

# Opportunity Mapping

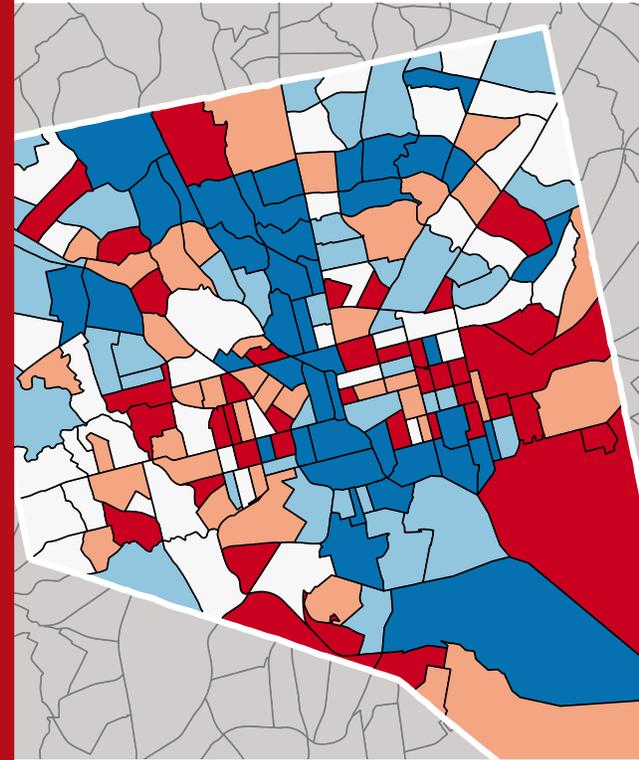
by Brian Stromberg | May 2016

## INTRODUCTION

Opportunity mapping uses various data sources to show segregation patterns and to help us see how these patterns affect individuals' abilities to access amenities and services that help promote economic well-being. Localities and regions have used opportunity maps to better understand the housing opportunities available to individuals and families from diverse backgrounds. Measuring and mapping opportunity are also critical components of the renewed federal commitment to furthering fair housing goals.

Racial and economic segregation in urban and suburban areas have shaped how different groups of people are able to access resources like education, transportation, healthcare and employment.<sup>1</sup> Mitigating the impact of these patterns is an important goal of the U.S. Department of Housing and Urban Development (HUD)'s Affirmatively Furthering Fair Housing (AFFH) rule. There is a growing awareness of the consequences of spatial inequalities, and making these patterns visible through a map provides a powerful tool for policymakers interested in addressing these consequences.<sup>2</sup>

Opportunity mapping has become a tool that any community can use. The Kirwan Institute led the innovation around creating opportunity maps and has collaborated with a number of cities and organizations on developing opportunity maps. Now, most of the data are publicly available, and the basic technique requires only some proficiency with mapping software. This means that most localities can develop their own opportunity maps and indices. The availability of open-source geographic information systems/science (GIS) software such as QGIS, along with the increase in online mapping services (such as Mapbox, PolicyMap, and Esri's ArcGIS Online), makes opportunity mapping even easier.



## Inclusive Communities Working Group

The National Housing Conference created the Inclusive Communities Working Group with support from the Open Society Foundations to help localities become more inclusive using best practices in housing policy from around the country. The Working Group is a practical, nonpartisan forum that gives local housing solutions more national prominence and creates a peer learning opportunity for housing leaders. This brief originated at a Working Group meeting and benefited from members' guidance.

