RE: Against the 2016 Comprehensive Plan Amendment (that destroys land protections) and Related Industrial Use Zoning Changes

Dear Commissioners,

I'm writing to you today to express my dismay that you continue to exploit the Bryans Road community for private gain. This peninsula is a unique place, much like other places surrounded by water, but has a history that goes back to the very beginning of colonization. My research reviewing Soil Surveys, Census information and AgCensus information confirms what you already know. This county is historic, still retains many of it's natural resources, and the population of African Americans has continuously been about 50% throughout it's history, but that doesn't mean it's been equal. Equality isn't just about providing a school. It's about ensuring the entire population of Bryans Road has clean air and clean water – so they don't have health problems as a result of living there. It's about providing a secure place, where families can thrive and live in pursuit of happiness.

I lived in Chelsea Manor Phase 1, right next to the forest. I saw the poor building practices that moved the pond that already existed next door, so they could fit more houses onto their map and make more money. The result is a dry stream, that used to feed a wetland, but now is the only way for floodwater to overflow out of the community when flooding occurs. These man-made replacement stormwater ponds bring mosquitos into the community, making it so communities must expose children and pets to pesticides for control and do nothing but gather trash.

At Chelsea Manor, TWO special exceptions were approved by the county leadership. One allowed an exception from the mixed-use retail requirements of the zoning for the development. The second allowed the developer to pass on the cost of running county sewer and water lines into the new community to the families that bought homes. As a result, families pay about $1000 each year for 10 years, plus they pay the high costs of sewer and water charged by the county, plus they pay for Zone 3 Flood Insurance (another $500 a year), plus high HOA fees to maintain these inadequate stormwater control measures. There hasn't been a real flood in Bryans Road in the last decade, but this year is a textbook year to start to worry.

This week is Climate Change week in New York City, where the world is acknowledging what Climate Scientists have been saying since before I learned that Global Warming was happening. The world is on track to keep warming, ice is melting, ocean currents are changing and together this will create higher sea-levels. Salt-water intrusion from the Bay and the River has already begun, as evidenced by the high sodium concentrations in the well water supplied to Bryan's Road. This well water, while free to the county, costs each family in the community. Rising sea-levels will push the Chesapeake Bay, the Potomac and all the tributaries back up onto the land. Even Realtor.com has a flood zone map. Adding an industrial area in the middle of this flood zone, which already closes local roads with any heavy rain, will flood out these communities in the end. Saddling each family with a host of new burdens and challenges that flooding will bring, due to your choices today.

I'm including several recent news articles talking about the latest research about Environmental Justice for BIPOC communities. Highways, industrial sites, a lack for trees and clean infrastructure have been adversely effecting communities of color around this country for our entire history. Airport infrastructure like sewage, water, and other related buildings, will only impact this community in negative ways:

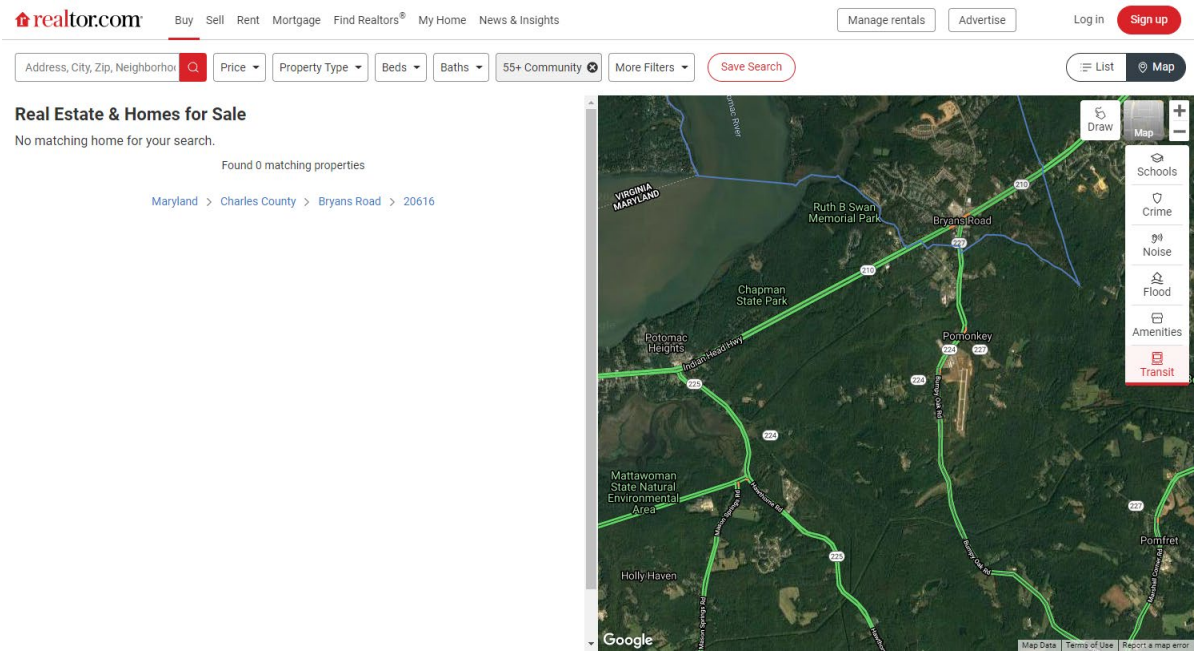
- More traffic pollution near homes and schools
- More air pollution from increased activity at the airport near homes and schools
- Even more noise pollution from air traffic near homes and schools

- More pollutants being dropped onto the floodplain of Mattawoman Creek potentially contaminating the groundwater that residents depend on.

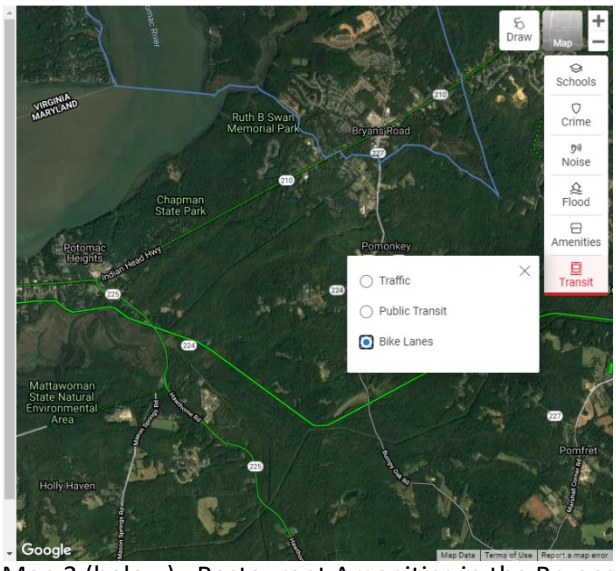
The airport and surrounding industrial development benefit private investors, not the families in this area. Allowing rich people with private jets to fly into Bryans Road instead of DC to avoid paying taxes and fees, only shifts the burden of environmental costs for those planes to the people of Bryans Road. To force them to pay the taxes that fund the infrastructure for private economic development, while they still pay for their own infrastructure, is outrageous.

I'm including some Realtor.com maps for your reference which show the huge impact that this decision will definitely have on the children and families of this community. I hope you can provide equally concrete evidence of ways these same families will benefit from your amendment that outweigh these obviously adverse impacts and costs that will occur on the community health and wellbeing.

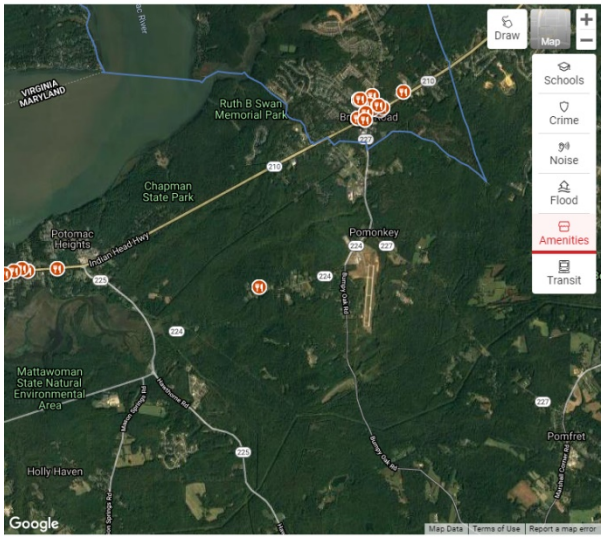
Map 1 - Current Traffic tracked in the 'rural' Bryans Road Area via Realtor.com:



Map 2 (left): Bike Lanes in the Bryans Road Area

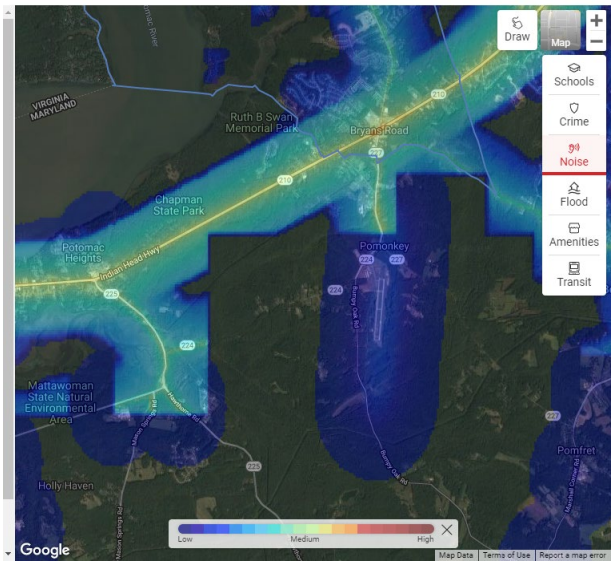


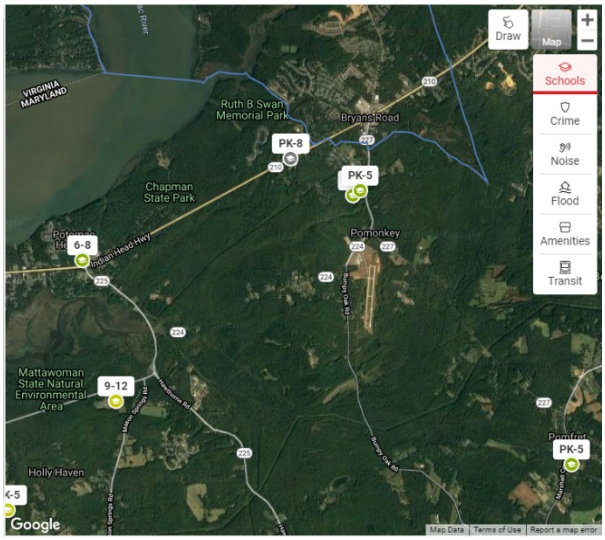
Map 3 (below): Restaurant Amenities in the Bryans Road Area, obviously concentrated at already developed retail and industrial sites.



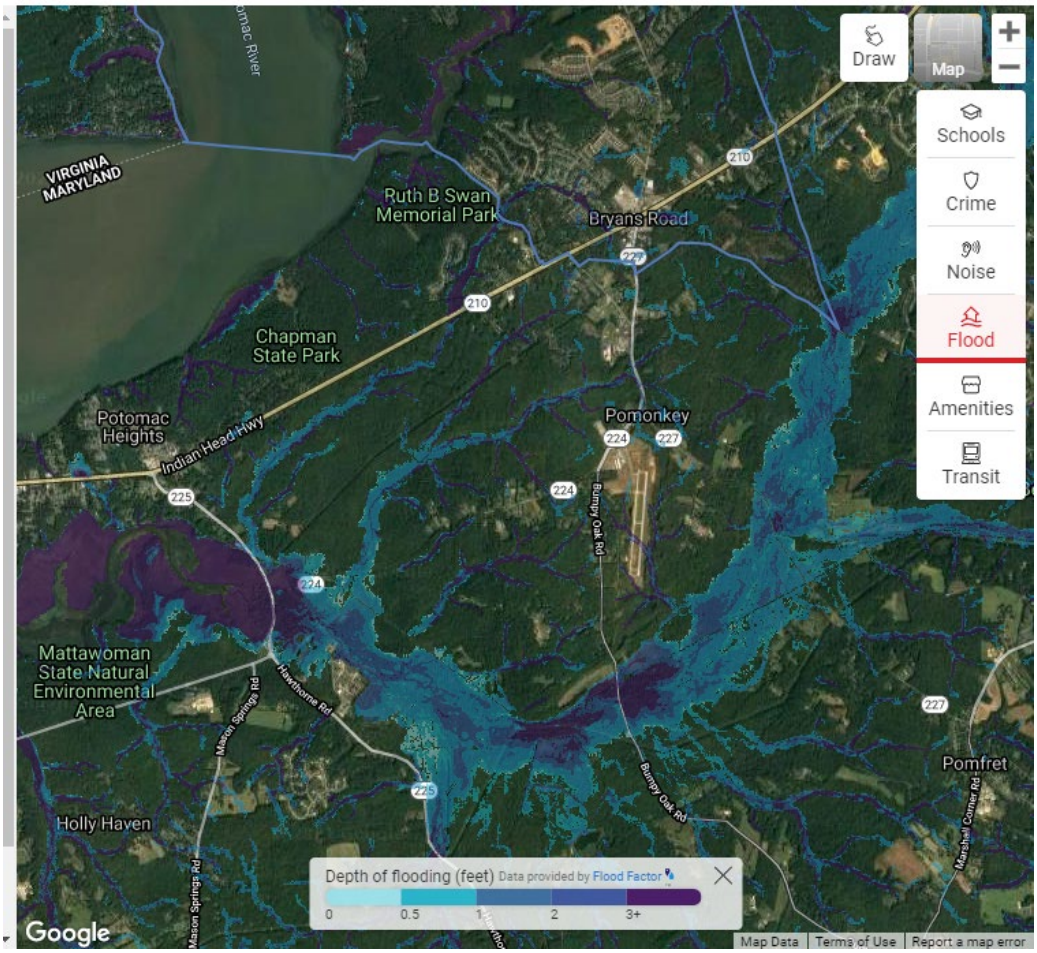
Map 4 (below left): Noise Pollution already affecting families without this amendment.

