

REGIONAL DEMOGRAPHICS

Burdens to Philadelphia and Delaware County residents who suffer from environmental injustices will be exacerbated with climate change as higher temperatures and flooding increase.

Evaluating the combination of climate risk, vulnerability, and exposure that each focus community faces is key to understanding how to move towards a more resilient region, people, and environment.

Environmental Justice

The core principle of environmental justice advocates for protected environmental rights and benefits for everyone across all backgrounds. The Environmental Protection Agency (EPA) has defined environmental justice as “the just treatment and meaningful involvement of all people, regardless of income, race, color, national origin, Tribal affiliation, or disability, in agency decision-making and other Federal activities that affect human health and the environment.” In doing so, environmental justice seeks to ensure people are fully protected from adverse human health and environmental effects and hazards, including those related to climate change and the legacy of racism or other structural barriers. Equitable access to a healthy and resilient environment is also a key component to environmental justice. However, this is often not the reality for all, especially communities of color and low-income communities.

During the New Deal era, federal policies like redlining—a discriminatory housing practice that denied mortgages and financial services to people of color and diverse

ethnicities—were widely implemented across the country, including in Philadelphia and Delaware County.¹ These practices led to widespread segregation, forcing marginalized residents to seek housing and form communities in areas associated with higher levels of pollution and environmental hazards and, in the case of the focus communities, that are prone to flooding. The legacy of redlining continues to affect these communities today, as many previously redlined neighborhoods remain close to active industrial sites and face elevated levels of pollution and environmental risks.²

Other discriminatory land-use practices compound environmental injustices, such as the siting of major highways, power plants, refineries, and other major polluting infrastructure in low-income communities and communities of color. At the same time, access to clean water, green spaces, and other environmental amenities is often severely lacking in these neighborhoods.

The overall uneven distribution of environmental benefits and burdens has and continues to have profound impacts on public health and quality of life in the communities of Marcus Hook, Trainer, Chester, Eastwick, and Grays Ferry.

Vulnerability and Exposure

Exposure refers to the presence of people, assets, infrastructure, and ecosystems in hazard-prone areas.³ It is important to note that exposure and risk are not the same; risk assesses the potential for negative consequences from a hazard.⁴ For example, two houses in a low-lying area are exposed to the same threat (flooding), but if one house is elevated, it has a lower risk of being flooded while the other is at a higher risk of damage.

Vulnerability describes the degree to which people, assets, and ecosystems are adversely affected by a hazard.⁵ Within that definition, climate and social vulnerability are understood to be intertwined and often synonymous. In communities burdened by environmental injustice, one cannot address one vulnerability without addressing



the other. Communities that have faced historical discrimination and disinvestment often have less adaptive capacity and fewer resources to respond to climate impacts, while simultaneously bearing greater exposure to climate risks.

One working definition of climate vulnerability is “the degree to which natural, built, and human systems are at risk of exposure to climate change impacts.”⁶ Federal Emergency Management Agency defines social vulnerability as the susceptibility of social groups to the adverse impacts of natural hazards, which includes disproportionate death, injury, loss, or disruption of livelihood.⁷ It also includes the challenges these groups face in anticipating, withstanding, and recovering from adverse impacts from the stressors to which they are exposed. For example, older adults, low-income communities, or people with chronic illnesses may be less equipped to prepare for or recover from a natural disaster. It may mean that low-income households lack air conditioning during heat waves or that elderly individuals struggle to evacuate during an emergency.

These vulnerabilities often intersect and compound one another. Resiliency requires confronting both the physical and social dimensions of climate risk, from upgrading infrastructure and expanding green stormwater infrastructure to addressing underlying social inequities to help increase a community’s capacity to adapt and respond. Barbara Brown Wilson, a professor of Urban and Environmental Planning at the University of Virginia, proposes a redefinition of resiliency with equity in mind – what does it mean to go beyond bouncing back after a crisis or simply absorbing shock? A resilient community or neighborhood brings social and ecological systems together, and understands that adaptive capacity and inclusivity is critical to any resilience planning.⁸

Indicators of Social and Environmental Burdens

This project looked at three national datasets to evaluate social vulnerability across the focus communities and region: the Social Vulnerability Index from the Center for Disease Control and Prevention and Agency for Toxic Substances and Disease Registry, EJScreen from the EPA, and the Climate Economic Justice Screening Tool from the Justice40 Initiative.

