

The geography of climate risk and impact

Jeremy S. Hoffman, Ph.D.

Director of Climate Justice and Impact, Groundwork USA

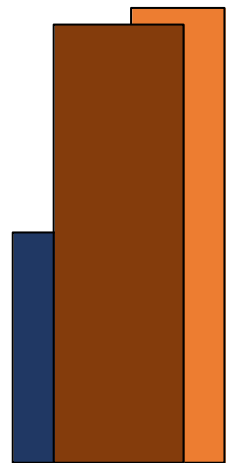
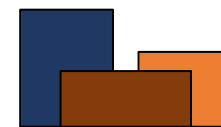
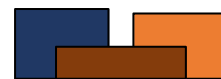
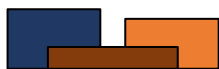
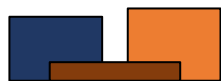
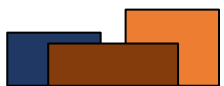
Affiliate Faculty, Wilder School for Government and Public Affairs, Virginia Commonwealth University

Lead Author, Fifth National Climate Assessment, Southeast Chapter

With a lot of help from a lot of other amazing people



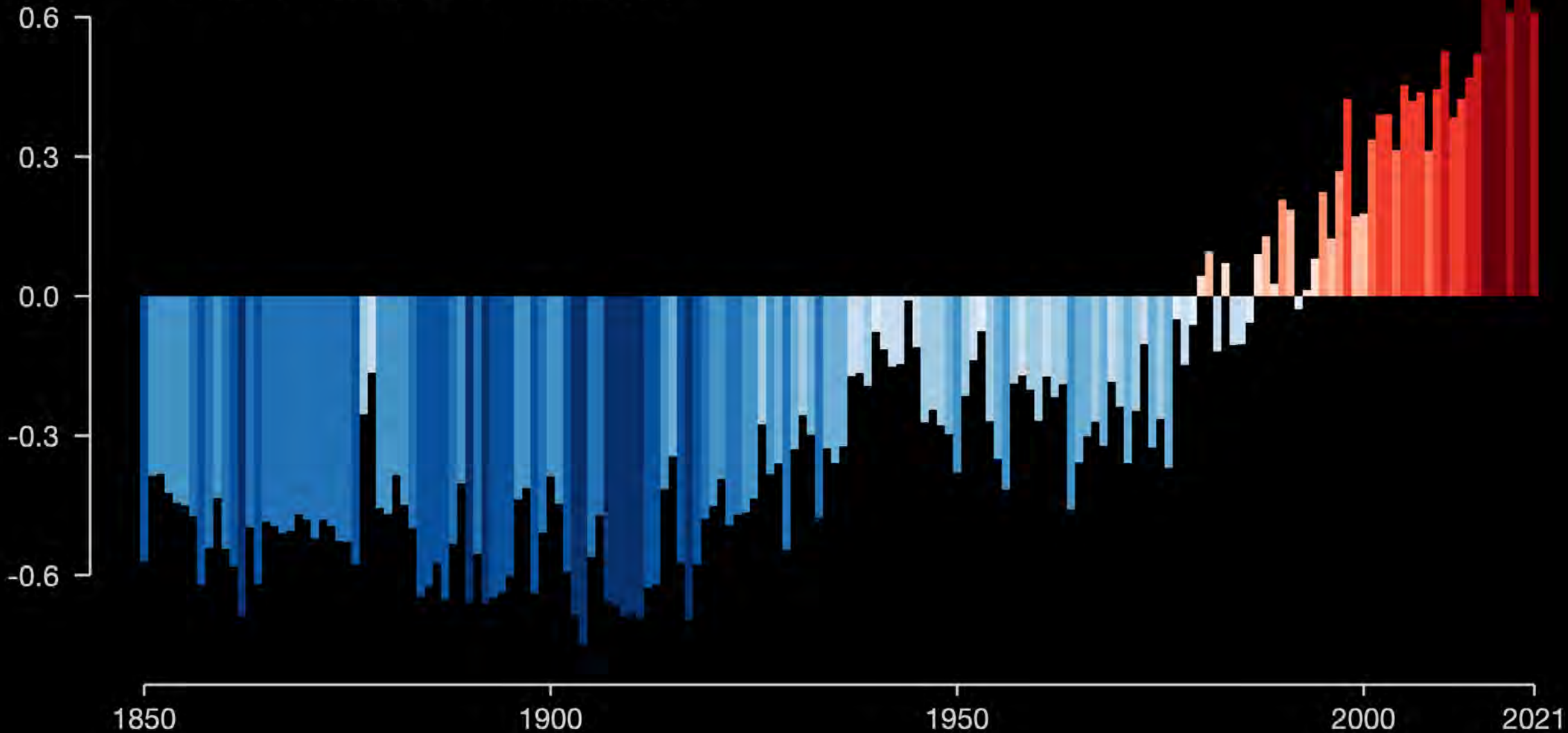
@jer_science



**Global climate change
+ local built environment
= increased or decreased risks**

Global temperature change

Relative to average of 1971-2000 [°C]



FUTURE TEMPERATURES

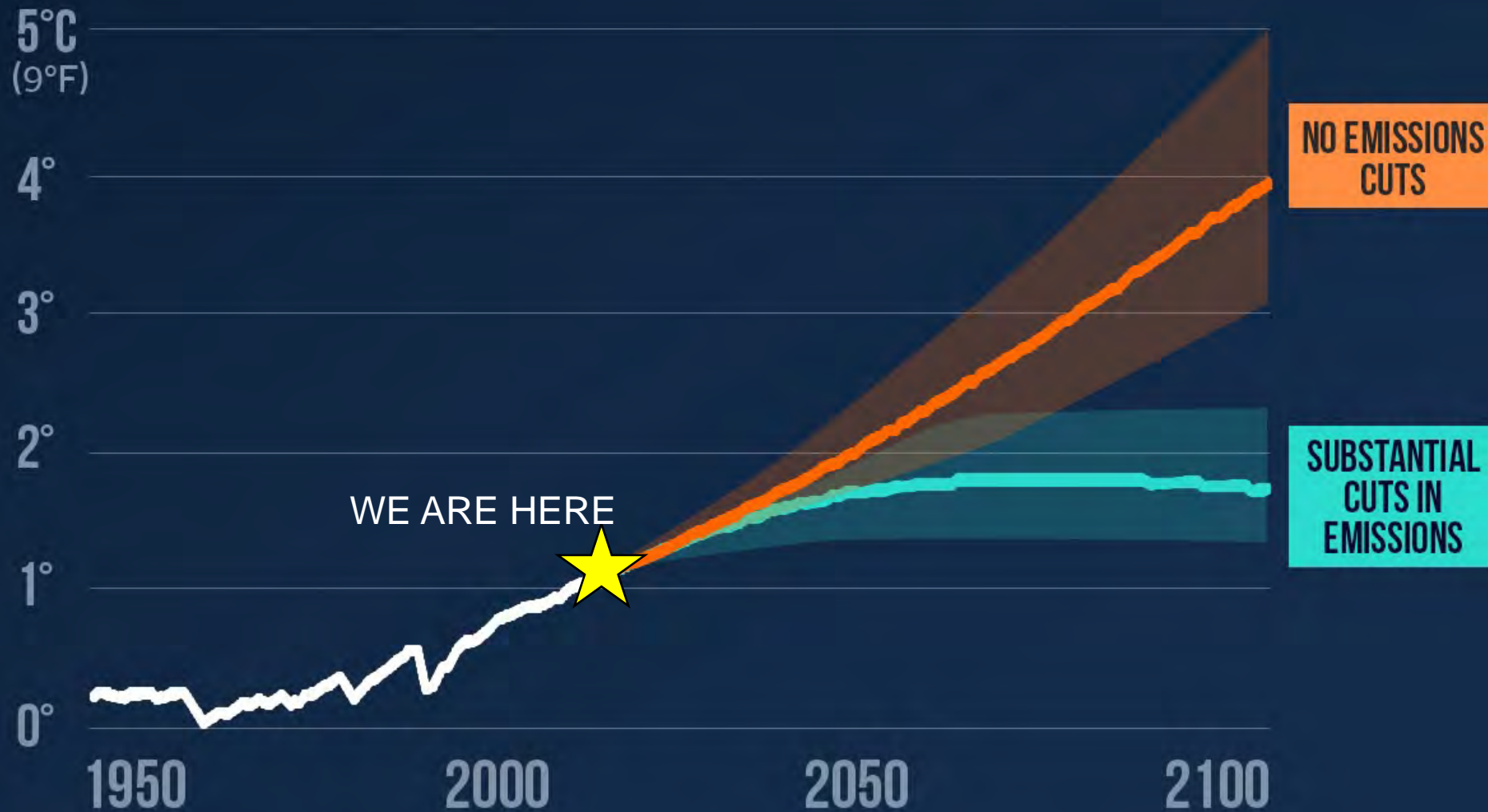
WARMING DEPENDS ON CHOICES TODAY



Global surface temperature (°C) anomaly relative to 1850-1900
High warming scenario: SSP3-7, Low warming scenario from SSP1-2.6.
Source: IPCC AR6 WG1

FUTURE TEMPERATURES

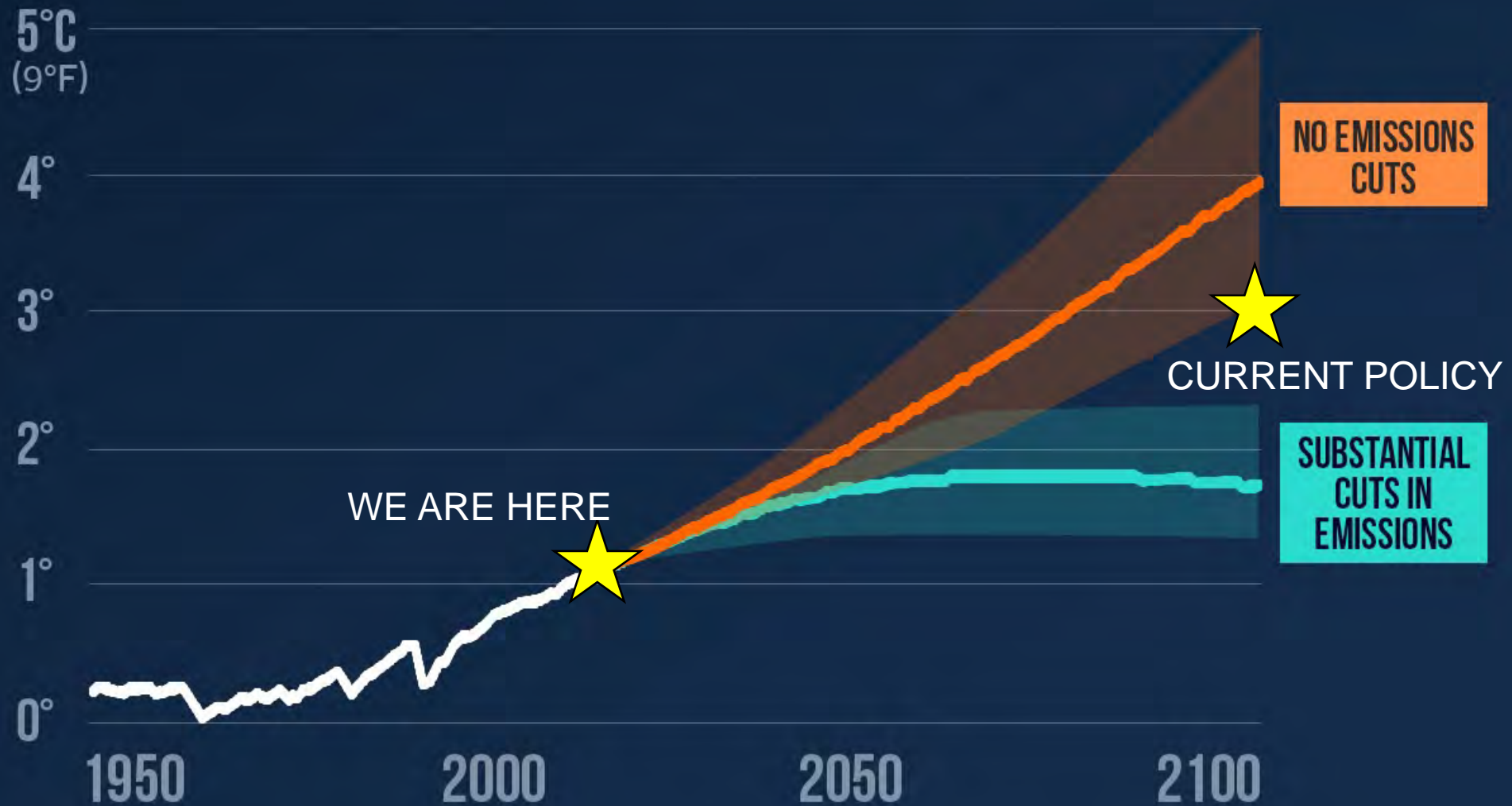
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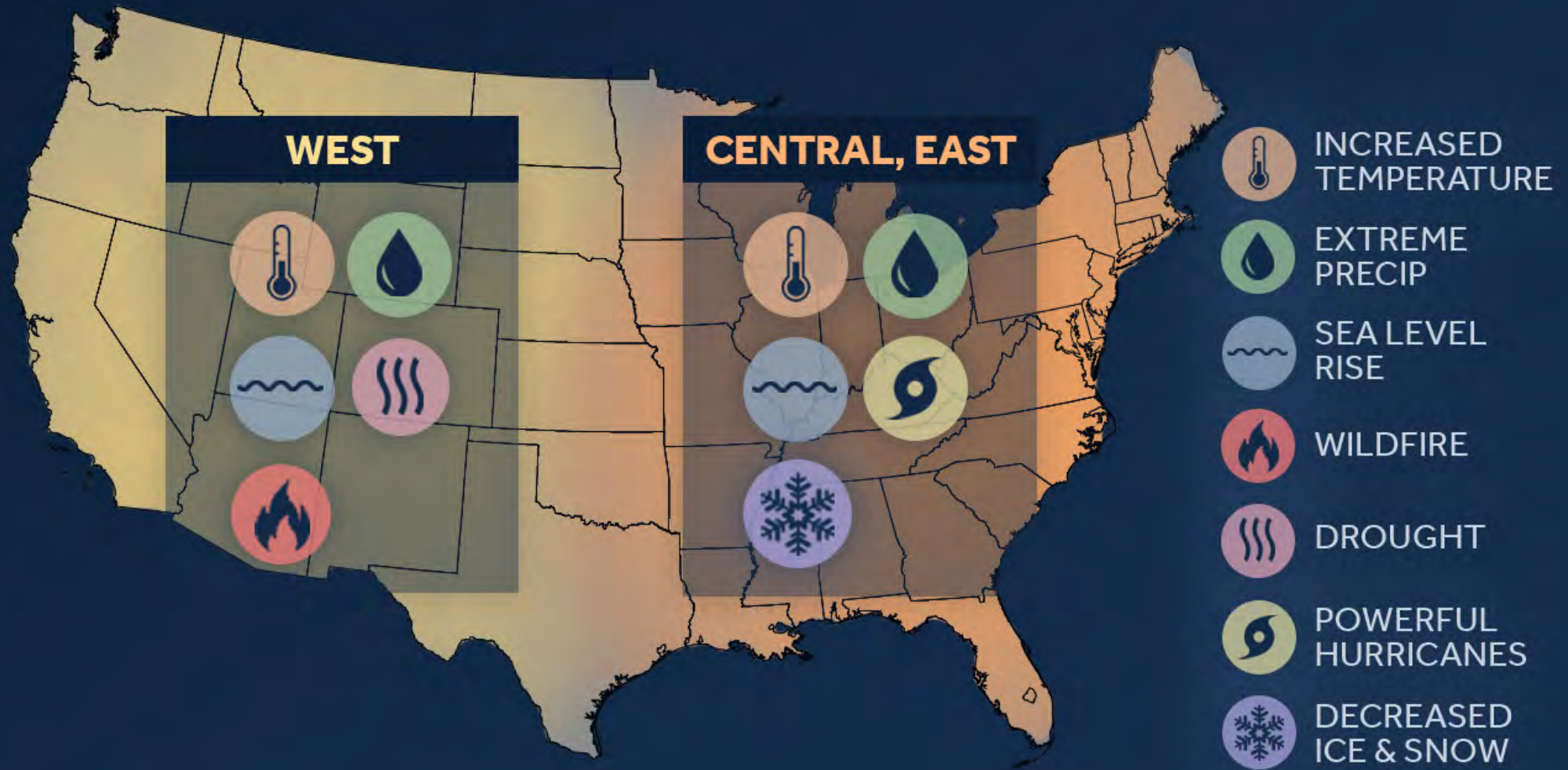
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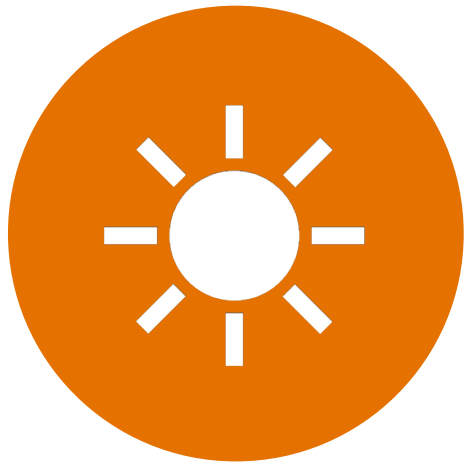
U.S. CLIMATE IMPACTS

