

# *Water, Water Everywhere:* Insights and Policy Prescriptions for Stormwater Flooding



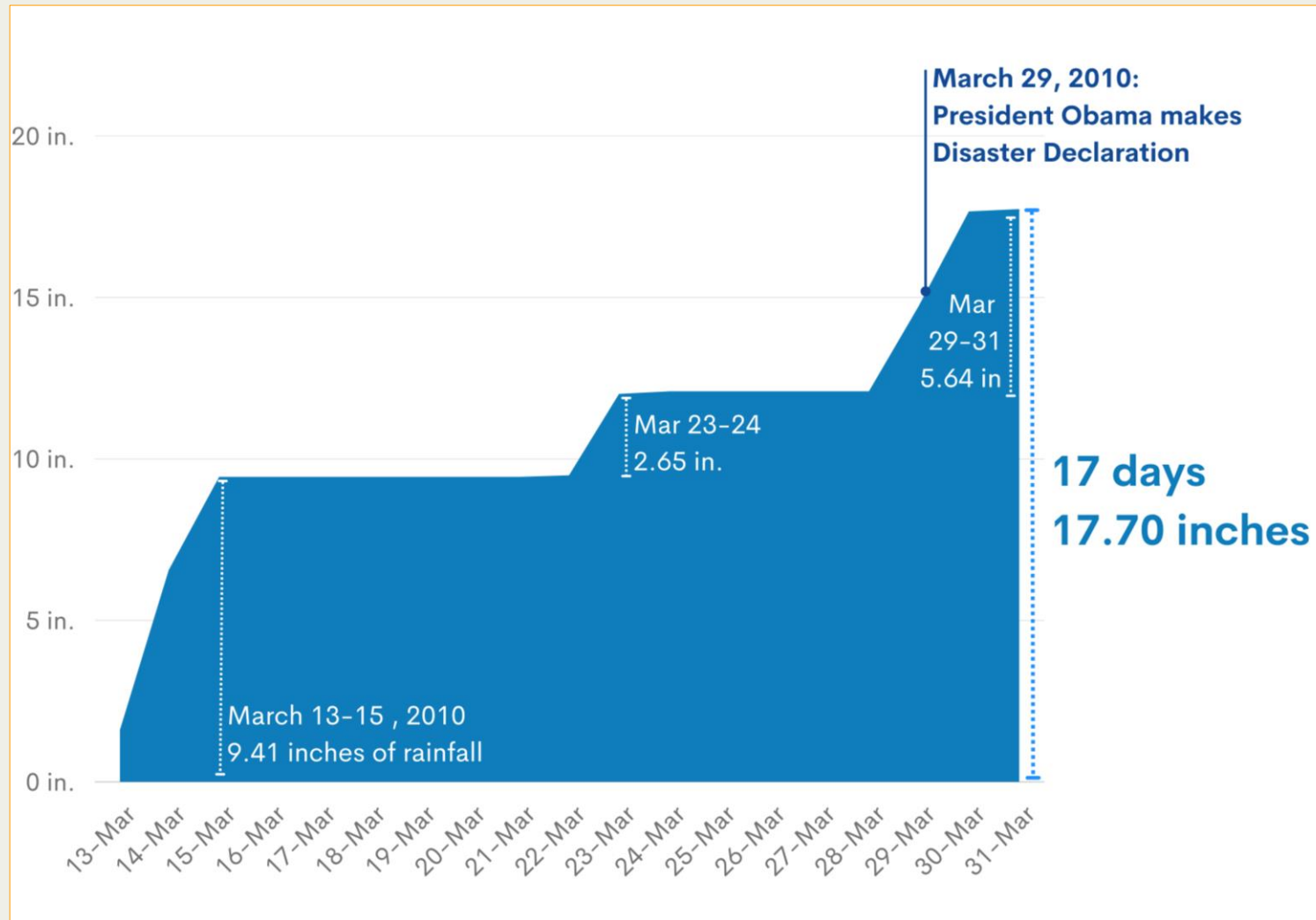
*Braintree, MA March 2010*

May 3, 2023

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Rachel Bowers, Regional Planning Data Analyst

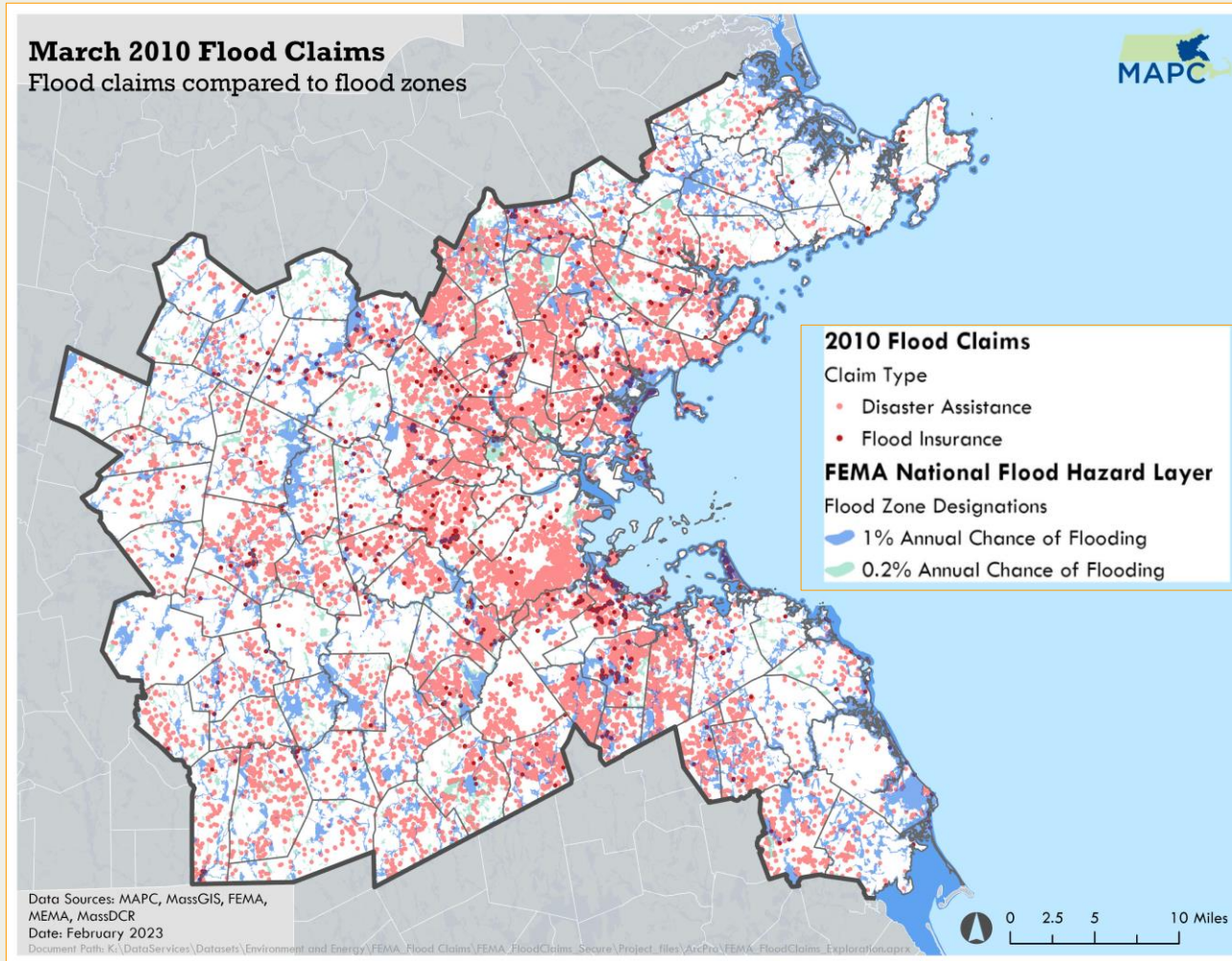


# March 2010 Rainfall



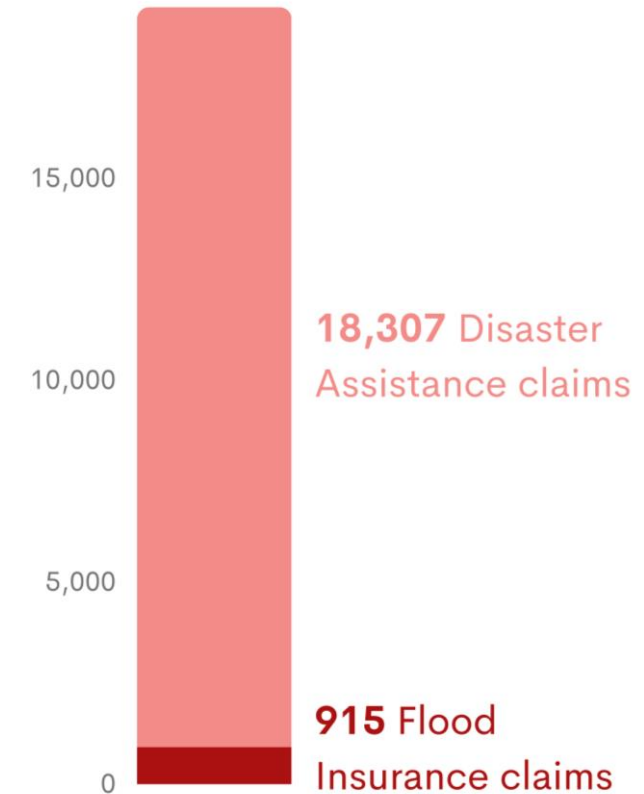
Inches of rainfall recorded at Blue Hill • Observatory, Milton, MA

# March 2010 Flood Claims



**19,222**

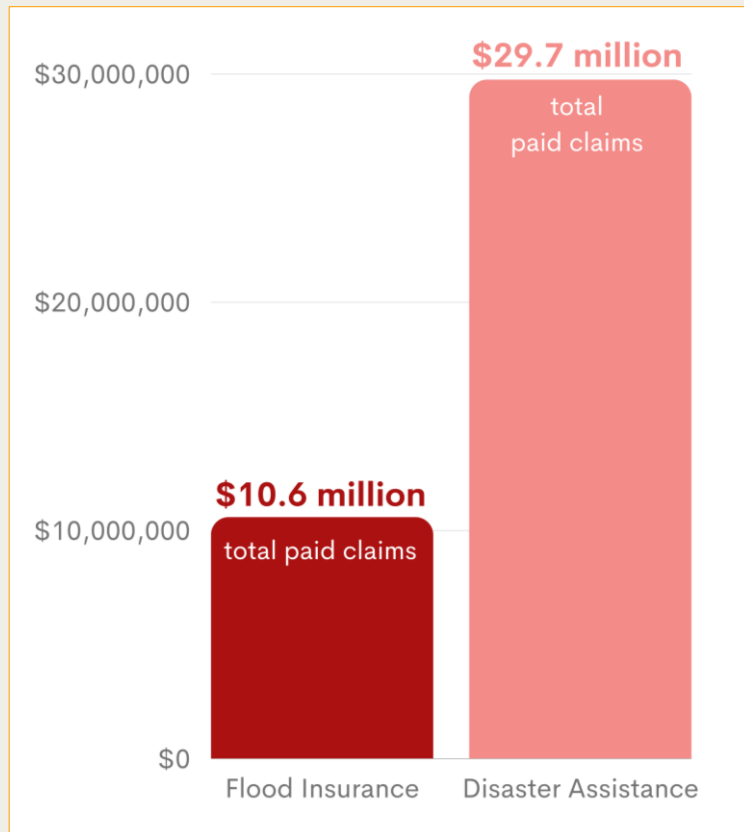
**total claims** (in MAPC region)



