An Exploratory Spatial Analysis of Subsidized Housing in the Pioneer Valley

Sara Zhu | RP 625

Purpose

Research routinely shows that where one lives has a profound impact on a person's ability to succeed. Access to a high quality education, a healthy environment and nourishing food, employment opportunities, and strong social and cultural networks are all tied to where we live. Unfortunately, cities and towns across the nation have historically struggled to provide residents with a sufficient supply of affordable housing. To address growing housing insecurity and inequality, policymakers have supported a variety of government subsidized housing programs, including public housing, section 8 vouchers, Low Income Housing Tax Credits (LIHTC) and other subsidies for private developers. These policies have had varied results and remain widely debated to this day. While research shows that subsidized housing has the potential to increase upward mobility by exposing low-income children to "high opportunity neighborhoods," most public housing has historically been sited in low-income areas that lead to concentrated clusters of poverty. Over time, growing awareness of this phenomenon has led to increased political support for more mixed-income housing. However, many obstacles stand in the way of building affordable housing in high opportunity neighborhoods. Many residents, who are motivated to "preserve" their property values, often oppose the construction of affordable housing developments. These so-called "NIMBY" campaigns are often supported by local zoning laws that limit the density of new developments and require subjective standards of "compatibility" with the existing surrounding. For these reasons and others, research shows, cities and towns tend to vary widely in their supply of affordable housing.

This analysis investigates the distribution of affordable housing units throughout the Pioneer Valley. It specifically focuses on the relationship between the density of subsidized housing and the income levels, property values, homeownership rates, and historic patterns of upward mobility in a given census tract.

Data

1) US Census Bureau - 3 Shapefiles: 2021 MA Municipalities, 2021 MA Census Tracts, and 2015 MA Census Tracts.

2) 2021 American Community Survey - Data on the median income, median house property value, total housing stock, and homeownership rates for each 2021 census tract.

3) National Housing Preservation Database - List of affordable housing units in Massachusetts, including data on the location, subsidy size (# affordable units), subsidy type, and tenant population (elderly, family, disabled) of each development.

4) Opportunity Atlas Study (Chetty, 2018): US Census Bureau data on the average annual income (at age 35) of children from low-income families who were raised in the region (Figure 2). These historical estimates are informative predictors of outcomes even for children growing up today because neighborhood conditions are relatively stable over time.

Methodology

After joining the ACS data to the 2021 census tract shapefile, I used a spatial join on the NHPD data to aggregate the number of affordable housing units in each tract. I divided this variable over the total housing stock to compute a subsidized housing density measure for each census tract (Figure 1).

To compare the current distribution of affordable housing to the Opportunity Atlas data on historic patterns of social mobility, I joined the OAS data to the 2015 census tract shape file and added both layers to Figure 2. I also ran a series of regressions and created a table to display summary statistics for all the variables tested.

Results

In Figure 1, we can see that properties with subsidies are concentrated in a few parts of the Pioneer Valley. As a share of the total housing stock, subsidized housing density is highest in Springfield, Holyoke, Northampton and Greenfield. Figure 2 shows that many subsidized housing units are still concentrated in neighborhoods that perform low in measures of upward mobility. This map also displays properties with subsidies categorized by tenant population. Of all 368 properties, 176 have unrestricted subsidies, which means they are accessible to families and young children. On average, unrestricted developments are 6 units larger than restricted developments. Of the 156 census tracts included in this analysis, 54 had no subsidy at all. The following results were obtained from an analysis of the 102 tracts with at least one subsidy.

Table 1: In the average census tract, the median household income is $61,669, the median property value is $226,000, subsidized housing accounts for 11.50% of the total housing stock, and the median household income (at age 35) of low-income children who were raised in the area was $43,960 (converted to 2021 dollars). Running linear regressions on each of the variables revealed that neighborhoods with high densities of subsidized housing are strongly negatively correlated with median household income (R^2=0.371) and moderately negatively correlated with property values (R^2=0.252).