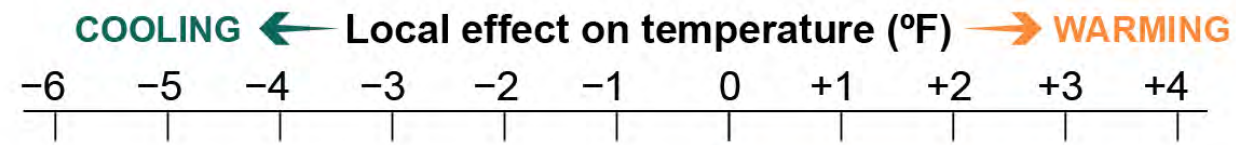
FUTURE SEVERITY DEPENDS ON CHOICES TODAY



Summary of U.S. Impacts. Based on Table 12.8
Source: IPCC AR6 WG1

**Already experiencing & expecting a:
hotter, wetter, sneezier and wheezier climate**





City geometry
 Building density, city layout, height and size



Heat from human activities
 Domestic/ industrial heating



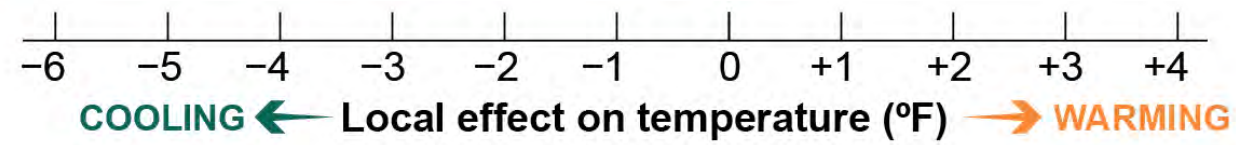
Heat-retaining properties
 Buildings and road materials

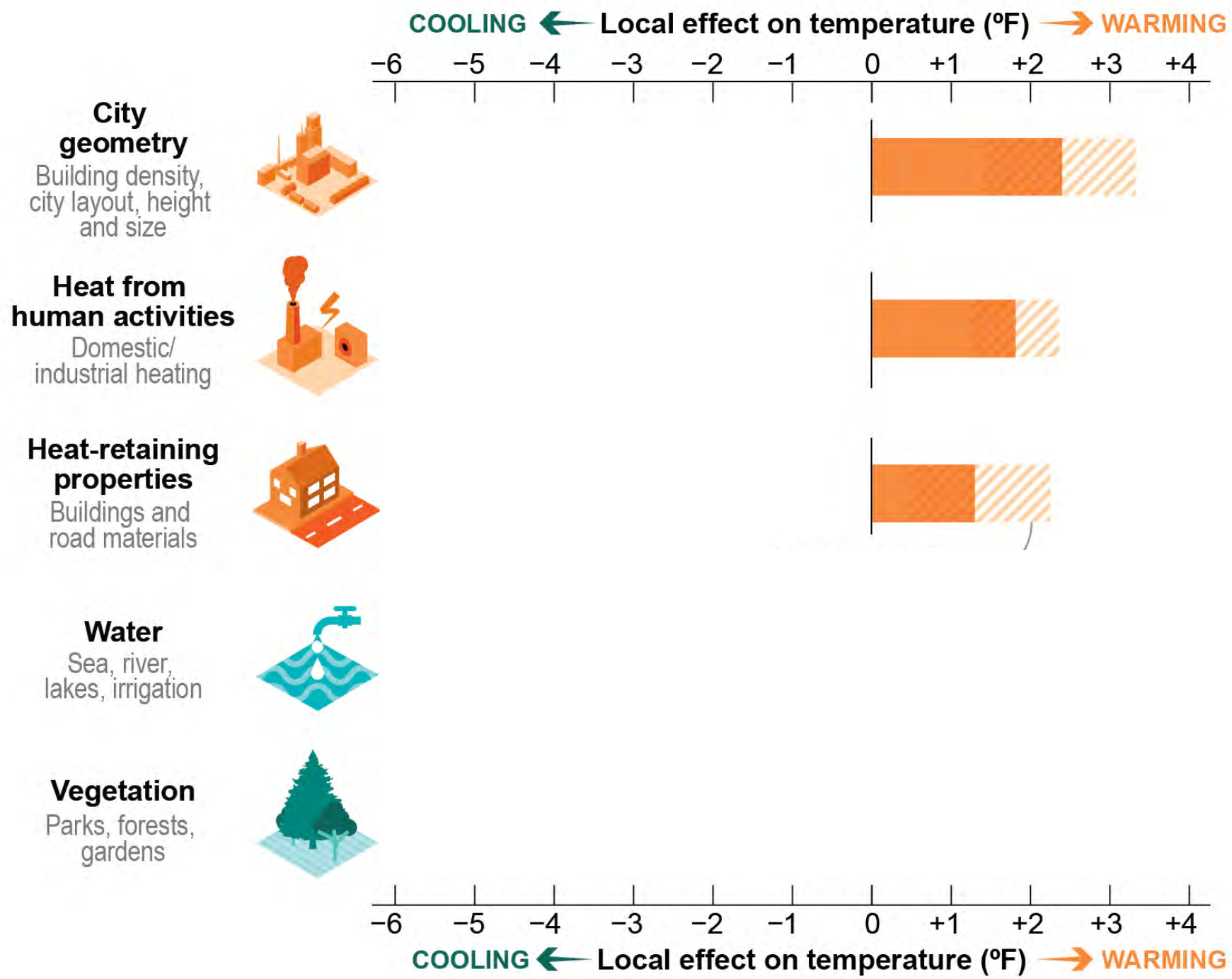


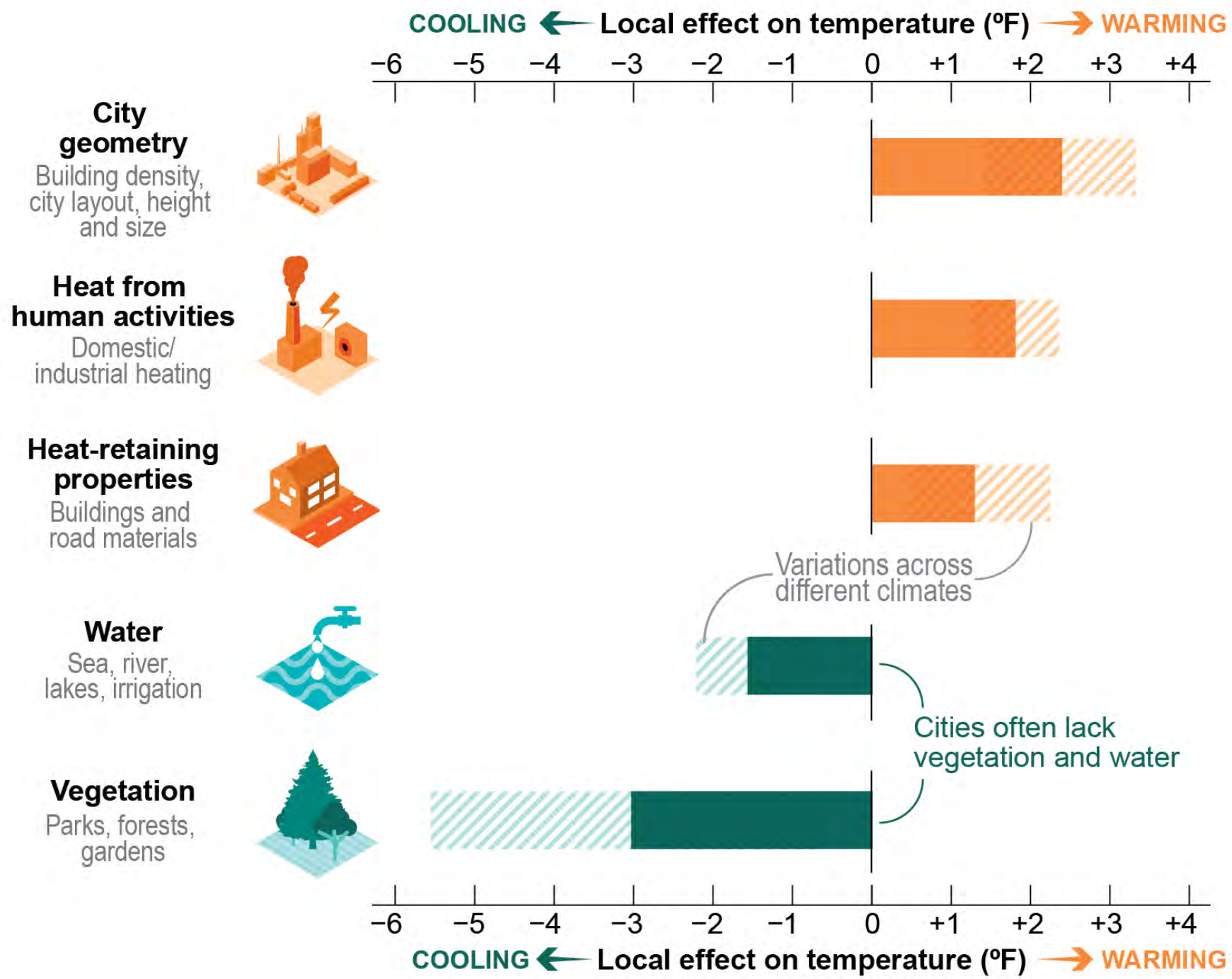
Water
 Sea, river, lakes, irrigation



Vegetation
 Parks, forests, gardens

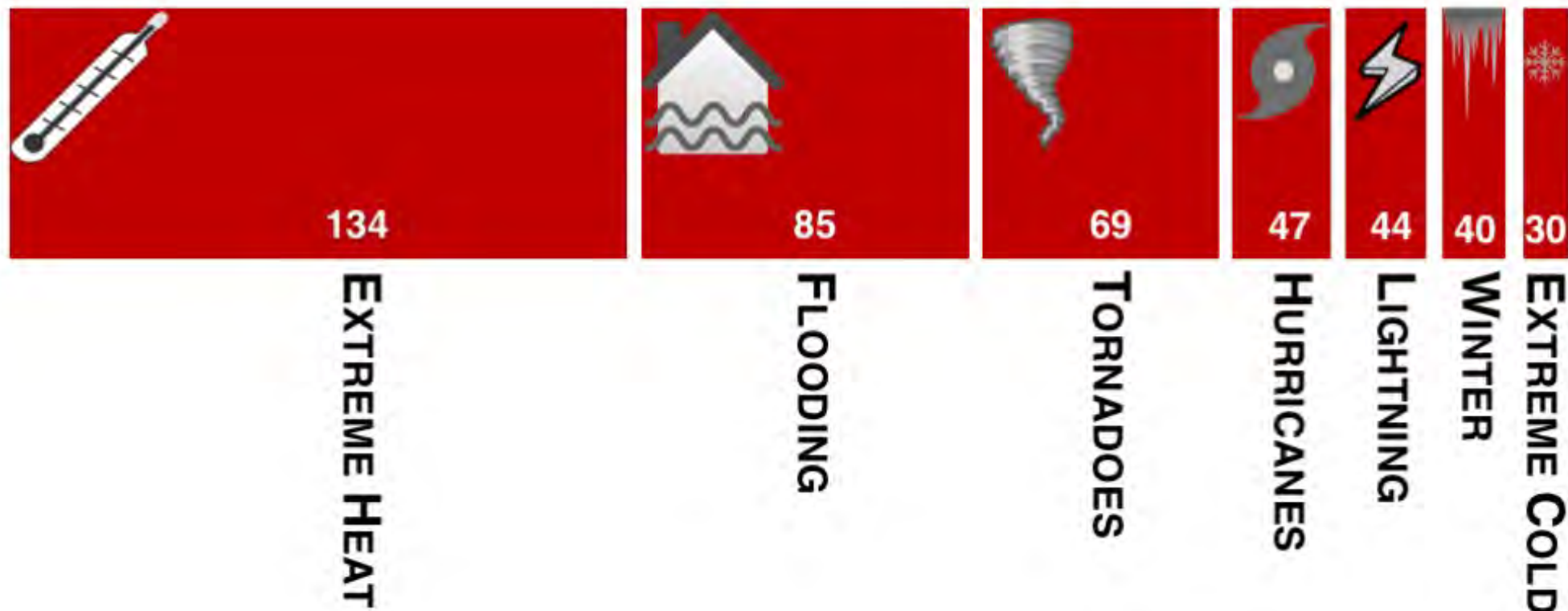






DEADLIEST WEATHER-RELATED HAZARDS

AVERAGE NUMBER OF PEOPLE KILLED PER YEAR (1988-2017)

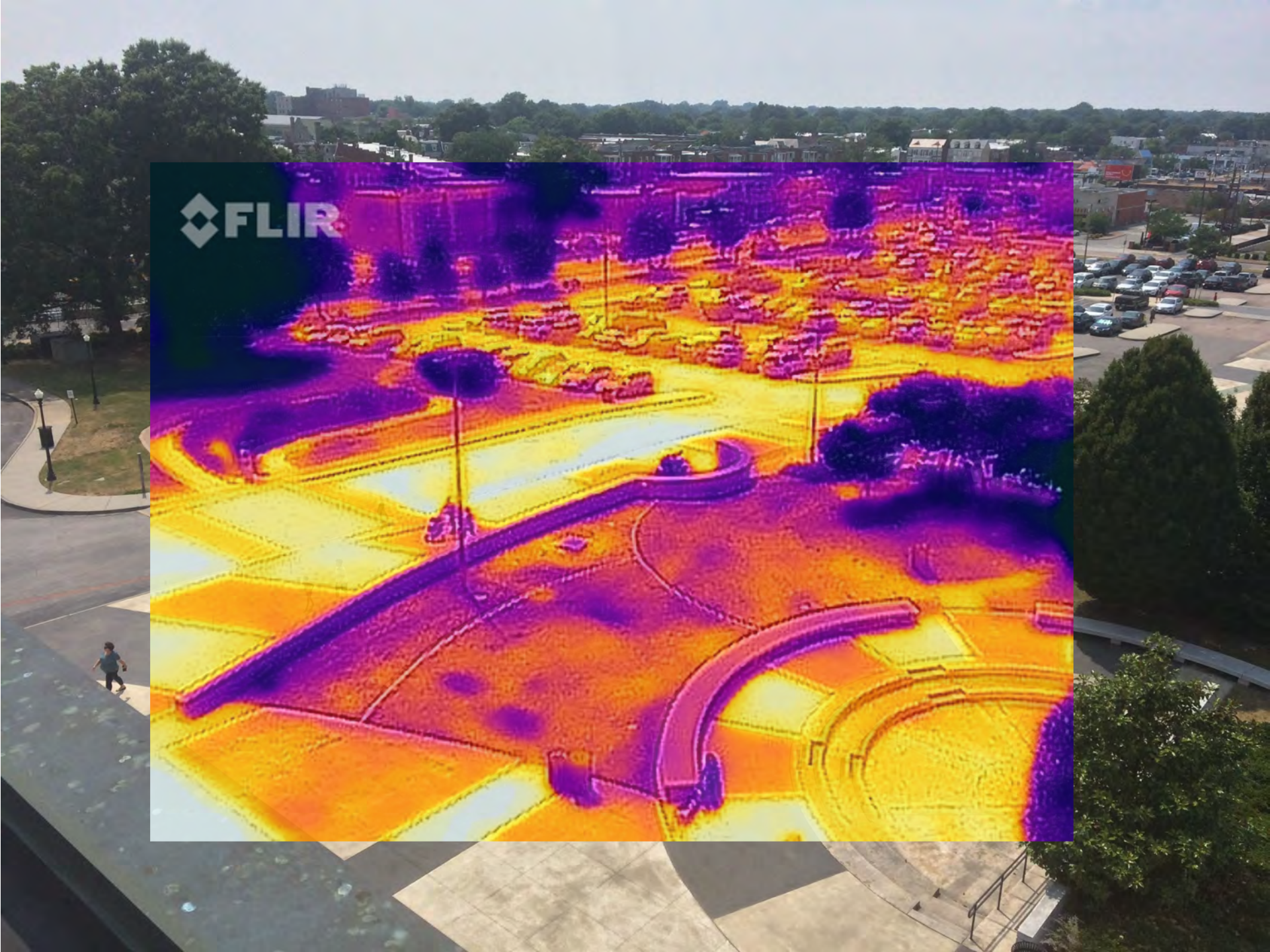


Source: National Weather Service Office of Climate, Water, and Weather Services Natural Hazard Statistics



