Socio-Technical Mapping:

Thinking About the Built Environment

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Outline – Technical

- Snapshot of *the now – what is it that we're here to do?*
- History of *the then – what happened here before we got here?*
- Technical implications of *the then* for *the now – why here? why now?*
- Implications of *the now – what comes next?*





Outline – Socio-Technical

- Snapshot of *the now* – ***who lives here?***
- History of *the then* – ***what happened here before we got here?***
- Technical implications of *the then* for *the now* – ***why not someplace else? (why here in this neighborhood rather than there?)***
- Implications of *the now* – ***what are we setting in motion? what is the impact of what we're doing? Is the impact the same for everyone?***

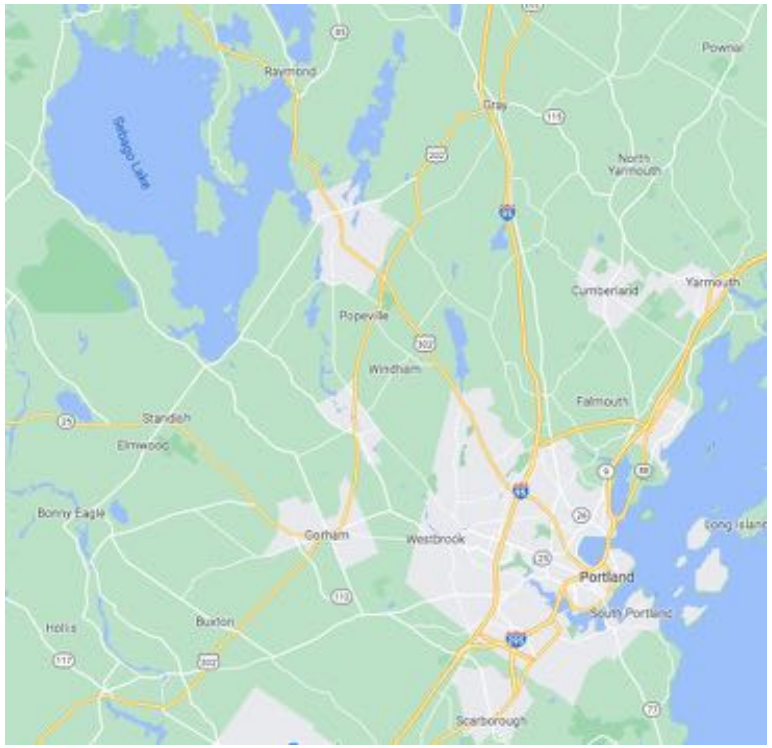


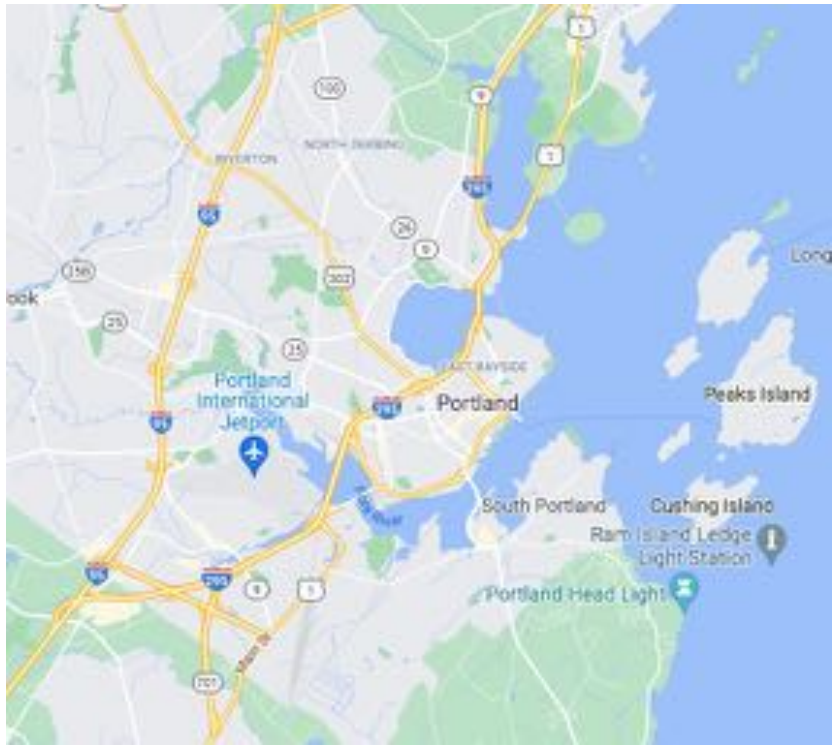


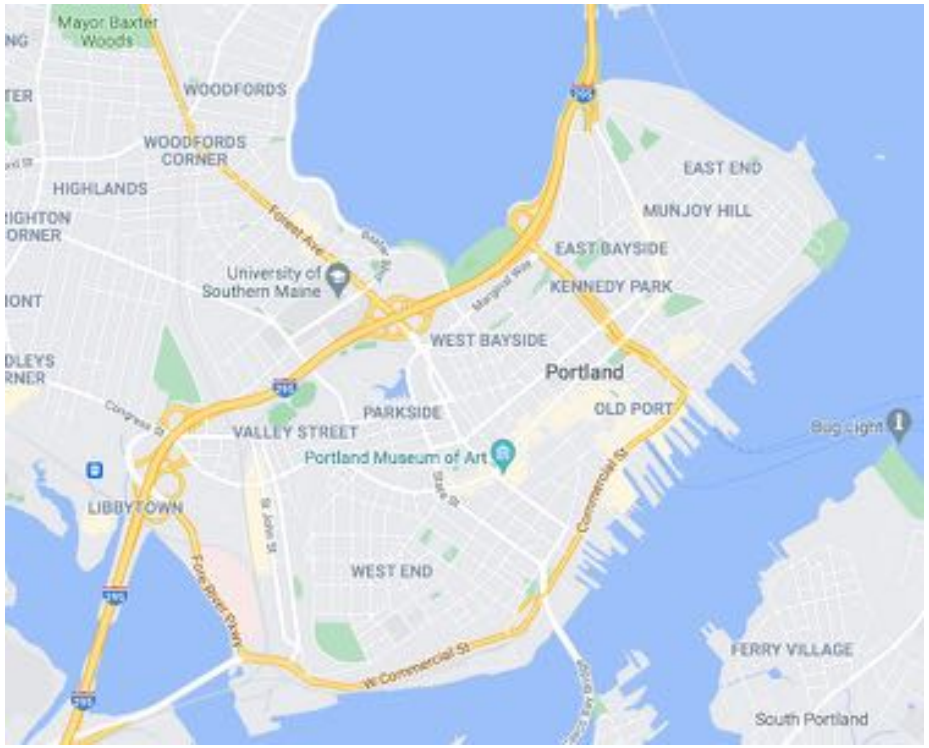
Terminology | Framing

- Terminology – Engineering
  - How we talk about our work frames how we think about our work
  - How we think about our work frames how we see our own role in what we do
- Terminology – The Built Environment
  - How do we think about cities?
  - How do we think about people who live in cities?
- What role does engineering play in creating | shaping | limiting | removing?
- What is our role (if any?) as engineers with respect to community?
- What do we think about ideas of access? agency? ownership?

