

Educational Opportunity in King County

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Introduction

Opportunity mapping provides a tool to help us find the areas of our communities that are experiencing conditions that are preventing people from succeeding in life. Using tools such as the Puget Sound Regional Council's (PSRC's) Opportunity Index, policy makers, nonprofit organizations, and the public at large to know which areas need additional resources to help address unequal access to opportunity in the Puget Sound area.

Methods

PSRC's Opportunity index provides an opportunity score for each census tract in central Puget Sound Region (King, Pierce, Snohomish, and Kitsap Counties), split into five categories: Education, Economic Health, Housing and Neighborhood Quality, Transportation and Mobility, and Health and Environment. This analysis focuses on studying the patterns in King County for the five indicators for educational opportunity identified by PSRC in their 2012 Opportunity Index. All data for the educational indicators was gathered from the Washington State Report Card prepared by the Office of the Superintendent of Public Instruction (See Appendix A – Central Puget Sound Opportunity Indicators Metadata). The following list provides a summary of the indicators, their data sources, and methodology of how the values of the indicators were generated:

- Fourth Grade Reading Proficiency, taken from WASL (Washington Assessment of Student Learning) test scores. Each tract was assigned the average of the reading proficiency scores of the three elementary schools closest to the tract centroid, accounting for school district boundaries (only schools within the tract's school district were used).
- Fourth Grade Math Proficiency, taken from WASL test scores. Each tract was assigned the average of the mathematics proficiency scores of the three elementary schools closest to the

- tract centroid, accounting for school district boundaries (only schools within the tract's school district were used).
- Student Poverty Rates, taken from the percentage of elementary school students receiving free or reduced-price lunches. Each tract was assigned the average of the reading proficiency scores of the three elementary schools closest to the tract centroid, accounting for school district boundaries. Each tract was assigned the student poverty rate of the three elementary schools closest to the tract centroid, accounting for school district boundaries (only schools within the tract's school district were used).
 - Teacher Credentials, taken from the percentage of teachers who have obtained a master's degree or higher. Each tract was assigned the teachers master's achievement rate of the three elementary schools closest to the tract centroid, accounting for school district boundaries (only schools within the tract's school district were used).
 - Graduation Rates of high school students. Each tract was assigned the graduation rate of the three high schools closest to the tract centroid, accounting for school district boundaries (only schools within the tract's school district were used).

This analysis consists of creating an educational opportunity score for each census tract in King County by weighing each of the educational indicators used in the 2012 PSRC Opportunity Index. Each of the indicators was weighted based on the correlation coefficient found during PSRC's analysis of the data as follows:

Indicator	Correlation Coefficient	Weighting Modifier
School Reading Proficiency	0.569806	4
School Math Proficiency	0.565631	4
Student Poverty Rate	-0.594176	4
Teacher Qualifications	0.183252	1
Graduation Rate	0.292436	2

The correlation coefficients for indicators with greater absolute values (i.e., further from zero) are a better predictor of a census tract's opportunity score than those with lower absolute values (i.e. closer to zero). As such, the scores of indicators with correlation coefficients with higher absolute values were given higher weights. The scores were then classified into five groups using the Jenks Natural Breaks classification method. Using this classification method accounts for natural clusters and gaps in data values to ensure that census tracts with similar values are grouped together.

Results

This analysis found that census tracts in North Seattle and in Seattle's eastern suburbs have the highest composite educational index scores (Appendix B1 – Educational Opportunity Index). Census tracts with lower composite educational index scores are concentrated in a corridor in western King County from South Seattle through Federal Way, with smaller pockets in eastern Shoreline and northeast Bellevue.

The geographic distribution of the composite index score corresponds closely with the geographic distribution of reading proficiency (Appendix B2 – Fourth Grade Reading Proficiency), math proficiency (Appendix B3 – Fourth Grade Math Proficiency), and student poverty rates (Appendix B4 – Student Poverty Rates). This outcome is not surprising since these indicators were given higher weights than the other indicators.

The other indicators do not correspond as closely to the educational opportunity index score. The high school graduation rate indicator (Appendix B6 – High School Graduation Rate) is generally higher across King County than the Education Opportunity Index. However, areas with higher and lower high school graduation rates have similar geographic distribution to the areas with higher and lower Education Opportunity Index Scores, respectively.

The geographic distribution of teachers with master's degrees or higher is the indicator that differs the most from the Education Opportunity Index scores. The areas with the lowest rate of

teachers with master's degrees or higher are in Auburn, Bellevue, and Kirkland (Appendix B5 – Teacher Qualifications). Auburn, Kirkland, and portions of Bellevue have Educational Opportunity Index scores generally between moderate and very high. Conversely, many of the areas of South King County that have low or very low Educational Opportunity Index scores have between moderate and high rates of teachers with at least a master's degree. This discrepancy could be the result of school districts hiring teachers with higher credentials in an effort to improve test scores.

