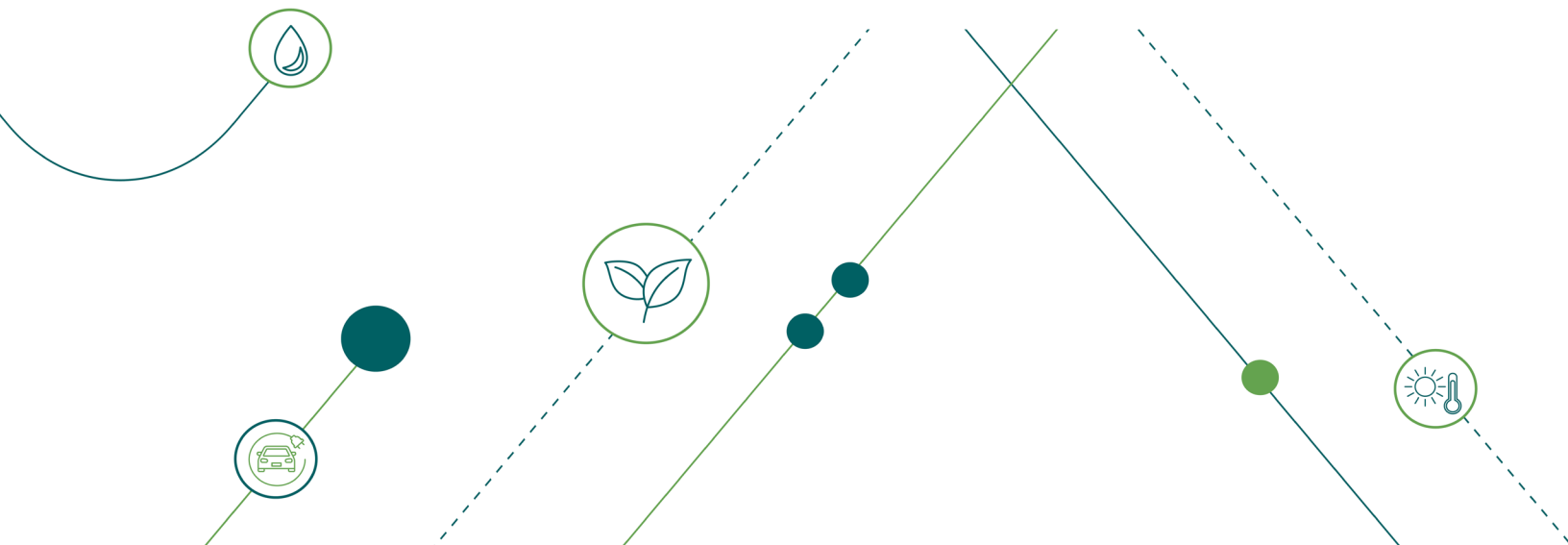




CLIMATE EQUITY

DATA-RICH ROADMAP FOR A RESILIENT
ESSEX COUNTY



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THE CENTER FOR
STATE POLICY
ANALYSIS

Introduction

Climate change is reshaping Essex County, bringing intense heat, unprecedented storms, and heightened flood risks. Fully **48 percent of residents live in heat islands** with elevated temperatures, while **25 of our 34 cities and towns face significant long-term flood risks** that could potentially affect **one-quarter of all residents**.

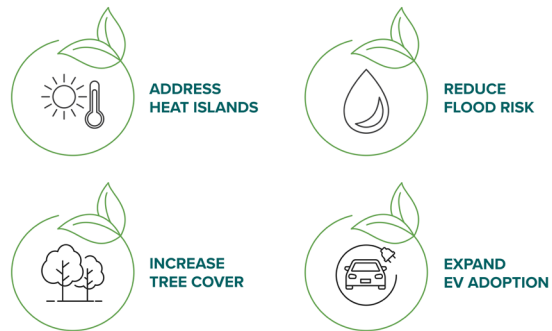
Yet these challenges also create opportunities to expand climate resilience and redress longstanding inequities.

Working together as a county, we have the resources and knowledge to ease environmental harms, uplift communities, and build a brighter collective future. And with significant federal, state, and philanthropic resources now available for worthy efforts, it is the ideal time to build an ecosystem and fortify our county for the uncertain future.

