

Climate Displacement

Roxbury, MA

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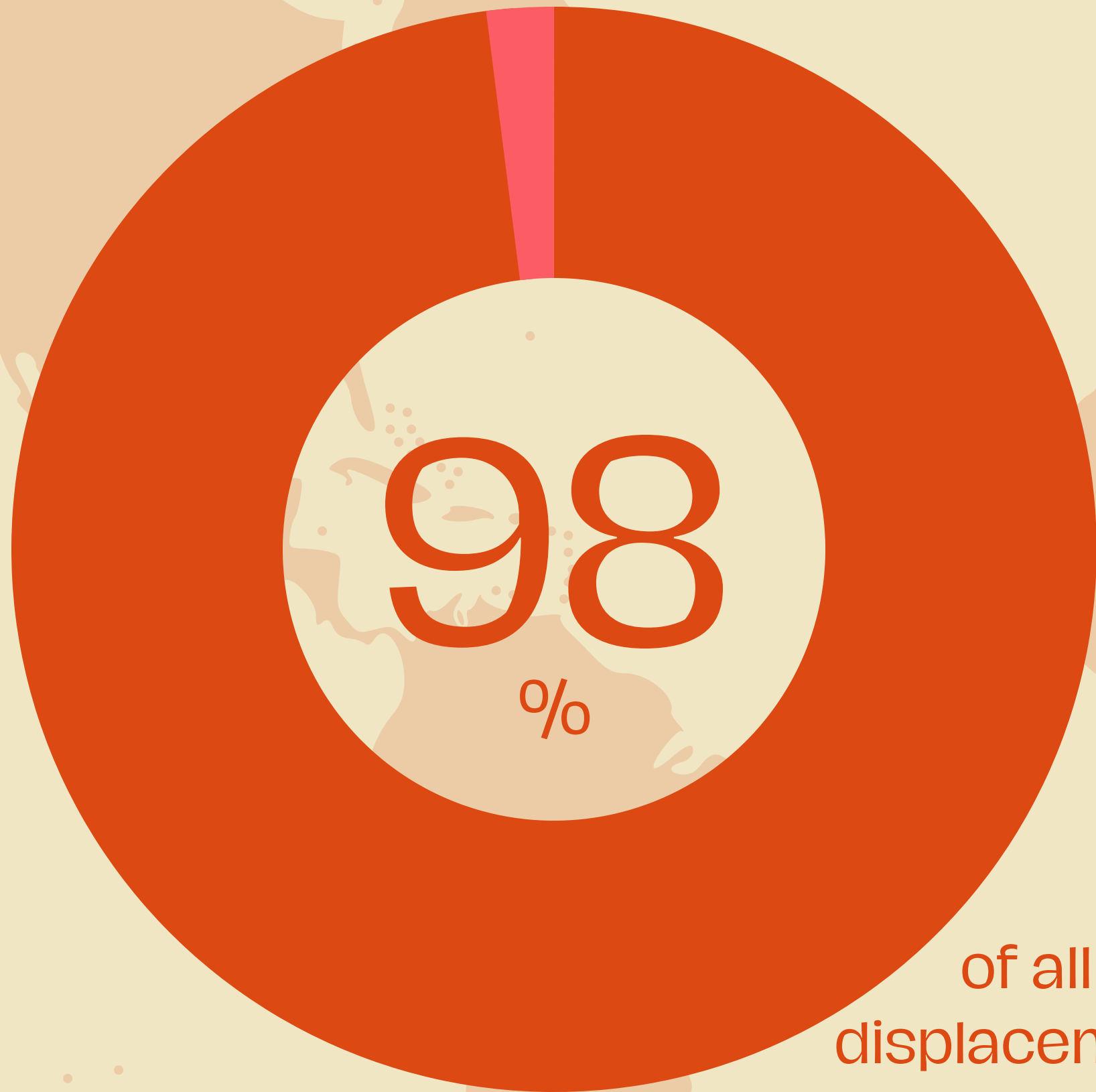
3	What is Climate Displacement?
13	How Does It Work?
19	How is Roxbury Affected?
25	What Can Be Done?

driver of refugee movements
 well-founded fear driven globe displaced people disproportionate impact
 climate displacement program context of disasters
 negative impact disaster risk reduction refugees international clean water limited natural resource
 protection for refugees country climate climate refugee
 enhanced protection for refugees
 unhcr environmental degradation hostile environment
 safer shelters climate change forced people strong partnership
 devastating consequence affected country climate crisis accurate to refer
 displacement disaster related disaster
 worst weather vulnerable country role important role refugees human crisis
 not considered disaster climate emergency clean energy vulnerable refugee situation
 focused climate action prolonged drought climate action led initiative related displacement
 urgent issue vulnerable people effect of climate change environmental sustainability overwhelming majority vulnerable community
 un refugee agency expected number disaster displacement
 international discussion indiscriminate violence adverse effect

what is climate displacement?

...is displacement due to climate disasters that physically destroy or damage property beyond repair and require inhabitants to abandon the property.

In 2020,



of all disaster displacement was due to climate, as opposed to conflict

If you breakdown
that **98%**, you will
see...

Floods
30.7%

Other
3.5%

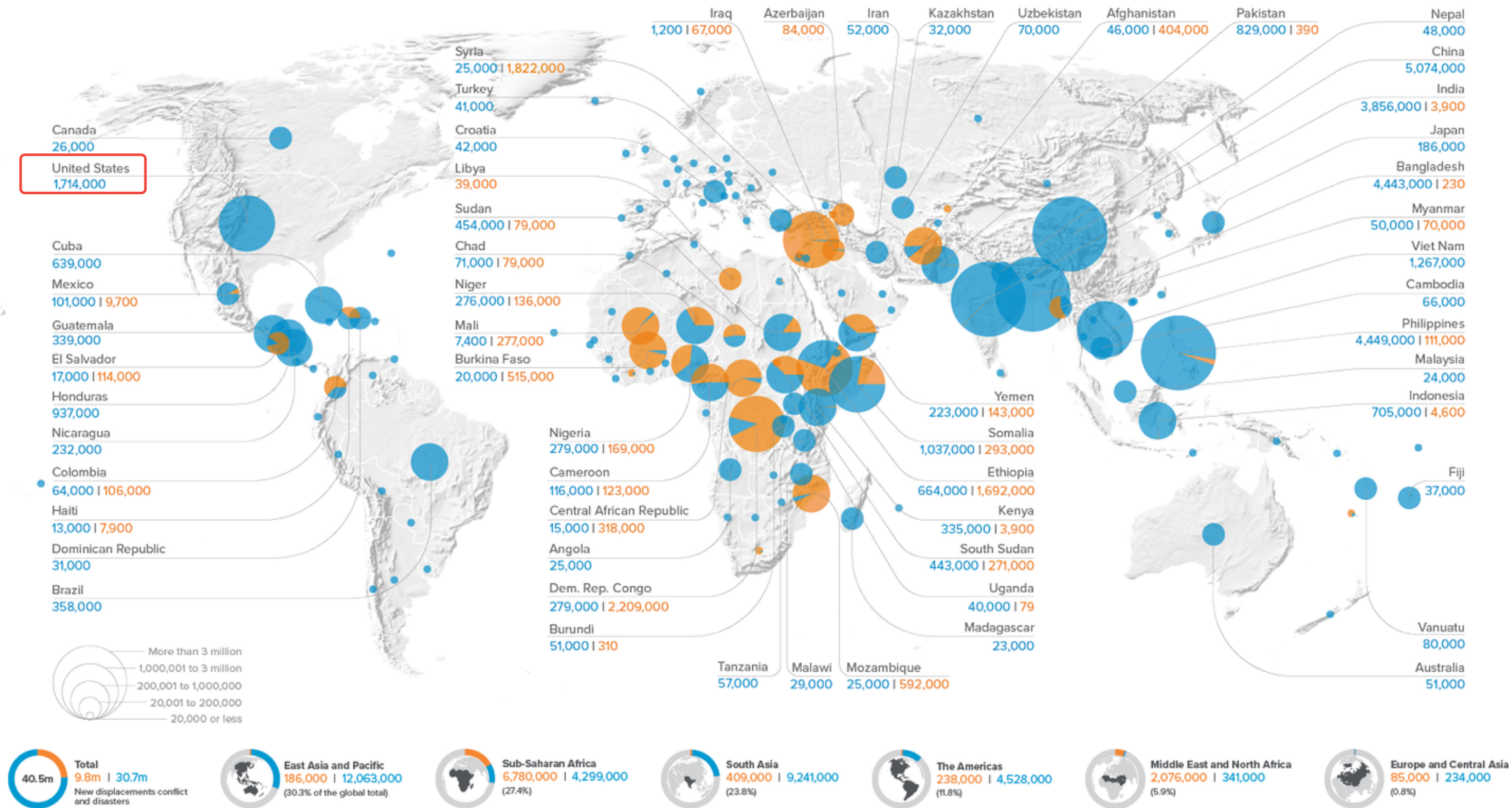
Hurricanes
29.8%

30.7
million
climate displacements

***3x** more than the
number from conflict
disasters

Storms
32%

New displacements by conflict and disasters in 2020



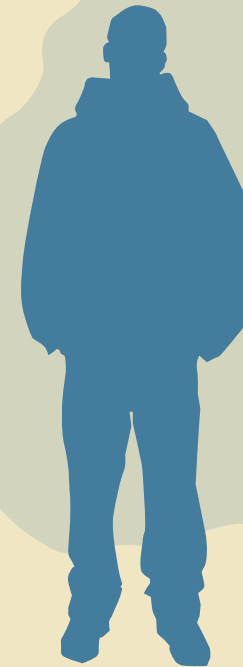
The country and territory names and figures are shown only when the total new displacements value exceeds 20,000. Due to rounding, some totals may not correspond with the sum of the separate figures. The boundaries and the names shown and the designations used on this map do not imply official endorsement or acceptance by IDMC.



Of that **30.7 million**...



7
million



climate refugees



...were **still** living internally displaced by a climate disaster at the end of the year, and remained refugees into 2021

Drivers of Climate Displacement

Source: Cash et al.

5 Categories of Climate Change

1. Storm Intensity

More frequent and more intense



This can lead to increased flooding in areas causing landslides, infrastructure destruction, and more.

2. Wildfires

More frequent and more severe



Areas with dryer air are seeing extremely long instances of wildfires. This was the main cause of displacement in the US in 2020.

3. Sea Level Rise

4ft sea level rise by 2100



As the polar ice caps melt from extreme temperatures, islands, and coastal cities will see major sea level rise and possibly cease to exist by 2050.

4. Extreme Heat

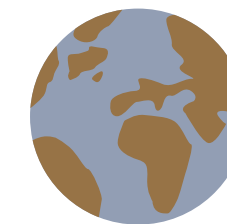
Heatwaves are hotter and longer



Average high temperatures continue to increase all across the globe and in major cities urban heat island effect is increasing temperatures even more.