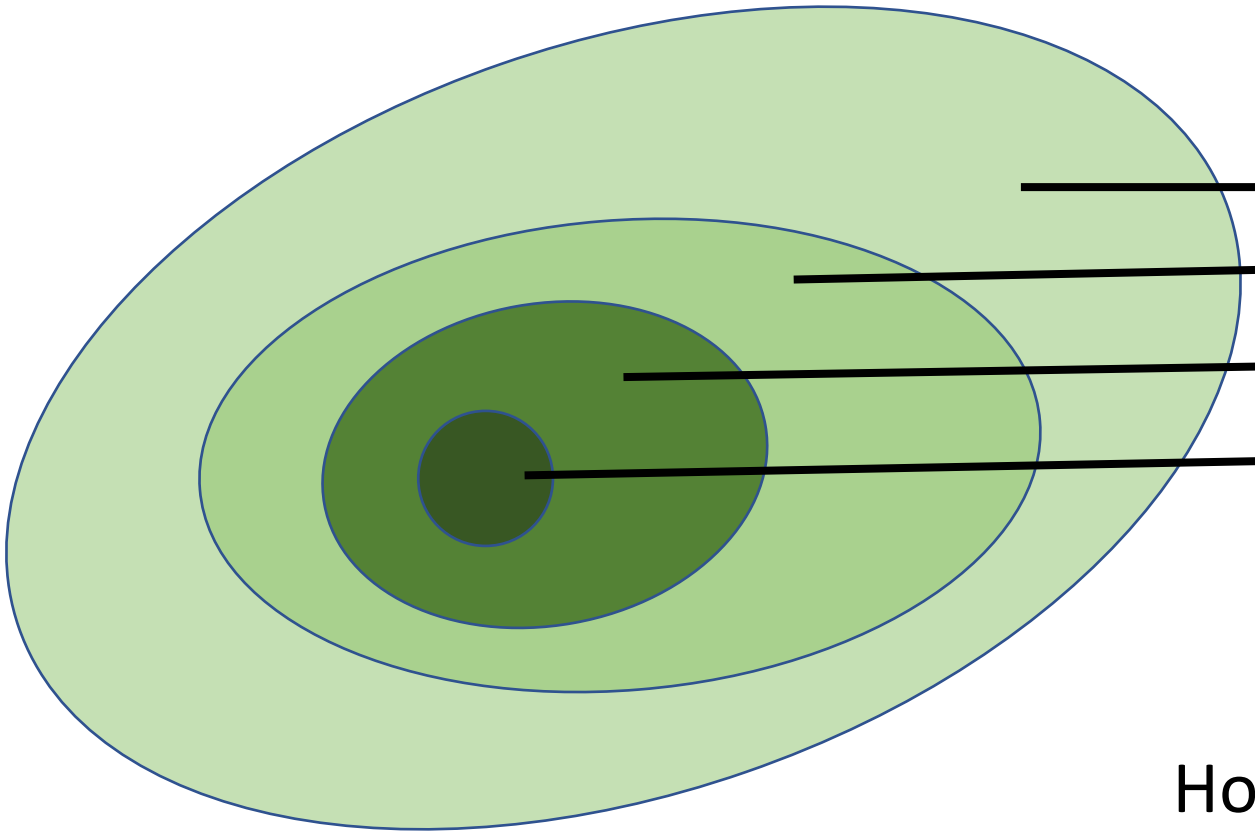
Socio-Technical Mapping - Portland, ME







Framework: Questions of Scale



What varies by:

State

County

City

Neighborhood

How do we think about what (who) *representation* looks like (is)?

Portland Demographics (who lives here now?)

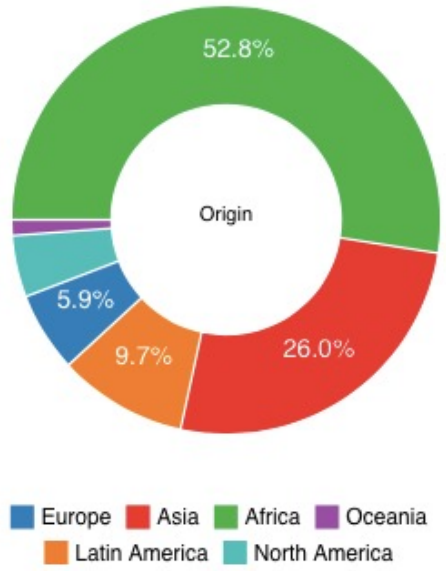
- Population: 65,835 (state: 1.3M)
- Racial and Latinx composition
  - White: 84.6% (state: 94.4%)
  - Black or African American: 8.5% (state: 1.7%)
  - Asian: 3.5% (state: 1.3%)
  - 2 or more races: 2.9% (state: 1.8%)
  - Native American: 0.2% (state: 0.7%)
  - Native Hawaiian or Pacific Islander: 0.1% (state: NA)
  - Latinx: 3% (state: 1.8%)
- Median income: $33,470 (state: $29,808)

How about relative to Cumberland County?

• Population	City: 65,835	County: 281,690	State: 1.3M
• Composition			
• White:	City: 84.6%	County: 92%	State: 94.4%
• Black:	City: 8.5%	County: 3.2%	State: 1.7%
• Asian:	City: 3.5%	County: 2.4%	State: 1.3%
• Native American:	City: 0.2%	County: 0.4%	State: 0.7%
• Latinx:	City: 3.0%	County: 2.2%	State: 1.8%
• Median $$:	City: $33,470	County $35,560	State: $29,808

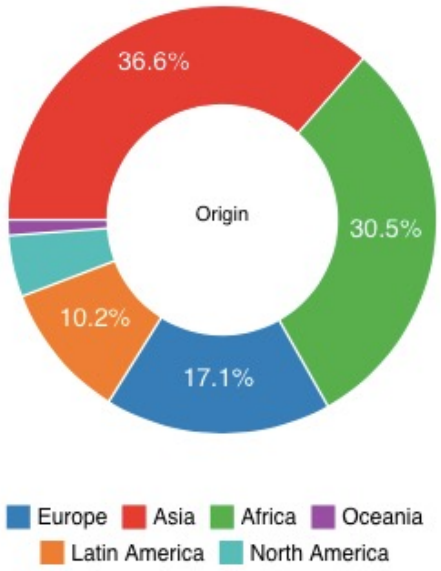
Portland: Where are folks from?