Walter Kale, Chicago Tribune



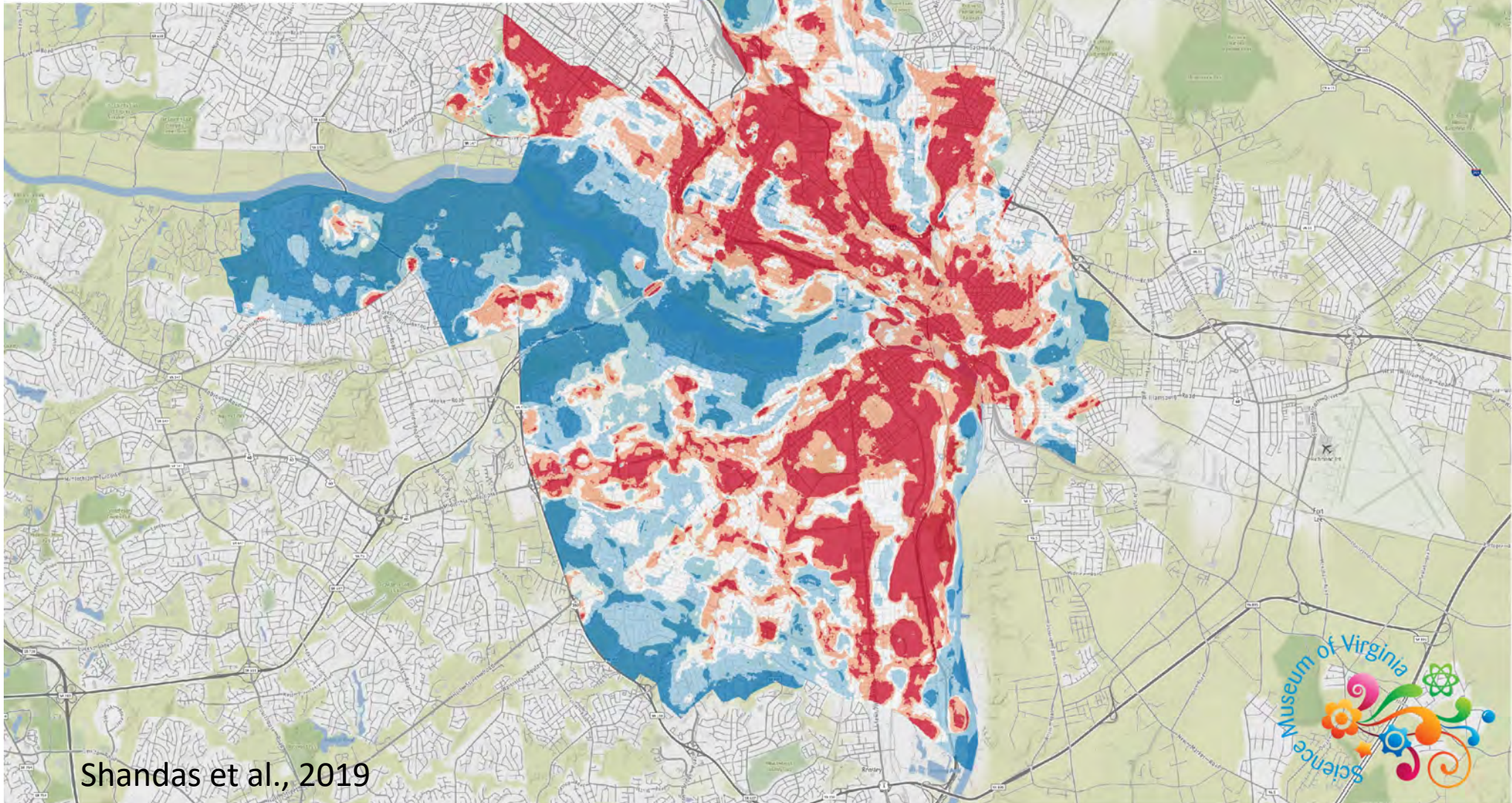
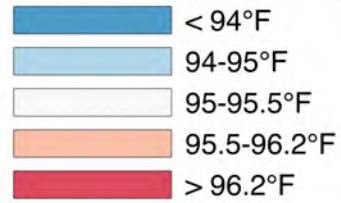




Shelby Lum, RTD

Richmond's Urban Heat Islands

Afternoon (3PM) Temperatures on July 13, 2017



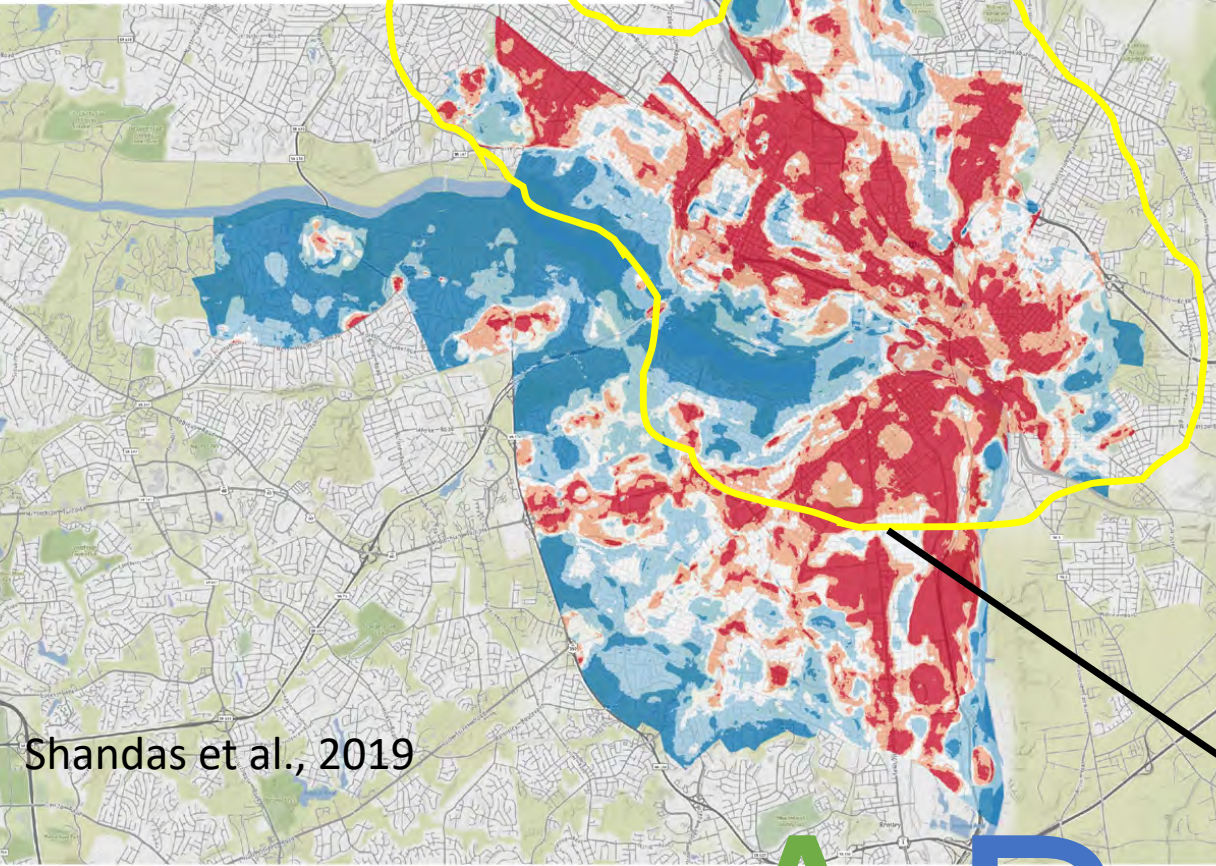
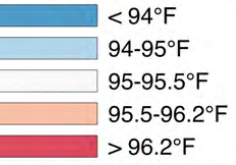
Shandas et al., 2019



Richmor

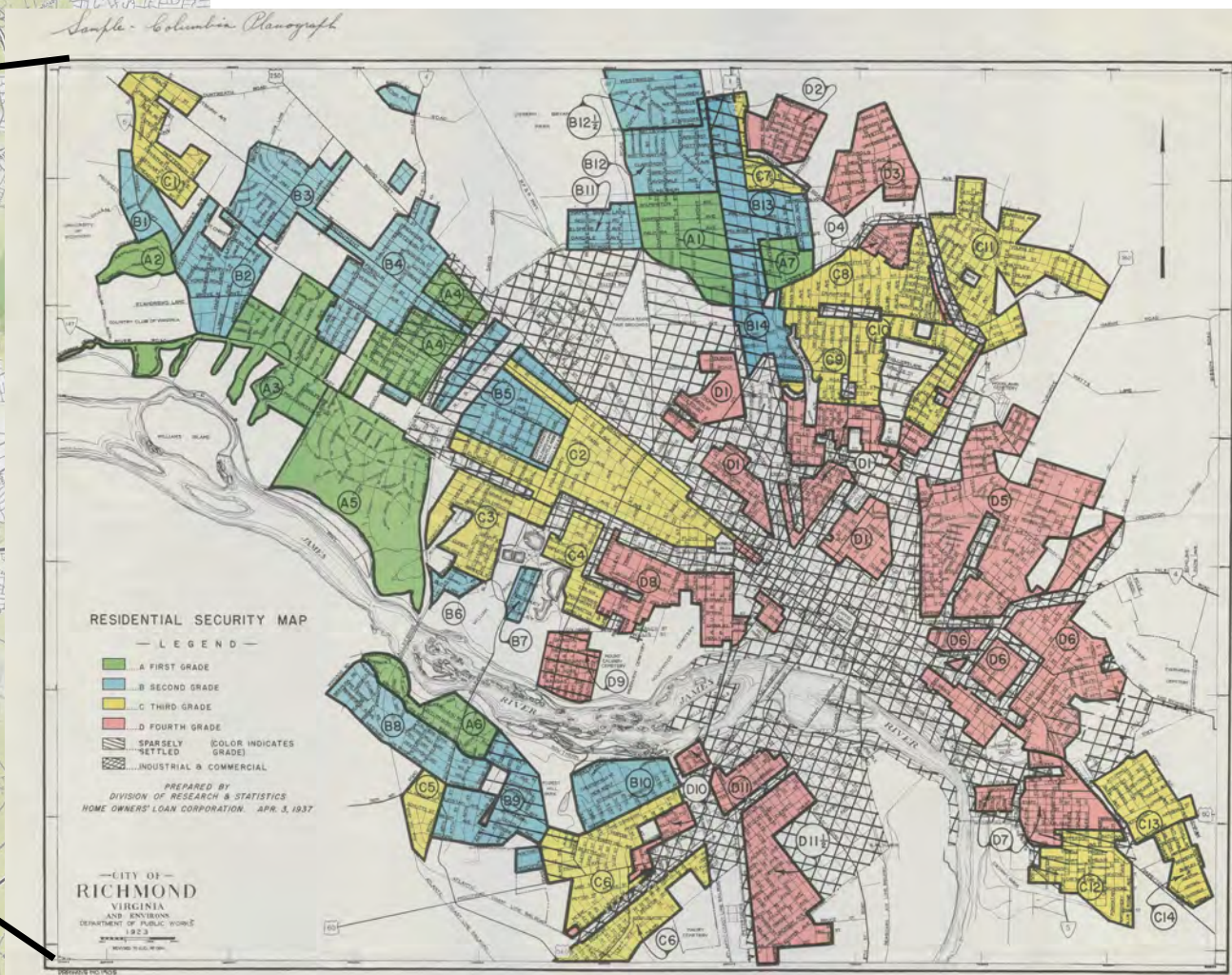
VULNERABILITY

Afternoon (3PM) Temperatures on July 13, 2017



Shandas et al., 2019

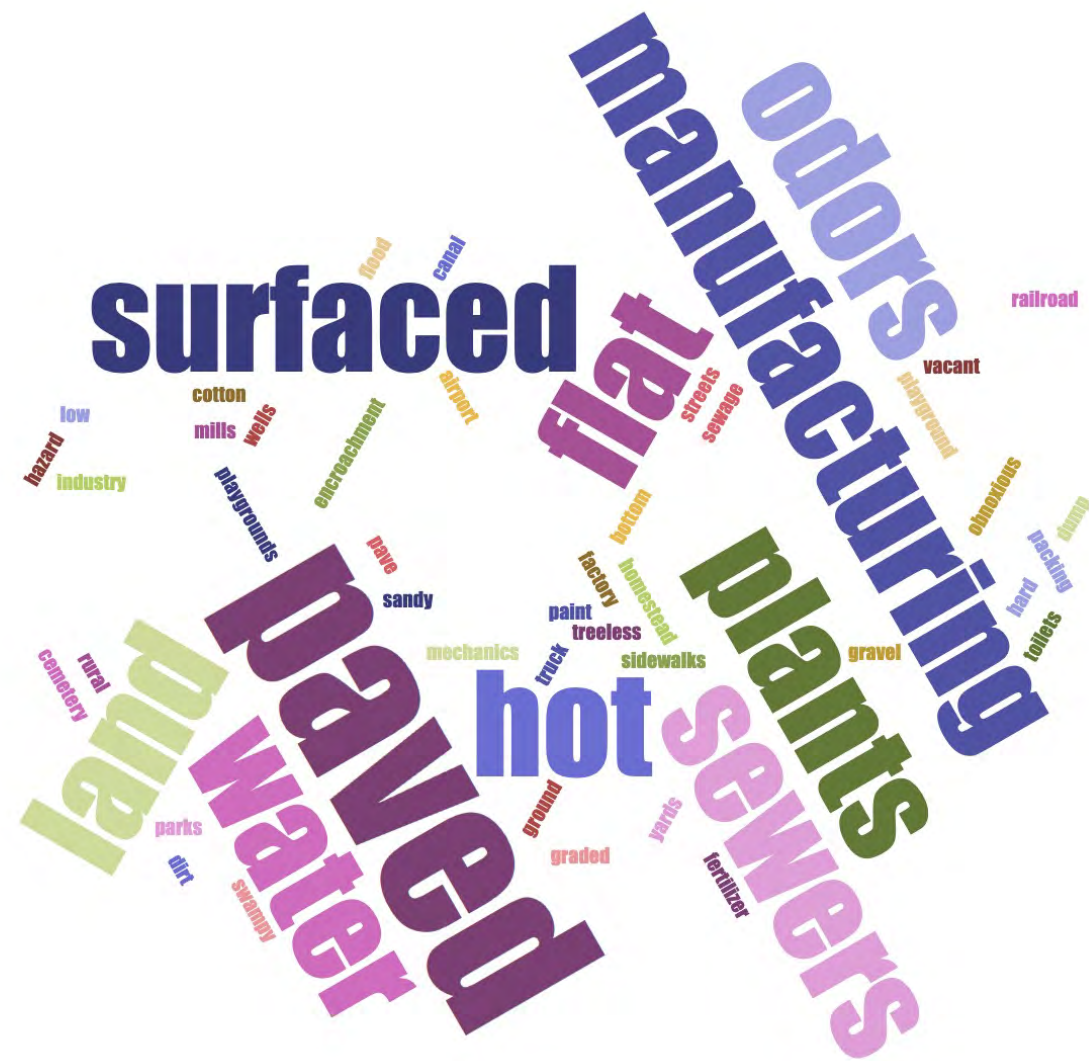
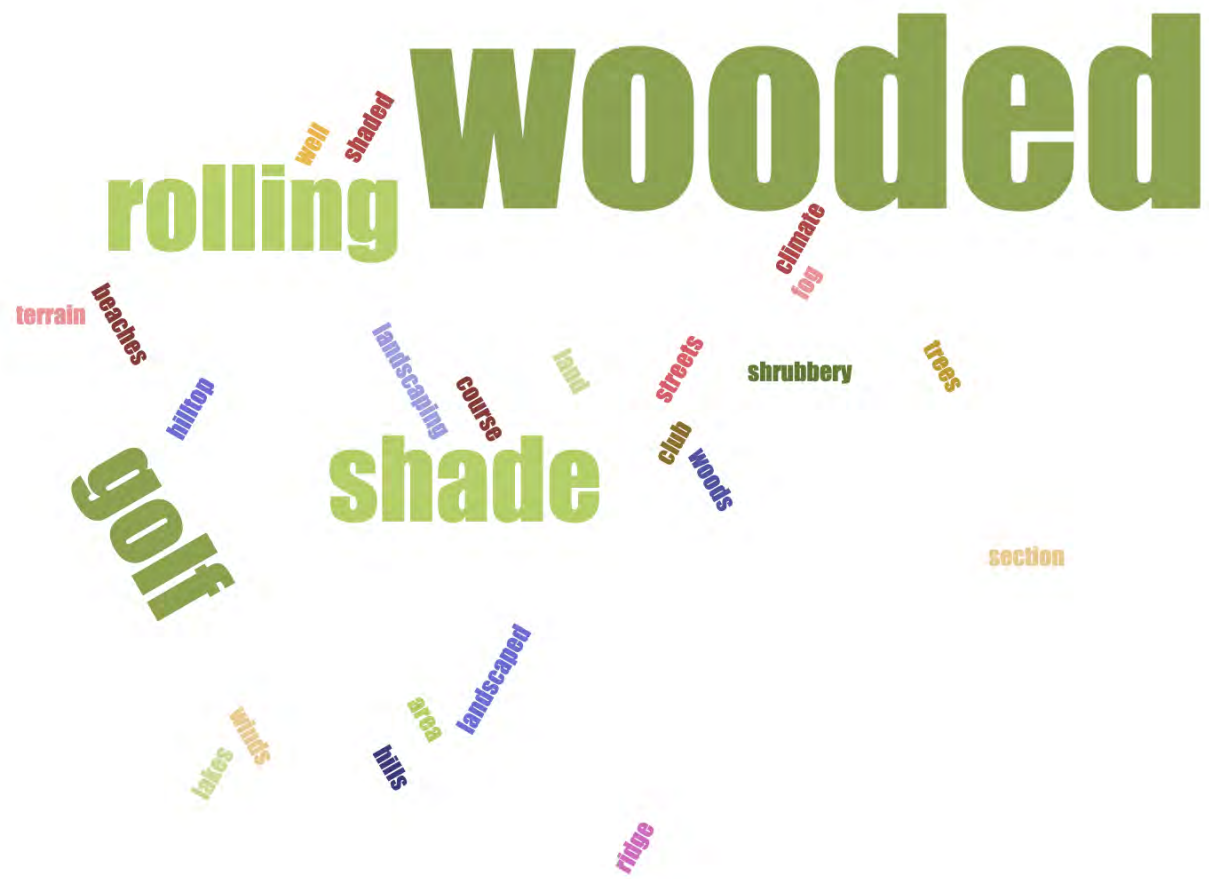
REDLINING MAP (1937)