Each dataset measures and aggregates various socioeconomic and environmental data such as age, race, ethnicity, and exposure to environmental stressors to evaluate community burdens and vulnerability (either by census tract or block group). Further detail about each dataset and index follows.



EPA EJSCREEN

EJScreen is the EPA's environmental justice mapping and screening tool at the national level, highlighting areas that have higher environmental burdens and/or vulnerable populations. EJScreen provides demographic and environmental information and includes a method for combining them into environmental justice (EJ) indexes.

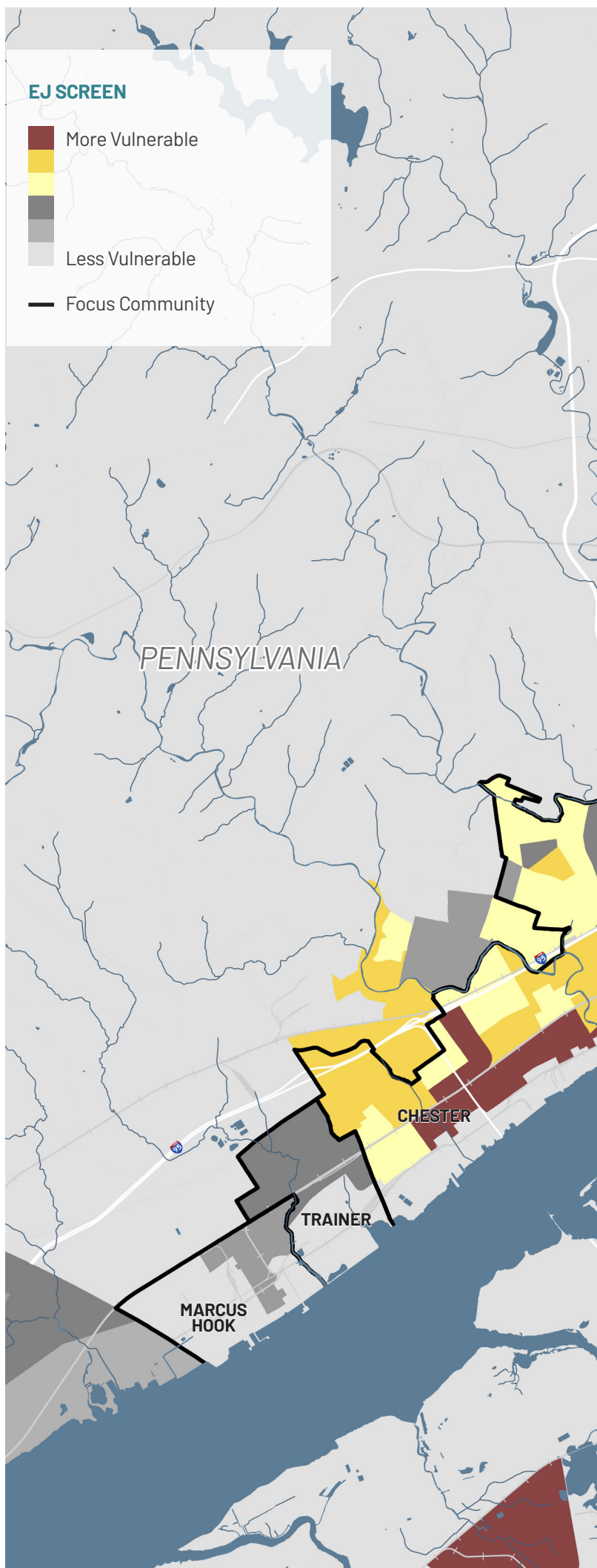
Areas emerge when they exceed the 80th national percentile for an EJ Index, which combines an environmental indicator with the demographic index (percent people of color x percent low-income).⁹

Socioeconomic indicators:

- » People of color
- » Low-income
- » Unemployment rate
- » Limited English speaking household
- » Less than high school education
- » Under age 5
- » Over age 64