Map 5 (below right): Schools in the Bryans Road area affected by this amendment.





Map 6: Flood Zones already in existence before sea-level rise.



I moved away from Bryans Road because I didn't want to live in a polluted community. The generation station near me is closing. It's up to you to protect the health and well-being of this community. If you continue to break down the WCD causing even more flooding and pollution in Bryans Road, it will be your name in the New York Times talking about the corruption that leads to unhealthy black communities.

Sincerely,

Laurie Snow
B.S. Biology- Microbiology and Ecology
M.S. Bioinformatics

and Robin Snow
16705 Persica Ln, Hughesville, MD 20637

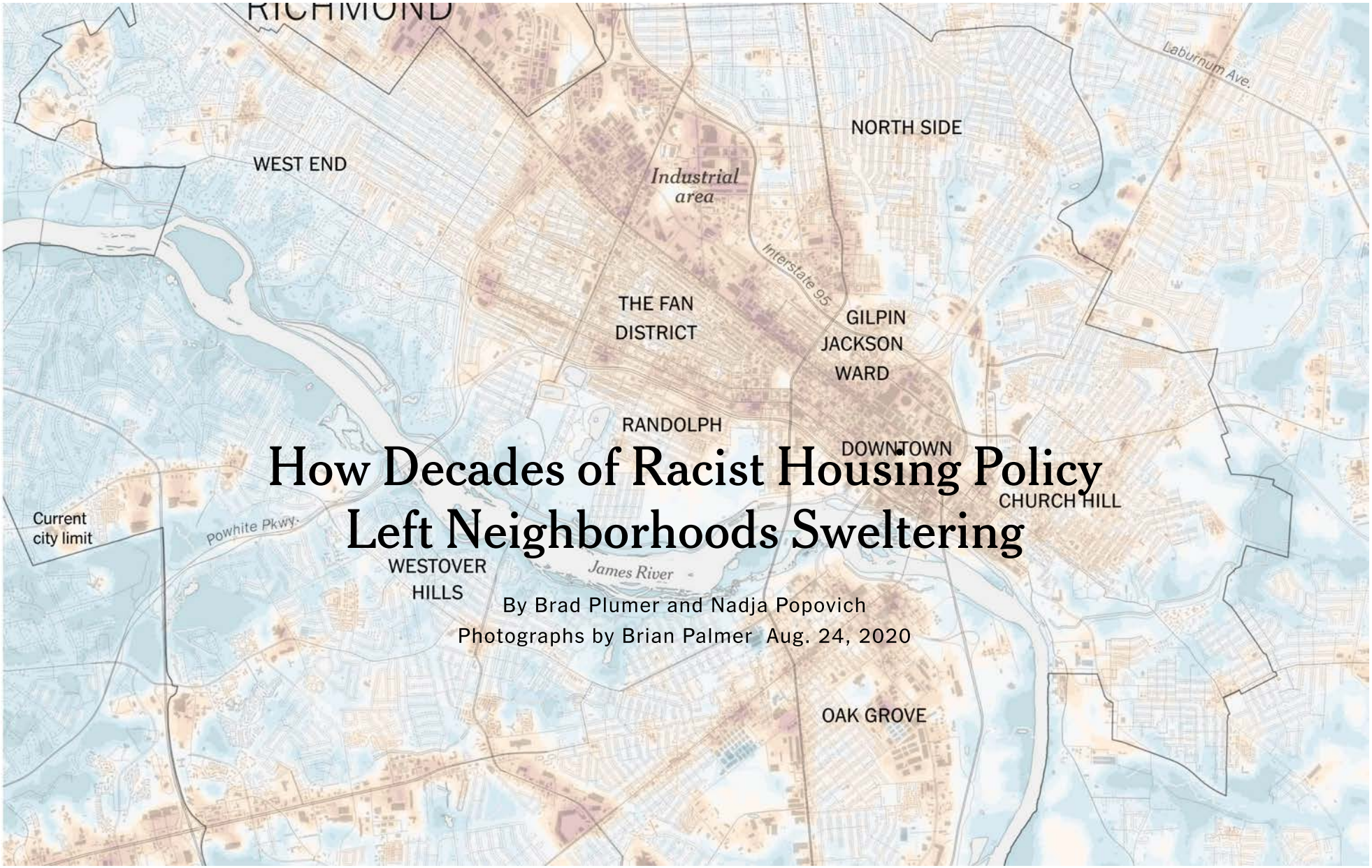
Enclosures below:

https://www.nytimes.com/interactive/2021/05/27/climate/us-cities-highway-removal.html

https://www.nytimes.com/2020/07/28/magazine/pollution-philadelphia-black-americans.html

https://www.nytimes.com/interactive/2020/08/24/climate/racism-redlining-cities-global-warming.html

https://www.nytimes.com/2021/04/28/climate/air-pollution-minorities.html



How Decades of Racist Housing Policy Left Neighborhoods Sweltering

By Brad Plumer and Nadja Popovich

Photographs by Brian Palmer Aug. 24, 2020

In the 1930s, federal officials **redlined these neighborhoods** in Richmond, Va., marking them as risky investments because residents were Black.

Today, they are some of the **hottest parts of town** in the summer, with few trees and an abundance of heat-trapping pavement.

White neighborhoods that weren't redlined tend to be **much cooler** today — a pattern that repeats nationwide.

RICHMOND, Va. — On a hot summer's day, the neighborhood of Gilpin quickly becomes one of the most sweltering parts of Richmond.

There are few trees along the sidewalks to shield people from the sun's relentless glare. More than 2,000 residents, mostly Black, live in low-income public housing that lacks central air conditioning. Many front yards are paved with concrete, which absorbs and traps heat. The ZIP code has among the highest rates of heat-related ambulance calls in the city.

There are places like Gilpin all across the United States. In cities like Baltimore, Dallas, Denver, Miami, Portland and New York, neighborhoods that are poorer and have more residents of color can be 5 to 20 degrees Fahrenheit hotter in summer than wealthier, whiter parts of the same city.

And there's growing evidence that this is no coincidence. In the 20th century, local and federal officials, usually white, enacted policies that reinforced racial segregation in cities and diverted investment away from minority neighborhoods in ways that created large disparities in the urban heat environment.

The consequences are being felt today.

To escape the heat, Sparkle Veronica Taylor, a 40-year-old Gilpin resident, often walks with her two young boys more than a half-hour across Richmond to a tree-lined park in a wealthier neighborhood. Her local playground lacks shade, leaving the gyms and slides to bake in the sun. The trek is grueling in summer temperatures that regularly soar past 95 degrees, but it's worth it to find a cooler play area, she said.

"The heat gets really intense, I'm just zapped of energy by the end of the day," said Ms. Taylor, who doesn't own a car. "But once we get to that park, I'm struck by how green the space is. I feel calmer, better able to breathe. Walking through different neighborhoods, there's a stark difference between places that have lots of greenery and places that don't."

Sparkle Veronica Taylor's children, Apollo, left, and his brother Ax at the Gilpin Court complex where they live.

Ms. Taylor often walks more than a mile so her two sons can play in a tree-covered park. “It’s a cooler space,” she said. “Just a totally different environment.”

To understand why many cities have such large heat disparities, researchers are looking closer at historical practices like redlining.

In the 1930s, the federal government created maps of hundreds of cities, rating the riskiness of different neighborhoods for real estate investment by grading them “best,” “still desirable,” “declining” or “hazardous.” Race played a defining role: Black and immigrant neighborhoods were typically rated “hazardous” and outlined in red, denoting a perilous place to lend money. For decades, people in redlined areas were denied access to federally backed mortgages and other credit, fueling a cycle of disinvestment.

In 2016, these old redlining maps were digitized by historians at the University of Richmond. Researchers comparing them to today’s cities have spotted striking patterns.

Across more than 100 cities, a recent study found, formerly redlined neighborhoods are today 5 degrees hotter in summer, on average, than areas once favored for housing loans, with some cities seeing differences as large as 12 degrees. Redlined neighborhoods, which remain lower-income and more likely to have Black or Hispanic residents, consistently have far fewer trees and parks that help cool the air. They also have more paved surfaces, such as asphalt lots or nearby highways, that absorb and radiate heat.

“It’s uncanny how often we see this pattern,” said Vivek Shandas, a professor of urban studies and planning at Portland State University and a co-author of the study. “It tells us we really need to better understand what was going on in the past to create these land-use patterns.”

Heat is the nation’s deadliest weather disaster, killing as many as 12,000 people a year. Now, as global warming brings ever more intense heat waves, cities like Richmond are drawing up plans to adapt — and confronting a historical legacy that has left communities of color far more vulnerable to heat.

A Redlined Past, a Hotter Future

Source: Nelson, Winling, Marciano, Connolly, et al., Mapping Inequality

The appraisers in Richmond were transparent in their racism as they mapped the city in the 1930s as part of a Depression-era federal program to rescue the nation's collapsing housing markets.

Every Black neighborhood, no matter its income level, was outlined in red and deemed a "hazardous" area for housing loans. The appraisers' notes made clear that race was a key factor in giving these neighborhoods the lowest grade.

One part of town was outlined in yellow and rated as “declining” because, the appraisers wrote, Black families sometimes walked through.

Source: Mapping Inequality

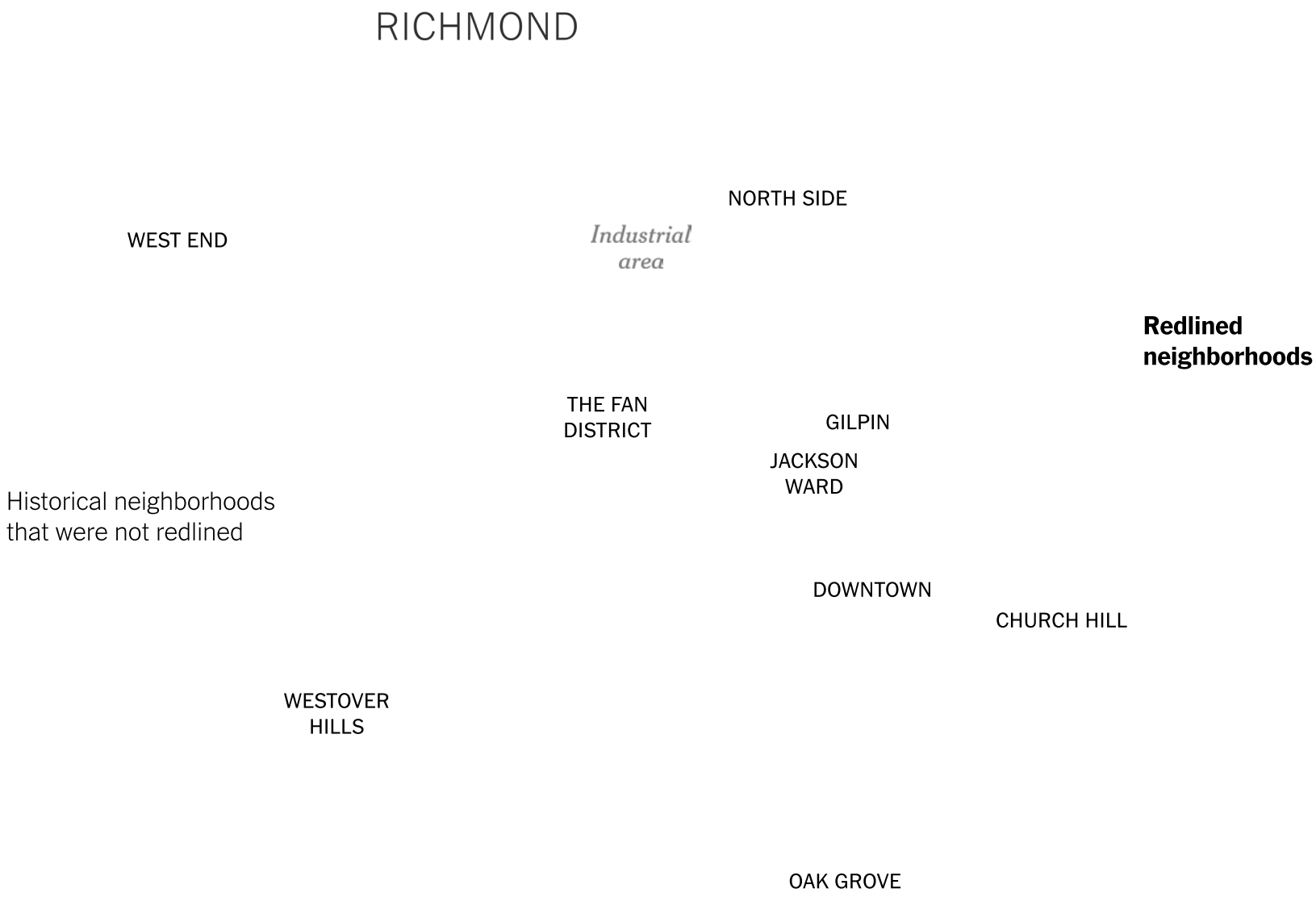
By contrast, white neighborhoods, described as containing “respectable people,” were often outlined in blue and green and were subsequently favored for investment.

Richmond, like many cities, was already segregated before the 1930s by racial zoning laws and restrictive covenants that barred Black families from moving into white neighborhoods. But the redlining maps, economists have found, deepened patterns of racial inequality in cities nationwide in ways that reverberated for decades. White families could more easily get loans and federal assistance to buy homes, building wealth to pass on to their children. Black families, all too often, could not.

That inequity likely influenced urban heat patterns, too. Neighborhoods with white homeowners had more clout to lobby city governments for tree-lined sidewalks and parks. In Black neighborhoods, homeownership declined and landlords rarely invested in green space. City planners also targeted redlined areas as cheap land for new industries, highways, warehouses and public housing, built with lots of heat-absorbing asphalt and little cooling vegetation.