Origin of Non-Citizens



Non citizens include legal permanent residents (green card holders), international students, temporary workers, humanitarian migrants, and illegal immigrants.

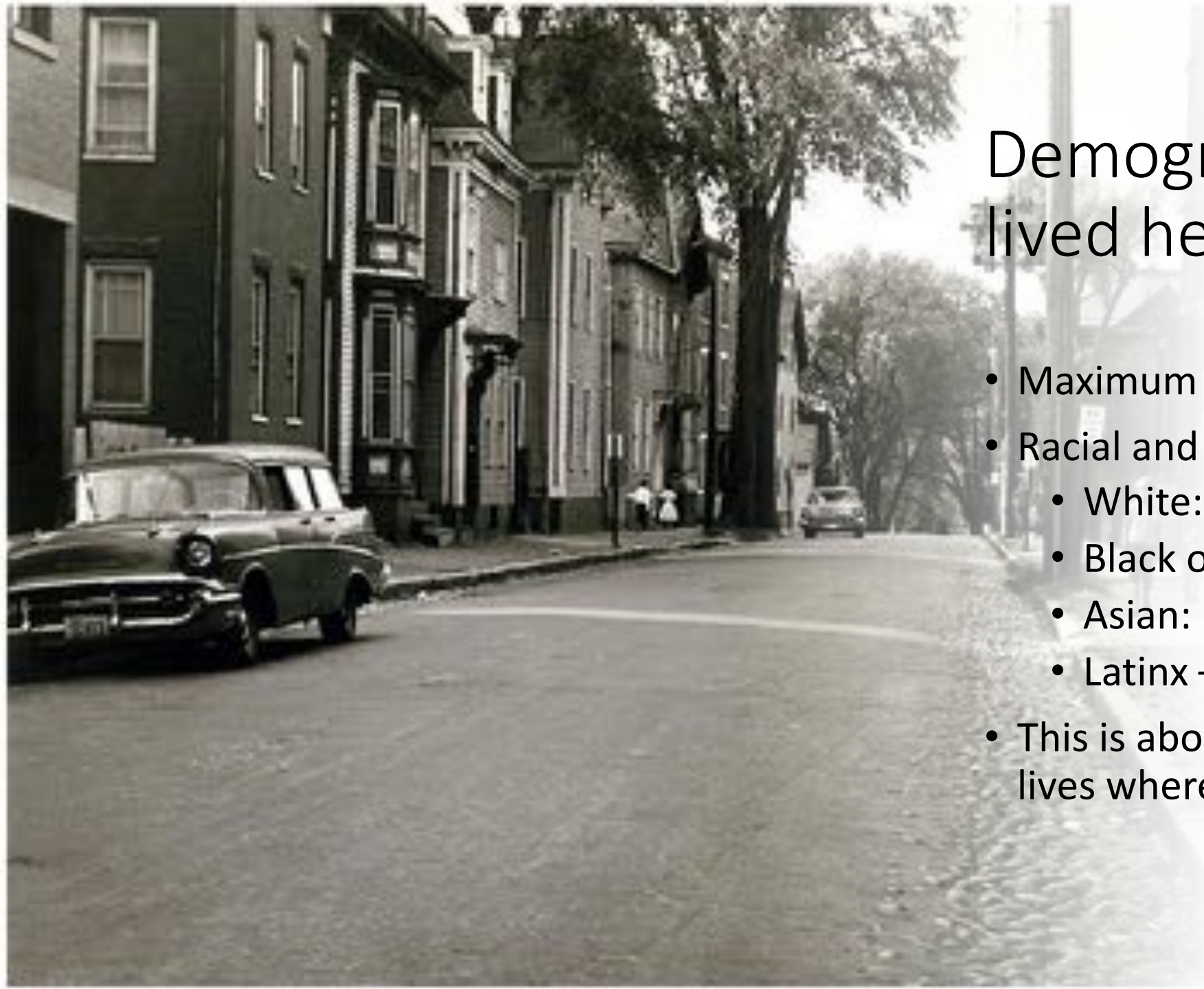
Origin of Naturalized Citizens



47.92%	Born in Portland
88.88%	Native Born
11.12%	Foreign Born
5.40%	Non Citizen
5.72%	Naturalized

Place of Birth

88.88% of Portland residents were born in the United States, with 47.92% having been born in Maine. 5.40% of residents are not US citizens. Of those not born in the United States, the largest percentage are from Africa.



Demographics (who lived here back when?)

- Maximum Population: 77,634 (1950)
- Racial and Latinx composition (1960)
  - White: 99.4%
  - Black or African American: 0.5%
  - Asian: 0.1%
  - Latinx – NA
- This is about making sense of who lives where on what scale

What about neighborhoods within Portland?

What about within neighborhoods?