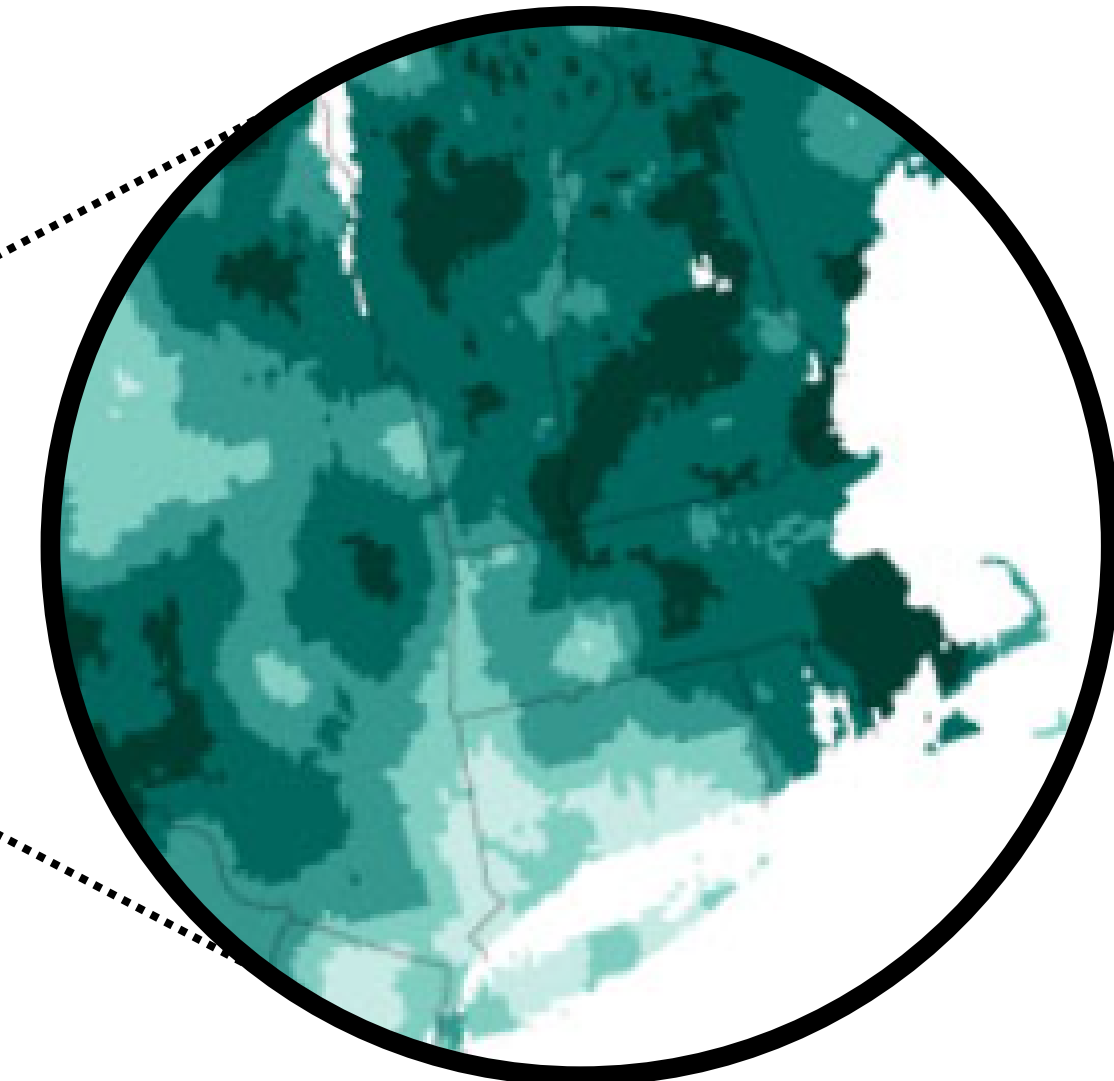
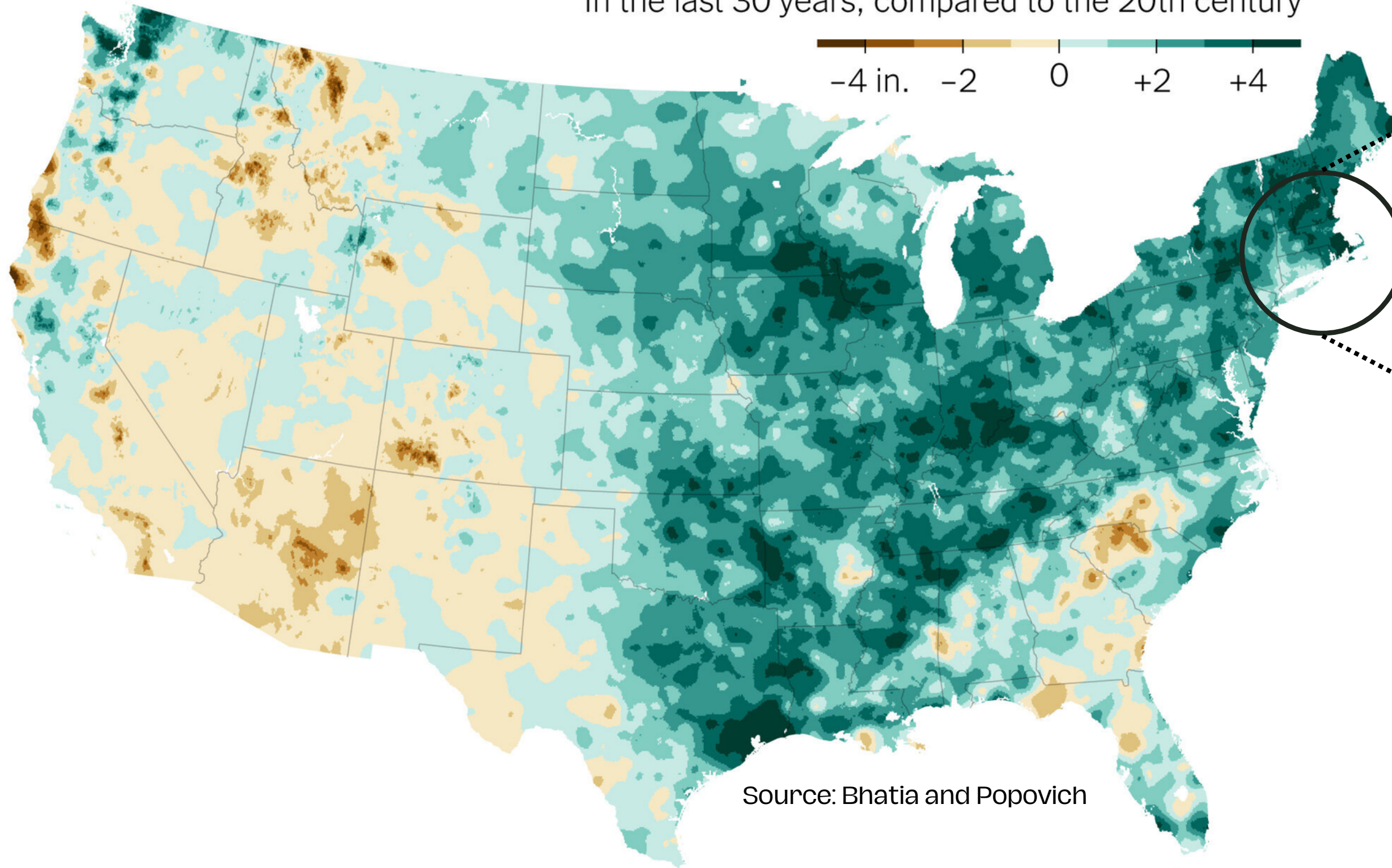
5. Drought

Less precipitation in dryer areas



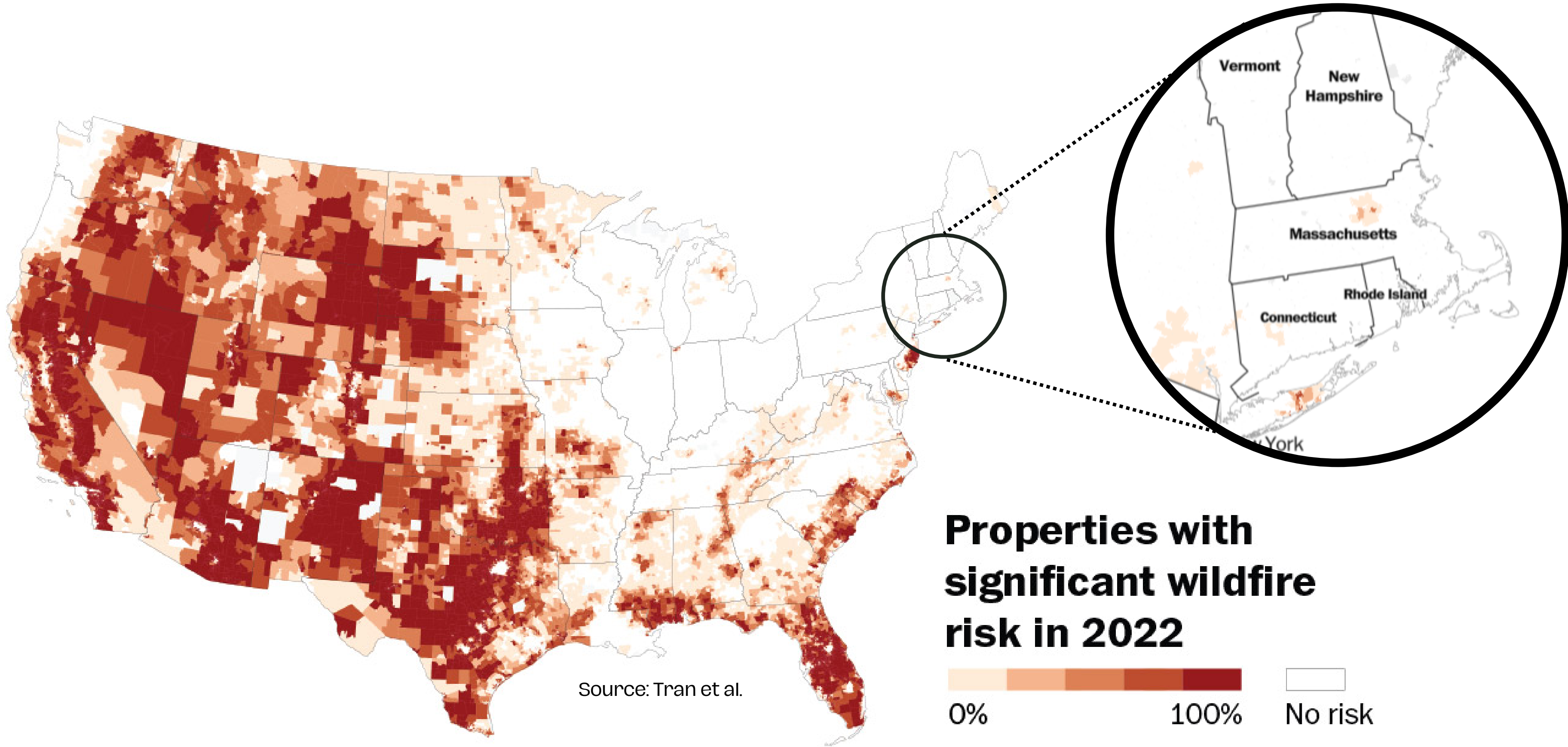
Areas with historically dryer air are seeing more intense drought seasons which will soon effect agriculture stock in many places.

