OVERVIEW OF THE OHIO 2024-2025
USR Opportunity Index

A new form-based, user-friendly framework for incentivizing economically stable and socially equitable housing development.

SUBURBAN

URBAN

RURAL

THE OHIO STATE UNIVERSITY
KIRWAN INSTITUTE FOR THE
STUDY OF RACE AND ETHNICITY

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THIS REPORT WAS PREPARED FOR AND SUPPORTED BY:

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Introduction

Overview of Collaboration and Work

The partnership between the Ohio Housing Finance Agency (OHFA) and the Kirwan Institute for the Study of Race and Ethnicity at The Ohio State University (Kirwan Institute) began with a pilot project which brought Opportunity Mapping into the 2016-2017 Qualified Allocation Plan (QAP), offering bonus points to family housing proposals in moderate and high opportunity areas in the state's six largest counties (Franklin (Columbus), Summit (Akron), Cuyahoga (Cleveland), Lucas (Toledo), Montgomery (Dayton), and Hamilton (Cincinnati)). The goal behind this work was to incentivize housing choice in higher opportunity census tracts and begin to address the challenge of concentrated poverty in many urban neighborhoods. Though the pilot was successful, developers with projects in small- and mid-sized cities and more rural portions of the state expressed concern that there were no equivalent bonus points available in the QAP for the types of neighborhoods where their development tended to focus. As a result, OHFA invited the Kirwan Institute to expand the use of Opportunity Mapping to incentivize the location of low-income family housing across the entire state.

In the 2018-2019 QAP the Kirwan Institute introduced our statewide Urban-Suburban-Rural (USR) Opportunity Mapping tool to accomplish this objective and the tool has been updated for each QAP since. This innovative tool divides the state into urban, suburban, and rural census tracts. Opportunity index is calculated for each of the three census tract groups (urban, suburban, rural) and the three sets of opportunity indices are then combined to build the statewide opportunity index[a] . By dividing the opportunity index into these three distinct community types, this methodology addresses two important concerns for a tool designed to incentivize low-income housing choice. First, context matters. This approach creates three distinct opportunity maps, one for urban, one for suburban, and one for rural Ohio. When the Kirwan Institute maps opportunity, the maps that we create are relative to the geography of focus. In other words, each census tract is measured against all the other census tracts

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a. A detailed methodology section is included later in this report.

within the geography of focus. So, when we split our urban, suburban, and rural census tracts, it is important for developers to understand that urban census tracts are only "competing" against other census tracts designated as urban in the USR. Suburban tracts, therefore, only compete against other suburban tracts and rural tracts against other rural tracts. The benefit of this is realized by our second important concern: the status quo matters.

By dividing the state and opportunity index in this way, we have created a proportionately equal distribution of opportunity levels across typologies (urban, suburban, rural), which means that there are more moderate, high, and very high opportunity census tracts in places that, if mapped at the state level as opposed to by typology type, would otherwise score as lower in relative opportunity. In other words, this methodology creates more competitive census tracts in urban and rural areas, which is important because in statewide opportunity maps, suburban census tracts tend to hoard relative opportunity.

The Kirwan Institute has continued our partnership with OHFA through the 2020-2021 and 2022-2023 QAPs, updating our USR Opportunity Mapping tool with each iteration, and we are pleased to introduce our 2024-2025 USR Opportunity Mapping tool. This year, OHFA will use the tool to inform both family and senior housing, an addition that we are thrilled to see included and which we are excited to evaluate the impacts of.

Opportunity and Housing

What is Opportunity?
At the Kirwan Institute, we define opportunity as a situation or condition that places an individual in a position to be more likely to succeed or excel. Therefore, opportunity is about external conditions and places and not about individuals. There is no factor more important in housing policy than place and place in the context of housing is very much about opportunity. People with agency select places to live that offer the situations or conditions that will make them and their family more likely to succeed or excel. In the context of family housing, people tend to focus on issues like school quality, employment availability, health and safety, neighborhoods (or existing housing), and transportation to inform their choices.

Unfortunately, housing in the United States is segregated by race, class, economic status, and even employment[1] due to decades of racist housing policies and practices designed to build racial segregation and inequality into the very fabric of the country. These policies and practices include the prolific use of racial and other exclusionary restrictive covenants in property deeds, the creation of home owner associations, the real estate practices of steering and blockbusting, and federal policies including Redlining (both by the Home Owners Loan Corporation and the Federal Housing Administration (FHA)), FHA's requirements of racially restrictive covenants as a precondition to access federal mortgage insurance, federal highway policy (highways overwhelmingly harmed communities of color while benefitting white and often suburban communities), and urban renewal and public housing policies, among others. [2,3,4,5] These policies, taken together, worked to both disenfranchise people considered non-White from the wealth-building activity of property ownership, resulting in spatial segregation, and decimated what were once vibrant and healthy historically black urban communities throughout Ohio.

