FLOODING IN MASSACHUSETTTS

Authority, Programs, Coordination & Planning

Part I

Presentation to the Water Resources Commission

June 12, 2025

Legislative Beginnings

The Problem in Massachusetts:
Water out of control…..Disastrous floods…polluted streams…acute shortage in summer…wildlife dying…industry suffering…people confused and at a loss what to do.

Legislators met from January to May 1956 to discuss the above and find a pathway to cooperative and coordinated action.

On August 8, 1956 a bill was signed into law by Governor Herter establishing the Water Resources Commission and its responsibilities.

Living Waters, 1956
The story of the creation of the Massachusetts Water Resources Commission which will direct the Water Resources Division

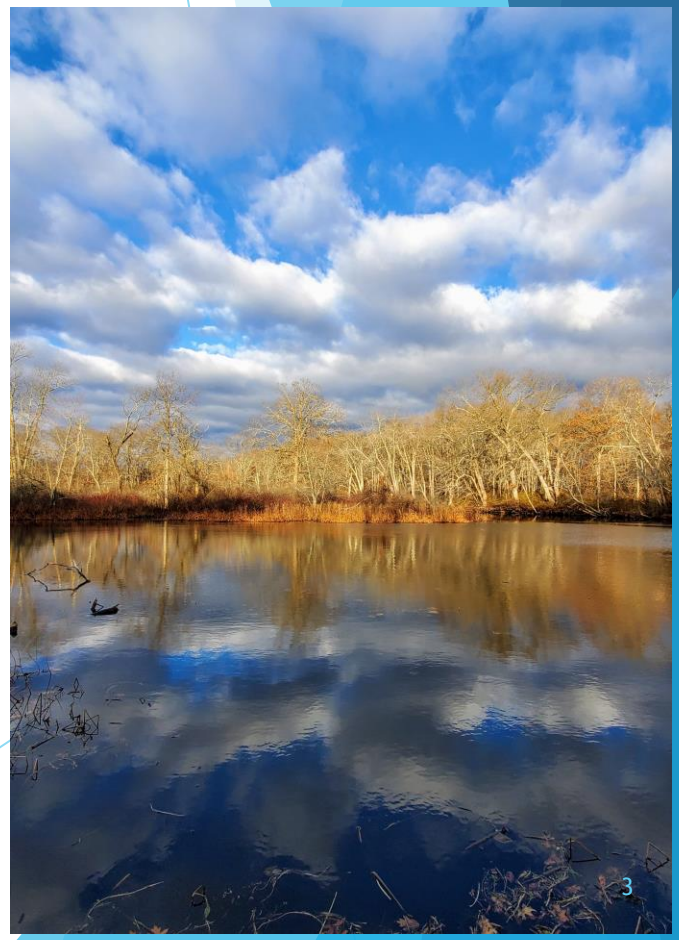
Role of the MA Water Resources Commission (WRC)

Established in **1956** (Chap. 620) by the Massachusetts Legislature

"WRC shall be the agent of the commonwealth in coordinating all activities of federal, state and other agencies in the conservation, development, utilization and disposal of water for the purpose of preventing loss of life and damage to property by erosion, floodwater and sediment in the watersheds of the commonwealth, and to obtain necessary financial assistance from the federal government, necessary for the immediate preservation of the public safety and convenience."

"WRC shall meet and consult on matters concerning watersheds, water systems, storage basins, underground and surface supplies and shall study needs, supplies and resources with respect to water conservation and flood prevention…and shall make recommendations for legislation designed to provide the Commonwealth with a water policy based upon the common and interdependent interests of agriculture, industry, recreation, wildlife, conservation, domestic consumption and flood prevention. It shall act as a coordinating agency between all departments of the Commonwealth and shall cooperate with the agencies of the federal governments and all other states in carrying out water conservation and flood prevention programs."