Conclusion

The Educational Opportunity Index identifies the areas in King County with high and low degrees of educational opportunity. This information can help policy makers to redirect resources to areas with low educational opportunity (such as South King County) to improve their access to high-quality education. Improving educational outcomes in areas currently experiencing low educational opportunity will help to improve educational equity region-wide.

Appendix A

Central Puget Sound Opportunity Indicators Metadata

Central Puget Sound Opportunity Indicators Metadata

Note: In order to map access to opportunity at the Census tract level, all indicators have either been collected in or converted to the 2010 tract boundaries and FIPS codes. For tract-based data from the 2000 Census or the American Community Survey (ACS), data was translated to its 2010 equivalency through the parent-child relationship of the tract names, and the areal proportion of the 2010 children to the 2000 parent.¹

For data that was originally collected at another geography, (i.e. postal address, traffic analysis zone, or some other coverage) processes were employed to assign a value to each of the 2010 tracts based on the raw data, and a description of these is included in the methodology section of each of the following indicator profiles.

Education Indicators

School Reading Proficiency

Description: The school proficiency rate on the 4th-grade reading exam (WASL)

Field Code: EDU1

Data Source: Washington State Report Card, Office of Superintendent of Public Instruction (OSPI)

Geography: Point-based, School locations

Date: 2010-2011 school year

Methodology: Each tract was assigned the average of the reading proficiency scores of the three elementary schools nearest the tract centroid. This process also considered school district boundaries, so as to assign data to tracts only according to the district in which the tract resides.

Correlation coefficient: 0.569806

School Math Proficiency

Description: The school proficiency rate on the 4th-grade mathematics exam (WASL)

Field Code: EDU2

Data Source: Washington State Report Card, Office of Superintendent of Public Instruction (OSPI)

Geography: Point-based, School locations

Date: 2010-2011 school year

Methodology: Each tract was assigned the average of the mathematics proficiency scores of the three elementary schools nearest the tract centroid. This process also considered school district boundaries, so as to assign data to tracts only according to the district in which the tract resides.

Correlation coefficient: 0.565631

Student Poverty Rates

Description: The percentage of elementary school students receiving free or reduced-price lunches

Field Code: EDU3

Data Source: Washington State Report Card, Office of Superintendent of Public Instruction (OSPI)

Geography: Point-based, School locations

Date: 2010-2011 school year

Methodology: Each tract was assigned the student poverty rate of the three elementary schools nearest the tract centroid. This process also considered school district boundaries, so as to assign data to tracts only according to the district in which the tract resides.

Correlation coefficient: -0.594176

Teacher Qualifications

Description: The percentage of teachers who have obtained a master's degree or more

Field Code: EDU4

Data Source: Washington State Report Card, Office of Superintendent of Public Instruction (OSPI)

Geography: Point-based, School locations

Date: 2010-2011 school year

¹ This methodology assumes normal distribution throughout the tract.

Methodology: Each tract was assigned the teacher master's achievement rate of the three elementary schools nearest the tract centroid. This process also considered school district boundaries, so as to assign data to tracts only according to the district in which the tract resides.

Correlation coefficient: 0.183252

Graduation Rates

Description: The percentage of students who graduated from high school on time

Field Code: EDU5

Data Source: Washington State Report Card, Office of Superintendent of Public Instruction (OSPI)

Geography: Point-based, School locations

Date: 2010-2011 school year

Methodology: Each tract was assigned the graduation rate of the three high schools nearest the tract centroid. This process also considered school district boundaries, so as to assign data to tracts only according to the district in which the tract resides.

Correlation coefficient: 0.292436

Economic Health Indicators

Access to Living Wage Jobs

Description: The percentage of all regional jobs that provide living wages within 15 minutes of travel time by automobile and 30 minutes via public transit.

Field Code: ECON1

Data Source: Puget Sound Regional Council Travel Model (Traffic Analysis Zone (TAZ)) and Covered Employment Estimates. "Searching For Work That Pays", Report from Alliance for a Just Society
http://nwfco.org/wp-content/uploads/2010/12/2010-1209_2010-Job-Gap.pdf

Geography: Traffic Analysis Zone (TAZ)

Date: 2008 - 2010

Methodology: Each tract was assigned a value based on the traffic analysis zones whose centroids are within the tract's boundaries.