Likewise, more rural portions of Ohio have faced similar disinvestment from both government and private actors, most notably the movement of manufacturing from mid-sized and small cities like Lima, Mansfield, and Youngstown to the South and across the globe[6]. Appalachian Ohio, where many communities historically relied on a single industry, have likewise struggled to adapt to shifting and structural economic conditions.[6] Because where you live can predict your life expectancy and lifetime earnings, providing housing choice for low-income families and older adults is one important tool to creating equitable regions across the State of Ohio.

Our Methological Approach

Our approach to creating the USR Opportunity Mapping Tool includes three components. First, we build the USR or Urban-Suburban-Rural index, which separates the state into urban, suburban, and rural census tracts. Next, we calculate three sets of opportunity indices for the three census tract groups, one for all urban tracts, one for all suburban tracts, and one for all rural tracts. The three distinct opportunity indices are then combined into one to make the Opportunity Index for the entire state. Finally, we create an overlay Community Change index which illustrates the growth trajectory of each census tract within the state. Together, these indices create the USR Opportunity Map.

Building the USR

The USR is the most complex component of the mapping tool. Building the USR index involves multiple steps of analyses considering various characteristics that delineate urban, suburban, and rural. First, all census tracts in the state are grouped into clusters using K-means clustering analysis based on two sets of indicators: built form density indicators and housing unit density indicators.

Table 1 lists the indicators and the respective rationales for their inclusion.

Built Form Density Indicators	
Indicator	**Description and Rationale**
Road Network Density	Dense road networks are found in more densely populated areas, including urban and suburban spaces. The use of road network density helps identify areas that are more developed, highlighting urban and suburban spaces and helps identify the suburban-rural interface, allowing us to more precisely separate suburban spaces from rural.
Intersection Density Average Block Area	A high density of connected streets is a traditional characteristic of urban areas prior to the 1960's before subdivision regulations incorporated elements to discourage through traffic. Utilizing intersection density helps us to identify core urban spaces in our index.

Cul-de-sac Density	Cul-de-sacs (or disconnected streets) are a key design characteristic of suburban neighborhoods. Utilizing this indicator helps us separate urban from suburban communities.
Average Block Area	A city block bounded on all sides by streets is usually small in area, but blocks in suburban and rural areas may be larger. Average block area is a good barometer for the level of urbanization of an area.

Housing Unit Density Indicators	
Indicator	**Description and Rationale**
Population Density	Population density is a key indicator in this index. It helps us better refine our urban, suburban, and rural classifications because population density is highest in urban space and lowest in rural spaces.
Housing unit density	Density of housing units in census tract area, weighted by structure type (higher weights given for multi-unit housing) is another indicator of housing density because housing units are more densely concentrated in urban areas and more sparsely distributed in rural areas.
Urbanized Area	While road network density is extremely helpful in separating urban and suburban spaces from rural spaces, small pockets of dense road networks often exist in small towns located in otherwise rural areas. Using the US Census definition of urbanized areas, this indicator helps further distinguish rural areas from urban and suburban.

The resulting clusters (7 based on built form density and 5 based on housing density) are mapped, closely examined, and labeled to reflect unique characteristics of each cluster. Each of the two sets of clusters are subsequently grouped into 3 bins each – urban (bin #3), suburban (bin #2), and rural (bin #1)[b]. At the completion of the K-means clustering analyses, a total of nine bin combinations are possible (e.g., Bin 1-1 for

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b. Seven clusters based on built form density are labeled as older suburb, oldest urban core, rural, middle age suburb, newer suburb, spare rural, and urban core. These were then binned as urban (bin #3 - oldest urban core and urban core), suburban (bin#2 - older suburb, middle age suburb, and newer suburb), and rural (bin#1 – rural and spare rural). Five clusters based on housing unit density are labeled as suburb, dense urban, downtown center, high rise apartments, and rural. These were then binned as urban (bin #3 – dense urban, downtown center, and high rise apartments), suburban (bin#2 - suburbs), and rural (bin#1 – rural).

Rural (built form density cluster) - Rural (housing density cluster), Bin 1-2 for Rural-Suburban, etc.).

