

Mitigating Urban Heat Threats through a Community-Driven Framework

Jeremy S. Hoffman, Ph.D.

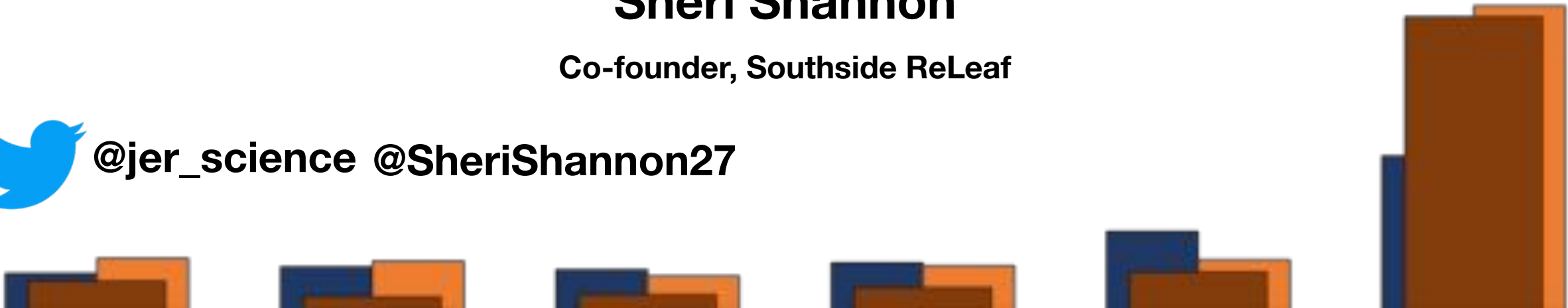
David and Jane Cohn Scientist, Science Museum of Virginia

Sheri Shannon

Co-founder, Southside ReLeaf

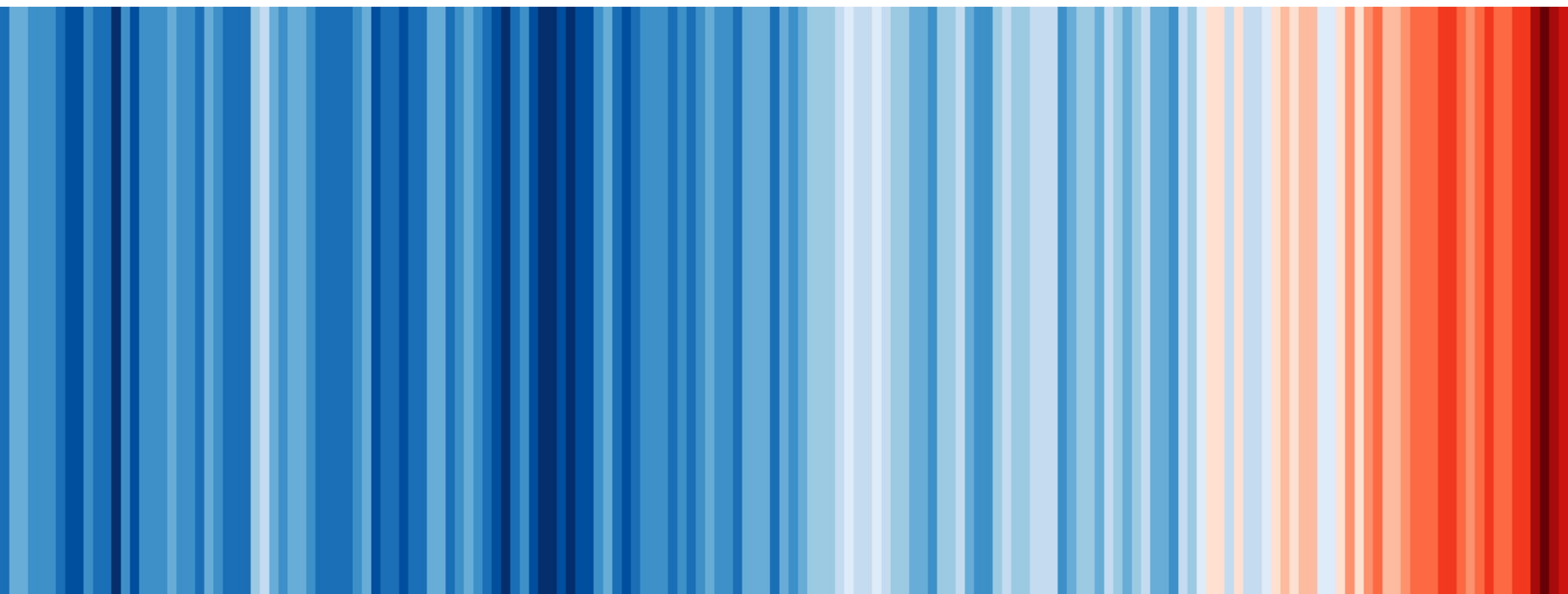


@jer_science @SheriShannon27

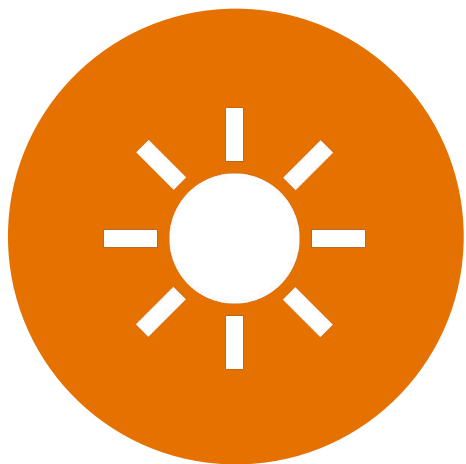
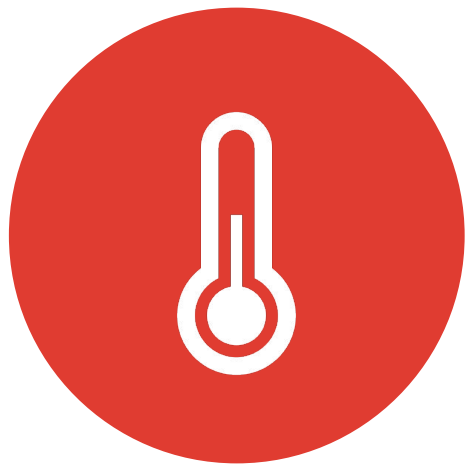