## Why Do Opportunity Mapping?

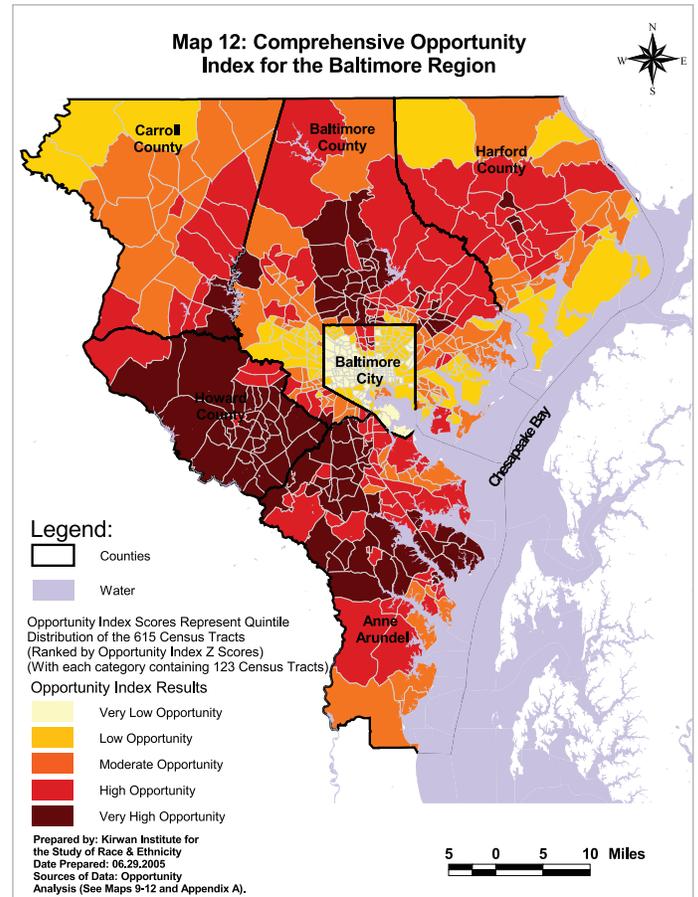
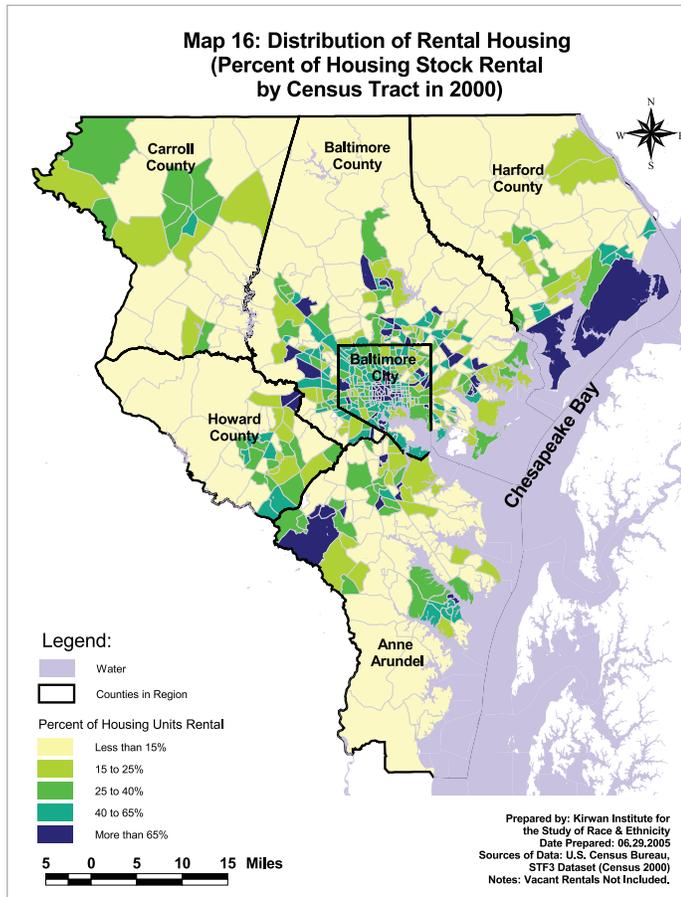
Interest in opportunity mapping has grown because of recent federal actions regarding fair housing. The Sustainable Communities Regional Planning Grant (SCRPG) program required grantees to produce a Fair Housing and Equity Assessment (FHEA), and the AFFH rule requires an Assessment of Fair Housing (AFH) from jurisdictions that submit plans for federal funds.<sup>3</sup> Neither of these requirements explicitly calls for the production of a map. However, HUD strongly encourages jurisdictions submitting AFHs to use geographical data in their assessments, and provides a tool for jurisdictions to analyze their own socioeconomic patterns.

Meeting HUD's requirements is not the only reason to create an opportunity map, but it is likely to provide the introduction to the concept for some policymakers, and may provide the first opportunity for using and analyzing geospatial data. In order to help jurisdictions fulfill their AFH obligation, and as part of HUD's commitment to making data more available, HUD has created a tool that displays various local data related to fair housing. This tool provides

access to several sets of data, all mapped at the census-tract level. It is fairly limited, however, and in the AFFH rule HUD encourages supplementing these data with other local data. The data categories outlined in the HUD rule provide a useful starting point for any community, organization or jurisdiction that is interested in better understanding how to analyze and map access to opportunity.<sup>4</sup>

Categories of neighborhood indicators tend to include racial/ethnic concentrations, concentrations of poverty, quality of education, and environmental health. The complexity of these categories can also vary. For example, John Powell's map of the greater Baltimore area used 14 different datasets, organized into three categories: economic opportunity and mobility, neighborhood health, and educational opportunity.<sup>5</sup> The opportunity map created by the National Center for Smart Growth Research & Education (NCSG) used 92 different indicators, organized into six categories: education, housing and neighborhood quality, social capital, public health and safety, employment and workforce, and transportation and mobility (see Appendix B for the complete list of the indicators used).<sup>6</sup>

**Both of these maps are taken from John Powell's testimony in Thompson v. HUD. The map on the left shows one of the indicators that was layered with several others to produce the final comprehensive index, which is on the right.**



## Making the Opportunity Map

The term *opportunity* does not have a single definition, and part of the opportunity mapping process is determining what *opportunity* means to each community. The Puget Sound Regional Council, one of the case studies described below, defined *opportunity* as “a situation or condition that places individuals in a position to be more likely to succeed or excel.”<sup>7</sup> The Kirwan Institute describes *opportunity* in terms of segregation and isolation, focusing on the impact on education, health, employment and physical safety, as well as how segregation and isolation can affect access to “social, political, and economic opportunities and resources.”<sup>8</sup> Defining *opportunity* in your community is a key first step toward developing an opportunity map or index.

### Getting the Right Data

Making effective and useful maps requires two things: obtaining the right data and using those data effectively. There are several publicly available sources for data that are published for various geographies (state, county, metropolitan area, census tract, etc.). The U.S. Census Bureau provides nearly all of its data online through the American FactFinder tool and other data retrieval sites.<sup>9</sup> HUD provides some data through an online mapping tool that is designed to help jurisdictions create their AFHs, but they have another, more comprehensive site for downloading detailed data on HUD programs, such as the location of public housing developments, Housing Choice Voucher usage and Low-Income Housing Tax Credit (LIHTC) projects.<sup>10</sup>

It is important to note that data from federal agencies can sometimes be unavailable at the level of detail required to provide a meaningful analysis. They can also miss certain topics that may be of particular importance to certain groups, such as test scores and detailed crime statistics. Using local data from public housing authorities, education agencies, public health departments, nonprofits or even community-based mapping projects can supplement national data sources and help make sure the map is as relevant as possible<sup>11</sup> for the goals of the community process.