Separating urban and suburban areas has proved to be the most challenging component of the USR index. To address this, we adopted methods utilized by Cooke & Marchant (2006)[7] and Airgood-Obrycki, Hanlon, & Rieger (2020)[8] to incorporate examination of the density of housing units from four separate time periods of construction – prewar (before 1939), postwar (1950-1969), modern era (1970-1989) and exurban/new era (1990-Present). Based on the housing unit density by construction era and population density, all census tracts are classified into nine groups - urban core (adjacent), postwar (adjacent), modern (adjacent), exurban/new (adjacent), and low-density/rural. We call this second stage of analysis the 'housing age & population density classification.'
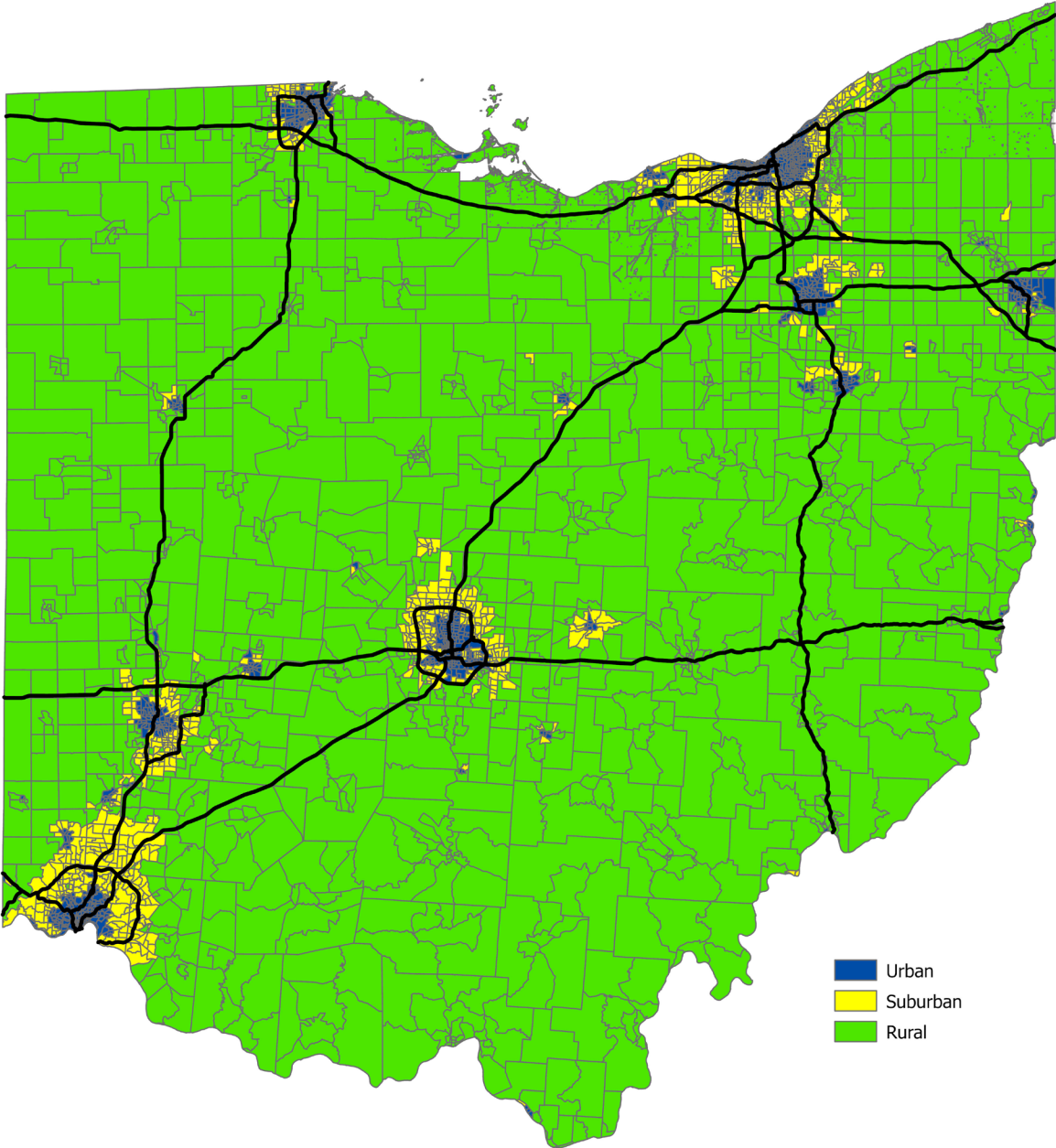
During this stage the USR classification also goes through three final refinement processes. First, the nine cluster bins obtained from the built form and housing density K-means clustering analyses (bin 1-1 for rural-rural, bin 3-3 for urban-urban, etc.) are re-examined to be classified as urban or suburban on multiple conditions[c]. The second refinement is to correct census tracts that fall into urban school districts but were classified otherwise (suburban or rural) using school district boundary for eight school districts defined as urban (typology code 8) per Ohio Department of Education's school district typology[d] . The USR index is mapped for the third and final refinement to correct any random errors through manual checking and editing before finalizing the index.