Environmental indicators:

- » Particulate Matter 2.5
- » Ozone
- » Diesel Particulate Matter
- » Air Toxics Respiratory HI
- » Toxic Releases to Air
- » Traffic Proximity
- » Lead Paint
- » Superfund Proximity
- » RMP Facility Proximity
- » Hazardous Waste Proximity
- » Underground Storage Tanks
- » Wastewater Discharge



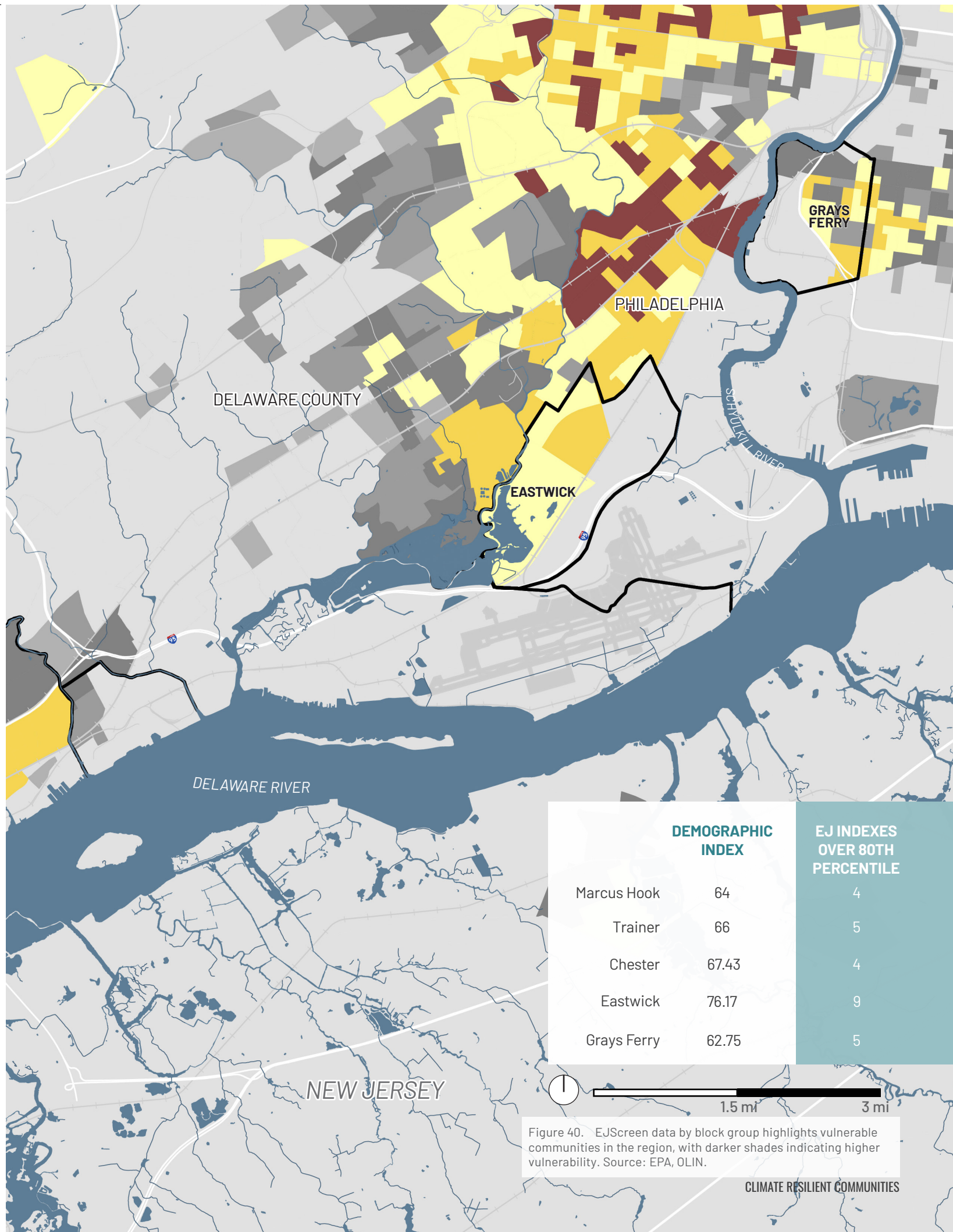


Figure 40. EJScreen data by block group highlights vulnerable communities in the region, with darker shades indicating higher vulnerability. Source: EPA, OLIN.