There are a number of other online resources that can be used to develop opportunity maps. Some local organizations have also created more localized mapping tools, such as the one that Green Doors and the Kirwan Institute created for the Austin region.<sup>12</sup> The Social Explorer website (a subscription-based service) provides access to a wide variety of data and data visualizations through a very user-friendly interface.<sup>13</sup> In addition, many cities have created online repositories of data (geospatial and otherwise). For example,

Washington, D.C.’s Office of the Chief Technology Officer administers a website that provides access to data that range from Capital Bikeshare stations to zoning overlays.<sup>14</sup>

The White House recently launched the Opportunity Project, which is a collaboration between government agencies and a number of private and nonprofit organizations to improve access to data for policy analysis.<sup>15</sup> In their words, the Opportunity Project was created to “harness 21st century technology and innovation to expand access to opportunity and tackle our greatest challenges.” This translates to a curated set of data from the federal agencies as well as data from nine local jurisdictions around the country.<sup>16</sup> This project represents the federal government’s ongoing commitment to open data and has already resulted in some interesting tools that are available online.

### Using the Data

Getting the data is only the first step; knowing what to do with them is the key to making them useful. Certain dimensions of opportunity, such as access to transportation, have to be analyzed with care. However, the methods used to measure particular elements depend on the capabilities of the agency doing the mapping. In their analysis of Baltimore, the NCSG used a highly complex model to analyze transportation opportunities. Other maps used much simpler methods to evaluate transportation access, such as drawing a circle of a particular radius around each transit point. While the first method may be more rigorous than the second, not everyone has access to the detailed data or advanced modeling capabilities. You cannot always control what data are available to you, but you can compensate by recognizing their limitations.

One of the central concerns around the opportunity mapping process is the inclusion of community members. This helps to ensure that the most appropriate data are being used. HUD requires it in the AFFH rule, although what this looks like in terms of an acceptable AFH is yet to be determined. Jurisdictions might turn to completed opportunity mapping projects for guidance. For example, the NCSG’s process for creating a map for the Baltimore Opportunity Collaborative involved researchers making a list of potential indicator data, a series of meetings with an Opportunity Mapping Advisory Panel (OMAP), and finally a proportional voting system to give appropriate weights to the different indicators.

Opportunity mapping (and mapping in general) inevitably simplifies complex social issues to numbers. The heavily inclusive nature of the NCSG’s process helped their

coalition at least partially mitigate the risks associated with this. Failing to be considerate when creating a map can produce a map that misrepresents certain aspects of what is happening on the ground. This can have significant consequences when the map is used to evaluate need and make decisions on what funding goes where. The history of geography is full of examples of maps used to deny opportunity to communities and neighborhoods.<sup>17</sup> Opportunity mapping was developed to improve circumstances for vulnerable communities, but it could easily become a tool of inequity without a carefully considered method. The increased popularity and usage of the concept of opportunity by policymakers and housing advocates makes this consideration even more important.

The ultimate product of this process—after selecting the indicators and crunching all the numbers—is a map that shows a composite opportunity index divided into categories. These categories are conventionally defined as “very low,” “low,” “high,” and “very high,” but this categorization is at the discretion of whoever is making the map. A more complex categorization may provide a more nuanced analysis and a better understanding of the region under consideration. This composite is created by combining the selected indicators after standardizing them. This standardization may include weighting the different indicators according to their importance. For example, the NCSG’s composite index involved adding weights to each indicator, which emphasized and de-emphasized certain indicators according to the preferences of their OMAP. Examples of the NCSG maps are in Appendix C.

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## Methodological Concerns

There are some things to keep in mind when making opportunity maps. One is to make sure that the geographic scale of the data used to create the composite is taken into account. Since not all data are available at all geographic scales, it is important to consider how data at different scales are used. For example, some census data are released at the block-group level, while other data are only available at the census-tract level. Mixing scales of analysis without due consideration can produce inaccurate maps.

Using different levels of geography can also have a huge impact on how opportunity is represented. For example, HUD recently changed the geography used for designating Difficult Development Areas (DDAs) from metropolitan areas to ZIP codes, creating small DDAs (SDDAs). This change was made to more accurately target LIHTC development in areas of higher opportunity, and increased the range of LIHTC use from 36 metropolitan areas with DDAs to 300 with SDDAs.<sup>18</sup> However, for some developers, the change created new difficulties when trying to create and preserve affordable housing in disadvantaged areas.

Another thing to consider is recognizing the limitations of certain data. Neighborhood-level analyses can be difficult to create accurately, as census tracts and other administrative boundaries do not always match up with the boundaries of neighborhoods and communities. Two neighborhoods of greatly different character may fall within a single tract, meaning those differences will not be captured. The process of manipulating the data to produce a final opportunity index also requires careful consideration. Creating a composite index involves making sure all of the indicators are standardized and that each of them are available at a common geography.

Finally, anyone using maps to develop policy should remember that there are limits to what maps can represent. As the NCSG points out in their report, trying to define opportunity through point-in-time datasets cannot capture the social networks that increase access to employment opportunities.<sup>19</sup> These involve social relationships that are difficult to represent on a map. Community engagement can improve the understanding of a specific context and help capture the dimensions of opportunity that cannot be easily mapped.