Annual average precipitation, in inches
In the last 30 years, compared to the 20th century



Source: Bhatia and Popovich

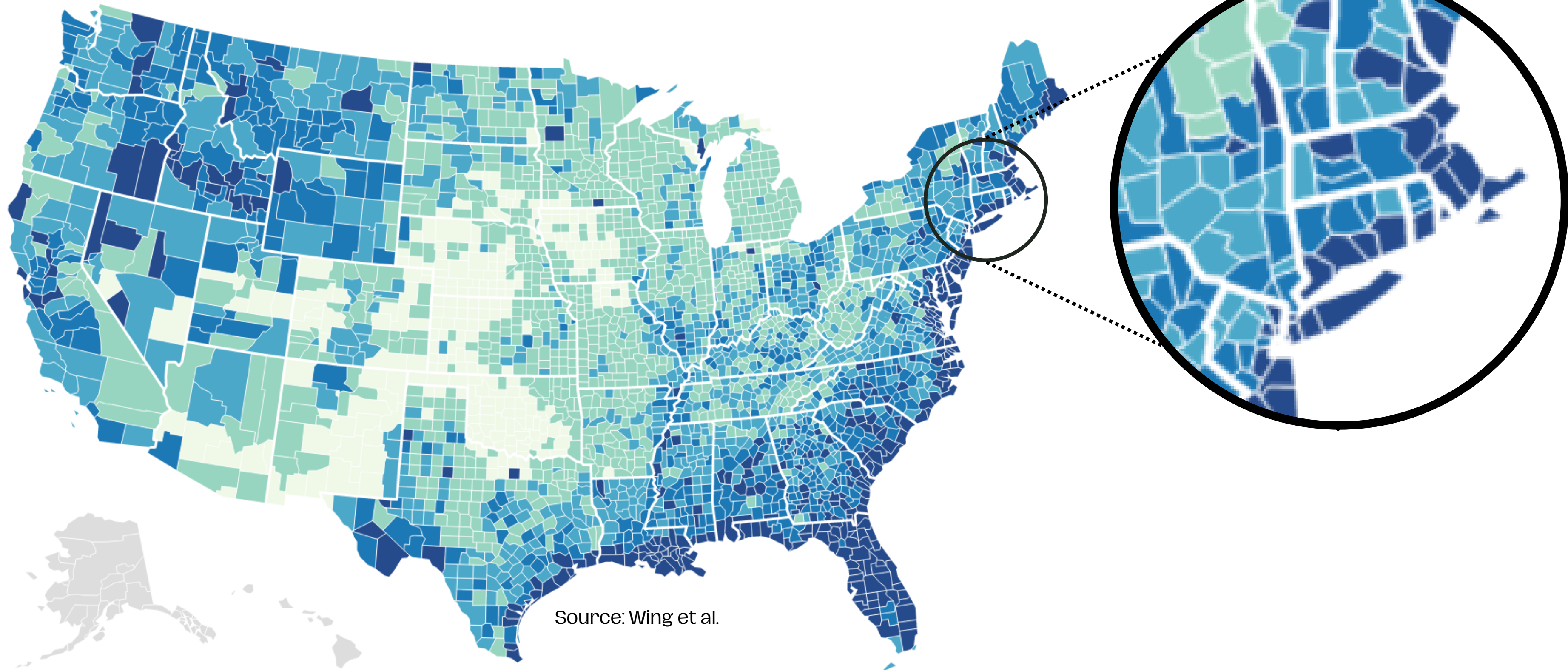
Storm Intensity & Drought



Source: Tran et al.

wildfires

Percentage rise, 2020-2050



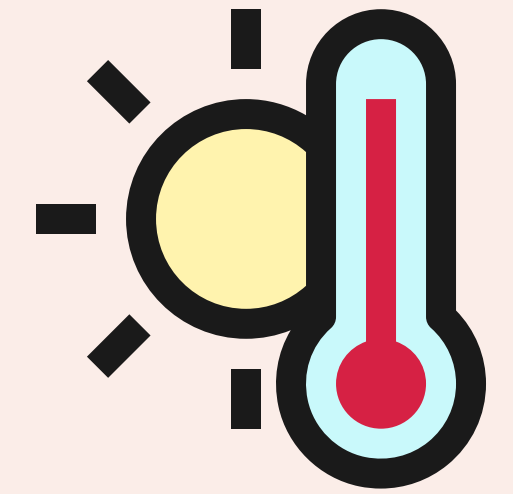
Source: Wing et al.

Flood Risk

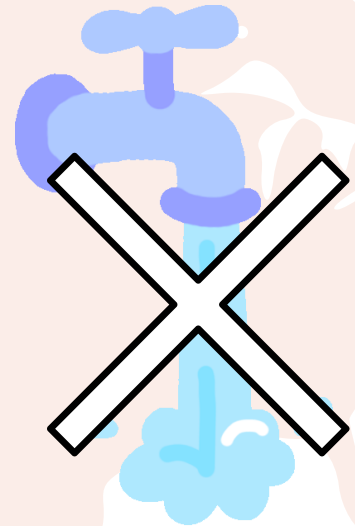
How Does
Climate Displacement
Work?