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c. To be classified as Urban (for cluster bins 3-3, 3-2, 3-1, 2-3, 2-2, 2-1), a tract must be in a Metropolitan Statistical Area, must be in an urbanized area, the housing age & population density classification is "Core" or "Core Adj", or part of a core city. To be classified as Suburban (for cluster bins 2-3, 2-2, 2-1, 1-3, 1-2, 1-1), a tract must be in a Metropolitan Statistical Area, must be in an Urbanized Area, the housing age & population density classification is "Postwar", "Postwar Adj", "Modern", "Modern Adj", "New" or "New Adj", or in incorporated city, core city, or village.

d. The eight urban school districts are Akron City, Canton City, Cincinnati City, Cleveland Municipal City, Columbus City, Dayton City, Toledo City, Youngstown City school district. Data and methodology available from https://education.ohio.gov/Topics/Data/Report-Card-Resources/Report-Card-Data-Forms-and-Information/Typology-of-Ohio-School-Districts

USR Map

Urban
Suburban
Rural

Opportunity Map

The Opportunity index included in this mapping tool is the core component and contribution of this work to inform the siting of LIHTC family and senior housing. The Kirwan Institute has been using and refining our Opportunity Mapping methodology for 20 years and has been using it in partnership with the Ohio Housing Finance Agency to inform the siting of LIHTC housing since 2015.

To visualize opportunity, the Kirwan Institute typically works with our partners to identify opportunity categories. We then work together to identify indicators for each category that will best illustrate opportunity for the population of interest. In our work with OHFA, family and senior housing residents are the identified populations of interest and this index is designed to inform housing policy, therefore, we selected indicators appropriate to both the populations this policy will target as well as the issue (low-income housing) that is the focus of this tool. A step-by-step illustration of the process, including the data indicators selected for this iteration is included below.

THE OPPORTUNITY MAPPING PROCESS

STEP 1: A stakeholder asks,
"**What does Opportunity look like in *my* community?**"

STEP 2: Kirwan Institute
Digs for *data...*

Kirwan Institute prefers using government sourced data, such as information from the US Census Bureau's American Community Survey (ACS). As a core dataset of most Opportunity indices's, Kirwan Institute prefers the 5-Year ACS Estimates, because of its scale advantages.

	1 Year ACS Estimates	3 Year ACS Estimates	5 Year ACS Estimates
Data Collected	12 Months	36 Months	60 Months
Best Scale	Areas of 65,000+	Areas 20,000+	Areas 1,000+
Best Geographic Application	Nation, State, & County	Nation, State, County, & Cities	Nation, State, County, Cities, & Neighborhood
Advantages	Most Current Data	Somewhat Current Data Moderately Reliable	Best Geographic Scale High Reliability
Disadvantages	Low Reliability Collected for Large Communities	Collected for Mid-Sized Communities	Least Current Data

STEP 3:

Kirwan Institute

Collects and Cleans the *data* to create *indicators.*

Informed by research, Kirwan Institute selects data. Then, working in partnership with local stakeholders, Kirwan Institute selects and sorts the data into categories. Kirwan then sorts and cleans data to turn data into indicators at the US Census Tract level. Some typical categories include:


*You could call this a data **deep dive...** This is the most time intensive part of creating an Opportunity Index*

Typical Indicator Categories

| Housing | Education | Transportation | Employment | Health |

STEP 4:

Kirwan Institute

Normalize the *indicators* to create *z-scores.*

After data selection, sorting, and cleaning, Kirwan Institute normalizes the indicators, by measuring how far away each individual data point is from the mean, or average, of all data points. This measurement is either positive (+) or negative (-) and is a measurement of the number of standard deviations (or the data spread of all data points) between that data point and the average and is referred to as the ***z-score.***
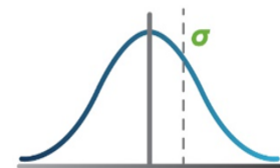
*Indicators with a **'normal distribution'** of data work best for Opportunity Mapping.*

STEP 5:

Kirwan Institute

Averages *z-scores* to create a category *sub-index.*

The z-scores for each indicator within each category are then averaged. These categorical sub-indices help stakeholders see the cumulative impact of inequality in specific categories.