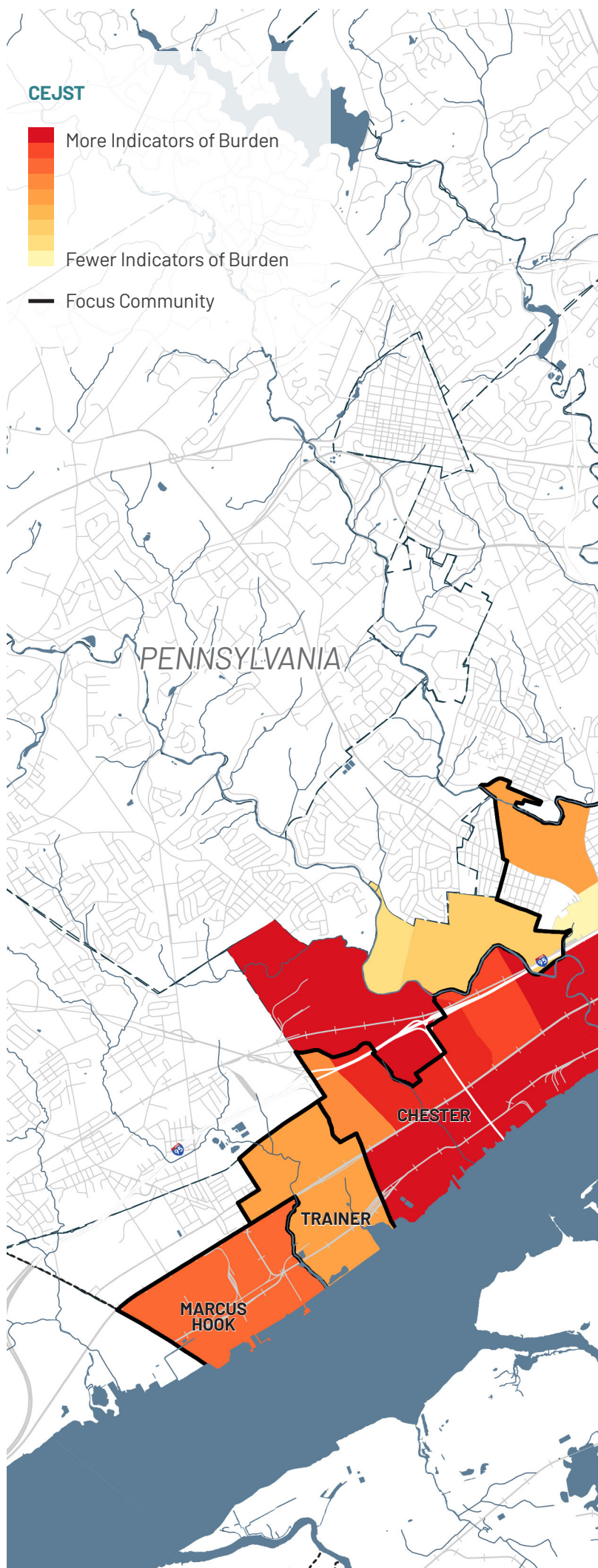
CLIMATE AND ECONOMIC JUSTICE SCREENING TOOL (CEJST)

The Climate and Economic Justice Screening Tool (CEJST) was developed by the federal government and used to identify communities that are overburdened and underserved. Within the tool, various datasets indicate burdens across eight categories: climate change, energy, health, housing, legacy pollution, transportation, water and wastewater, and workforce development. Communities are considered disadvantaged if they are located in census tracts that meet the thresholds for at least one category of burden while at or above the threshold for an associated socioeconomic burden (e.g. low-income, less than high school education). A census tract completely surrounded by disadvantaged communities and also at or above the 50% percentile for low income is also considered disadvantaged.¹⁰

Federal agencies can use the CEJST to identify communities that will benefit from various federal programs, including the Justice40 Initiative, which seeks to deliver 40% of overall benefits of investments in climate, clean energy, and related areas to disadvantaged communities.