A B C D



Descriptions of A & B neighborhoods



Descriptions of C & D neighborhoods

Stephen DeBerry | TED2018

Why the "wrong side of the tracks" is usually the east side of cities



Share



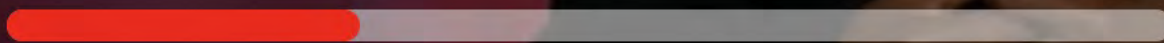
Add to list



Like




Recommend



4:41

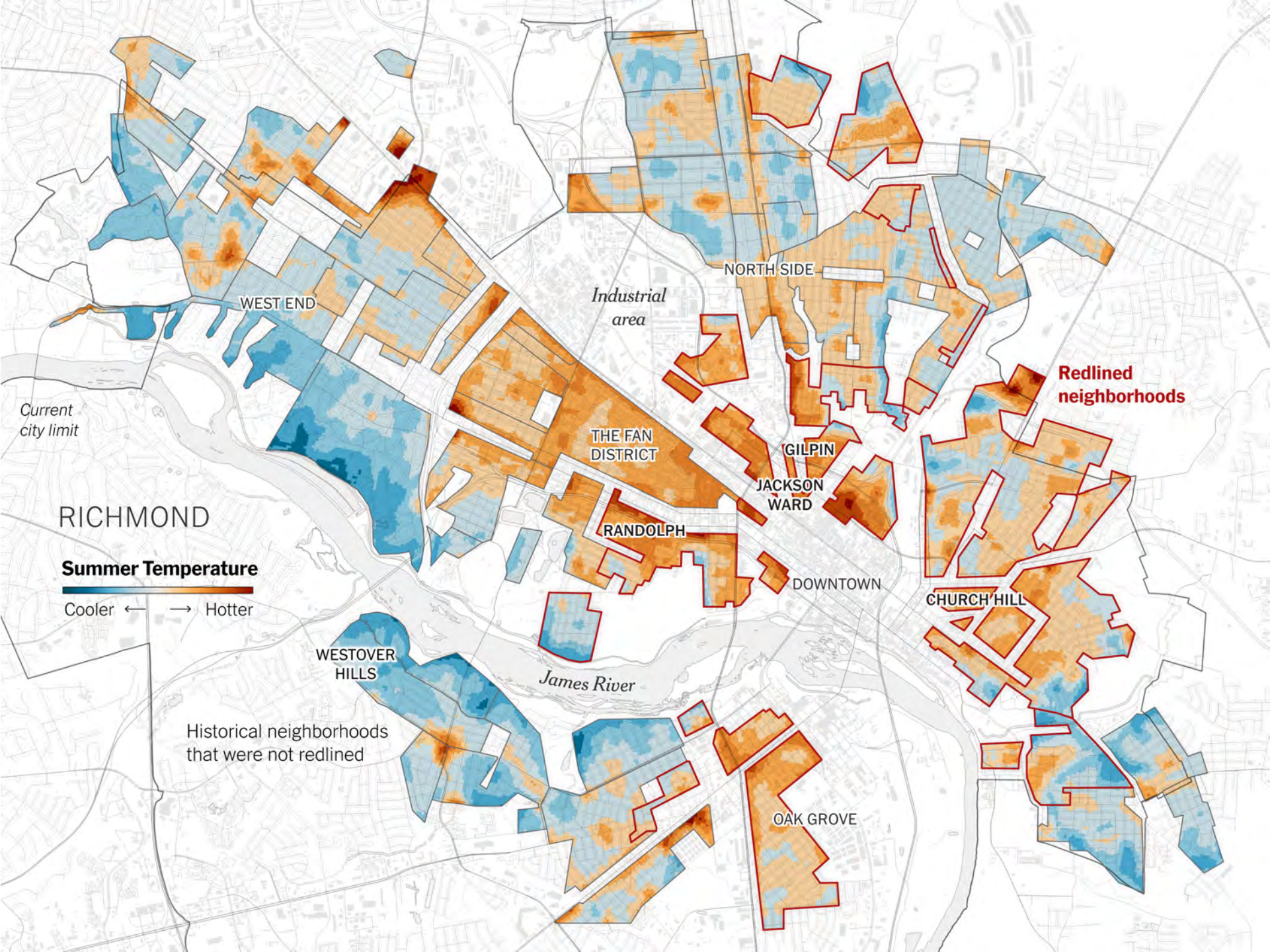


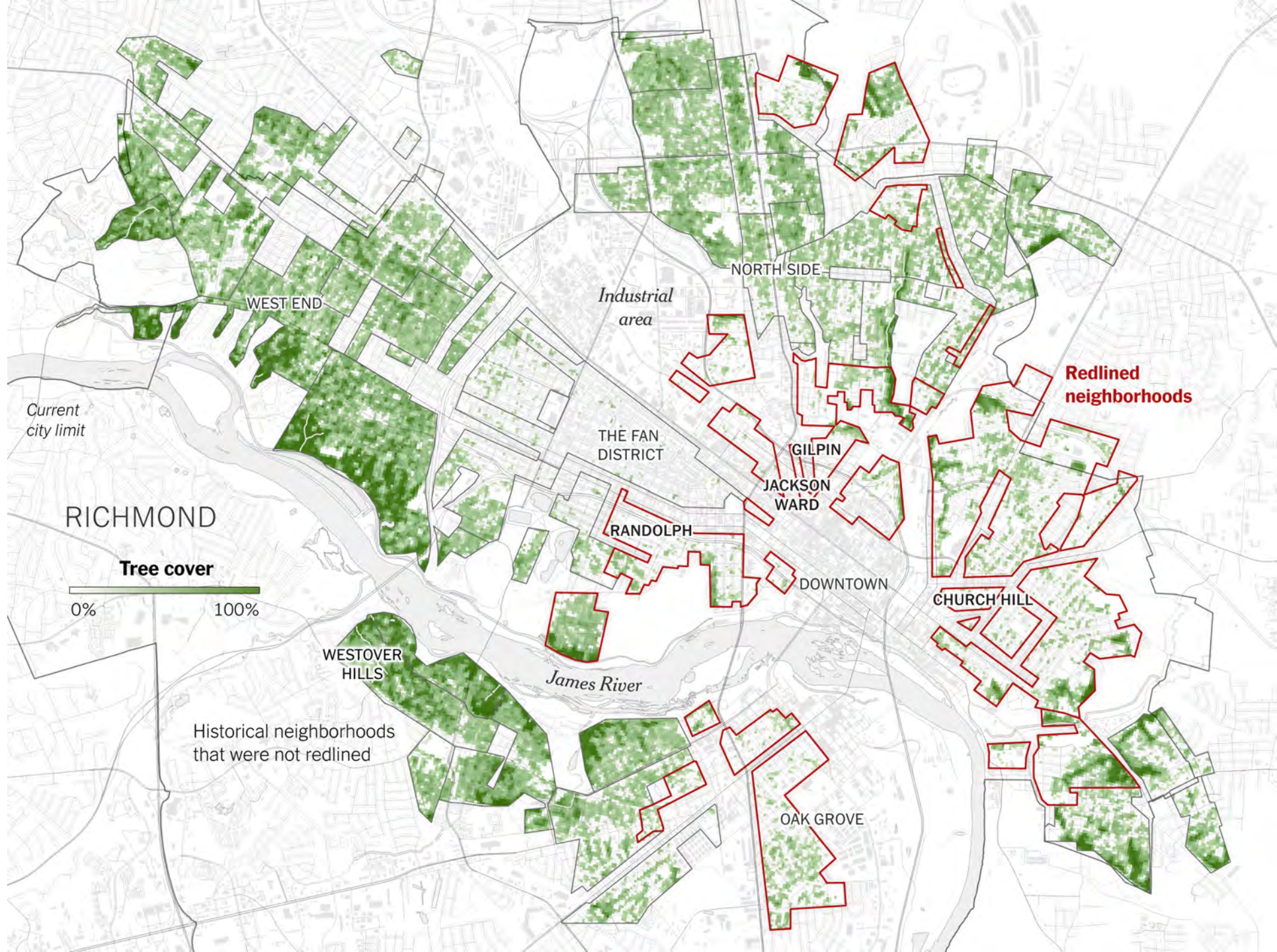


The New York Times

How Decades of Racist Housing Policy Left Neighborhoods Sweltering

By Brad Plumer and Nadja Popovich
Photographs by Brian Palmer Aug. 24, 2020





Current city limit

RICHMOND

Tree cover

0% 100%

Historical neighborhoods that were not redlined

Industrial area

NORTH SIDE

Redlined neighborhoods

THE FAN DISTRICT

GILPIN

JACKSON WARD

RANDOLPH

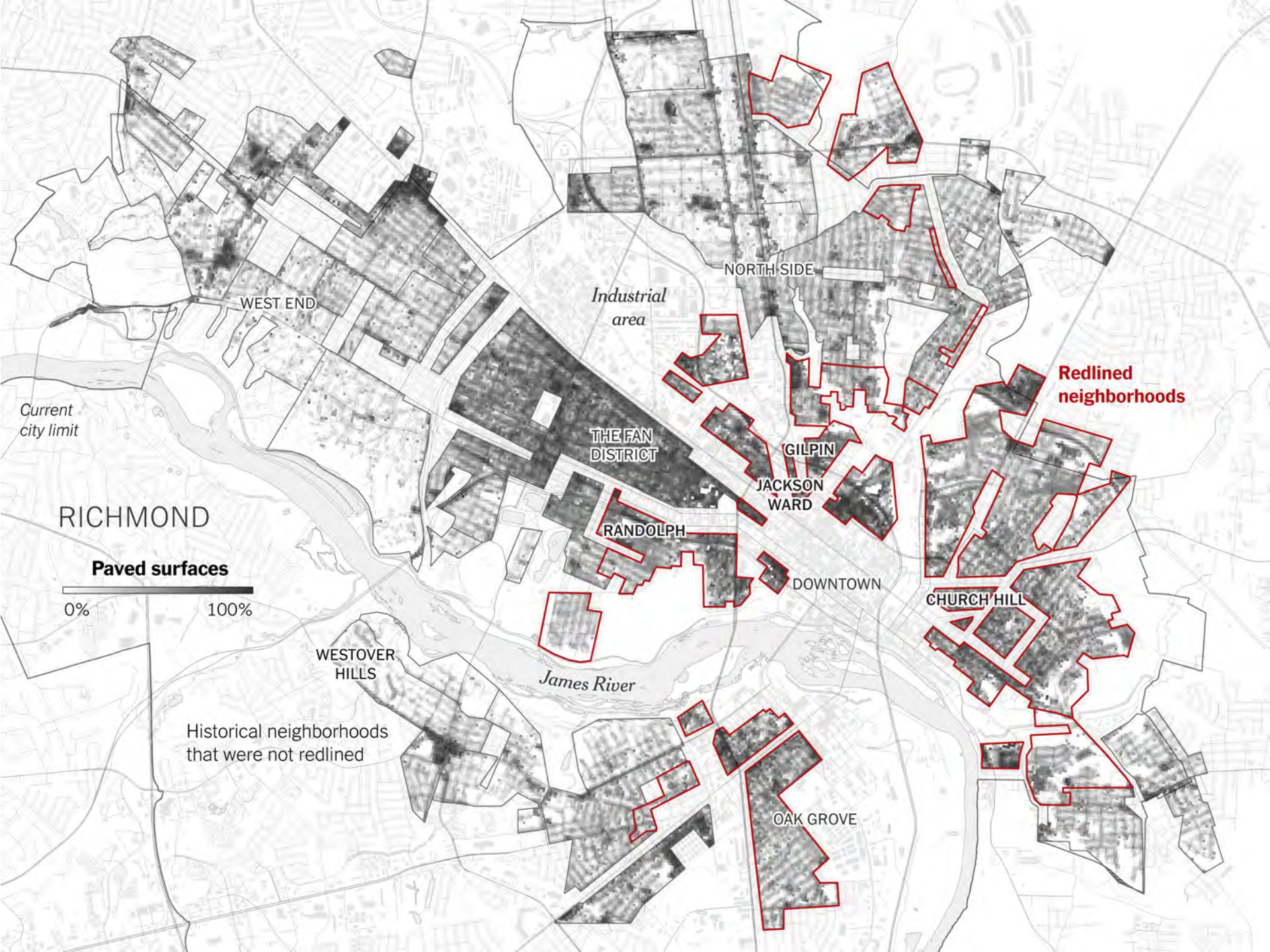
DOWNTOWN

CHURCH HILL

WESTOVER HILLS

James River

OAK GROVE



Current city limit

