

The background features abstract, overlapping geometric shapes in various shades of blue, ranging from light sky blue to deep navy blue. The shapes are primarily triangles and polygons, creating a dynamic, layered effect. The overall composition is clean and modern, with the text centered in the white space.

# Massachusetts Floodplains & Vulnerable Populations

Initial work December 2020

DCR Flood Hazard Management Program

# Intern position description

- ▶ On-going national and global research findings indicate that flood risk and damages from flooding inordinately affect lower income people and people of color more than white and wealthy populations.
- ▶ We need to understand if this is true in Massachusetts, and if there are solutions to this type of social inequity.
- ▶ **STEP ONE:** conduct research into existing floodplain populations in MA using GIS data

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.

# Initial questions

- ▶ Identify communities of low income and/or minority communities that reside within floodplains
- ▶ Where they are?
- ▶ What data matters?

Income  
disadvantages  
?

Race,  
ethnicity?

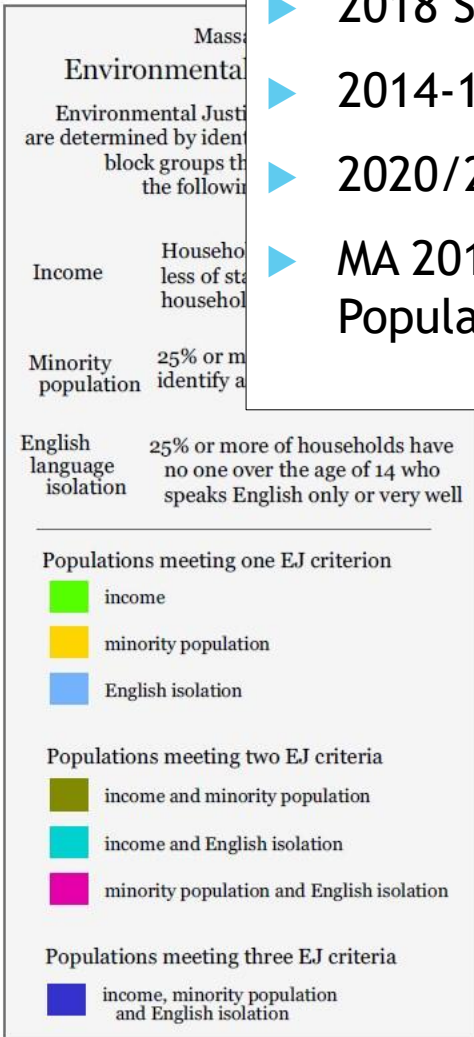
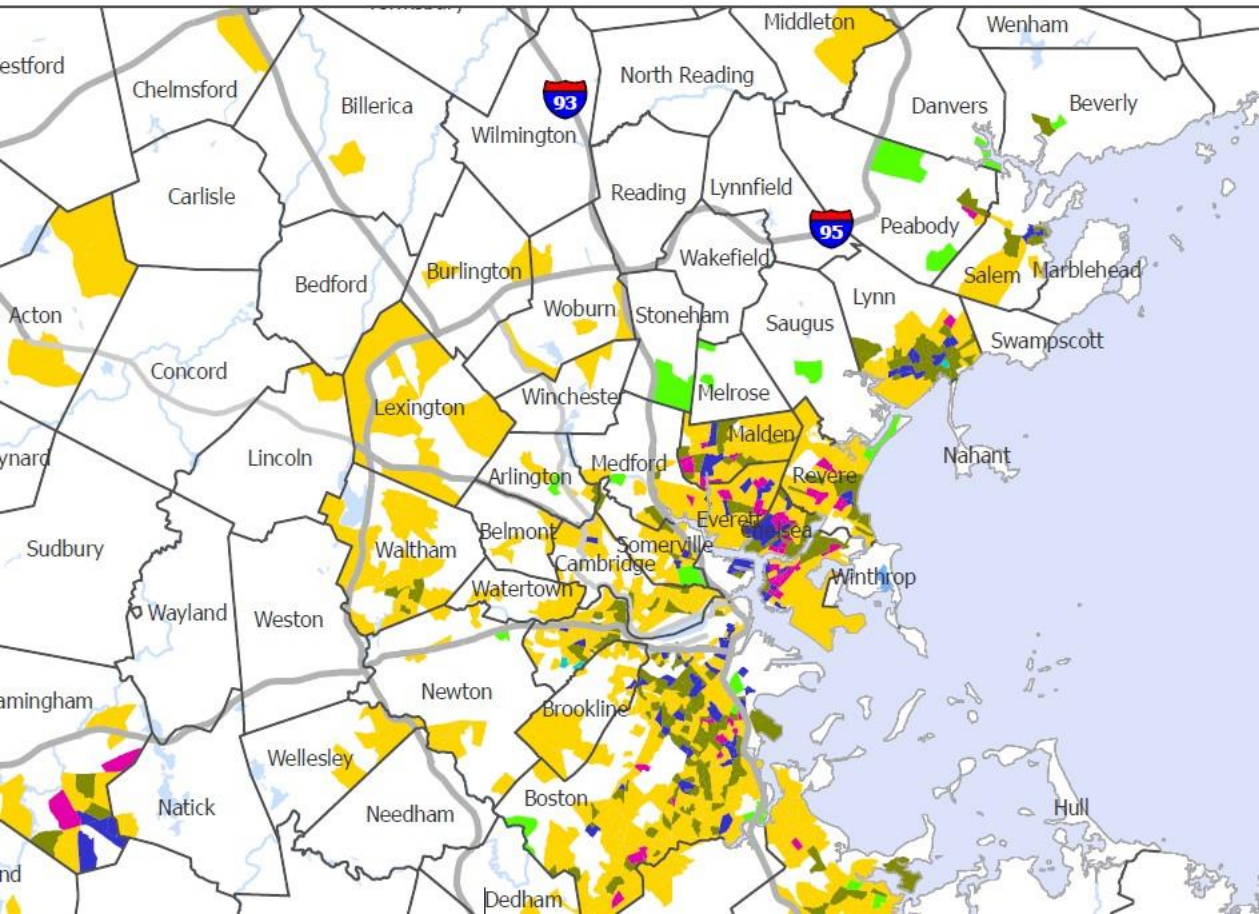
Renters or owners?  
Disabilities?