Discussion

Overall, these findings show that subsidized housing is unevenly distributed throughout the Pioneer Valley. Census tracts with higher densities of subsidized housing tend to be concentrated in low-income neighborhoods. Springfield stands out in particular for having extremely high rates of poverty and extremely dense clusters of subsidized housing. On the other end of the spectrum, neighborhoods in Longmeadow tend to have very high average incomes and potential for upward mobility, but no subsidized housing for families. Granby, Wilbraham, East Longmeadow, Hampden, and South Hadley are also noteworthy examples of towns that are relatively wealthy and densely populated yet home to very little subsidized housing.

However, more research is needed to understand how access to these neighborhoods may differentially affect groups. According to the Opportunity Atlas, the effect of growing up in an upwardly mobile neighborhood can differ dramatically based on one's race and gender. For instance, it is more likely that growing up in a high-income, racially homogenous neighborhood would benefit low-income white children more than low-income children of color. Planners should avoid applying a "one size fits all" approach as they consider new affordable housing designs and sites. It may be more impactful to design policies that target specific subgroups in ways that directly address the particular challenges they face.
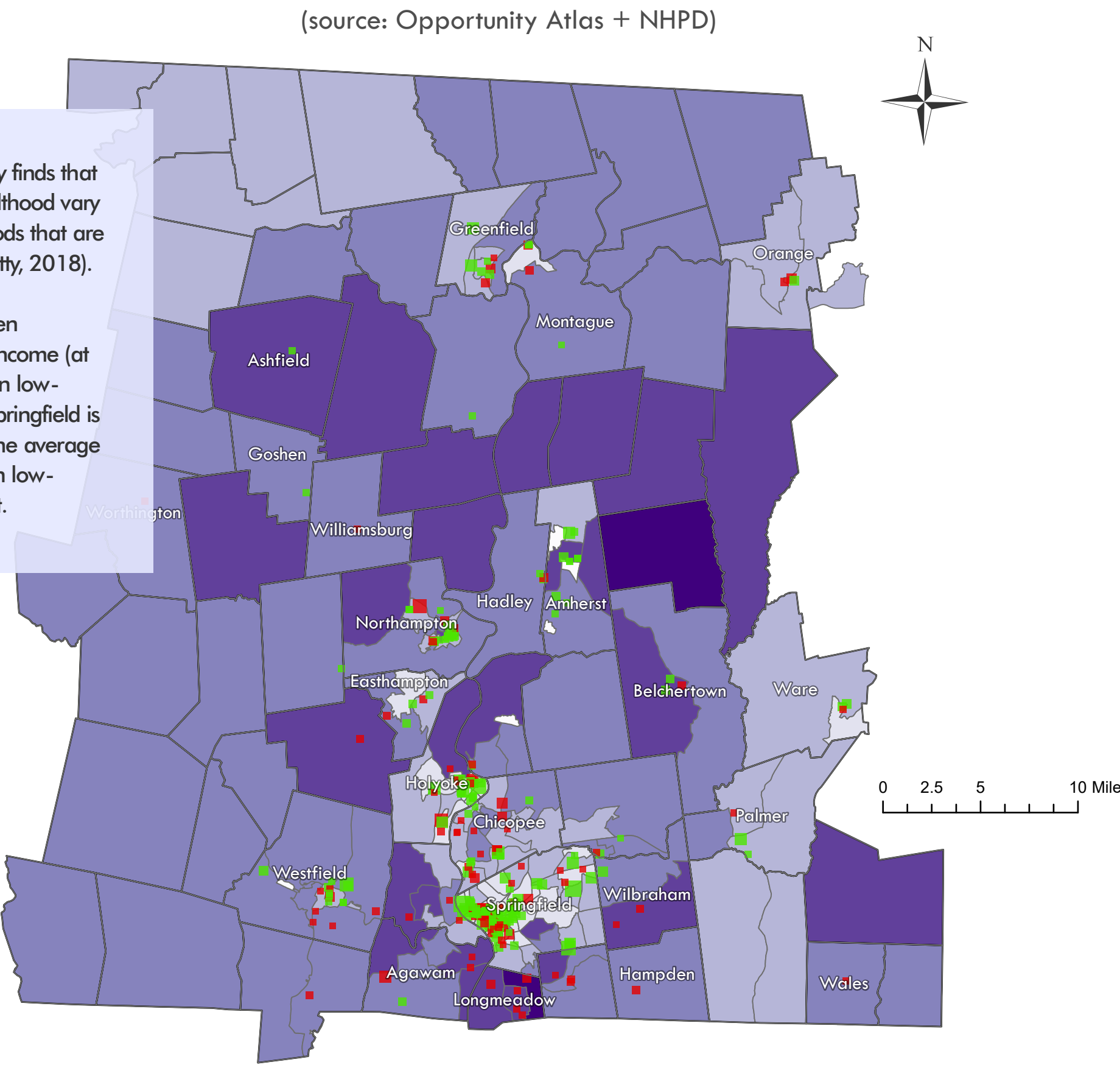
1. Subsidized Housing Density