Correlation coefficient: 0.546859(% Jobs within 15Min. by Auto) 0.570737(% Jobs within 30Min. by Transit)

Job Growth Trends

Description: The change in number of jobs between 2000 and 2010

Field Code: ECON2

Data Source: Puget Sound Regional Council

Geography: Census Tract

Date: 2000 - 2010 annually

Methodology: For the 2000 tracts, data was translated to its 2010 equivalency through the parent-child relationship of the tract names, and the areal proportion of the 2010 children to the 2000 parent.

Correlation coefficient: 0.064998

Unemployment Rate

Description: The percentage of the civilian labor force who are unemployed

Field Code: ECON3

Data Source: American Community Survey (ACS)

Geography: Census Tract

Date: 2006-2010 5-year estimates

Methodology: None

Correlation coefficient: -0.359840

Housing & Neighborhood Quality Indicators

Housing Vacancy

Description: The percent of all housing units which are vacant

Field Code: NQ5
Data Source: U.S. Census
Geography: Census Tract
Date: 2010
Methodology: none
Correlation coefficient: 0.116735

Foreclosure Rate

Description: The estimated foreclosure rate
Field Code: OVLY1
Data Source: HUD User
Geography: Census Tract
Date: Second Quarter, 2010
Methodology: none
Correlation coefficient: -0.675700

High Cost Loan Rate

Description: The percentage of high cost loan which homes is financed by a subprime mortgage related loan
Field Code: OVLY1
Data Source: HUD User
Geography: Census Tract
Date: 2010
Methodology: none
Correlation coefficient: -0.523992

Housing Stock Condition

Description: The percentage of all households that are in poor condition (have 1.01 or more occupants per room with complete plumbing facilities or lacking complete plumbing facilities)
Field Code: NQ10
Data Source: American Community Survey (ACS)
Geography: Census Tract
Date: 2006-2010 5-year estimates
Methodology: none
Correlation coefficient: -0.282007

Crime Index

Description: An estimated index based on all personal and property crimes relative to total population
Field Code: NQ3
Data Source: Tetrad Computer Applications, Inc. PCensus Dbx
Geography: Census Tract, 2000 boundaries
Date: 2010
Methodology: Data was translated to its 2010 equivalency through the parent-child relationship of the tract names, and the areal proportion of the 2010 children to the 2000 parent.
Correlation coefficient: 0.197745

Transportation and Mobility Indicators

Transportation Cost

Description: The cost of the average commute to work at \$0.50 per mile
Field Code: MT2
Data Source: Puget Sound Regional Council
Geography: Traffic Analysis Zone (TAZ)

Date: 2010

Methodology: Each tract was assigned a value based on the traffic analysis zones whose centroids are within the tract's boundaries.

Correlation coefficient: -0.543292

Access to Transit

Description: The percentage of the total area that is within 1/4-mile of an Express Bus stop

Field Code: MT3

Data Source: Puget Sound Regional Council

Geography: Point, Bus Stop locations

Date: 2010

Methodology: Each tract was assigned a value based on the percentage of the tract's total area that is within a .25-mile buffer of the express bus stops.

Correlation coefficient: 0.561872

Transit Cost

Description: The cost of the average transit fare

Field Code: MT4

Data Source: Puget Sound Regional Council

Geography: Traffic Analysis Zone (TAZ)

Date: 2010

Methodology: Each tract was assigned a value based on the traffic analysis zones whose centroids are within the tract's boundaries.

Correlation coefficient: -0.016901

Walkability

Description: The percentage of all commuters who walk to work

Field Code: HE4

Data Source: American Community Survey (ACS)

Geography: Census Tract

Date: 2005-2009 5-year estimates

Methodology: none

Correlation coefficient: 0.444555

Health and Environmental Indicators

Parks and Open Space

Description: The distance to the nearest park or open space

Field Code: HE1

Data Source: Puget Sound Regional Council

Geography: Polygon, Park and Open Space locations

Date: 2006

Methodology: Each tract was given a value based on the distance between the tract's centroid and the nearest park or open space.

Correlation coefficient: -0.227054

Toxic Waste Release

Description: Pounds of toxic release emitted from toxic waste sites

Field Code: HE2

Data Source: Environmental Protection Agency (EPA)

Geography: Point, Locations of Toxic Release Sites

Date: 2010

Methodology: The indicator is based on the proportion of each site's toxic release within a 2-mile area. Tracts received a value if they were within 2 miles of at least one toxic release site.

Correlation coefficient: -0.306450

Access to Healthy Food

Description: Percentage of tract that is within a food desert

Field Code: HE3

Data Source: Puget Sound Regional Council, Regional Food Policy Council & University of Washington (Identifying Food Deserts Access to Healthy Food in the Puget Sound Region: Puget Sound Food System Assessment)

Geography: Census tract

Date: 2011

Methodology: The indicator is based on the percentage of tract area that is within a qualified food desert.