Household  
language?  
Education?

# Resources used

- ▶ FEMA flood maps online
- ▶ Mass GIS data
- ▶ US Census 2010 data
- ▶ 2018 Social Vulnerability Index (SoVI)
- ▶ 2014-18 American Community Survey
- ▶ 2020/2025 ESRI estimates
- ▶ MA 2010 Environmental Justice (EJ) Population Data

## 2010 Environmental Justice Populations Boston Metro



TRACT	COUNTY	MINORITY	H. POVERTY
6512	BRISTOL	59	25
6140	BRISTOL	38	28
6316	BRISTOL	45	15
6506	BRISTOL	43	29
6507	BRISTOL	73	40
6513	BRISTOL	53	32
6519	BRISTOL	83	33
6526	BRISTOL	68	30
6527	BRISTOL	55	30
2043	ESSEX	67	29
2072	ESSEX	84	28
2107	ESSEX	47	17
2504	ESSEX	97	43
2508	ESSEX	84	26
2513	ESSEX	97	33
8115	HAMPDEN	97	63
8117	HAMPDEN	84	51
3103	MIDDLESEX	56	25
3104	MIDDLESEX	68	22
3105	MIDDLESEX	47	20

# Parameters

Massachusetts poverty rate as of the 2018 American Community Survey was 10%

A decision was made to include communities with greater than 35% minority populations