To identify the suite of risks and highlight promising interventions, we partnered with the Center for State Policy Analysis at Tufts on a landscape survey of the climate challenges and environmental justice issues facing Essex County communities.

Together, we analyzed dozens of metrics, spoke with leading experts, and convened a countywide think lab of local groups. We found that:

- **Climate change will impact every part of the county**, from coastal communities to urban areas and historic towns.
- The challenges are especially acute for low-income neighborhoods and communities of color.
- Climate risks could trigger a vicious cycle, where wealthier residents move to less exposed areas, leaving the most vulnerable communities less able to effectively adapt or rebuild.
- Currently, the tools of remediation — like tree cover and electric vehicle adoption — are more common in higher-income areas. As an example, folks in the highest-income areas are nearly eight times as likely to have purchased EVs.
- Opportunities abound for philanthropy and community-centered collaborative action.
- What follows is a fuller analysis of these challenges and opportunities, including some background on environmental justice and a select review of several key measures of climate risk and resilience.



Resilience and equity

One vital lens for understanding the suite of challenges and opportunities triggered by climate change is the approach known as environmental justice, which foregrounds 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.”](#)

Often shorthand as EJ, the environmental justice movement grew out of the civil rights and social justice efforts of the 1960s and 1970s. More recently, it's become a focus of federal policymaking and a central pillar of the investments flowing through the Inflation Reduction and CHIPS acts.

Perhaps the central insight of the EJ movement is that environmental harms often compound existing social and economic inequities, putting lower-income and more diverse communities at heightened risk. As we know from the Covid experience, even systemwide shocks don't affect everyone equally; the impact craters are especially deep and more damaging for those at the economic and social margins.

Here in Essex County, more than 250 neighborhoods have been officially designated as EJ communities, places where lower-income and more diverse communities shoulder a disproportionate share of environmental risks.

Here's one way to think about the problem: Faced with climate risks like flooding or excess heat, better-resourced residents can choose to move to safer climes. Their departure then exacerbates climate risk in the at-risk neighborhoods they've chosen to leave, putting downward pressure on property values and leaving remaining residents with fewer resources to adapt or rebuild.

Flip this dynamic around, however, and you can see the positive potential for equity. When you ameliorate climate risk, you block this vicious cycle, ensure the long-term health of our cities and towns, and provide particular relief to the EJ communities who would otherwise face the largest risks.

And there's a further benefit to intervening: The more we do today, the more we can learn together and gain insights that deepen our collective understanding and heighten our mutual gains during the inevitable climate transition.

*“It's hard for people to think about insulation or energy efficiency when they're worried about work and jobs.”
- Gabe Shapiro, All In Energy*

Four facets of climate resilience

To make the challenges of climate resilience vivid, and help drive system-wide change, we have chosen to highlight four concrete measures that best exemplify the scope of climate challenges in Essex County and sketch the limits of our current resilience.

1. FLOOD RISK

With its long coastline and low-lying areas, Essex County is highly exposed to the risk of rising sea levels and increased flooding. **Of our 34 cities and towns, fully 25 have areas with substantial long-term flood risk.**

And it is important to think about the countywide risk. Floodwaters don't just erode the shoreline; they chip away at the economic stability of the region, leading to increased property damage, rising insurance costs, and the potential loss of local businesses and tourism.

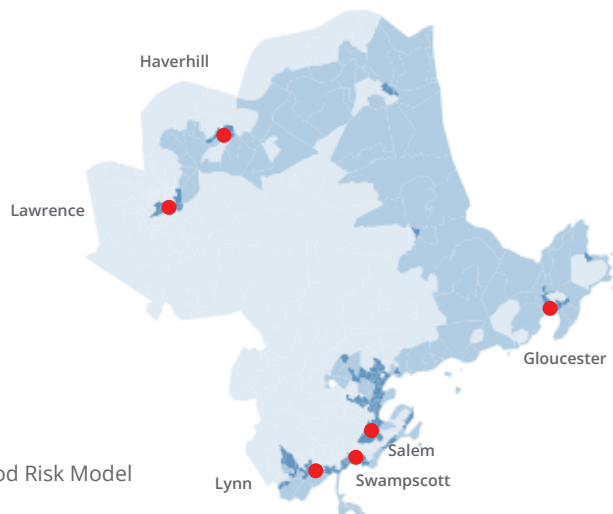
Moreover, big floods introduce public health challenges, from waterborne diseases to stress-related illnesses.