2010 Census Block Data

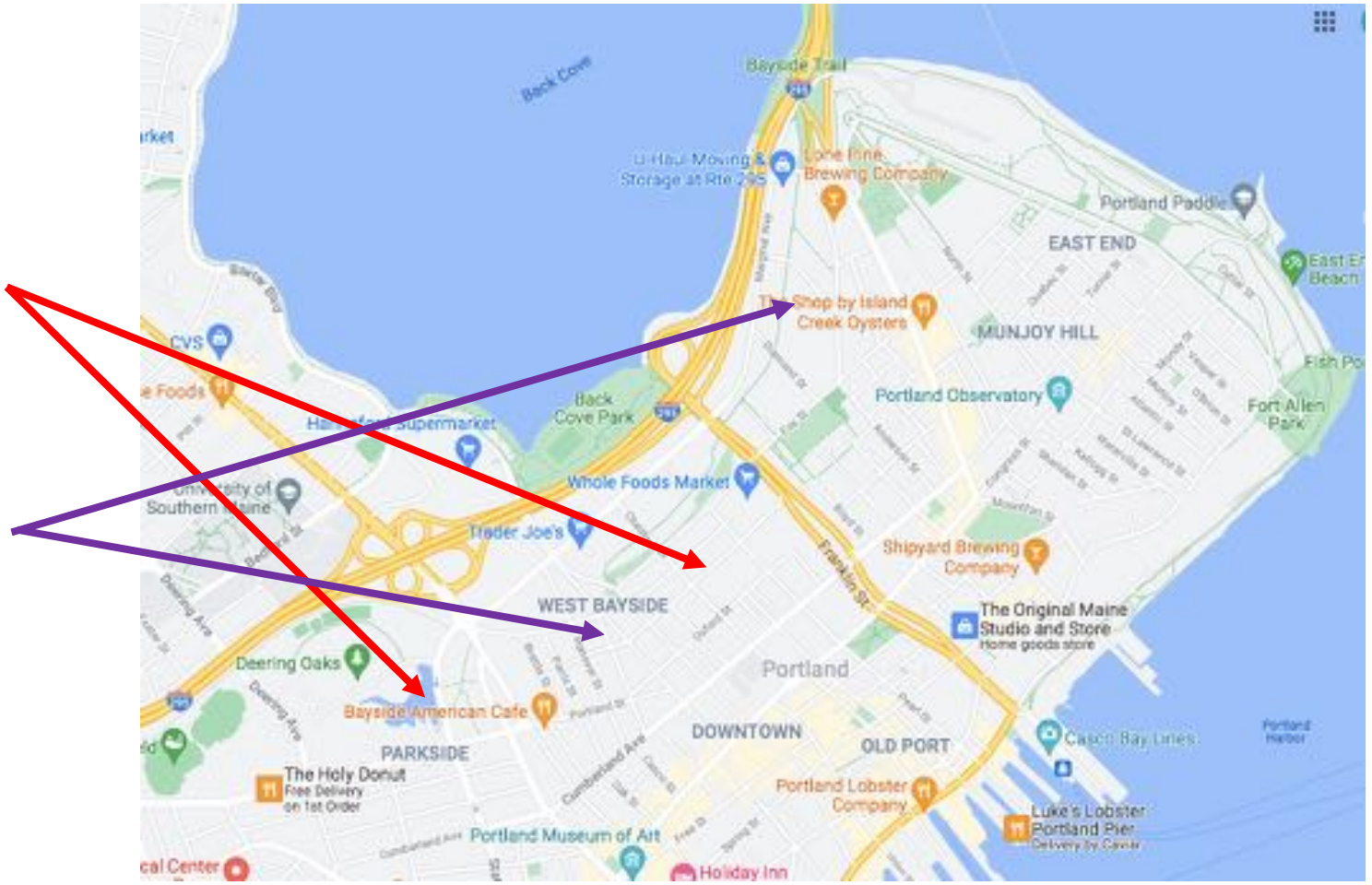
1 Dot = 1 Person

- White
- Black
- Asian
- Hispanic
- Other Race / Native American / Multi racial

What am I looking at...?

Parkside, West Bayside, East Bayside

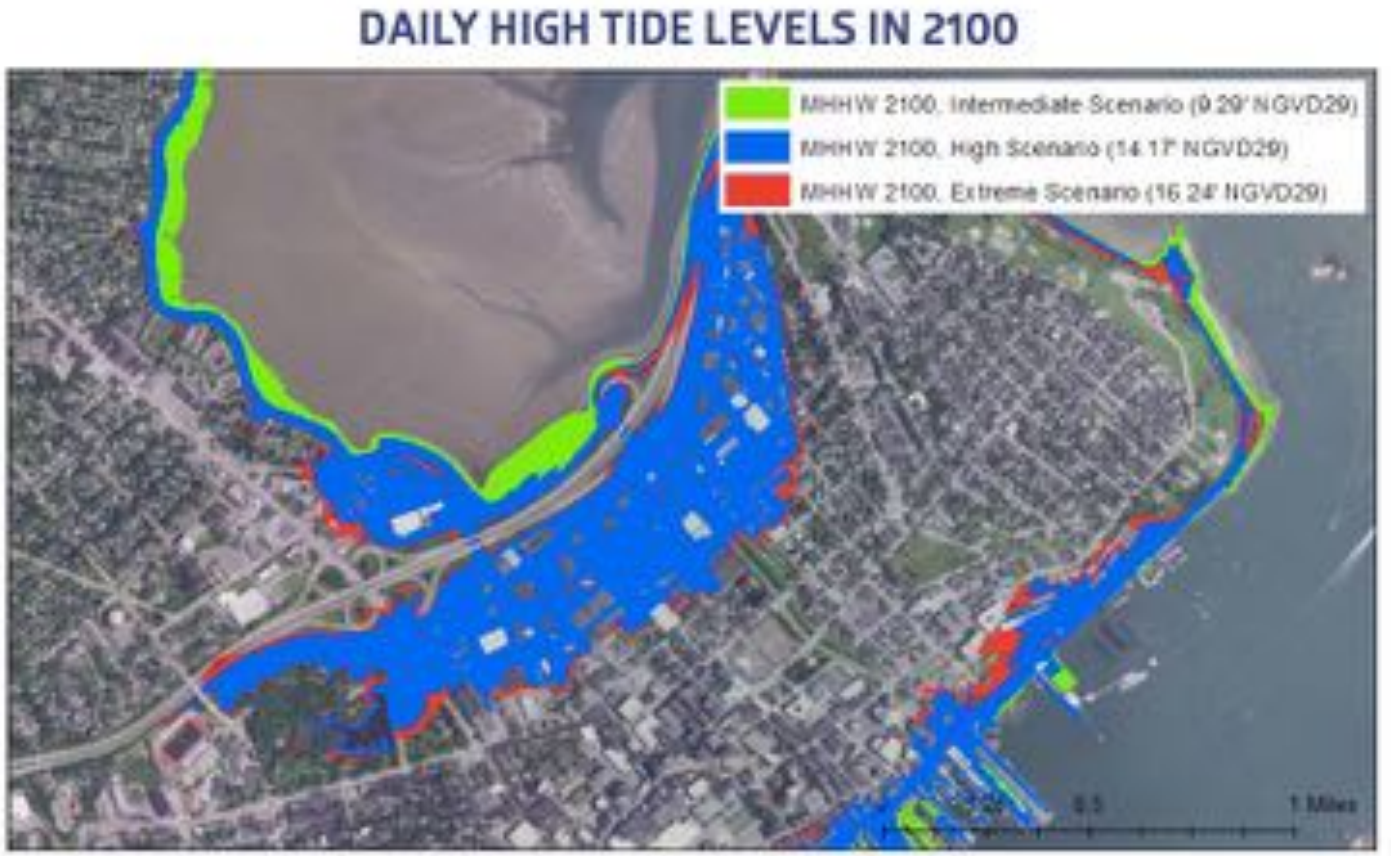
- What separates Parkside from West Bayside?
- What separates West Bayside from East Bayside?



Parkside, West Bayside, East Bayside

- What separates East Bayside from the East End?

- What separates East Bayside from the Back Bay?