**Poverty greater than 10%**  
**Minority greater than 35%**

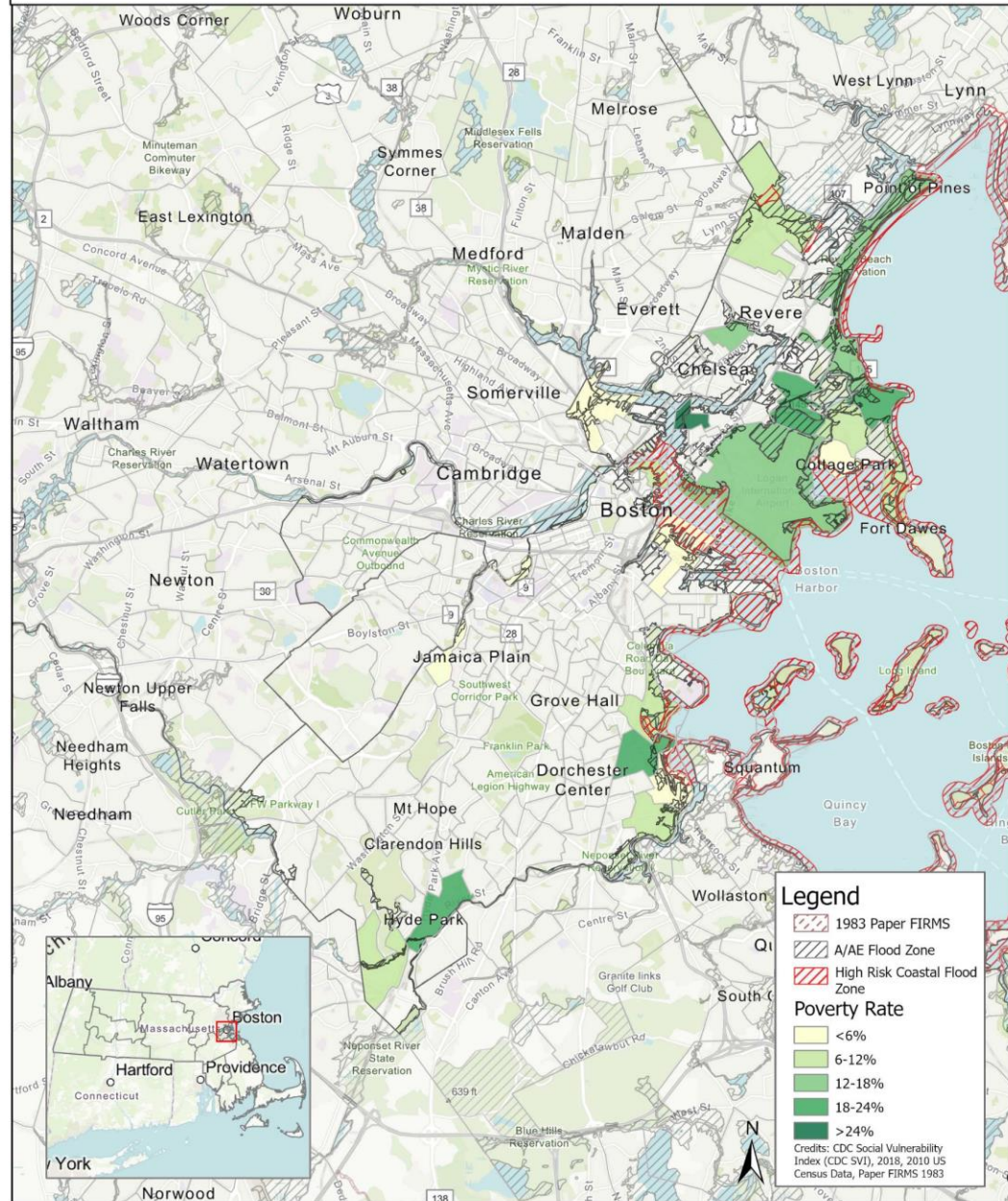
# Restrictions

- ▶ Franklin County is not included due to lack of floodplain data
- ▶ Tracts removed included those where there were no structures and/or roads in the FEMA 1% floodplain
- ▶ Census Tract 9801.01 (Boston Harbor Islands) was excluded from the study because of the unavailability of American Community Survey data (population: 405)
- ▶ The following counties had no tracts which fell into the stated criteria:
  - Barnstable County
  - Berkshire County
  - Dukes County
  - Hampshire County
  - Nantucket County

A tract must have all 3:  
Structures or roads in SFHA  
Greater than 10% poverty  
Greater than 35% minority

