

Flood Vulnerability Assessment for Environmental Justice Communities

Massachusetts
Water Resources
Commission

April 11, 2024

Our Team



Project Lead: Vandana Rao, Director of Water Policy and Executive Director, Water Resources Commission
Crystal Johnson, Assistant Secretary of Environmental Justice
Project Co-Manager: Caitlin Spence, Assistant Climate Scientist



Project Co-Manager: Nadia Madden, Floodplain Specialist
Anne Carroll, Director of Office of Water Resources
Joy Duperault, Director of Flood Hazard Management Program
Viki Zoltay, State Hydrologist

"The people shall have the right to clean air and water, freedom from excessive and unnecessary noise, and the natural, scenic, historic, and aesthetic qualities of their environment; and the protection of the people in their right to the conservation, development and utilization of the agricultural, mineral, forest, water, air and other natural resources is hereby declared to be a public purpose."

-Constitution of the Commonwealth of Massachusetts, Article 97

Inequity in Floodplain Management

- ▶ History of red-lining
- ▶ Lack of inclusion in planning
- ▶ Proximity to hazards
- ▶ Reduced capacity for recovery
- ▶ Evictions and displacement

E&E NEWS
ENVIRONMENT

Flooding Disproportionately Harms Black Neighborhoods

The impacts of floods can exacerbate existing racial and social inequality

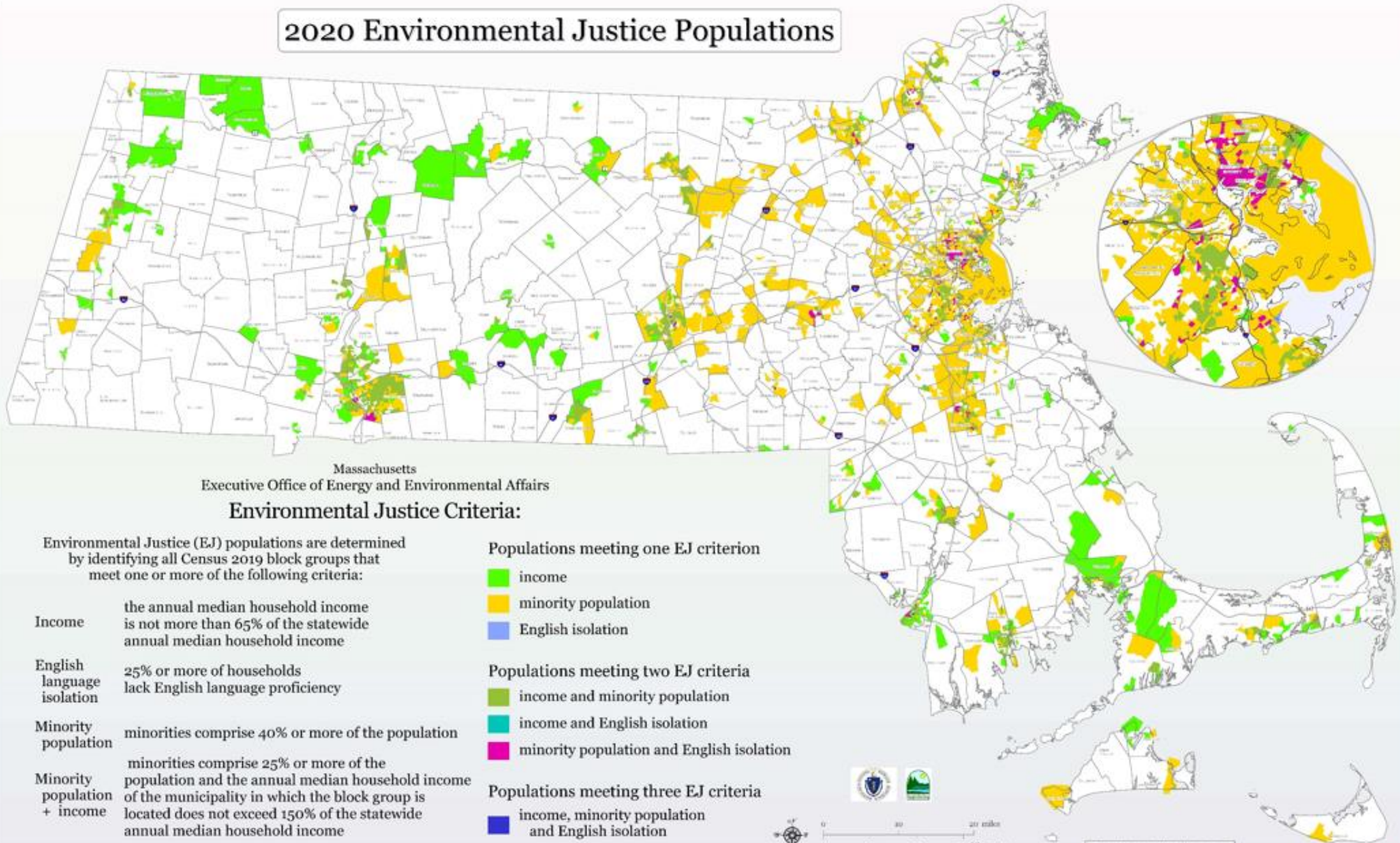
By Thomas Frank, E&E News on June 2, 2020