# Key Points to Remember As Your Community Gets Started with Opportunity Mapping

## Creating More Inclusive Communities Through Mapping

Maps can show only what you want them to show. Deciding on what kind of data is represented (and what form that representation takes) determines the story that the map tells. Making the process of creating the map as transparent as possible is essential in producing an objective policy tool. Even the most well-meaning policy solutions can be damaging when the process of developing them is too opaque or oversimplified. This means the data sources should be accurately cited, the process for choosing indicators should be as inclusive as possible and the process for analyzing the data should be made available publicly. While there is general consensus about what indicators are most useful, an opportunity map is most effective when it includes feedback from a broad range of stakeholders. The NCSG process used community feedback to make sure the indicators were represented appropriately in the final product. This makes the process more complex but also mitigates the risk of creating a problematic map.

## Choosing the Right Tools to Analyze Your Data

Desktop GIS software like Esri's ArcGIS and the free, open-source QGIS are powerful applications that allow you to do almost any kind of geographic analysis imaginable. At the same time, many small organizations do not have the budget or technical expertise to make full use of such software. There are several online mapping services—like Mapbox, CartoDB and PolicyMap—that allow you to create your own maps using publicly available data. PolicyMap also includes some licensed data from their partners with their subscription-based accounts. Esri's ArcGIS Online has a similar service and includes the benefit of easily integrating with the ArcGIS desktop software.

## Mapping as Communication

A map is a particularly powerful tool for policymakers because it can communicate complex information in a straightforward and highly visual manner. Maps can be distributed at community meetings, featured in articles, published online or used in any other situation where complex information needs to be communicated quickly and easily. In addition, creating an opportunity map generally involves a number of datasets that are publicly available but are often not particularly accessible to the general public. Getting all the data in one place is a great chance to improve the public's access to those data. This can be done by creating an online tool (see the examples below of Austin and Minnesota) or by simply listing the data somewhere in easy-to-use formats (like on the website for the Opportunity Project discussed above).

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## Examples of Opportunity Mapping

**Austin:** Local nonprofit Green Doors collaborated with the Kirwan Institute in 2012 to produce a report on opportunity in the Central Texas region. The report is a follow-up to a report from 2007 and incorporates a *change index* to indicate neighborhoods where significant change had occurred. Mapping the change in neighborhoods is important for targeting efforts at increasing opportunity, but it can be difficult to recognize trends quickly enough to react. Using local data that can be updated more regularly than federal data is essential to recognizing neighborhood changes fast enough to produce a policy response. The report on Austin was released along with an online mapping tool that provides access to data that were used.<sup>20</sup>

**Baltimore:** The Opportunity Collaborative was required to produce an opportunity map as part of a grant from HUD's Sustainable Communities Initiative. Along with the map, the NCSG produced a report<sup>21</sup> that outlines the history of opportunity mapping and gives a detailed description of the process they used to create the maps. Their methodology took the original methods pioneered by John Powell and added a heavily participatory process that produced a more nuanced opportunity index. The process involved 92 different datasets, organized into six categories. These datasets were then given different weights by surveying a panel of several dozen experts on each category of data.

**Chicago:** In 2005, the Leadership Council for Metropolitan Open Communities published a report entitled "The Segregation of Opportunities" in collaboration with the Institute on Race and Poverty and the Kirwan Institute.<sup>22</sup> Unlike the other cases listed here, this report was not prompted by AFFH requirements or a Sustainable Communities Initiative grant. Instead, the Council's goal was to better understand the patterns of racial segregation and their impact on the city. It was also prompted by findings from an earlier piece of research that detailed the patterns of racial segregation in the city. The analysis of Chicago used four dimensions of opportunity with subcategories of data within them. Also included are a number of suggestions of potential solutions to the issues the report raises.

**Connecticut:** In 2009, the Connecticut Fair Housing Center commissioned the Kirwan Institute to create an opportunity map for the entire state. The purpose was to improve the general understanding of where opportunity was and was not in Connecticut's communities. In 2014, the Open Communities Alliance joined Kirwan and the Connecticut Fair Housing Center to update the map with a broader set of indicators and a more sophisticated analysis.<sup>23</sup>

**Dallas:** In response to the 1985 case of *Walker v. HUD*, the Dallas Housing Authority (DHA) identified targeted areas based on poverty rate, African American population share and where there is no existing public housing. Beyond the targeted areas, DHA has used a more comprehensive set of metrics to identify High Opportunity Areas (HOAs), all of which have zoned public schools that are "high performing," a poverty rate of no more than 10%, and an average household income that is at or above 80 percent of the area median income (AMI). DHA also provides an online mapping tool for households looking to use the housing vouchers that were created as part of the remedy from *Walker v. HUD*.<sup>24</sup>

**King County, WA:** In 2014, the King County Housing Authority initiated the Community Choice Housing Mobility Program, which serves families living throughout the county, excluding the cities of Seattle and Renton. The program defines opportunity areas using an opportunity mapping analysis conducted by the Kirwan Institute. The analysis uses a number of different indicators—education, economic and housing- and neighborhood-related—to create an opportunity index for each community in the county.

**Minnesota:** The Minnesota Housing (MNH) used mapping to create their Qualified Allocation Plan for their LIHTC distribution and increased the number of geographically based points in their assessment from one in eight in 2012 to one in three in 2017. The four geographic categories are economic integration (proximity to jobs), workforce housing (located in a place that needs workforce housing), location efficiency (walkability, access to public transportation), and location in a Qualified Census Tract (50% or more are 60% AMI or below, or poverty rate at or above 25%). MNH also released an online mapping tool using PolicyMap to make some of these data accessible to the public. According to MNH, developers have used the tool to site projects before submitting applications for tax credits.