(source: US Census Bureau + NHPD)
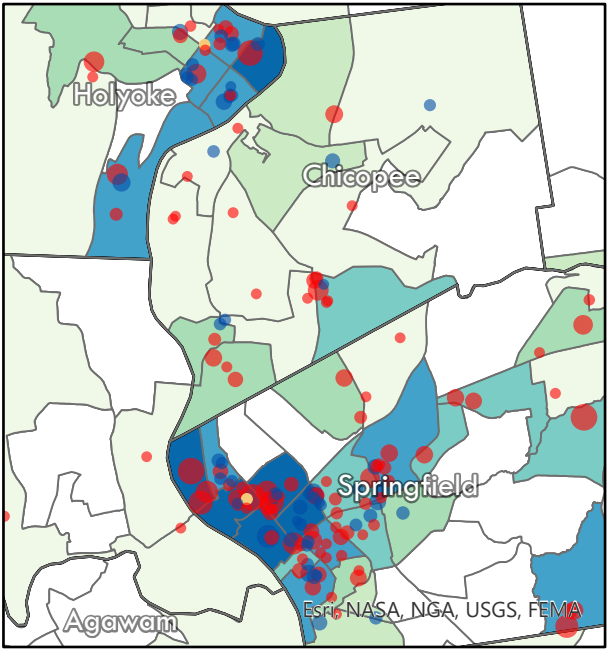