Palazzolo Simmons, 49, looks out over his home neighborhood for the first time since Hurricane Katrina in the mostly poor and black Lower Ninth Ward section of New Orleans on October 2, 2005. While New Orleanians in more upscale neighborhoods were being urged to return home, their counterparts from the poorest areas hardest hit by Hurricane Katrina were forced to sneak past police checkpoints to see for the first time the remnants of their life. Credit: Robyn Beck *Getty Images*

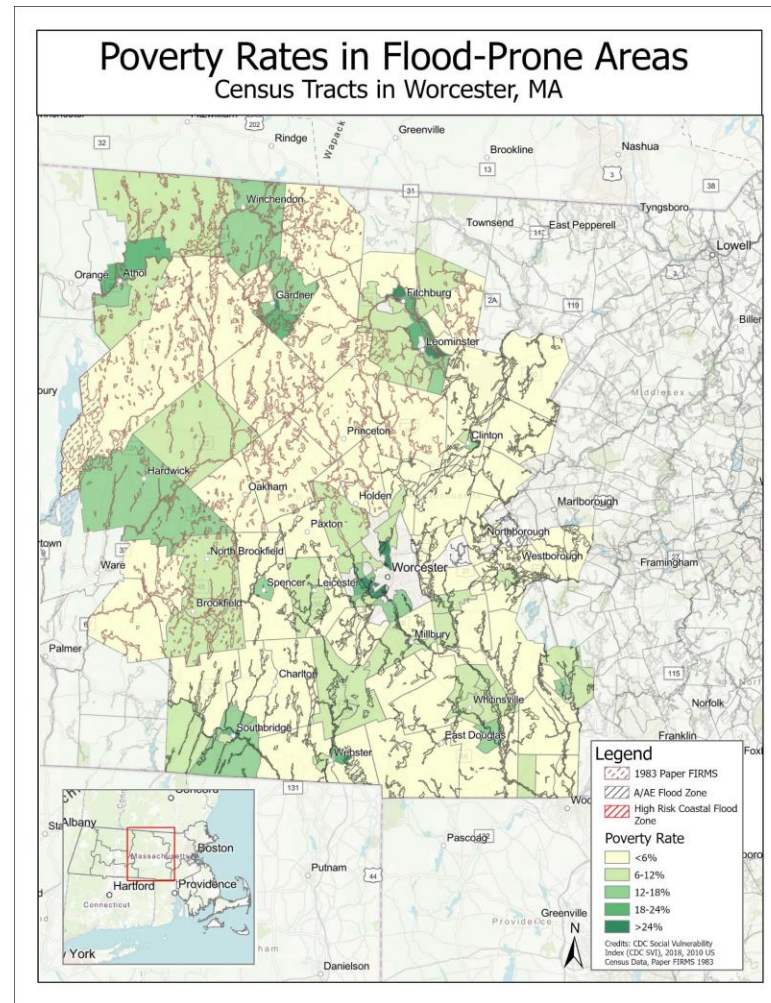
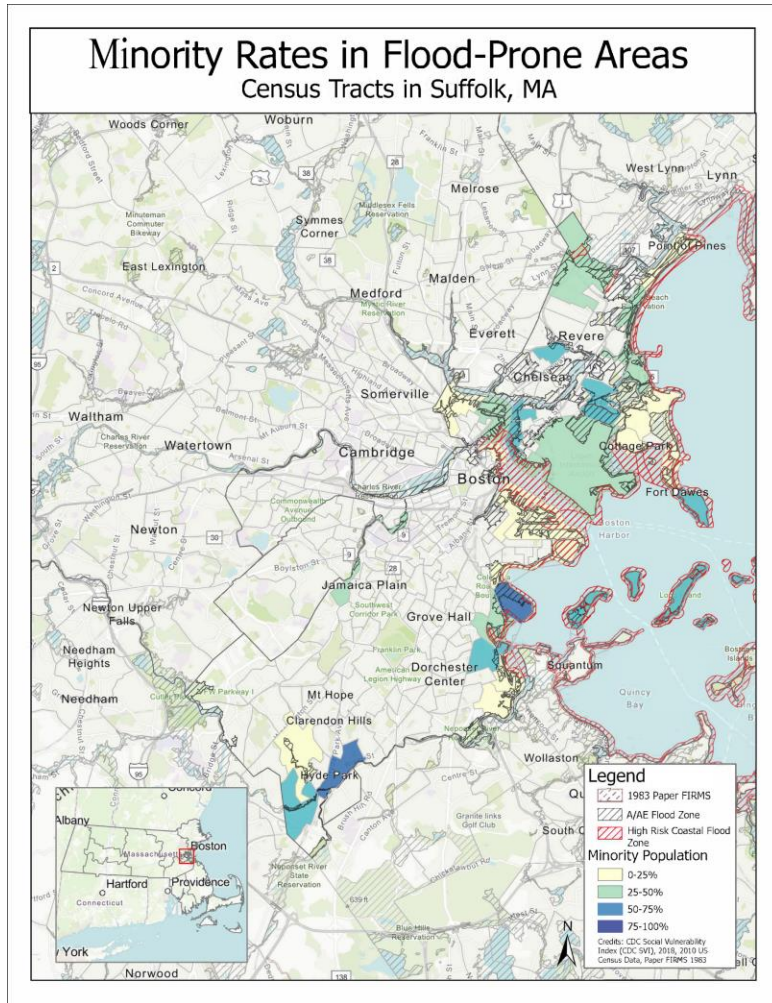