Climate Change

Threat Multiplier



Unbearable Heat



Water Scarcity- Drought



Abnormally Heavy Rainfall



Crops & Livestock Struggle to Survive
= Hunger



Increased Occurrence of Natural Disasters

**International
Displacement**

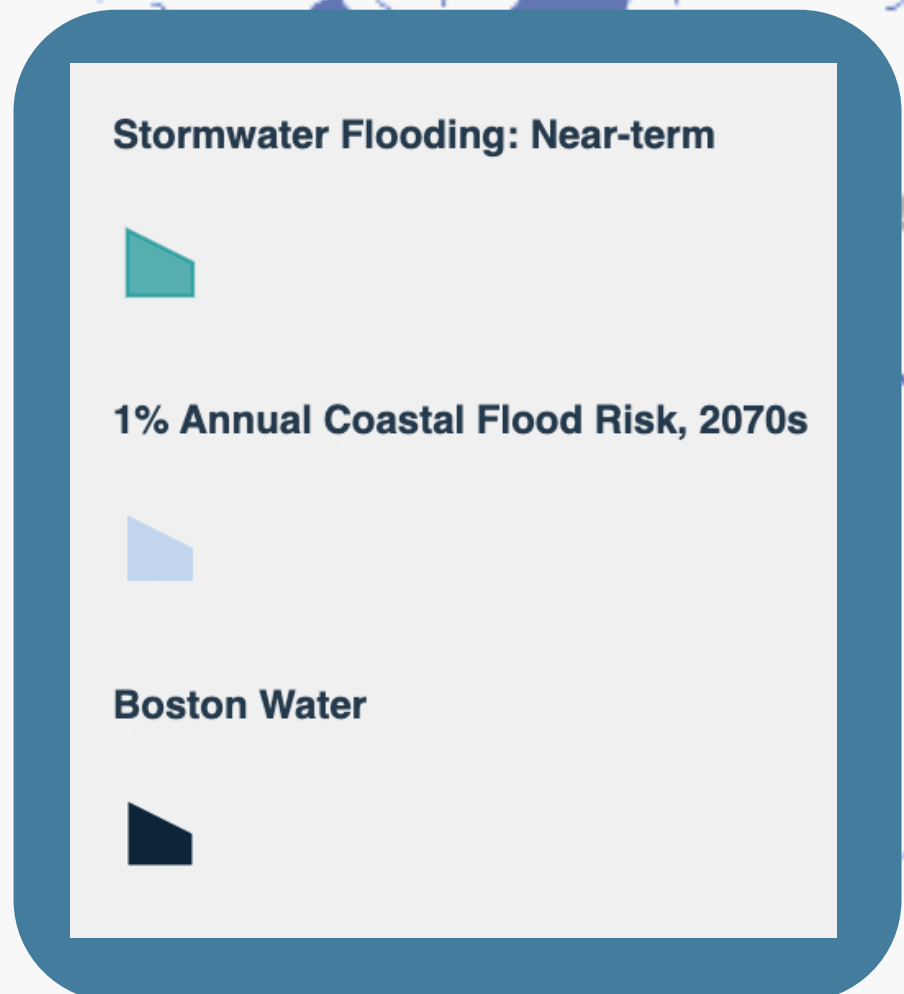
**Internal
Displacement**

**Sudden-Onset
Disasters**

**Slow-Onset
Disasters**

Evacuation

**Climate
Displacement
Scenarios**

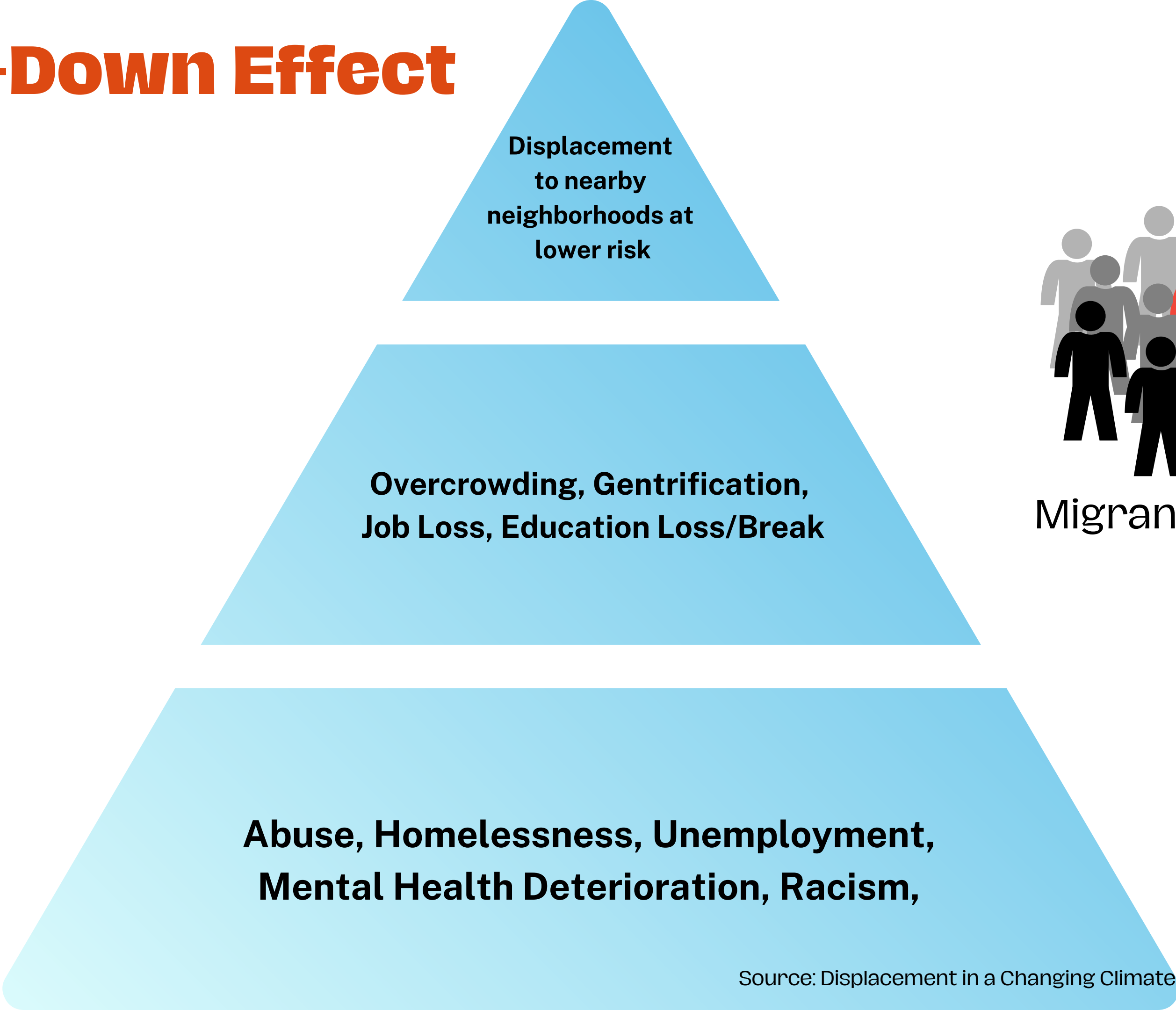


This map allows us to identify the zones in greatest danger of flooding. We must then consider that these will have to be evacuated and the people in the green/blue areas will have to move into the beige colored areas, increasing congestion and population size there.

Flooding

Source: Boston.maps.arcgis.com

Trickle-Down Effect



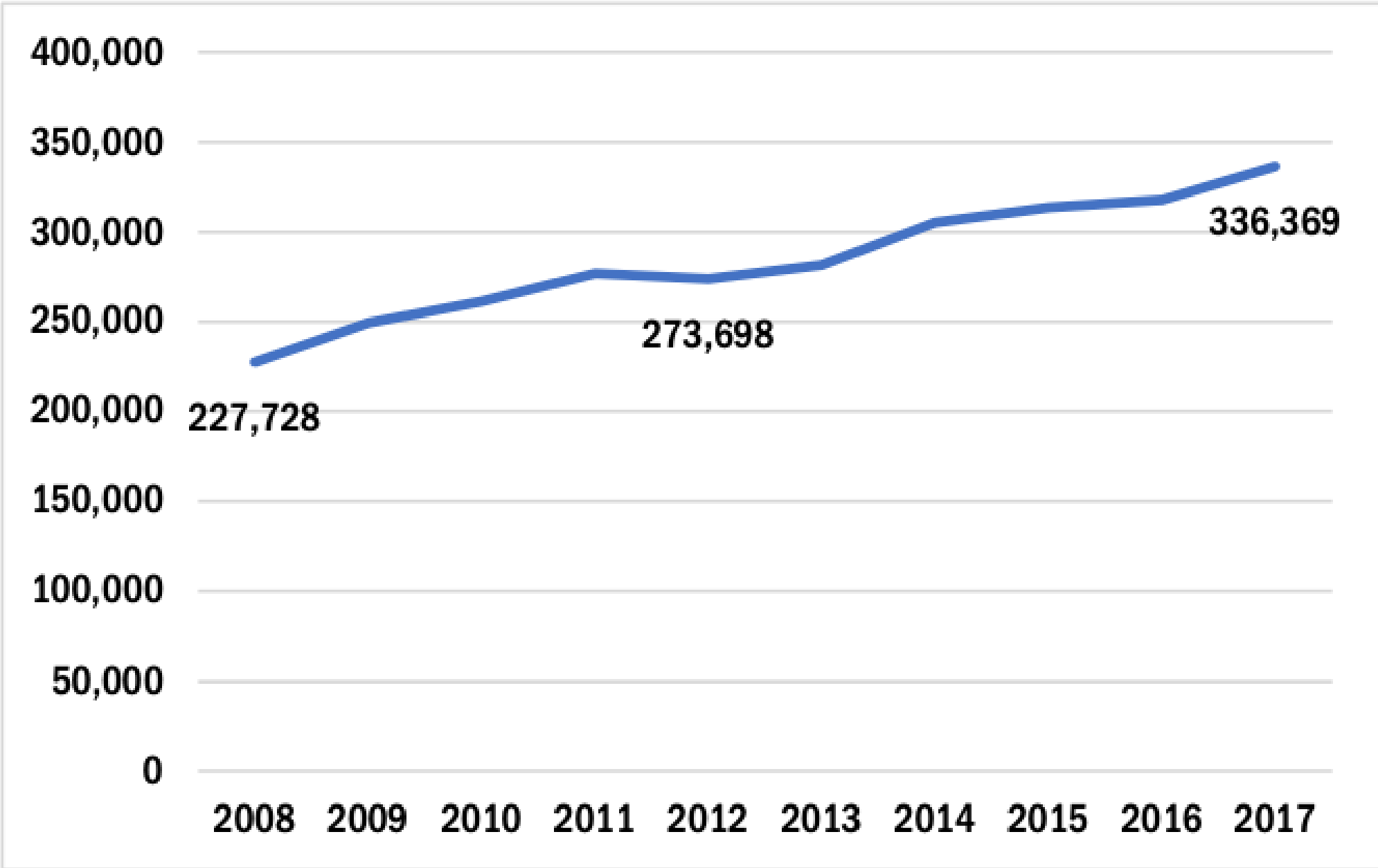
Migrant Caravans

Source: Displacement in a Changing Climate (British Red Cross)

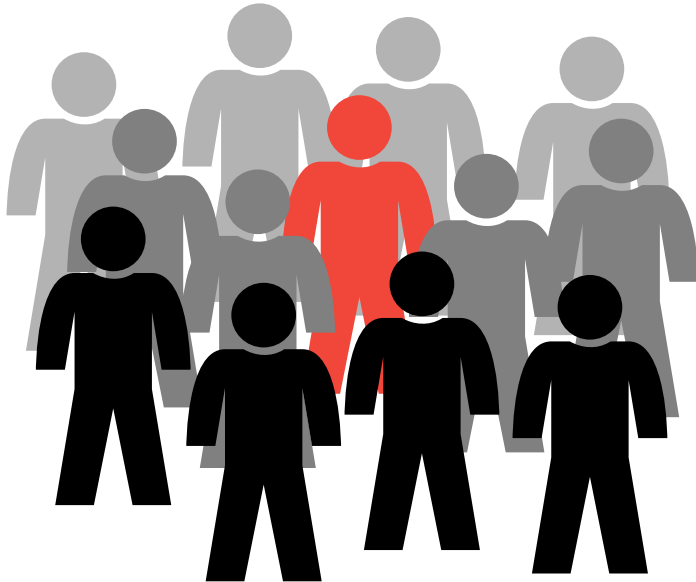
Puerto Ricans In MA

Hurricane Maria 2017

Figure 1: Puerto Rican Population from 2008 to 2017



Source: 2008-2017 American Community Survey



Puerto Rican Migrant Caravans

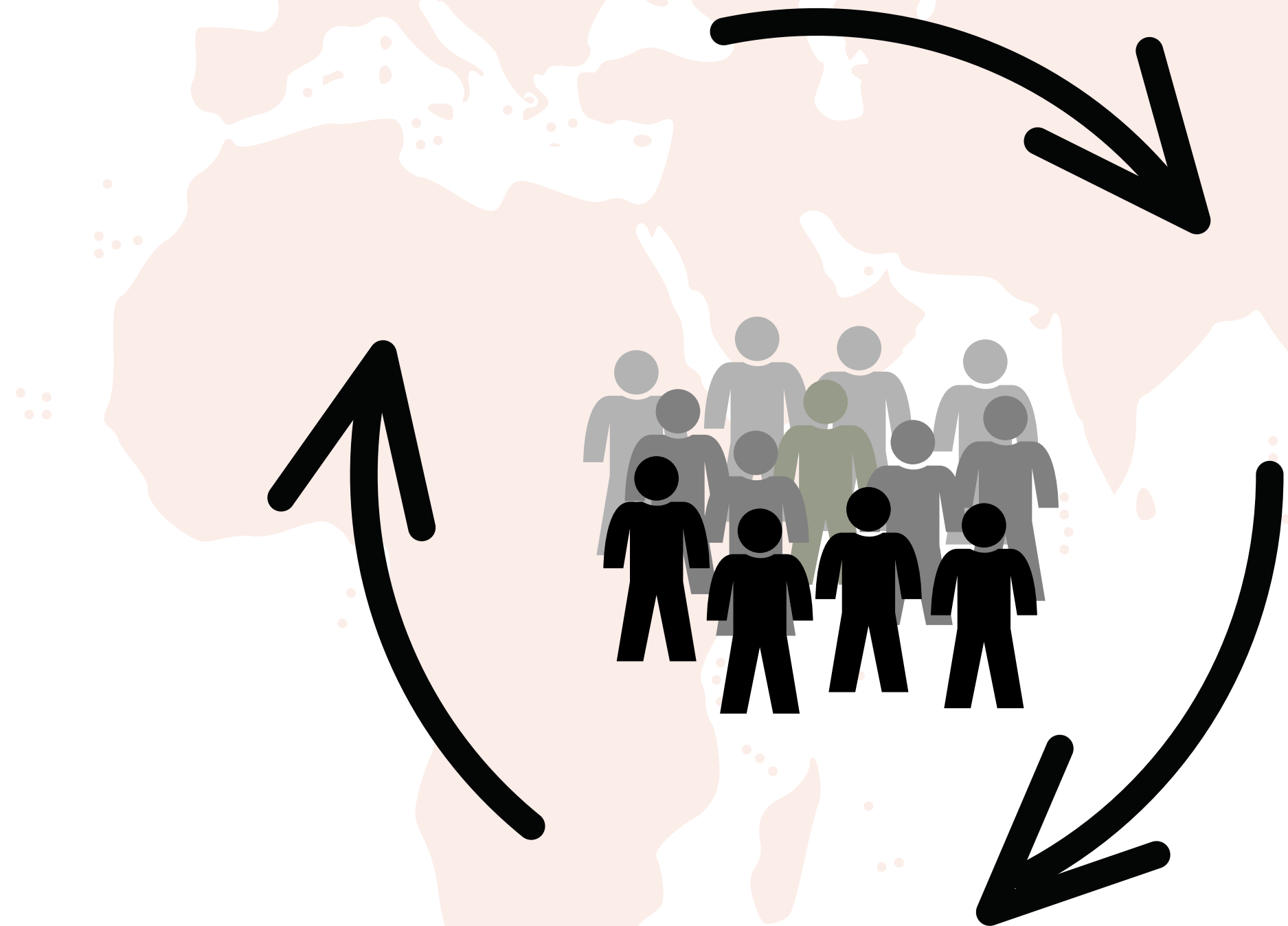
Boston has an incredibly diverse population. The following graph shows the growth of the Puerto Rican population in the State before and after Hurricane Maria (2017).