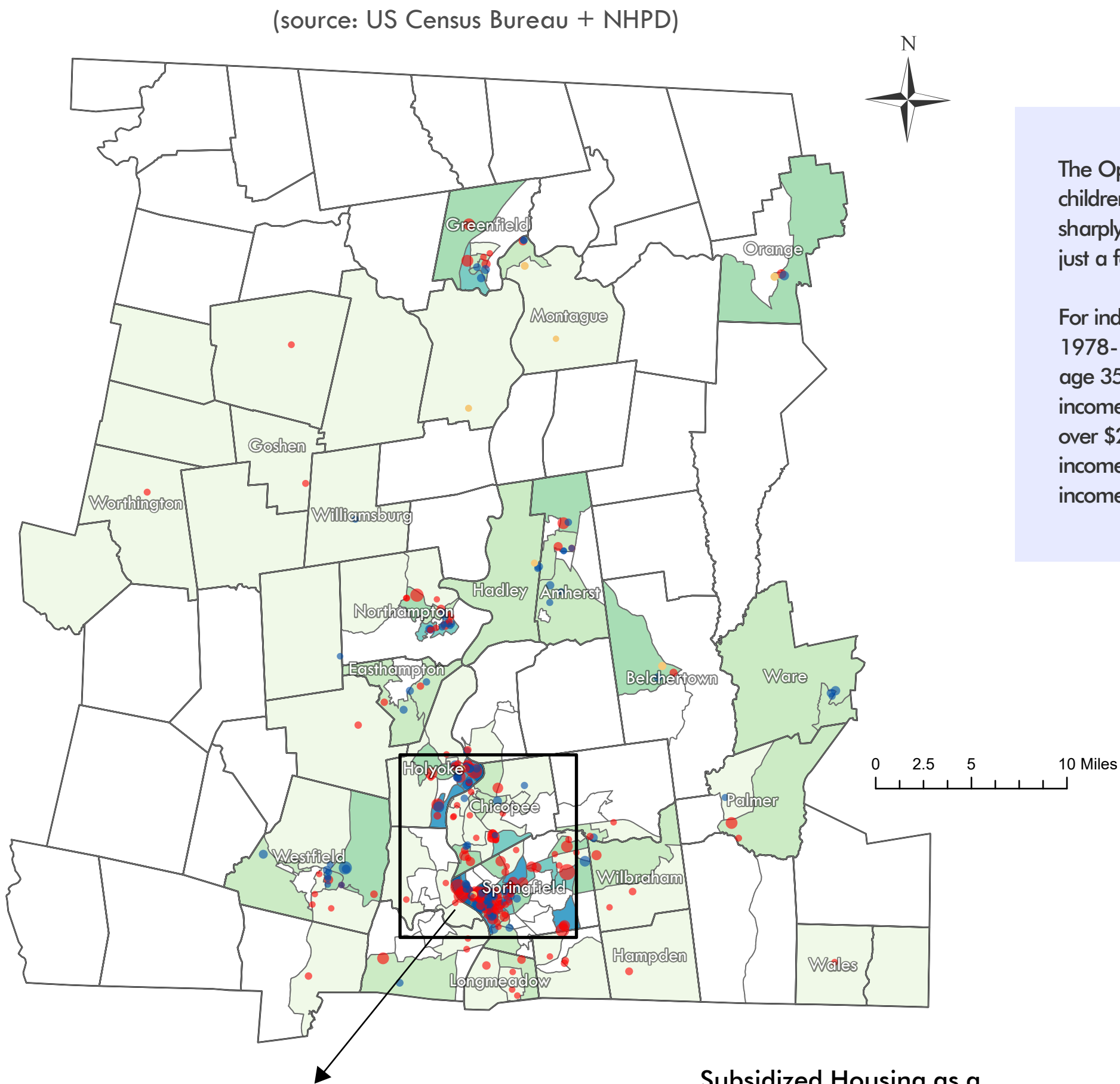
Housing Subsidy Type
- Low-Income (161)
- Mixed-Income (103)
- Rural (8)