When Hurricane Harvey devastated Texas in 2017, the neighborhood that suffered the worst flood damage was a section of southwest Houston where 49% of the residents are nonwhite.

2020 Environmental Justice Populations



MA flood zones coincide with EJ neighborhoods



No flood zone? No guarantee

- ▶ In March 2010, 18 inches of rain affected eastern Massachusetts and southern New England. **96%** of Greater Boston flood damage claims were outside FEMA 1% flood areas.
- ▶ Massachusetts continues to see severe flood damage outside FEMA zones.



MassLive, September 2023: Erosion caused by flooding at culverted Reservoir Brook in Leominster September 11th & 12th, 2023 in Minority & Low-Income EJ block group.. As much as 11" of rain fell in Leominster during the event. No flood zone is mapped around Reservoir Brook.



WBUR, July 2023: Flooding at Natural Roots Farm, Conway MA. The farm is adjacent to South River; Natural Roots' fields overlap with 100-year flood zone delineated in 1976.



Boston.Com, June 2020: "Cars are partially submerged in a parking lot near emergency entrance at Norwood Hospital." As much as 5.75" of rain fell in Norwood on June 28th, 2020. Norwood Hospital serves surrounding Minority, Low-Income, and Language-Isolated EJ communities. The area is not in a FEMA flood zone.

ResilientMass: 2022 Climate Assessment



Identified precipitation-driven flooding as the most significant climate hazard in Massachusetts



Low-income and linguistically isolated populations are 24% and 39% more likely to live in areas with the highest projected precipitation-driven flood damage



Massachusetts is planning for sea level rise by up to 2.5 feet by 2050 compared to 2008 if global emissions are not significantly reduced



Minority and low-income populations combined are 244% more likely to live in coastal areas with the highest projected disruptions in emergency responses and evacuations due to flooding

ResilientMass Plan Actions

High

Address impacts of flooding to infrastructure, natural resources and groundwater through better understanding of climate change drivers