"The commission may establish rules and regulation as may be necessary for proper administration of (above)……'



Additional WRC Authority

Section 18 of Chapter 589 of the Acts of 1983

- Develop **water resources management policy** framework within which the water resource policies, plans and management programs of the several agencies and departments under the secretary shall function
- **Coordinate** water resources planning and management functions among the environmental agencies
- **Review** and comment on all **policies** brought before the WRC
- Annual **review** and comment on water resources management **programs** of environmental agencies
- Establish criteria and priorities for **cooperative programs** with federal or state govt, executive office, department, or division
- Develop and periodically update comprehensive **water resources management plans** for river basins
- Develop **water allocation criteria**
- Develop a **management information system** and data processing capability for water resources information
- Develop an **education program** with emphasis on long term water resources and wastewater planning and management

Responsibilities in various state statutes/regulations

- Update the Massachusetts **water policy statement** at least once every five years
- Submit annual **budget** estimates of funds needed to fulfill the above duties
- File an **annual report** (see MGL, c. 30, ss. 32 and33)
- Responsible for reviewing and approving or denying all increases in **interbasin transfer** (see Chapter 658, Acts of 1983 codified as MGL, c. 21, s8b-8d).
- Approve **water needs forecasts** for communities and water districts
- Approve state **Water Conservation Standards**

The commission may establish rules and regulations as may be necessary for the proper administration of the above.

WRC Authority on Floods: Flood Management – Public Law 566

(Watershed Protection and Flood Prevention Act)

Purpose: This program was established to prevent loss of lives and to reduce damage caused by floods

- Legislation in the 1950s and 60s authorized the WRC to cooperate with federal government to plan, take lands and implement flood control improvement projects in certain watersheds; only local organizations can request
- 32 facilities were constructed by USDA to provide for flood storage and control - 7 municipal lands, 25 WRC on state lands now managed as State Park lands (5020 acres total)
- These projects are multi-purpose; also provide for passive recreation, wildlife habitat, open space preservation and reservoirs for public water supply
- On WRC properties, parcels were taken in fee and in easement. All the deeds with easements call out the easement purpose which is the right to flood the land at any time. Easements are carried forward into each property conveyance into perpetuity as written in the original easement taking instruments
- Through the 1960s, 70s and 80s, the Commission cooperated with the federal government, other agencies and local sponsors to plan, review feasibility, approve projects, deny projects, approve acquisition of lands, secure financial assistance from the federal government, approve and review design and construction of multipurpose flood prevention facilities and to ensure ongoing operations and maintenance
- Today: Administration of Program by DCR Engineering, i.e. Operation, Maintenance and Repair of WRC projects on state lands, and oversight of WRC projects on municipal properties
- Any new facilities will need WRC process and approval

Leicester-Spencer Moose Hill Reservoir Flood Prevention Facility

Washington – School House Lake (L), October Mountain Lake(R), Washington Mountain Brook

WRC Authority on Floods: Flood Hazard Management Program (FHMP)

Executive Order 149 (1978) - Designates the Commission as the state coordinating agency to implement the National Flood Insurance Program (NFIP) and implement flood plain management criteria for state-owned properties in special hazard areas.

Responsibilities

- Acting as liaison between FEMA and Mass communities
- Offering technical support to NFIP communities
- Monitoring floodplain development in general
- Coordinating with FEMA on map updates and CRS activities
- Reviewing critical state agency floodplain projects through MEPA
- Coordinating with MEMA on hazard mitigation grants and planning efforts
- Coordinating with other state and federal agencies re: floodplain development issues, e.g., BCAB testimonies & FFRMS technical assistance
- Offering training on NFIP regulations, FEMA flood maps, and general good principles of floodplain management
- Assisting general callers with NFIP questions and concerns
- Coordinating with MEMA and FEMA during flood events

Programs & Projects

- Statewide Floodplain Management Framework — inter- agency coordination
- Environmental Justice Populations & Flooding in MA — discovering where these populations are being impacted
- Higher Standards in State Building Code and Local Bylaws — recommendations to BBRS for 11th edition & guide for local governments
- Strong coordination with MEMA for planning (RMAT, ResilientMass) and grants
- First FHMP Strategic Plan completed— 3-year goals and strategies
- FY25 Training & Communications Plans—improved outreach

FHMP - Community Assistance

Answered homeowner questions about elevation certificates and their increasing flood insurance rate.