Burdens:

- » Climate Change
- » Energy
- » Health
- » Housing
- » Legacy Pollution
- » Transportation
- » Waste and Wastewater
- » Workforce Development



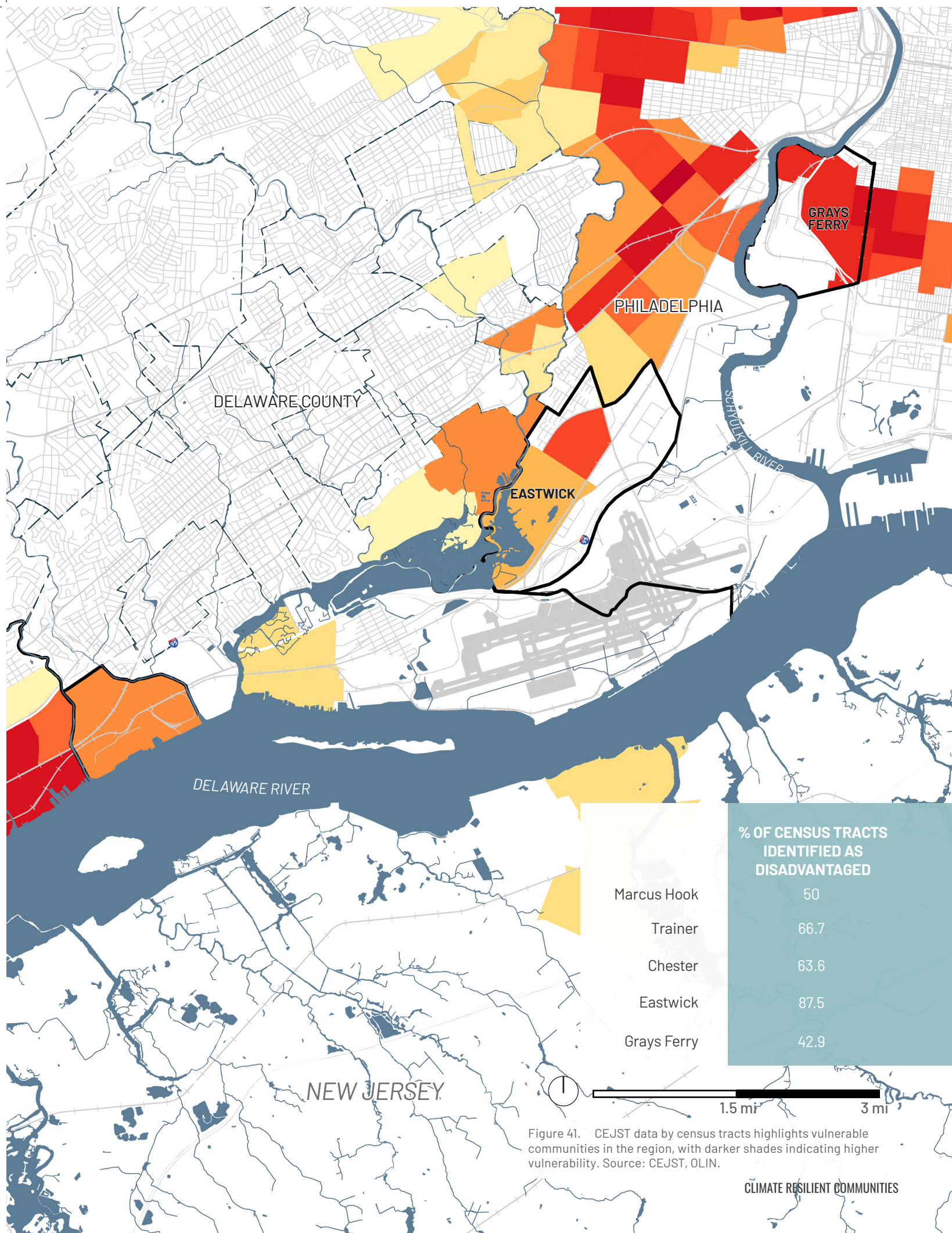


Figure 41. CEJST data by census tracts highlights vulnerable communities in the region, with darker shades indicating higher vulnerability. Source: CEJST, OLIN.