Executive Office: **EOEEA**

Lead Agencies: **EEA** **DCR-OWR**



Category

Assessment, research, and mapping



Status

In Development



Completion

3-5 years



Main components of this action include: (1) Address Flood Vulnerability and (2) Enhance Understanding of Groundwater Flooding. Part (1) includes developing flood map overlays to show increased flood vulnerabilities across the Commonwealth and in particular where these intersect with EJ populations and identifying areas of repeated flooding across the state, overlaying with EJ data, overlaying with potential causes (e.g., geology, land use/IS) and overlaying with potential mitigation options such as upland recharge areas, improved stormwater infrastructure, and removing impervious surfaces or similar. Advance implementation through pilot projects in prioritized areas. Part (2) includes continuing study of groundwater flooding, refining statewide groundwater model, applying output from EEA's Climate and Hydrologic Risk Project, and conducting recharge modeling to run new climate change scenarios and add sea level rise inputs for coastal areas.

2018 Action or New?: 2018 - revised

Scale: Statewide

2023 SHMCAP Goals



Science-based and Informed Decision-Making

Project Team

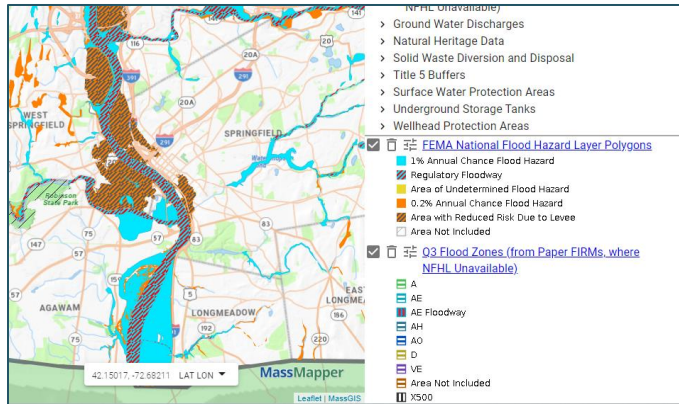


- ▶ Update and expand existing flood vulnerability assessments of the Commonwealth and in particular Environmental Justice (EJ) populations across the Commonwealth.
- ▶ How to identify and address flood vulnerability in EJ communities?
 - **Gather Data:** What mapping is already out there?
 - **Engage:** What do communities know about flood vulnerability?
 - **Map:** Where do flood-prone areas overlap environmental justice communities?
 - **Pilot:** Ground-truth flood-prone areas, identify causes, and assess and prepare to implement mitigation activities in partnership with municipal/EJ community groups.
- ▶ **Timeline:** January 2024 – June 2024 (FY24), July 2024– June 2025(FY25)

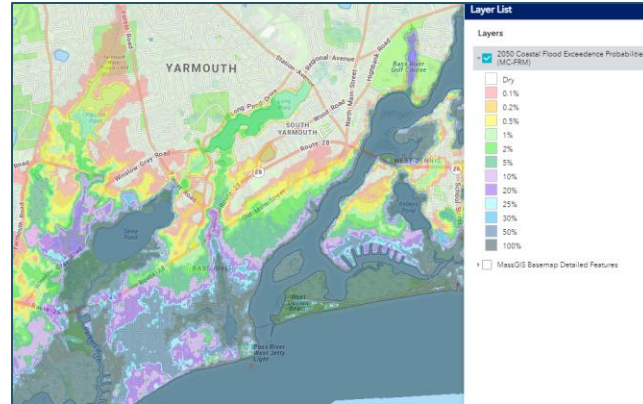
Project Objectives

Compile → Share (Flood Viewer)