Disparities in access to housing finance “created a snowball effect that compounded over generations,” said Nathan Connolly, a historian at Johns Hopkins who helped digitize the maps. Redlining wasn’t the only factor driving racial inequality, but the maps offer a visible symbol of how federal policies codified housing discrimination.

Congress outlawed redlining by the 1970s. But the practice has left lasting marks on cities.


RICHMOND
NORTH SIDE
WEST END
Industrial area
Redlined neighborhoods
THE FAN DISTRICT
GILPIN
JACKSON WARD
Historical neighborhoods that were not redlined
DOWNTOWN
CHURCH HILL
WESTOVER HILLS
OAK GROVE

Formerly redlined areas have less **tree cover** today than areas that weren't redlined.

They have more **paved surfaces**, like roads and parking lots, that absorb and radiate heat.

That adds to up to **higher summer temperatures** compared to the city average.

Neighborhoods to Richmond's west that were deemed desirable for investment, outlined in green on the old maps, remain wealthier and predominantly white, with trees and parks covering 42 percent of the land. Neighborhoods in Richmond's east and south that were once redlined are still poorer and majority Black, with much lower rates of homeownership and green space covering just 12 percent of the surface.

These patterns largely persisted through cycles of white flight to the suburbs and, more recently, gentrification.

Today, Richmond's formerly redlined neighborhoods are, on average, 5 degrees hotter on a summer day than greenlined neighborhoods, satellite analyses reveal. Some of the hottest areas, like the Gilpin neighborhood, can see temperatures 15 degrees higher than wealthier, whiter parts of town.

Even small differences in heat can be dangerous, scientists have found. During a heat wave, every one degree increase in temperature can increase the risk of dying by 2.5 percent. Higher temperatures can strain the heart and make breathing more difficult, increasing hospitalization rates for cardiac arrest and respiratory diseases like asthma. Richmond's four hottest ZIP codes all have the city's highest rates of heat-related emergency-room visits.

Few neighborhoods in Richmond have been as radically reshaped as Gilpin. In the early 20th century, Gilpin was part of Jackson Ward, a thriving area known as "Black Wall Street" and the cultural heart of the city's African-American middle class, a place where people came to see Louis Armstrong or Ella Fitzgerald perform.

But with redlining in the 1930s, Jackson Ward fell into decline. Black residents had a tougher time obtaining mortgages and property values deteriorated. In the 1940s, the city embarked on "slum clearance" projects, razing acres of properties and replacing them with Richmond's first segregated public housing project, Gilpin Court, a set of austere, barracks-style buildings that were not designed with heat in mind.

A decade later, over the objections of residents, Virginia's state government decided to build a new highway right through the neighborhood, destroying thousands of homes and isolating Gilpin.

West Duval Street in 1956. Today the street overlooks a six-lane highway.
Edith Shelton Collection/The Valentine

Interstate 95 cleaved central Richmond in two, isolating neighborhoods.
The Library of Virginia

Chamberlayne Parkway is one of the few roads left connecting Gilpin to the rest of downtown.

Today, Gilpin's community pool sits empty, unfixed by the city for years. Cinder block walls bake in the sun, unshaded by trees. While city officials and local utilities have provided many people with window air-conditioners, residents said they often aren't enough, and old electric wiring means blown fuses are common.

"The air conditioning unit in my bedroom runs 24/7," said Ms. Taylor, the 40-year-old mother of two. "Air circulation is poor up here on the upper level of where I live."

Gilpin is grappling with a mix of heat and poverty that illustrates how global warming can compound inequality.

Sherrell Thompson, a community health worker in Gilpin, said residents have high rates of asthma, diabetes and blood pressure, all conditions that can be worsened by heat. They are also exposed to air pollution from the six-lane highway next door.

There are no doctor's offices nearby or grocery stores selling fresh produce, which means that people without cars face further health challenges in the heat.

"It becomes a whole circle of issues," Ms. Thompson said. "If you want to find any kind of healthy food, you need to walk at least a mile or catch two buses. If you have asthma but it's 103 degrees out and you're not feeling well enough to catch three buses to see your primary care physician, what do you do?"

Gilpin, a majority-black, low-income area that was formerly redlined, has plenty of heat-absorbing pavement and scant tree cover, making it much hotter in the summer.

Westover Hills, a majority-white, middle-income neighborhood that was greenlined in the 1930s, is cooler than average on summer days thanks in part to its tree canopy.

In Gilpin, the average life expectancy is 63 years. Just a short drive over the James River sits Westover Hills, a largely white, middle-income neighborhood that greets visitors with rows of massive oak trees spreading their leaves over quiet boulevards. Life expectancy there is 83 years.

A broad array of socioeconomic factors drives this gap, but it is made worse by heat. Researchers have found that excess heat and a lack of green space can affect mental well-being and increase anxiety. Without parks or shady outdoor areas to gather, people are more likely to be isolated indoors during the summer, a dynamic worsened by the coronavirus pandemic.

“Especially when there’s no green space nearby, the heat traps people in their homes,” said Tevin Moore, 22, who grew up in Richmond’s formerly redlined East End. “The heat definitely messes with you psychologically, people get frustrated over every little thing.”

Climate Planners Confront Racial Inequality

Nationwide, the pattern is consistent: Neighborhoods that were once redlined see more extreme heat in the summer than those that weren't.

Across U.S. cities, neighborhoods assigned lower grades by the federal government in the 1930s are hotter today

Ordered by size of heat gap on a hot summer day

	A-graded areas "Best"	**B** "Still desirable"	**C** "Declining"	**D** "Hazardous"
Portland, Ore.	**−8.0°F**	+0.9°F	+1.3°F	+4.8°F
Denver	**−7.4°**	−3.7°	+0.7°	+4.7°
Minneapolis	−5.5°	−1.5°	+1.9°	+5.3°
Jacksonville, Fla.	−5.5°	−0.8°	+2.0°	+4.4°
Chattanooga, Tenn.	−3.7°	−4.2°	+0.6°	**+5.9°**
Indianapolis	**−7.9°**	−1.6°	+1.0°	+1.6°
Philadelphia	**−6.5°**	−1.6°	+2.0°	+2.8°
Louisville, Ky.	−5.6°	−1.2°	+0.9°	+3.8°
Baltimore	−3.6°	−2.7°	+1.3°	**+5.7°**
Atlanta	−5.1°	−2.7°	+0.1°	+3.6°
Birmingham, Ala.	**−8.5°**	−0.8°	+2.6°	−0.6°
Miami	−3.0°	−1.4°	+1.1°	+4.6°
Los Angeles	−5.5°	−1.0°	+1.8°	+2.1°
Boston area	−3.0°	−1.6°	+1.3°	+3.0°
Chicago	−4.6°	−1.4°	+0.7°	+1.3°

Relative to the city average

New York area	−4.2°	−1.4°	+0.8°	+1.6°
Dallas, Texas	−3.6°	−0.2°	+2.0°	+1.6°
Richmond, Va.	**−3.0°**	**−0.5°**	**+0.6°**	**+1.7°**
New Orleans	−3.7°	−1.2°	+0.4°	+0.9°
Detroit	−2.4°	−1.0°	+0.1°	+0.9°

The New York and Boston values reflect graded neighborhoods in the broader area, including some suburbs. | Source: Hoffman, Shandas and Pendleton, Climate

Every city has its own story.

In Denver, formerly redlined neighborhoods tend to have more Hispanic than Black residents today, but they remain hotter: parks were intentionally placed in whiter, wealthier neighborhoods that then blocked construction of affordable housing nearby even after racial segregation was banned. In Baltimore, polluting industries were more likely to be located near communities of color. In Portland, zoning rules allowed multifamily apartment buildings to cover the entire lot and be built without any green space, a practice the city only recently changed.

The problem worsens as global warming increases the number of hot days nationwide.

Today, the Richmond area can expect about 43 days per year with temperatures of at least 90 degrees. By 2089, climate models suggest, the number of very hot days could double. “All of a sudden you’re sitting on top of really unlivable temperatures,” said Jeremy Hoffman, chief scientist at the Science Museum of Virginia and a co-author of the redlining study.

Playground equipment, with no shade, at Gilpin Court.

To escape the heat, the Taylor family treks to a greener playground in Lombardy Park.

For years, cities across the United States rarely thought about racial equity when designing their climate plans, which meant that climate protection measures, like green roofs on buildings, often disproportionately benefited whiter, wealthier residents. That's slowly starting to change.

In Houston, officials recently passed an ordinance to prioritize disadvantaged neighborhoods for flood protection. Minneapolis and Portland are reworking zoning to allow denser, more affordable housing to be built in desirable neighborhoods. Denver has passed a new sales tax to fund parks and tree-planting, and city officials say they would like to add more green space in historically redlined areas.

And in Richmond, a city in the midst of a major reckoning with its racist past, where crowds this summer tore down Confederate monuments and protested police brutality, officials are paying much closer attention to racial inequality as they draw up plans to adapt to global warming. The city has launched a new mapping tool that shows in detail how heat and flooding can disproportionately harm communities of color.

"We can see that racial equity and climate equity are inherently entwined, and we need to take that into account when we're building our capacity to prepare," said Alicia Zatcoff, the city's sustainability manager. "It's a new frontier in climate action planning and there aren't a lot of cities that have really done it yet."

Officials in Richmond's sustainability office are currently engaged in an intensive listening process with neighborhoods on the front lines of global warming to hear their concerns, as they work to put racial equity at the core of their climate action and resilience plan. Doing so "can mean confronting some very uncomfortable history," said Ms. Zatcoff. But "the more proponents there are of doing the work this way, the better off we'll all be for it."

To start, the city has announced a goal of ensuring that everyone in Richmond is within a 10-minute walk of a park, working with the Science Museum of Virginia and community partners to identify city-owned properties in vulnerable neighborhoods that can be converted into green space. It's the city's first large-scale greening project since the 1970s.

Green space can be transformative. Trees can cool down neighborhoods by several degrees during a heat wave, studies show, helping to lower electric bills as well as the risk of death. When planted near roads, trees can help filter air pollution. The presence of green space can even reduce stress levels for people living nearby.

And trees have another climate benefit: Unlike paved surfaces, they can soak up water in their roots, reducing flooding during downpours.

A few years ago, in Richmond's formerly redlined Southside, local nonprofits and residents sought to address the lack of green space and grocery stores by building a new community garden, a triangular park with a shaded veranda and fruit trees. "Almost instantly, the garden became a community space," said Duron Chavis of Lewis Ginter Botanical Garden, which backed the effort. "We have people holding cookouts, people doing yoga and meditation here, they can get to know their neighbors. It reduces social isolation."

Duron Chavis at an urban farm in Richmond, Va., one of several built to address rising heat and a lack of grocery stores nearby.

Richmond's long-term master plan, a draft of which was released in June, calls for increasing tree canopy in the hottest neighborhoods, redesigning buildings to increase air flow, reducing the number of paved lots and using more light-colored pavement to reflect the sun's energy. The plan explicitly mentions redlining as one of the historical forces that has shaped the city.

"Even people who don't believe institutionalized racism are struck when we show them these maps," said Cate Mingoya, director of capacity building at Groundwork USA, which has been highlighting links between redlining and heat in cities like Richmond. "We didn't get here by accident, and we're not going to get it fixed by accident."

Still, the challenges are immense. Cities often face tight budgets, particularly as revenues have declined amid the coronavirus pandemic.

And tree-planting can be politically charged. Some researchers have warned that building new parks and planting trees in lower-income neighborhoods of color can often accelerate gentrification, displacing longtime residents. In Richmond, city officials say they are looking to address this by building additional affordable housing alongside new green space.

Richmond's draft master plan envisions building a park over Routes I-95 and I-64 to reconnect Gilpin with historical Jackson Ward, as well as redeveloping the public housing complex into a more walkable mixed-income neighborhood. That plan is not imminent, but local activists fear residents could eventually be priced out of this newer, greener area.

"My worry is that they won't build that park until the people who currently live here are removed," said Arthur Burton, director of the Kinfolk Community Empowerment Center, who has been working to build community gardens in historically redlined areas like Gilpin.

While many are optimistic about Richmond's efforts to focus on racial equity, they warn there's still much work to be done to undo disparities built up over many decades. Inequality in housing, incomes, health and education "all make a difference when we're talking about vulnerability to climate change," said Rob Jones, executive director of Groundwork's Richmond chapter. "Greening the built environment is absolutely important," he said, "but it's only a start."

Brad Plumer, a writer on the Times' climate team, reported from Richmond, Va., and Washington, D.C. Nadja Popovich, a graphics editor and writer on the Times' climate team, reported from Richmond and New York. Brian Palmer is a Richmond-based freelance visual journalist.

Additional reporting from Denver by Veronica Penney. Additional development by Josh Williams.

The maps use land surface temperatures derived from remotely-sensed satellite data to estimate heat disparities across cities. The values reflect heat being radiated from surfaces, rather than the overlying air temperatures. Detailed maps of air temperature for cities in the United States aren't available nationwide. Surface and air temperatures most often follow the same pattern in cities, according to an analysis by Dr. Shandas of Portland State University, though the difference between the hottest and coolest areas is usually greater for surface temperatures.

Sources: Tree cover and impervious surface data are from the National Land Cover Database 2016. Temperature values are derived from NASA/U.S.G.S. Landsat thermal data, via Hoffman et. al., Climate

Correction: Aug. 31, 2020
An earlier version of this article described incorrectly a highway that was built through Jackson Ward. While the route that isolated Gilpin later became part of the national Interstate highway system, it was not a federal highway when it was built.

The New York Times https://www.nytimes.com/2021/04/28/climate/air-pollution-minorities.html

People of Color Breathe More Hazardous Air. The Sources Are Everywhere.