1850

2020

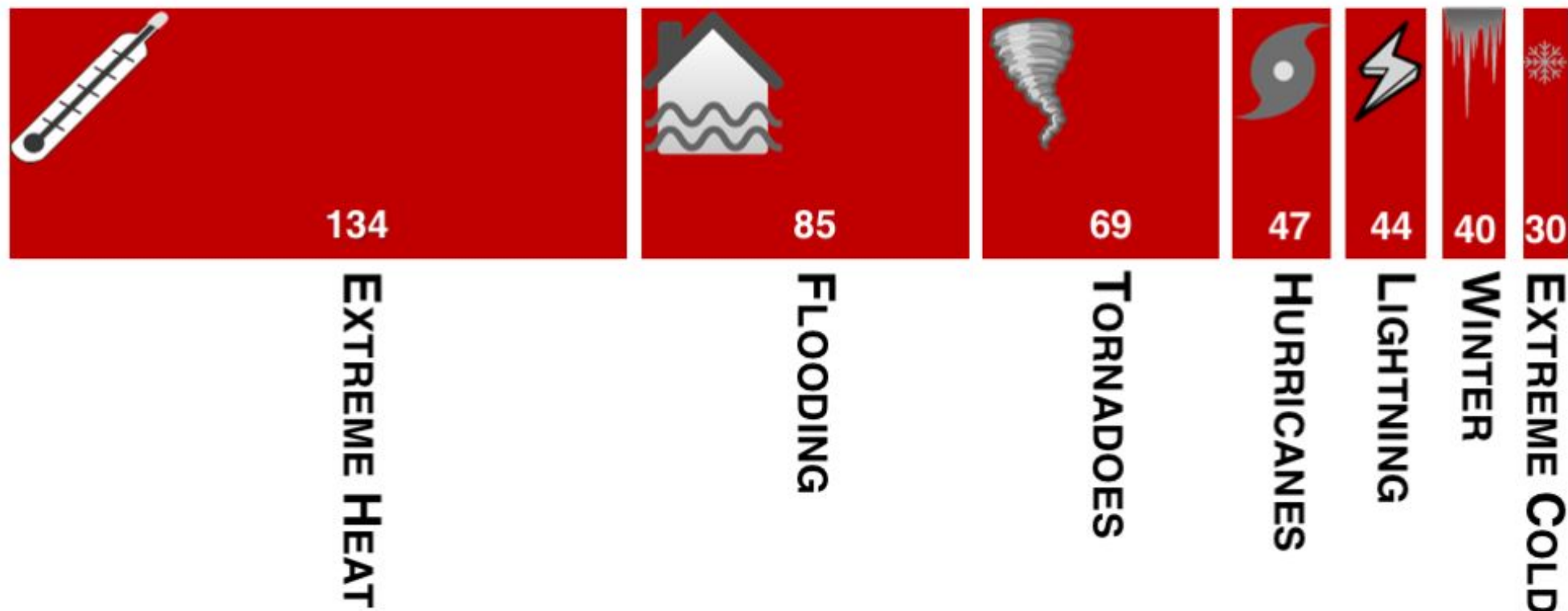


**Already experiencing & expecting a:
hotter, wetter, sneezier and wheezier climate**



DEADLIEST WEATHER-RELATED HAZARDS

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

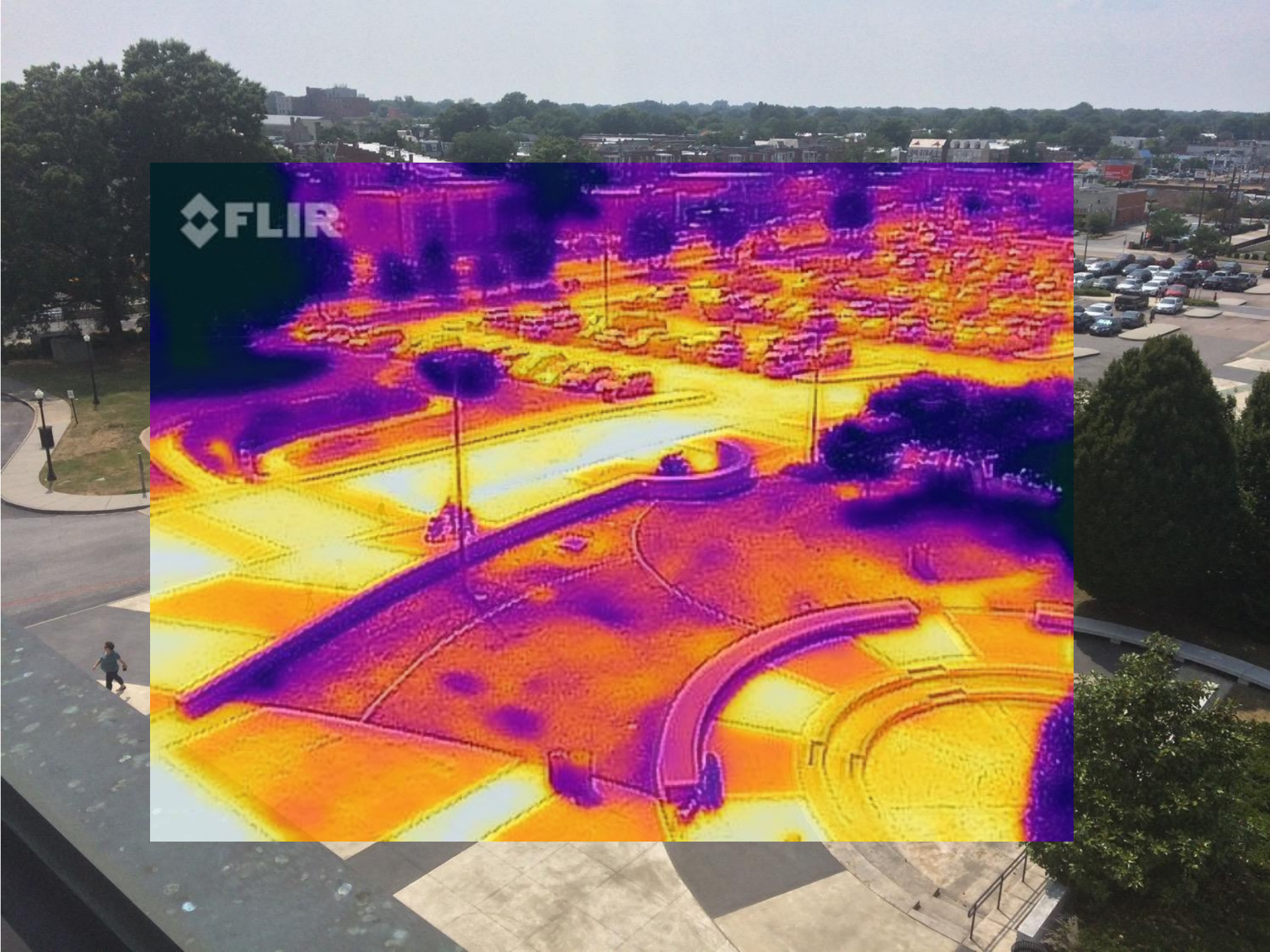


Source: National Weather Service Office of Climate, Water, and Weather Services Natural Hazard Statistics



Walter Kale, Chicago Tribune



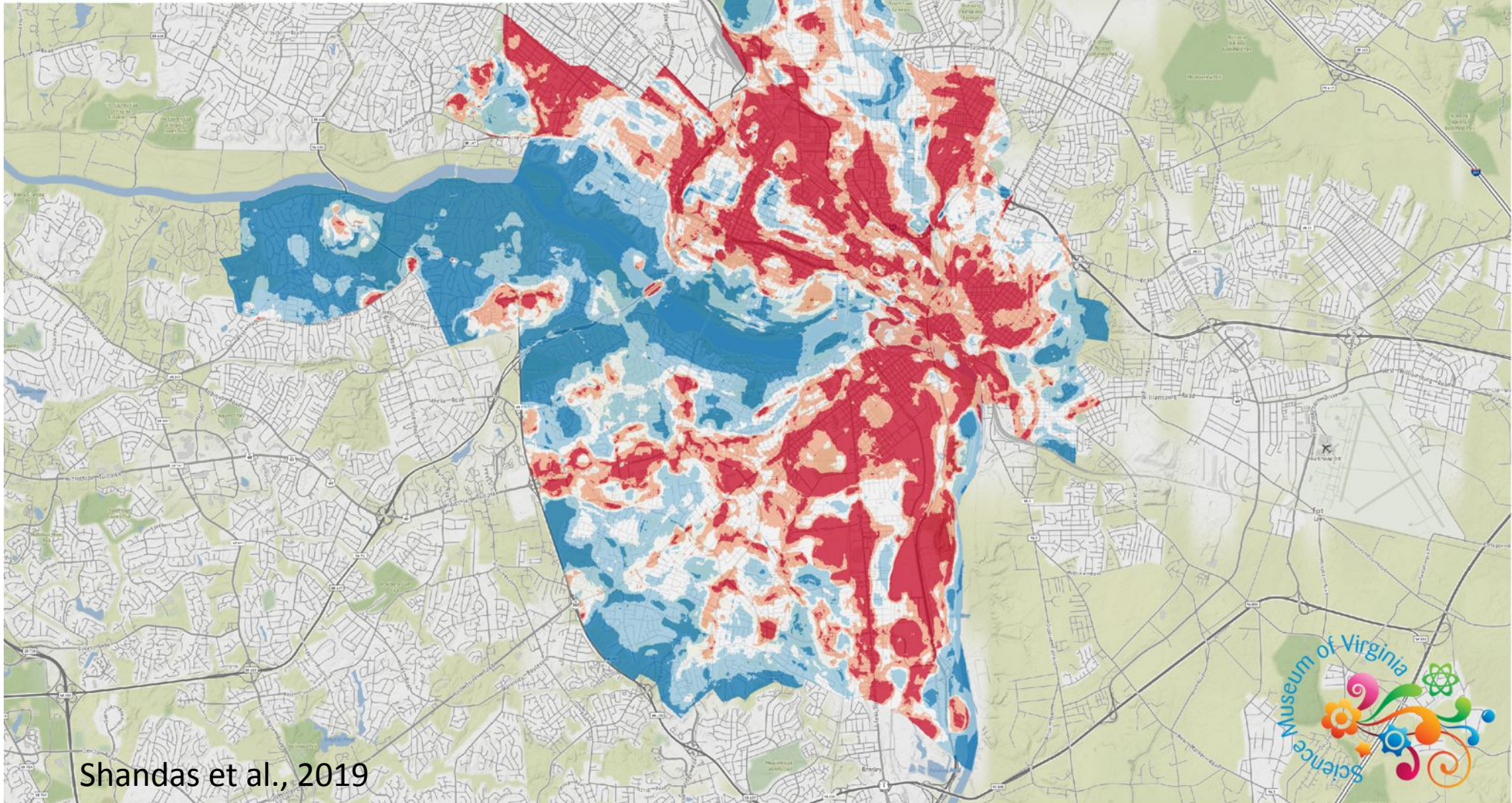
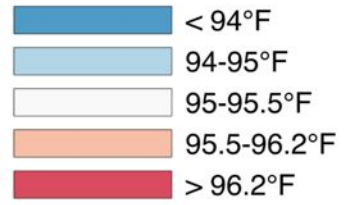




Shelby Lum, RTD

Richmond's Urban Heat Islands

Afternoon (3PM) Temperatures on July 13, 2017



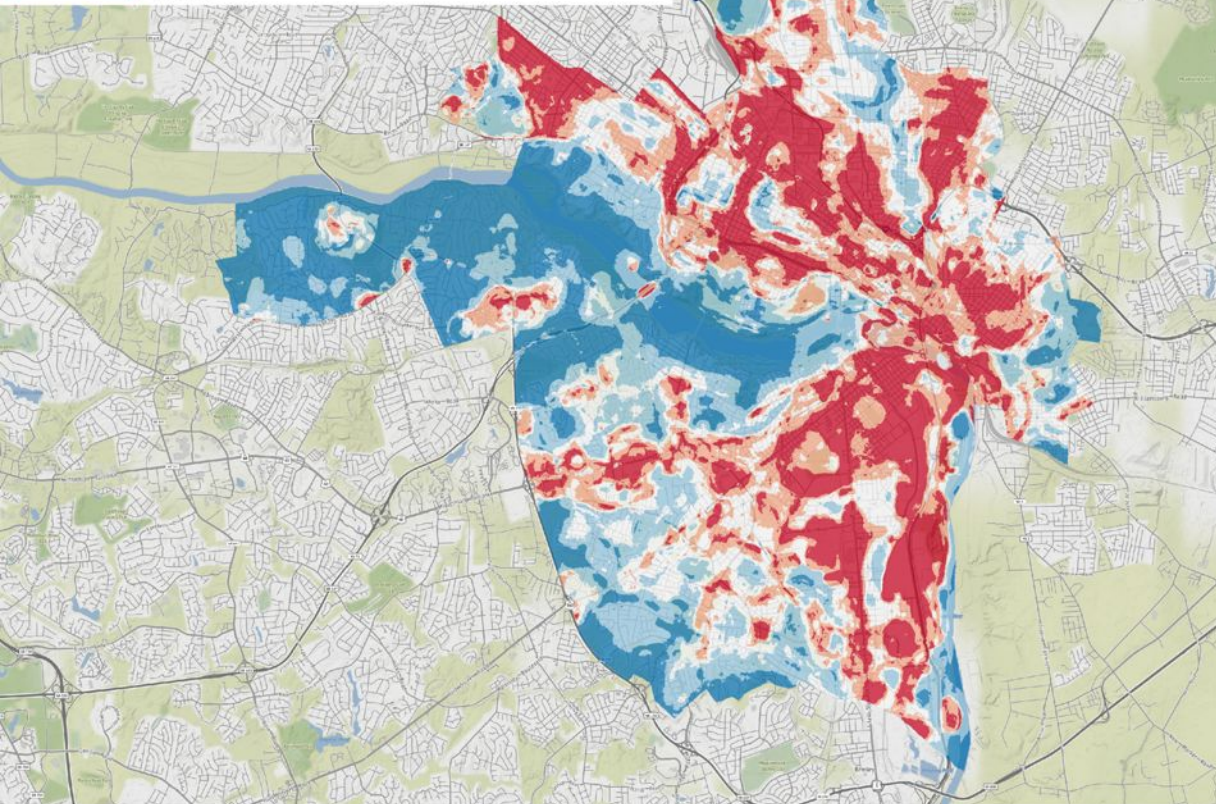
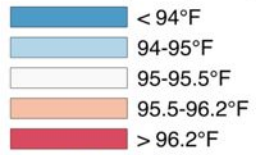
Shandas et al., 2019



EXTREME HEAT (2017)