Source: Latinos in Massachusetts: Puerto Ricans (ScholarWorks at UMass Boston)

Who is most at risk?

Those least equipped to recover and adapt

- Vulnerable Populations
 - Lacking resources
 - Lacking education
 - Lacking healthcare
 - Elderly
 - Developing Countries



How Is Roxbury Affected?

How is Roxbury Affected?

From
Climate Ready:
Roxbury

TOP 2 CLIMATE ISSUES

Flooding

180 Acres vulnerable to future flooding



West Roxbury is one of the largest land areas in Boston that is vulnerable to future stormwater flooding

Heat

Hotter Temps in Urban Heat Islands



Areas with more asphalt and less tree coverage to provide shade and other cooling strategies

High % of people vulnerable to heat stroke



1. Low-income individuals
2. Older Bostonians and Children
3. Those dealing with medical illnesses

Total Population
71,600 | 9% of BOS

People of Color
59,200 | 83%

Disability
10,400 | 15%

Children
16,700 | 23%

Medical Illness
24,000 | 34%

**Low-to-No
Income**
27,700 | 39%

**Limited English
Proficiency**
11,400 | 16%

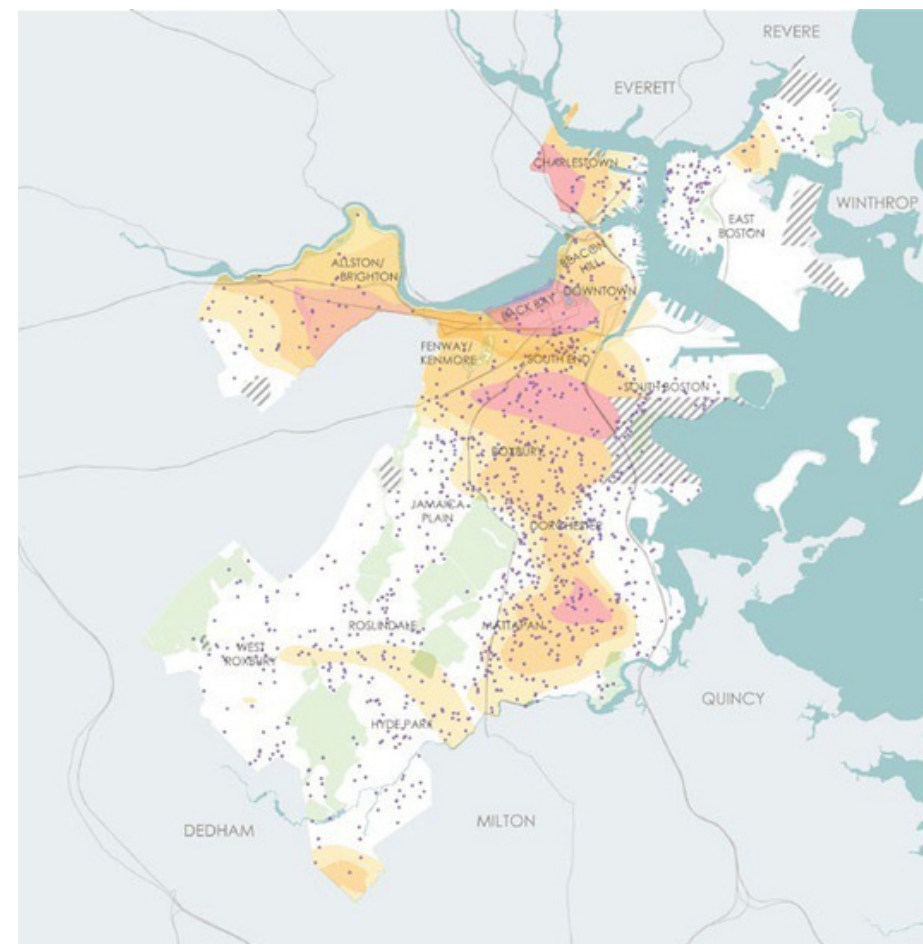
Older Adults
5,800 | 8%

From
Climate
Vulnerability
Assessment

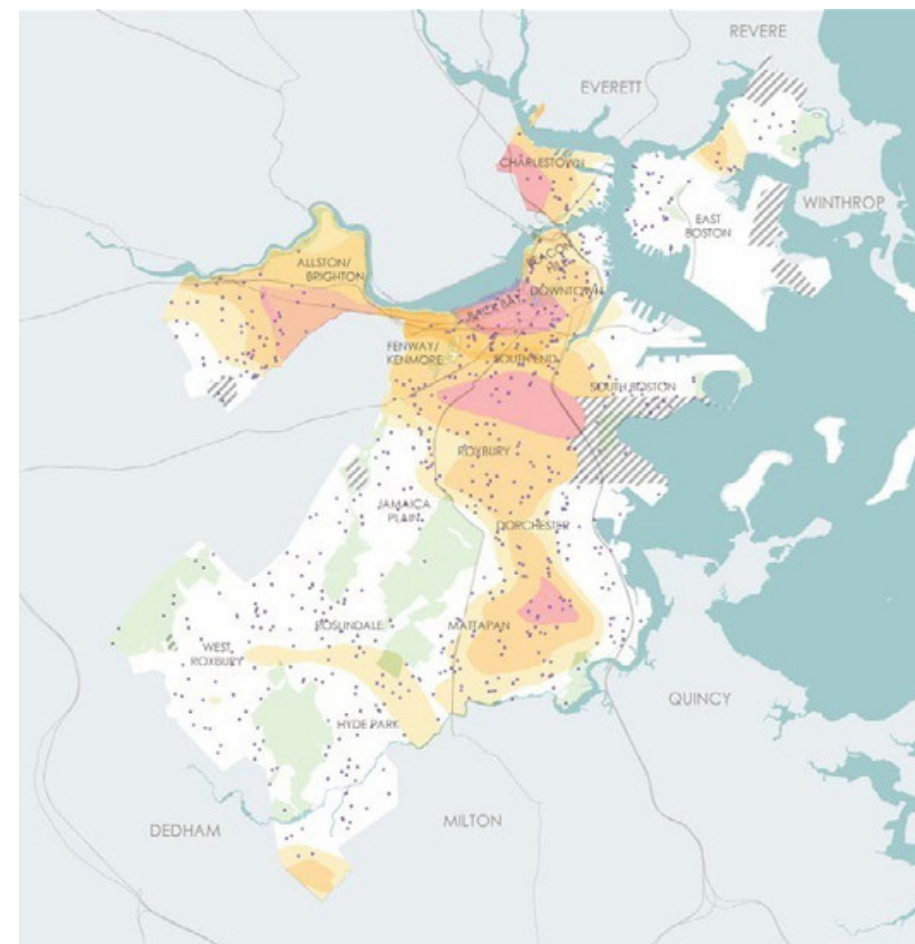
ROXBURY

Social
Vulnerability
Analysis

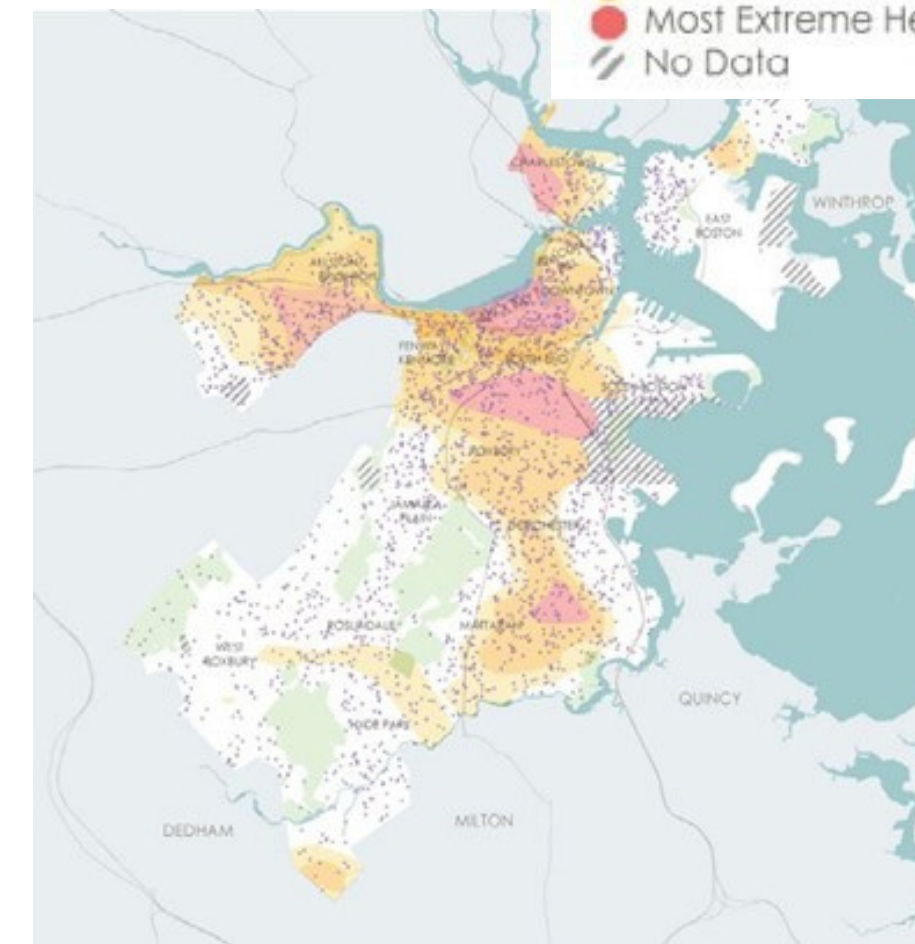
Extreme Heat



Children & Heat Island Exposure



Older Adults & Heat Island Exposure



Medical Illness & Heat Island Exposure

- 1 dot=180 People/Cases of Illness
- Heat Island
- More Extreme Heat Island
- Most Extreme Heat Island
- No Data