Projected high tide map

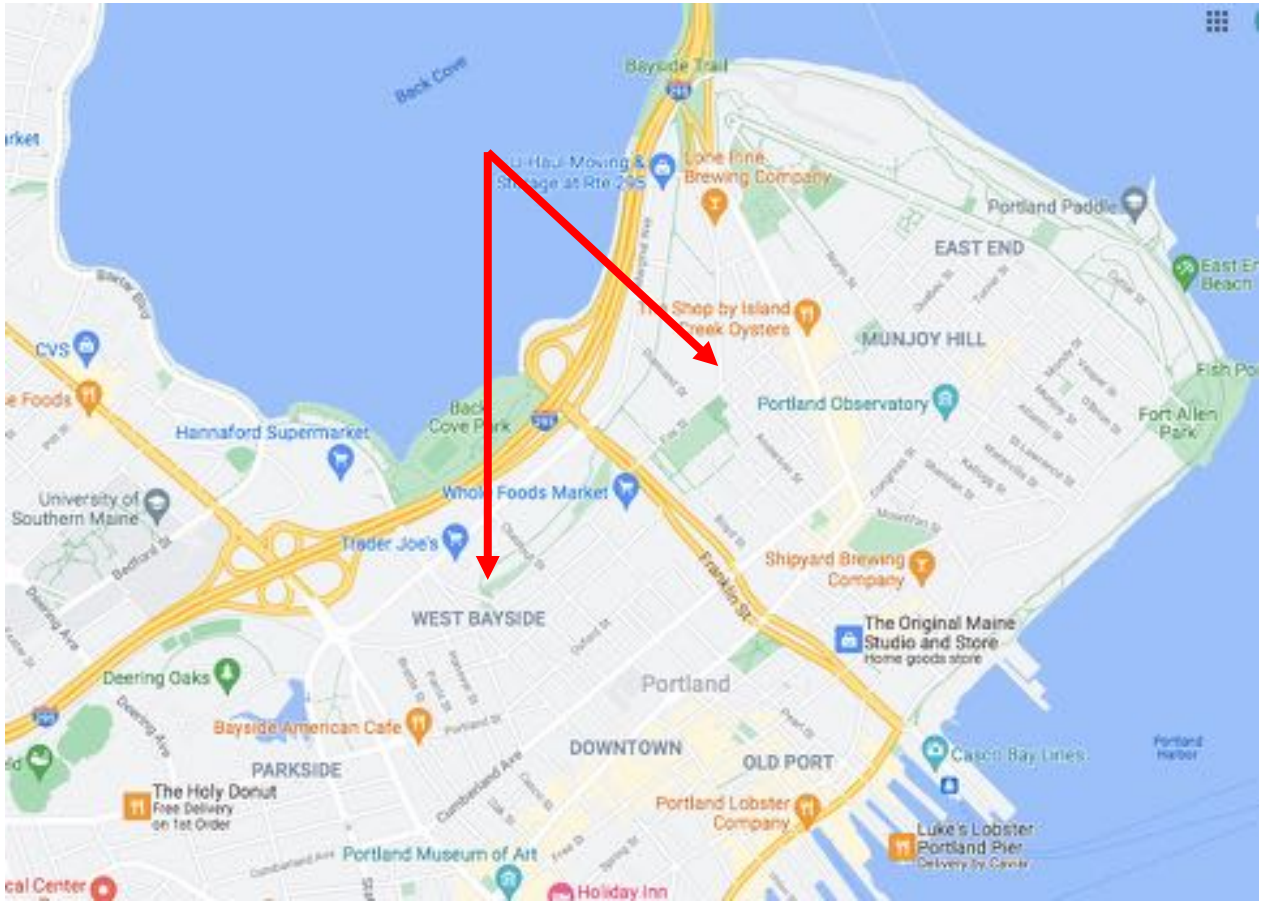
Why Does Socio-Technical History Matter?