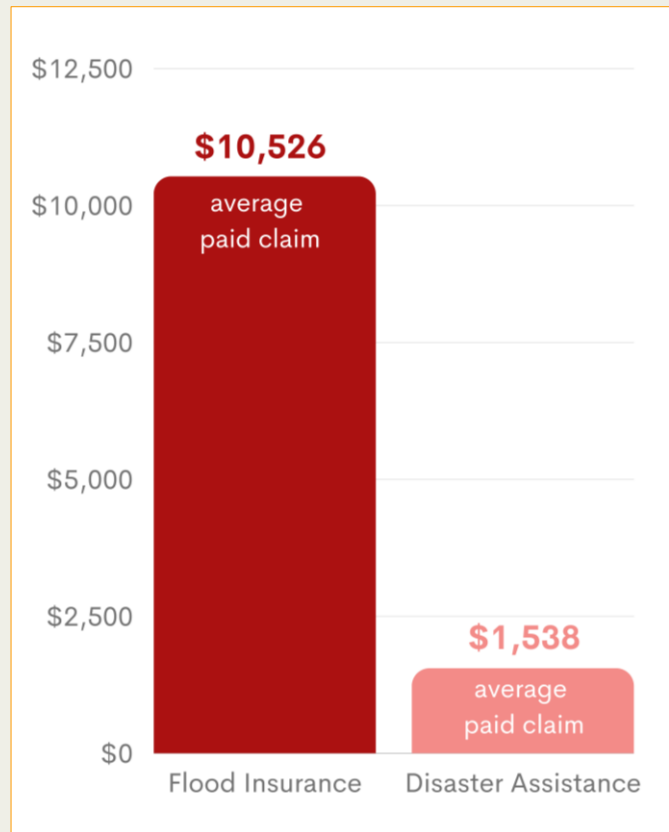


# March 2010 Total and Average Claims

Total claims (region-wide)