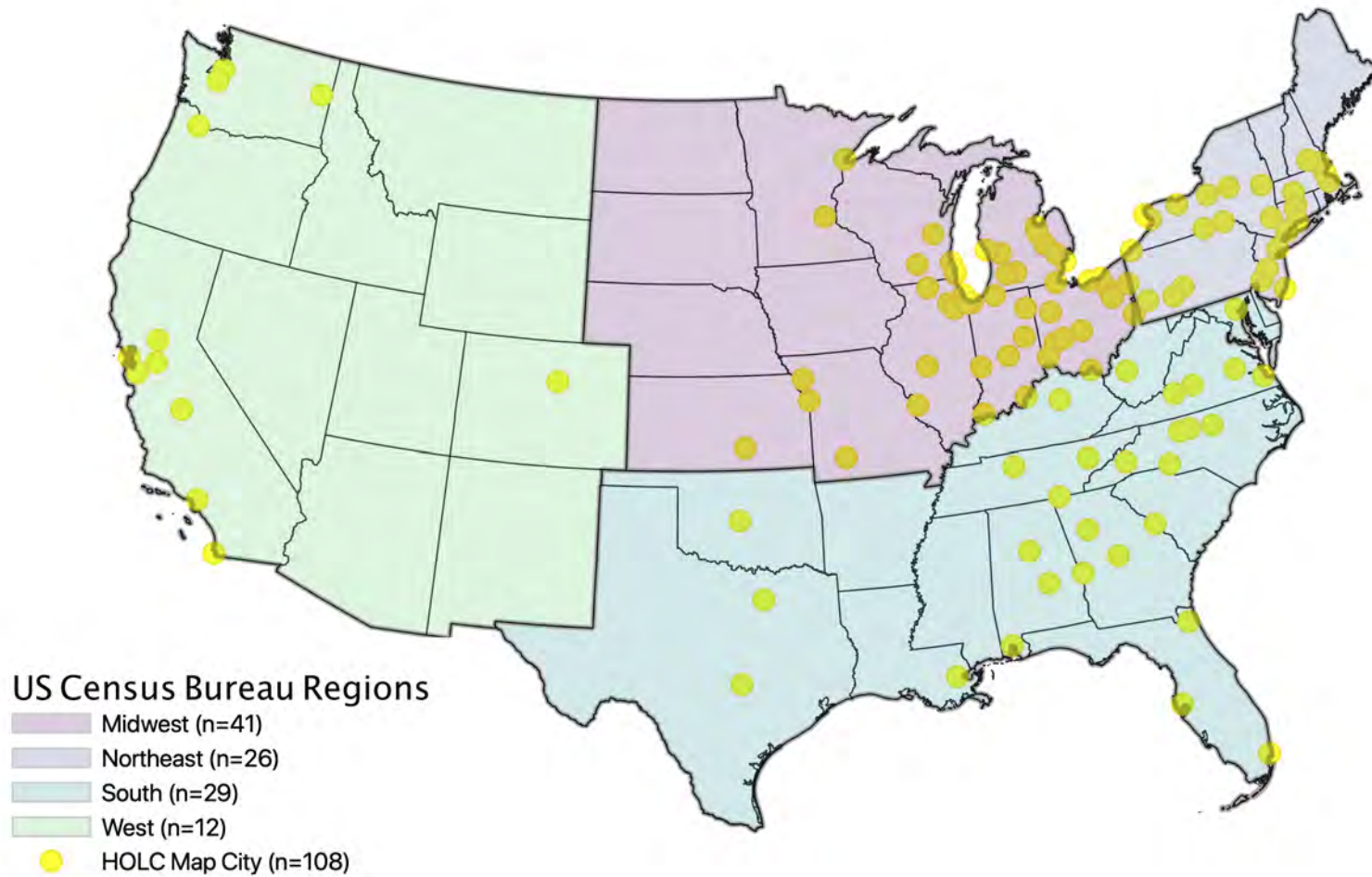
RICHMOND

Paved surfaces



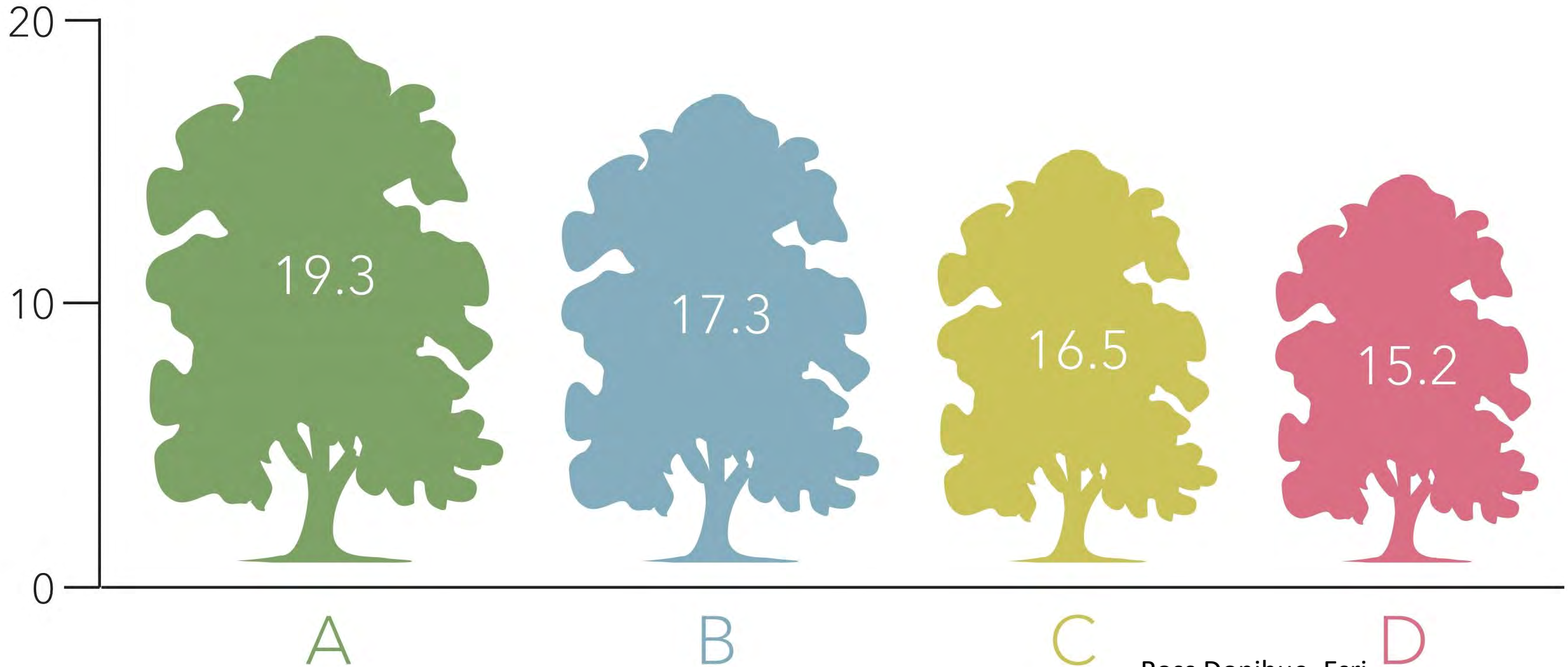
Historical neighborhoods that were not redlined

Redlined neighborhoods



In 94% of the cities studied, this pattern was observed.

Average Tree Height in Meters by HOLC Grade

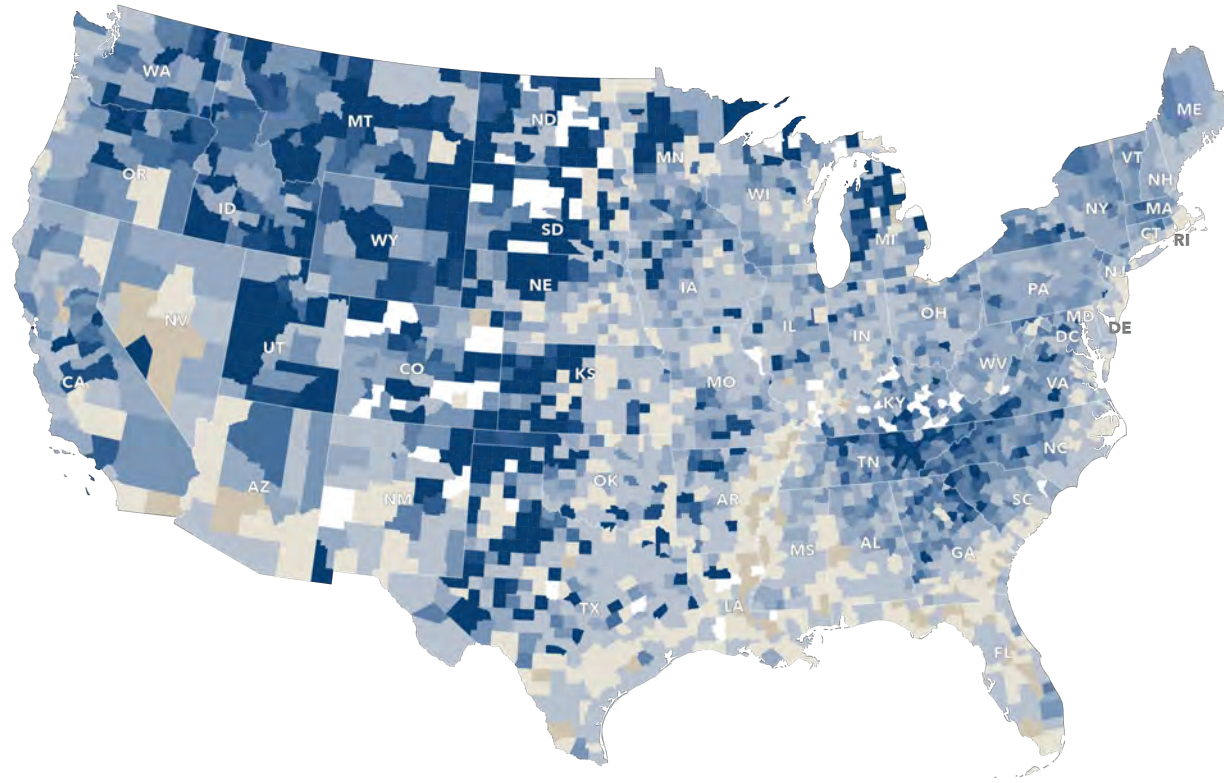
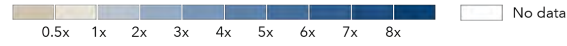


Flood Factor™



Difference in number of properties at substantial flood risk* (FSF) compared to FEMA

More properties at risk in FSF model →

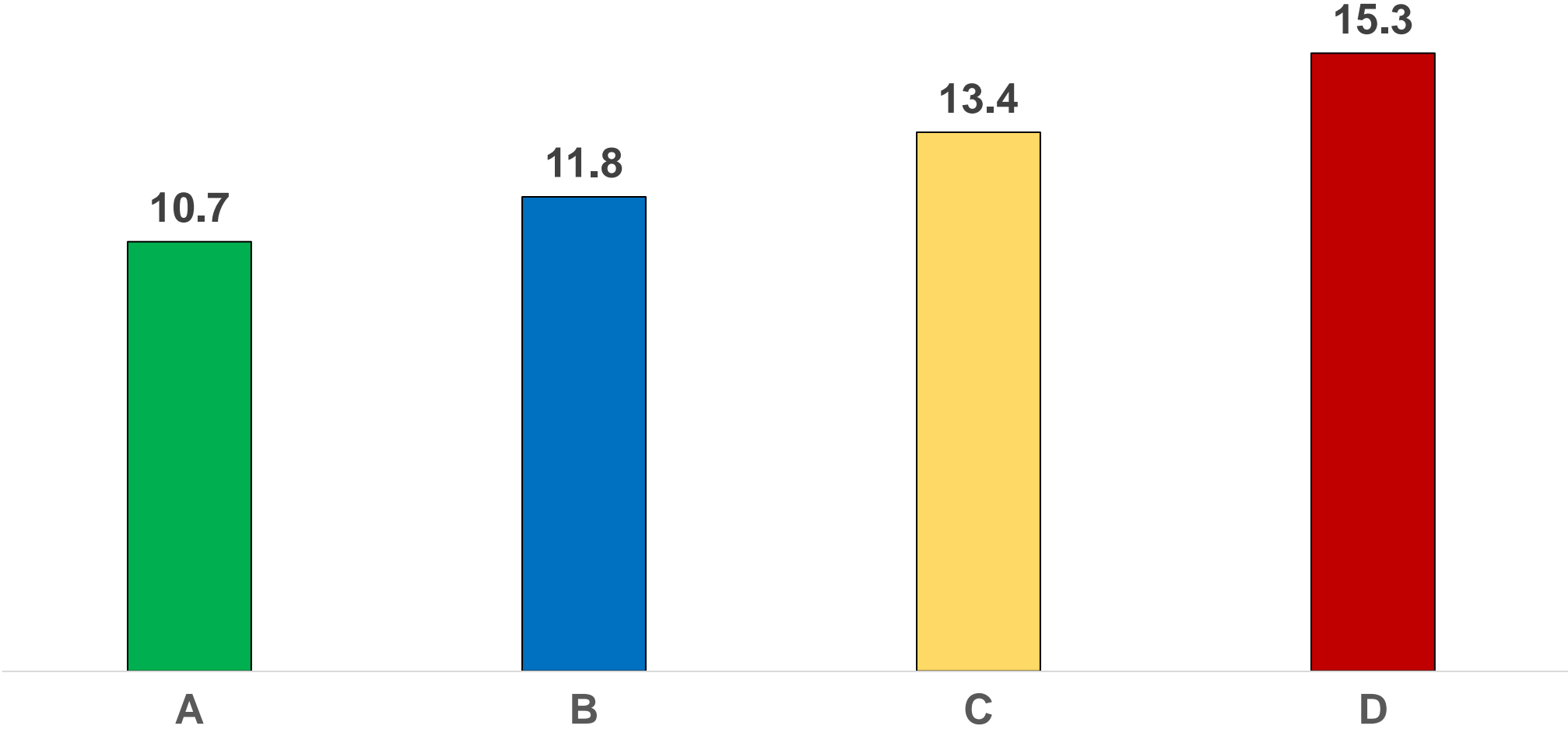


More properties at risk in FSF model →

Circles are sized according to total # properties at substantial risk



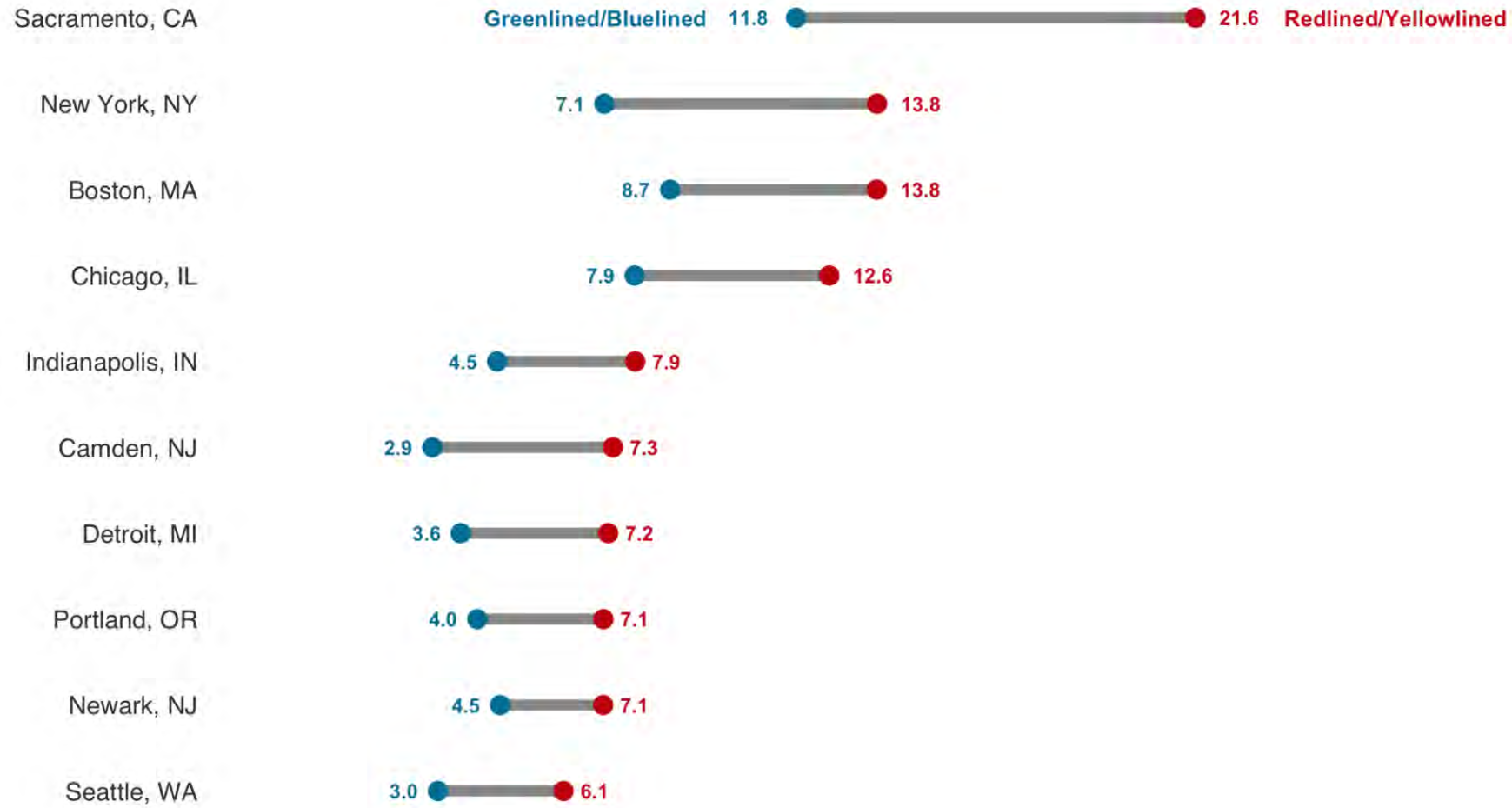
% Parcels with High Flood Risk



Higher flood risks in formerly redlined areas

Top 10 Metros with Greater Share of Homes at Risk in Redlined and Yellowlined Areas