Researchers uncovered stark disparities between white people and minorities across thousands of categories of pollution, including trucks, industry, agriculture and even restaurants.

By Hiroko Tabuchi and Nadja Popovich

Published April 28, 2021 Updated Sept. 7, 2021

Over the years, a mountain of evidence has brought to light a stark injustice: Compared with white Americans, people of color in the United States suffer disproportionately from exposure to pollution.

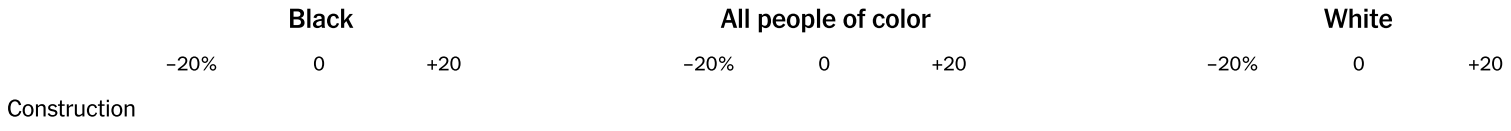
Now, a new study on a particularly harmful type of air pollution shows just how broadly those disparities hold true. Black Americans are exposed to more pollution from every type of source, including industry, agriculture, all manner of vehicles, construction, residential sources and even emissions from restaurants. People of color more broadly, including Black and Hispanic people and Asian-Americans, are exposed to more pollution from nearly every source.

The findings came as a surprise to the study's researchers, who had not anticipated that the inequalities spanned so many types of pollution.

"We expected to find that just a couple of different sources were important for the disparate exposure among racial ethnic groups," said Christopher W. Tessum, an assistant professor in environmental engineering and science at the University of Illinois at Urbana-Champaign, who led the study. "But what we found instead was that almost all of the source types that we looked at contributed to this disparity."

Biggest Pollution Disparities

Nationwide, Black people are exposed to greater-than-average concentrations of a dangerous form of pollution known as PM 2.5. People of color face more exposure from almost every type of source, while white people are less exposed.



Other sources include pollution from commercial cooking, off-highway vehicles and equipment, and others. The cars and trucks category includes direct pollution as well as road dust. • Source: Tessum et al., Science Advances • By The New York Times

The study builds on a wealth of research that has shown that people of color in America live with more pollution than their white neighbors. Fine particulate matter air pollution, known as PM 2.5, is harmful to human health and is responsible for 85,000 to 200,000 excess deaths a year in the United States.

Racial and socioeconomic disparities in exposure to PM 2.5 have been well documented and have persisted despite an overall decline in particulate pollution. But the researchers sought to get a better grasp of whether these disparities came from just a handful of sources, or whether the inequalities could be seen more widely.

They used an air quality model to analyze data from the Environmental Protection Agency on more than 5,000 emission sources collected as part of a 2014 nationwide emissions survey. Then they identified differences in exposure to each by broad race-ethnicity and income groups, based on United States census data.

They found that nearly all emissions sources caused disproportionate exposures for people of color, on average, as well as separately for Black, Hispanic and Asian people. Black people were exposed to higher-than-average concentrations from all major emissions groups, while white people were exposed to lower-than-average concentrations from almost all categories. The disparities were seen nationally, as well as at the state level, across income levels and across the urban-rural divide.

The Motiva oil refinery in Texas. The Houston Ship Channel is a petrochemical hub adjoining neighborhoods with sizable numbers of Black and Hispanic residents. Brandon Thibodeaux for The New York Times

These findings were consistent with the experiences of communities on the ground, said Robert D. Bullard, a professor at Texas Southern University who has written for more than 30 years about the need to redress environmental racism, and who was not involved in the study.

“If you go to communities of color across this country and ask them, ‘What’s the source of the environmental problems?’ they can point you to every one: the highway, the chemical plants, the refineries, the legacy pollution left over from decades ago, in the houses, in the air, in the water, in the playgrounds,” he said. “Empirical research is now catching up with the reality: that America is segregated and so is pollution.”

On Wednesday, the Environmental Integrity Project, a nonprofit group founded by former officials from the E.P.A., released a separate report that found that 13 refineries across the United States had released elevated levels of benzene, another harmful pollutant, into mostly minority and lower income neighborhoods in 2020.

These disparities have roots in historical practices, like redlining, under which the federal government marked certain neighborhoods as risky for real estate investments because their residents were Black. For decades, residents of redlined areas were denied access to federally backed mortgages and other credit, fueling a cycle of disinvestment and environmental problems in those neighborhoods.

“Communities of color, especially Black communities, have been concentrated in areas adjacent to industrial facilities and industrial zones, and that goes back decades and decades, to redlining,” said Justin Onwenu, a Detroit-based organizer for the Sierra Club. “And a lot of our current infrastructure, our highways, were built on — built through — Black communities, so we’re breathing in diesel emissions and other pollution just because we’re located right next to these highways,” Mr. Onwenu said.

The latest research, published Wednesday in the journal Science Advances, shows how that legacy continues to cast a shadow. Emissions from industry, construction and both light- and heavy-duty vehicles were among the sources that caused the largest absolute disparities for Black, Hispanic and Asian-Americans.

Particulate pollution from coal-fired power plants, meanwhile, was one of the only sources that substantially affected white Americans more than average. That was explained, Dr. Tessum said, by the predominantly white demographics of many coal towns. Coal power plants also tend to have smoke stacks that are many hundreds of feet high, scattering fine particles more evenly across larger areas.

Likely for the same geographic reason, white Americans were slightly more exposed to particulate pollution from agriculture, including from soil tilling and wind erosion. But in California, which produces more than a third of the country’s vegetables and two-thirds of its fruits and nuts, Hispanic people were disproportionately exposed.

Vandee Lakthanasuk helped her father, Sieng Lakthanasuk, who has asthma, don a face mask outside their home in Richmond, Calif., near a Chevron refinery. Preston Gannaway for The New York Times

Newer industries can perpetuate these inequalities. A large Latino population in the Inland Empire region of Southern California, for example, near one of the nation’s largest concentration of Amazon warehouses, has suffered from the heavy diesel traffic that feeds the sprawling e-commerce hub.

“These warehouses are being built within feet of existing homes, within feet of schools,” said Cesunica E. Ivey, an assistant professor in chemical and environmental engineering at the University of California, Riverside, who was not involved in the study. “Local voices in those neighborhoods are often drowned out,” she said. “And they can’t just move. You need resources to relocate.”

The coronavirus pandemic, which has taken a disproportionate toll on Black, Latino and other communities, added to the burdens.

“A lot of families have kids with asthma. There’s high rates of respiratory illness. Many people have died from cancer and other types of diseases,” said Vivian Huang, a director at the Asian Pacific Environmental Network, which works with communities that live at the fence line of refineries and other polluting facilities in California. “The Covid pandemic has just exacerbated these immense inequalities.”

One surprising source of pollution that disproportionately affects communities of color, though a smaller source of emissions over all, were restaurants. A recent study that looked at Oakland, Calif., and Pittsburgh found that emissions from commercial kitchens — mostly from their use of cooking oils — were a surprisingly large fraction of particulate air pollution in those cities. More people of color tended to live nearby, and so were more exposed.

Getting a clearer picture of how different sources of air pollution affect different groups of people is important, because history has shown that simply reducing overall emissions does not address racial and other disparities, said Joshua Apte, an assistant professor at the University of California, Berkeley, and a co-author of both the PM 2.5 and commercial kitchen studies.

“When nearly every major source category in the U.S. disparately impacts people of color, reducing sources alone is really insufficient to solve this problem,” he said. “We have to think about where the sources are as well.”

These aerial photos show American cities before the highway boom of the 1950s and '60s.

Highways radically reshaped cities, destroying dense downtown neighborhoods, dividing many Black communities and increasing car dependence.

Now, some cities are looking to take them out.

But reconnecting neighborhoods is more complicated than breaking them apart.

Can Removing Highways Fix America's Cities?

By Nadja Popovich, Josh Williams and Denise Lu May 27, 2021

ROCHESTER, N.Y. — Built in the 1950s to speed suburban commuters to and from downtown, Rochester's Inner Loop destroyed hundreds of homes and businesses, replacing them with a broad, concrete trench that separated downtown from the rest of the city.

Now, the city is looking to repair the damage. It started by filling in a nearly-mile-long section of the sunken road, slowly stitching a neighborhood back together. Today, visitors of the Inner Loop's eastern segment would hardly know a highway once ran beneath their feet.

As midcentury highways reach the end of their life spans, cities across the country are having to choose whether to rebuild or reconsider them. And a growing number, like Rochester, are choosing to take them down.

In order to accommodate cars and commuters, many cities "basically destroyed themselves," said Norman Garrick, a professor at the University of Connecticut who studies how transportation projects have reshaped American cities.

"Rochester has shown what can be done in terms of reconnecting the city and restoring a sense of place," he said. "That's really the underlying goal of highway removal."

The project's successes and stumbling blocks provide lessons for other cities looking to retire some of their own aging highways. Nearly 30 cities nationwide are currently discussing some form of removal.

Some, like Syracuse and Detroit, have committed to replacing stretches of interstate with more connected, walkable neighborhoods. Others, like New Orleans and Dallas, are facing pressure from local residents and activists to address the pollution, noise and safety hazards brought by the mega-roads.

The eastern section of Rochester's Inner Loop highway, before it was removed. City of Rochester

Shawn Dunwoody, a local artist and community organizer, walking along the new Union Street corridor, which replaced the Inner Loop. Mustafa Hussain for The New York Times

The growing movement has been energized by support from the Biden administration, which has made addressing racial justice and climate change, major themes in the debate over highway removal, central to its agenda.

In a wide-reaching infrastructure plan released at the end of March, President Biden proposed spending $20 billion to help reconnect neighborhoods divided by highways. Congressional Democrats have translated the proposal into legislation that would provide funding over the next five years. And the Department of Transportation opened up separate grants that could help some cities get started.

Pete Buttigieg, who heads the department, has expressed support for removing barriers that divided Black and minority communities, saying that "there is racism physically built into some of our highways." Midcentury highway projects often targeted Black neighborhoods, destroying cultural and economic centers and bringing decades of environmental harm.

Congress is still haggling over Mr. Biden's infrastructure plan, but experts say the proposed funding for highway removal represents a shift in the way the government approaches transportation projects.

"As recently as a decade ago," said Peter D. Norton, a transportation historian at the University of Virginia, "every transportation problem was a problem to be solved with new roads." Now, the impacts of those roads are beginning to enter the equation.

Turning a Highway Back Into a Neighborhood

Federal and state funds have historically gone to building highways, not removing them. But in 2013, the city of Rochester, in upstate New York, won a nearly $18 million grant from the Obama administration that allowed it to take out an eastern segment of its sunken Inner Loop freeway, known locally as "the moat."

Photos from a bird's-eye view show the road's transformation:

Inner Loop 2014

The original highway spanned six lanes, with access roads alongside.

Dump trucks hauled thousands of tons of dirt to fill it in.

A narrower boulevard replaced the highway, and the rest of the land was opened up for development.

Today, apartments and bike lanes line the street, with many projects still under construction.

People have already moved into townhouse-style apartments where the highway once stood. Scooters and bicycles share space with cars along the new Union Street corridor, a once unlikely sight. Several cross-streets cut off by the highway have been reconnected, encouraging more walking in the area.

And the big fear of removing a highway — terrible traffic — hasn't materialized.

Lovely Warren, who has served as Rochester's mayor since 2014, said the project is proof the city can undo some of its mistakes.

In the past, "we created a way for people to get on a highway and go directly out of our community," she said, adding that highways also created "barriers that were really detrimental to the communities left behind."

Now, Rochester is trying a different approach: Instead of moving people in and out of downtown as quickly as possible, the city is trying to make downtown a more livable place.

The highway removal and other deconstruction projects are part of a long-term plan for a city still struggling to come back from years of economic and population decline. The big bet: Rebuilding more walkable, bikeable and connected neighborhoods will attract new investment and new residents. And city officials hope it might even reduce car-dependence in the long run.

A new apartment building under construction, next to a florist and interior design shop that sat atop the highway for decades. Mustafa Hussain for The New York Times

But rebuilding a neighborhood from scratch isn't easy, or quick.

Four years after the sunken freeway was filled, many buildings along the corridor are still under construction and new businesses have not yet moved into the space, including a planned pharmacy and grocery store.

Local residents and business owners said they were glad to see the highway go, but many of them had mixed feelings about what followed.

"The success was: It got filled. You now have people living somewhere that was just road before," said Shawn Dunwoody, an artist and community organizer who lives in Marketview Heights, a neighborhood near the removal site.

"We don't have the moat that was there," he said, walking along the new corridor. "But now, when you look down, there's just a whole series of walls," he added, pointing to the large, new apartment buildings that repeat down Union Street.

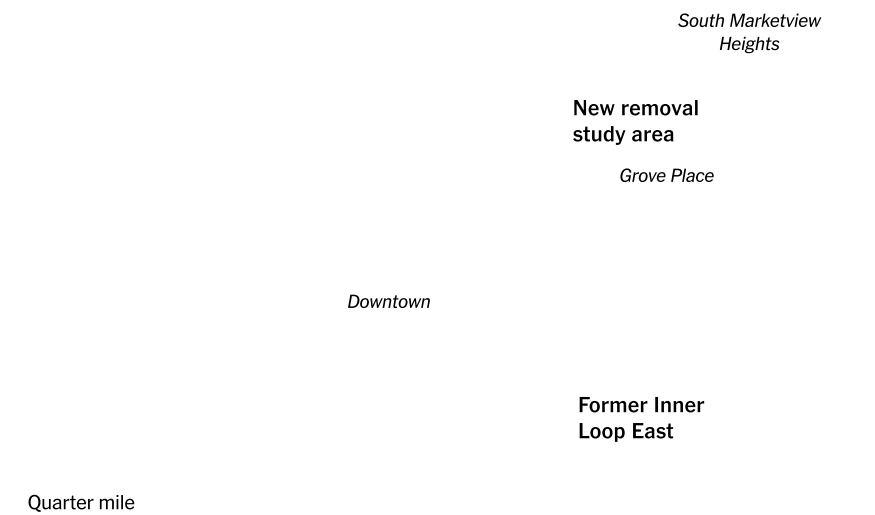
Others echoed the concern that the redevelopment project brought in too many higher-end apartments (though a portion are reserved for lower-income tenants and other vulnerable groups) without opening up any space for the public: No parks, no plazas.