And while it's tempting to focus on the oceanfront itself, flood risk is not limited to coastal communities; it stretches inland to low-lying areas in some of our most populous cities via the extended watersheds from rivers like the Merrimack and Ipswich.

The map below shows where human vulnerability is highest, highlighting those neighborhoods with both high flood risk and dense populations.

Some flood prone areas are also population centers

- High future flood risk and dense population
- High future flood risk and sparser population
- All other neighborhoods



SOURCE: Census Bureau, Massachusetts Coastal Flood Risk Model

2. EXCESS HEAT

All around the globe, temperatures are rising. But the effect can vary dramatically between individual towns and even streets. Dark pavement, concrete, bricks, black roofs, and other urban features tend to absorb and radiate heat in a way that creates heat islands and prevents cooling day and night.

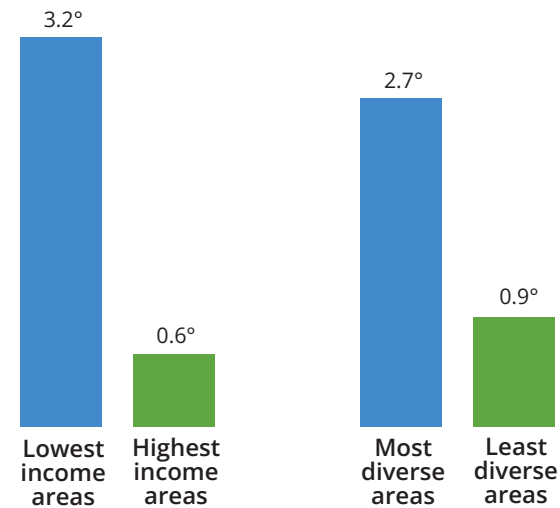
And these heat islands have a range of nasty consequences. They affect air quality, triggering respiratory reactions like asthma. They also raise the risk of heat exhaustion and heat stroke, particularly for the elderly, the young, and those with underlying health conditions.

When heat builds up, energy costs spike as well — from the need to run round-the-clock air conditioning. And those who can't afford continuous air conditioning are more likely to have sleep problems, which can then translate into broader health issues or difficulties focusing at work.

Heat islands are most pronounced in the cities of Essex County, as shown in the chart above. And there's a clear environmental justice pattern where the poorest and most diverse neighborhoods have three to five times as much excess heat as their wealthier neighbors.

Excess heat is more intense in poorer, more diverse communities

Difference between local temperature and neighboring areas, measured in summer 2021



SOURCE: Trust for Public Land, US heat anomalies 2021

3. TREE COVER

Now let's turn around and focus on resilience, rather than climate risks.

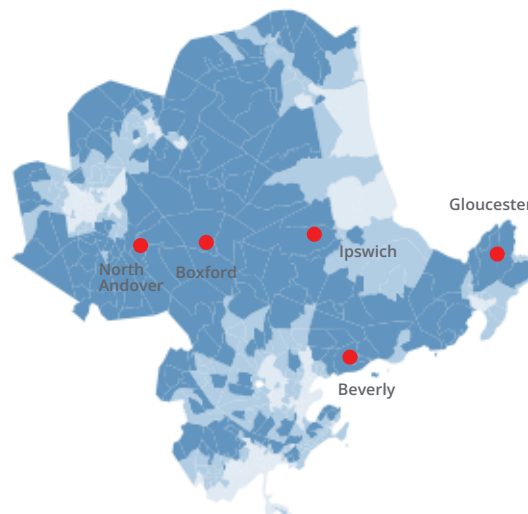
Starting with tree cover, which has a universe of known benefits. Trees help prevent heat islands, offsetting the heat-trapping quality of construction materials. They also improve air quality and provide a buffer against flooding — not to mention offering valuable escapes into nature and serving as homes for various species.

But tree cover across Essex County is very uneven, with notable gaps in our cities. And for residents, this means a higher environmental justice burden on lower-income areas and communities of color.