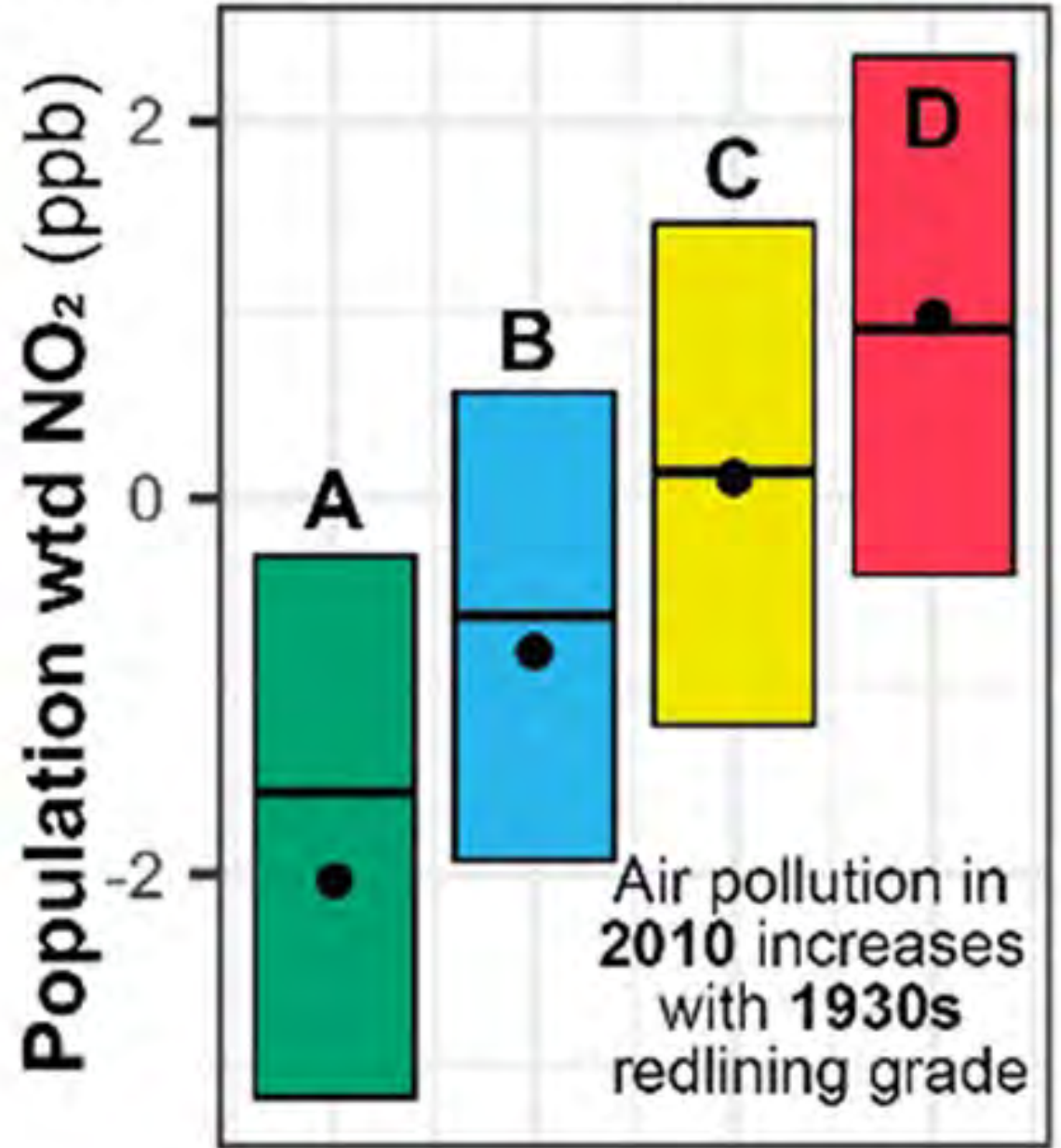
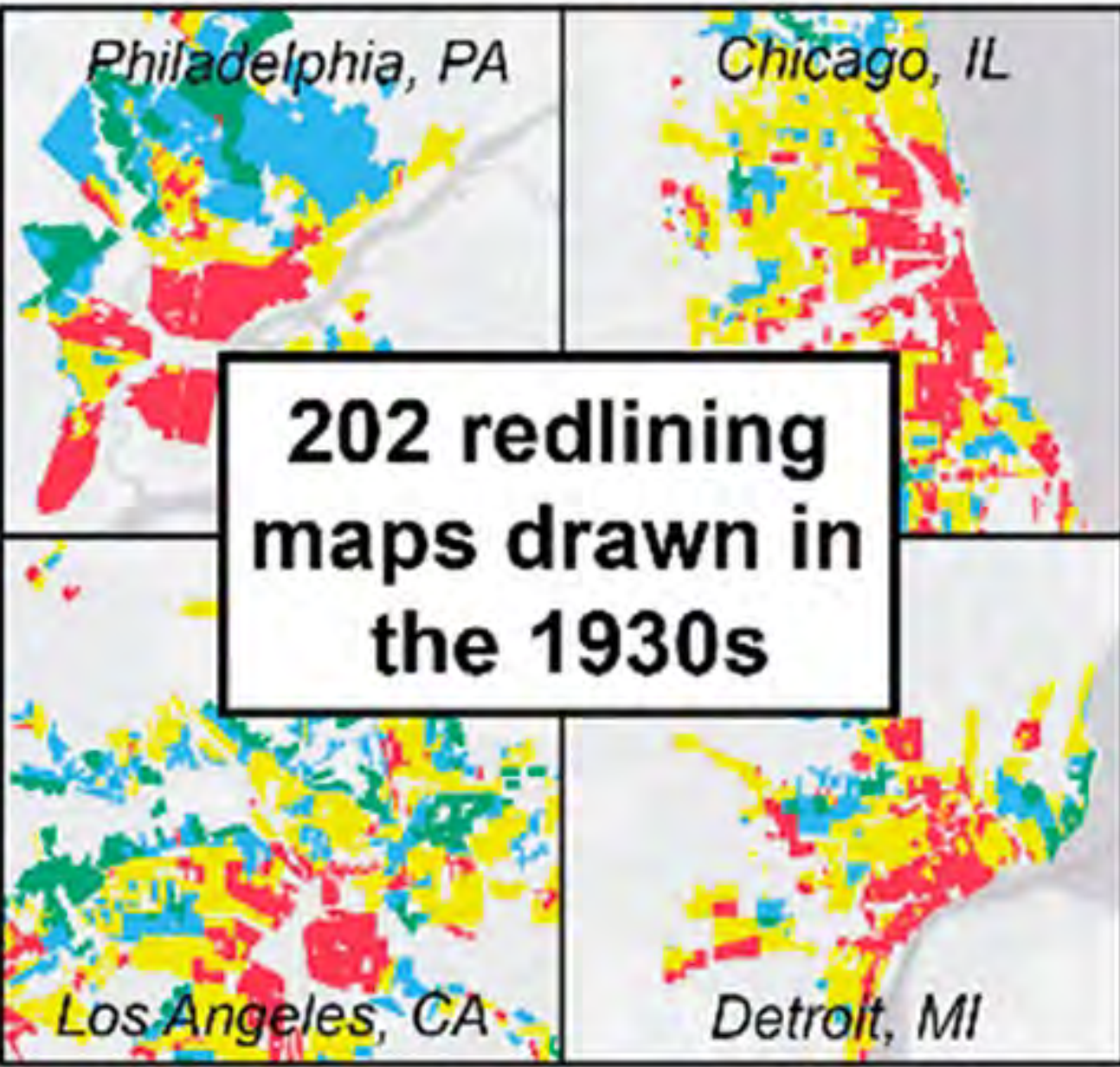
Percentage of homes, by redlining grade, that face high flood risk; %



Source: Redfin analysis of First Street Foundation flood risk data (FSF) and HOLC redlining maps



Modern air pollution disparities in historically redlined areas



Health outcomes in redlined versus non-redlined neighborhoods: A systematic review and meta-analysis

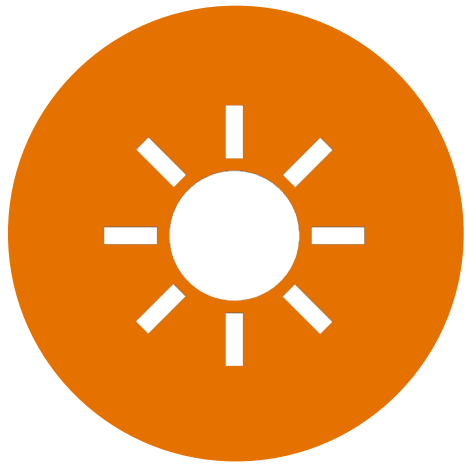
Eun Kyung Lee ¹, Gwendolyn Donley ¹, Timothy H. Ciesielski, India Gill, Owusua Yamoah, Abigail Roche, Roberto Martinez, Darcy A. Freedman

Disparities in environmental exposures (e.g., air pollution, endocrine disrupting chemicals) & biological responses

Health disparities:

- Asthma
- Cancer
- COVID-19
- Gun-related injuries
- Preterm birth
- Chronic diseases
- Heat-related illnesses

**Our neighbors are already experiencing a:
hotter, wetter, sneezier and wheezier climate**





Climate Safe Neighborhoods



Purpose:

Capacity Building & Systems Change





UNPACK HISTORY

Understand why our neighborhoods look the way they do- this is no accident.



PRIORITIZE CHANGES

Data informed, resident led changes to built environment



INTERVENE IN SYSTEMS

Build the capacity of residents to self advocate for more equitable distribution of resources

THREE
PRONGED
STRATEGY
OVER FOUR
YEARS

Building Climate Resilience For a Climate Safe Yonkers

Working Together to Ensure Our Communities are Prepared for Climate Change



Groundwork Hudson Valley creates sustainable environmental change in urban neighborhoods through community-based partnerships that promote equity, youth leadership, and economic opportunity.

OUR AREAS OF WORK



CLIMATE RESILIENCE



SUSTAINABILITY EDUCATION



YOUTH LEADERSHIP

What we'll cover

- ✓ Understanding Yonkers and its link between historic policies and today's climate risks
- ✓ Building resiliency, action, and empowerment within the community
- ✓ Local climate resilience strategies and action
- ✓ Lessons Learned and Q&A



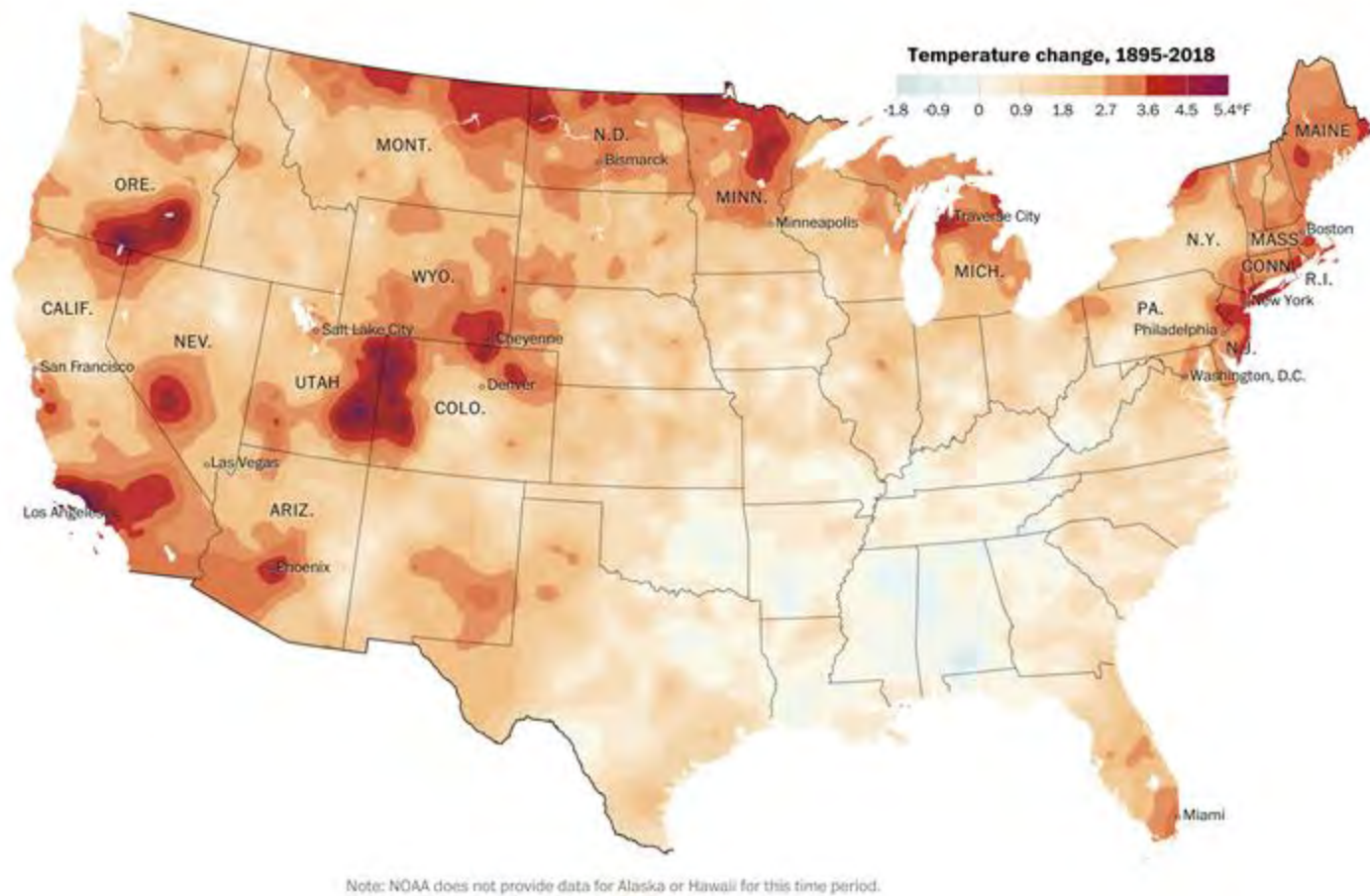
Yonkers is the largest city in Westchester County and 3rd largest city in the state of New York.

Population of over 200,000.

Diverse and multicultural community, including different ethnicities and backgrounds.

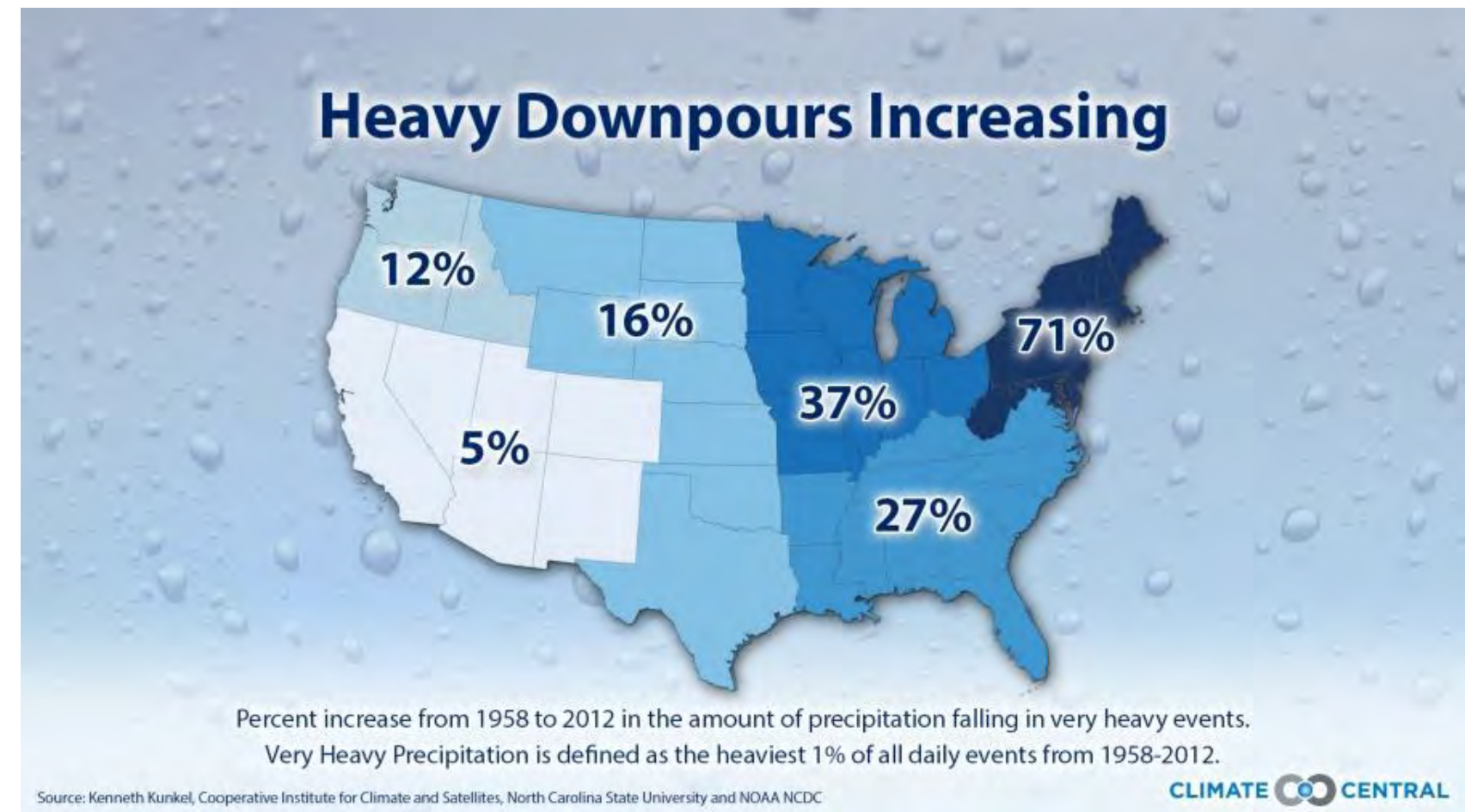
IT'S GETTING HOT IN HERE!