Erik Frisch, a transportation specialist for the city who worked on the Inner Loop East removal, said the project has so far fulfilled its main goals: bringing in new investment and enlivening the city's East End. But the new neighborhood is still a work in progress.

Rebuilding a neighborhood "is not just an 'Add water, mix and stir' type situation," said Emily Morry, who works at the Rochester Public Library and has written about the neighborhoods razed by the Inner Loop's construction. "You can set up all the infrastructure you like, but there's the human factor, which takes all these different buildings and turns them into actual, viable communities."

Rochester is now looking to take down more of the Inner Loop highway, starting with a northern arm. Officials hope the experience from the first removal will help expedite the process.

Rochester's Inner Loop



By The New York Times ▪ Source: City of Rochester, Nearmap

It took more than two decades of planning to break ground on the Inner Loop East removal, even though the project faced fewer obstacles than most.

The eastern highway segment never carried the traffic it was built to serve, so its removal faced scant opposition from daily commuters and business groups. The aging road was due for major upgrades, which would have cost much more than the entire removal process. And there weren't a lot of people already living along the corridor.

Funding and expertise were the biggest barriers to removal.

A few highways had been taken down in the past, but there was no real template. San Francisco's Embarcadero Freeway was irreparably damaged by an earthquake in 1989 and removed two years later. Other, more recent removals targeted waterfront highways and short "spurs" rather than segments of a working highway.

"We are a bit of a proof of concept," said Mr. Frisch, the city's transportation specialist.

Removing the northern arm of the Inner Loop presents a new challenge. That section of highway carries much more traffic and its removal would reconnect two long-divided neighborhoods: Marketview Heights, a

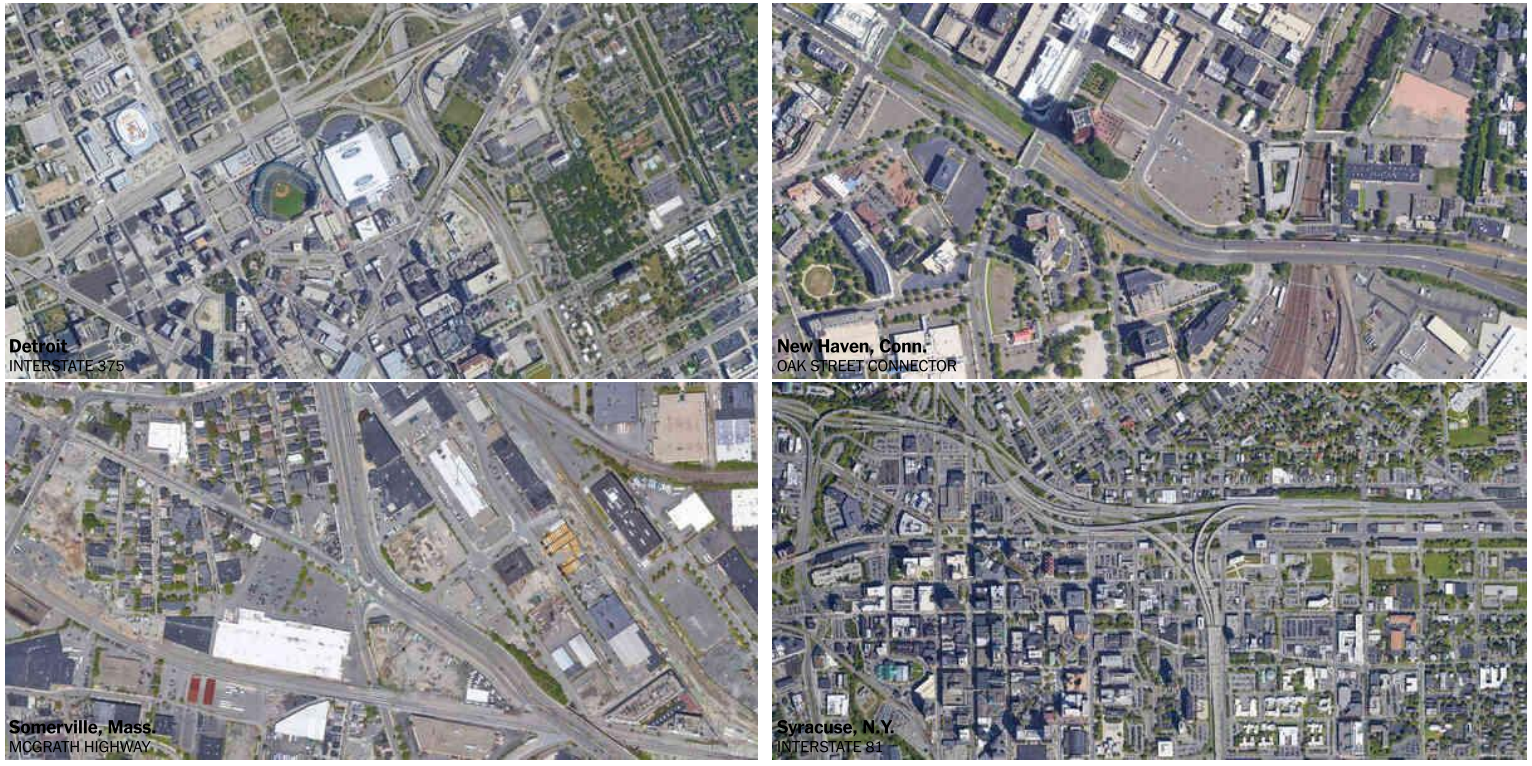
majority Black and Hispanic lower-income community north of the Inner Loop, and Grove Place, a whiter, wealthier enclave to the south.

For current residents of Marketview Heights, the crucial question is: What will reconnection bring? More opportunity and less pollution? Or another round of displacement?

Dozens of Projects Across the Nation

In recent years, more cities have started to seriously rethink some of their highways. The Congress for the New Urbanism, a group that tracks highway removals, counted 33 proposed projects in 28 American cities. And the idea is being discussed in many others.

Committed to removing highway or section



Removal under official study


Arlington, Va.
ROUTE 1

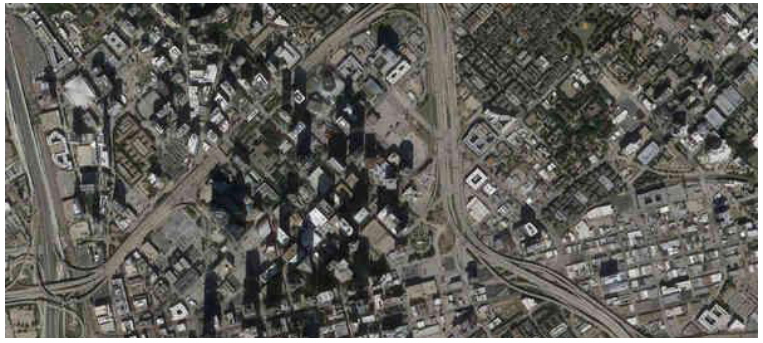

Austin, Texas
INTERSTATE 35


Boston
ALLSTON VIADUCT


Buffalo
KENSINGTON EXPRESSWAY


Buffalo
SCAJAQUADA EXPRESSWAY

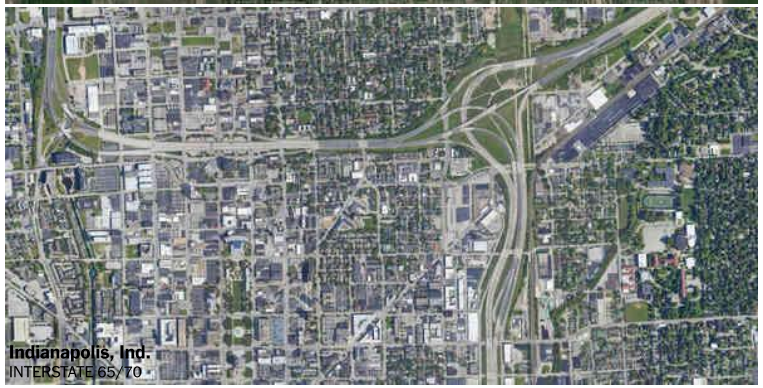

Buffalo
SKYWAY

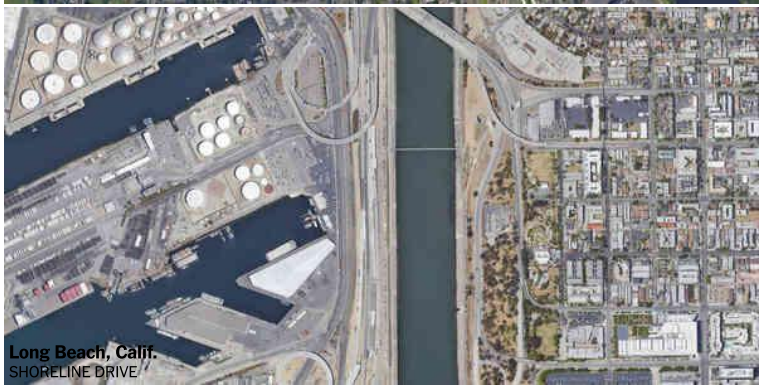


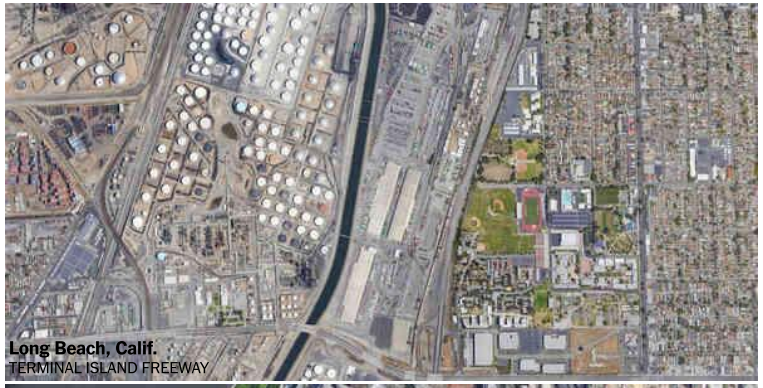
Removal plan proposed


Flint, Mich.
INTERSTATE 475


Hartford, Conn.
INTERSTATE 91/84


Indianapolis, Ind.
INTERSTATE 65/70


Long Beach, Calif.
SHORELINE DRIVE


Long Beach, Calif.
TERMINAL ISLAND FREEWAY


New Orleans, La.
CLAIBORNE EXPRESSWAY


New York City
BROOKLYN-QUEENS EXPRESSWAY


Oakland, Calif.
INTERSTATE 980


Pasadena, Calif.
STATE ROUTE 710

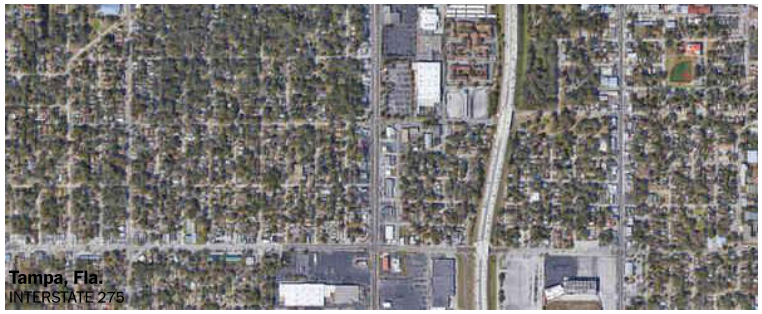

Portland, Ore.
INTERSTATE 5


San Francisco
INTERSTATE 280


San Francisco
THE GREAT HIGHWAY


Seattle
STATE ROUTE 99


St. Paul, Minn.
INTERSTATE 94



If rebuilding cities is done right, highway removal projects could make life better for local residents as well as the planet, said Dr. Garrick of the University of Connecticut, because denser, less car-centric neighborhoods are crucially important to reducing greenhouse gases that are causing climate change.

The proposed replacements, and their benefits, vary. Some follow Rochester's model, turning former highways into smaller, walkable boulevards. Others are covering highways with parks, or merely replacing them with highway-like streets. Nationwide, many cities also continue to expand highways.

A growing number of removal projects are grappling with the questions of environmental justice central to Mr. Biden's proposal. Historically, vulnerable communities have had little say in infrastructure decisions.

When the National Interstate Highway System was built in the 1950s and '60s, it connected the country like never before. But it plowed through cities with little concern for local effects. State highways and connector roads compounded the damage.

"Highways, freeways, expressways were always hostile to cities," said Dr. Norton of the University of Virginia. But they were particularly hostile to Black communities.

In cities like Detroit, New Orleans, Richmond, Va., and many more, federal interstates and other highways were often built through thriving Black neighborhoods in the name of "slum clearance."

Detroit's Black Bottom neighborhood, the center of the city's Black community, was demolished to make way for Interstate 375 and other urban renewal projects. Now, the highway is slated for removal. Burton Historical Collection, Detroit Public Library; Cydni Elledge for The New York Times

Most highway projects fit into a broader program of urban renewal that reshaped American cities in the mid-20th century, displacing more than a million people across the country, most of them Black. Cities replaced dense, mixed-use neighborhoods with mega-projects like convention centers, malls, and highways. When public housing was built, it usually replaced many fewer units than were destroyed.

Clearing "blighted" neighborhoods, which was usually a reference to low-income and Black areas , was the intentional goal of many urban highway projects, said Lynn Richards, president of the Congress for the New Urbanism, which advocates for more sustainable cities. "But, you know, where one person sees urban blight, another person sees a relatively stable neighborhood."