**Puget Sound region:** As a grantee of the Sustainable Communities Initiative, the Puget Sound Regional Council worked with the Kirwan Institute to publish a report on promoting opportunity through transit planning in the central Puget Sound region. This report was produced as part of the Growing Transit Communities Partnership, a regional effort to engage local communities with the massive transit projects underway in the Puget Sound region. Similar to the process in the Baltimore case mentioned above, choosing the datasets for the index involved several meetings over a period of months. The final map was based on 20 indicators split into five categories.

## Tables of Indicator Variables from Liu et al., 2014

These tables are included as an example of what kinds of indicators are available for creating opportunity maps. This is a complete set; this many indicators are not necessary for creating a map.

**TABLE 1A:** Education Indicator

SUBCATEGORY	INDICATOR TITLE
ELEMENTARY SCHOOL	Student Performance (Elementary School)
	3rd Grade Reading
	3rd Grade Math
	5th Grade Reading
	5th Grade Math
	Percent of Teachers Highly Qualified (Elementary School)
MIDDLE SCHOOL	Student Performance (Middle School)
	Percent of Teachers Highly Qualified (Middle School)
HIGH SCHOOL	Student Performance (High School)
	Advanced Placement Course Enrollment
	Advanced Placement Exam Scores
	SAT Scores
	High School Dropout
	Percent of Teachers Highly Qualified (High School)
ADULT WORKFORCE DEVELOPMENT	Access to Workforce Investment Area Training Programs
	Proximity to Community Colleges
	Proximity to Private Career Schools

**TABLE 1B:** Housing and Neighborhood Quality Indicator

SUBCATEGORY	INDICATOR TITLE
HOUSING CHARACTERISTICS	Median Housing Value
	Median Gross Rent
	Percent Change of Total Housing Units (2000–2010)
	Percent Change of Total Occupied Housing Units (2000–2010)
	Percent Change of Owner-Occupied Housing Units (2000–2010)
	Percentage Change of Renter-Occupied Housing Units (2000–2010)
	Percentage of Single-Family Housing Units (Attached)
	Percent of Single-Family Housing Units (Detached)
	Percent of Multi-Family Housing Units
	HOUSING BURDEN/ AFFORDABILITY
Gross Rent as Percentage of Income	
Ratio of Median Gross Rent to FMR	
Cost Burden – Owner 35% Monthly Income	
Cost Burden – Renter 35% Monthly Income	
Cost Burden – Owner 50% Monthly Income	
Cost Burden – Renter 50% Monthly Income	
Housing Affordability Index	
Housing + Transportation Index (local base)	
Housing + Transportation Index (AMI base)	
HOUSING MARKET	High-Cost Loan Rate
	Foreclosure Rate
HOUSING POLICY	Vacant Units Abandoned
	Housing Capacity per Acre

**TABLE 1C: Social Capital Indicators**

SUBCATEGORY	INDICATOR TITLE
N/A	Access to Combined Civic, Social, Community & Religious Organizations
	Access to Public Institutions
	Percent Population Age 25–44
	Racial Diversity Index
	Percent Population Having High School Diploma or Greater
	Percent Population Having Bachelor’s Degree or Greater
	Median Income
	Percent of Households in Poverty
	Labor Force Participation Rate - Ages 16–64
	Percent of Labor Force Unemployed
	Population Density
	Percentage of Owner-Occupied Housing Units
	Percent Single-Parent Households

**TABLE 1D: Public Health and Safety Indicators**

SUBCATEGORY	INDICATOR TITLE
PUBLIC HEALTH	Cancer Risk
	Neurological Disease Risk
	Respiratory Disease Risk
	Infant Mortality Rates
	Teen Birth Rates
	Percent of Births to Women Receiving Late or No Prenatal Care
	Rate of Low Birth Weight
	Access to Emergency Services
	Emergency Services Coverage Areas
	Access to Social Services
	Access to Hospitals
	Access to Freestanding Ambulatory Surgical and Emergency Centers
	Access to All Other Outpatient Care Centers
	Access to Food Stamps
ENVIRONMENT	Percent of Watershed Fail in Nitrogen and/or Phosphorous
	Access to Parks
	Percent Park
CRIME	Crime Risk Index: Total Crime