AND WET...



Source: Washington Post:

<https://www.washingtonpost.com/graphics/2019/national/climate-environment/climate-change-america/>

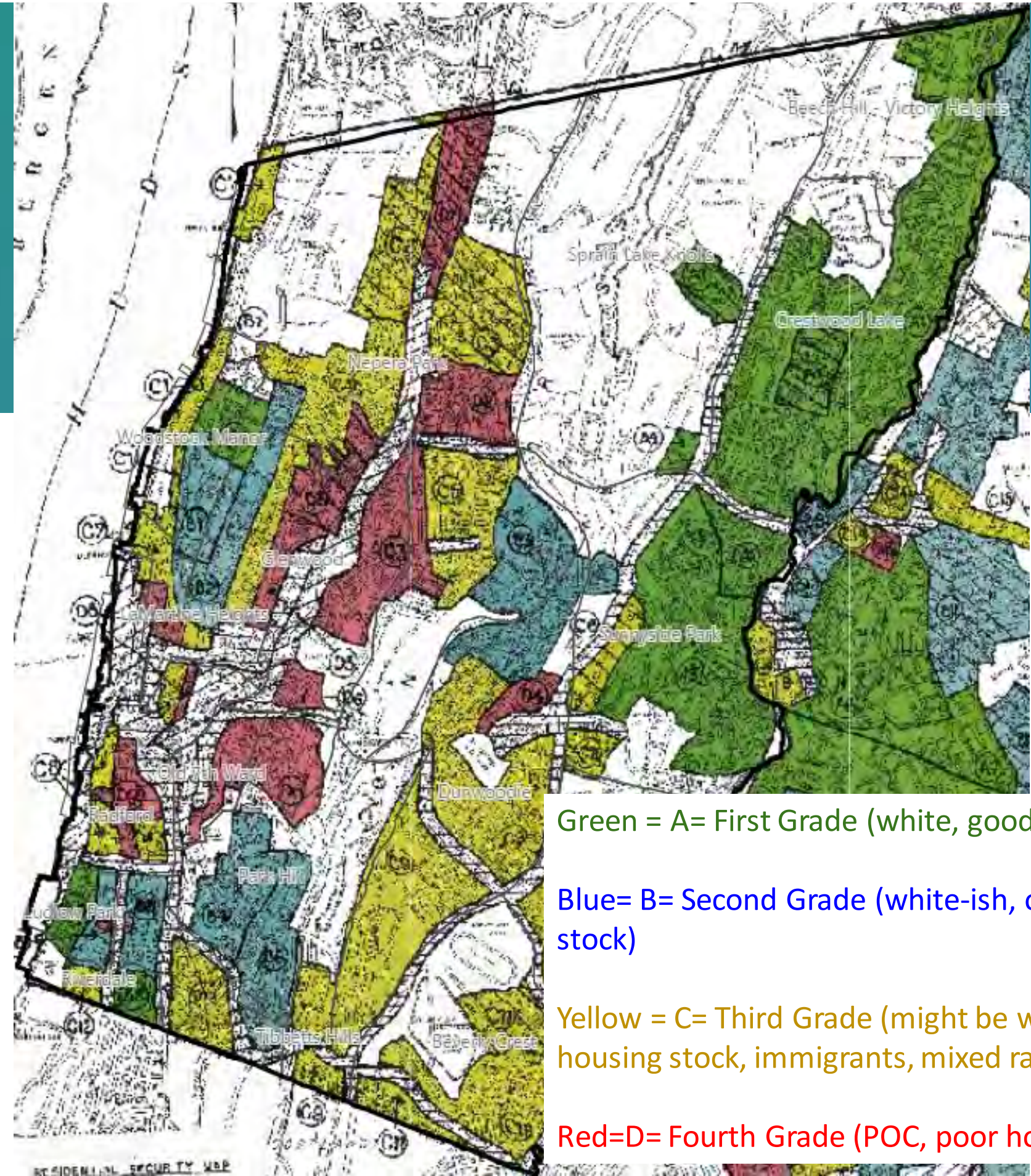


Yonkers Then

Policies and decisions made in the past have had significant impacts on our environment.

Legacy of policies

- Redlining
- Poorly planned urban development



Green = A= First Grade (white, good housings stock)

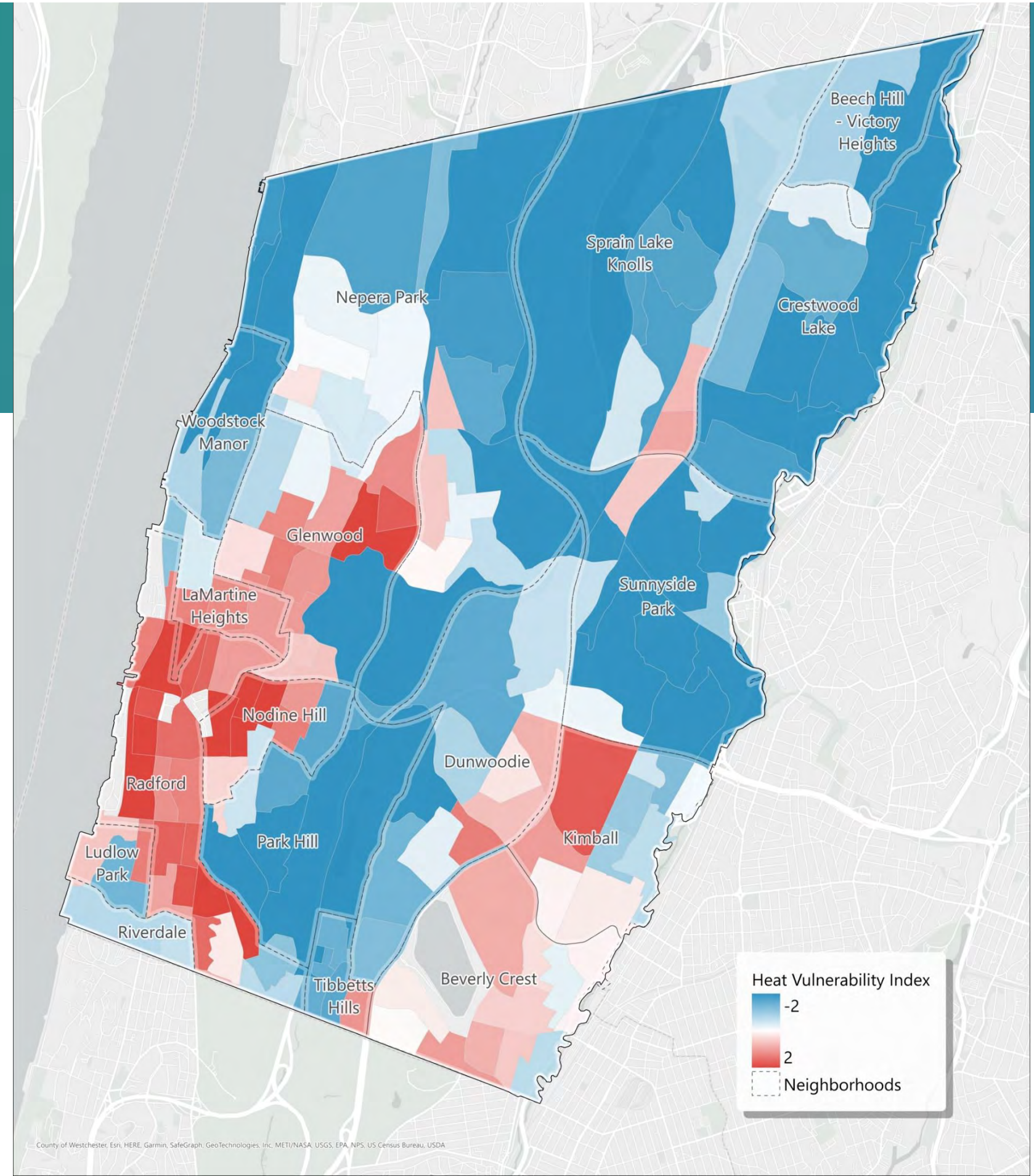
Blue= B= Second Grade (white-ish, ok housing stock)

Yellow = C= Third Grade (might be white now, poor housing stock, immigrants, mixed race)

Red=D= Fourth Grade (POC, poor housing stock)

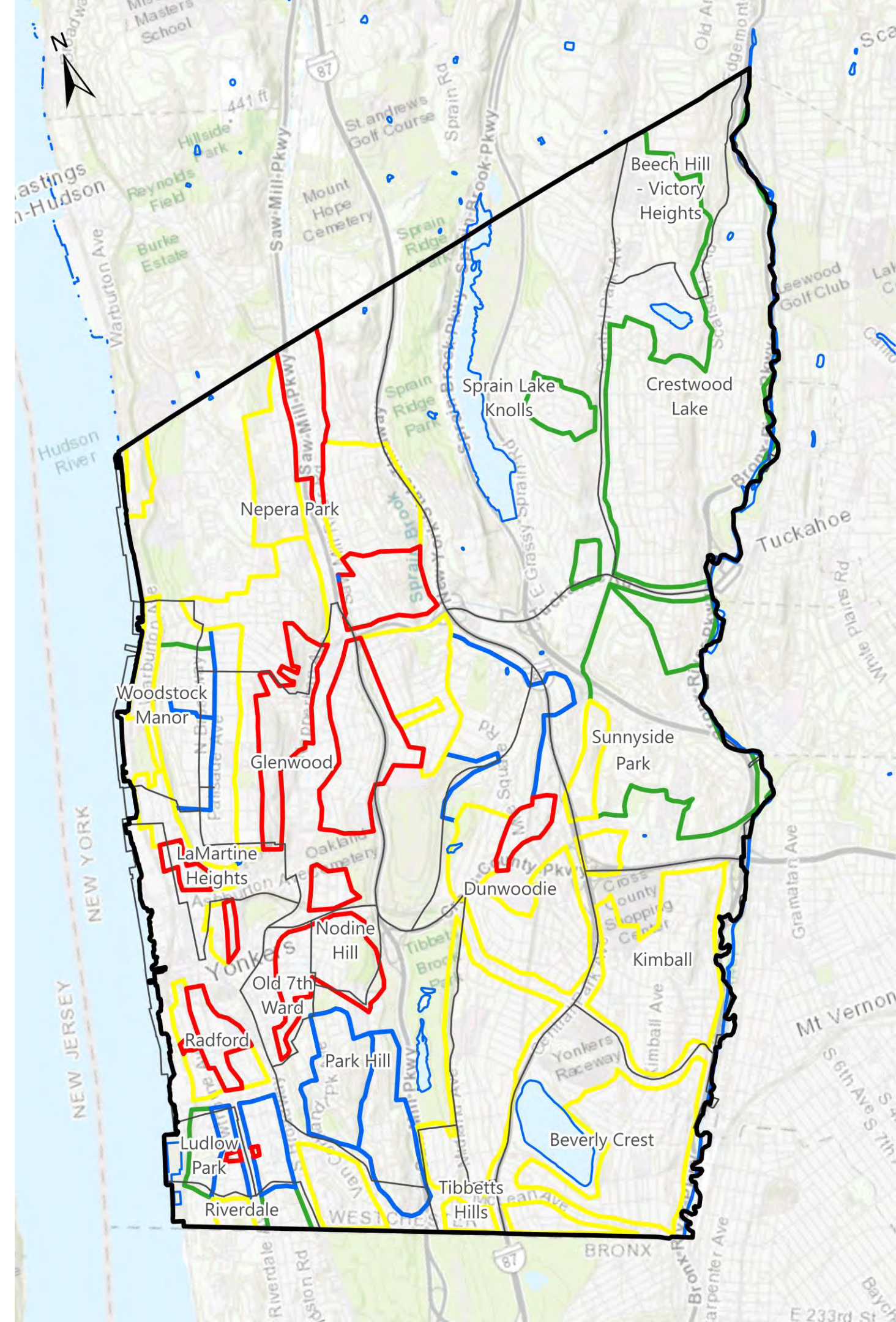
Yonkers Now

As a result of these historic policies, climate risks are not evenly distributed and often disproportionately affect vulnerable populations, exacerbating existing social and economic inequalities.



Understanding the relationship between historic discriminatory federal policy and current day environmental inequity

- Disparities in vulnerability to extreme heat and flooding can be traced back to segregationist housing policies
- Residents in the most vulnerable, under-resourced areas should have a say in the distribution of climate change mitigation resources



Local Urban Flooding

Flood Modeling from Extreme Rain
The New School Urban Systems Lab
100 Year Storm Modeling

NEWS

Photos show extreme flooding in New York's Hudson Valley that left 1 dead, several missing

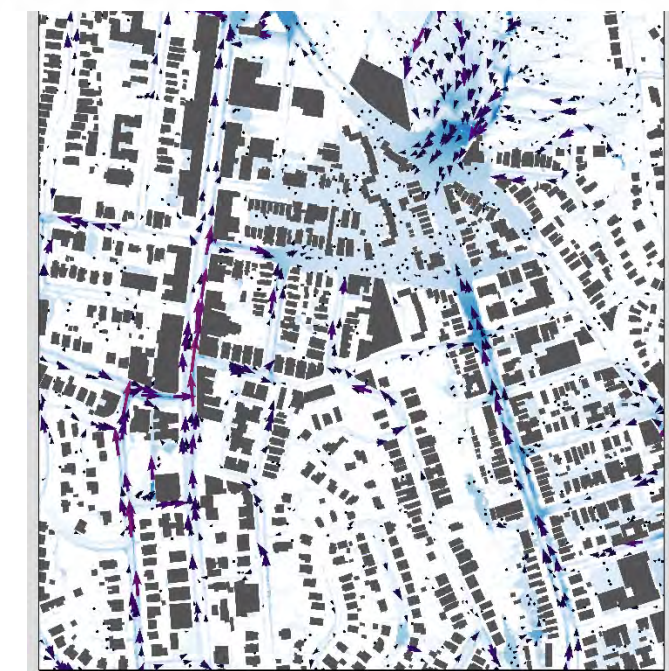


FLOODING ON LOWLAND HILL ROAD, STONY POINT, N.Y.

Stony Point neighborhood flooded during torrential storms Sunday

Homes and a park along Lowland Hill Rd. in Stony Point were flooded during Sunday's torrential rainstorm Seth Harrison/lohud, Rockland/Westchester Journal News

McLean Ave



“New York's Hudson Valley region experienced extreme flooding that left roadways inaccessible and at least one person dead after heavy rain swept through the area.”

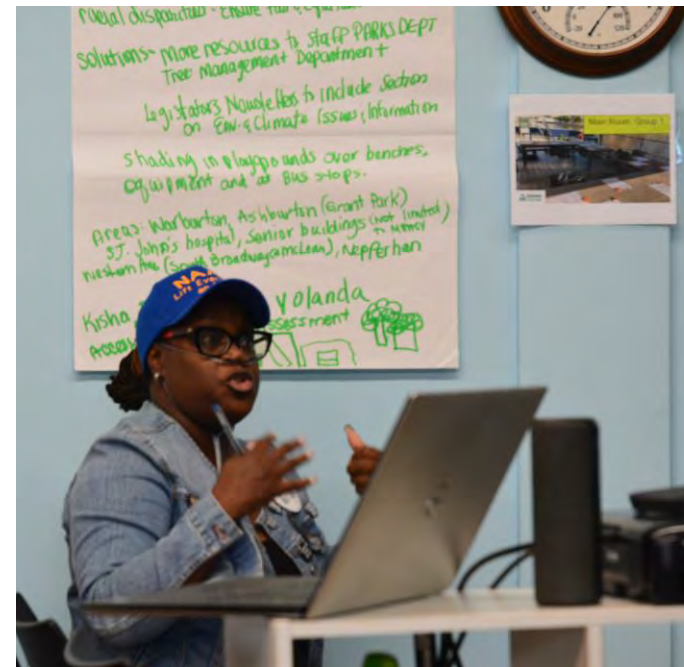
CLIMATE SAFE YONKERS TASK FORCE

A community capacity building program to:

- IDENTIFY
 - Hazards
 - Vulnerabilities
 - Assets
 - Opportunities
- PRIORITIZE
 - Needs
 - Mitigation Strategies
 - Locations
- PROMOTE INTERVENTIONS
 - Outreach + Education



Building resiliency, action, and empowerment within the community.