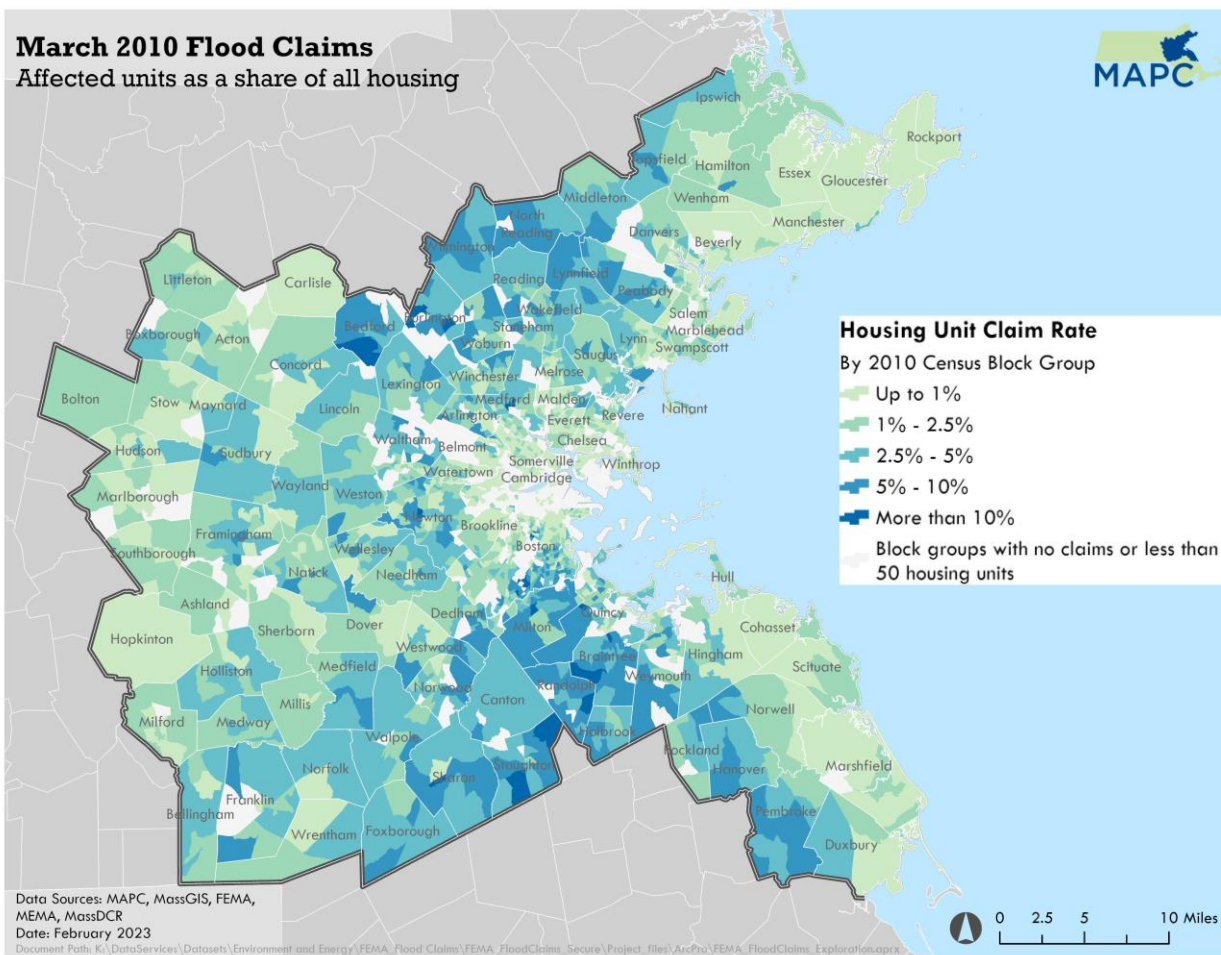


Average claims

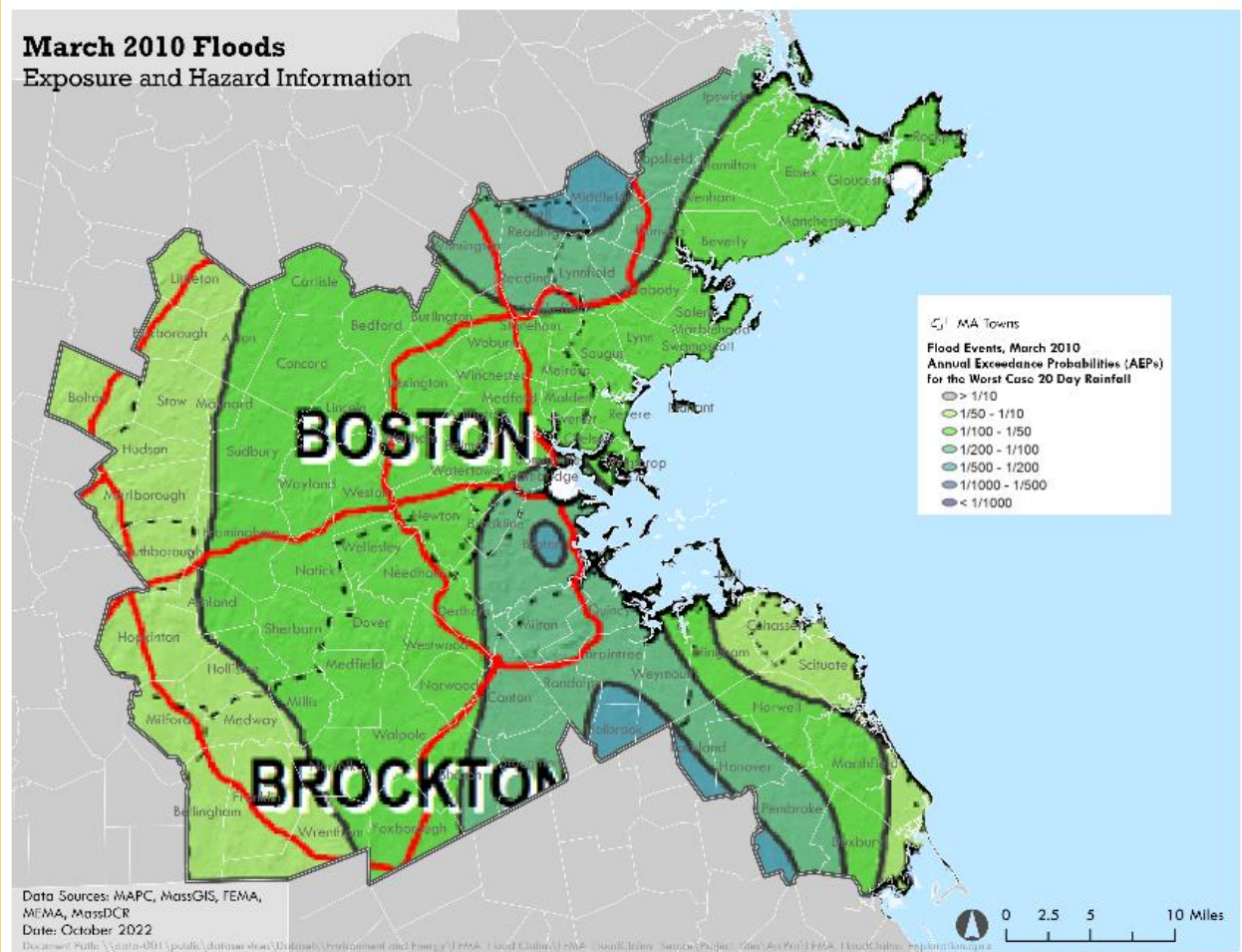


# March 2010 Rain Intensity

**March 2010 Flood Claims**  
Affected units as a share of all housing



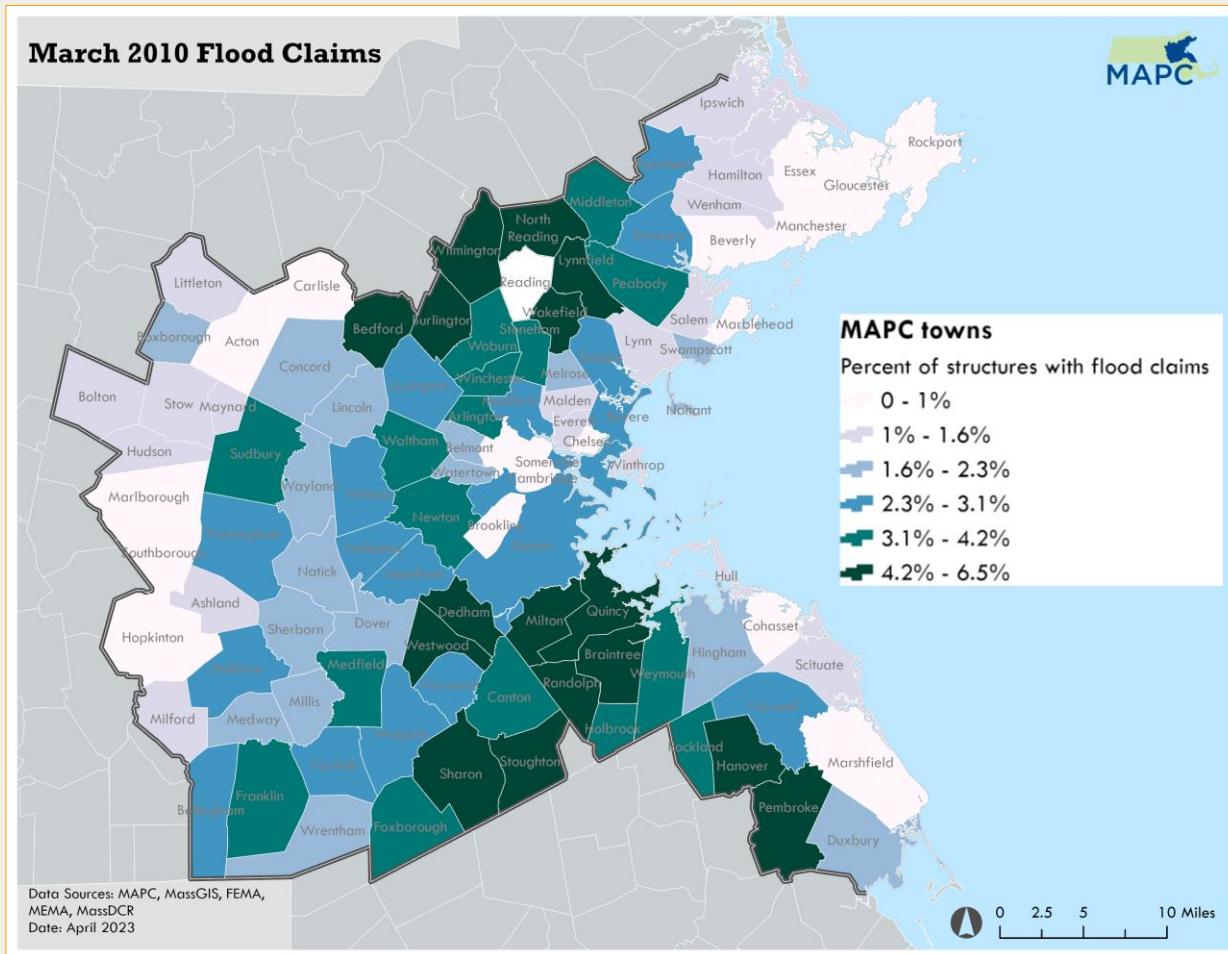
**March 2010 Floods**  
Exposure and Hazard Information



Distribution of rainfall across the region (right) roughly corresponds with spatial variation in flood claims (left).



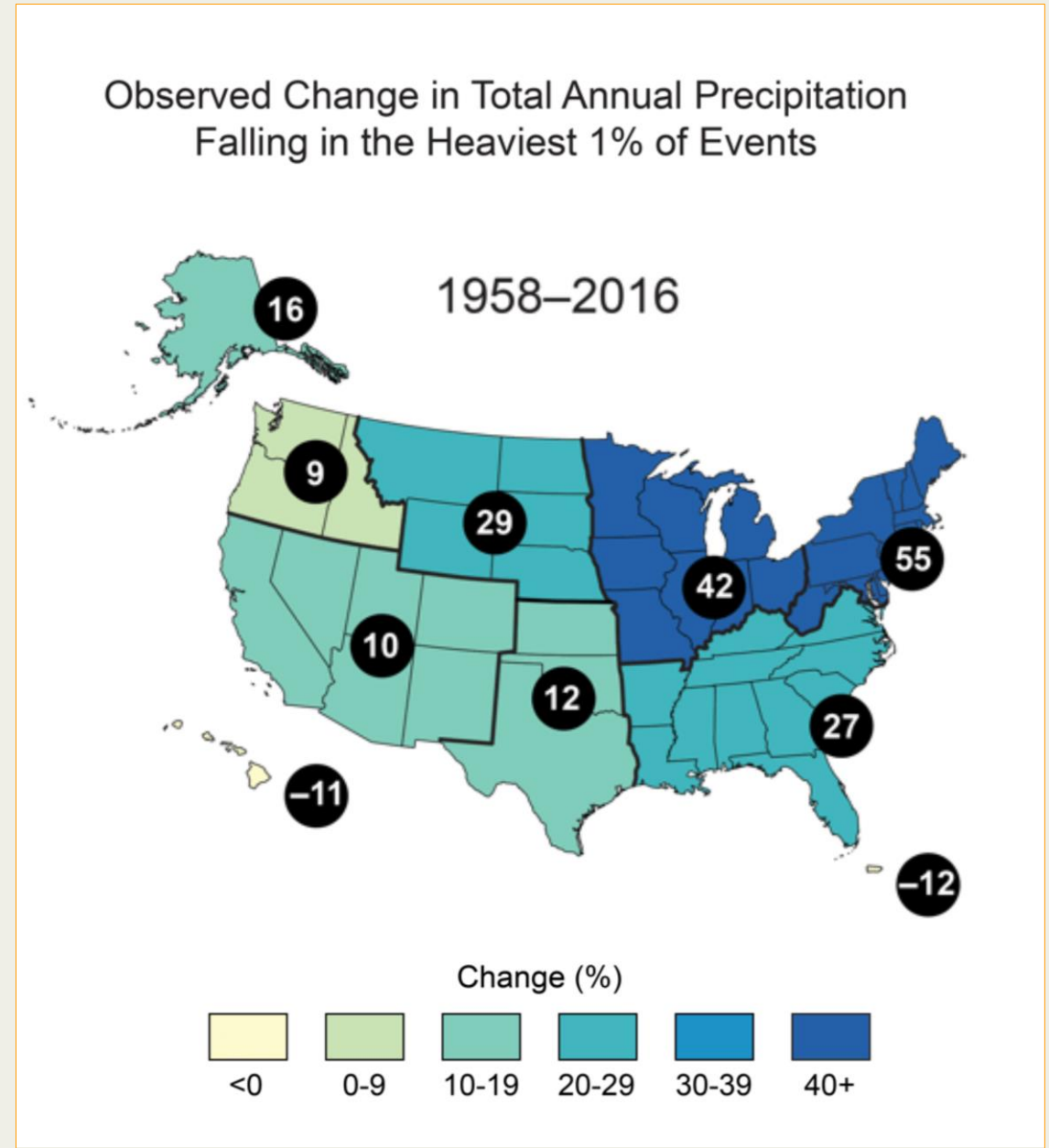
# March 2010 Flood Claims per municipality



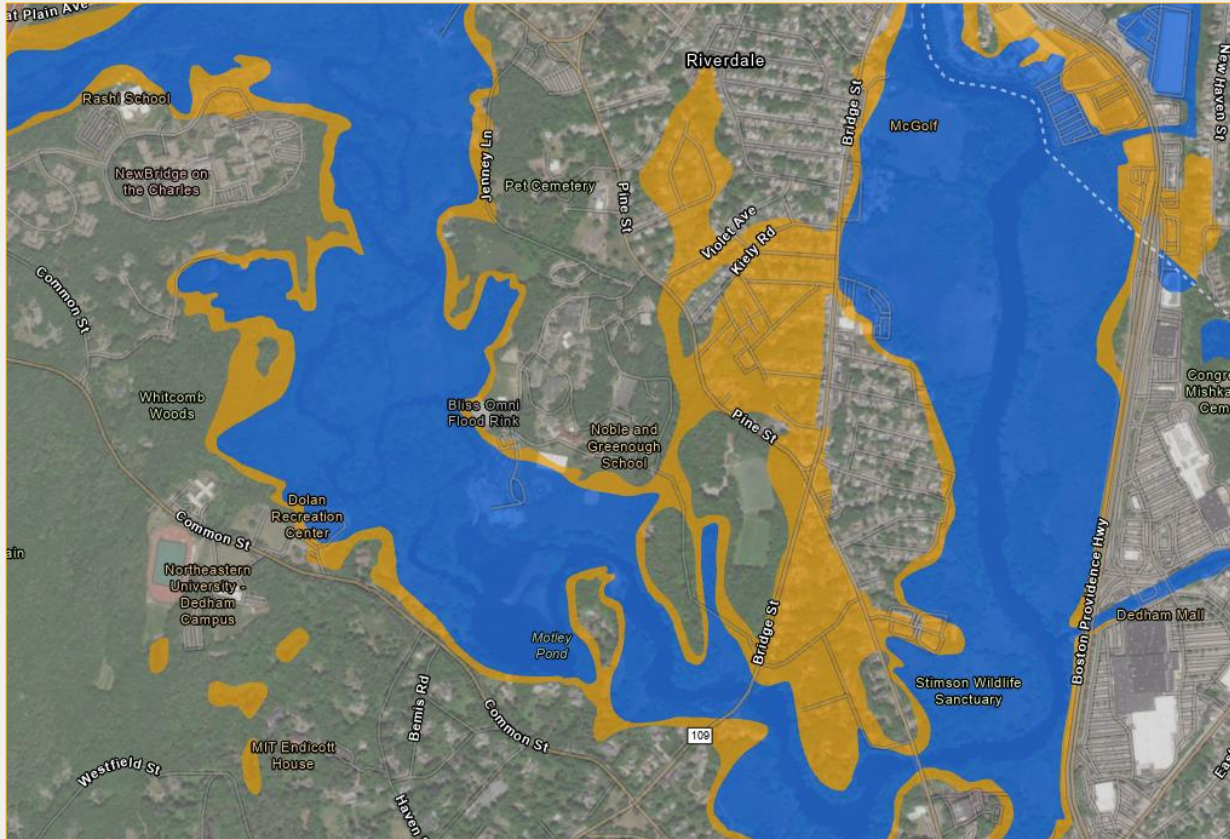
Municipality	Total number of claims	% of structures with flood claims
Randolph	551	6.5%
Sharon	358	6.3%
North Reading	281	6.1%
Milton	467	5.8%
Stoughton	447	5.8%
Braintree	587	5.7%
Wilmington	415	5.6%
Bedford	222	5.6%
Burlington	351	5.0%
Lynnfield	195	4.9%