Subsidized Housing as a % of Total Housing Stock
- 0% - 3%
- 3 - 8%
- 8% - 15%
- 15% - 25%
- 25% - 40%
- 40% - 74%

2. Social Mobility Index

(source: Opportunity Atlas + NHPD)

The Opportunity Atlas study finds that children's outcomes in adulthood vary sharply across neighborhoods that are just a few miles apart (Chetty, 2018).

For individuals born between 1978-1983, the average income (at age 35) of children raised in low-income families in South Springfield is over $20,000 lower than the average income of children raised in low-income families in Amherst.
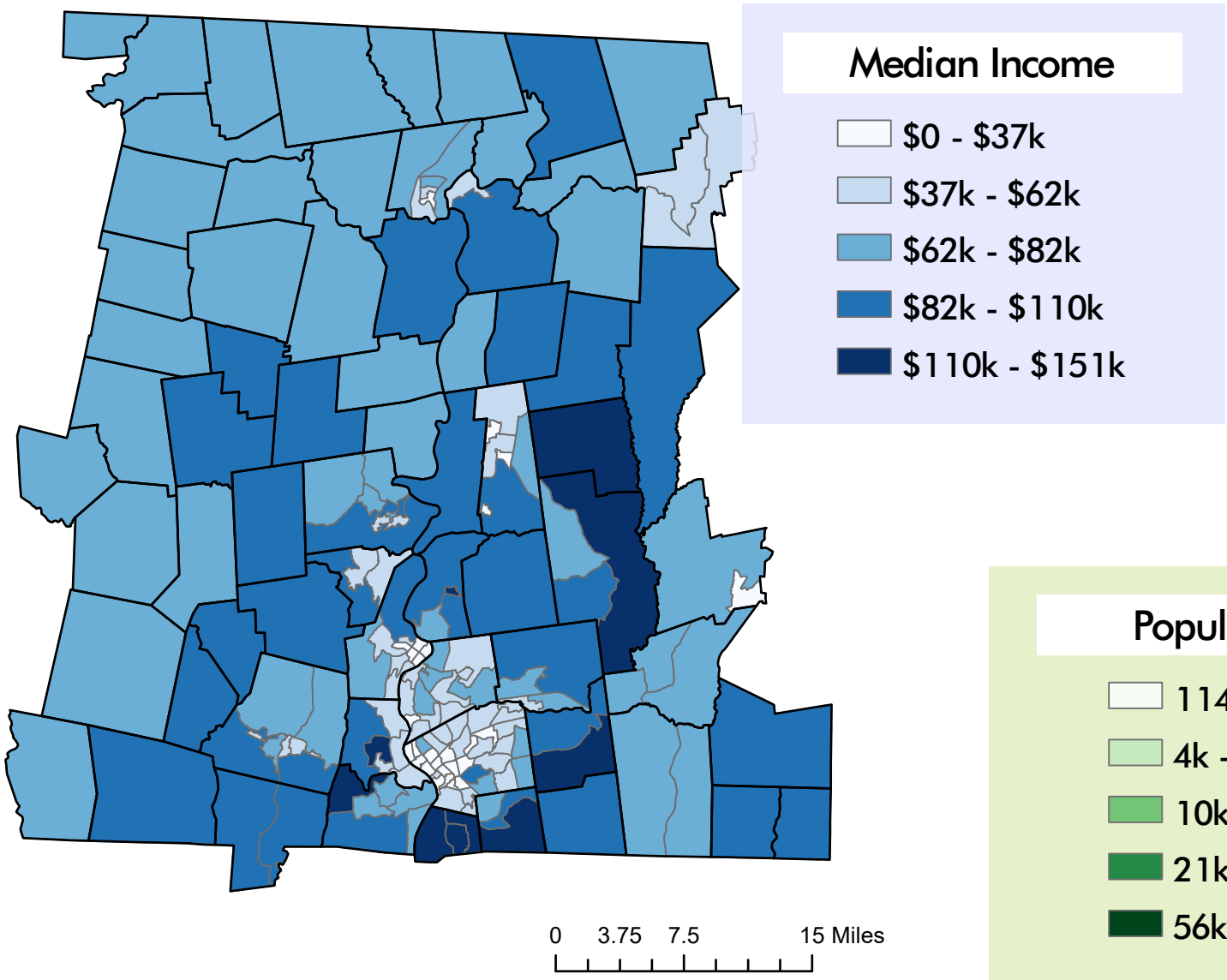
Tenant Population
- Unrestricted (176)
- Restricted (Elderly + Disabled) (96)