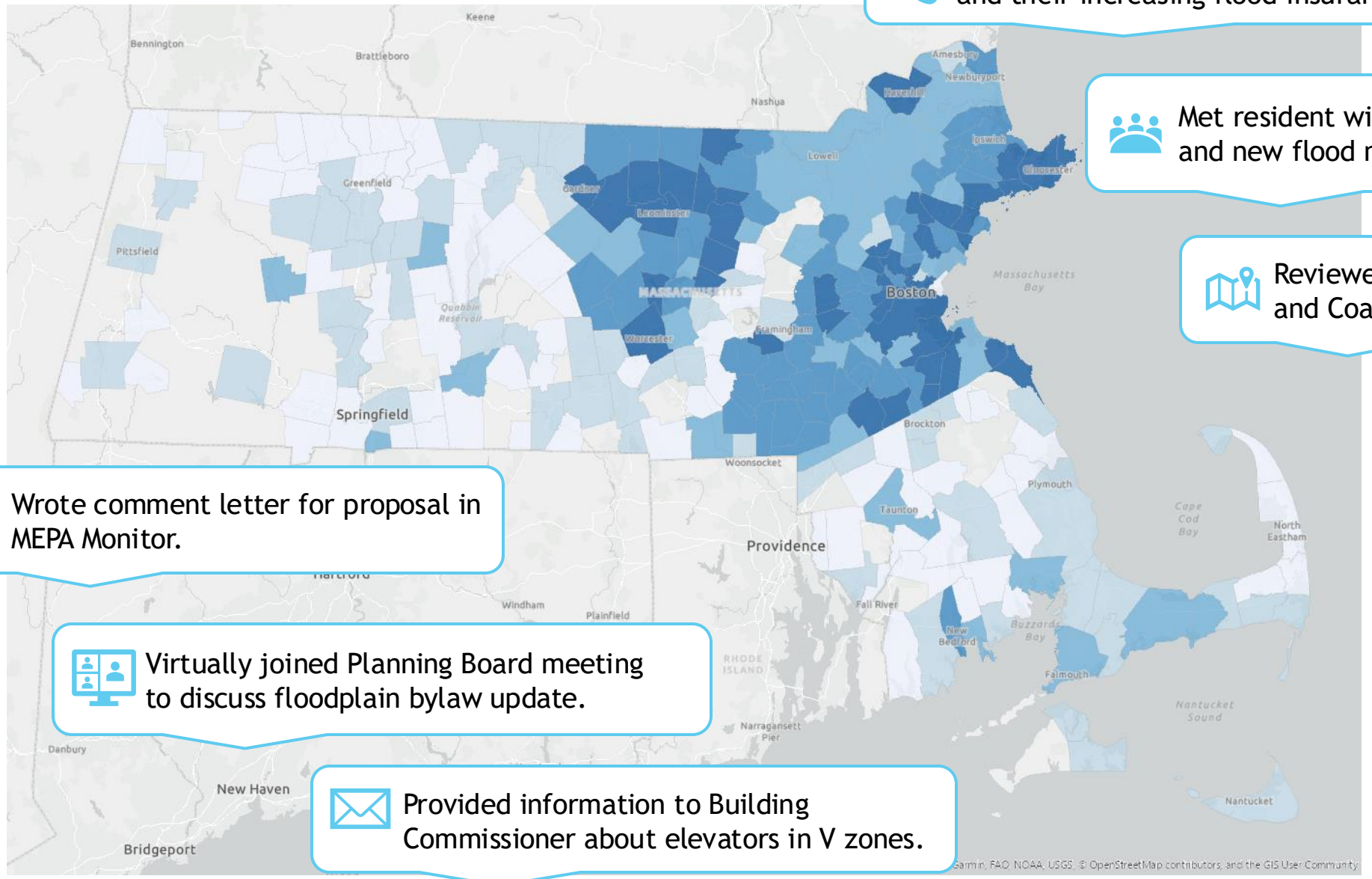
Met resident with questions about flooding and new flood maps at FEMA Open House

Reviewed how to ID LiMWA and Coastal A zone with consultant

Wrote comment letter for proposal in MEPA Monitor.

Virtually joined Planning Board meeting to discuss floodplain bylaw update.

Provided information to Building Commissioner about elevators in V zones.