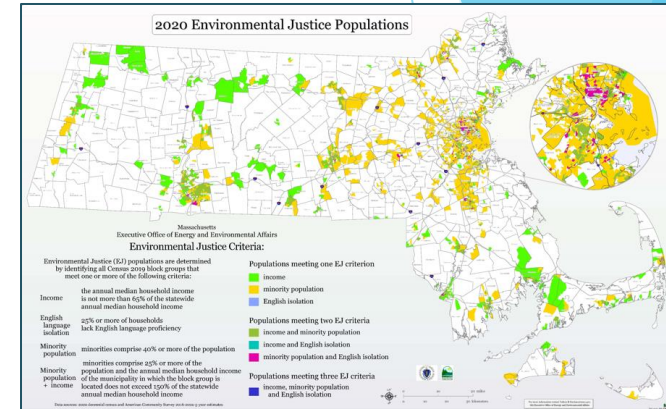
FEMA NFHL & Q3 Maps



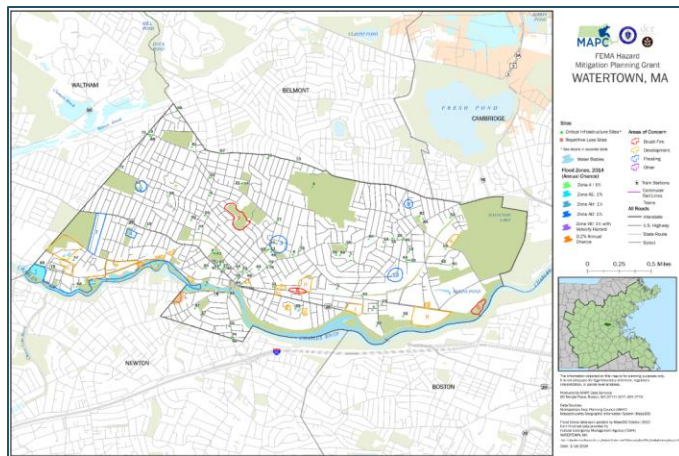
Massachusetts Coast Flood Risk Model



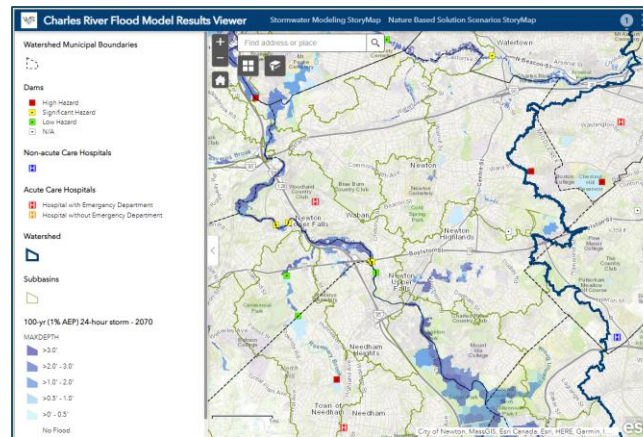
EJ & Population Vulnerability



Hazard Mitigation Plan Flood Areas



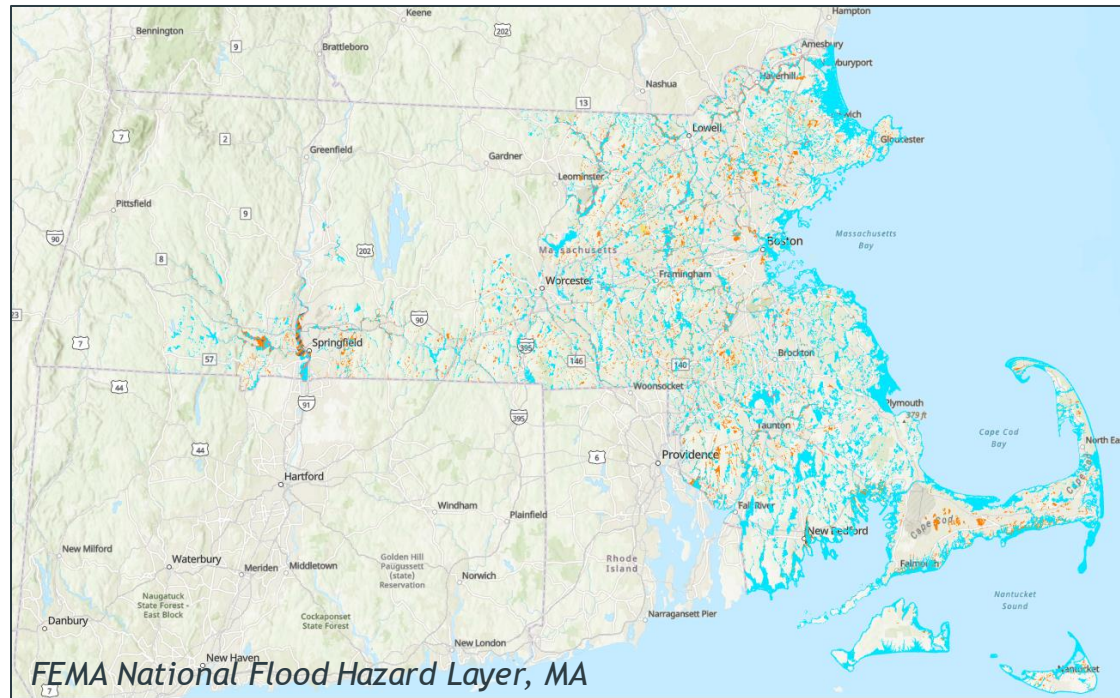
Local Flood Studies



Lived Experience



Data Gaps Identified