Correlation coefficient: -0.096407

Overlay Data

Subsidized Housing

Description: The number of housing vouchers and public housing units

Field Code: OVLY2

Data Source: HUD User

Geography: Census Tract

Date: 2008

Methodology: none

Housing Cost Burden

Description: The percentage of all households with income under \$75,000 annually, that spent 30% or more of household income on housing costs

Field Code: NQ8

Data Source: American Community Survey (ACS)

Geography: Census Tract

Date: 2006-2010 5-year estimates

Methodology: None

Disability Status

Description: The percent of the population that has a disability

Field Code: OVLY4

Data Source: American Community Survey (ACS)

Geography: Census Tract

Date: 2005-2009 5-year estimates

Methodology: none

Race

Description: The population of Whites, Blacks, Hispanics, Asians, and Native Americans

Field Code: OVLY5

Data Source: U.S. Census (SF1)

Geography: Census Tract

Date: 2010

Methodology: none

Population

Description: The total number of people living in each census tract

Field Code: OVLY6

Data Source: U.S. Census (SF1)

Geography: Census Tract

Date: 2010
Methodology: none

Poverty Rate

Description: The percentage of people living below the poverty level
Field Code: OVLY9
Data Source: American Community Survey (ACS)
Geography: Census Tract
Date: 2006-2010 5-year estimates
Methodology: none

Public Assistance Rate

Description: The percent of the population receiving public assistance
Field Code: OVLY10
Data Source: American Community Survey (ACS)
Geography: Census Tract
Date: 2006-2010 5-year estimates
Methodology: none

Transit Routes

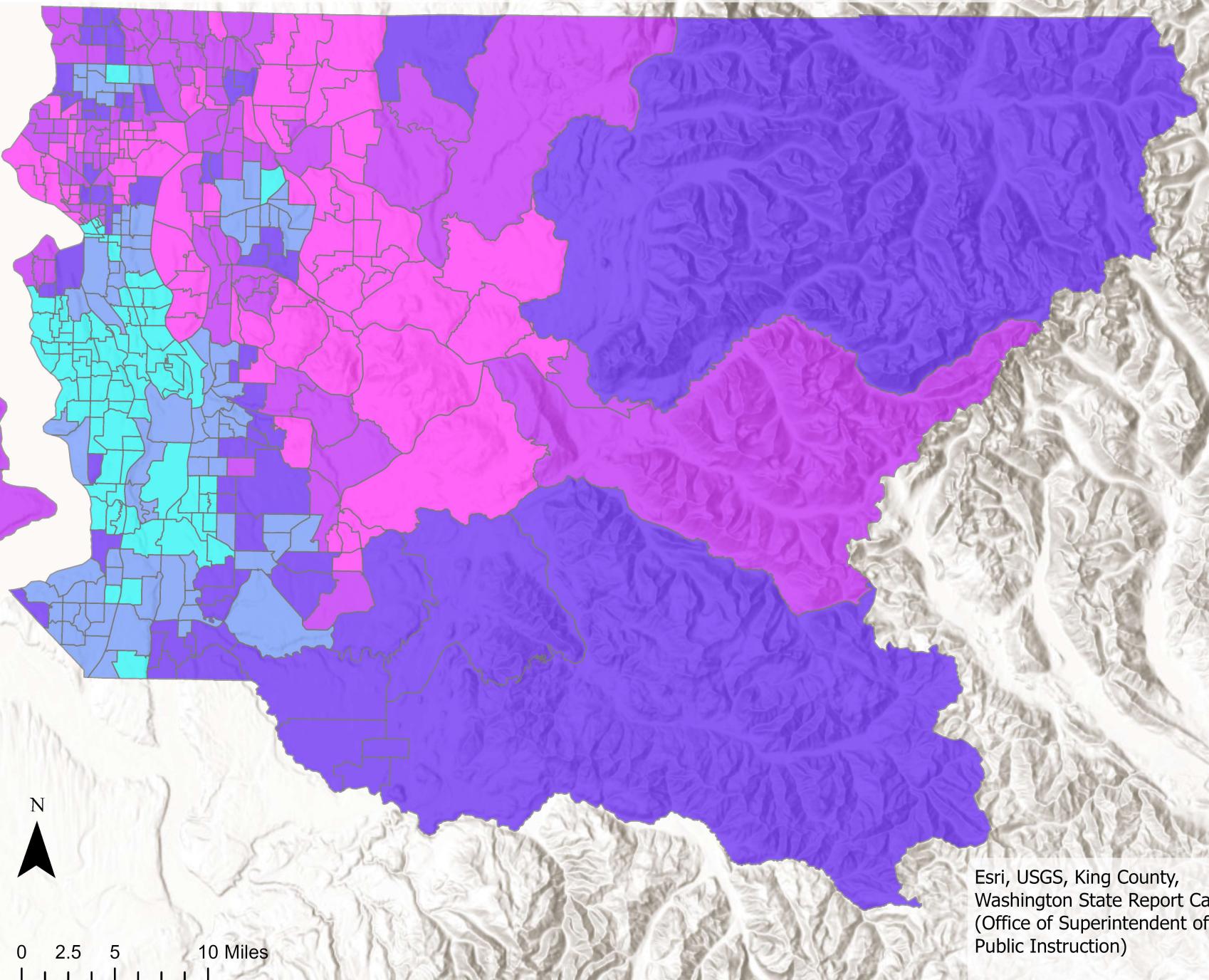
Description: The location of existing and future light rail lines and stations.
Field Code: none
Data Source: Puget Sound Regional Council
Geography: points, polylines
Date: 2008
Methodology: none