CDC/ASTR SOCIAL VULNERABILITY INDEX

The Agency for Centers for Disease Control and Prevention and the Toxic Substances and Disease Registry (CDC/ASTR) created the Social Vulnerability Index (SVI) with the goal of aiding public health officials and emergency response planners to identify and map communities that will need the most support before, during, and after a hazardous event.

SVI indicates the relative vulnerability at the census tract level; the tool evaluates 16 social factors sorted into four ranked themes¹¹:

1) Socioeconomic Status

- » income
- » poverty
- » employment
- » education

2) Household Characteristics

- » age
- » single parenting
- » disability

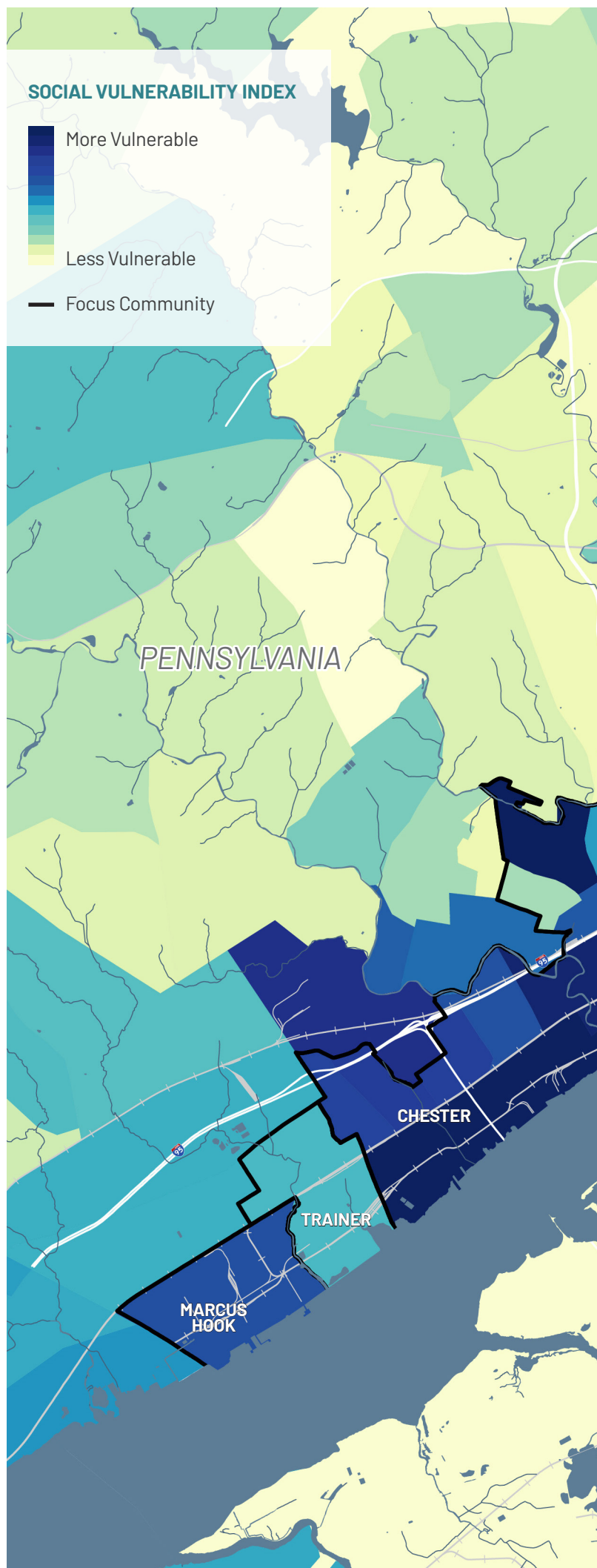
3) Racial & Ethnic Minority Status

- » race
- » ethnicity
- » English-language proficiency

4) Housing Type and Transportation

- » housing structure
- » crowding
- » vehicle access

The average of all four themes is an indicator of overall vulnerability for each census tract and in this case, each focus community. The chart to the right highlights each community's score per theme and their overall vulnerability score, while the map shows the relative overall vulnerability of each census tract.