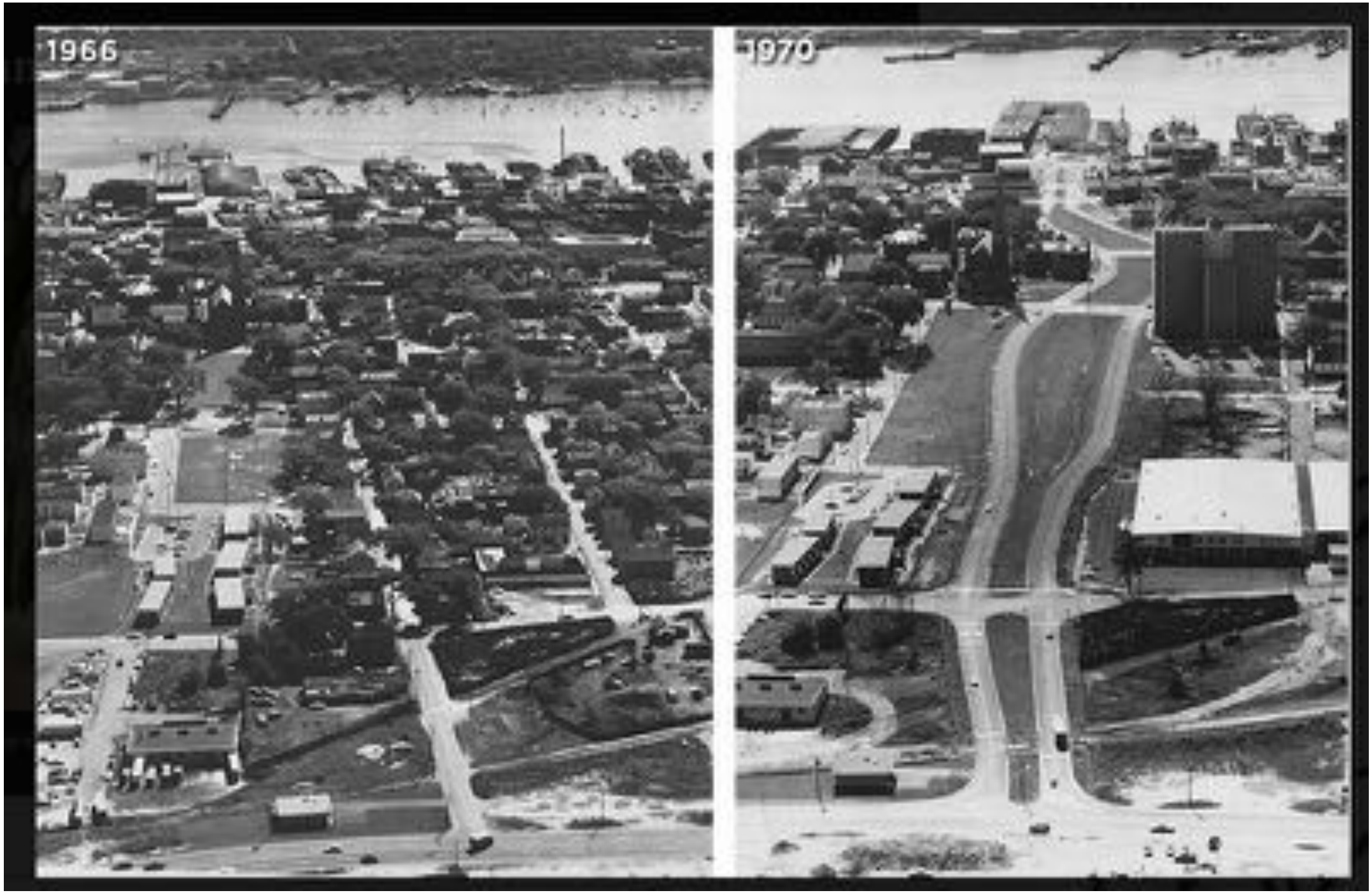
Question the City

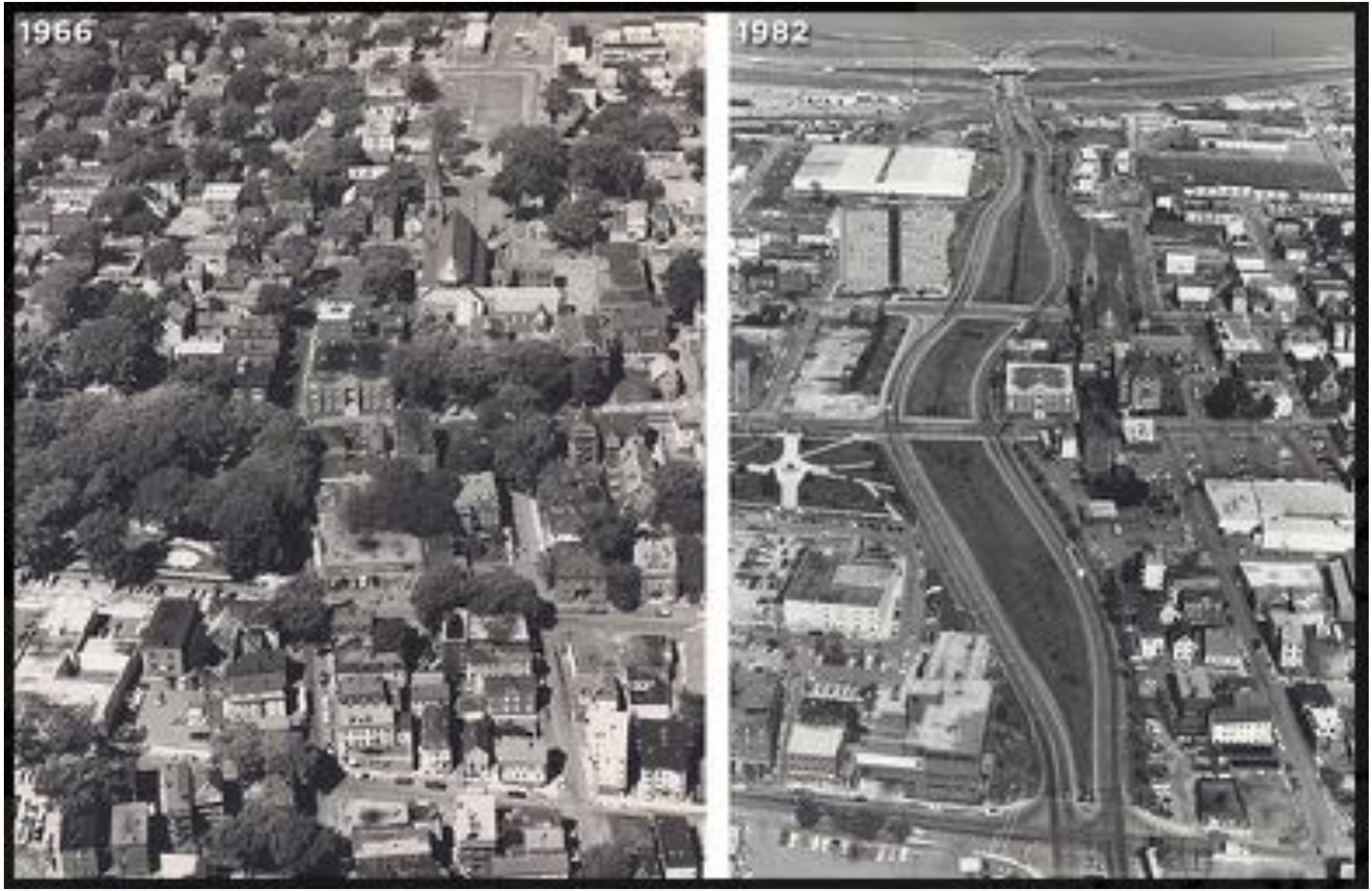
- Transportation – where do highways get placed and how does the impact of infrastructure placement impact community health?
- Structural – how does U.S. history of redlining and restrictive covenants create disparity in housing quality?
- Geotechnical – how does land use history (and creation) impact geotechnical stability for future construction?
- Water Resources – how does history create disparities in neighborhood susceptibility to flooding? Or disparities in infrastructural resilience in the face of sea level rise? Or disparities in functioning sanitation infrastructure?
- Environmental – how does land use history impact potential for chemical exposures in soil, water or air? % impervious surfaces? heat islands?

Franklin Arterial

- Late 1960s – approx. 130 buildings removed on Franklin Street to allow easier access
- Created a significant separation within Bayside neighborhood
- Joins I-295 to downtown (highway construction – 1954) – (Forest Ave. exchange also)