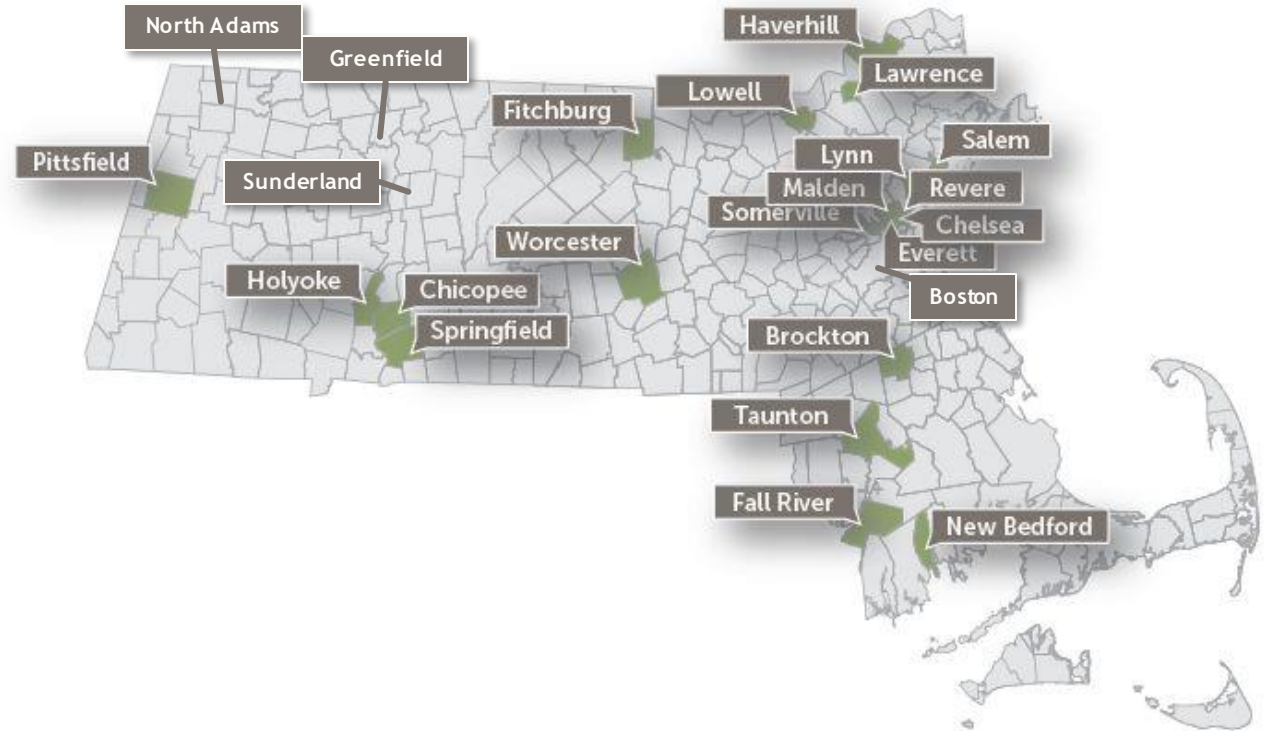


- ▶ Central and Western MA: Gaps in FEMA web maps
- ▶ Flooding caused by malfunctioning stormwater infrastructure
- ▶ Pluvial flooding away from rivers and streams
- ▶ Climate change and riverine, pluvial flooding

Listening and learning (2024)

Learn what we don't know by talking to EJ community organizations and municipal officials:

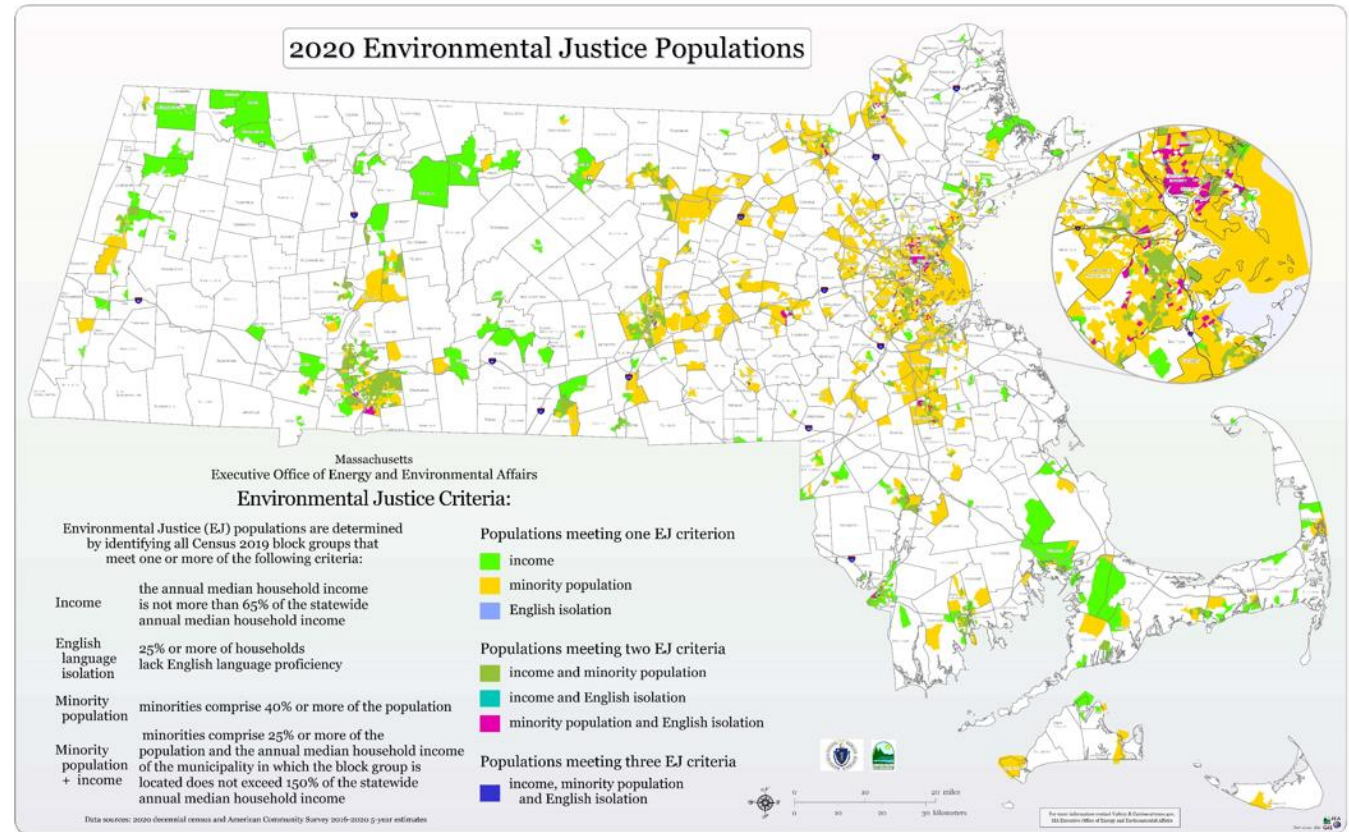
- ▶ Pilot Surveys and Conversations
 - ▶ Where does it flood?
 - ▶ Who does flooding impact, and how?
 - ▶ What would help?
- ▶ FY24: Start with 26 Gateway cities along with North Adams, Greenfield, Sunderland, and Boston.



Listening and learning (2025)

Learn what we don't know by talking to EJ community organizations and municipal officials:

- ▶ In FY25 we will extend surveys to all 187 municipalities with EJ populations
- ▶ Reflect and integrate what we learn into state data gathering, planning, and sharing processes.
- ▶ Update map overlays



- ▶ Work with EJ community organizations and local officials to jointly understand and identify solutions to flooding issues (4-5 communities).
- ▶ Set up communities for success in obtaining funding to move forward on flood mitigation solutions.

Pilot Partnerships (2025)

- ▶ Vandana Rao, Project Lead: vandana.rao@mass.gov
- ▶ Nadia Madden, Project Co-Manager: nadia.madden@mass.gov
- ▶ Caitlin Spence, Project Co-Manager: caitlin.spence@mass.gov

Contact

Groundwater Flooding Survey



<http://tinyurl.com/masswetbasement>

Additional Slides