FHMP - Training Plan

Join our FEMA flood map training!
Weds 8/20 12-1:30pm

- Support Beginners
- Promote Learning
- Recognize Excellence

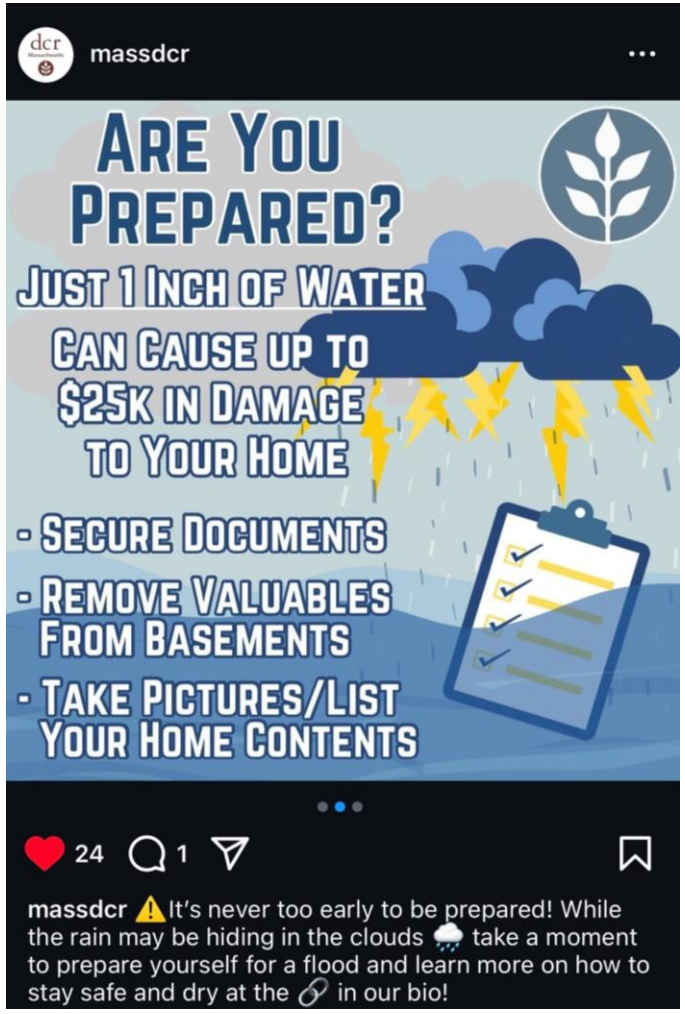
FHMP - Outreach and Communication

Email Campaigns

Myth: Flooding only happens in coastal areas.
Fact: Flooding can happen anywhere it can rain. Inland flooding can occur from heavy rainfall, ice jams, or a burst water main. Every home has some flood risk.
What can I do? Learn more about the flood risk for your home https://www.floodsmart.gov/flood-risk.

Courtesy of your
Flood Hazard Management Program
MA Dept. of Conservation & Recreation

Social Media



Public Transit Ads

So What do we know about Floods? And are we Prepared?

- Data & Resources
- Interagency Coordination
- Planning and Flood Impact Minimization
- Flood Response and Recovery

Data & Resources: Climate and Hydrologic Risk

- **Goal:** Create actionable projections of future climate relevant to water resources management and other applications.

Temperature & Precipitation Projections

- CMIP6
- Modeled at 6-km grid
- Available at 27 MA major drainage basins, towns & 6-km grid
- **Expected completion: June 2025**

Streamflow Projections

- Peak and low-flow statistics
- Modeled at 90 gaged locations
- Available across the state via regression, i.e., StreamStats
- **Expected Completion: June 2026**

TEMPERATURE

Minimum, average & maximum
Number of days over 90F, 95F & 100F
Number of days under 32F & 0F
Number of cold & heat wave events
Number of heat & cold stress events
Heating & cooling degree days
Growing degree days
Heat Index
Dew Point (0.4%, 1%, 2%)
Minimum & maximum heat index
Minimum & maximum dew point
Maximum Dew Point
Heating dry bulb (99% & 99.6%)
Cooling dry bulb (0.4%, 1%, 2%)
Mean coincident wet bulb (0.4%, 1%, 2%)
Date of first & last frost
Number of freeze/thaw events
Average heat & cold wave duration
Annual maximum heat & minimum cold wave duration

PRECIPITATION

Total
Maximum 24-hour
90th & 99th percentile 24-hour
Number of days with more than 1", 2", & 4"
Proportion of precipitation as rain vs. snow

Annual Return Periods:

2-, 5-, 10-, 20-, 50-, 100-, 200-, and 500-year
24-hour & 48-hour
1000-year 24- & 48-hour

Average number of consecutive:

Wet days
Dry days

STREAMFLOW

Low-flow:
7q10
7q2

High-flow:
Peak discharge for 2-, 5-, 10-, 25-, 50-, 100-, and 500-year return periods