Median Household Income (at age 35) of Low-Income Children Raised in the Area
- NO DATA
- $0 - $37,000
- $37,000 - $44,000
- $44,000 - $51,000
- $51,000 - $61,000
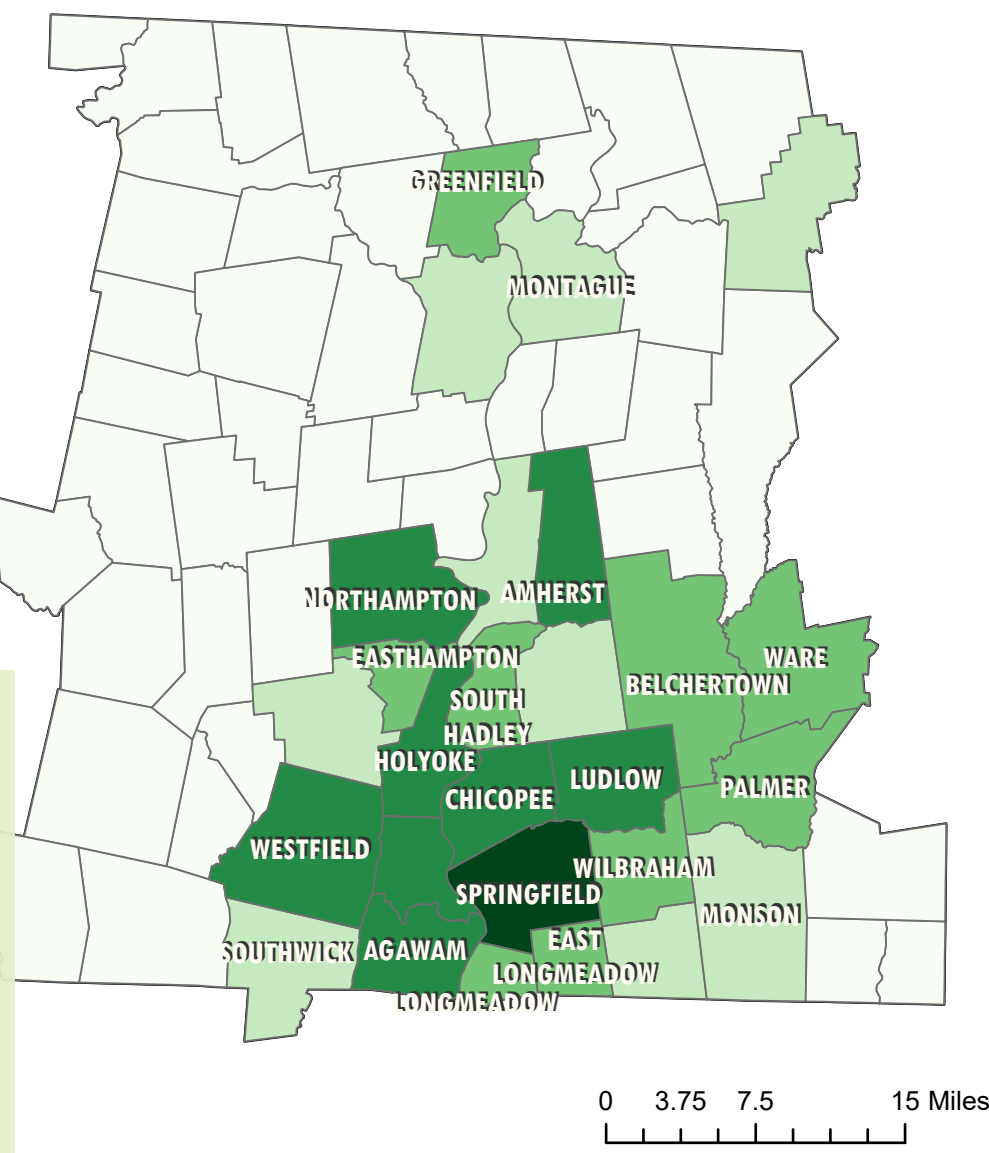- $61,000 - $81,000

Table 1

	Average	Range
Avg. Income (2021)	$61,669	$14.8k - $151.3k
Avg. Property Value (2021)	$226k	$0 - $489.5k
Avg. Income (Opportunity Atlas)	$43,960	$28.2k - $85.5k
Subsidized Housing Density	11.50%	12.6% - 74%
Subsidized Units	182	3 - 1050

3. Median Income

Census Tracts

Median Income
- $0 - $37k
- $37k - $62k
- $62k - $82k
- $82k - $110k
- $110k - $151k

4. Population Density

Towns & Cities

Population
- 114 - 4k
- 4k - 10k
- 10k - 21k
- 21k - 56k
- 56k - 156k