# Climate Change

# Climate change is increasing the frequency, intensity, and impacts of precipitation events in New England



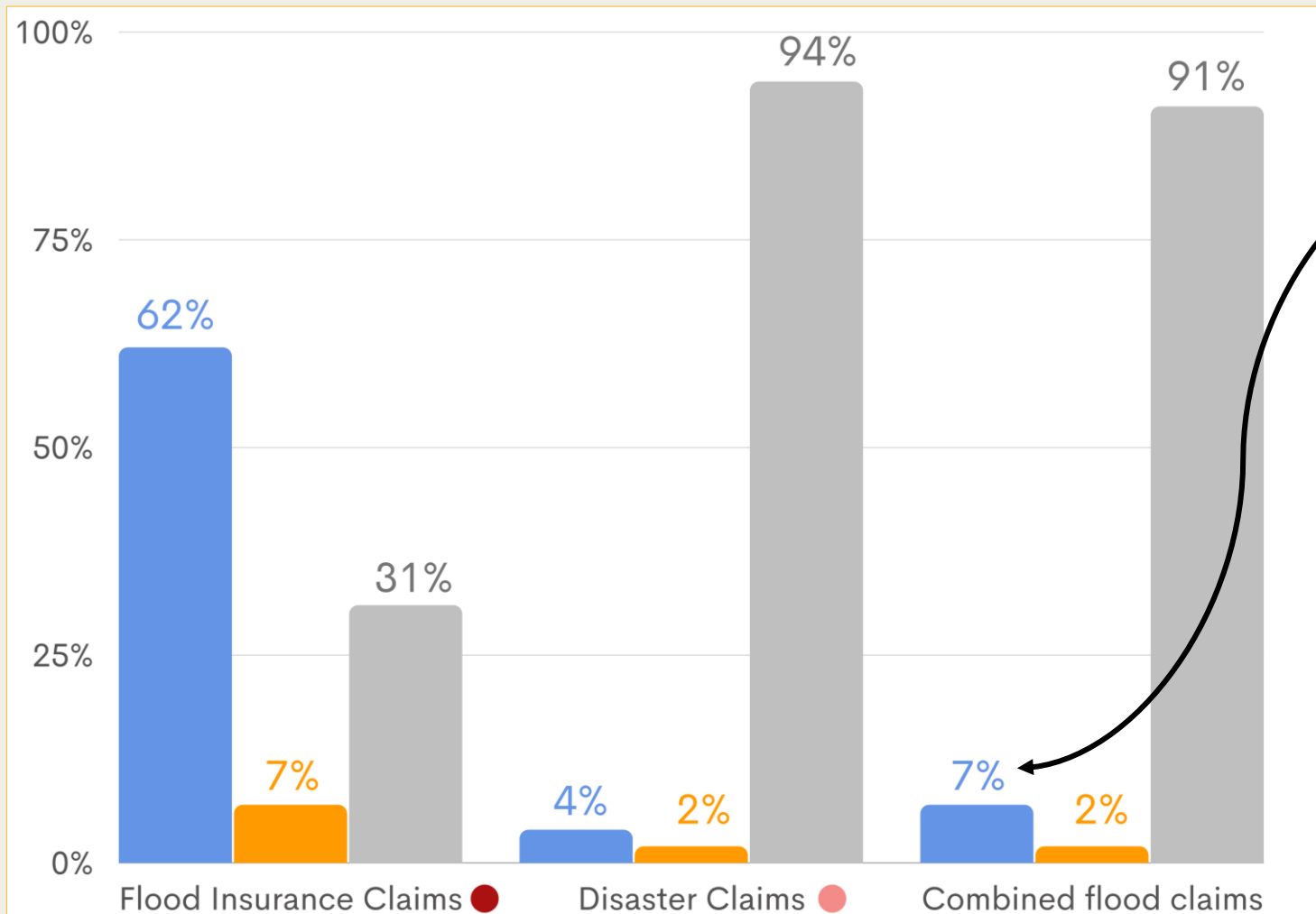
# March 2010 FEMA Flood Zones



- 1% chance zone ("100 year flood zone")**
  - Areas with an estimated 1% chance of experiencing flood inundation in a given year.
  - FEMA: "Special Flood Hazard Area"
- 0.2% chance zone ("500 year flood zone")**
  - Areas with an estimated 0.2% chance of experiencing flood inundation in a given year.
  - FEMA "Moderate Flood Hazard Area"
- Other X zone ("Not in a flood zone")**
  - Areas with less than a 0.2% chance of experiencing flood inundation in a given year.
  - FEMA "Minimal Flood Hazard Area"



# March 2010 Flood Claims vs Flood Zones



Only 7% of all claims were in the 1% chance flood zone.

- In 1% flood zone
- In 0.2% flood zone
- In other X zone

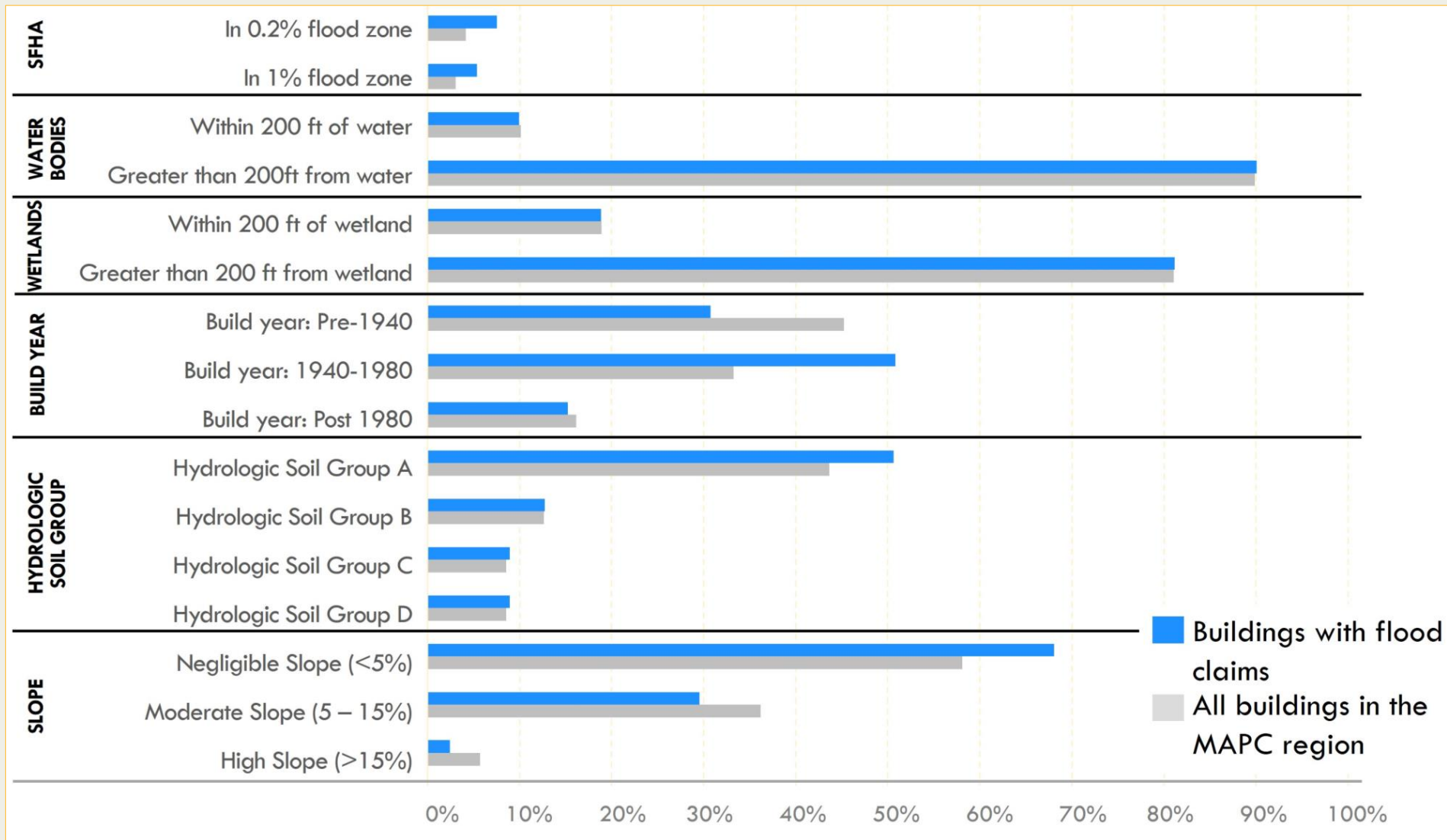
Percent of claims located in specified flood zone

# *FEMA Flood Insurance Rate Maps*

- ✓ Rivers
- ✓ Streams
- ✓ Ponds
- ? Mapped wetlands
- X Drainage areas < 1 square mile
- X Inadequate stormwater infrastructure
- X Impervious surfaces
- X Depressions
- X Clay soils or ledge
- X High groundwater
- X Historic wetland areas