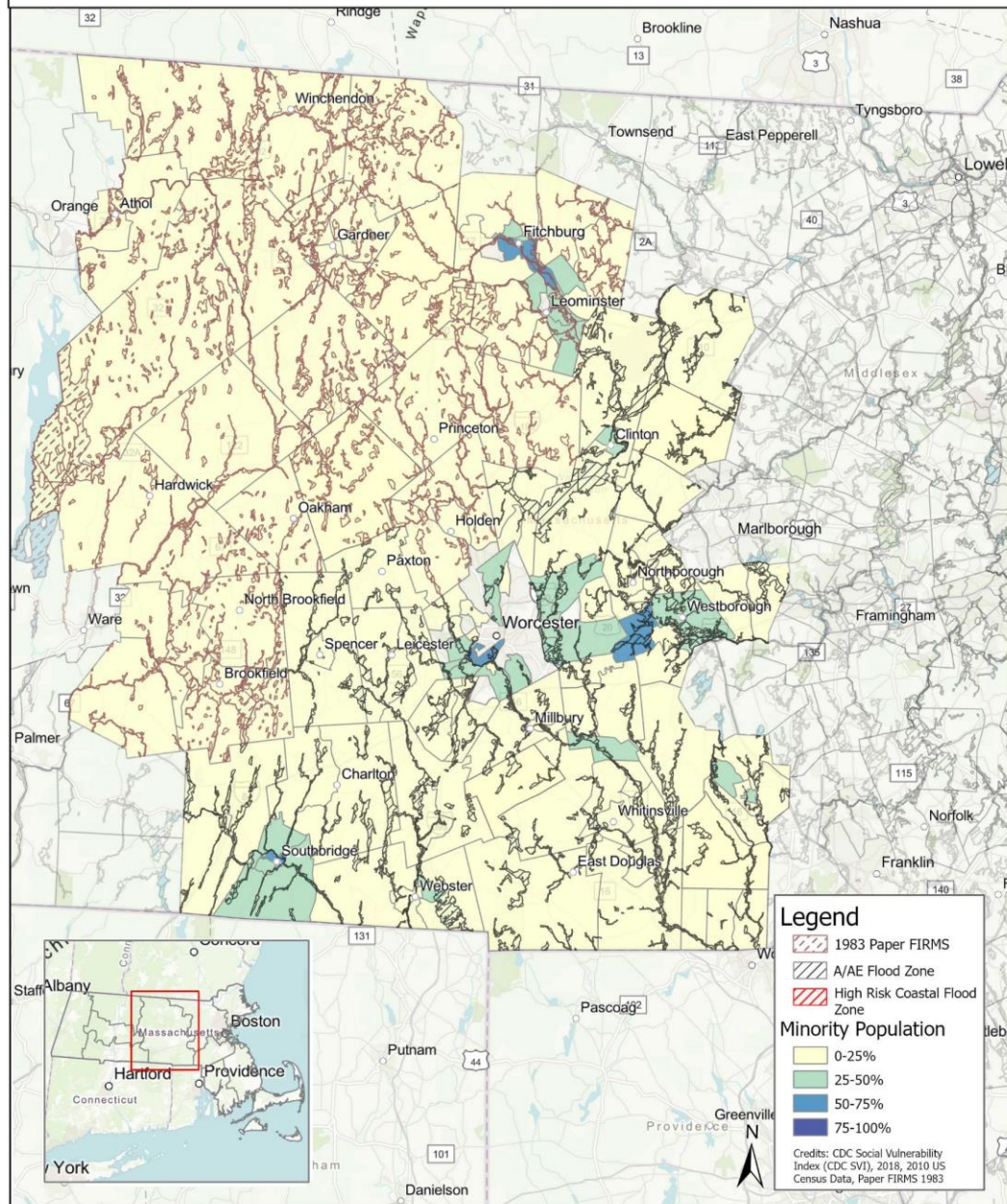
# Poverty Rates in Flood-Prone Areas

## Census Tracts in Suffolk, MA