Data & Resources: Groundwater Flooding

- **Goal:** Estimate current and future statewide groundwater levels to determine potential impacts of increasing levels due to increase in precipitation and sea level rise.
- **Impacts:** roadways, subsurface utilities, basements, foundations, septic system, mobilization of contamination, drowning of crops, drowning of trees (ghost forests), wetland growth

Completed

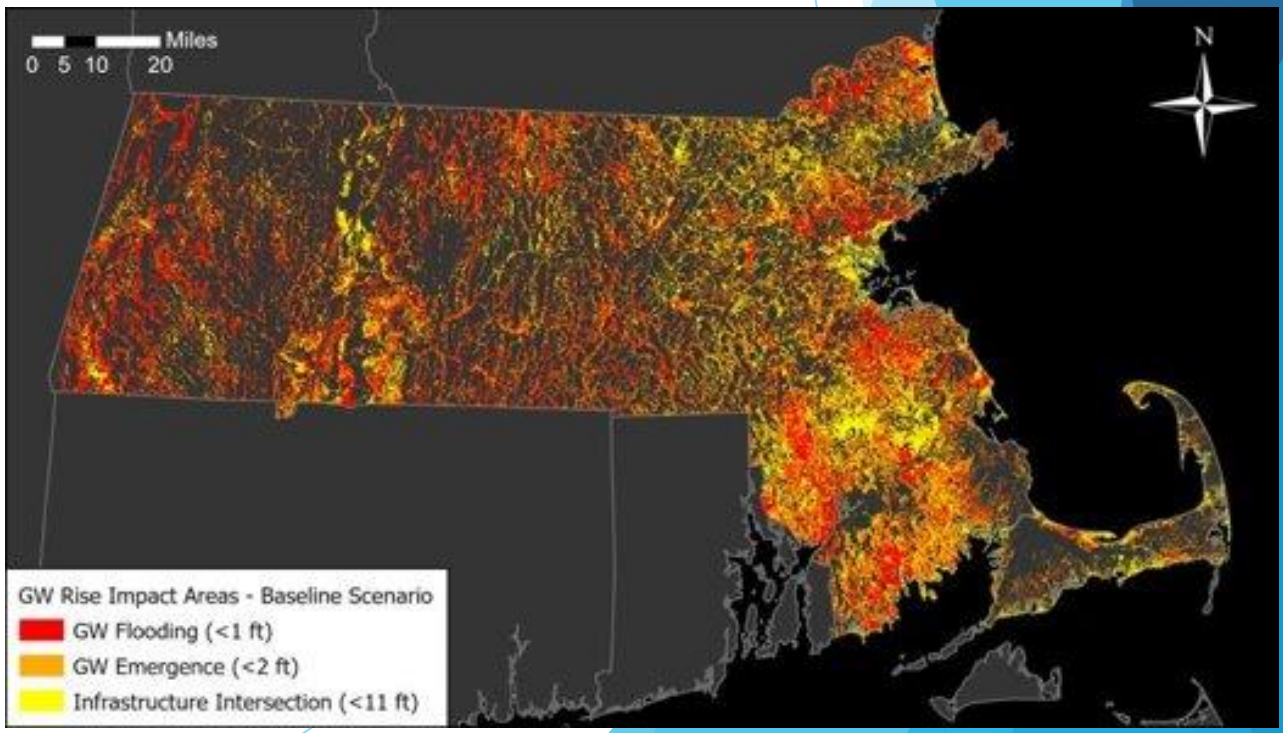
- Statewide groundwater model
- Reviews by Technical Advisory Group (TAG)