**TABLE 1E: Employment and Workforce Indicators**

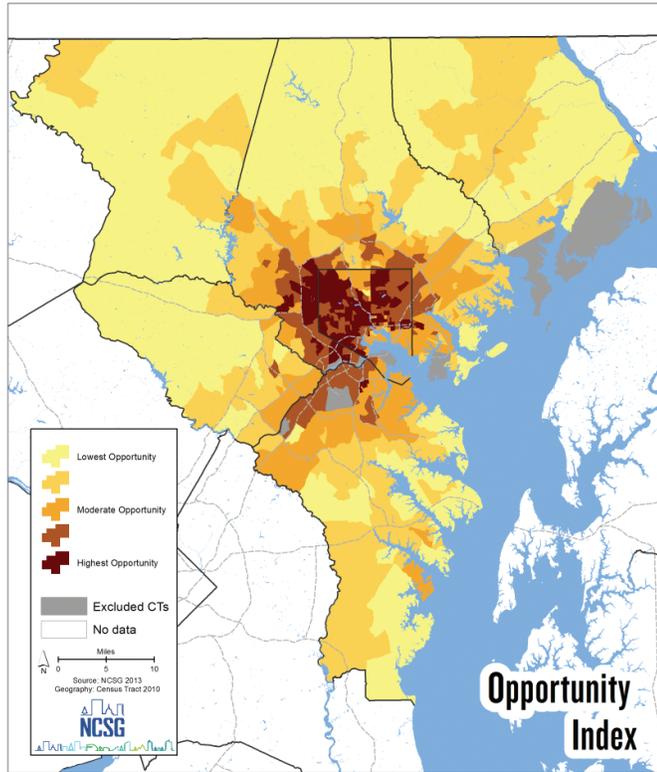
SUBCATEGORY	INDICATOR TITLE
JOBS	Total Job Density
	Total Jobs Accessible by Auto
	Total Jobs Accessible by Transit
	Accessibility Gap Between Transit and Auto
	Percent Change in Total Jobs (2002–2010)
WORKFORCE	Low-Skill Workers
	Middle-Skill Workers
	High-Skill Workers
	Percent Low-Skill Workers
	Percent Middle-Skill Workers
	Percent High-Skill Workers
	Job Access Ratio

**TABLE 1F: Transportation and Mobility Indicators**

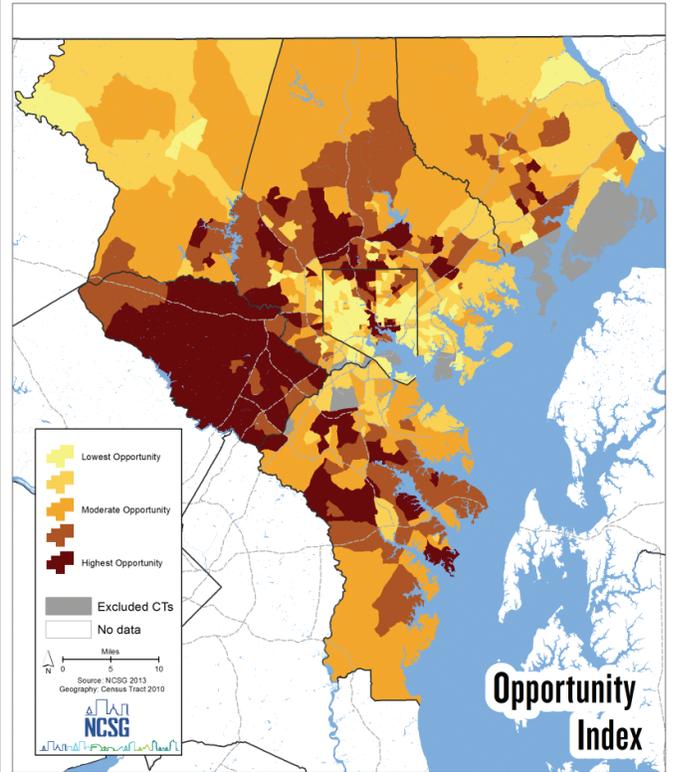
SUBCATEGORY	INDICATOR TITLE
N/A	Travel Time Index
	Driving Commuters: Percent Driving Less Than 30 Minutes
	Commuters: Percent Taking Transit Less Than 45 Minutes
	Transit Access (1/4 Buffer From Transit Stops)
	Transit Connectivity Index
	Walk Score
	Transportation Trail Miles
	Per Capita vehicle miles traveled (VMT) for Home-Based Trips
	Per Capita vehicle hours traveled (VHT) for Home-Based Trips