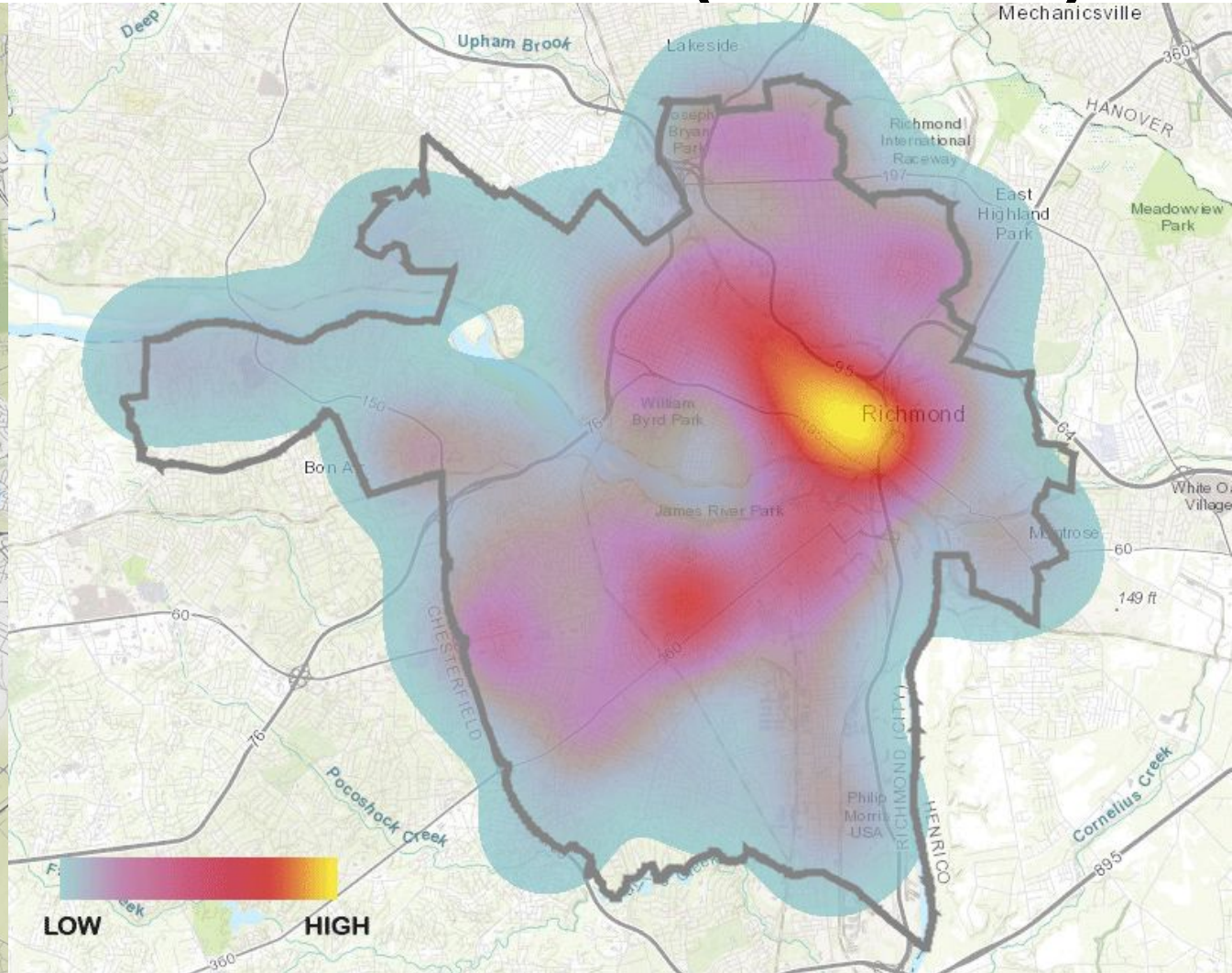
Richmond's Urban Heat Islands

Afternoon (3PM) Temperatures on July 13, 2017

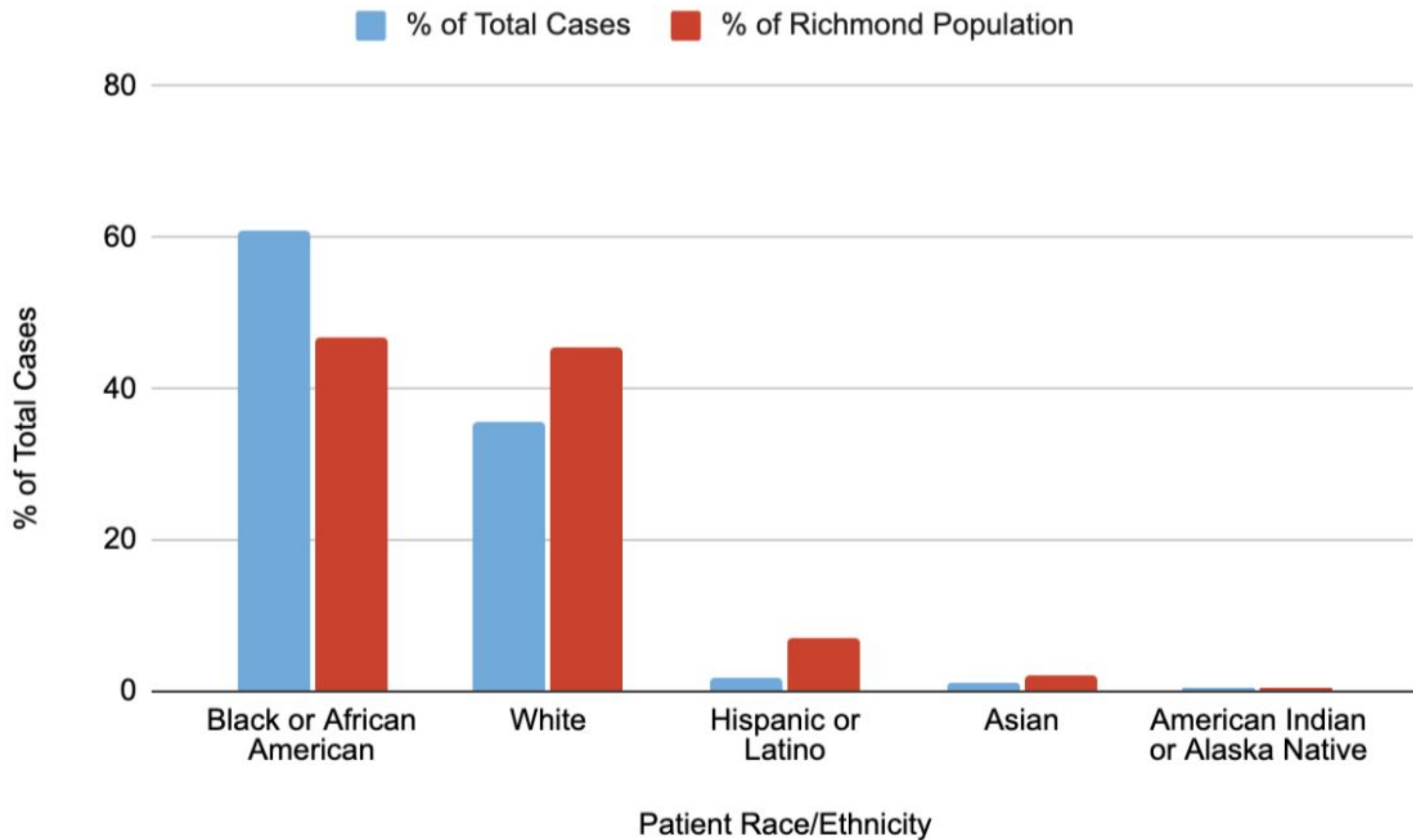


Shandas et al., 2019

AMBULANCE RESPONSES FOR HEAT ILLNESS (2015-2019)



Data: Richmond Ambulance Authority



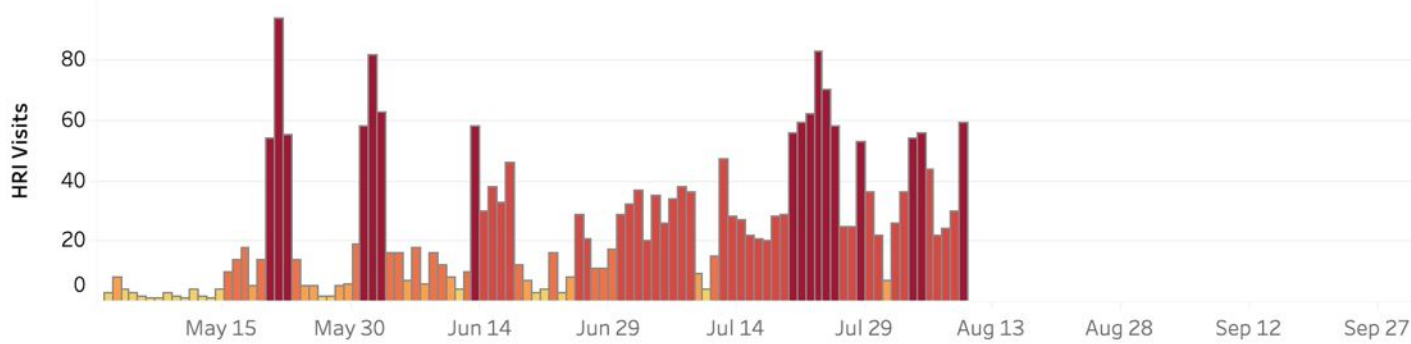
Heat Related Illness (HRI) in Virginia

Select Year
(Affects All Graphs and M...)
2022

Select Patient Geography
(Affects All Graphs and M...)
All Visits

Emergency Department and Urgent Care Visits from May to September, 2015 - 2022

Daily HRI - All Visits in Virginia, 2022 (Total HRI Visits = 2,468)



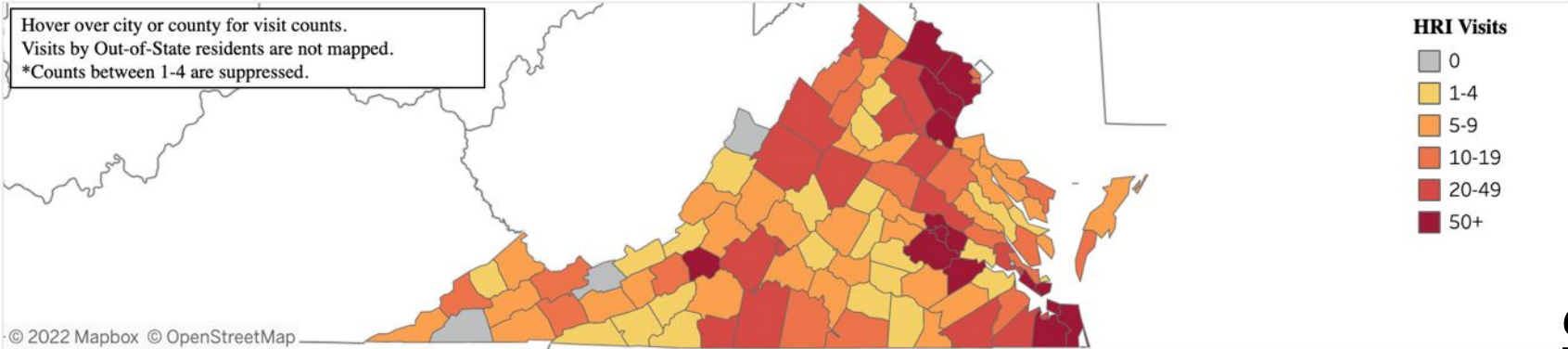
HRI Visits



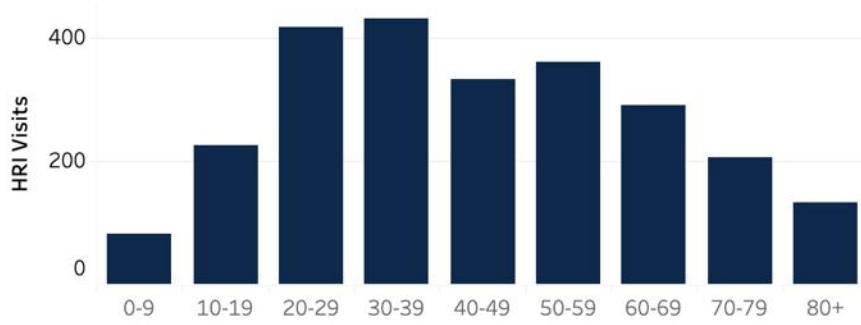
~2,500

Heat-related
Illnesses
so far in 2022

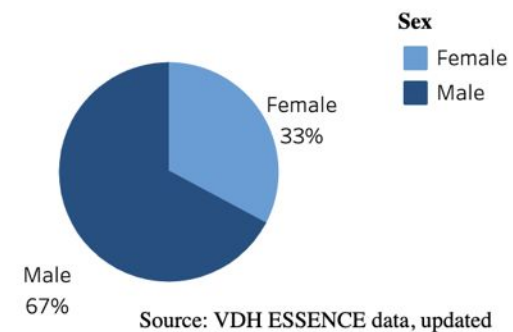
Annual HRI by Patient City/County - All Visits by Virginia Residents, 2022