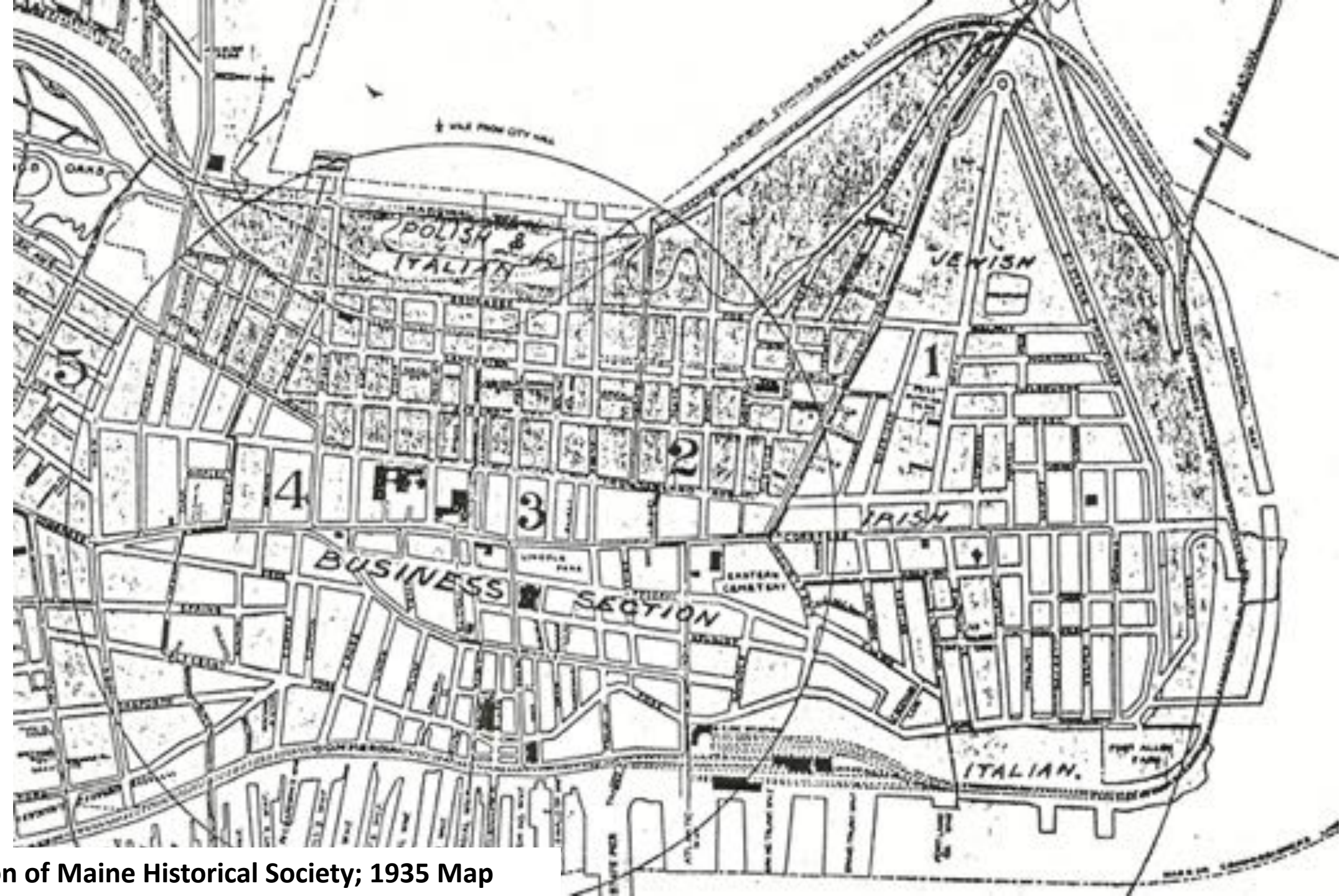



1966
1970


1966
1982

Who lived on Franklin Street before the Arterial?

Who Lived in Bayside Before I-295?



Collection of Maine Historical Society; 1935 Map

Bayside and Urban Renewal

- Densely populated neighborhood – immigrant communities
- One of several neighborhoods in Portland designated as ‘slums’ by the “Slum Clearance and Redevelopment Administration”
- Urban renewal activity from 1950s – 1970s destroyed approx. 2,800 units of housing in Portland with > 1,100 of those units in Bayside.
- Portland is STILL struggling to replace that housing.
- Bayside is STILL culturally rich with immigrant communities.
- Bayside is also STILL under-resourced, significantly subject to flooding (and now dealing with gentrification and its impacts on affordability).

This presentation isn't about gentrification, but…is the value of this neighborhood only in what visitors spend money on? Who drives 'transformation' of neighborhoods? Does EB need 'transforming'? Why is this neighborhood an attractive place for an 8000ft^2 art gallery, breweries etc.? These things aren't bad – but why HERE and not somewhere THERE?

What to Do This Summer: Portland, Maine

Streets lined with galleries and shops. A working harbor. Outdoor dining at award-winning restaurants. The fleeting summertime pleasures of Longfellow's childhood home await.

East Bayside and East End

Cove Street Arts, an exhibition, event, workshop and studio space, is one of the many places transforming East Bayside, where coffee shops and breweries have sprung up in warehouses and industrial buildings. The show "Here & There" celebrates the enduring tie between Maine and the New York art world with the work of more than a dozen artists who, like those who came before them — including Modernists such as Marsden Hartley and Max Weber — find inspiration in Maine. Through Sept. 11 (71 Cove Street).

New York Times Travel Section – 08.24.21

What Does this Have to Do with Engineering?

We're looking at one set of neighborhoods within one city impacted by engineering decisions regarding:

- **Transportation** – where do we site the through roads and highway exchanges?
- **Structural integrity** – who determines the quality of housing stock?
- **Geotechnical questions** – is it a problem that neighborhoods are built on fill?
- **Water Resources | Flood Control** – old pipe networks, %IS, sea level rise
- **Water Resources | Flood Control** – sanitation infrastructure × stormwater (CSO)
- **Environmental (air) quality** – neighborhoods are bounded by major roads
- **Environmental (air) quality** – paving and %IS create heat islands
- **Environmental (water) quality** – how does the water distribution network scale?

Why does socio-technical understanding matter?

Do Ethnicity or Race × Socio-Economic Status Impact Drinking Water Quality?

FIGURE 1 Effect of percent Hispanic population and poverty on Safe Drinking Water Act violations