*Sub-Indicies reveal **spatial inequalities** in neighborhoods.*

STEP 6:

Kirwan Institute

Averages all *sub-indices* to create an *Opportunity Index. Then we map it!*

Each sub-index is averaged together. This does two things; 1) it ensures that no component is more important than another, and 2) it allows Kirwan Institute to map Comprehensive Opportunity. Kirwan Institute uses the 'Quintile' approach to equally portion the total number of neighborhoods, or US Census Tracts into Very High, High, Moderate, Low, and Very Low Opportunity. For example: if there is a city with 101 neighborhoods, or Census Tracts, 20 would be Very High; 20 would be High, 21 would be Moderate, 20 would be Low, and 20 would be very low. For odd breaks, uneven tracts are included in the Moderate Opportunity classification.

Shades of Opportunity

	Very High
	High
	Moderate
	Low
	Very Low
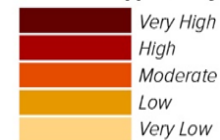
The above colors are the official Kirwan Institute color palette for Opportunity Mapping; they represent the shades of Opportunity in American cities.

Five categories of indicators comprise this year's USR Opportunity index: transportation, housing, health, employment, and education. For each category three indicators were selected in partnership with OHFA. Tables 2, 3, 4, 5, and 6 list the indicators and respective rationales for each category.

Table 2. USR Opportunity Map Transportation Indicators

Transportation Indicator	Description and Rationale	Rationale Data Source
Automotive Access	The percentage of households without access to a personal vehicle. Access to a car for transportation increases economic and social opportunities by expanding the potential reach of households.	ACS 2017-2021 5-Year Estimates[e]
Average Commute Time	The average commute time in minutes within a given census tract. The time required to commute to economic and social opportunities directly impacts quality of life. Higher commute times are less desirable than shorter commute times.	ACS 2017-2021 5-Year Estimates
Traffic Proximity and Volume	Count of vehicles (average annual daily traffic) at major roads within 500 meters, divided by distance in meters. Proximity and volume of traffic is considered a proxy for the level of connectivity of a certain neighborhood to the surrounding transportation networks, which leads to access to jobs, health care, food, or other benefits.	EJ Screen[f]

e. U.S. Census Bureau, 2017-2021 American Community Survey 5-Year Estimates, data available from https://www.socialexplorer.com/

f. Environmental Justice Screening and Mapping Tool, 2022 data available from https://www.epa.gov/ejscreen/download-ejscreen-data

Table 3. USR Opportunity Map Housing Indicators

Housing Indicator	Description and Rationale	Rationale Data Source
Median Rent	Higher median rents indicate high income levels and are locations where housing developers are building or acquiring more expensive housing stock.	ACS 2017-2021 5-Year Estimates
Median Home Value	High median home values are an indicator of a strong housing market.	ACS 2017-2021 5-Year Estimates
Existing Affordable Housing	The percentage of subsidized voucher units divided by the total housing units within a census tract. Concentrating affordable housing in areas where there is already a substantial existing stock of affordable housing both limits consumer choice and contributes to neighborhood decline. Distributing affordable housing throughout urban, suburban, and rural areas expands economic and social mobility and helps combat the concentration of poverty in certain and typically urban neighborhoods.	HUD LIHTC Dataset 2020[g]

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g. Low-Income Housing Tax Credit (LIHTC) property level data from U.S. Department of Housing and Urban Development (HUD) LIHTC database available at https://www.huduser.gov/portal/datasets/lihtc/property.html

Table 4. USR Opportunity Map Health Indicators

Health Indicator	Description and Rationale	Rationale Data Source
Segregation Index	Weighted average of the income and racial/ ethnic distribution as compared to the State's average. Locations that are integrated both economically and racially benefit affordable housing residents economically. Such locations also promote mixed income communities and improve social mobility as social networks are more diverse.	ACS 2017-2021 5-Year Estimates
Air Toxics Respiratory Hazard Index	Ratio of exposure concentration to health-based reference concentration, calculated based on the analyzed carcinogens in ambient outdoor air. Air quality is an important environmental risk measure to include, particularly for family and senior housing placement.	EJ Screen 2022
Modified Retail Food Environment Index (mRFEI)[h]	The percentage of healthy food retailers located within a half mile of the census tract's perimeter. Availability of healthy food retailers in the neighborhood can promote healthy eating and improve health outcomes.	ESRI Business Analyst[i]

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h. The mRFEI was calculated following the definition available at https://www.cdc.gov/obesity/downloads/census-tract-level-state-maps-mrfei_TAG508.pdf

i. Data for food retailers of different types were obtained from ESRI Business Analyst based on the NA-CIS (North American Industry Classification Codes) specified in the mRFEI calculation formula.