# Indicator Maps and Final Composite Map from Liu et al., 2014

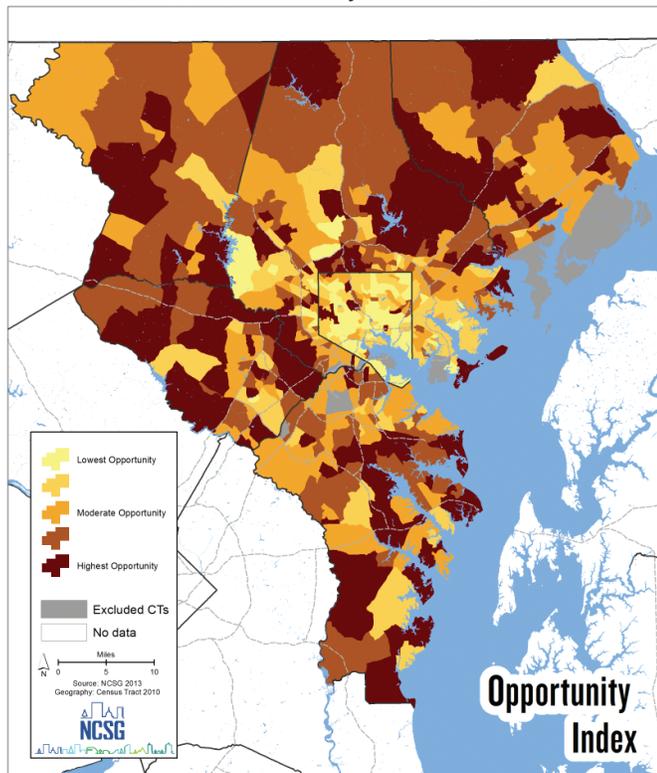
**OMAP Employment & Workforce Index**



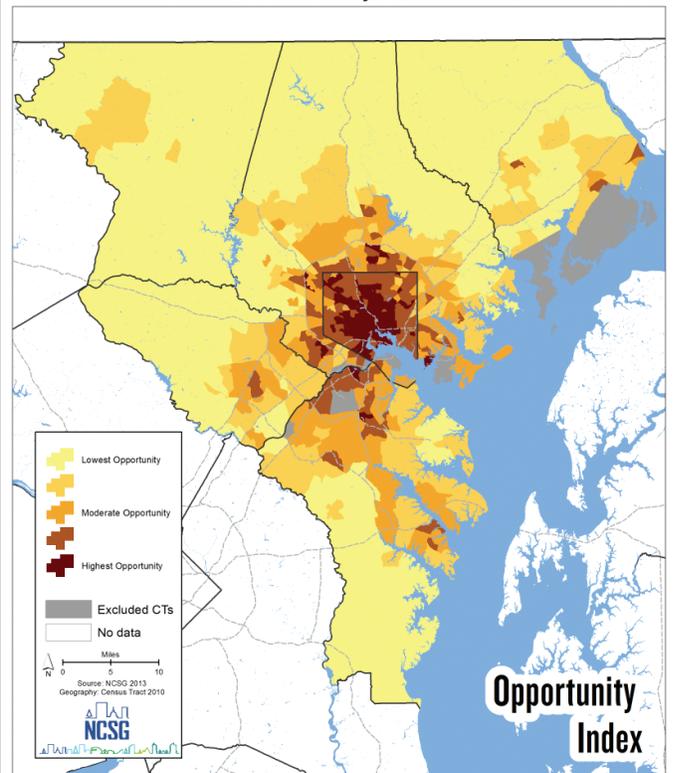
**OMAP Social Capital Index**



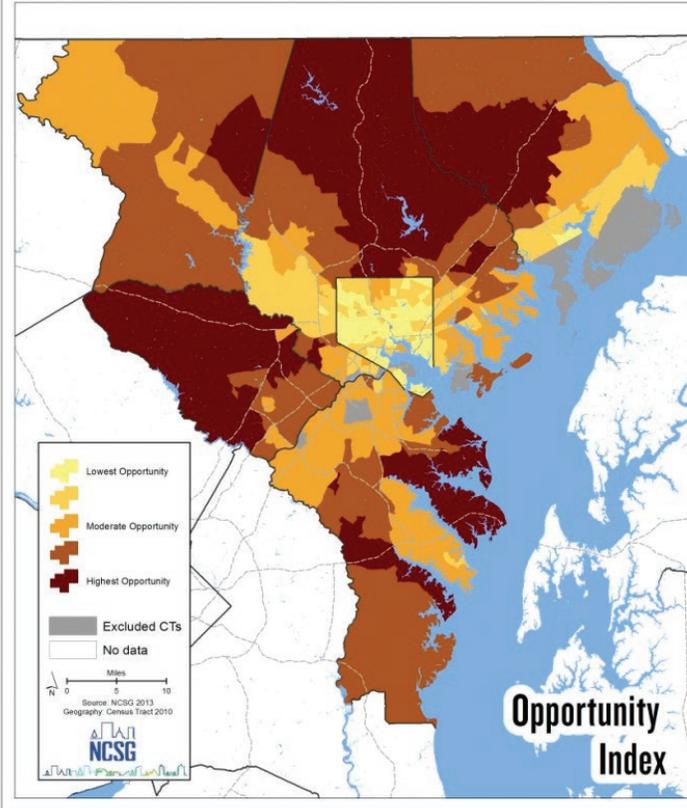
**OMAP Public Health & Safety Index**



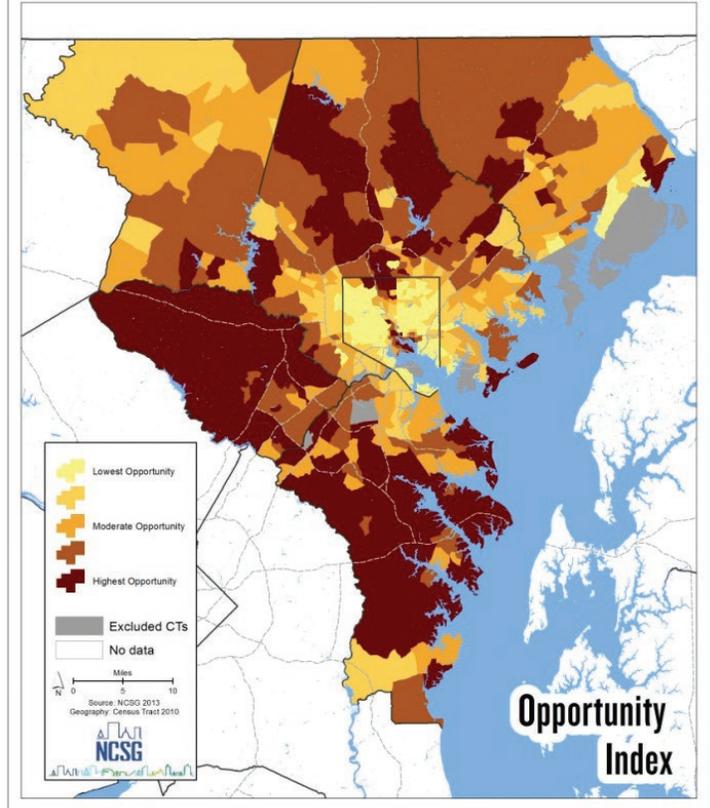
**OMAP Transportation & Mobility Index**