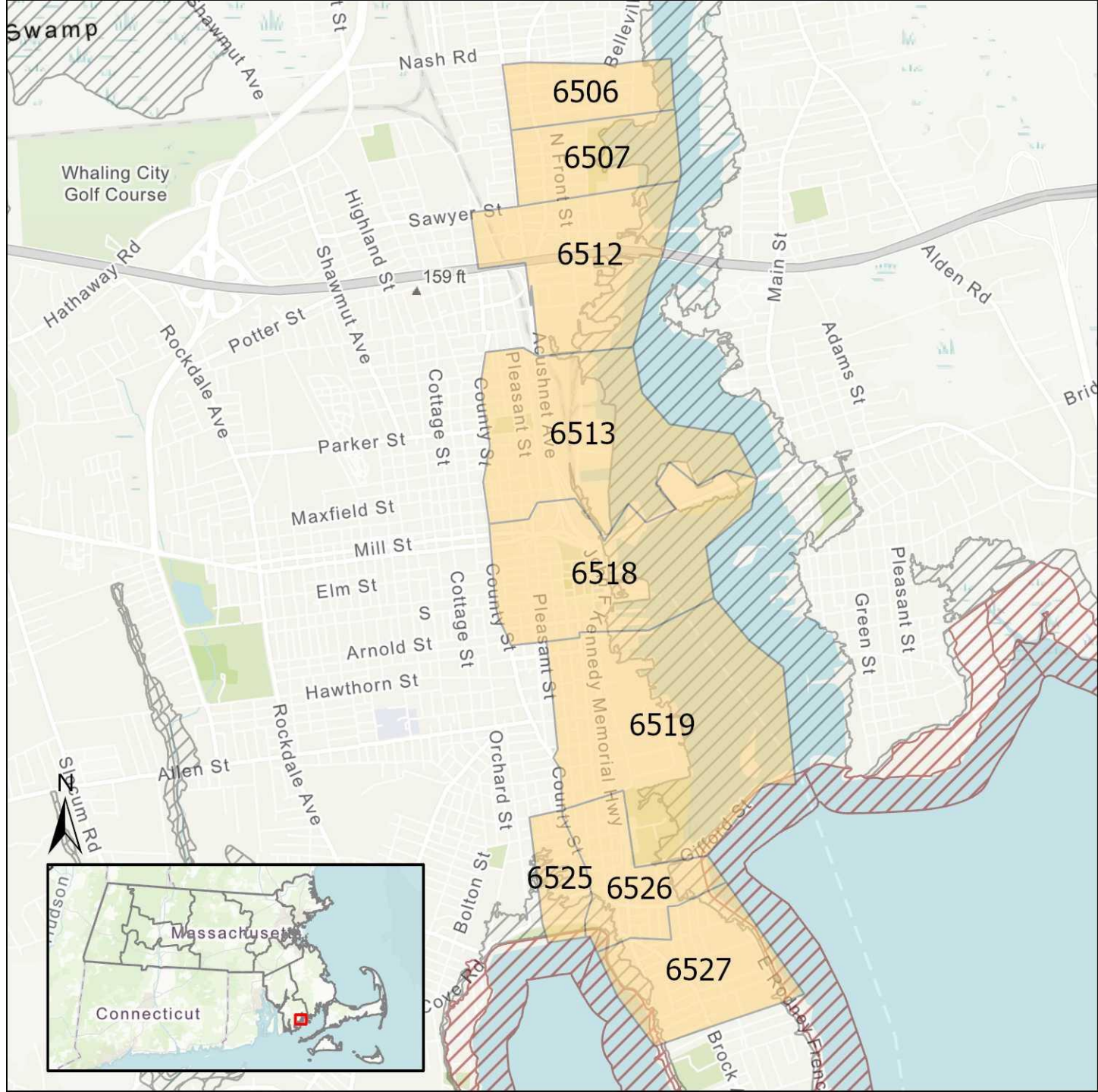


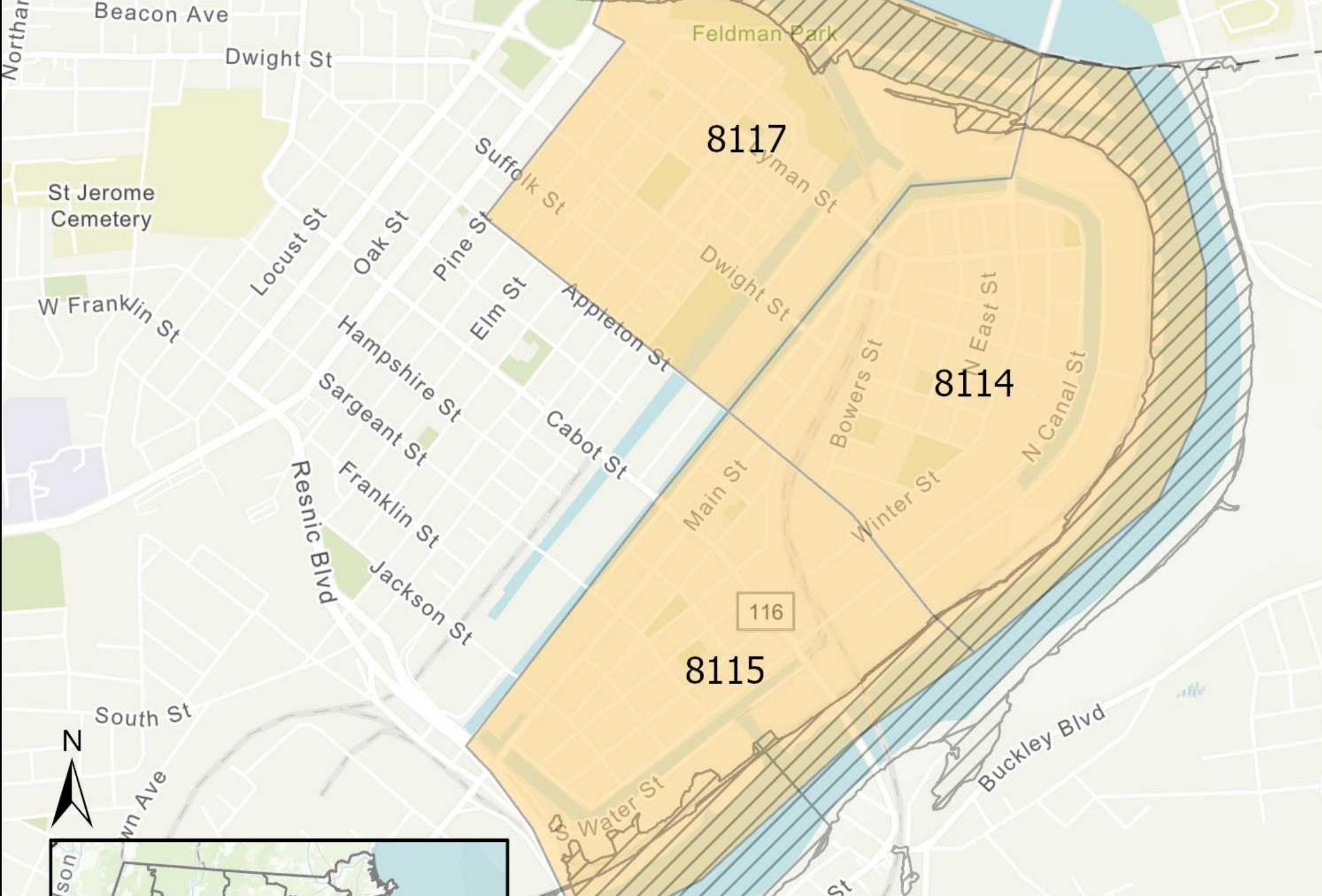
# Minority Population in Flood-Prone Areas