Annual HRI by 10-Year Age Group - All Visits in Virginia, 2022



Annual HRI by Sex - All Visits in Virginia, 2022

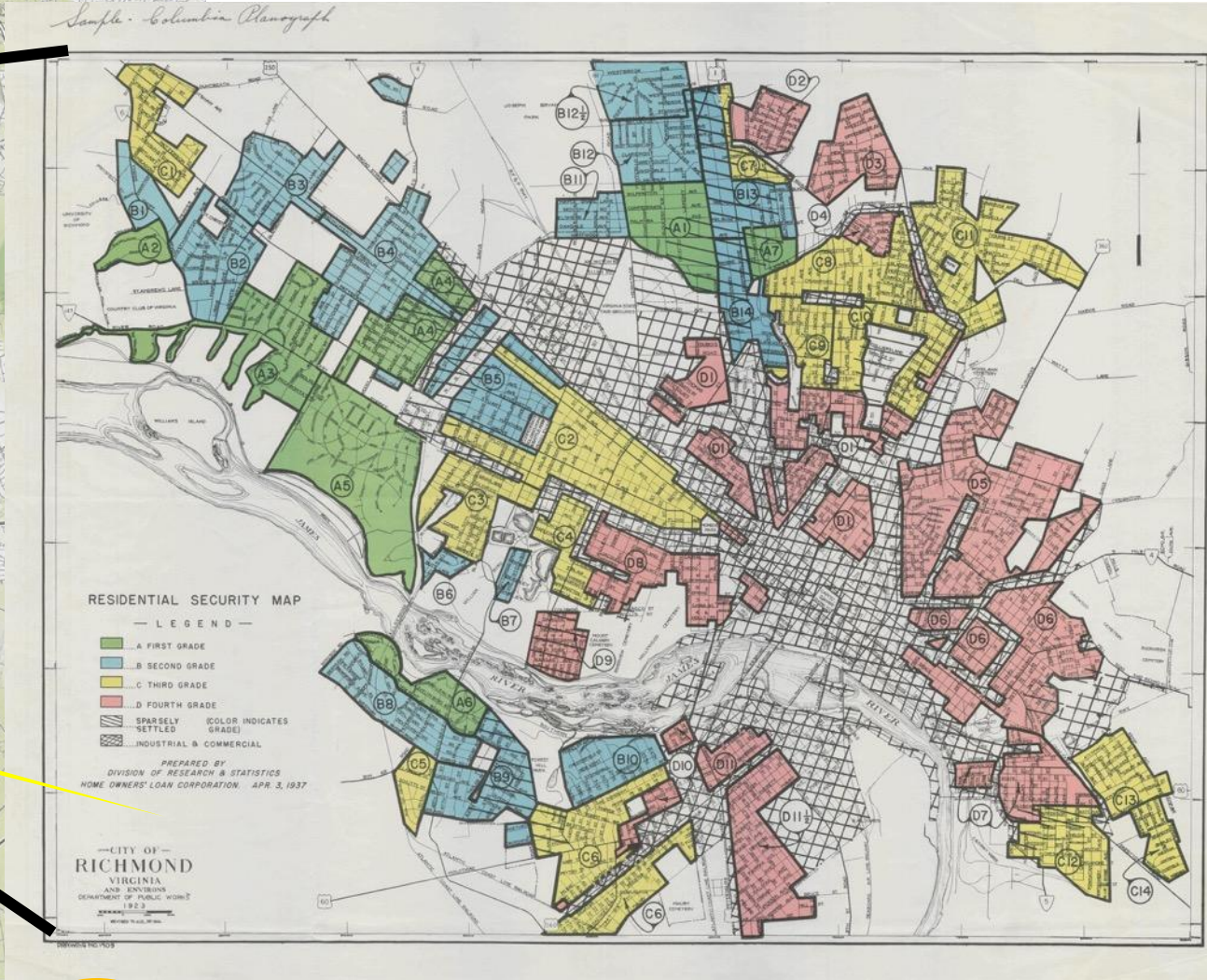
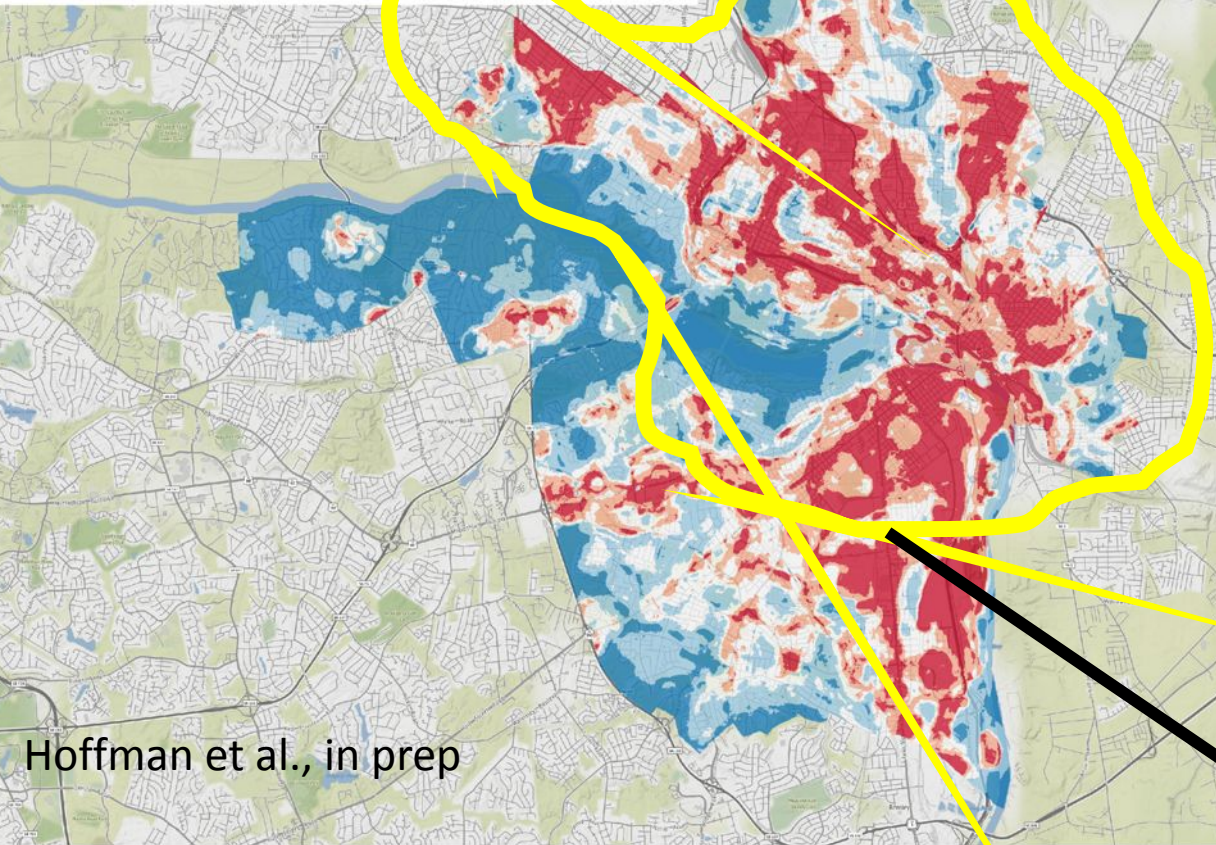
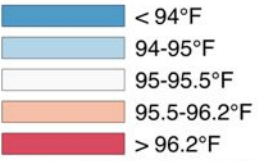


VULNERABILITY

REDLINING MAP (1937)