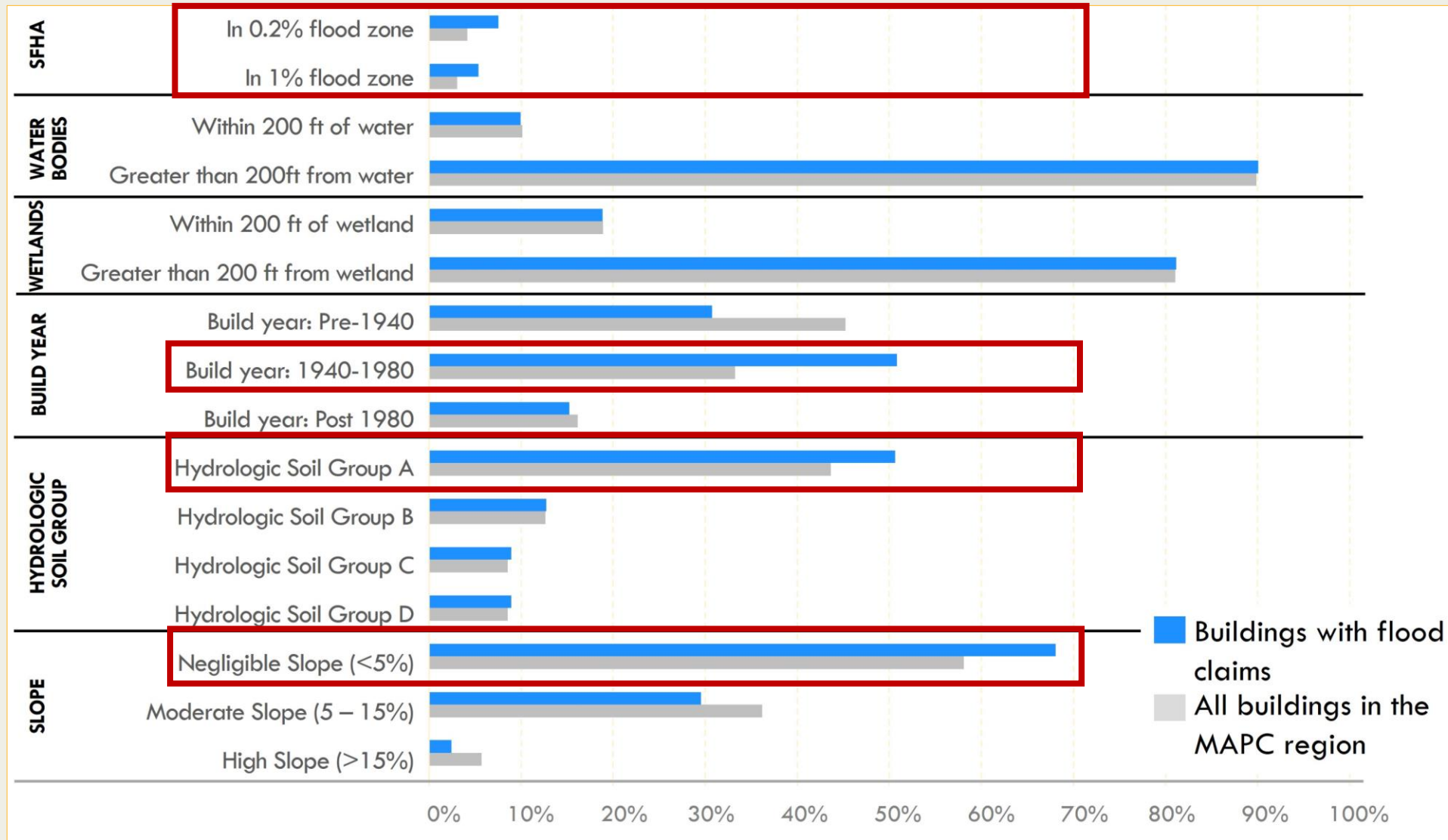


# Flood Risk Indicators



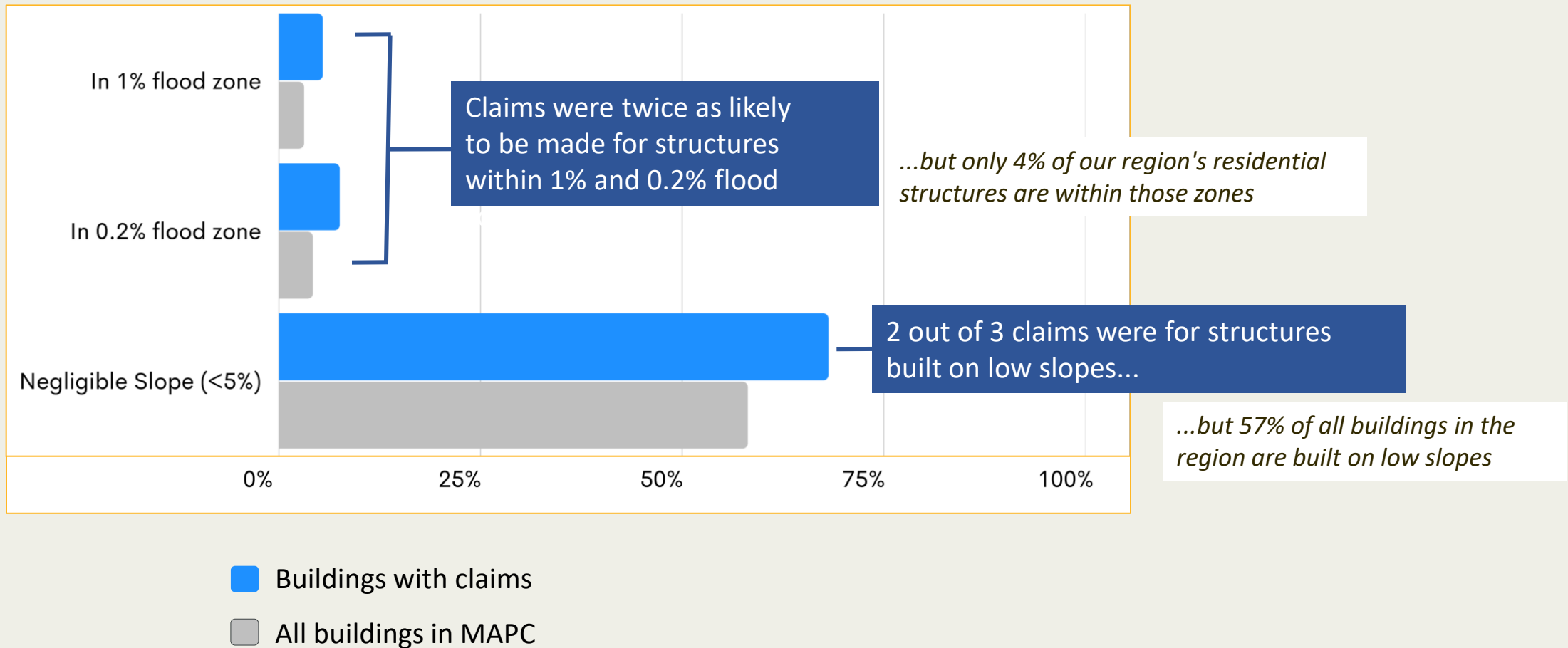


# Flood Risk Indicators

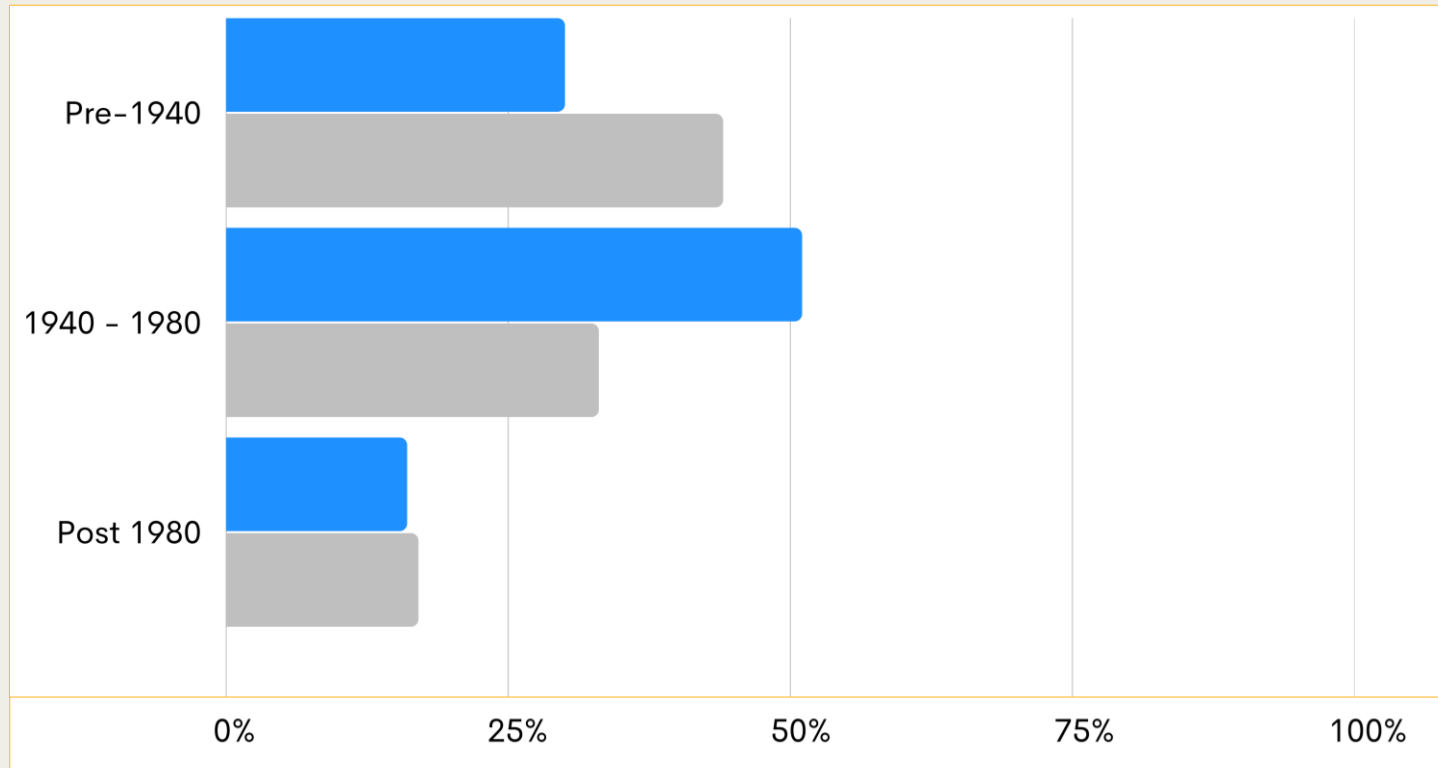


# Flood Risk Indicators

## Takeaways



# *Flood Risk Indicators* Build Year

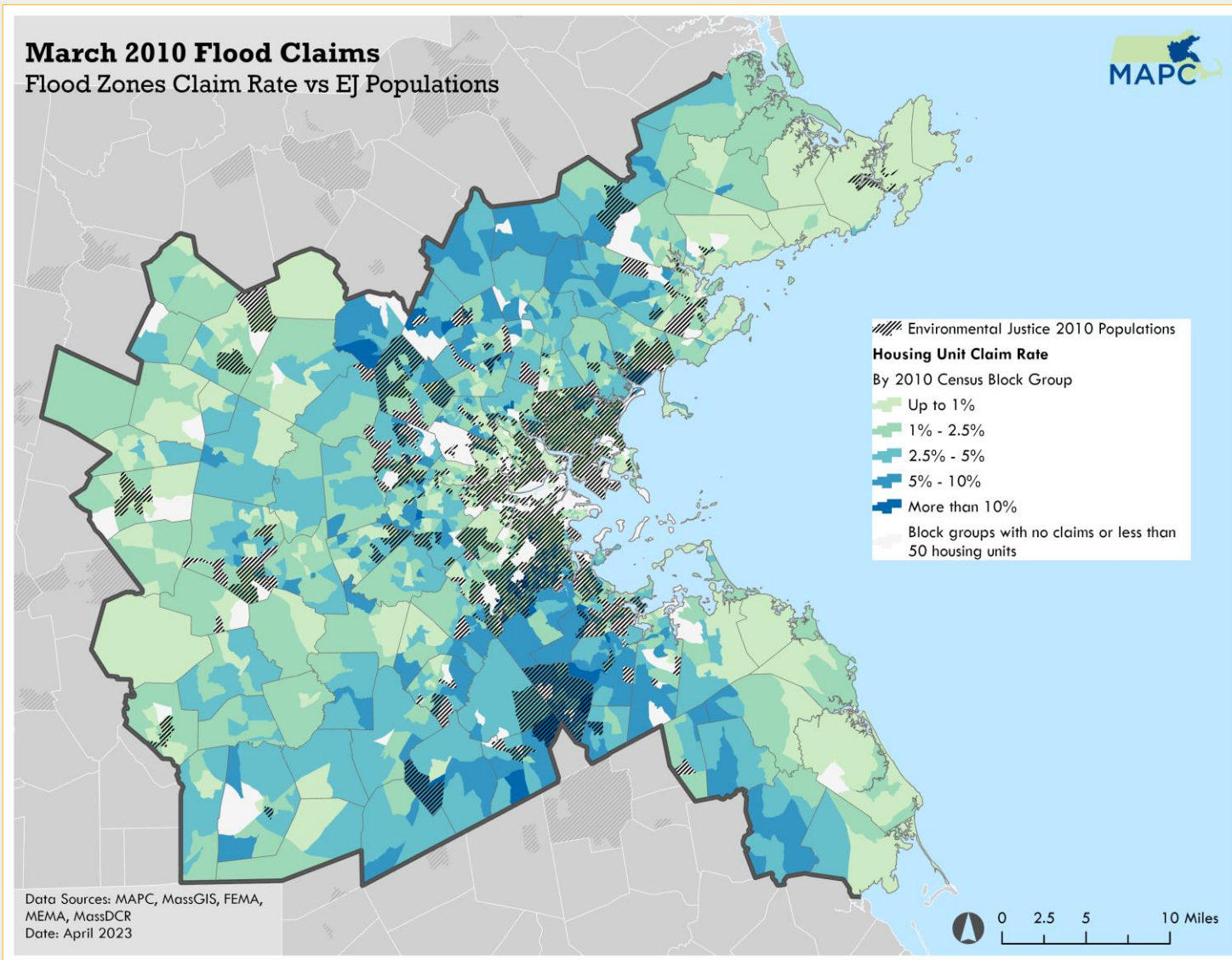


- Buildings with claims
- All buildings in MAPC

- Incidence of flooding varies by age of structure
- Structures built between 1940 and 1980 more likely to have a flood claim than those built earlier or later
- Building design and regulations influence flood risk