## Census Tracts in Worcester, MA









8117

8114

8115

116



Navigation icons: Home, Refresh, Search, Info, Location, Zoom to a town, Favorites, Print, Download, Help

Search bar: water street holyoke ma

Zoom to a town: [Dropdown]



### Available Data Layers

Search data layers

- DEP Tier Classified ZTL Sites
- DEP BWP Major Facilities
- FEMA Flood Data (Most Current)
  - Q3 Flood Zones (from Paper FIRMs, where)
  - FEMA National Flood Hazard Layer Polygon
- FEMA Q3 Flood from Paper FIRMs
- Ground Water Discharges
- Solid Waste Diversion and Disposal
- Title 5 Buffers

### Active Data Layers

Check all | Uncheck all | Remove

- FEMA National Flood Hazard Layer Polygon

### Legend

- AE: 1% Annual Chance of Flooding, with
- AE: Regulatory Floodway
- AH: 1% Annual Chance of 1-3ft Ponding,
- AO: 1% Annual Chance of 1-3ft Sheet Flo
- VE: High Risk Coastal Area
- D: Possible But Undetermined Hazard
- X: 0.2% Annual Chance of Flooding
- X: 1% Drainage Area < 1 Sq. Mi.
- X: Reduced Flood Risk due to Levee

Find address or place



City of Holyoke  
250142

AREA OF MINIMAL FLOOD HAZARD  
Zone X

25013C0203E  
eff. 7/16/2013

FLOODWAY  
Zone AE

Connection River

75 FEET

72 FEET

72 FEET

71 FEET

70 FEET

60 FEET

60 FEET

Zone AE

0.2mi

10,000 D

25  
eff.

# AT RISK POPULATION IN FLOOD AREAS

Census Tract 8114

Census Tract 8114 is located in Holyoke, MA. Flooding risk exists from the FEMA 1% floodplain from the Connecticut River. As of the 2010 census, the population is 2,447.

## EDUCATION

35%

No High School Diploma



22%

Some College



3%

College Degree

40%

High School Graduate

## INCOME



\$20,546

Median Household Income



57%

2018 Households Below the Poverty Level (ACS 5-Yr)



75%

2018 Households Receiving Food Stamps/SNAP (ACS 5-Yr)

## AT RISK



47%

2018 Households with 1+ Persons with a Disability (ACS 5-Yr)



96%

Minority Population



0%

2018 Owner Households with No Vehicles (ACS 5-Yr)

## Race and Ethnicity

The largest group: Hispanic Origin (Any Race) (94.46)

The smallest group: Pacific Islander Alone (0.00)

Indicator	Value (%)	Difference	
White Alone	41.11	-30.51	
Black Alone	3.72	-5.50	
American Indian/Alaska Native Alone	2.28	+1.84	
Asian Alone	0.08	-2.65	
Pacific Islander Alone	0.00		
Other Race	47.97	+35.72	
Two or More Races	4.84	+1.15	
Hispanic Origin (Any Race)	94.46	+66.62	