Appendix B

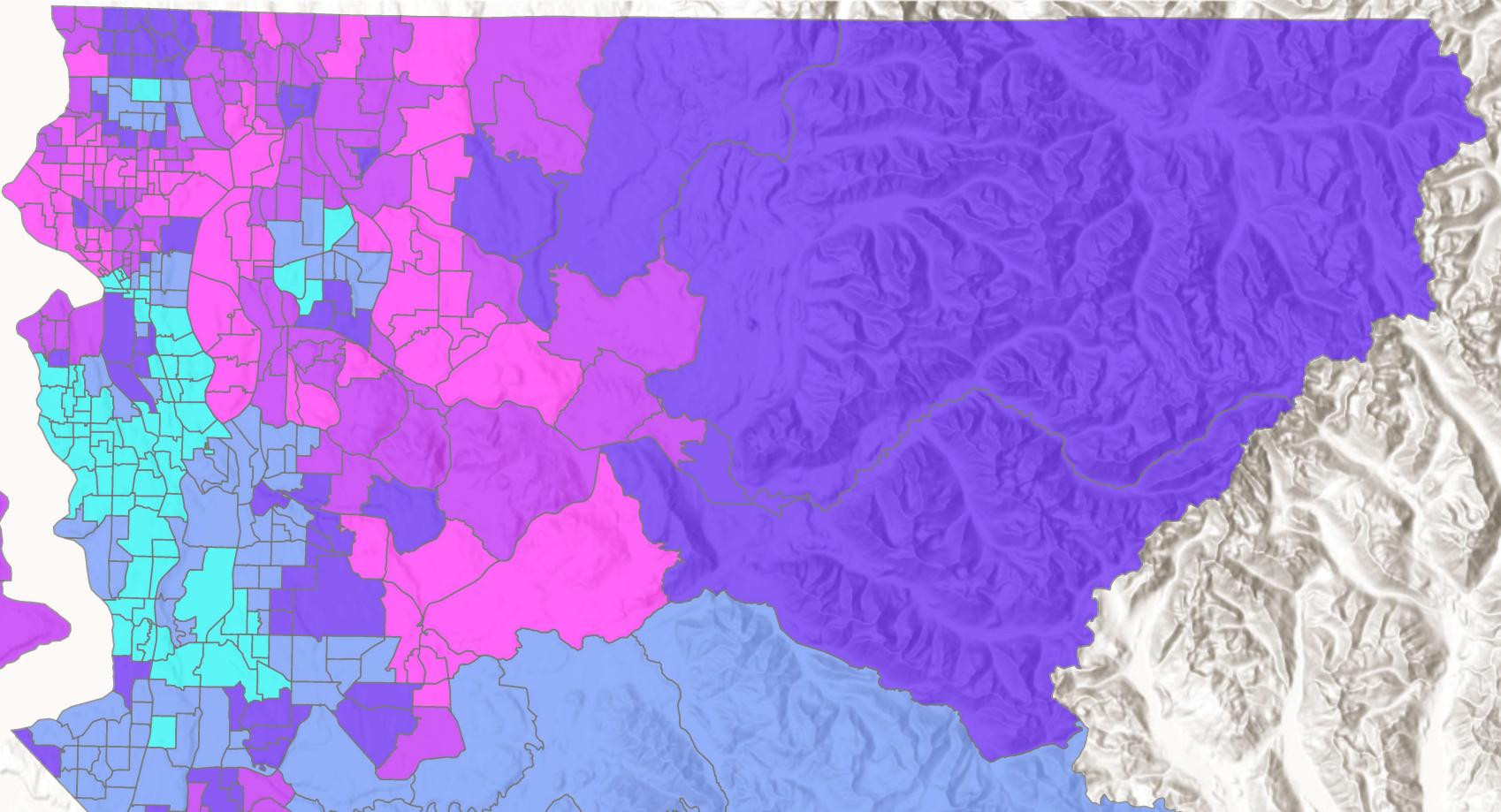
Maps of the Educational Opportunity Index and Component Indicators:

- 1 – Educational Opportunity Index**
- 2 – Fourth Grade Reading Proficiency**
- 3 – Fourth Grade Math Proficiency**
- 4 – Student Poverty Rate**
- 5 – Teacher Qualifications**
- 6 – High School Graduation Rate**

Educational Opportunity in King County: Educational Opportunity Index



Educational Opportunity in King County: Fourth Grade Reading Proficiency

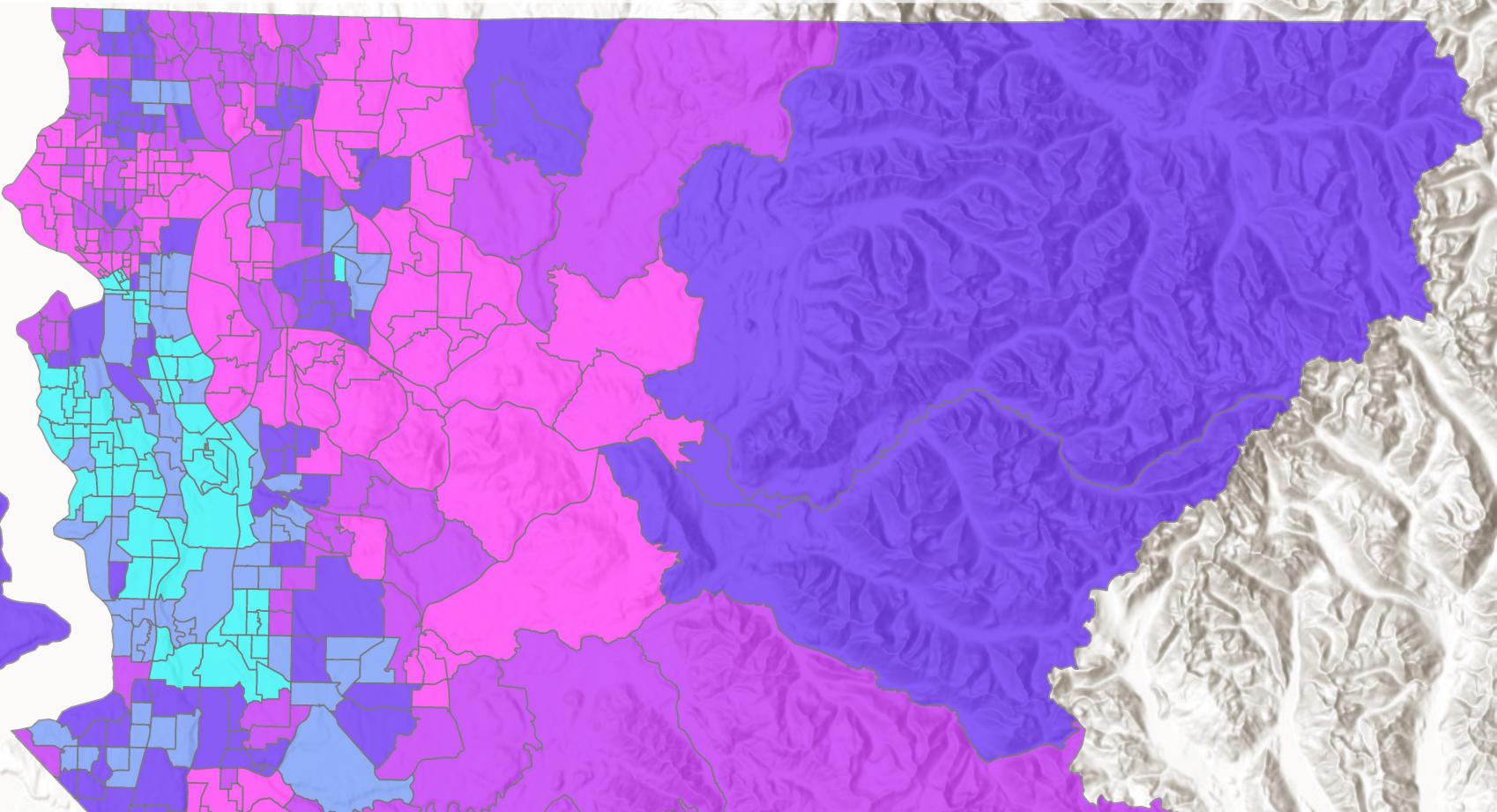


Legend

- King County
Educational
Opportunity
- Fourth Grade Reading
Proficiency - WASL
Test Scores
- | |
|-----------------------|
| 84.897601 - 93.465600 |
| 77.228101 - 84.897600 |
| 68.031301 - 77.228100 |
| 55.923701 - 68.031300 |
| 31.958800 - 55.923700 |
- N
- 0 2.5 5 10 Miles