Tree coverage is highest in wealthier suburbs

Average forest canopy coverage, by block group

- Most dense canopy coverage (top 33%)
- Median canopy coverage (middle 33%)
- Least dense canopy coverage (bottom 33%)



SOURCE: NOAA Office for Coastal Management

And while small, sparsely populated towns may always have some advantage when it comes to canopy coverage, cities around the world have found ways to boost green growth, whether from parks and playgrounds, tree-lined streets, or rooftop gardens.

In the end, tree growth is often a matter of dollars and devotion, rather than environmental inevitability.

4. EV ADOPTION

Another pillar of long-term climate resilience and durable decarbonization is a deeper reliance on electricity, including the transition to electric vehicles.

For years, the state of Massachusetts and the federal government have provided substantial rebates for drivers who make the switch.

But our analysis of those rebates exposed two big challenges in Essex County. First, our communities have not particularly embraced electric vehicles; none appears among the top 10 adopters statewide.

Second, EV adoption is heavily concentrated in high-income areas. Families in the wealthiest zip codes are eight times as likely to have purchased an electric vehicle, compared to those in the lowest-income zip codes.

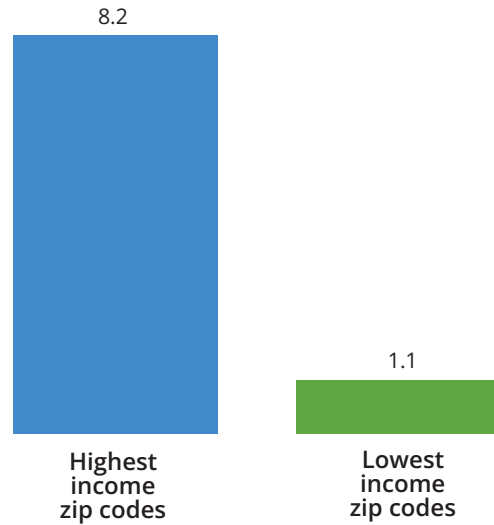
And EV adoption is just one facet of a broader effort to increase efficiency through efforts like weatherization while reducing reliance on fossil fuels by switching to electric devices such as heat pumps, solar panels, and battery-powered bikes.

Enabling this broad electrification will require both overdue upgrades to our regional transmission system, which is currently inadequate to handle future electricity needs, as well as new funding systems to ensure that the residents least able to afford clean energy upgrades don't end up shouldering a disproportionate burden.

If subsidies for this broader electrification follow the EV pattern, and flow overwhelmingly to high-income residents, we'll not only fall short on equity but on carbon reduction as well.

Wealthier residents are far more likely to own electric vehicles

Massachusetts EV rebates per 1000 residents



SOURCE: Massachusetts MOR-EV Program Statistics

Current progress and future efforts

All across the county, vital and productive work is being done to advance climate resilience, including everything from preserving green space and planting trees to teaching environmental justice in schools and building awareness of clean energy incentives.

Moreover, virtually every city and town in Essex County is participating in the state's Municipal Vulnerability Preparedness (MVP) grant program, which has provided roughly \$10 million to bolster climate resilience across the county.

But this is just a fraction of what we can accomplish by weaving disparate initiatives into a comprehensive, regionwide approach.

At our November "think lab," nearly a hundred local leaders representing dozens of organizations identified a number of big ideas and key principles, which fall naturally into a few main buckets.

1) Broader education about the harms of climate change, the history of environmental justice, and the opportunities for redress.

- Expand curricula for K-12 schools.
- Host community film screenings and public lectures.

2) Workforce development to support a thriving green economy in Essex County.

- Organize training programs for jobs in offshore wind.
- Coordinate with local unions around paid apprenticeships.
- Launch community college-based boot camps for high-demand skills.

"There's a lot of movement in terms of residents starting to get involved because it's not just about this 'climate change' thing that's out there somewhere. No, no, no, we're in the thick of it." - Lesly Melendez, Groundwork Lawrence

3) Improved financing to stabilize bedrock organizations and unlock innovative new possibilities.

- Develop a Green Impact Fund to support nonprofits, residents, and community efforts.
- Explore public-private partnerships to fund green initiatives.
- Set up a cross-county team focused on maximizing federal grants.

4) Smoother regional coordination to ensure we are rowing in the same direction — and learning together as we advance climate resiliency.