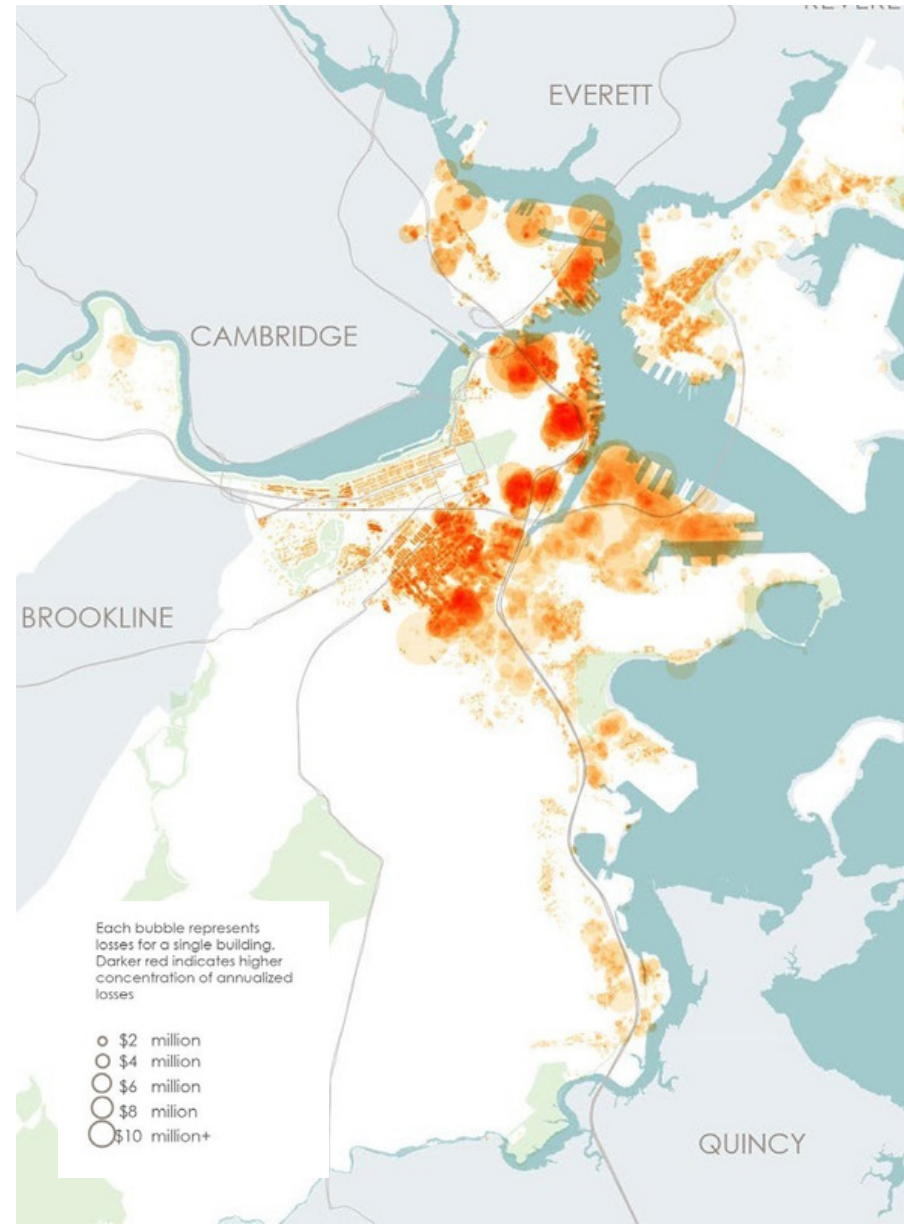
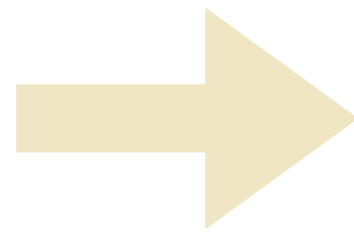
From
Climate
Vulnerability
Assessment

****Roxbury experiences a large share of Boston's extreme heat island exposure****

Annualized Losses From Buildings Due to Rising Sea Level Conditions



9-INCH RISE



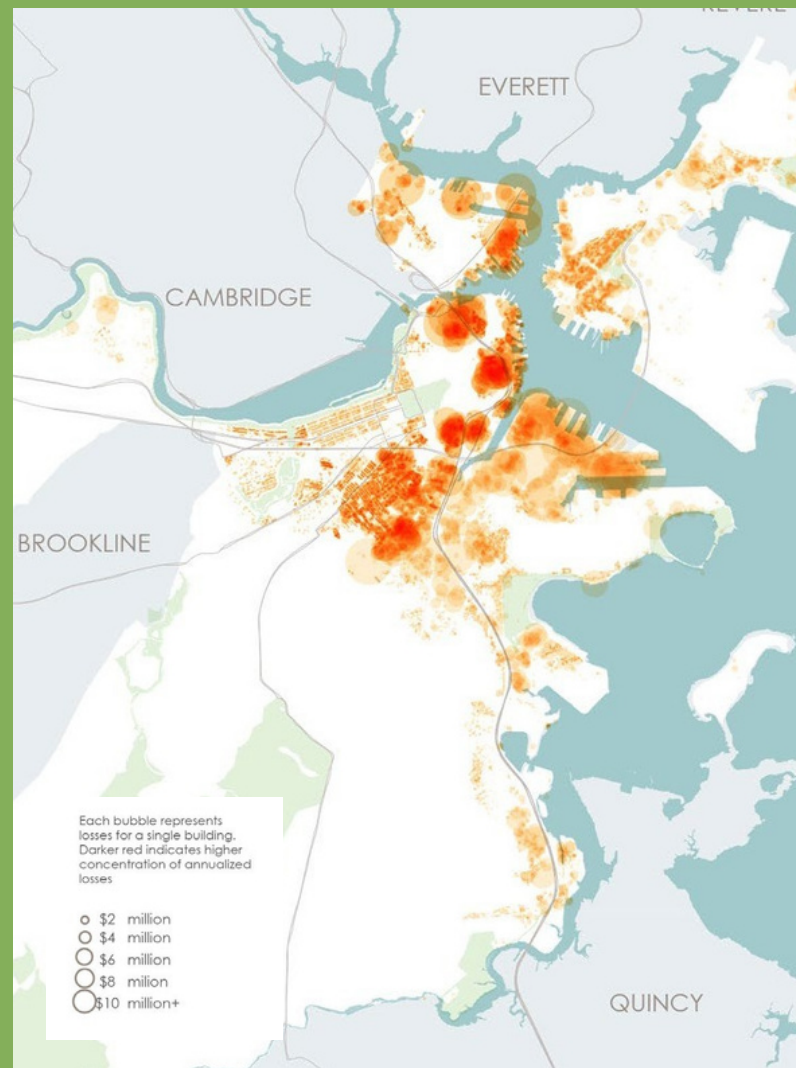
36-INCH RISE

FLOODING & SEA LEVEL RISE

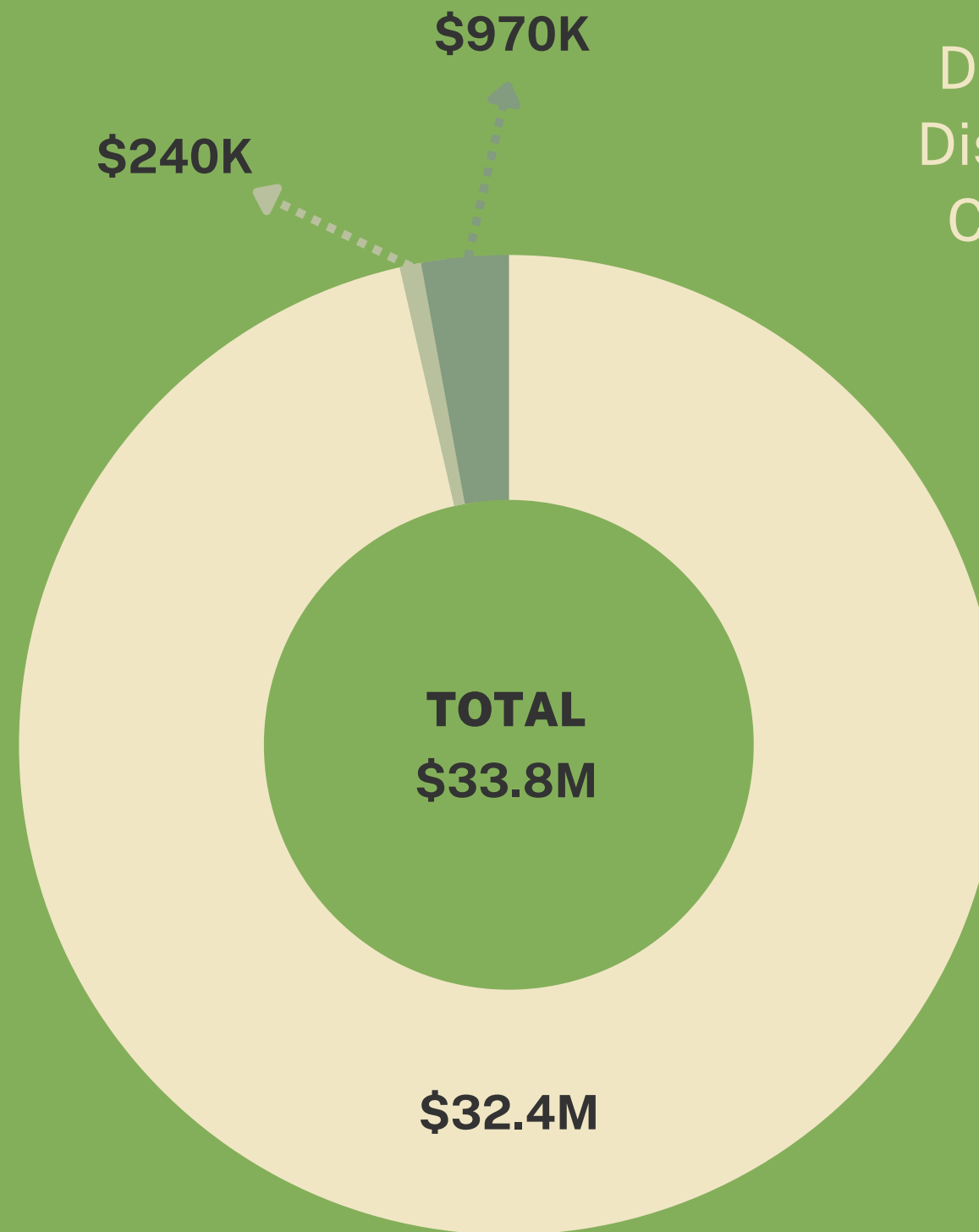
From
Climate
Vulnerability
Assessment

****Roxbury's economic losses will exponentially increase as sea level rises****

ROXBURY ANNUALIZED COSTS



36-INCH RISE



Annualized Direct Physical Damages, Stress Factors, and Displacement Costs for the 36" Climate Condition In Roxbury

- Direct Physical Damage
- Stress Factors
- Displacement Costs

From
Climate
Vulnerability
Assessment

What Can Be Done?