Highways didn't just destroy communities, they also often reinforced racial divides within cities.

White Americans increasingly fled cities altogether, following newly built roads to the growing suburbs. But Black residents were largely barred from doing the same. Government policies denied them access to federally backed mortgages and private discrimination narrowed the options further.

In effect, that left many Black residents living along the highways' paths.

New Orleans' Claiborne Avenue, once a tree-lined boulevard, now sits in the shadow of the Claiborne Expressway. Local groups are pushing to remove the mega-road. The Historic New Orleans Collection; Abdul Aziz for The New York Times

In March, Mr. Biden named New Orleans' Claiborne Expressway as a vivid example of how highway construction divided communities and led to environmental injustice.

The highway looms over Claiborne Avenue, once an oak-lined boulevard that served as "the economic heart and soul of the Black community of New Orleans," said Amy Stelly, a local resident and urban planner, who has been pushing for the Expressway's removal for most of the last decade. A

part of the Treme neighborhood, the Claiborne Avenue corridor was a central meeting space for local residents and the site of Black Mardi Gras celebrations at a time when the festival was still segregated.

In the mid-1960s, the oak trees were ripped out to make way for the highway, cleaving the neighborhood in two. Over the following decades, the once middle-class area fell into decline. Today, the Expressway corridor is polluted: Local residents suffer higher than average rates of asthma and the soil is contaminated with lead, the result of years of leaded gasoline use in cars traveling into and out of downtown.

The idea of removing the highway, however, is raising some of the same concerns heard in Rochester.

Not Repeating Mistakes of the Past

Older residents of Rochester's Marketview Heights neighborhood still remember the displacement caused by the construction of the Inner Loop. Many people now fear a second wave if it is removed.

A common argument, said Mr. Dunwoody, the artist and community organizer, is that if the highway is removed "folks are now going to be looking at our neighborhood, and bringing in yoga studios and coffee shops to move us out."

"People don't want to get gentrified, get pushed out, get priced out," he said.

To make sure that city officials listen to these concerns, Mr. Dunwoody started a local advocacy group three years ago with Suzanne Mayer, who lives on the other side of the highway, in the Grove Place neighborhood. The group, called Hinge Neighbors, aims to bring local residents into the planning process.

Shawn Dunwoody and Suzanne Mayer stand on a bridge overlooking the Inner Loop's remaining northern arm. Mustafa Hussain for The New York Times

At a community meeting in Marketview Heights in early May, the biggest question on people's minds wasn't whether the highway should come down, but what will replace it.

Miquel Powell, a local resident and business owner working on a prison re-entry program, worried that more large-scale apartments, like those built in the East End, would come to the neighborhood. "That would totally change the whole dynamic," he said. Marketview Heights is mostly free-standing, single-family homes; some are subdivided and most are rented.

Nancy Maciuska, who is in her 60s, said she wants to see more family-centric development in the area if the highway is removed, and some parks to replace those torn down by the construction of the freeway. "So people can raise their families and enjoy Mother Nature," she said.

Hinge Neighbors helped Mrs. Maciuska, Mr. Powell and other local residents put some of their concerns about the Inner Loop North project into a presentation for city consultants and the mayor.

The project is still in early stages and Marketview Heights is only one corner of the area under study for removal. But Ms. Warren said her administration is exploring options that would help keep longtime residents in the neighborhood, including potential rent-to-own housing arrangements.

City officials are scheduled to present a series of options for the project to the community this summer.

Miquel Powell and Nancy Maciuska, both residents of the Marketview Heights neighborhood, presented their concerns about post-highway removal redevelopment to the mayor and other city officials. Mustafa Hussain for The New York Times

The big challenge, according to Dr. Garrick, is that new investments in American cities today tend to lead to gentrification. "We need to figure out how to change without displacing people," he said.

Some of the positive effects of highway removals, like decreasing pollution and increasing property values, can lead to the displacement. A recent study looked at the effects of replacing the Cypress Freeway in Oakland, Calif., with a street-level boulevard and found that the project decreased pollution but increased resident turnover.

Such "environmental gentrification" can also happen when parks and other greenery are introduced to historically disadvantaged neighborhoods.

The proposed Democratic legislation hopes to avoid that paradox. The bill would fund community outreach and engagement by local groups. And it prioritizes capital construction grants for projects that include measures

like land trusts that would ensure the availability of affordable housing for local residents.

"It's no longer good enough for us to remove a highway and make a replacement road beautiful," said Ms. Richards of the Congress for the New Urbanism. "We have to reconnect the neighborhoods and invest in the legacy residents."

Additional work by Claire O'Neill and Matt McCann.

Sources: Historic aerial images were taken between 1938 and 1969 and come from the United States Geological Survey. Current satellite and aerial images were taken between 2010 and 2021 and come from Google Earth and Nearmap. A portion of the images were collected by Shane Hampton at The University of Oklahoma, and the rest by The New York Times. Images in the Inner Loop East removal sequence come from Nearmap. A database of cities with active highway removal projects was compiled by Benjamin Crowther at the Congress for the New Urbanism.

Removal categories: The "committed" category covers projects where a highway authority has committed to removing some portion of a highway or removal is in progress. The "under study" category covers projects that are being considered in feasibility studies. The "proposed" category covers projects where an alternative vision and design for the highway corridor has been put forward by local groups.

The New York Times Magazine | https://www.nytimes.com/2020/07/28/magazine/pollution-philadelphia-black-americans.html

FEATURE

Pollution Is Killing Black Americans. This Community Fought Back.

African-Americans are 75 percent more likely than others to live near facilities that produce hazardous waste. Can a grass-roots environmental-justice movement make a difference?

By Linda Villarosa

July 28, 2020

To hear more audio stories from publishers like The New York Times, download Audm for iPhone or Android.

When Kilynn Johnson walks out the door of the house her parents bought in 1972, where she grew up and lives to this day, she steps into the warm embrace of a community where neighbors feel more like kin. Her home sits across the street from Stinger Square Park, where Johnson passed long days of her childhood playing alongside her siblings and cousins and friends. But by age 8, diagnosed with asthma, she spent more time sitting on the sidelines, watching the other children tumble on playground equipment or rip and run through the park. Once in a while a neighbor, Ms. Sylvia or any number of Black mother figures whom Johnson and everyone knew never to call by just their first names, might come by and check on her. “You doing all right, Kilynn?” they would ask the quiet little girl.

Near the end of 2015, Johnson felt short of breath and wondered whether the asthma that plagued her when she was a child had flared up once again. By the last week of December, she was able to leave her house on the corner of Dickinson Street and South 32nd Street, in the Grays Ferry neighborhood of South Philadelphia, only once, to drag herself to church on New Year’s Eve. Three nights later, she began vomiting uncontrollably. At sunrise, she managed to call her former partner, Tony, and could get out only one word: “Hospital.”

Several hours and a battery of tests later, doctors at the Hospital of the University of Pennsylvania in West Philadelphia, across the Schuylkill from Grays Ferry, told Johnson that she needed surgery to remove a tumor from her gallbladder — but that she was also suffering from such a severe infection that she would require IV antibiotics and a week in intensive care before doctors could operate. The surgery revealed gallbladder cancer that had spread; the doctors removed her gallbladder, seven lymph nodes and part of her liver. She needed six weeks of both radiation and chemotherapy. “They didn’t know if I was going to make it,” Johnson said.

Shy and reserved by nature, Johnson was slow to tell anyone about the cancer. “I held it to myself,” Johnson recalls. “In the beginning it was private, so I preferred to open up a little at a time.” One day in the spring of 2016, Johnson went out for some fresh air. Leaning heavily on a walker, she passed the familiar rowhouses on Dickinson Street. As she made her way with the walker, she met Sylvia Bennett, whom Johnson still called Ms. Sylvia, and who lived three doors down on the same block.

Bennett, 76, a retired behavioral-health specialist, had raised five children in the tight-knit community of Grays Ferry. Bennett’s youngest daughter was just a little older than Kilynn Johnson; Ms. Sylvia had watched Johnson grow up and raise a family of her own. Now, observing her frail neighbor and the walker, she asked Johnson in her most gentle voice: “Where you been? Haven’t seen you for a while.” “I think I told her, ‘I been sick,’” Johnson says, recalling her reticence. Bennett knew not to pry. This went on for months, until the summer day when Bennett asked, “How you doing?” and Johnson told her, “Ms. Sylvia, I have cancer.”

After she recovered from the initial shock of her diagnosis, Johnson began to wonder why she had such an unusual cancer. The Centers for Disease Control and Prevention estimates that only about 3,700 Americans find out they have gallbladder cancer each year; breast cancer is the most frequently diagnosed cancer in the country, with more than 276,000 new cases annually. Because Johnson’s disease was so uncommon, doctors at University Hospital had to formulate a special treatment plan. Gallbladder cancer occurs mainly in older people, and 72 is the average age at diagnosis. Johnson was 46. “I started thinking, What was I doing with this?”

Bennett had an answer for her. “Look across the highway,” she said, pointing toward the massive 150-year-old refinery, owned by Philadelphia Energy Solutions since 2012, that was so familiar to Grays Ferry residents that it seemed like part of the landscape.

Kilynn Johnson outside her home. She and several members of her family have suffered from various forms of cancer. Hannah Price for The New York Times

Over the next year, Bennett and Johnson began to tally the diseases all around them suffered by the people they loved. Johnson's father's brother, her uncle Robert, who also lived in the neighborhood, died of prostate cancer in 2010, and three of his children, Kilynn's first cousins, had also had different forms of cancer — four out of six people in one household. Those three cousins learned they had cancer earlier than age 66, the average age of a diagnosis. Bennett's daughters Ladeania and Wanda, found out they had breast cancer several months apart and when they were both in their 50s; Wanda then came down with multiple myeloma, a cancer of the blood. "And now me," Johnson said.

Between the two of them, Johnson and Bennett knew two dozen family members, friends and neighbors, a number of them under 50, who'd had cancer. As they tallied their sick and their dead, the two women wondered, "What we gonna do?"

Black communities like Grays Ferry shoulder a disproportionate burden of the nation's pollution — from foul water in Flint, Mich., to dangerous chemicals that have poisoned a corridor of Louisiana known as Cancer Alley — which scientists and policymakers have known for decades. A 2017 report from the N.A.A.C.P. and the Clean Air Task Force provided more evidence. It showed that African-Americans are 75 percent more likely than other Americans to live in so-called fence-line communities, defined as areas situated near facilities that produce hazardous waste.

A study conducted by the Environmental Protection Agency's National Center for Environmental Assessment and published in 2018 in the American Journal of Public Health examined facilities emitting air pollution along with the racial and economic profiles of surrounding communities. It found that Black Americans are subjected to higher levels of air pollution than white Americans — regardless of their income level. Black Americans are exposed to 1.5 times as much of the sooty pollution that comes from burning fossil fuels as the population at large. This dirty air is associated with lung disease, including asthma, as well as heart disease, premature death and now Covid-19.

Philadelphia, which is 44 percent Black, received a warning from the American Lung Association in 2019: "If you live in Philadelphia County, the air you breathe may put your health at risk." According to 2016 E.P.A. data, the refinery that looms over Grays Ferry was responsible for the bulk of toxic air emissions in the city. The E.P.A. found that the refinery had been out of compliance with the Clean Air Act nine of the past 12 quarters through 2019 with little recourse. From 2014 to 2019, P.E.S. was fined almost $650,000 for violating air, water and waste-disposal rules.

Though Black communities bear disproportionate hardships of the environmental crisis, they historically have been left out of the environmental movement. A 2018 survey conducted by Dorceta Taylor, a professor at the University of Michigan School for Environment and Sustainability, found that white people made up 85 percent of the staffs and 80 percent of the boards of 2,057 environmental nonprofits. Last year, a report released by Green 2.0, an independent advocacy campaign that examines the intersection of environmental issues and race, showed that people of color made up only 20 percent of the staffs of 40 environmental nongovernmental organizations. The face of the environmental movement is more likely to be someone like Greta Thunberg, the Swedish teenager who was Time magazine's 2019 person of the year, than someone like Kilynn Johnson living environmental injustice on the ground. Protests and movement conferences are filled with a sea of mostly young white people and generally not Black people whose families have lived near polluting facilities for generations, their bodies ravaged by the effects of toxic emissions.

The urgency of this environmental crisis has been hastened by climate change and has now gathered speed and attention as a result of the coronavirus pandemic and the current racial-justice movement. The racial disparities that have exposed Black Americans to a disproportionate share of air pollution have risen to the surface to lethal effect during the current pandemic. A study of more than 3,000 U.S. counties released in April but not yet published shows a statistical connection between death rates from Covid-19 and long-term exposure to air pollution. The researchers, from the Harvard T.H. Chan School of Public Health, noted that even a small increase in particulate matter — tiny airborne particles emitted from power plants, industrial facilities and vehicles — corresponded to a significant increase in Covid-19 mortality. Each increased microgram of this kind of pollution per cubic meter of air is associated with an 8 percent increase in death from Covid-19.

The death rate for the city's Black patients is 50 percent higher than for white patients. "You can't understand environmental racism without understanding the legacy and the history of residential segregation, which created the disinvestment that has happened in communities in Philadelphia like Grays Ferry for decades," says Sharrelle Barber, an assistant research professor of epidemiology and biostatistics at Drexel University's Dornsife School of Public Health in Philadelphia.

The Grays Ferry neighborhood in Philadelphia, where residents say a nearby oil refinery had catastrophic effects on their health, even before a fire there in 2019. Hannah Price for The New York Times

"The compounded effect of racism is really showing up in the interlocking systems of structural inequality operating in this moment to increase exposure, transmission, severity and the likelihood of death from Covid-19 in communities like Grays Ferry, which have already experienced such devastating environmental racism for so many years," says Barber, who is the daughter of the Rev. Dr. William Barber, the civil rights activist, and a national adviser for the Covid-19 health-justice advisory committee of his Poor People's Campaign. "This has all been brought to the surface at this moment."