Winter/Spring 2022:
Recruitment +
Onboarding

PRIORITIZE:

Task force participated
in and lead workshops
to select climate
resilience strategies.

Spring/Summer 2022

Fall/Winter 2022

Spring/Summer 2023

IDENTIFY:

Training and education
sessions on the issue
and solutions and
summer outreach.

PROMOTE:

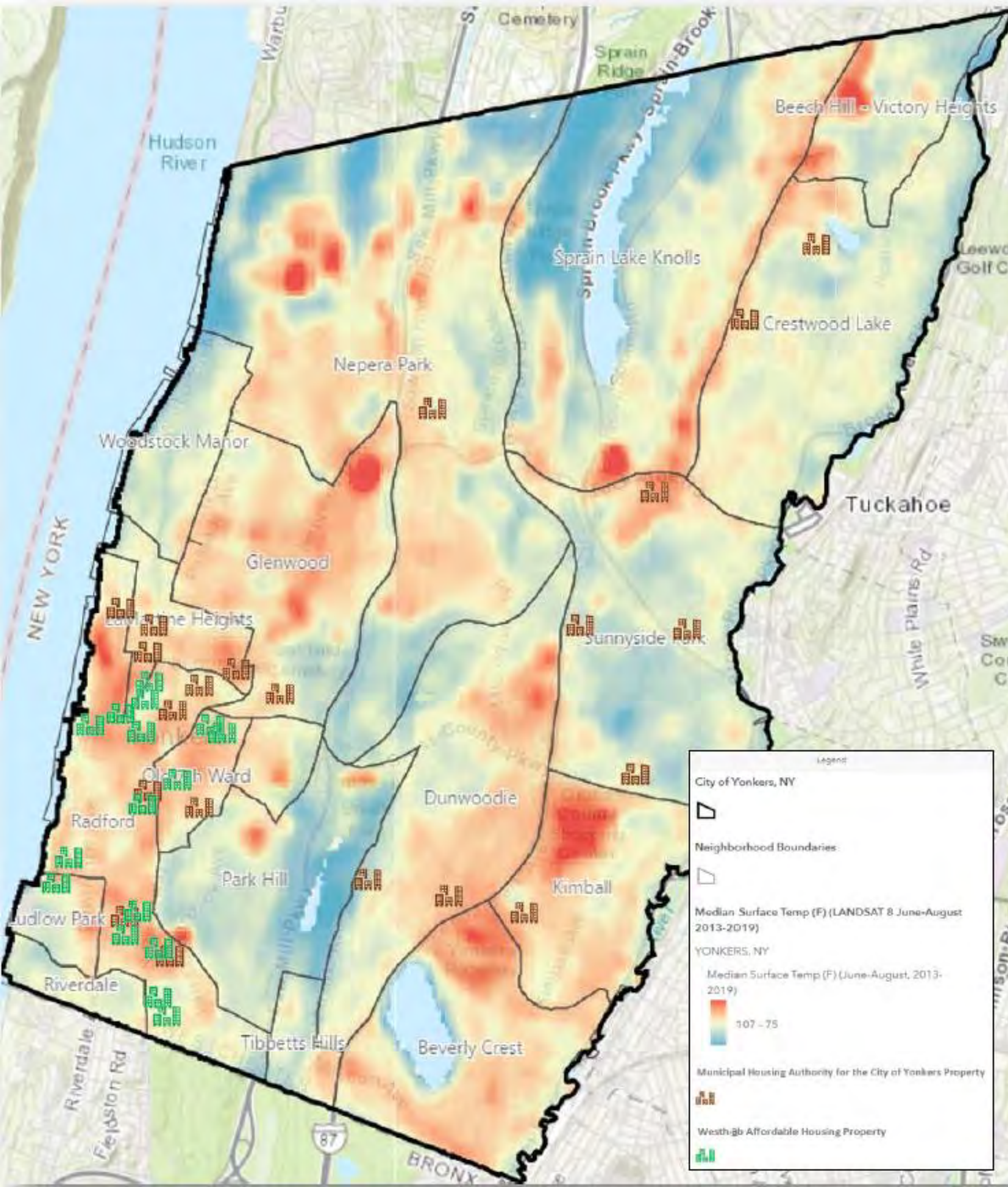
Community based public
outreach and
campaigns.

CSYTF Process and Timeline for Promoting Climate Resilience Strategies



YONKERS CLIMATE ACTION PLAN

Partnership in Action: Climate Ready Municipal and Affordable Housing



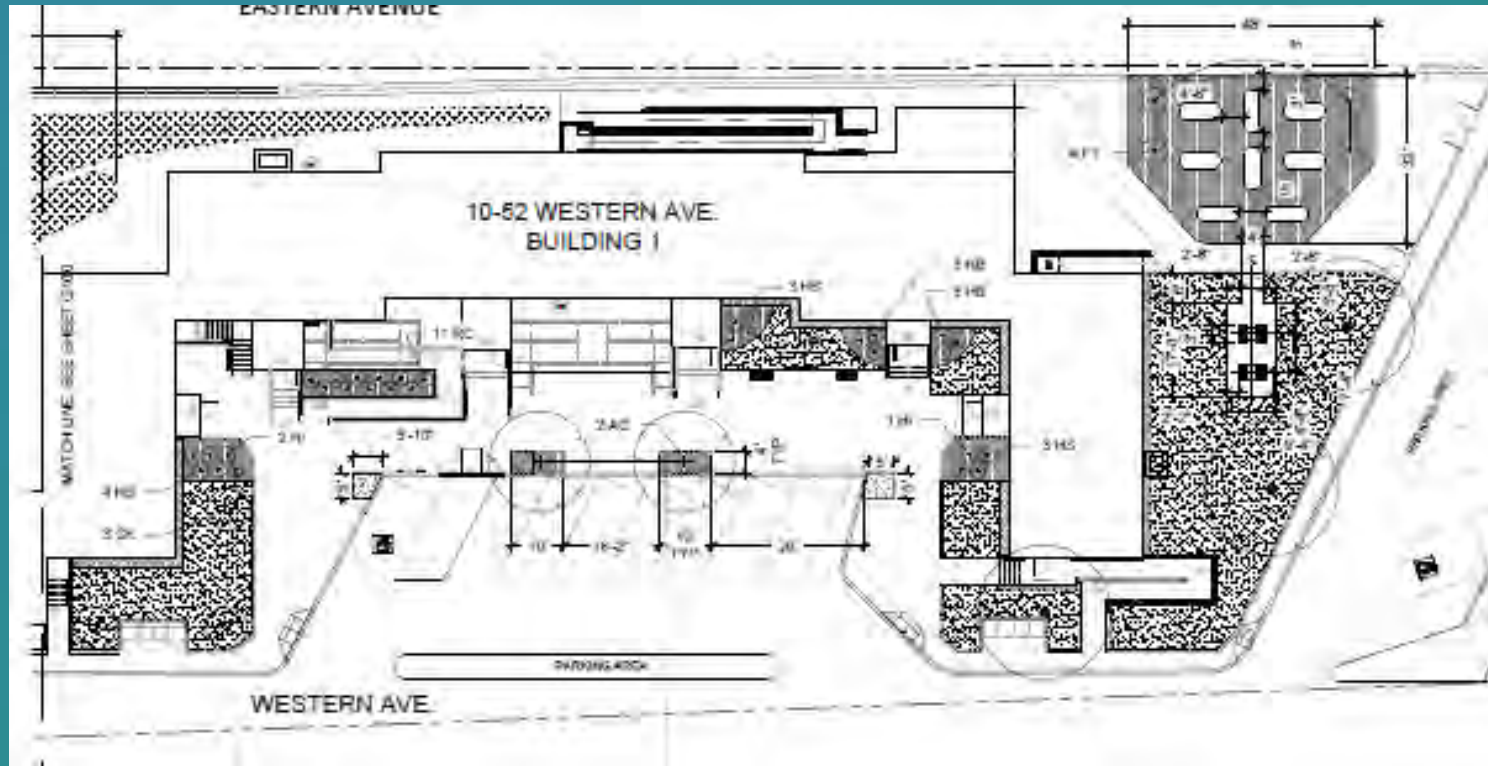
MHACY
Municipal Housing Authority
for the City of Yonkers

WESTHAB
Building Communities. Changing Lives.

CLIMATE READY MUNICIPAL HOUSING

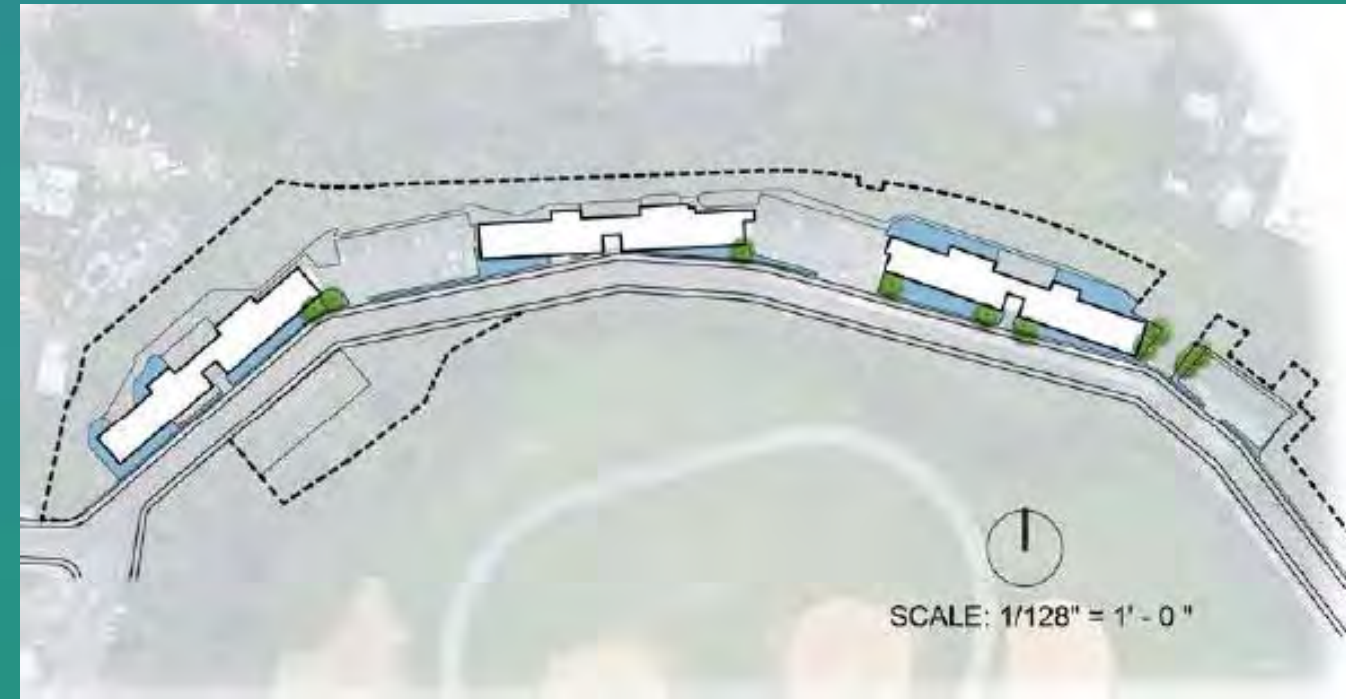
Climate Safe Landscaping at 4 MHACY Properties

Loehr Court Planting Plan



Feasibility Study – Heat and Flood Mitigation - 10 MHACY Properties

Walsh Homes GI Conceptual Design



Kris Kristensen Design Charrette



Loehr Court Planting Rendering

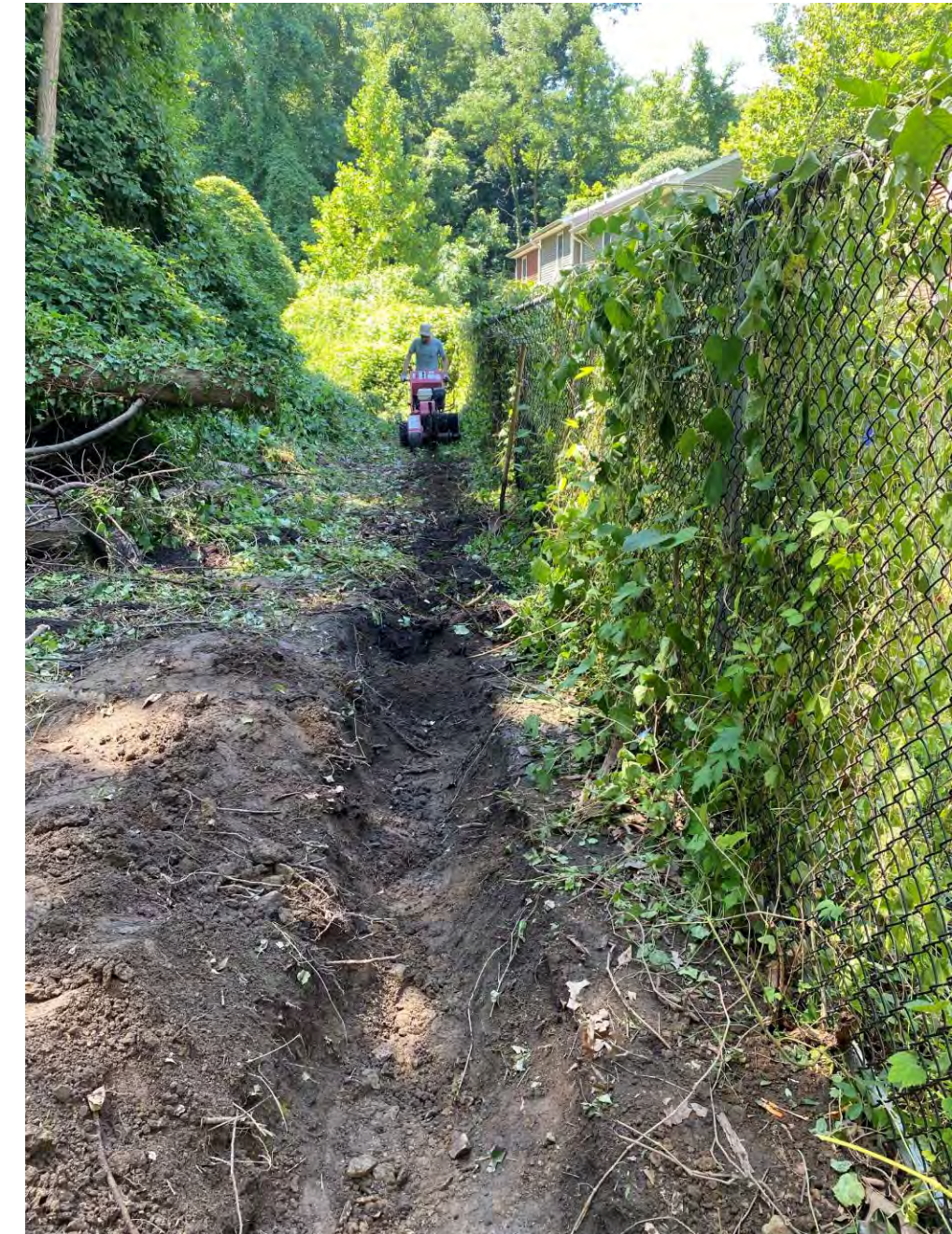


O'Rourke Town-houses GI Conceptual Design



Demonstration Projects

Lawrence Christopher Townhouses



Demonstration Projects

Reagan Townhouses



Before



After

Groundwork and MHACY In The News



WHAT'S NEXT?

- Future projects at MHACY sites.
- Advocacy around implementation of the Yonkers Climate Action Plan.
- Continue to engage the community and raise awareness.



LESSONS LEARNED



Relationships and Partnerships Matter

Building partnerships with MHACY and Westhab opened the doors for Groundwork to secure funding and work across 10 housing properties, leading green infrastructure projects and efforts.

Invest to Get a Return

Groundwork invested time and efforts conducting a heat and flooding feasibility study at 10 MHACY properties, providing us with the data and insights to secure additional funding to implement key projects.

Community Engagement is Key

Involving and engaging the community makes people want to be part of the process and change.

Systems Leverage for a Systems Change

Leveraging our technical expertise to be a community partner for key climate policy such as the Yonkers Climate Action Plan.

Visit us at:

GROUNDWORKHV.ORG

Connect with us



@GROUNDWORKHV

THANK YOU!

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Director of Community Relations,
Groundwork Hudson Valley
candida@groundworkhv.org