Esri, USGS, King County,
Washington State Report Card
(Office of Superintendent of
Public Instruction)

Educational Opportunity in King County: Fourth Grade Math Proficiency



Legend

King County
Educational
Opportunity
Fourth Grade Math
Proficiency - WASL
Test Scores

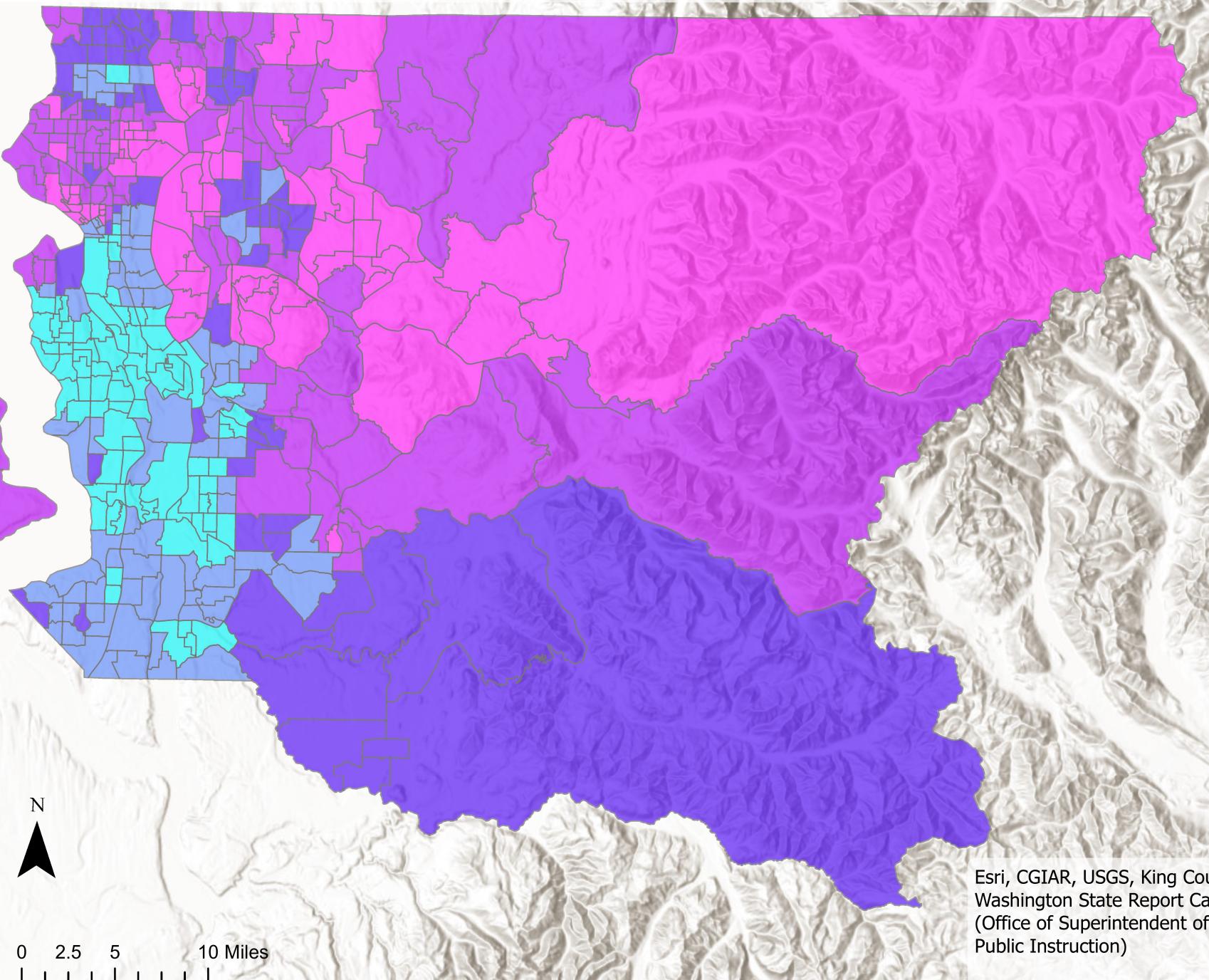
77.416501 - 90.842000
67.548401 - 77.416500
57.459401 - 67.548400
46.657401 - 57.459400
27.143900 - 46.657400