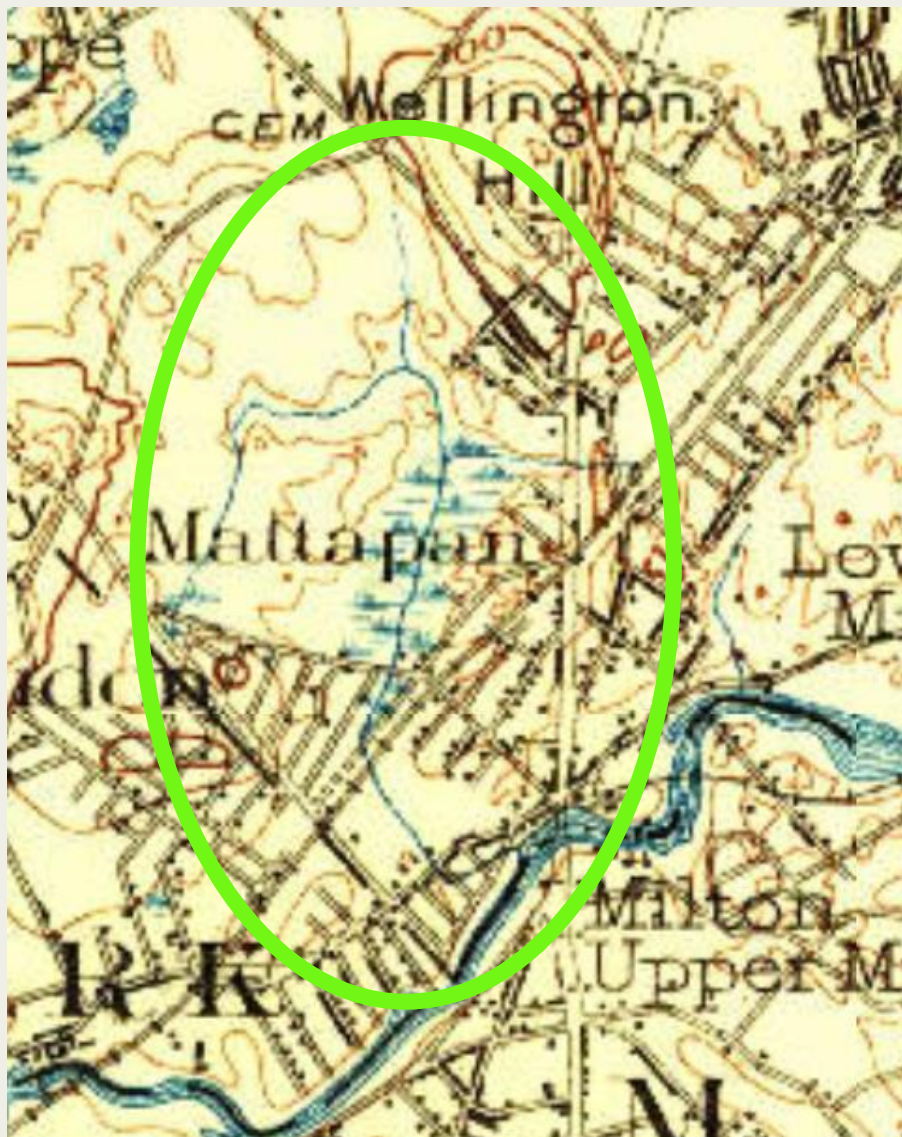


# Flood Risk Indicators Environmental

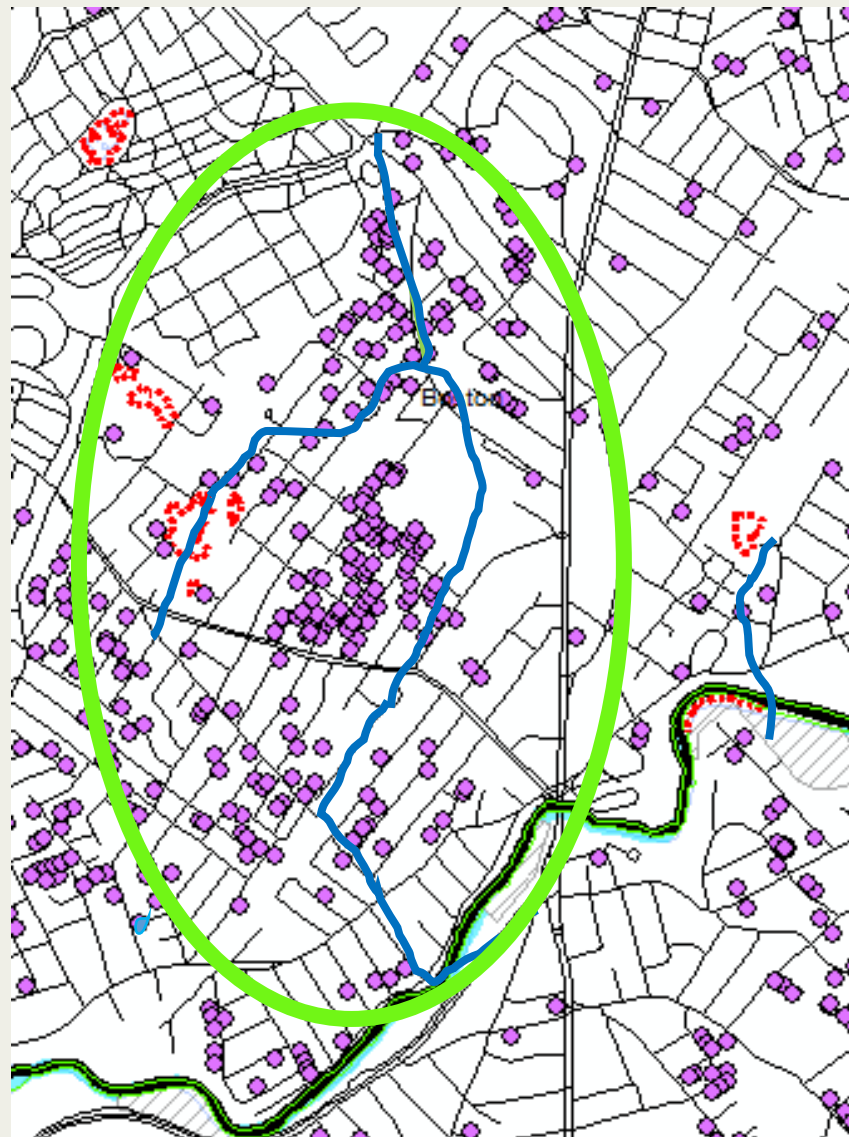


- No relationship between flood claims and factors like race, income, language, and renting
- Recovery for low-income households is likely to be more difficult

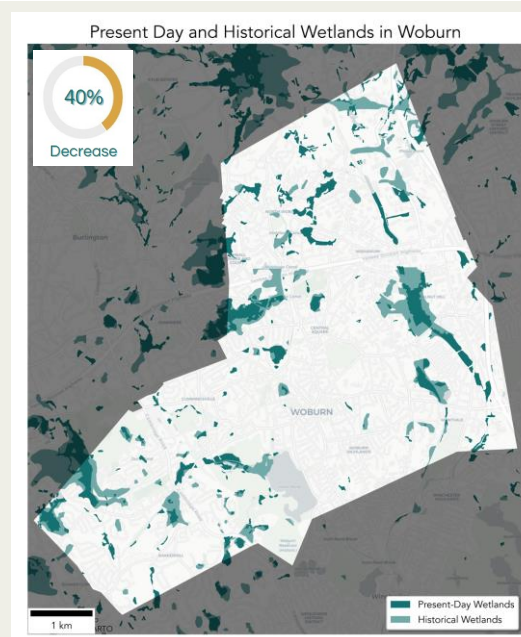
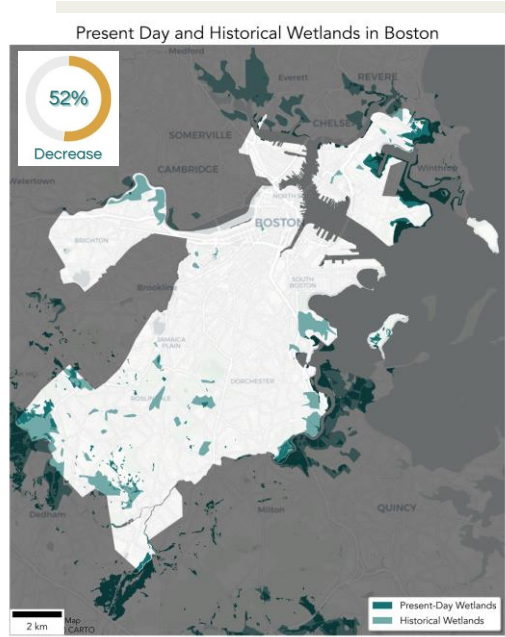
USGS Topo 1893



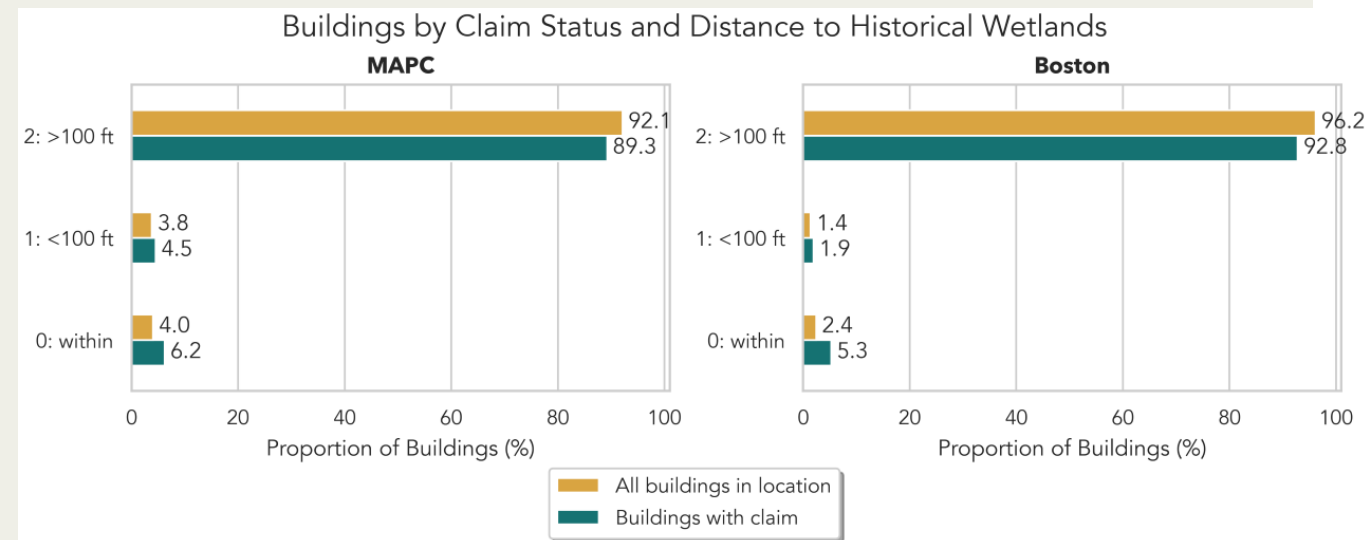
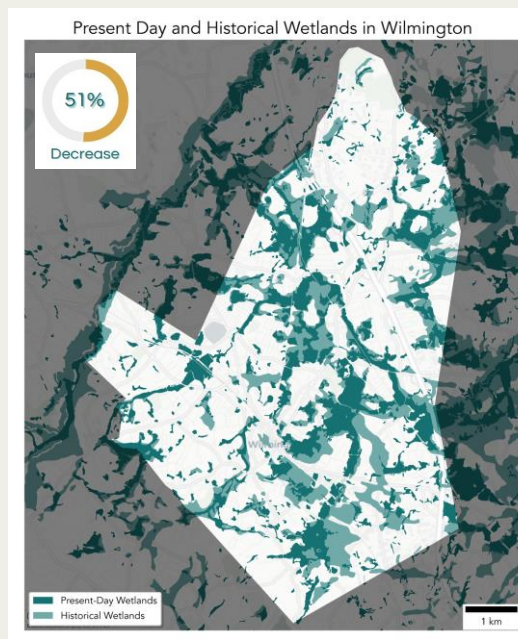
March 2010 Claims