Richm

Afternoon (3PM) Temperatures on July 13, 2017



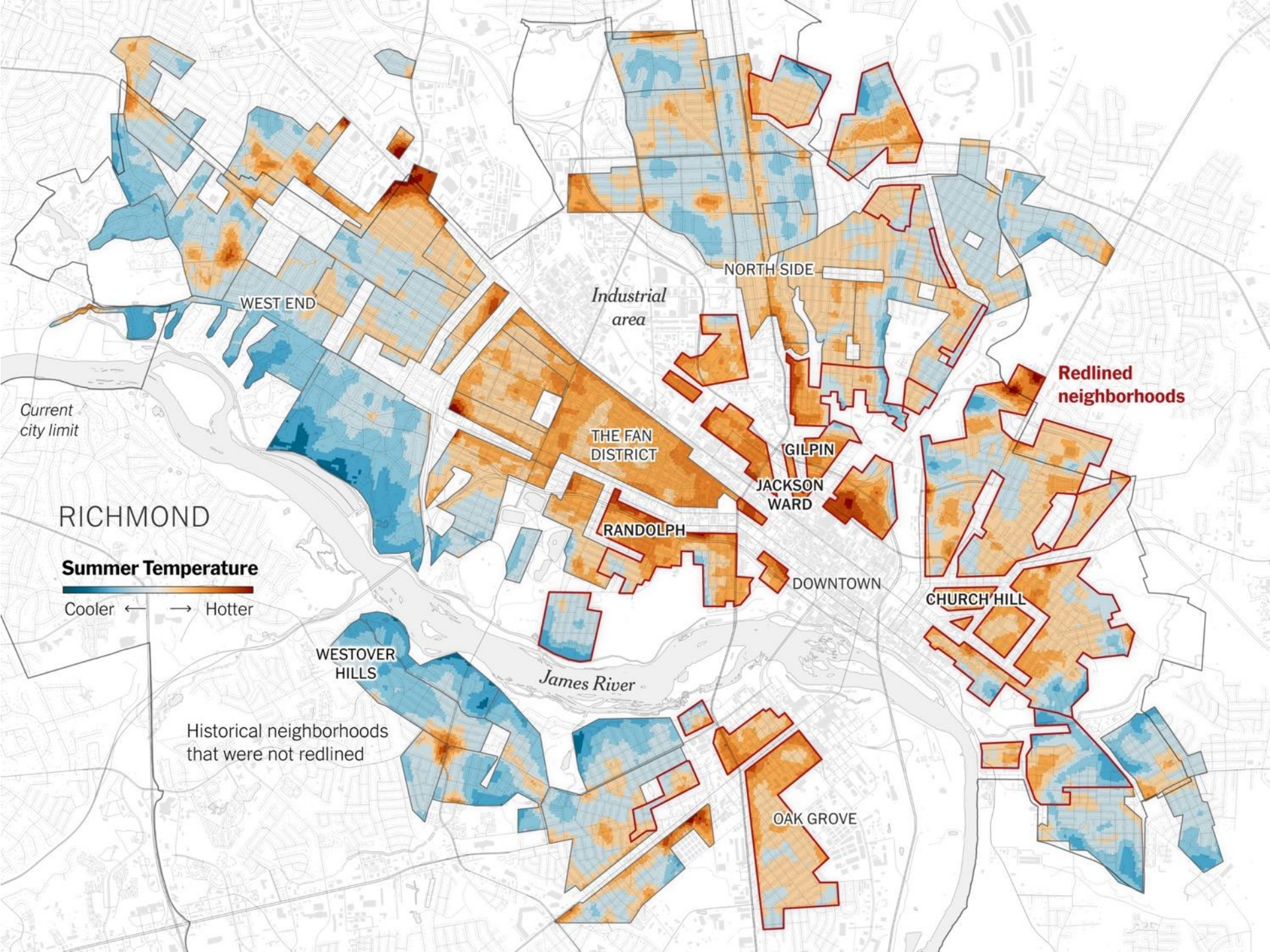
A B C D



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



RICHMOND

Summer Temperature



Current city limit

Historical neighborhoods that were not redlined

Redlined neighborhoods

WEST END

Industrial area

NORTH SIDE

THE FAN DISTRICT

GILPIN

JACKSON WARD

RANDOLPH

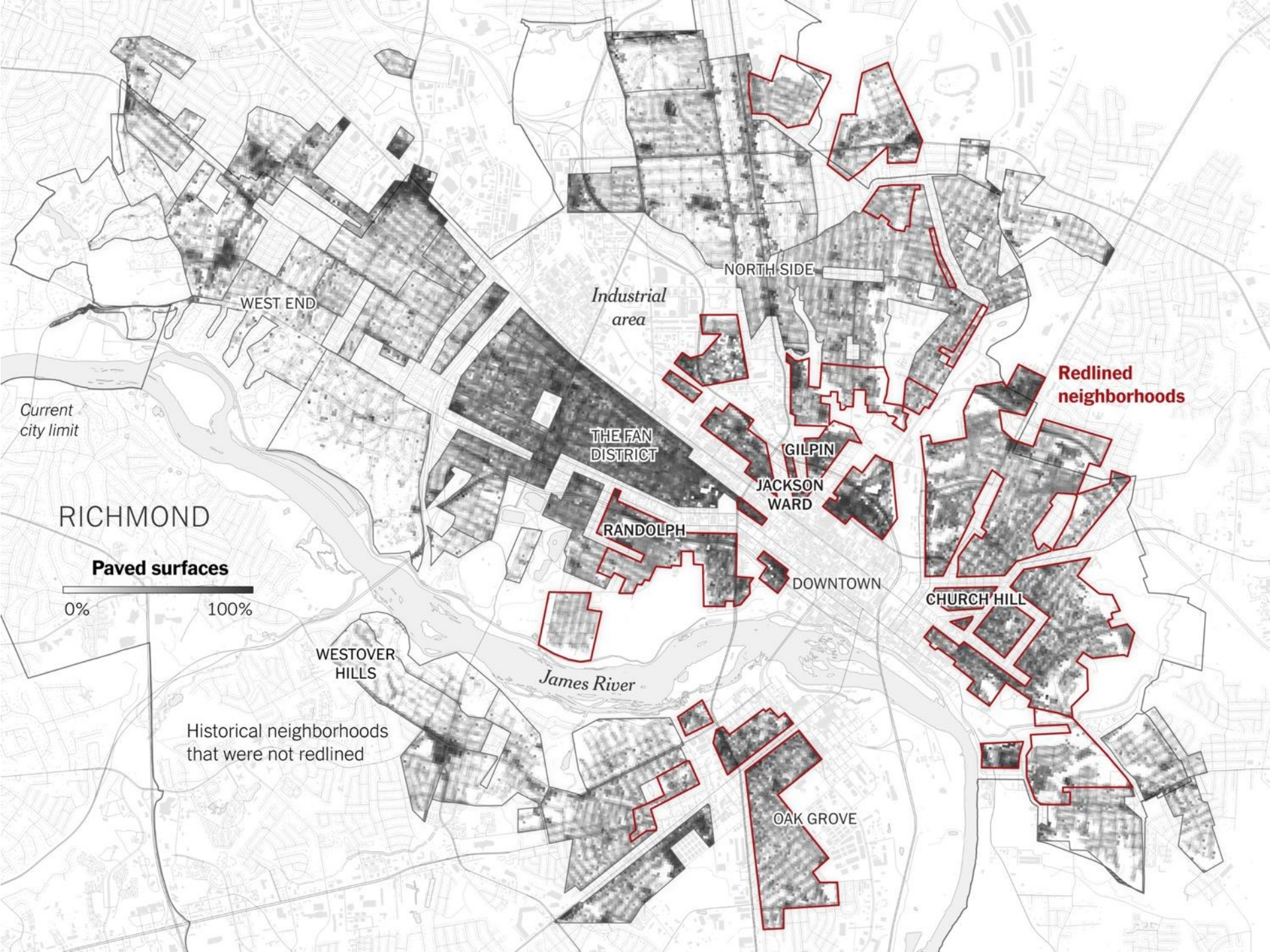
DOWNTOWN

CHURCH HILL

WESTOVER HILLS

James River

OAK GROVE



Current city limit

RICHMOND

Paved surfaces

0% 100%

Historical neighborhoods that were not redlined

Redlined neighborhoods

WEST END

Industrial area

NORTH SIDE

THE FAN DISTRICT

GILPIN

JACKSON WARD

RANDOLPH

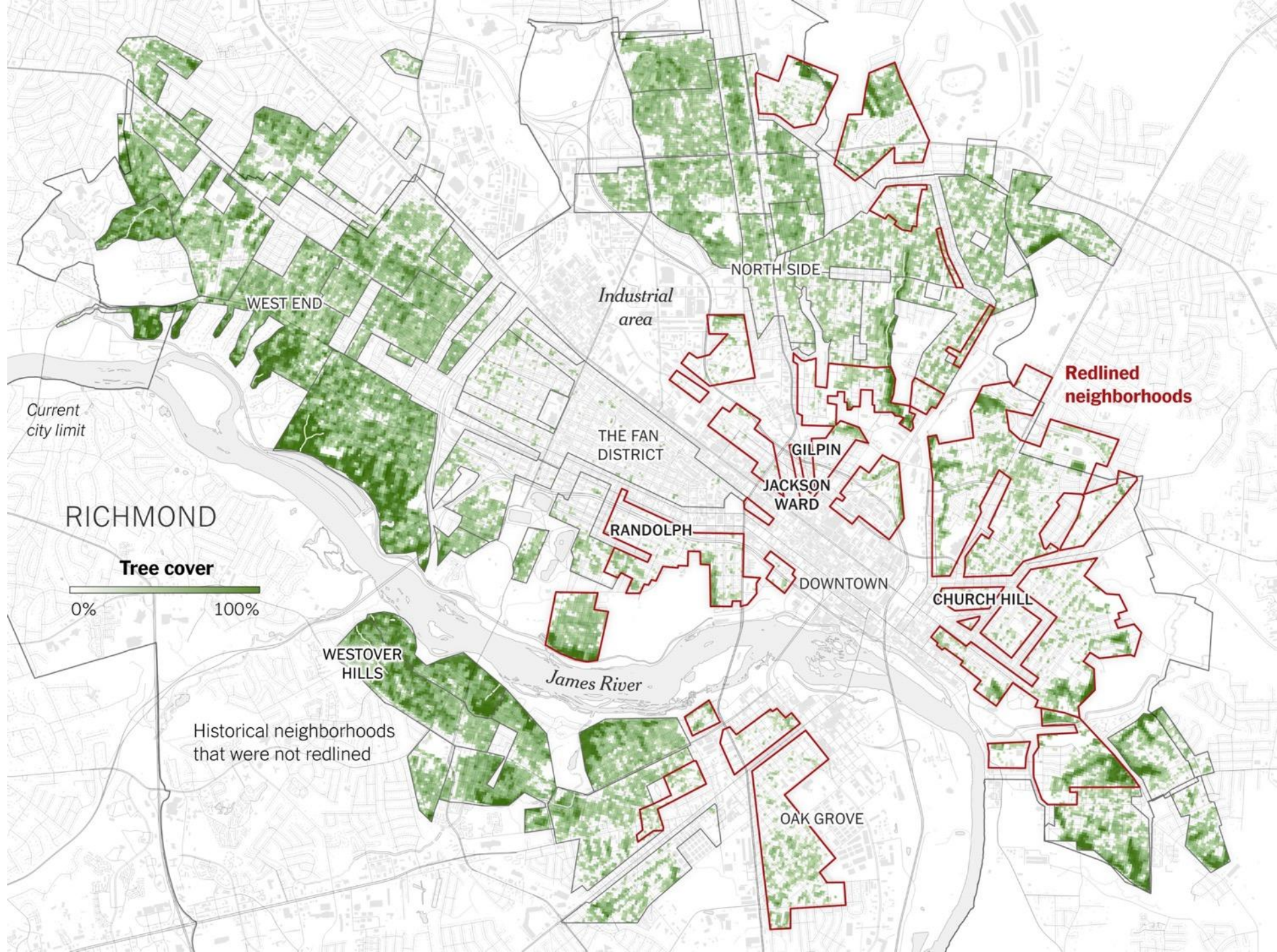
DOWNTOWN

CHURCH HILL

WESTOVER HILLS

James River

OAK GROVE



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

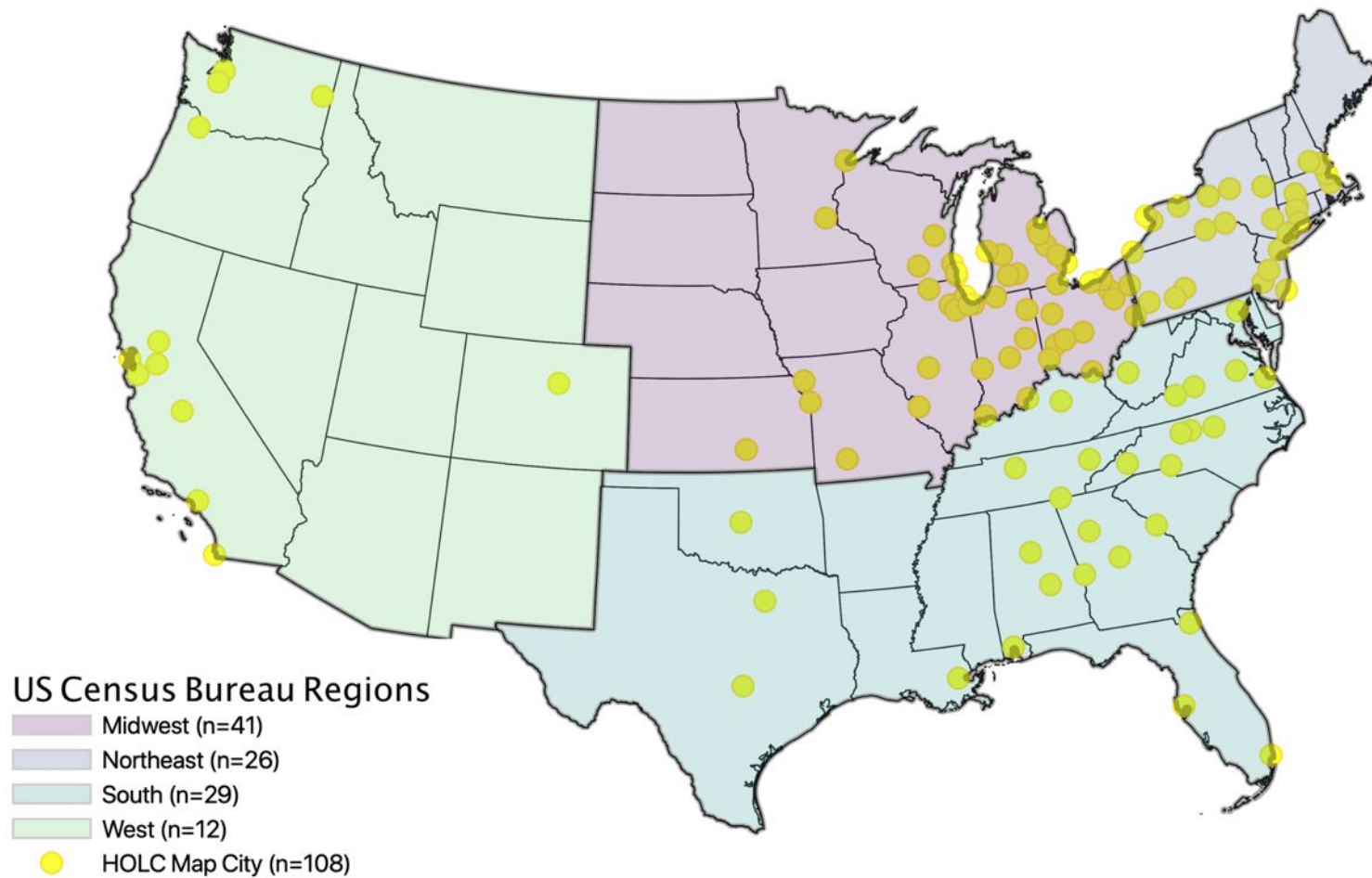
DOWNTOWN

CHURCH HILL

James River

WESTOVER HILLS

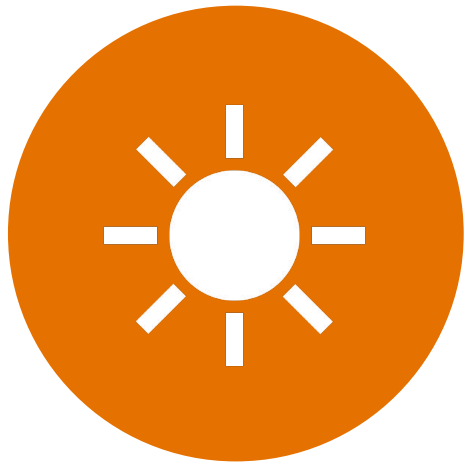
OAK GROVE



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

Studies have since linked redlining with air quality, flooding, and many adverse health outcomes, including gun violence and COVID-19.

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



P A S R E P O R T 6 0 0

PLANNING FOR URBAN HEAT RESILIENCE

Ladd Keith, PHD, and Sara Meerow, PHD

Solutions

Heat mitigation