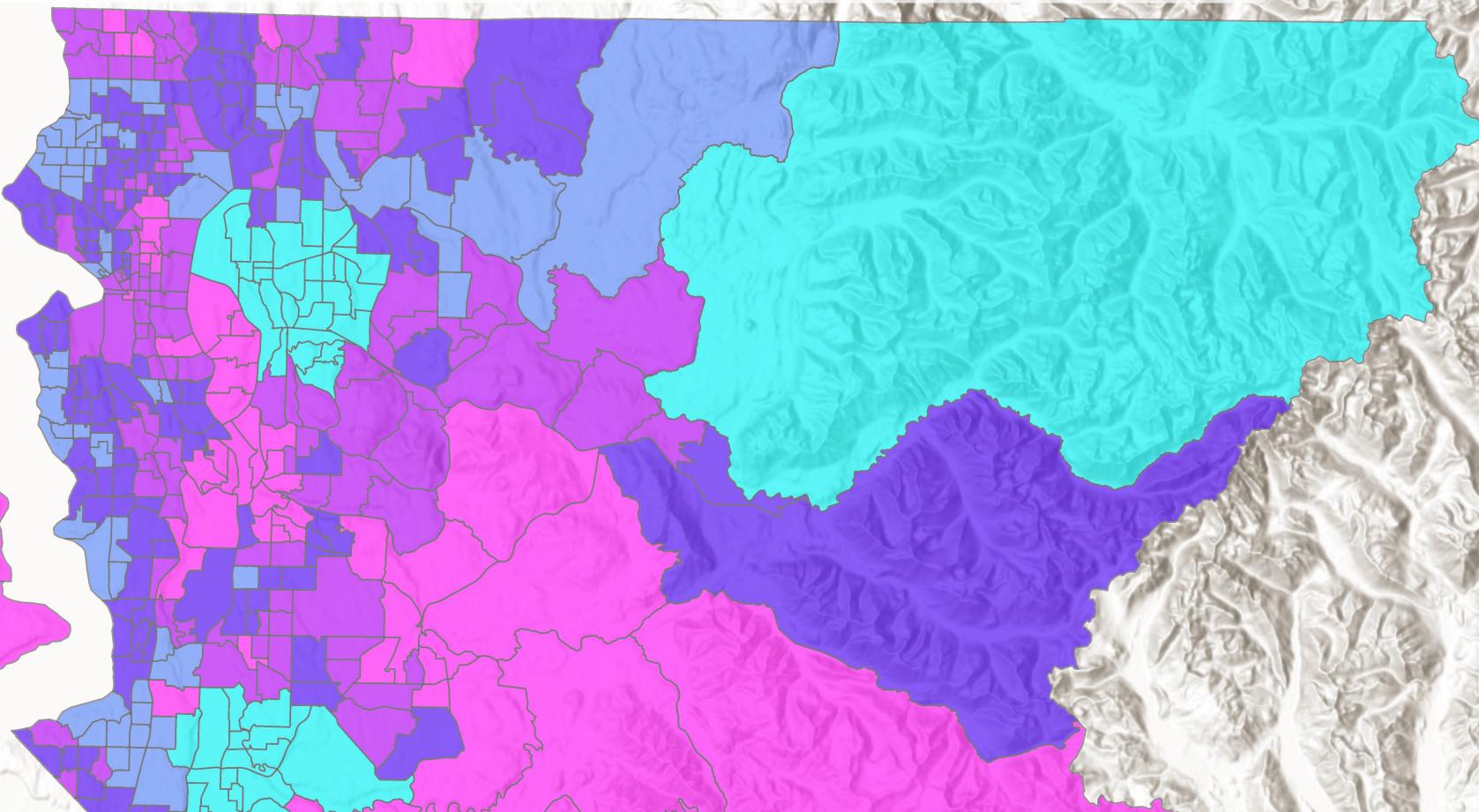
0 2.5 5 10 Miles

Esri, USGS, King County,
Washington State Report Card
(Office of Superintendent of
Public Instruction)

Educational Opportunity in King County: Student Poverty Rate



Educational Opportunity in King County: Teacher Qualifications



Legend

King County
Educational
Opportunity

Percentage of
Teachers With
Masters Degree or
Higher

0.716801 - 0.827700
0.649201 - 0.716800
0.585101 - 0.649200
0.202901 - 0.585100
0.000000 - 0.202900



0 2.5 5 10 Miles

Esri, USGS, King County,
Washington State Report Card
(Office of Superintendent of
Public Instruction)

Educational Opportunity in King County: High School Graduation Rate