Table 5. USR Opportunity Map Employment Indicators

Employment Indicator	Description and Rationale	Rationale Data Source
Entry Level Job Access	Ratio of entry level jobs to total persons unemployed within a census tract. Expanding access to economic and social opportunities requires employment. This indicator considers job competition for entry level employment by the relative education of those in a neighborhood.	LEHD 2019[j]
Childcare Access	The number of certified childcare centers within a half mile of the census tract boundary divided by the total population under 9. Neighborhood-level accredited childcare access is a critical opportunity structure for working families.	ACS 2017–2021 5 Year Estimates & ODJFS 2021[k]
Unemployment Rate	High unemployment rates are an indicator of low economic and social opportunities while areas with low unemployment have high economic and social opportunities	ACS 2017-2021 5-Year Estimates

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j. Longitudinal Employer-Household Dynamics (LEHD) program data available at https://lehd.ces.census.gov/data/

k. Data for childcare centers were obtained from Ohio Department of Job and Family Services, available at https://jfs.ohio.gov/

Table 6. USR Opportunity Map Education Indicators

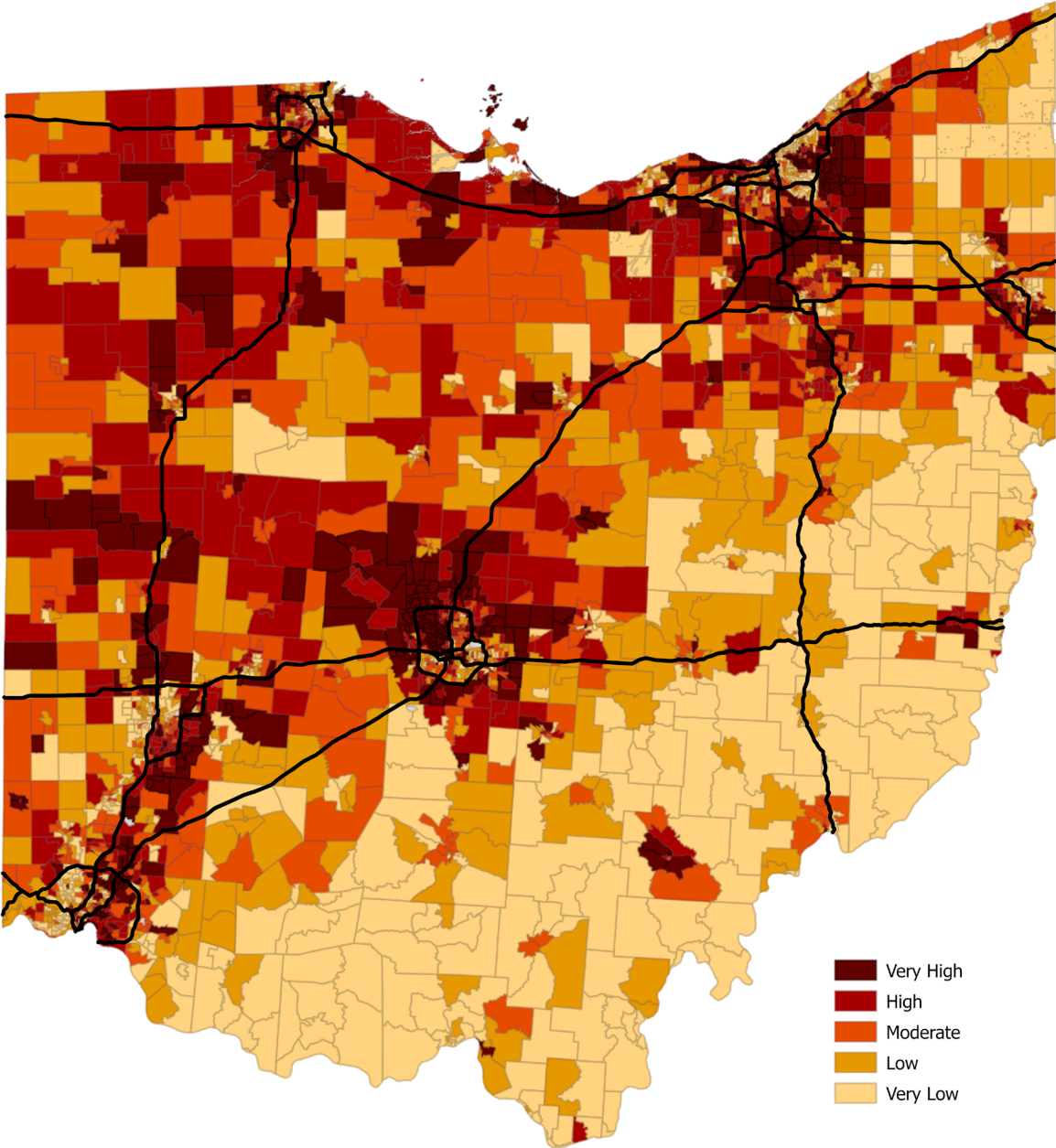| Education Indicator	Description and Rationale	Rationale Data Source
School Performance Index	The index score that a public school is given based on the school's test performance averaged by the three nearest public schools. Neighborhoods with high performing schools provide more opportunities for social and economic mobility.	Ohio School Report Card, 2022[21]
School Overall Value-Added Growth Index	A measure of academic growth of students at a public school averaged by the three nearest public schools. Schools that make improvements in their students' academic performance over time contribute to positive impacts on the surrounding community.	Ohio School Report Card 2022
Educational Attainment	Percentage of population over 25 years of age with a bachelor's degree or higher. Neighborhoods with higher educational attainment attract more social and economic opportunities.	ACS 2017-2021 5-Year Estimates