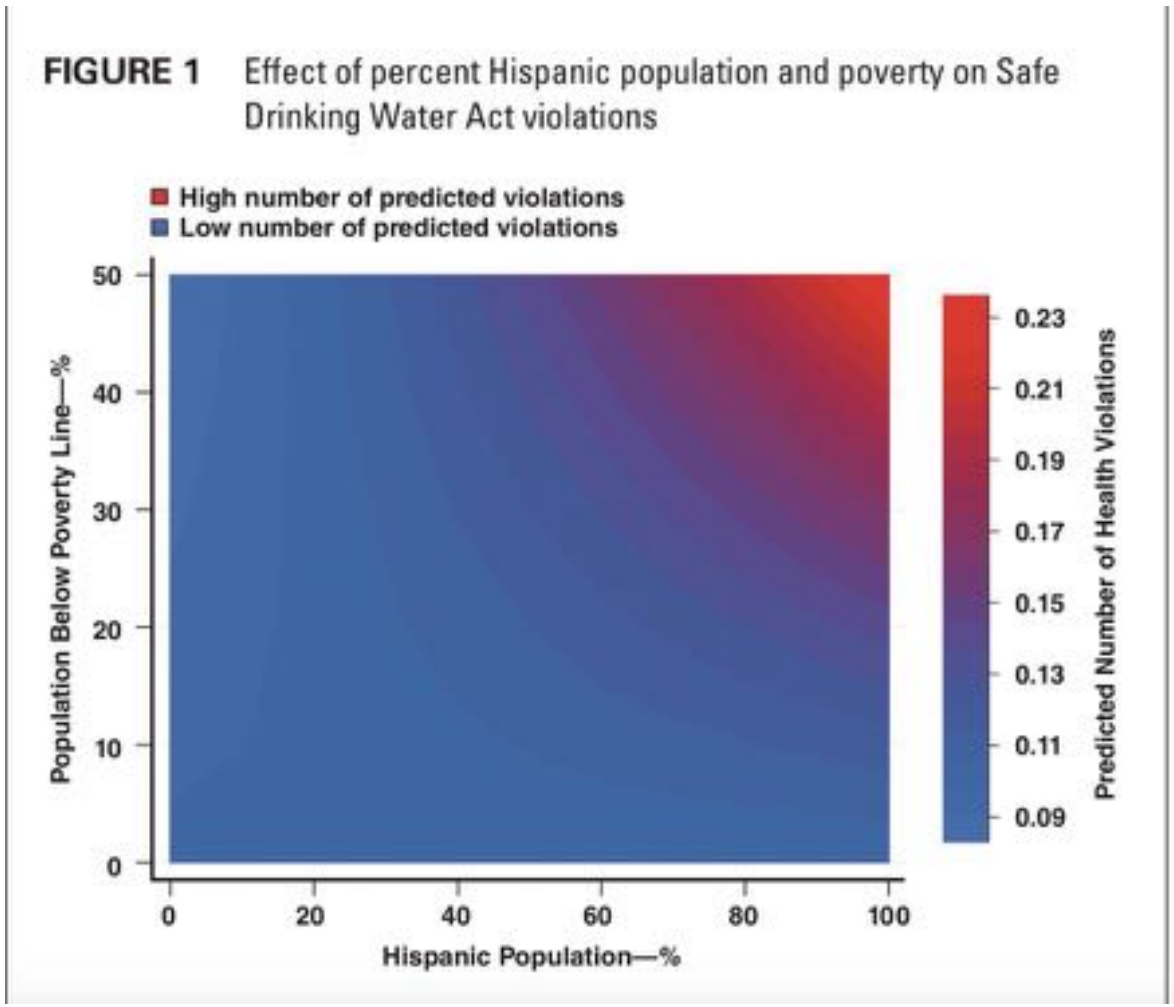
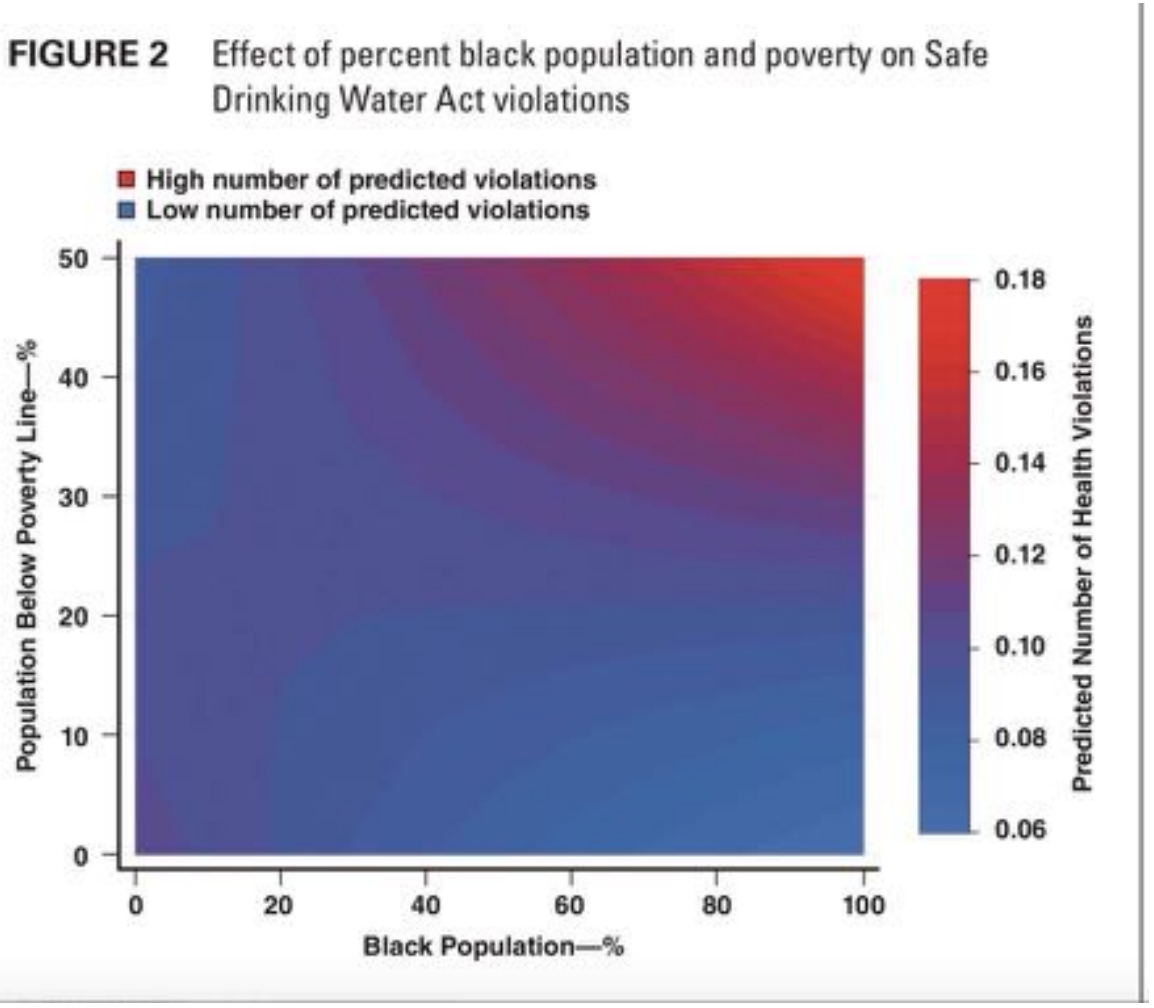


FIGURE 2 Effect of percent black population and poverty on Safe Drinking Water Act violations



(Switzer and Teodoro, 2017)

Ethnicity or Race × SES[1] spatially correlate with disparities in:

- Access to clean and consistently available drinking water
- Access to functioning sanitation
- Access to nutritious foods at reasonable prices
- Ability to grow food safely
- Protection from large-scale flooding
- Ability to rely on stable and accessible power (electricity, lighting)
- Access to sturdy and sufficient housing built with safe materials
- Ability to NOT live in proximity to brownfields and waste disposal sites

[1]These are neighborhood-scale, census tract and/or city-scale correlations in the U.S., they do not predict any individual's experience (meaning: pay attention to your mental shortcuts and biases). And also…being on the receiving end of this list does not mean you caused your place on it.


What can we do to help make neighborhoods healthier places for people and their communities who already live there?