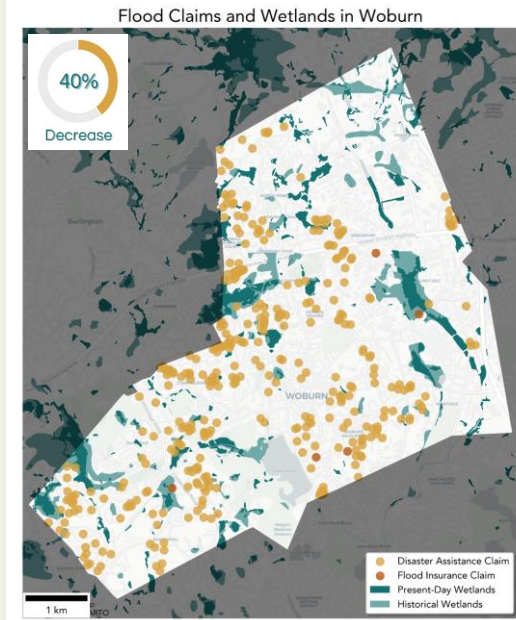
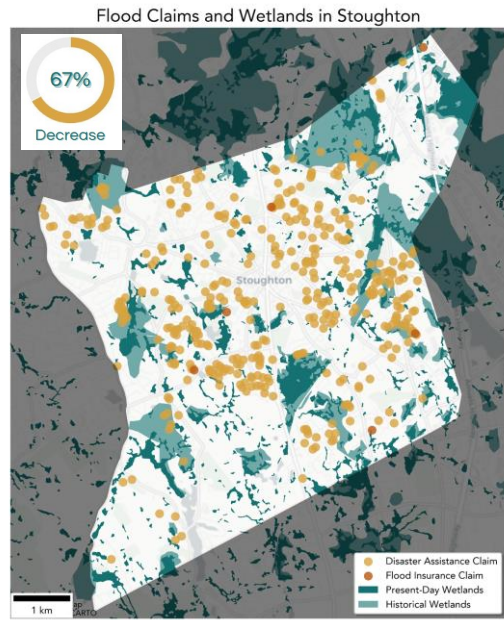
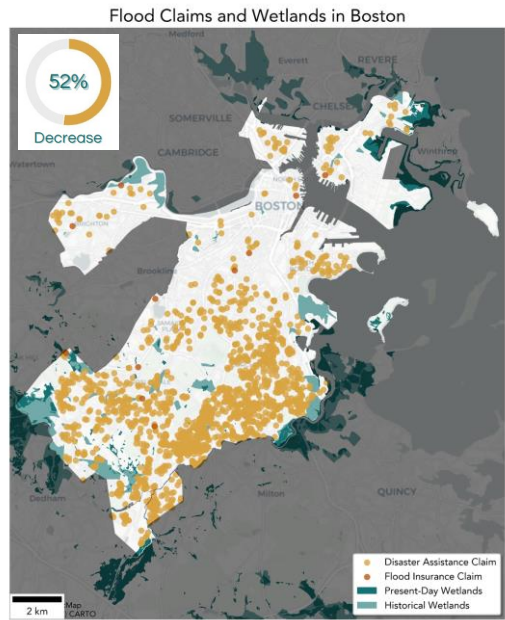




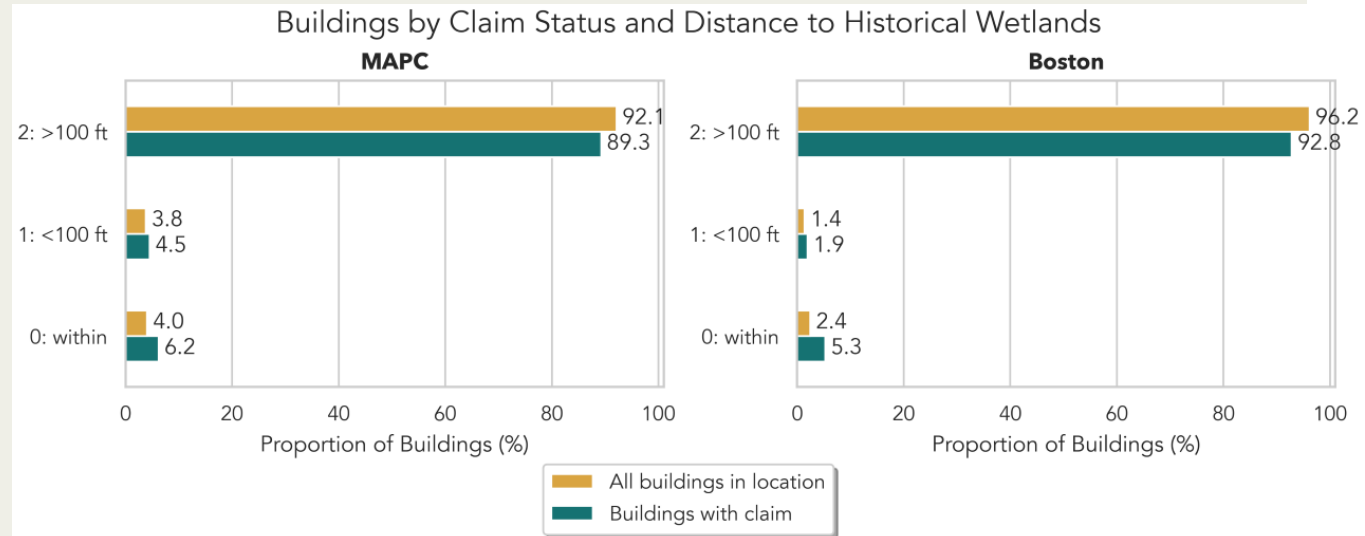
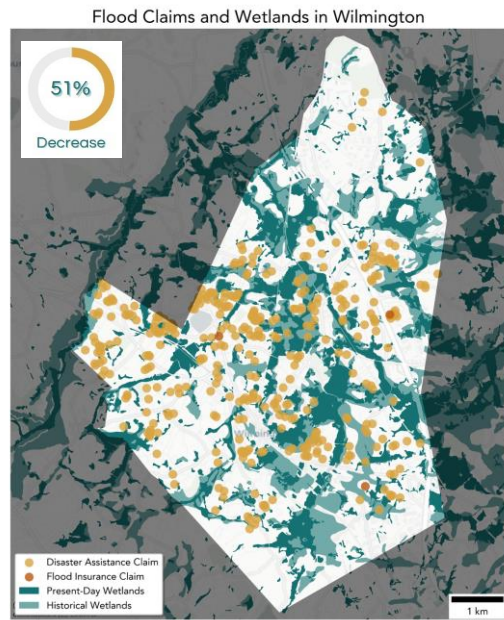
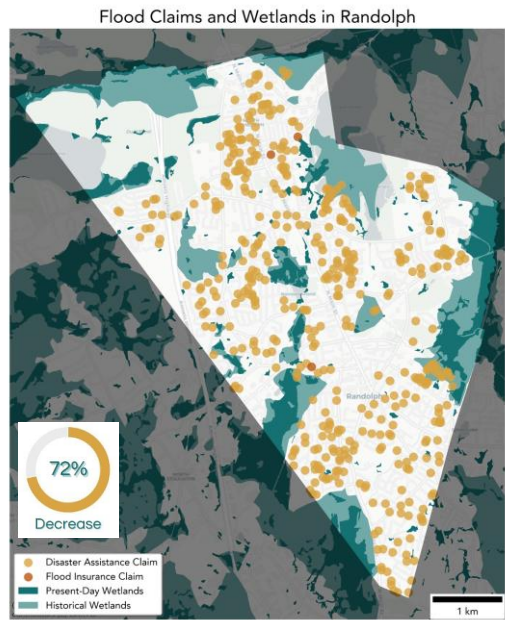
Municipality	Wetland Loss
Boston	52%
Stoughton	67%
Randolph	72%
Wilmington	51%
Woburn	40%







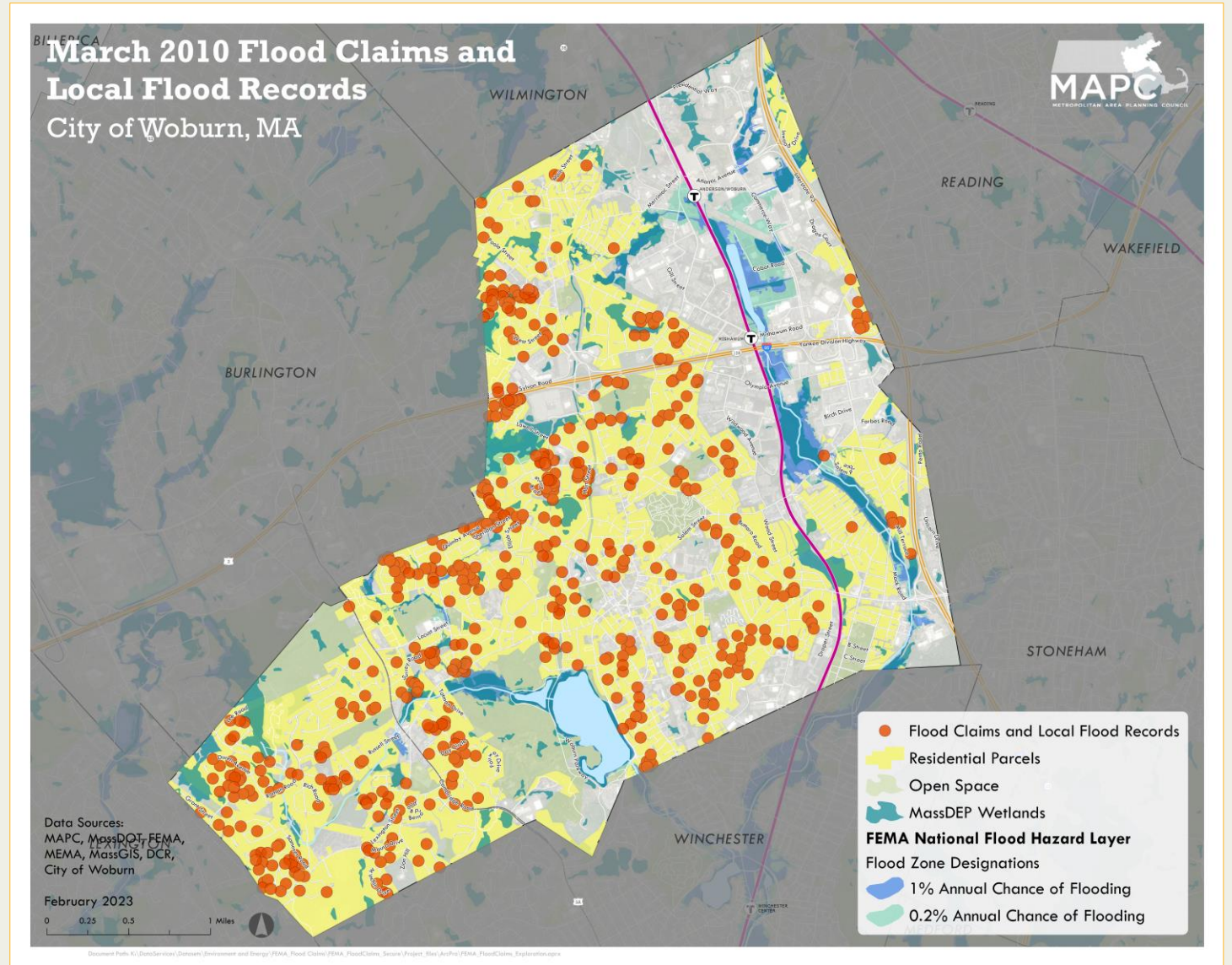
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# Woburn Flood Claims

- 400 claims
- 4% of residential properties
- 99% outside of 1% flood zone
- More likely to be in:
  - 500-year flood zone
  - Within 100 ft. of wetlands