Summer 2025

- Release of impact assessment products and report

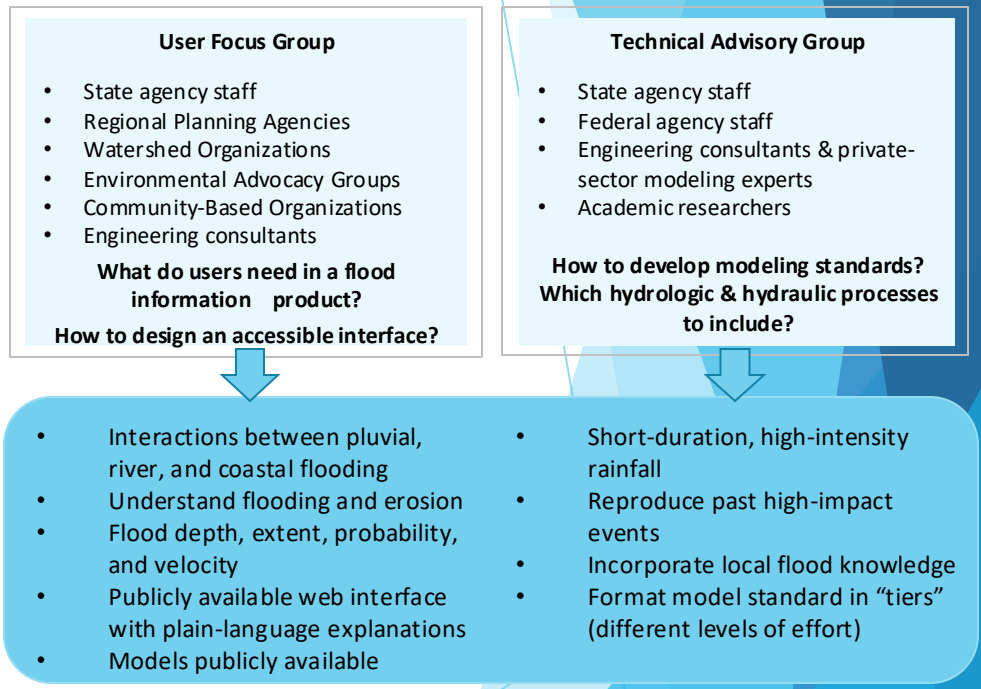
Future

- Refine methods based on TAG comments



Data & Resources: Flood Modeling & Visualization

- **Goal: Produce inland* future-looking flood maps and data products**
- Phase 1 | **COMPLETE**
  - Convene flood modelling expert advisory group and flood data user advisory groups
  - Develop draft technical specifications for riverine and pluvial flood modelling
  - Begin web map interface design
- Phase 2 | **IN PROGRESS**
  - Pilot modelling technical specifications in 4-8 watersheds
  - Refine modelling technical specifications as needed
- Phase 3 | **UPCOMING ~March 2026**
  - Conduct flood modelling in additional regions as feasible within budget
  - Lauch flood data/mapping web tool



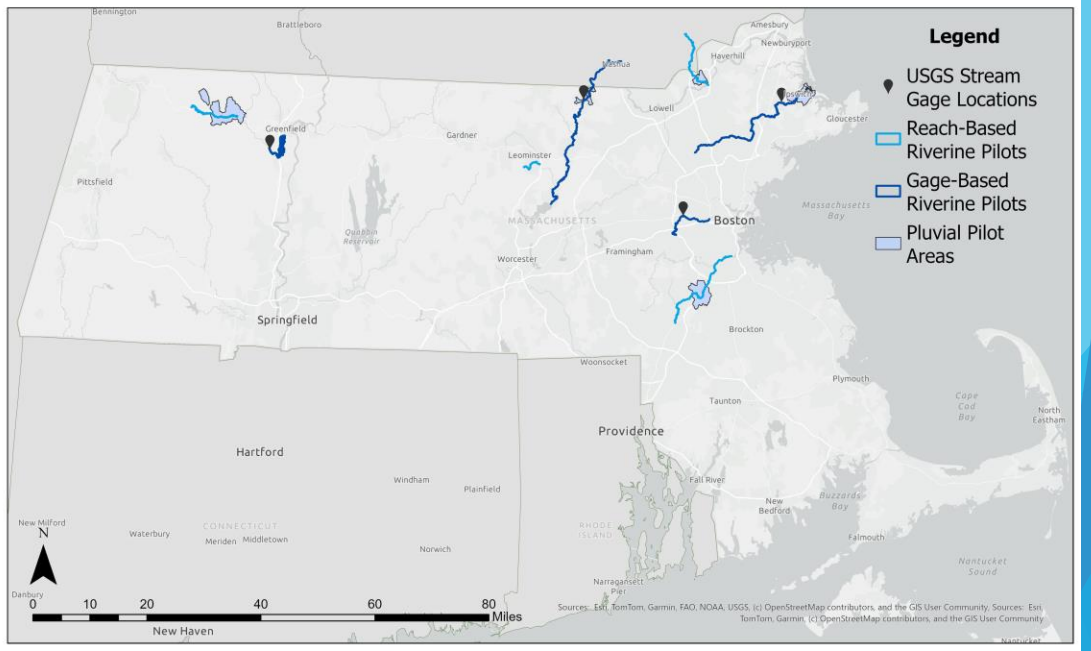
*"Inland" refers to riverine and pluvial (or stormwater) flooding, inclusive of riverine and stormwater flooding in coastal regions.