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I. Data from Ohio Department of Education, available at https://education.ohio.gov/

Changes to the 2024-2025 Index

Three indicators were changed for the 2024-2025 Opportunity Index, one in the transportation category and two in the health category. In the transportation category we replaced the connectivity index with traffic volume. This change was made because we wanted a more reliable data source and simpler indicator for connectivity.
In the health category we replaced life expectancy and family poverty rate with the air toxic respiratory hazard index and the modified retail food environment index. We replaced life expectancy because of the anticipated challenge with updating the data given the project timeline. We eliminated the family poverty indicator from this category in part because we use it in our Community Change index, and we try to avoid replicating the same indicators in different components of the mapping tool. This decision was also made in consultation with OHFA as both of our teams determined that the two new indicators in this category were more appropriate health category indicators than family poverty.

Opportunity Map

Legend:
- Very High
- High
- Moderate
- Low
- Very Low

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Community Change Map

The final component of the USR Opportunity Mapping Tool is the Community Change Index. This index is designed to be used as an overlay, that is, to be displayed on top of the composite USR Opportunity Map. This tool is designed to help developers identify moderate or high opportunity census tracts that are trending towards growth for development. As such, the index considers indicators of housing market change and demographic and social change and measures the direction and size of changes between two time periods. For all the indicators listed below, data from ACS 5-year estimates for two non-overlapping time periods, ACS 2012-2016 and ACS 2017-2021, were used[m].

Understanding housing market trends is key to informing a tool utilized to inform the development of low-income housing in areas of opportunity. It also provides developers that are considering building affordable housing additional independent analysis of housing trends. Table 7 lists the housing market indicators we incorporated into our Community Change Index.

Table 7. Community Change Index Housing Indicators

Housing Market Change Indicator	Description and Rationale
Median Home Value	Median home value is an indicator of the accumulated wealth in each census tract. When home values rise, an area is generally experiencing growth.
Median Gross Rent	Median gross rents express the market value associated with housing units. Areas with increasing gross rents relative to other areas are experiencing growth.
Owner Occupancy	Changes in owner occupancy rates are a primary driver of neighborhood and community change. Areas experiencing increases in owner occupancy tend to be experiencing growth.
Vacancy	Changes to the proportion of vacant units within neighborhoods influence other variables, including home values, rents, and occupancy rates. Areas experiencing an increase in vacancies tend to be experiencing decline.