Across the highway from Grays Ferry, the immense P.E.S. refinery, with its lattice of rusting pipes, smokestacks streaked with soot and mammoth holding tanks, swallows up 1,300 acres of land on the banks of the Schuylkill. It is a city in itself, encircled by a chain-link fence topped with barbed wire — nearly the size of Central Park and Arlington National Cemetery combined. For decades, when the sun set, the facility looked like its own vast metropolis, lights flickering throughout the night. The site was first used as a storage facility in Philadelphia a year after the Civil War ended and began refining oil shortly after that. By 1891, half the world's lighting fuel and more than a third of U.S. petroleum exports came from the refinery.

The Industrial Revolution and the invention of cars drove an insatiable hunger for oil, which became the dominant fuel of the 20th century. As the refinery continued to be a powerhouse in oil production on the East Coast and expanded operations, Philadelphia experienced a significant demographic shift. During the Great Migration, the Black population exploded with waves of new arrivals from the South, and white people moved out of the city. The city's African-American community went from 251,000 in 1940 to 376,000 in 1950, and peaked at 654,000 residents in 1970.

In 1934 South Philadelphia was redlined: given a D rating — the lowest — by the Home Owners' Loan Corporation, which outlined the community in red on maps used to determine loan eligibility. Agents of the loan group noted "Negro encroachment in certain neighborhoods." The Federal Housing Administration later relied on these maps, and its own underwriting manuals pointed to the condition of housing and the race or ethnicity of residents as characteristics that increased the risk of a community receiving a low rating from the agency. As a result, lending institutions issued fewer mortgages in these areas than in other parts of the city, creating entrenched segregation, disinvestment and decay. In South Philly, the proximity of residential areas to factories, including the refinery, most likely contributed to the neighborhood receiving the lowest grade and a label as "hazardous," making it difficult for residents to get approved for loans to buy homes.

Public housing filled the void. In 1940 the city completed the Tasker Street Homes Project, 125 barracks-like buildings with 1,000 units, taking up 40 acres to the southwest of 30th and Tasker Streets. More followed: Philadelphia received federal funding in 1949 for more than 20,000 low-income public-housing units. The city built Wilson Park, a 650-unit complex across the highway from P.E.S. in 1953, and continued to expand. According to the book "Public Housing, Race and Renewal: Urban Planning in Philadelphia, 1920-1974," by John F. Bauman, from 1956 to 1967 all of this public housing landed in poor or transitional communities. This included more than a thousand additional units in South Philadelphia. "Black leaders accused the [housing] authority of warehousing as well as ghettoizing the Black poor," Bauman, the author of several books about urban planning, wrote.

In 1969, when Johnson, the last of nine children, was born, her family lived in the Tasker Street Homes housing project. Her parents had good, stable jobs: Troy as a mechanic for SEPTA, the city's public-transportation system, Elizabeth as a custodian for the school district. When the couple heard about a good deal on a four-bedroom rowhouse not far away on Dickinson Street with a basement and a yard, they decided to make a move. Troy Johnson's brother Robert and his wife also bought a home nearby. Sylvia Bennett and her husband, who also lived in the Tasker Street Homes, landed on Dickinson Street as well. At that time, the neighborhood was less than one-third Black; it is now majority Black.

The "hazardous" label the government stamped onto the Johnsons' and Bennetts' community 86 years ago now has a different meaning. The legacy of 150 years of pollution from heavy industry has mounted. Local people have grown used to the poor air quality. Gloria C. Endres, a lifelong resident, described the constant cough and runny nose as the "South Philly postnasal drip" in a letter to The South Philly Review, a local publication. Derek Hixon joked that the South Philadelphia High basketball team "always has home-court advantage because opposing players find it hard to breathe." More ominous are the disturbingly frequent accounts of cancer.

According to data collected by the National Cancer Institute, each year 501 people in every 100,000 in Philadelphia will get cancer, compared with 449 in the United States and 485 in Pennsylvania. Data from the E.P.A.'s Toxics Release Inventory shows that contaminants released from the P.E.S. refinery include benzene, hydrogen cyanide, toluene and other hazardous chemicals. An analysis by the University of Pennsylvania's Kleinman Center for Energy Policy notes that the soil and groundwater at the site of P.E.S. have been contaminated with a number of toxic substances, including benzene, a known carcinogen.

Sylvia Bennett in Stinger Square Park. She and Kilynn Johnson tracked the illnesses suffered by their families and neighbors and became active in a local environmental-justice organization. Hannah Price for The New York Times

Despite the data, it's difficult to link individual cases of cancer to the documented dumping of carcinogenic substances into the air and soil in the community adjacent to the refinery. But the danger has long been apparent. "The refinery has a very long history of environmental regulation problems and really old technology," says Peter DeCarlo, a former professor at Drexel University who lived less than two miles from the refinery for eight years and is now an associate professor of environmental health and engineering at Johns Hopkins University. "It sits very close to a densely populated area. If a refinery were trying to get a permit to operate where it is currently, today, right now, it would never be given."

Three years after Kilynn Johnson's diagnosis, she had battled back from the aftereffects of the cancer and its harsh treatments — including the loss of her hair, energy, mobility and fragments of her memory — and was in remission. Now she was determined to understand how the refinery across the highway might have contributed to what happened to her. In January 2019, Sylvia Bennett persuaded Johnson to overcome her shyness and attend a meeting of Philly Thrive, a small but energetic local environmental-justice organization. Co-founded by Alexa Ross, a young organizer who moved to Philadelphia in 2013 after graduating from Swarthmore College, the group was determined to rally residents and make a more explicit connection between P.E.S. and the negative health impacts in the surrounding community.

Johnson stayed close to Bennett as they walked into a brightly lit room in a co-working space near the University of Pennsylvania for Philly Thrive's first monthly gathering of the year. She looked around at the swell of people of all ages, most of them Black and some of whom she knew from the neighborhood. Carol White, a retired mental-health worker who lives in Wilson Park, the South Philadelphia public-housing complex adjacent to I-76 and P.E.S., was the first to share. "I got 13 grandchildren, and most of them have asthma; I have inhalers all over the house for when they come to visit," she said. "Then I started thinking about my mother, who had cancer. I looked over at the refinery across the road from my house, and I started thinking, How long do I have to live?"

Bennett stood up. "Both my daughters got breast cancer," she said. "They are in remission from the breast cancer, but now one of them has been diagnosed with blood cancer." Tears pooled in her eyes. "This refinery, I call it a silent killer." She looked down at Johnson. "You want to speak?" Johnson shook her head.

“My eyes were opening,” Johnson recalled later, “but I wasn’t ready to speak.” By the end of the meeting, the Thrivers had decided to focus on blocking the construction of a new $60 million plant in southwest Philly capable of producing 120,000 gallons of liquefied natural gas a day on city-owned land close to P.E.S. Though accidents at liquefied-natural-gas plants are infrequent, a 2009 report by the U.S. Congressional Research Service warned that spills can release combustible vapor clouds and trigger fires or explosions.

Many of those who attended that January meeting may not have realized that they were joining a long tradition of on-the-ground environmental activism. The first stirrings of the Black-led environmental-justice movement began in the late 1970s as a convergence of a growing interest in environmental issues and the civil rights and Black-power movements. Alarmed and angry community members began raising concerns about the placement of facilities that contaminate the air, water and soil — including incinerators, oil refineries, smelters, sewage-treatment plants, landfills and chemical plants — near communities of color and, as in the case of Grays Ferry, placing housing that would be mainly occupied by Black citizens close to such facilities.

In 1978, a lawyer named Linda McKeever Bullard brought a lawsuit against the health departments of Houston, Harris County and Texas in federal court, charging these government agencies, as well as a now-defunct private waste-management company, with racial discrimination in the siting of the Whispering Pines municipal landfill in the predominantly middle-class Black neighborhood of Northwood Manor in suburban Houston. Her husband, Robert Bullard, was then a young professor of sociology at Texas Southern University. “My wife said, ‘For this lawsuit, I need somebody who can find out and put on a map where all the landfills, solid-waste facilities and incinerators are in the city,’” recalls Bullard, 73, a distinguished professor of urban planning and environmental policy at T.S.U., who is now regarded as the father of the environmental-justice movement.

Bullard and his students combed state and city records on paper and microfiche and walked through neighborhoods using census-tract maps to locate the waste facilities in the city. They discovered that all five municipal dumps, six of eight city-operated garbage incinerators and three of four private landfills were located in Black communities — though African-Americans made up only 25 percent of the population at the time. “What the data showed was a pattern of racist decisions over years and years by city officials,” Bullard says. “In the case of Whispering Pines, it was the height of disrespect compounded by the fact that the landfill was 1,300 feet from a high school in a Black school district and with at least a half-dozen elementary schools in a two-mile radius. It gets hot in Houston. How can kids learn if they’re smelling garbage? That’s the kind of racism that permeated that particular case.”

In 1978, North Carolina residents noticed dark streaks along the shoulders of more than 200 miles of roadway. Over that summer, the Ward Transformer Company dumped more than 30,000 gallons of oil thick with polychlorinated biphenyl (PCBs) — which can cause birth defects, liver and skin disorders and cancer — in the middle of the night, in order to avoid the cost of proper disposal. One of the so-called midnight dumpers went to prison, along with the head of the company, leaving state officials and the E.P.A. to decide where to place 60,000 tons of contaminated soil. They chose Warren County, a predominantly African-American part of the state. The community began to mobilize.

Four years later, hundreds of Warren County residents and environmental and civil rights activists were arrested as they rallied to stop construction of the landfill. A line of protesters lay in the street, blocking dump trucks full of the toxic soil. A group of mostly women and children clung to each other while being wrenched apart and dragged into buses by state troopers who had been summoned to break up the rallies. The evening news featured video of Black leaders, flanked by highway-patrol officers, marching arm and arm with the local organizers and singing “Ain’t No Stoppin’ Us Now” to the tune of the old protest song “Which Side Are You On?”

The rallies, marches, arrests and media attention weren’t enough to stop the landfill, but they did galvanize a growing movement against environmental racism, a term coined by the Rev. Dr. Benjamin Chavis, a leader of the protest in North Carolina. The following year, the U.S. General Accounting Office examined hazardous-waste-landfill placement and found that Black residents made up a majority in three of the four communities with hazardous-waste landfills in the eight Southern states that make up E.P.A. Region IV.

In 1987, the United Church of Christ Commission for Racial Justice, then headed by Chavis, issued a report, “Toxic Wastes and Race in the United States,” that was the first to examine race, class and the environment on a national level. The study revealed that three out of five Black and Hispanic-Americans, or more than 23 million people, resided in communities blighted by toxic-waste sites and found that while socioeconomic status was an important correlation, race was the most significant factor.

Bullard continued his research after the Whispering Pines lawsuit in Houston, finding the same correlation. In his 1990 book, “Dumping in Dixie: Race, Class and Environmental Quality,” using case studies including Sumter County, Ala., the site of the nation’s largest hazardous-waste landfill, Bullard argued that pollution from solid-waste facilities, hazardous-waste landfills, toxic-waste dumps and chemical emissions from industrial facilities was exacting a heavy toll on Black communities across the country. His book became a bible for the nascent environmental-justice movement.

In 2007, the United Church of Christ updated its research, this time with Bullard as a principal author, in “Toxic Wastes and Race at Twenty: 1987-2007,” finding that racial disparities in the location of toxic-waste facilities were “greater than previously reported.” People of color made up a majority of the population in communities within 1.8 miles of a polluting facility, and race — not income or property values — was the most significant predictor. The following year, a study by two University of Colorado social scientists published in the journal Sociological Perspectives found that African-American families with incomes of $50,000 to $60,000 were more likely to live in environmentally polluted neighborhoods than white households with incomes below $10,000.

As more research established such disparities, frustration grew with the mainstream environmental movement. In March 1990, more than 100 grass-roots activists, almost all of them people of color, signed an accusatory letter to 10 of the most prominent environmental groups. “Racism is a root cause of your inaction around addressing environmental problems in our communities,” they wrote, demanding that the organizations increase staffing of people of color to 35 to 40 percent (the demand was not met). The following year, more than 500 people gathered in Washington, D.C., for the First National People of Color Environmental Leadership Summit, dispelling the assumption that Black and brown people are not interested in or involved with environmental issues.

The federal government was shamed into action. Early in 1990, the Congressional Black Caucus met with E.P.A. officials to discuss the polluting of communities of color and why the government agency was not addressing the needs of their constituents. In November 1992, the E.P.A. created the Office of Environmental Equity (later changed to Environmental Justice). In 1994, President Bill Clinton issued an executive order to address adverse health and environmental conditions in minority and low-income populations. The government also established a multimillion-dollar grant program to support grass-roots organizations working on environmental-justice issues. A local nonprofit in Spartanburg, S.C., leveraged an initial grant of $20,000 in 1997 into $270 million to clean up and revitalize three neighborhoods near an operating chemical-fertilizer manufacturing plant, two Superfund sites and six brownfield sites.

Alexa Ross, co-founder of Philly Thrive, a local environmental-justice organization. Hannah Price for The New York Times

The changes at the E.P.A. dovetailed with the growing environmental-justice movement on the ground. Mustafa Ali, then a young Black staff member in the Office of Environmental Justice, had a foot in both worlds. “It was an exciting time, because there was so much energy,” Ali recalls. “It was a paradigm shift, but it was also tough back then. There were still folks in senior positions in the

Environmental Protection Agency and other places who believed that the impacts that were happening in these communities weren't real, that these folks had to be making this stuff up. They were also uncomfortable using the federal space to honor the voices and the innovation coming out of the communities."

