resilience Plan (2022), and an expanded Green Infrastructure and Stormwater Program (2024). Ongoing efforts to complete this action now included throughout new actions.

2021 Boston NHMP Mitigation Actions

ID	Mitigation Action	Responsibility	Status	Include in Updated Plan?	Notes
A42	Improve Food Access and Supply Chain Resiliency	**Mayor's Office of Food Access**, OEM	In Progress	Yes with Revisions	A Food Recovery Assessment has been completed, and investments have been made in the Boston Collaborative Food Hub and cold storage support for 12 food access organizations to strengthen emergency food distribution infrastructure. Continued efforts are needed to further advance food recovery and resilience across the system.
A43	Purchase Android-based Mobile GPS Tablets for ISD Inspectors	DoIT, **ISD**	Complete	No	Completed by the Inspection Services Department.
A44	Utilize Community Advisory Boards, District and Sub-district Working Groups, and Other Structures to Build Long-term Partnerships for Climate Action and Natural Hazard Mitigation	BPDA, **Environment Department**, Parks and Recreation	Complete	No	Boston's 2030 Climate Action Plan (2026) includes engagement from community advisory boards, working groups and the public, as well as working groups from the Local Planning Team for the NHMP. All city projects required to conduct extensive engagement with various community groups. Action to be continued through other actions.
A45	Assess Back-up Energy Options at Critical Facilities	BPDA, Environment Department, **OEM**	In Progress	Yes with Revisions	Previously identified pilot opportunities in Dorchester, actively in discussions regarding AMP grant opportunity for solar and storage. Looking to undertake broader city-wide assessment in the future.
A46	Sector-wide Vulnerability Assessment of Information Technology (IT) and Communication Infrastructure	**DoIT**, OEM	Not Started	No	Action has been determined to no longer be a priority.
A47	Conduct a Comprehensive Wetlands Inventory and Develop a Wetlands Protection Action Plan	Conservation Commission, **Environment Department**	Complete	No	Boston has advanced wetlands protection through adoption of Phase I and Phase II local wetlands regulations, which established permitting procedures and expanded protections for wetland resource areas not fully covered under state law. The City is continuing this work through Phase III regulations focused on climate resilience, environmental justice, extended riverfront protections, and coastal and inland flood resilience zones.
A48	Expand Back-up Power of Private Buildings that Serve Vulnerable Populations	**BPDA**, Environment Department, OEM	In Progress	Yes	Climate Ready Boston identifies backup power at private buildings that serve vulnerable populations as an important resilience strategy, particularly for facilities such as affordable housing, care facilities, and other buildings that support residents who may be more vulnerable during extreme heat, flooding, severe storms, and power outages. Implementation of back up power is still in progress.
A49	Adapt Municipal Facilities for Climate Change and Natural Hazard Impacts	**Office of Budget Management**, Property Management with other City Departments	In Progress	No	The City has advanced municipal facility adaptation through projects such as the restoration of 26 Court Street, which converted the building to 100% electric systems and achieved an overall 70% reduction in climate emissions. This demonstrates progress toward making municipal buildings more resilient, efficient, and aligned with climate goals. Continued work will be carried out through other actions.
A50	Sector-wide Vulnerability Assessment and Capacity Building Effort for Health Care Systems	**BPHC**	In Progress	Yes	A sector wide vulnerability assessment is conducted annually to identify gaps, limitations and high-risk hazards, and to inform preparedness priorities, including training, exercises, and the development of additional mutual aid planning in areas of concentrated vulnerability. While this remains an ongoing continuous improvement effort that evolves with changing risks and sector needs, uncertainty regarding future HPP funding presents a potential barrier to sustaining the annual assessment process.
A51	Identify, Support, and Promote Programs, Policies, or Other Actions for Institutions and Businesses to Reduce Their Vulnerability to Climate Change and Natural Hazards	DND, Department of Economic Development, Environment Department, **Small Business Development**	Complete	No	This action is completed as a planning/resource development action and ongoing in implementation. The City has developed and promoted resources to help businesses and institutions reduce their vulnerability to climate change and natural hazards, including the Business Continuity Toolkit, small business technical assistance, Main Streets support, Climate Ready Boston resilience planning, and development review requirements such as Article 37 and the Climate Resiliency Checklist.

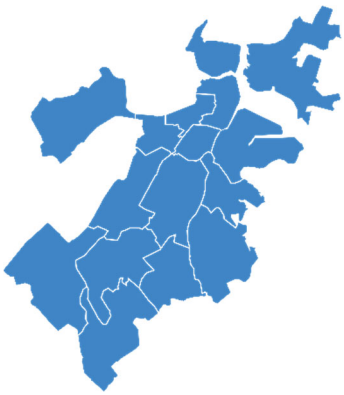
2021 Boston NHMP Mitigation Actions

ID	Mitigation Action	Responsibility	Status	Include in Updated Plan?	Notes
A52	Identify Resilience Focused Workforce Development Pathways	**Office of Workforce Development, Mayor's Office of Economic Development**, Environment Department	Complete	No	This action is completed as a planning action and ongoing in implementation. In 2026, the City released the Climate Ready Workforce Action Plan, which identifies workforce needs and career pathways tied to Boston's climate and resilience goals. The plan provides a framework for connecting residents to training, career pipelines, and high-quality jobs in climate-related fields, including resilience and nature-based solutions.
A53	Improve Resiliency of Boston Police Department Facilities	**BPD**	Complete	No	Boston opened a new sustainable and resilient East Boston Police Station in 2023. Ongoing efforts to continue improvements will be made through other continuing actions.
A54	Evaluate Feasibility of Mobilizing Passenger Ferries for Evacuation	**OEM**	Canceled	No	Project was found to not be feasible, no movement was made.
A55	Evaluate and Advocate for Reforms in the National Flood Insurance Program (NFIP)	Multiple agencies	In Progress	Yes	Continued through new actions.
A56	Establish an Infrastructure Coordination Committee	**Mayor's Office**	Complete	No	Completed as a part of the Climate Council established in 2024. Infrastructure coordination also completed through the Office of Climate Resilience primarily with other department. Boston's internal Cross Agency Climate Resilience group also focuses on information sharing and department coordination during the groups monthly meetings.
A57	Advocate for State Building Code Amendments to Promote Climate Readiness	BPDA, Environment Department, **ISD**	Canceled	No	This action is not recommended for inclusion in the updated plan. While climate-ready building standards remain important, ISD's role is primarily to enforce the state building code rather than advocate for state-level building code amendments. This action is was recommended by City leaders to be removed from the updated mitigation strategy. Future efforts should instead focus on local tools within the City's control, such as zoning code changes, development review requirements, and climate resilience standards that promote climate-ready buildings and sites.



APPENDIX H:

City Council Adoption Certificate



APPENDIX I:

FEMA Adoption Certificate