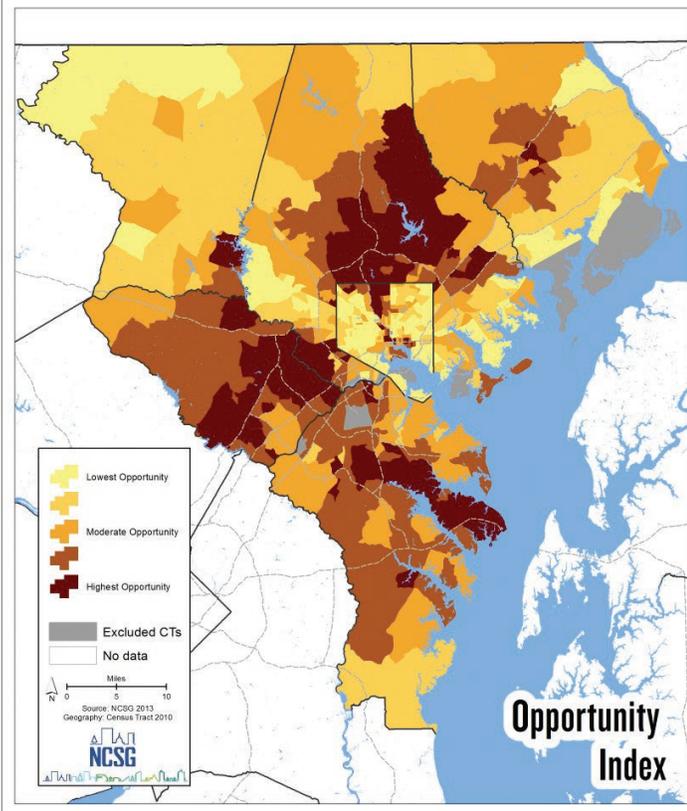
### OMAP Education Index



### OMAP Housing & Neighborhood Quality Index



### OMAP Composite Opportunity Index



## ENDNOTES

1. The earliest well-known use of opportunity mapping was by John Powell during his time at the Kirwan Institute. Powell used the technique in his testimony for the plaintiff in *Thompson v. HUD* in Baltimore, arguing that “[t]he segregation of African American public housing residents isolates them from the opportunities that are critical to quality of life, health, stability, and social advancement.” Powell’s use of layered geographic data to create a standard index of opportunity was an innovation that has since been used in cities and regions across the country.
2. Studies on mobility have shown that the neighborhoods that kids grow up in have lasting impacts on their opportunities in life. Recent papers using data from the IRS have been particularly influential (“The Impacts of Neighborhoods on Intergenerational Mobility: Childhood Exposure Effects and County-Level Estimates” by Raj Chetty and Nathaniel Hendren, and “The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment” by Raj Chetty, Nathaniel Hendren, and Lawrence Katz.).
3. This includes any jurisdiction that applies for a Community Development Block Grant (CDBG), an Emergency Solutions Grant (ESG), or HOME or Housing Opportunities for Persons with HIV/AIDS (HOPWA) funding.
4. Department of Housing and Urban Development. “Affirmatively Furthering Fair Housing; Final Rule.” 80 Federal Register 136 (16 July, 2015), p. 42355.
5. See John Powell’s testimony in *Thompson v. HUD*, available online at <http://www.prrac.org/pdf/johnpowellremedialreport2006.pdf>.
6. Chao Liu, Eli Knaap, and Gerrit Jan-Knaap. 2014. Opportunity mapping: A conceptual analysis and application to the Baltimore Metropolitan Area. Association for Public Policy Analysis & Management Online Paper Collection. Available online at <http://bit.ly/1SXtddg>.
7. From the Puget Sound Regional Council. See <http://bit.ly/1Les15E>.
8. Jason Reece, David Norris, Jillian Olinger, Kip Holley, and Matt Martin. “Place Matters: Using Mapping to Plan for Opportunity, Equity, and Sustainability.” Kirwan Institute.
9. See <http://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>.
10. The mapping tool is at <http://egis.hud.gov/affht/#>, while the more detailed listing of geospatial data is at <https://www.huduser.gov/portal/egis/index.html>.
11. PolicyLink partnered with the Kirwan Institute to provide technical assistance for the SCIRPG program. As part of this, they have produced some guidance for the FHEA requirement. One document in particular lists a number of organization types and suggests what kind of data they can provide. It is available online here: <https://policylink.app.box.com/s/mos08rumcknodboa2byo>.
12. See <http://www.opportunitymatterscentex.org>.
13. See <http://www.socialexplorer.com>.
14. See <http://opendata.dc.gov>.
15. See <http://opportunity.census.gov>.
16. The local data come from Baltimore, Detroit, Indianapolis, Kansas City, New Orleans, New York, Philadelphia, San Francisco and Washington, D.C. See <http://opportunity.census.gov/#build>.
17. The practice of redlining is one of the most well-known and relevant examples of this.
18. Department of Housing and Urban Development. “HUD Advances Opportunity and Fair Housing for Low-Income Renters With Small Difficult Development Areas.” Available at <https://www.huduser.gov/portal/pdredge/pdr-edge-frm-asst-sec-012516.html>.
19. Liu et al., 2014, p. 6.
20. See <http://www.opportunitymatterscentex.org>.
21. Liu et al., 2014.
22. See <http://bit.ly/1T3UEja>.
23. An interactive version of the map is available at [http://www.ctoca.org/opportunity\\_map\\_kirwan](http://www.ctoca.org/opportunity_map_kirwan).
24. See <http://opportunitymoves.org>.

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