Reducing the built environment's contribution to urban heat



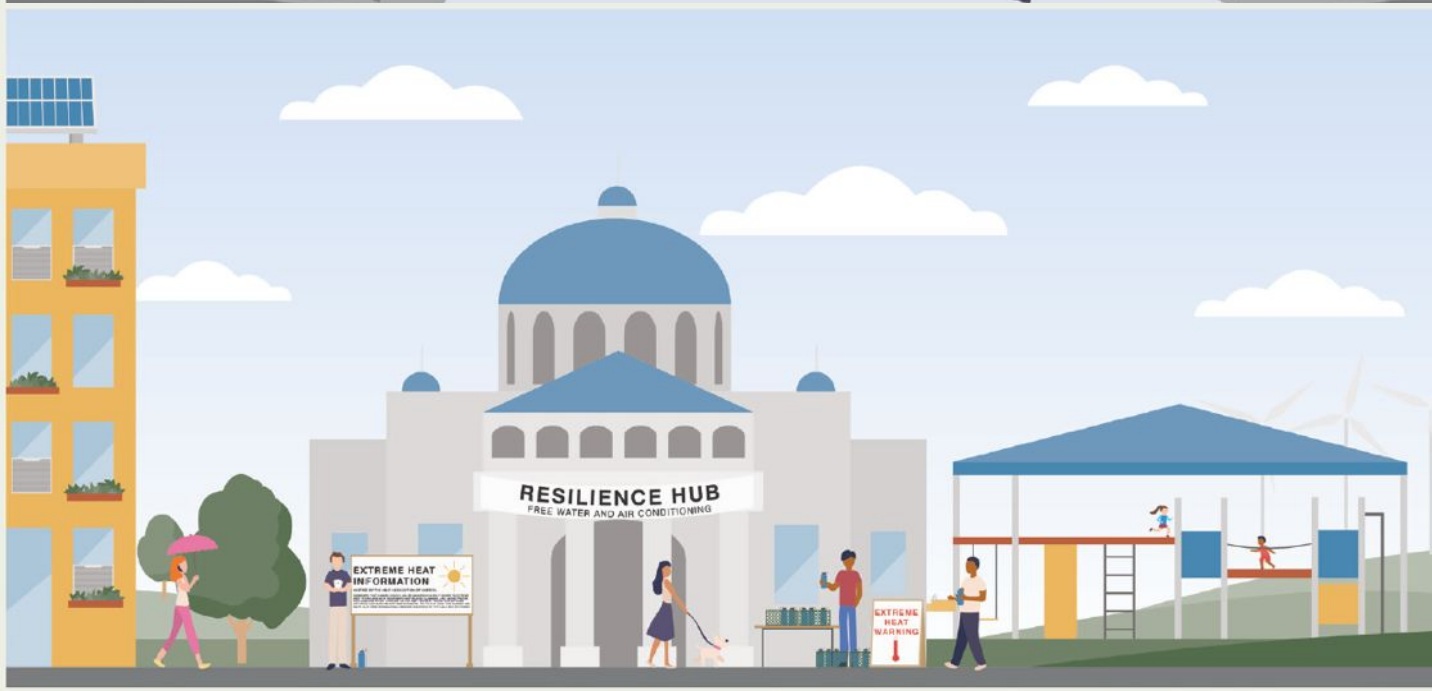
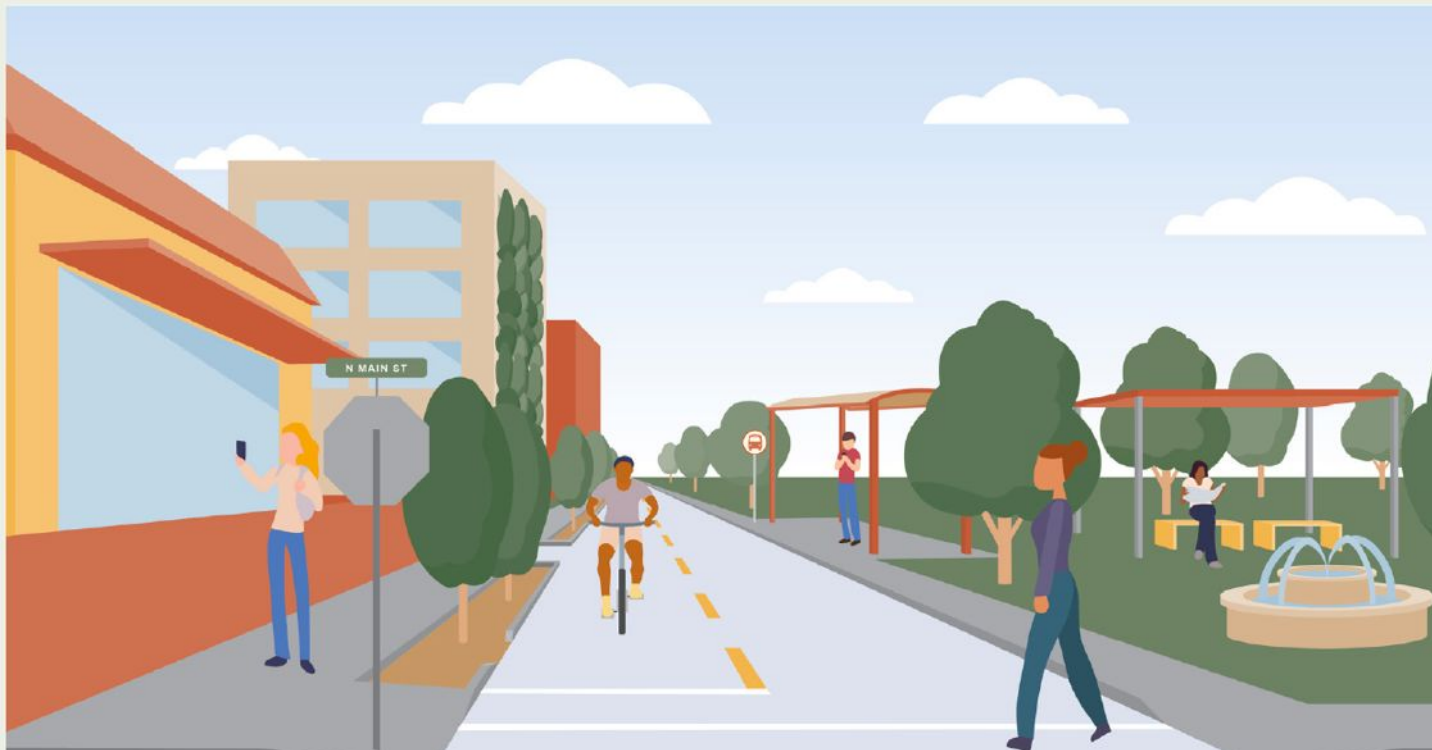
Heat management

Preparing and responding to chronic and acute heat risk



Heat-resilient communities





What we've done with the
data:

Mayor Stoney announces 5 new green spaces in Richmond's southside



Marshaling new funding (2018-present)

 National Oceanic and Atmospheric Administration
U.S. Department of Commerce
Home / Education

Search NOAA sites

Environmental Literacy Program awards \$3.5 million to advance community resilience through education

Education | Environmental Literacy Program | Office of Education

SHARE |    

September 30, 2020 — Eight projects will engage youth and the public around extreme weather, climate change, and other environmental hazards.

Combating Urban Heat Island Effect in Richmond

Capital One is teaming up with the Arbor Day Foundation and Groundwork RVA to plant 300 trees to combat Urban Heat Island Effect



Williams: Climate equity is a social justice issue. Four Richmond nonprofits with a federal grant are building resiliency

Marshaling new funding (2018-present)

This past weekend, [@randolphcollege](#) students and faculty advisor, Karin Warren, presented their work from this summer's VFIC collaborative research project, Virginia Heat Watch, at the 2021 Mid-Atlantic Regional Conference for Undergraduate Students.