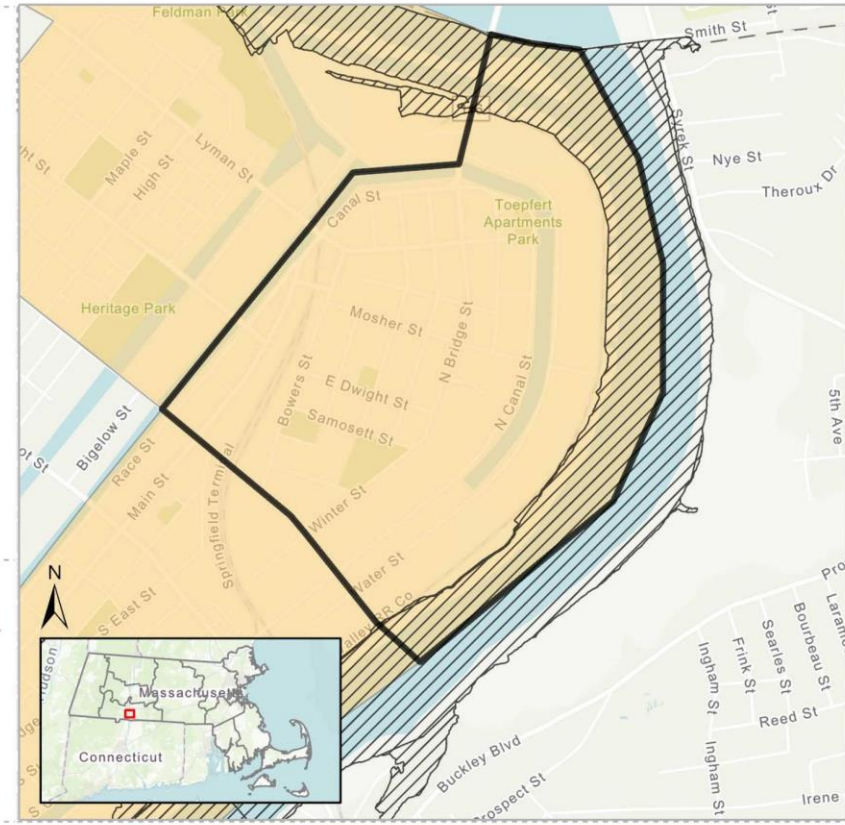
Bars show deviation from Hampden County

## MISCELLANEOUS



86%

2010 Renter Occupied Housing Units (U.S. Census)



Population by Language Spoken at Home (ACS)	Total	Percent
Pop 18-64 speak Asian-Pacific Isl & No English	0	0.0%
Pop 18-64 speak Indo-European & No English	0	0.0%
Pop 18-64 speak Spanish & No English	207	9.2%
Pop 18-64 speak Other Language & No English	0	0.0%
Pop 65+ speak Asian-Pacific Isl & No English	0	0.0%
Pop 65+ speak Indo-European & No English	0	0.0%
Pop 65+ speak Spanish & No English	61	2.7%
Pop 65+ speak Oth Language & No English	0	0.0%

# AT RISK POPULATION IN FLOOD AREAS

Census Tract 2072

Census Tract 2072 is located in Lynn, MA. A significant portion of the tract is located in the FEMA 100-year floodplain. The population was 2,939 as of the 2010 Census.

## EDUCATION

23%

No High School Diploma



23%

Some College



16%

College Degree

38%  
High School Graduate

## INCOME



\$32,652

Median Household Income



28%

2018 Households Below the Poverty Level (ACS 5-Yr)



36%

2018 Households Receiving Food Stamps/SNAP (ACS 5-Yr)

## AT RISK



35%

2018 Households with 1+ Persons with a Disability (ACS 5-Yr)



84%

Minority Population



12%

2018 Owner Households with No Vehicles (ACS 5-Yr)

## Race and Ethnicity

The largest group: Hispanic Origin (Any Race) (57.26)

The smallest group: Pacific Islander Alone (0.00)

Indicator	Value (%)	Difference
White Alone	29.46	-45.90
Black Alone	16.22	+11.15
American Indian/Alaska Native Alone	0.79	+0.39
Asian Alone	11.98	+8.14
Pacific Islander Alone	0.00	-0.05
Other Race	35.30	+23.57
Two or More Races	6.25	+2.70
Hispanic Origin (Any Race)	57.26	+33.70