- Establish a Climate Resiliency Coalition made up of local officials, nonprofits, for-profits, communities, and researchers.
- Regularly collect and share data highlighting progress and persistent challenges.
- Advance regionwide efforts like a “Green Canopy” connecting our cities and towns.

5) Direct action for challenges that can be effectively targeted.

- Support efforts to greatly expand urban greenery and remediate heat islands.
- Protect highly populated, flood-prone communities and neighborhoods, particularly in lower-income areas lacking local resources.

We don't yet know which specific efforts hold the most promise, but we are committed to expanding this conversation and exploring a long-term plan that advances climate resilience in Essex County by targeting the most significant barriers in the ecosystem.

“Essex County has so many amazing natural resources — but only if you’re a person who knows about those places, can get to them, and has the experience and comfort to enjoy the outdoors.” - Kate Bowditch, Greenbelt

Conclusion

Protecting Essex County's natural resources and enhancing the resilience of our local environment are among the central challenges of the 21st century. They also represent a generational opportunity — to invest in approaches that advance climate resilience and address existing economic and social inequities.

Our landscape analysis found serious environmental justice issues in the county, including a broad mismatch between risk and remediation. Even as the challenges of climate change are more acute for low-income and more diverse communities of color, the tools of redress — tree cover, EV adoption — are strongest elsewhere.

We must address this misalignment and ensure that the resources for effective climate adaptation and mitigation are available across all our communities. And with the right investments and a countywide focus, we can realize this vision and ensure climate resilience for all.

Methodological Notes

Our analysis integrates a wide variety of different data sources. In each case, we were careful to use the latest available data and the most appropriate geographic breakdowns.

Our most consistent source of information was the EJScreen system from the United States Environmental Protection Agency, which provided data on race, poverty, pollution, and more at a very granular level. But we also incorporated GIS and Massachusetts-specific data where appropriate, with individual sources noted in the charts.

Specific questions about our approach or methodology can be directed to the Essex County Community Foundation or the Center for State Policy Analysis at Tufts University.

Appendix

While this report focuses on a few key measure of climate change and resilience efforts, our landscape analysis encompassed a much wider set of metrics, including:

- Asthma rates
- Ozone
- Childhood lead levels
- Hazardous waste
- Gas leaks
- Small pollutants
- Solar installations
- EV charging
- Proximity to infrastructure
- Water quality
- Age of housing stock
- Brownfields

Not all of these measures were robust enough or recent enough to generate actionable insights. But several of them did speak to the broader challenges of climate resilience across the county.

To give a fuller sense of materials we unearthed in this research, consider the additional measures mapped below.

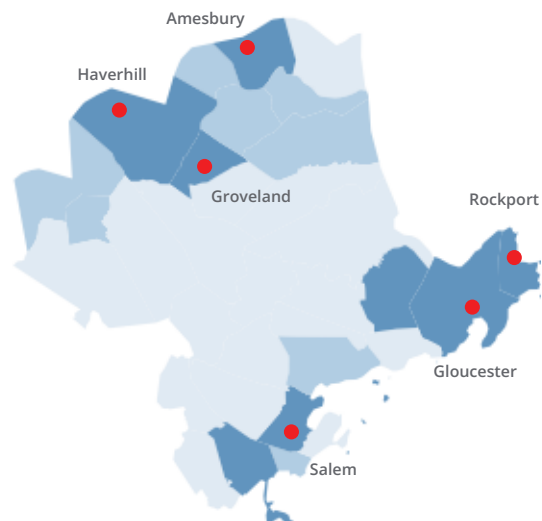
Childhood Lead Levels

Massachusetts has a testing program to track childhood lead exposure, and it shows substantial inequities among Essex County families.