#VFICHeatWatch
10 Cities
220 Volunteers!
490K observations



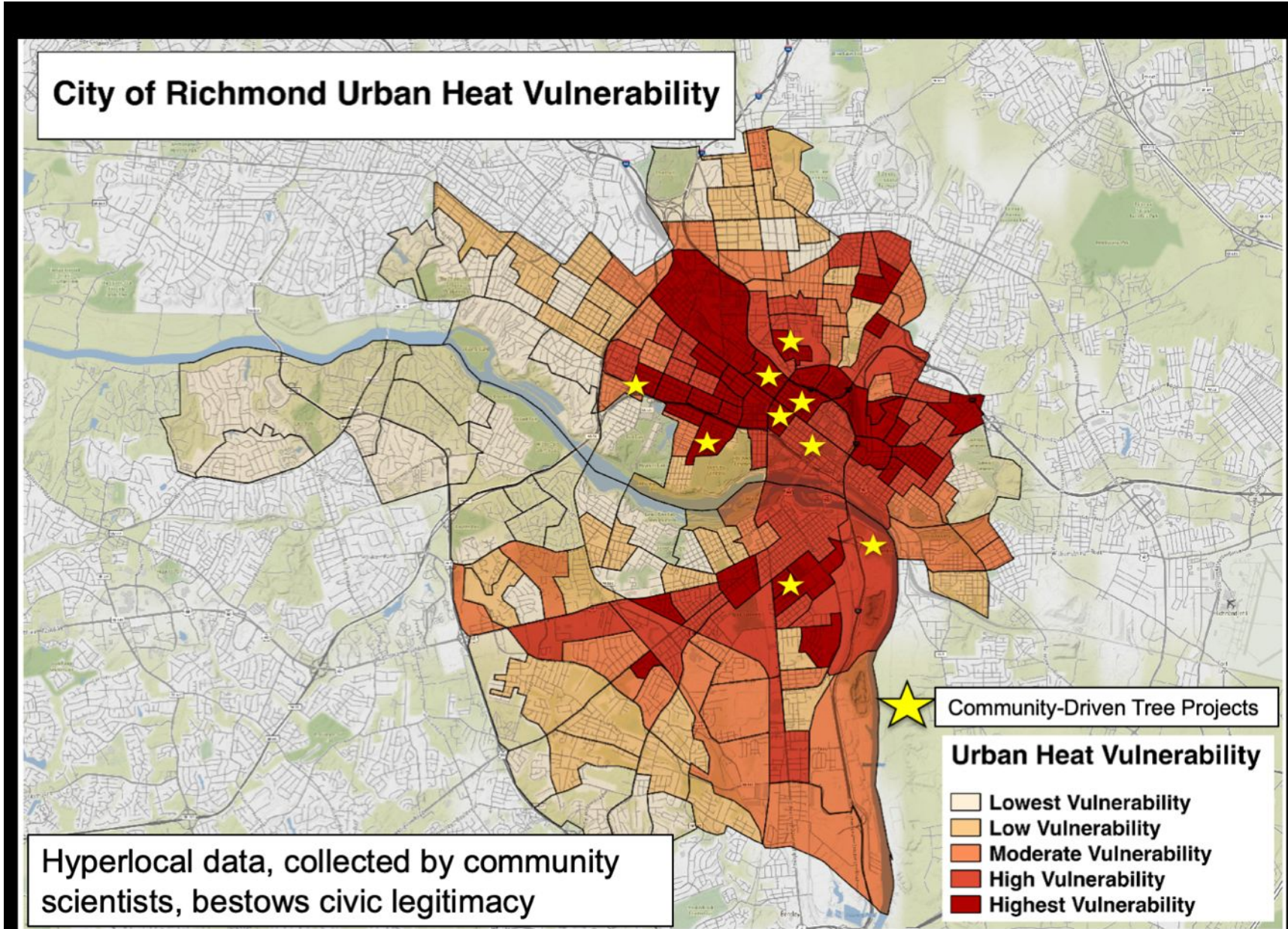
Marshaling new funding (2018-present)



New partnerships

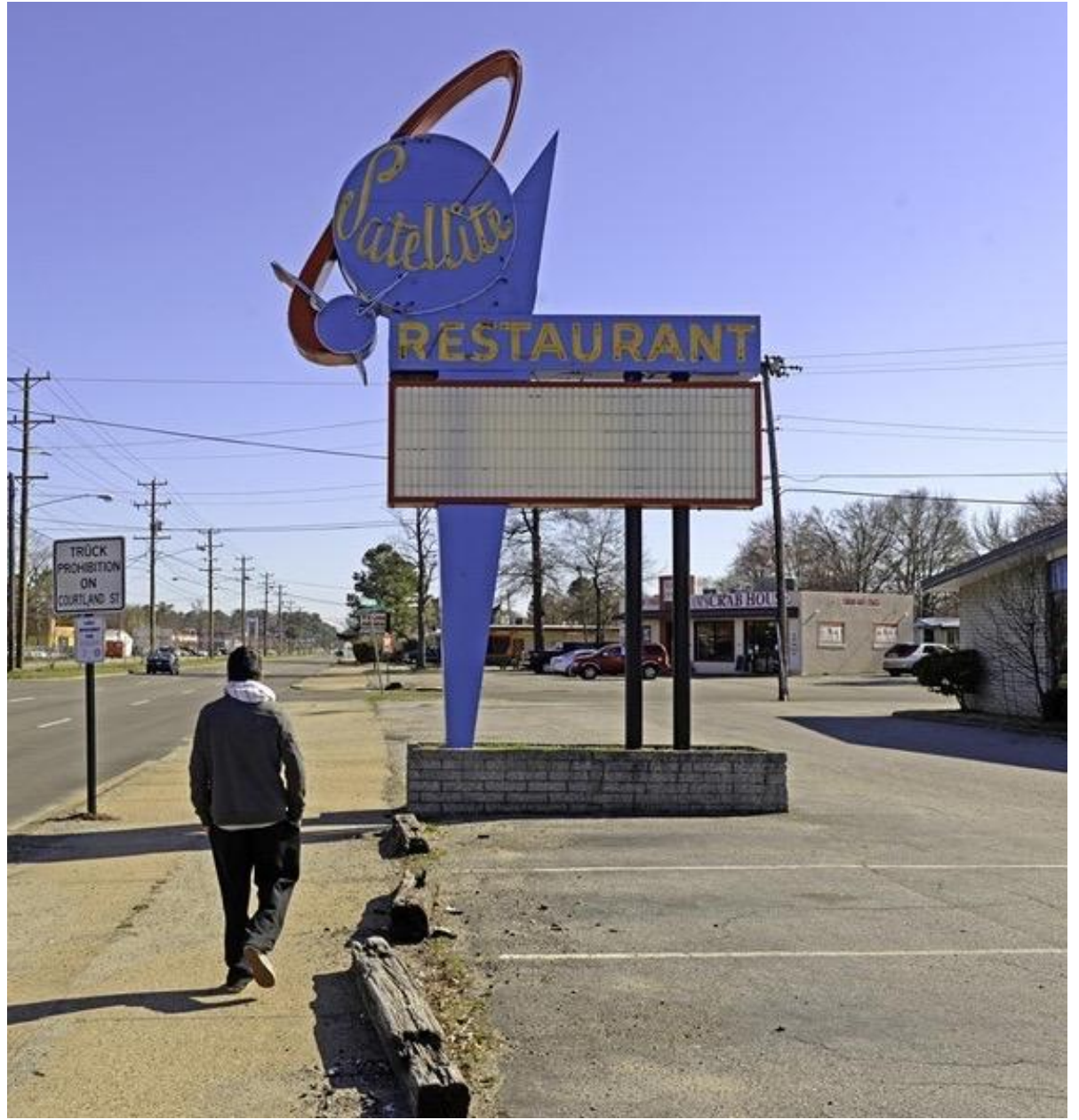


Expanding Green Space











850+ trees planted + given away in Southside

30+ community events in two years

Announcement of **5 new parks** in South Richmond

Newly created **urban forester** position

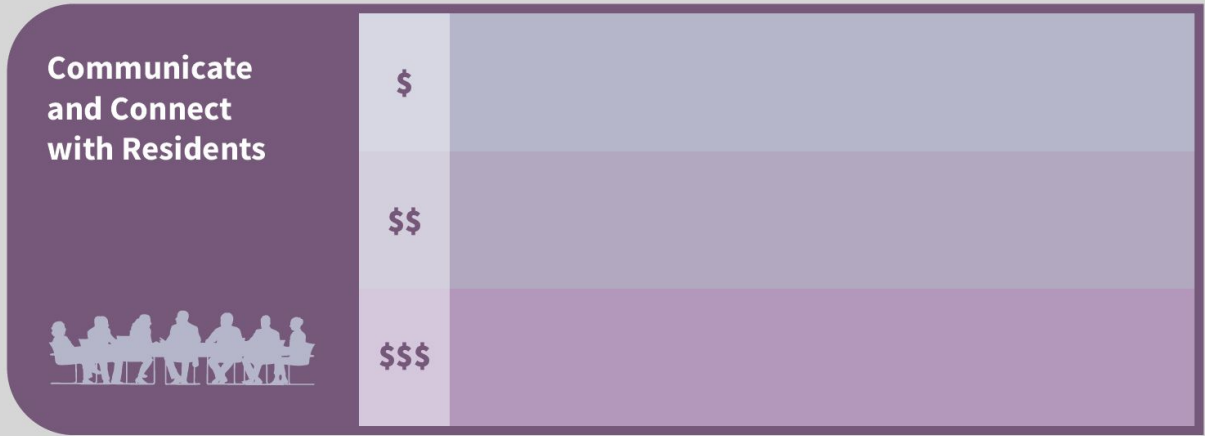
Launched Southside's **Greening Working Group**

35,870 trees planted citywide in five years

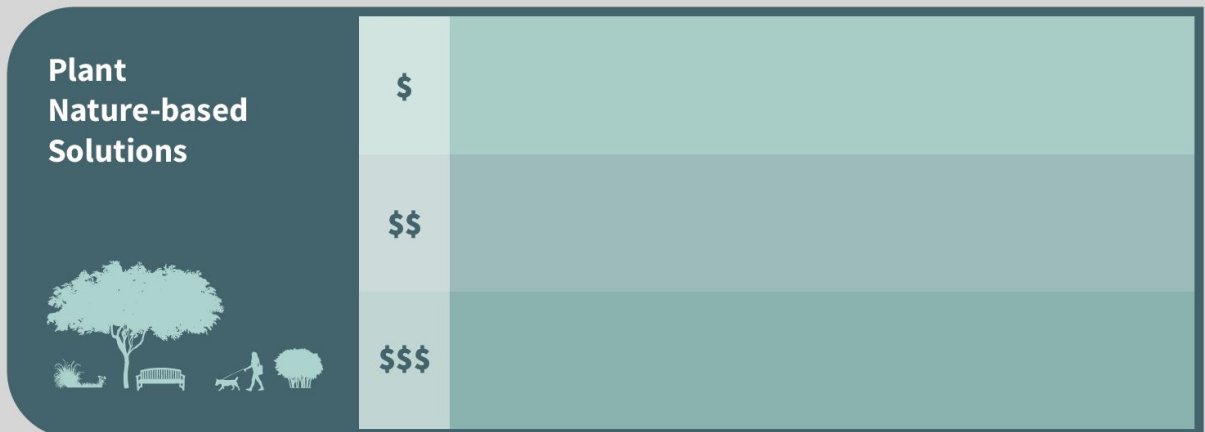
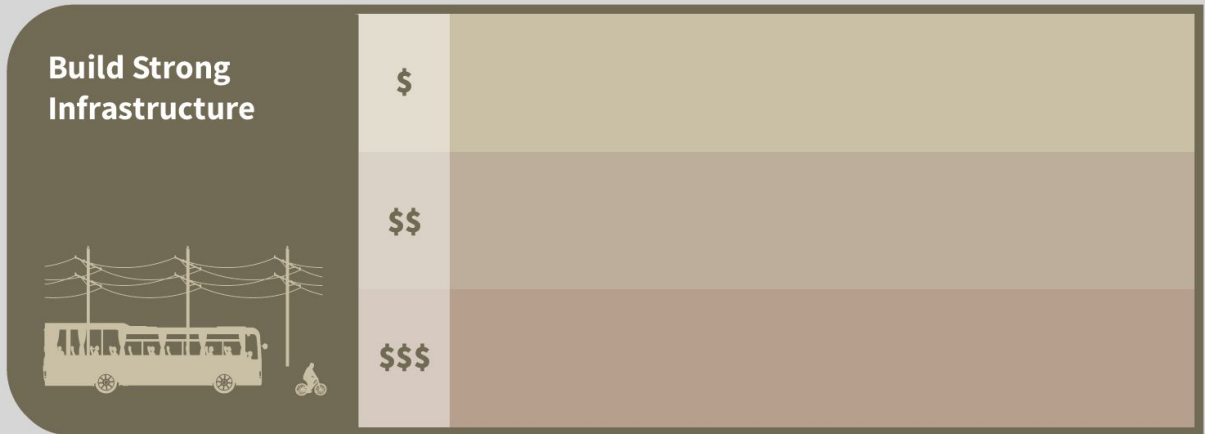


850+ trees to homeowners in 2021

What would community members prioritize?