Data & Resources: Flood Modeling & Visualization

Draft Modelling Standard "Tiers"

Tier	1	2	3
Effort	Lowest	Medium	High
Data requirements	Publicly available statewide datasets	Some analysis of publicly available data needed	Some manual data creation needed
Process detail	Simplest	Moderate	Highest
Products	Estimated flood extents, depths, and elevations	Estimated flood extents, depths, and elevations	Estimated flood extents, depths, and elevations
Scenarios	Highest-priority flood scenarios only	Large number of diverse flood scenarios	Highest number of thoroughly sampled flood scenarios

Example Riverine & Pluvial Pilot Selection



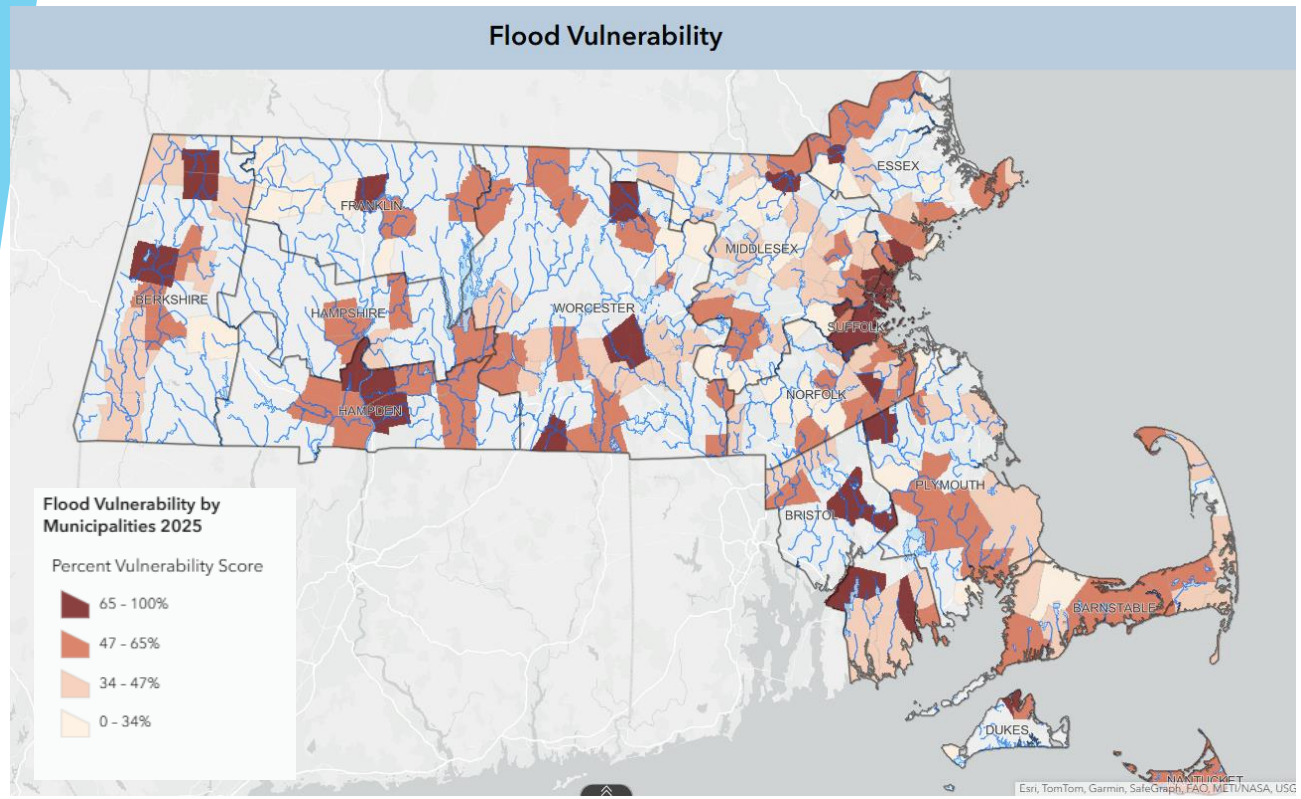
Where we're going

- Implement pilots and analyze performance in each setting, each modelling tier
- Identify strengths, efficiencies, and pitfalls | Develop implementation guidance
- Create user profiles and web tool alternative designs, mockups