In 2008, Ali was named the associate director of the Office of Environmental Justice and senior adviser to the E.P.A. administrator on environmental-justice issues. The E.P.A. was criticized during this time for not doing enough to combat environmental disparities in communities of color and the Flint water catastrophe unfolded as well, but Ali and his colleagues also assisted 1,500 communities with small grants to address local environmental issues.

When Donald Trump's administration arrived in 2017, his new E.P.A. administrator, Scott Pruitt, was a climate-change denier and an ally of the fossil-fuel industry who, as Oklahoma's attorney general, sued the E.P.A. several times. Pruitt proposed gutting the agency's budget by 25 percent, to just under $6 billion from $8 billion. As reported in The Oregonian newspaper, an internal memo called for dismantling the Office of Environmental Justice and reducing related funding by 79 percent, to $1.5 million from $6.7 million. Most painful for Ali, the proposed budget eliminated the small-grants program. "When I saw them talking about the elimination of certain air and clean-power-plant programs and cutting dollars to deal with lead, I knew how it would play out in our communities," he says. "I knew I couldn't be a part of what was happening."

In March 2017, Ali resigned, just short of 25 years at the agency, forfeiting his full government pension, and now serves as vice president for environmental justice, climate and community revitalization for the National Wildlife Federation. His three-page resignation letter to Pruitt pleaded for the E.P.A. not to turn its back on marginalized communities. "Communities have shared with me over the past two decades how important the enforcement work at the Agency is in protecting their often forgotten and overlooked communities," he wrote. "By ensuring that there is equal protection and enforcement in these communities, E.P.A. plays a significant role in addressing unintended impacts and improving some of the public health disparities that often exist from exposure to pollution."

On June 1, 2019, about 60 Philly Thrive members gathered in front of P.E.S. as tanker trucks passed in and out of the facility's gates. For the past four months, the group had attended planning meetings, spoken at City Hall and circulated petitions opposing the proposed South Philadelphia gas plant. Kilynn Johnson joined Alexa Ross, Sylvia Bennett, Carol White and others to distribute hundreds of fliers throughout Grays Ferry for the protest they organized for that day, two weeks before the City Council vote.

Holding a sign with her mother's name on it, Johnson stepped forward to the front of the assembly. Like the others, she wore Philly Thrive's signature T-shirt, bright yellow with two sunflowers bursting with kaleidoscopic colors. Since attending that first Thrive meeting in January, she had gone to more environmental-justice gatherings, participated in a public-speaking workshop and finally got up her nerve to address those assembled at the rally — her first time ever speaking before a crowd. She looked over at Bennett, wearing sunglasses and holding a sign with her daughter Wanda's name on it, who nodded. "Many of you may not know about the dangers of the oil refinery, with so many illnesses caused by air pollution," Johnson began, reading haltingly from a sheath of papers that she held before her face. "I was nonchalant about the refinery, but then Alexa was mentioning things like asthma. And I'm like, 'Check.' And cancer, and I'm like, 'Check,'" she continued. "That made me more aware of how the refinery is making our people not just sick — but killing our communities all over a dollar."

She asked the crowd to join her in a chant: "We're fired up! Can't take it no more!" As the sun got hotter and some of the older folks began to wilt, the protesters marched behind a banner that read "Philly Thrive Right to Breathe" as the refinery's security guards eyed them. There was little coverage of the protest. "Where were the TV crews?" Bennett asked after the rally. "What do we have to do to get anybody to pay attention? Why doesn't anybody care?"

In mid-June, the Philadelphia City Council voted 13 to 4 in favor of developing the gas plant. But even as Johnson, Bennett and the other Philly Thrivers nursed their defeat in the days afterward and feared for the future, a more imminent danger was at hand.

Irene Russell, the president of the nonprofit group Friends of Stinger Square. She tapes up memorials for deceased residents. Hannah Price for The New York Times

Just one week later, on June 21, Johnson was startled awake when she felt her bed move. She bolted upright, wrestled herself from a snarl of sheets, reached for her glasses and tried to figure out what was going on. It wasn't just her bed shaking, but her entire house. Johnson grabbed hold of the edge of her mattress, dropped her head, closed her eyes and prayed. "Father, Lord, God," she said out loud. "Protect my family, watch over my neighbors. Please help us."

Johnson's prayers were interrupted by the phone. On the other end of the line, she heard the panicked voice of her daughter Michelle, who lived about a mile and a half away in Southwest Philly. Her house was shaking, too, and she had lost power and was sitting in the dark holding tight to her two young children. "Mommy, turn on the news," she said, her voice trembling. "It's the refinery."

Johnson would later learn that at 4 that morning, a corroded pipe fitting appeared to have given way, triggering a series of explosions that set off a three-alarm inferno that would burn for more than a full day. A smaller fire erupted 11 days earlier at the refinery, but the heat this time was so intense that the National Weather Service was able to capture it on satellite from space, using infrared imagery. Large chunks of debris tumbled through the air, landing heavily on city streets as sirens sounded throughout Grays Ferry and the city's emergency-management department issued a shelter-in-place order for residents living near the refinery.

By 7 a.m., even with the refinery still engulfed in flames and clouds of smoke belching into the atmosphere, the shelter-in-place order was lifted. A few hours later, James Garrow, a spokesman from the Philadelphia Department of Public Health, released a statement assuring local residents that the fire posed no "immediate danger." Johnson, with that asthma diagnosis 40 years earlier, felt skeptical. She made certain all of her windows were closed to block out the rank odor that would hang in the air for weeks. And then, as Johnson traded calls with family and neighbors, watched the news and checked Facebook for updates, her breathing became more labored. By early afternoon she was lightheaded and struggling to catch her breath.

An hour later, as she sat on an examining table at Penn's University Hospital with a breathing mask strapped to her face, she thought of the thick black smoke that city officials insisted was safe to inhale and remembered the noxious odor that had singed her nostrils and irritated her airways. With oxygen filling her lungs through a machine, she thought about how often she had been in hospital rooms like these, suffering from asthma throughout her childhood and the rare cancer that was diagnosed three and a half years earlier. "I was tired of them saying that the refinery didn't affect people," Johnson says, "that it was doing no harm."

Four days after the explosion, some 100 Thrivers gathered at a small playground a few blocks from P.E.S. This time, the media was out in full force, jostling to get comments from members of Philly Thrive about the blast and fire. "The chemicals that they use, it's, like, really killing us," Johnson told a reporter from a local radio station. "It's killing us slowly. That's what it's doing."

As the Thrivers marched toward the refinery, they were met by a dozen police officers lined up in front of 17 police cars parked before the gates of P.E.S., where hard-hatted employees watched behind the metal fence as the protesters advanced. Chanting "What do we want? Clean air!" the Thrivers held up traffic for a half mile in either direction. Behind them, a large billboard sponsored by the local chapter of the United Steelworkers, the union representing the plant workers, rising over the highway, reminding drivers and neighbors that "Healthy communities need good jobs!"

After months attending Philly Thrive meetings and learning about the environmental dangers created by the refinery, after the explosion and her emergency trip to the hospital, Johnson had changed. The painful death of her first cousin Sharon, a longtime Grays Ferry resident, in late spring from pancreatic cancer was the final blow. This time Johnson, a yellow flower entwined in her braids, didn't speak from the edge of the crowd, but stepped straight into the middle. "I was born in South Philadelphia, a few blocks over," she said firmly. "The pollution and chemicals, they have been here 150 years. I have been here for a half century. I don't know how long asthma has been in my system, but in 2016 the doctor didn't even know if I was going to make it or not. They told my family to pray."

Irene Russell maintains a repository of memorial programs from the funeral services of local residents, including many, like her brother, who died prematurely of cancer. Hannah Price for The New York Times

Turning in a circle to face all sides of the crowd, she continued, her voice rising: "P.E.S. must go. They are taking our people away. By droves. By droves!" Johnson seemed to have shed any hint of the social anxiety that had been with her all her life. "I used to be a real quiet person, until I ran into Philly Thrive. Guess what? My voice will carry for the person down the street, for the person up the street. For the baby that cannot speak, for the senior citizen who cannot speak. My voice will travel. They will know my name and they will know my voice." As she spoke, the crowd snapped their fingers, clapped and showered her with amens.

In late June, the chief executive of P.E.S., Mark Smith, announced that the explosion and fire made it impossible to keep the plant open. A month later, P.E.S. filed for bankruptcy. The company would receive an advance of up to $65 million in bankruptcy financing in order to wind down current operations and potentially access $1.25 billion in insurance coverage. The goal, according to a statement from P.E.S., was to rebuild the refinery's fire-damaged infrastructure in order to position it for a sale and restart in the oil-refining business. (Representatives for the company did not respond to repeated requests for comment.) The city of Philadelphia formed an advisory group of environmental experts, business leaders, city officials, organized labor and community members who would hold six meetings to address the fallout from the P.E.S. fire, collect information about the future of the company and the site and hear public comments.

After the refinery closed, some 1,000 employees were dismissed without severance pay or extended health benefits; P.E.S. executives received $4.5 million in retention bonuses. At the third meeting of the city's advisory group in late August, convened to address labor issues, Philly Thrive members found themselves outnumbered by recently laid-off P.E.S. workers, mainly white men, some in tears, pleading for P.E.S. to remain in business. At the meeting, it was clear the distressed and angry former refinery employees didn't know the

mostly Black Thrivers though they had coexisted in the same corner of the city, breathing the same dirty air at work and at home, for years and years. When Sylvia Bennett stood at the microphone and told the advisory panel about her daughter Wanda, who was now in so much pain from cancer treatments that she could no longer walk, one worker shouted, “If you don’t like the refinery, then move!”

Bennett was hurt deeply by the hostility, but she also recognized that P.E.S. had caused harm to its workers, too. “We are not against workers or against workers having a job to support their families,” she said. “What we want is the air cleaned up so we can *all* breathe.”

The community of Grays Ferry, still more Southern than Northern, is full of people bound together by history, memories, struggle, dreams, blood, love and death. These residents may have landed there because of options limited by the structural discrimination created by redlining. But even as they pray for the sick and count their dead, they have stayed. The homes that their parents bought or that they bought, and the families they raised in them, all this is their legacy.

That legacy also remains in their bodies.

In a report last October, the Chemical Safety and Hazard Investigation Board noted that the P.E.S. explosion released more than 5,000 pounds of hydrofluoric acid. Ingesting even a thimbleful can prove deadly, and when discharged into the air in gas form, the chemical can irritate the eyes, nose and respiratory tract at low concentrations and cause irregular heartbeat and lung complications at higher levels.

In January 2020, an investigation by the environmental and energy-reporting organization E&E News, NBC and American University’s Investigative Reporting Workshop revealed that even before the June explosion, P.E.S. had released the cancer-causing chemical benzene into the air at 21 times the federal limit, though the city failed to let the public know. The report said: “The fenceline benzene emission data, which E.P.A. began posting early last year, shows the refinery exceeded the benzene emissions limit for all but 12 weeks from the end of January 2018 to late September 2019 — an 86-week span. That may have exposed thousands of Philadelphians to troubling levels of benzene, including children like those who often play in the streets of Grays Ferry.”

In February, a U.S. Bankruptcy Court approved the sale of P.E.S. to Chicago-based Hilco Redevelopment Partners for $252 million (the final sale was for $225.5 million). The Trump administration made one last lobbying effort to restart P.E.S.’s oil-refining business. “Look, these are great jobs for Philly,” Peter Navarro, the president’s director of the office of trade and manufacturing policy, told The Philadelphia Inquirer in January. “This is a way to advance the energy-policy agenda, the economic-policy agenda and the national-security agenda. So we’d love to see that remain as a refinery.”

The community was concerned. But Hilco announced plans to demolish the refinery, clean up the site and rebuild the property as a mixed-use industrial park. “This will be welcome environmental progress for neighborhoods that have suffered from the effects of the refinery,” said Roberto Perez, the chief executive of Hilco Redevelopment Partners, “and an exciting new chapter for Philadelphia.” The news, however welcome, could not erase 150 years of pollution or the fears of the toxins that remain.

The death of P.E.S. cannot bring back Grays Ferry’s dead, not those from cancer and not the 54 residents who lived in Grays Ferry’s ZIP codes who have died of Covid-19, a virus known to prey on those exposed to long-term air pollution.

Irene Russell, 68, who has lived in Grays Ferry all her life, helps the community remember. She was raised on South 32nd Street and now lives a few blocks away on South Napa Street in a rowhouse she bought in 1980. On 50 white boards, Russell, the president of the nonprofit group Friends of Stinger Square, has taped memorial programs from the community’s funeral services, six or seven per board. If she doesn’t have a program, she attaches a photograph. Deceased residents, sometimes their younger selves, smile from the yellowed programs, encircled in roses or floating in a sea of blue sky and fluffy clouds. They wear military uniforms, towering hats, graduation caps and gowns or simple Sunday best.

This spring, Russell rested a lime green fingernail on the face of George Scott, who died in 2010 at age 57. “That’s my brother,” she said softly. “He died of liver cancer; left behind eight kids.” Russell’s sister Sandy also died of cancer, at age 42. Her son George, named after her brother, developed lymphoma in his late 20s and survived. Russell shuffled through the boards until she found Sharon, Kilynn Johnson’s cousin, whose program she taped to a board a few months earlier. Next to the words “it is with deep sorrow, that we regret to inform you of the passing of our beloved Sharon E. Johnson” superimposed over a rose, Sharon looked off to the side, her lips pursed as if she were whistling a song.

Russell found out she had uterine cancer in 2018 and had a hysterectomy in January 2019. Last September her doctor discovered cancer in her lungs. She tried hard to keep the boards, stored in plastic garbage bags in her Stinger Square office, up to date, but the pile of memorials stacked on top of her computer, waiting to be attached, has grown larger since the coronavirus struck in February. “Between the cancer and the Covid, the loss is crazy,” Russell, who recently finished chemotherapy treatments for her lung cancer, said in June. “It’s just a lot of people who have died. It’s been kind of devastating, but all we can do is just keep living. And keep remembering.”