At a **Large** Scale

01 Protected Shores

Develop a local climate resilience plan for Roxbury to support district-scale climate adaptation.

02 Resilient Infrastructure

Develop coordinated risk response plans for extreme weather events

03 Adaptable Buildings

Help building owners assess potential impacts and increase resilience

04 City Planning

1. Imagine Boston 2030
2. GoBoston 2030
3. Michelle Wu's Boston Green New Deal

At a **Small** Scale

1

Food Access

2

**Community
Centers**

3

**Neighborhood
Empowerment
Network**

Reimagining Bodegas

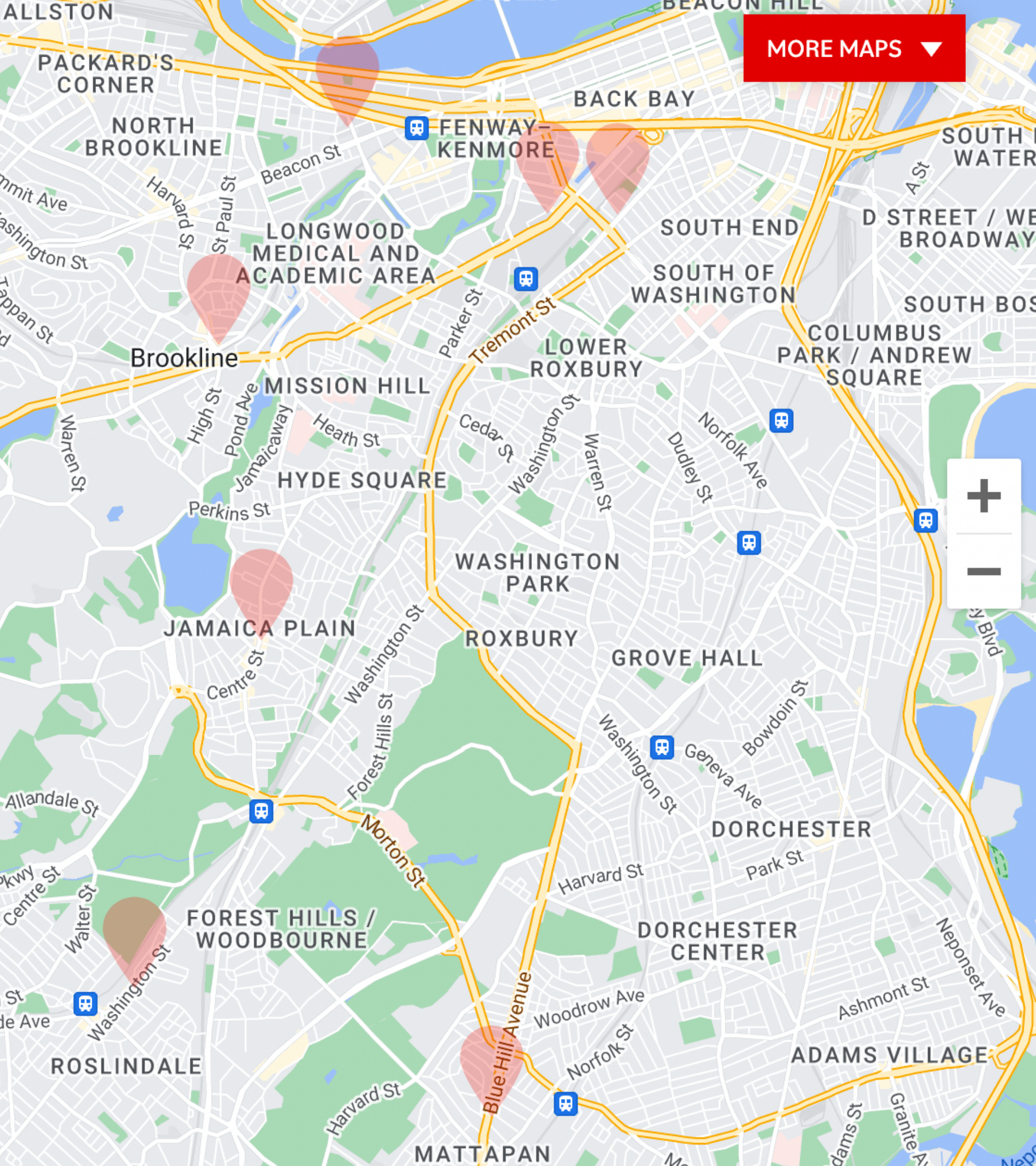


- Can Bodega's be places where people have access to free food?
- A system of community fridges integrated within the bodegas
- Case study: Healthy Bodega Initiative, NY

Bodega x Community Fridges



Community Fridges are maintained *by people in the community for people in the community*



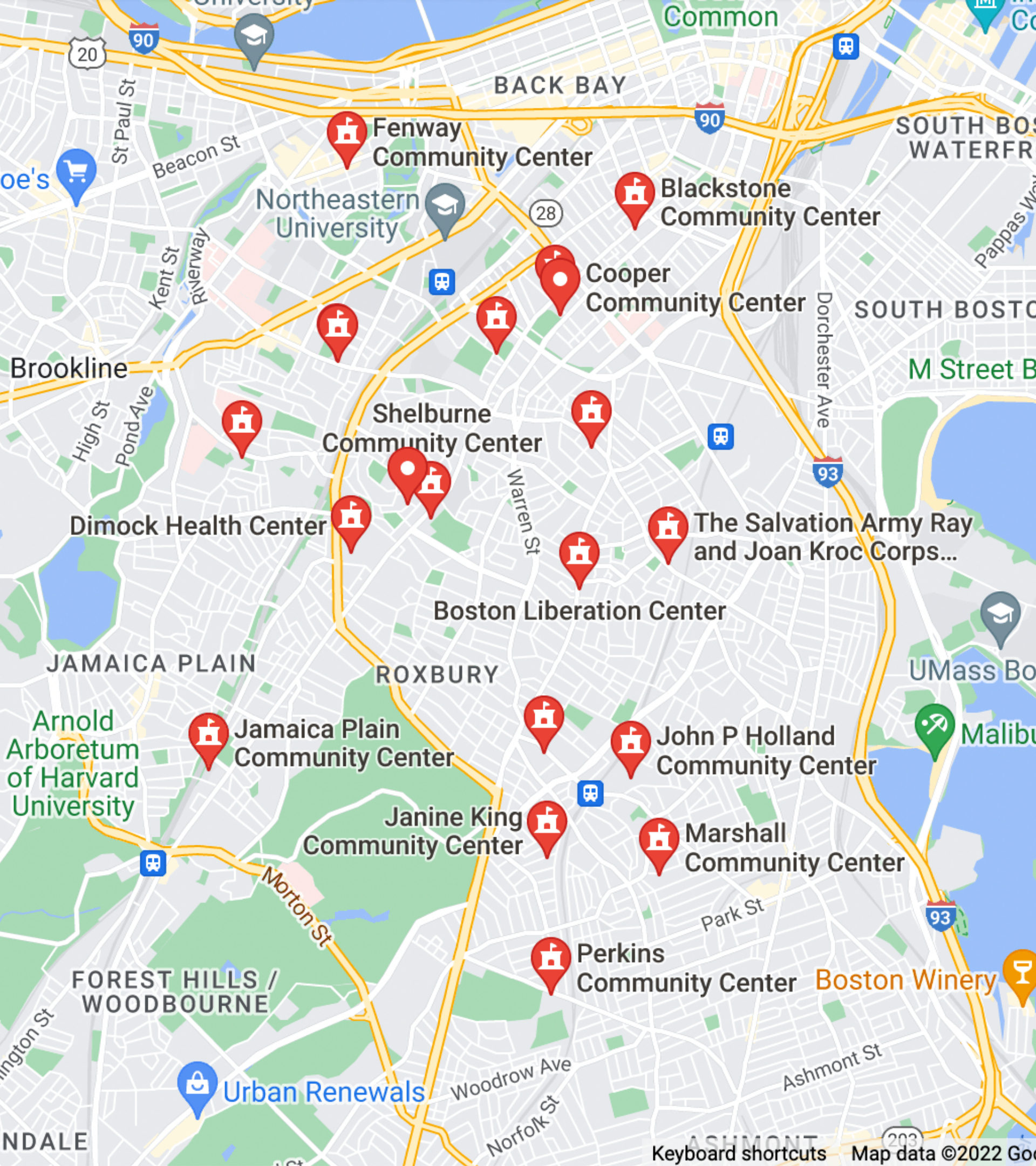
Existing Community Fridges

Mutual aid initiatives have been springing up nationwide during the pandemic, as community members look for ways to address food insecurity and other needs of their neighbors. And then there are community fridges, which have begun to appear in neighborhoods nationwide, including in and around Boston. These outdoor fridges, often built under a roof alongside some pantry shelves, are typically monitored and stocked by volunteers, filled with everything from fresh produce to canned goods and sometimes even toiletries and other non-food household essentials.

Community Centers

- Information hubs on disaster relief
- Resource allocation
- Community building
- Emergency shelter
- Neighborhood empowerment network





Existing Community Centers in Roxbury



From Google Maps

DISTRICT 7 COMMUNITY SPACES

COMMUNITY CENTERS

- 1 Orchard Garden Boys and Girls Club of Boston
- 2 Yawkey Boys and Girls Club of Roxbury
- 3 Roxbury YMCA
- 4 Shelburne Community Center
- 5 Hawthorne Youth and Community Center
- 6 Dudley St. Neighborhood Initiative
- 7 Twelfth Baptist Church
- 8 Islamic Society of Boston Cultural Center
- 9 Roxbury Branch of the Boston Public Library
- 10 Boston Center for Youth and Families - Vine St.
- 11 Boston Center for Youth and Families - Madison Park
- 12 Boston Liberation Center
- 13 Melnea A. Cass Recreational Complex

COMMUNITY SERVICE PROVIDERS

- 1 Roxbury Youthworks - Roxbury
- 2 ABCD Headstart Early Learning
- 3 Whittier Street Health Center
- 4 Morgan Memorial goodwill Industries
- 5 Boston Health Care for the Homeless Program
- 6 Dudley Street Neighborhood Initiative
- 7 Alternatives For Community & Environment (ACE)
- 8 Mothers For Justice And Equality
- 9 Massachusetts Department of Transitional Assistance - Washington St.
- 10 Dudley Square Main Streets
- 11 METCO, Inc.
- 12 The Salvation Army
- 13 Roxbury Innovation Center
- 14 Roxbury Center for Financial Empowerment
- 15 Central Boston Elder Services, Inc.
- 16 EforAll Roxbury
- 17 WriteBoston
- 18 Urban League of Eastern Massachusetts (ULEM)
- 19 Transformative Culture Project
- 20 Families for Justice As Healing
- 21 Home For Little Wanderers
- 22 Urban Edge
- 23 Dimock Health Center
- 24 Sojourner House Inc.
- 25 NAACP
- 26 Children's Services of Roxbury