Childhood lead exposure varies widely across Essex County

Blood lead levels $\geq 5 \mu\text{g/dL}$

- Highest childhood lead levels (top 25%)
- Second highest childhood lead levels (next 25%)
- Lowest childhood lead levels (bottom 50% or N/A)






SOURCE: Massachusetts Department of Public Health

Infrastructure exposure

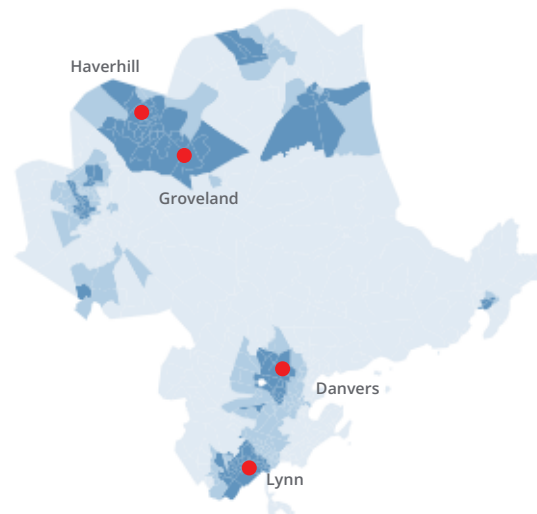
By combining measures of wastewater discharge, Superfund proximity, and hazardous waste, we were able to produce a unified measure of infrastructure exposure that showed heightened risk for cities, low-income neighborhoods, and residents of color.

Exposure to hazardous waste, superfund sites, and other physical infrastructure

-  Highest exposure (top 25%)
-  Next highest exposure (next 25%)
-  Lowest exposure (bottom 50%)

NOTE: This measure of infrastructure exposure includes superfund sites, RMP facilities, and hazardous waste facilities, by block group.

SOURCE: Environmental Protection Agency, EJScreen







Small Pollutants (PM2.5)

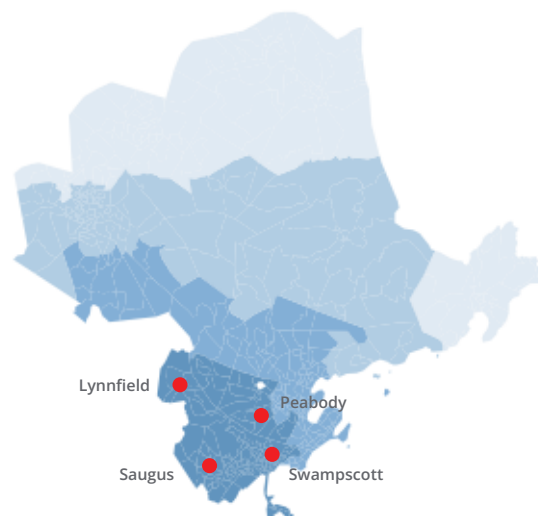
Small pollutants can be particularly noxious, leading to a range of respiratory and cardiac problems. Whether from trucking patterns, industrial sites, or otherwise, data from the EPA suggests that the biggest risk factor in Essex County is proximity to Boston.

Proximity to Boston is linked to pollution exposure

PM2.5 small pollutants

-  Highest pollution exposure (top 25%)
-  Next highest
-  Second lowest
-  Lowest pollution exposure (bottom 25%)

SOURCE: Environmental Protection Agency, EJScreen



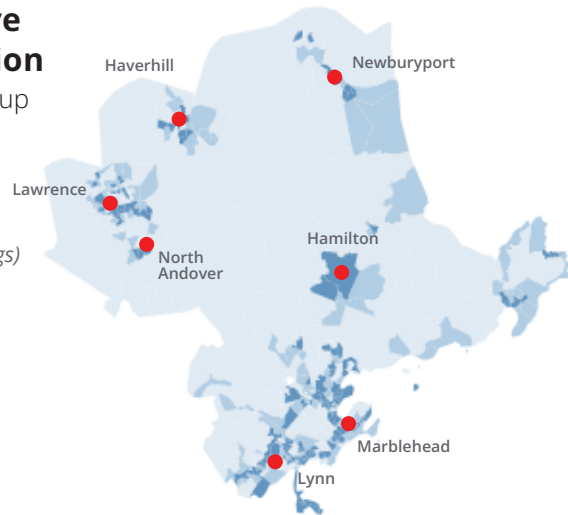
Older housing stock

Looking at the concentration of houses built before 1960 is a good proxy for underinvestment as well as health risks like lead paint and asbestos.

Older housing is more likely to have issues like lead paint, poor insulation

Share of housing built before 1960, by block group

-  Oldest housing stock (top 25%)
-  Next oldest housing stock (next 25%)
-  Newer housing stock (bottom 50% for pre-1960 buildings)



SOURCE: Environmental Protection Agency, EJScreen