# *Woburn* Resident Interviews

- Most were unaware of flood risk
- Flooding is reduced, not resolved
- Over half experienced flooding in 2021
- Almost all reported basement seepage
- Unmapped wetlands as flooding sources
- Stress and financial burden



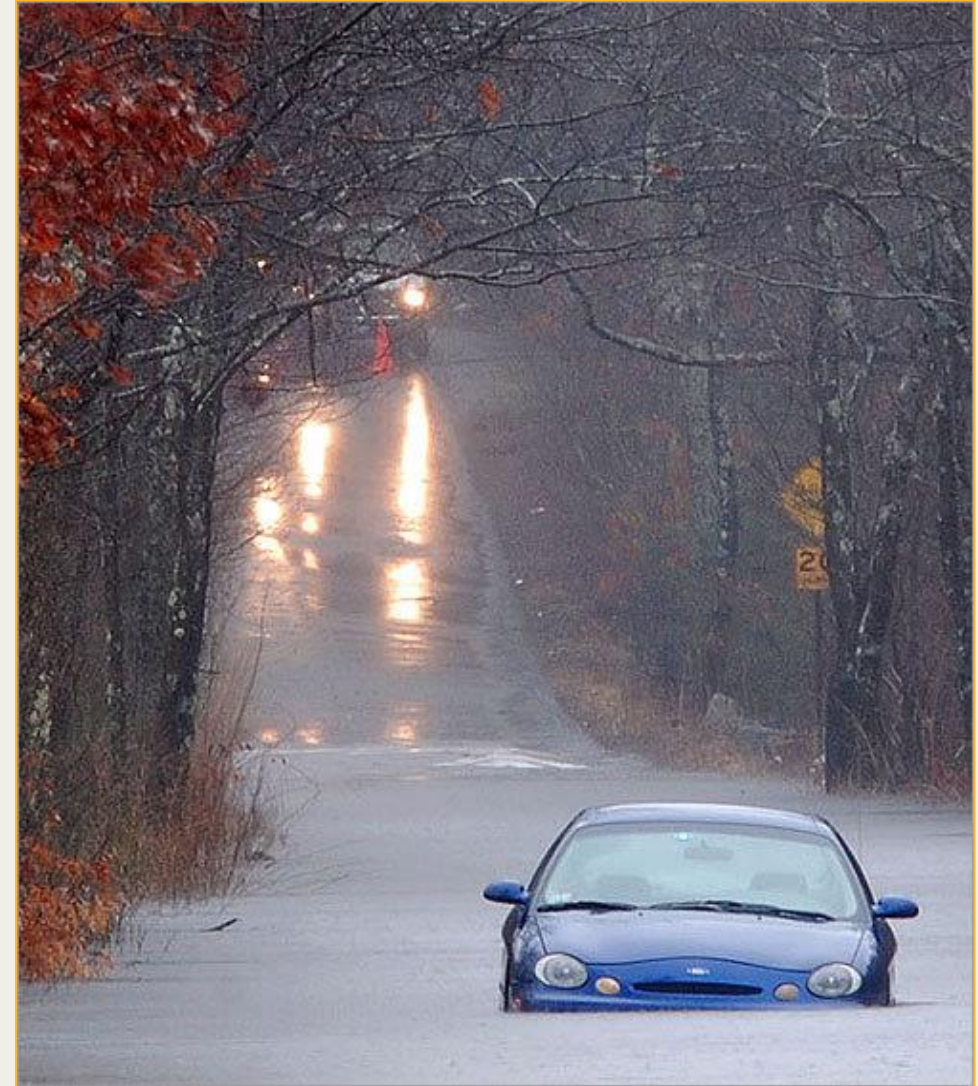






# *Stormwater Strategies*

1. Make data available
2. Promote and subsidize property retrofits
3. Strengthen development regulations

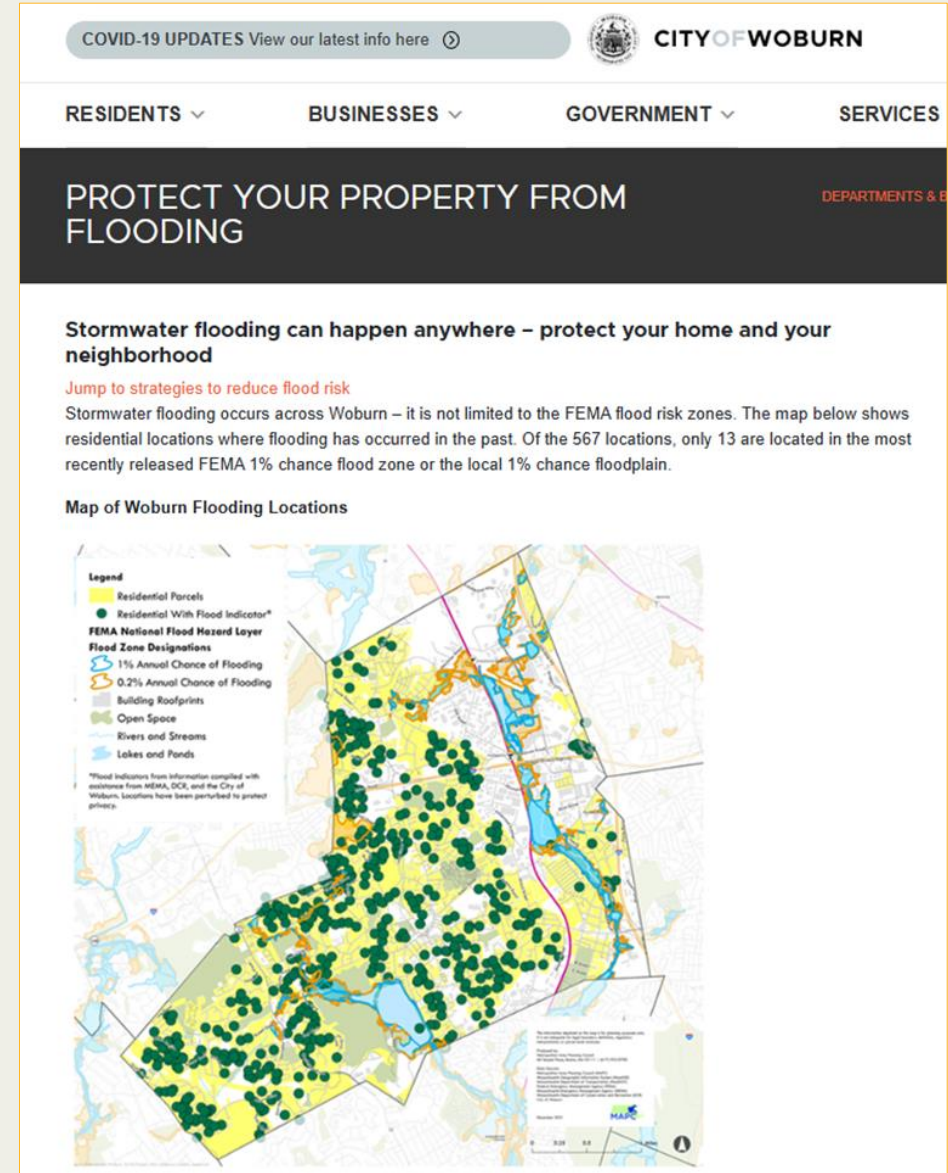


Boston.com; Winchester

# Stormwater Strategies

## Strategy 1: Make Data Available

- Repeal federal privacy restrictions
- Require flood history disclosure
- Collect local data





# *Stormwater Strategies*

## Strategy 2: Promote and Finance Property Retrofits

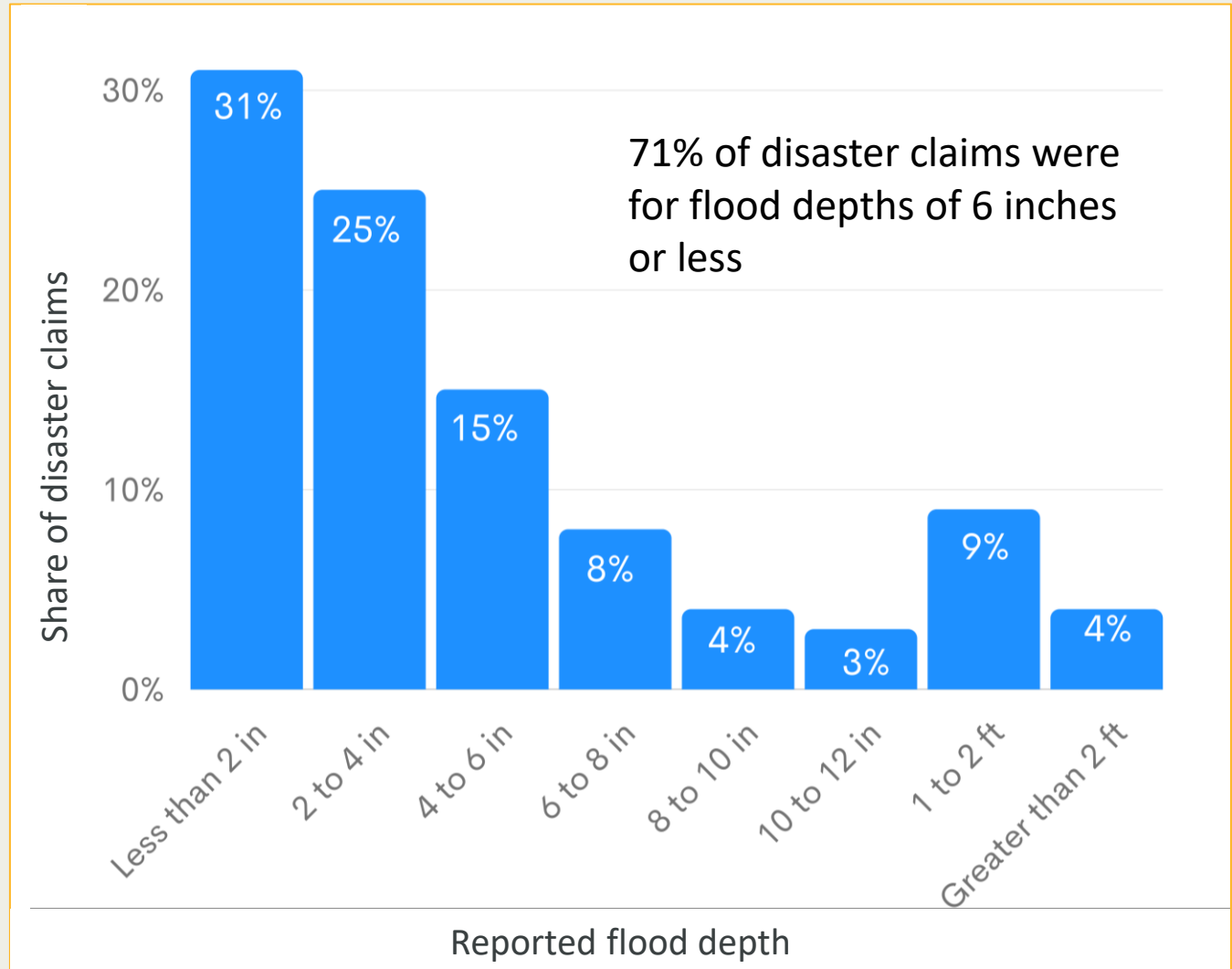
- Establish a state revolving loan fund
- Provide property retrofit assistance
- Develop local assistance programs



# *Stormwater Strategies* Strategy 3: Strengthen Development

## Regulations

- Elevate utilities
- LID and stormwater regulations
- Stormwater utilities
- Climate rainfall updates



*Thank you!*





## *Dedham: March 2010*