m. U.S. Census Bureau, American Community Survey 5-Year Estimates for two periods 2012-2016 and 2017-2021, data available from https://www.socialexplorer.com/
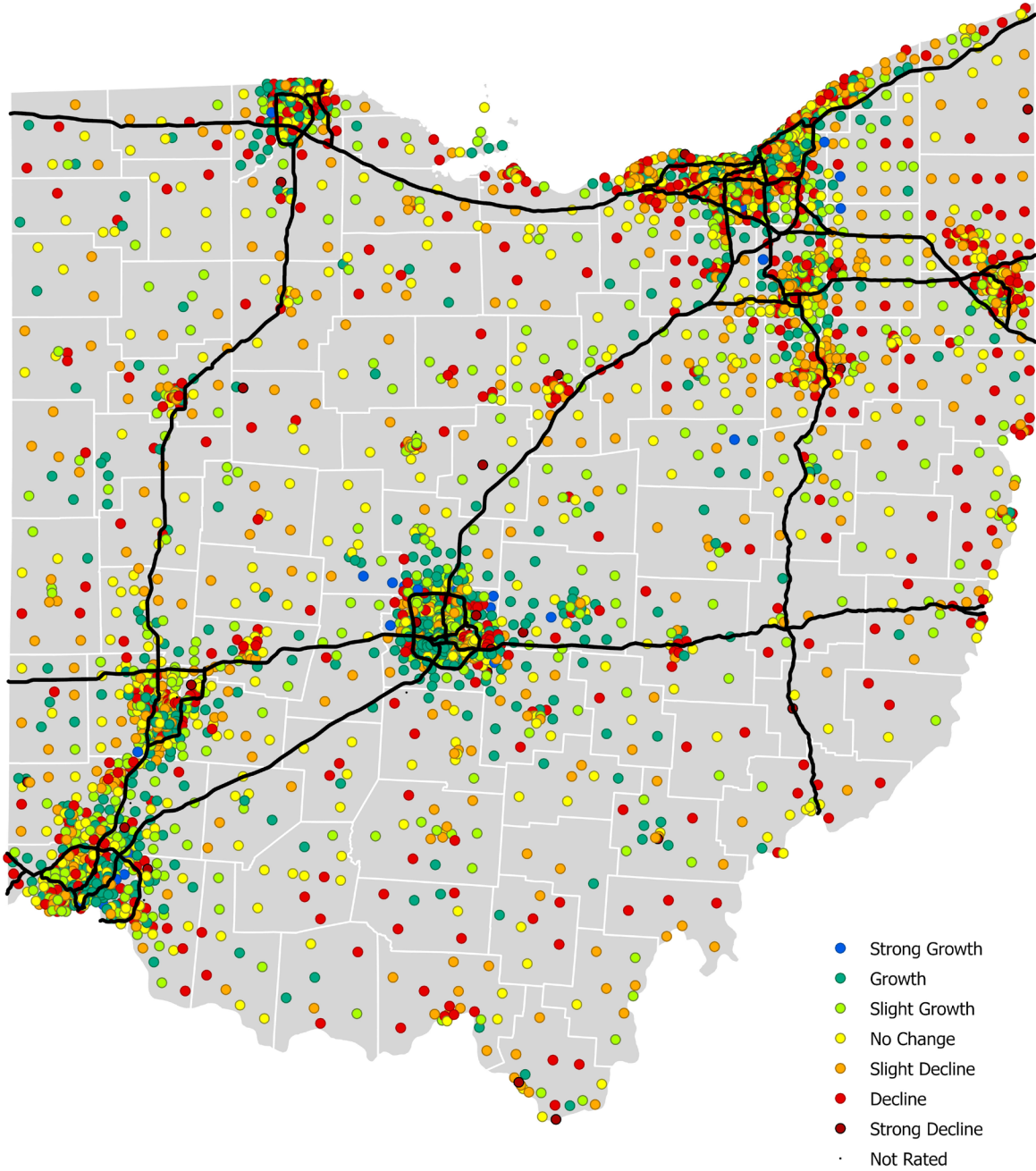
Community Change is defined by change to both the built environment and the people living in those communities. Table 8 lists the demographic and social change indicators used in the Community Change index.

Table 8. Community Change Index Demographic and Social Change Indicators

Demographic and Social Change Indicator	Description and Rationale
Median Household Income	Median household income in a census tract that is experiencing growth can generally be found to be increasing whereas median household income in census tracts that are experiencing decline tend to be decreasing.
College Attainment	Educational attainment is one of the most significant predictors of economic and social mobility. High growth areas tend to exhibit higher college attainment levels whereas areas experiencing decline tend to exhibit lower college attainment levels.
Family Poverty	Poverty rates are correlated with growth and decline in neighborhoods. Areas with increasing family poverty rates tend to be experiencing decline whereas areas with decreasing family poverty rates tend to be experiencing growth.

Community Change Map

Legend:
- Strong Growth
- Growth
- Slight Growth
- No Change
- Slight Decline
- Decline
- Strong Decline
- Not Rated

2024-2025 USR Opportunity Mapping Tool

The Kirwan Institute is excited to introduce the 2024-2025 Interactive USR Opportunity Mapping Tool, which can be accessed via the QR code or website listed at the bottom of this page. Included on the mapping tool's landing page you will find user-friendly instructions informing affordable housing developers how to utilize the tool.

go.osu.edu/USR2023

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This publication was produced by the Kirwan Institute for the Study of Race and Ethnicity at The Ohio State University. As a university wide, interdisciplinary research institute, the Kirwan Institute works to deepen understanding of the causes of—and solutions to—racial and ethnic disparities worldwide and to bring about a society that is fair and just for all people.

Kirwan Institute research is designed to be actively used to solve problems in society. Its research and staff expertise are shared through an extensive network of colleagues and partners—ranging from other researchers, grassroots social justice advocates, policymakers, and community leaders nationally and globally, who can quickly put ideas into action.

For More Information

The Kirwan Institute for the Study of Race and Ethnicity at The Ohio State University is known and respected nationally and deeply engaged in social issues. We are focused on projects that are integrated with sound research, strategic communication, and advocacy. To learn more, visit **www.kirwaninstitute.osu.edu.**

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