- 27 Project Hope Boston
- 28 The Salvation Army Ray and Joan Kroc Corps Community Center
- 29 Black Community Info Center Inc. (Imani House)
- 30 Roxbury Multi-Service Center, Inc.
- 31 ABCD Roxbury/North Dorchester Neighborhood Opportunity Center
- 32 Greater Grove Hall Main Streets
- 33 ABCD Walnut Grove Headstart
- 34 Freedom House Inc.
- 35 Casa Myrna

RELIGIOUS INSTITUTIONS

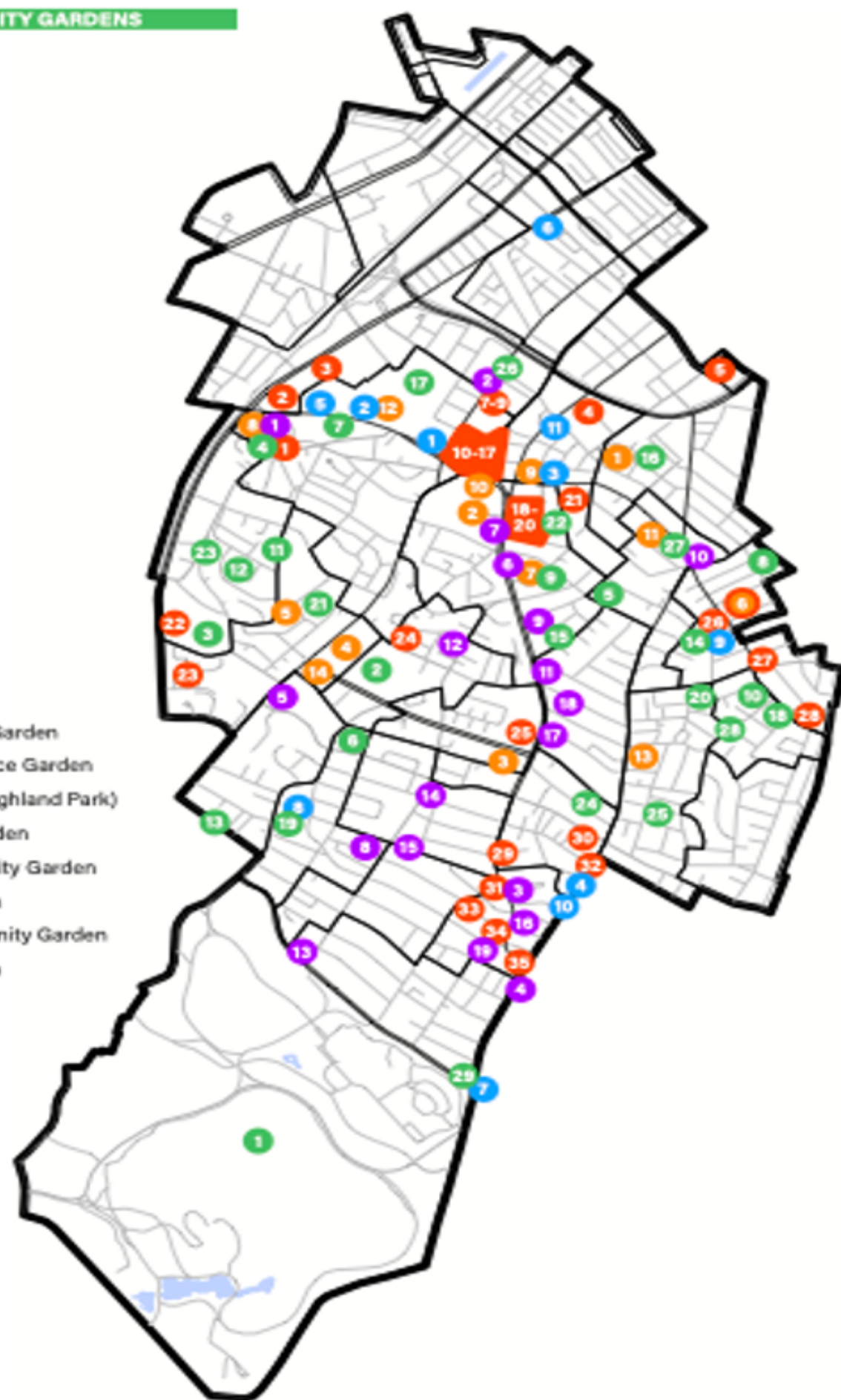
- 1 Islamic Society of Boston Cultural Center
- 2 Mosque for Praising Allah
- 3 Masjid Al-Quran
- 4 Muhammad's Mosque (Grove Hall Nation of Islam)
- 5 Boston Islamic Center
- 6 Twelfth Baptist Church
- 7 Resurrection Lutheran Church
- 8 Pleasant Hill Baptist Church
- 9 St. John Missionary Baptist Church
- 10 St. Patrick Catholic Church
- 11 Church of God of Prophecy
- 12 Church of Christ
- 13 Dorchester Berea Seventh-day Adventist Church
- 14 Bethel Pentecostal Church
- 15 First Christian Union - Boston
- 16 First Haitian Baptist Church of Boston
- 17 Roxbury Presbyterian Church
- 18 Warren Street Baptist Church
- 19 Beulah Pilgrim Holiness Church

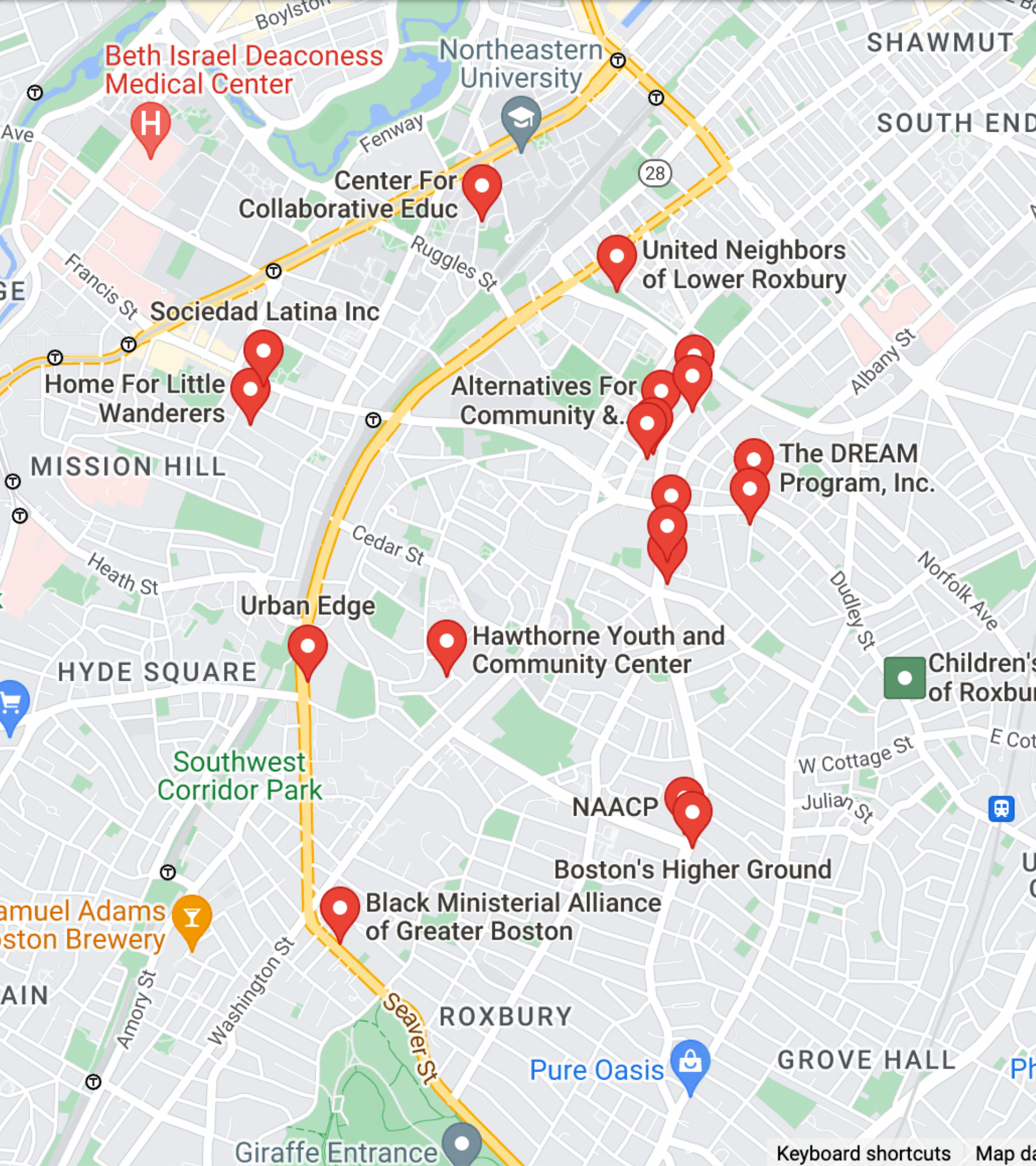
PUBLIC ART & MURALS

- 1 Faces of Dudley
- 2 The Lab
- 3 171 Dudley St
- 4 Breathe Life #1
- 5 Breathe Life #2
- 6 Breathe Life #3
- 7 'Prince' Electrical Box
- 8 Eternal Presence (Big Heads)
- 9 Our Tierra Livri
- 10 No Strings Detached
- 11 Between Wind and Water

PUBLIC PARKS & COMMUNITY GARDENS

- 1 Franklin Park
- 2 Malcolm X Park
- 3 Marcella Playground
- 4 Jeep Jones Park
- 5 Gertrude Howes Playground
- 6 Horatio Harris Park
- 7 Roxbury Heritage State Park
- 8 Clifford Playground
- 9 African Meeting House Parks
- 10 Mary Hannon Park
- 11 St Monica's Park
- 12 Highland Park
- 13 Robert Lawson Park
- 14 Dennis St. Park
- 15 Roxbury Skatepark
- 16 Orchard Park
- 17 Columbia St. Soccer Field
- 18 Salvation Army Field
- 19 Crawford Street Playground
- 20 Food Project
- 21 East Cottage Community St. Garden
- 22 Phyllis Wheatley / Warren Place Garden
- 23 Community Garden (Inside Highland Park)
- 24 Savin / Maywood Streets Garden
- 25 Dacia and Woodcliff Community Garden
- 26 Shawmut Ave Mosque Garden
- 27 Jardin De La Amistad Community Garden
- 28 Folsom St Community Garden
- 29 Puddingstone Garden





Existing Non-Profit Organizations in Roxbury

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