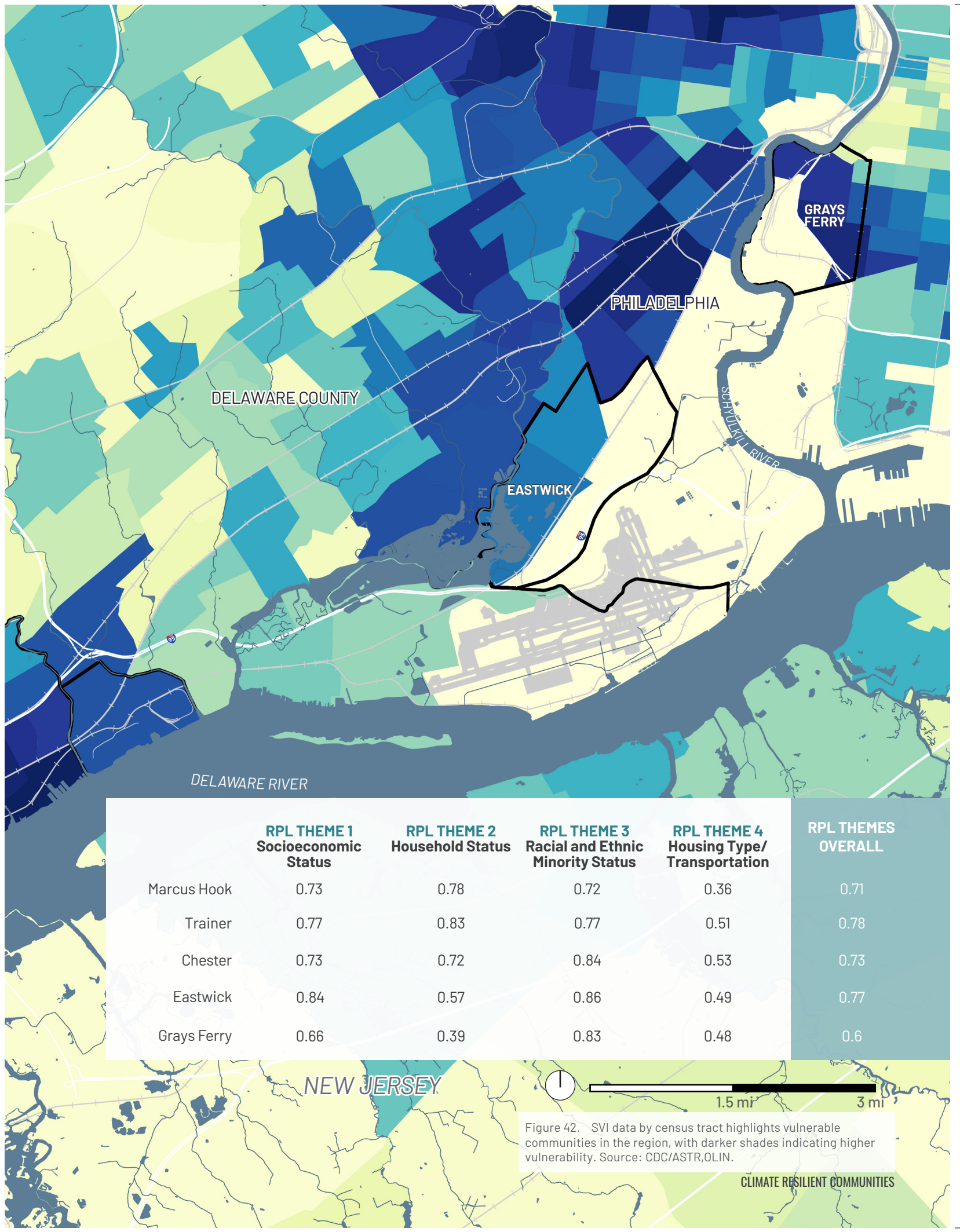


Figure 42. SVI data by census tract highlights vulnerable communities in the region, with darker shades indicating higher vulnerability. Source: CDC/ASTROLIN.