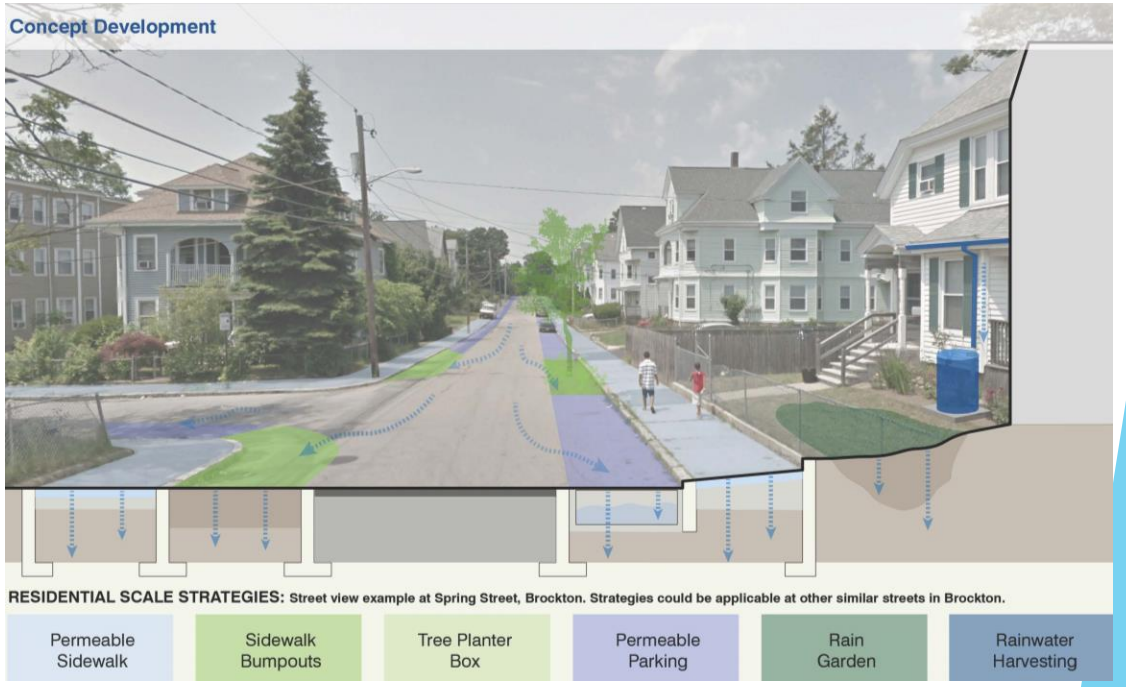
Data & Resources: MA Flood Vulnerability Assessment

Identifying Impacts to EJ Communities

Brockton Roadmap



Rather than focusing on a single event, **residents described chronic flooding** that affects basements, roads, and access to key community resources like schools and colleges. These insights shaped the roadmap's priorities and strategies, ensuring that the solutions proposed are grounded in local knowledge and community needs.



> **"Personal surprise of having to deal with flooding and didn't anticipate it.** My Aunt lives in Brockton - on Carver Street. When she bought her home, she lived in flood zone, so she had to get flood insurance, so she expected it. That was not my experience; no one said anything about flooding. My basement is not finished but it has potential to be a bedroom or another space."

MAPC Metropolitan Area Planning Council | Weston & Sampson

Interagency Coordination

- FEMA request, 2019: Assessment of Floodplain Management Regulations for State-Owned Properties
  - Flood-related work is siloed and not always coordinated
  - limited flow of information
- Statewide Floodplain Regulatory and Coordination Framework – a ResilientMass Action
- Climate Chief Hoffer's recommendation on inland flooding:

"As identified in the 2023 ResilientMass Plan, EEA should develop both a Floodplain Management Coordination Framework and a Floodplain Management Plan…

"A flood management plan should outline priority actions that can be taken statewide in the near term to address and mitigate floods and their impacts…"

Acts of 1956 (Ch.620) and EO 149 – WRC designated as the state coordinating agency

Are we doing enough?

How can we be more effective?