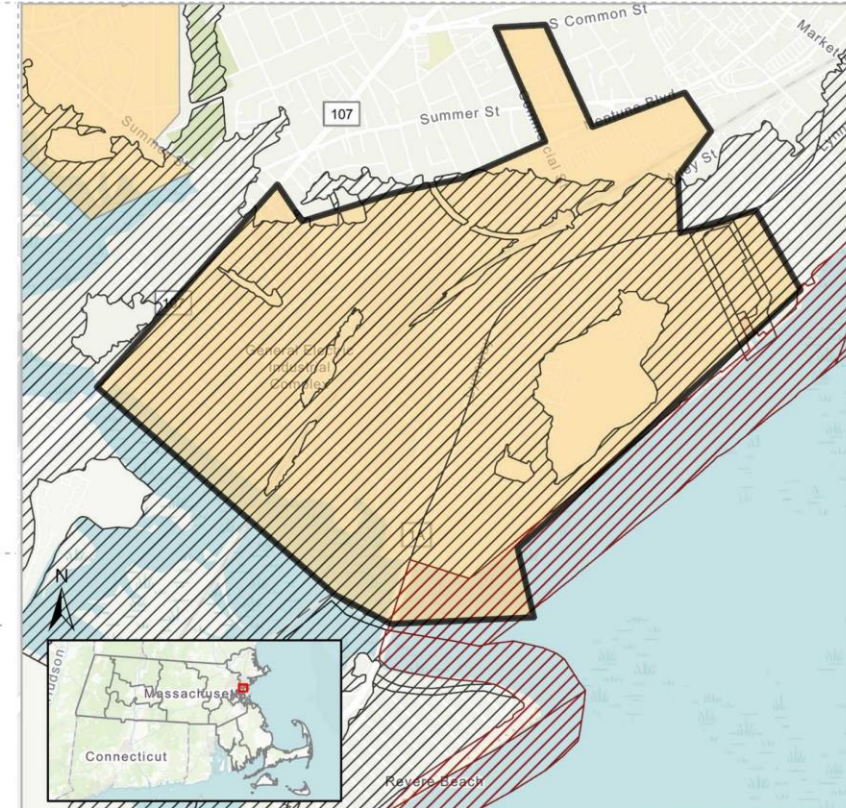
Bars show deviation from Essex County

## HOUSEHOLD OWNERSHIP



80%

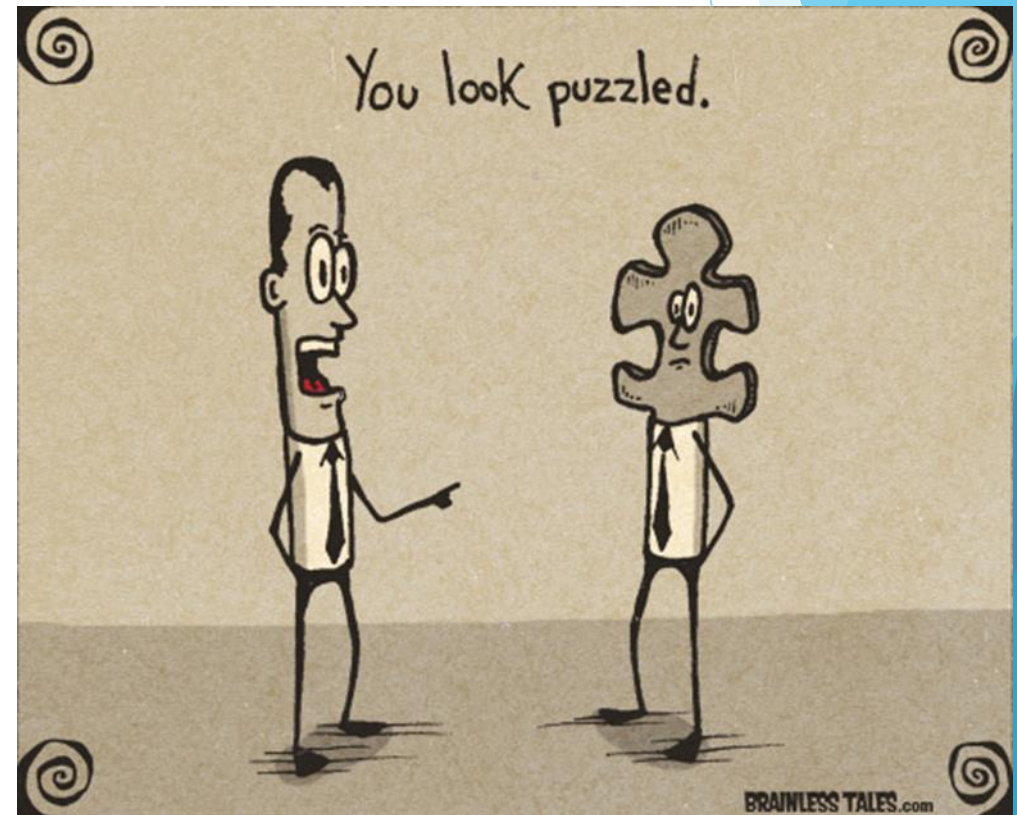
2010 Renter Occupied Housing Units (U.S. Census)



Population by Language Spoken at Home (ACS)	Total	Percent
Pop 18-64 speak Asian-Pacific Isl & No English	25	1.0%
Pop 18-64 speak Indo-European & No English	12	0.5%
Pop 18-64 speak Spanish & No English	63	2.5%
Pop 18-64 speak Other Language & No English	0	0.0%
Pop 65+ speak Asian-Pacific Isl & No English	4	0.2%
Pop 65+ speak Indo-European & No English	0	0.0%
Pop 65+ speak Spanish & No English	64	2.6%
Pop 65+ speak Oth Language & No English	0	0.0%

# What's next?

- ▶ Prioritize hotspots by greatest extent of minority/poverty?
- ▶ Meet with community to discuss flooding in those areas?
- ▶ Discover local willingness to examine potential solutions?
- ▶ And... or???



# Thank you

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State NFIP Coordinator

Department of Conservation &  
Recreation

**Flood Hazard Management Program**

Commonwealth of Massachusetts