What would you prioritize?



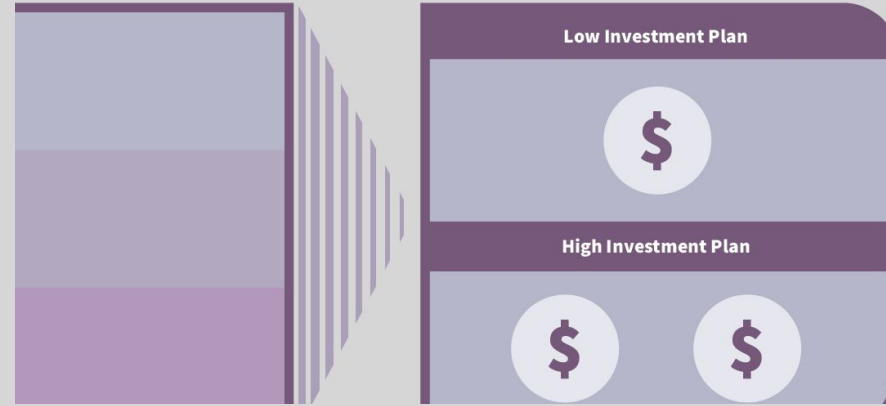
Louise McQueen

Retired resident and community advocate

- I have lived in Richmond since 1965 and retired from the Richmond Public Schools System after 32 years as a teacher in 1999.
- I have always been terrified of thunderstorms, and I have noticed that in recent years they have become extremely dangerous in the summer.
- I appreciate the shade from trees providing cooler spots in the summer heat.
- Some trees grow too large and their roots break through the sidewalk making it difficult to walk around my neighborhood.



What would you prioritize?



Ebony Walden

Community planner

- I am an urban planner that has lived in Richmond eight years in Church Hill and Brookland Park.
- I work on neighborhood and community-wide planning and revitalization projects and most recently on place-based equity issues.
- In the summer I have higher energy bills due to the heat. The fluctuating weather puts stress on my air conditioning system and all the heavy rain causes issues on my property.
- I want the City to provide mechanisms and education for stormwater retention on resident's homes. More trees to provide shade would help cool my neighborhood.



What would community members prioritize?

Communicate and Connect with Residents

\$

\$\$

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Louise McQueen
Retired resident and community advocate

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Build Strong Infrastructure

\$

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\$\$\$




Plant Nature-based Solutions

\$


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What would you prioritize?

Low Investment Plan

\$

High Investment Plan

\$ \$

Low Investment Plan

\$

High Investment Plan

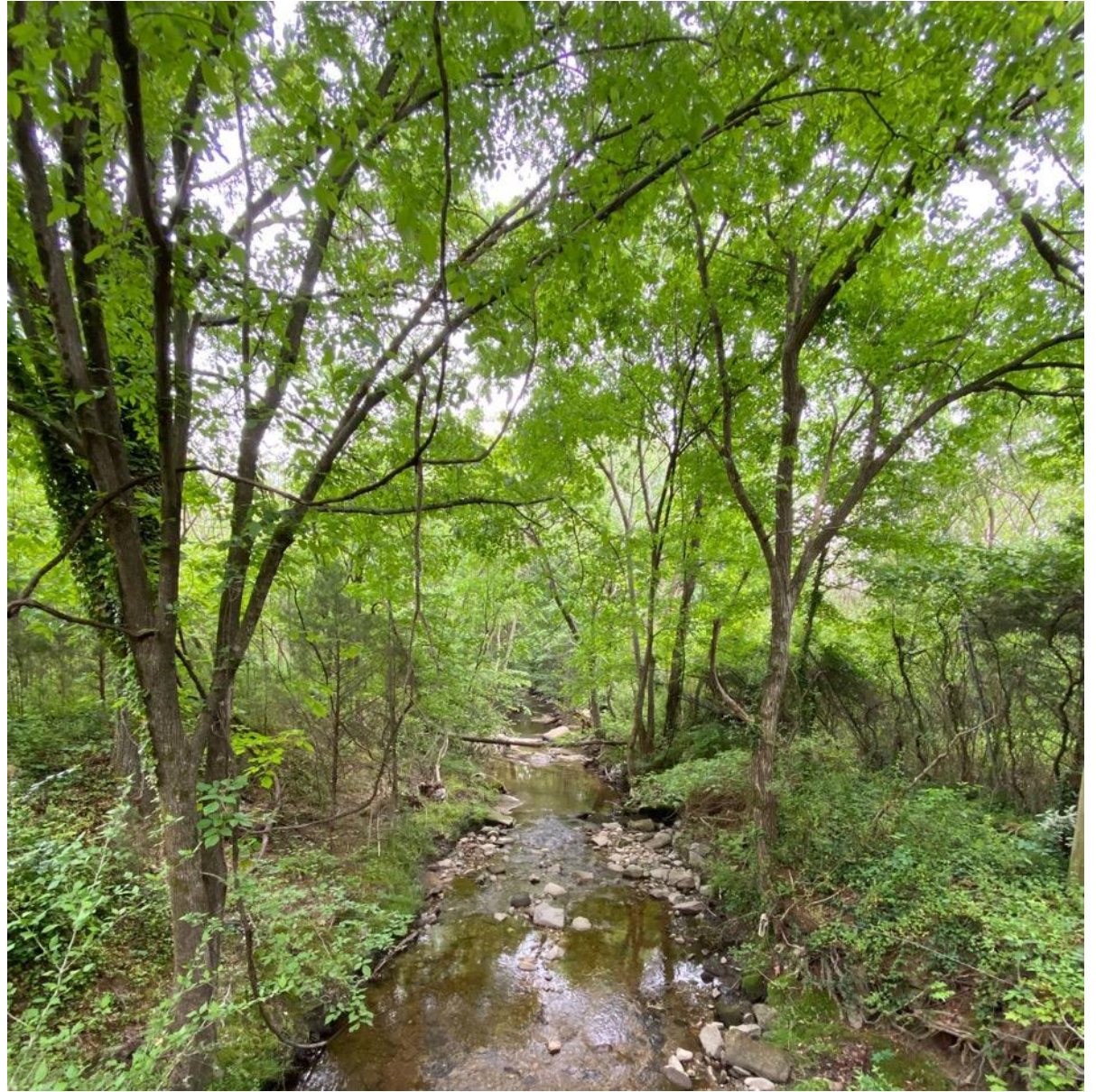
\$ \$

Low Investment Plan

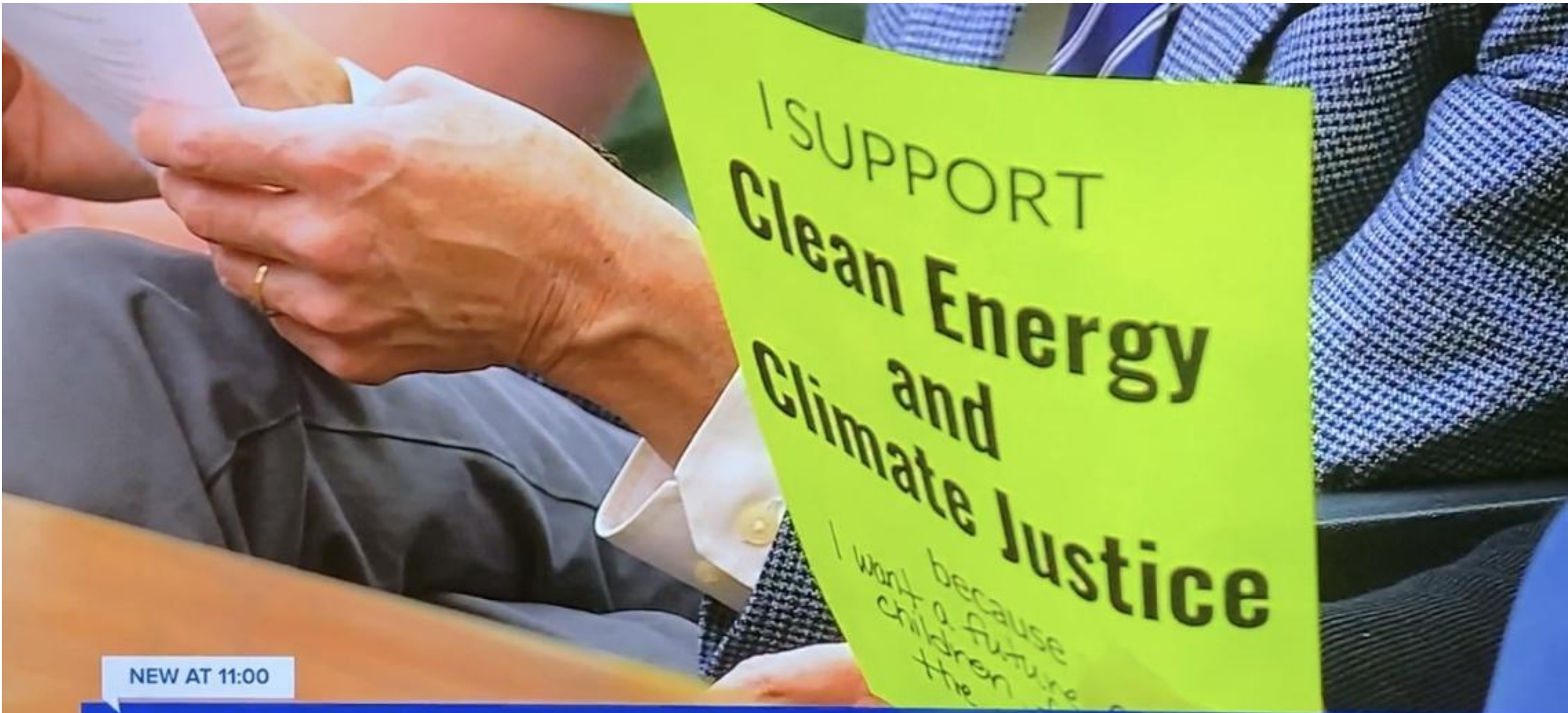
\$

High Investment Plan

\$ \$







NEW AT 11:00

CLEANER ENERGY IN RICHMOND

CITY COUNCIL CONSIDERS SEVERAL CLEAN ENERGY PROPOSALS

11:08
57°





Final thoughts...