Educational Opportunity in King County

Logan Selley

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This report aims to provide an understanding of this educational opportunity index, both through the direct analysis of the index in Washington State's King County as well as the indexes overall potential usefulness as a tool. Through this analysis, focus will be aimed toward discerning and understanding patterns in educational opportunity in regard to equity, both through the opportunity index itself as well as the individual statistics that are part of it.

The mapping of opportunity indexes such as this one can be an important tool when it comes to regional planning. When done effectively, these indexes can do an excellent job of condensing the numerous statistics and factors that may go into an area of interest or concern and simultaneously make decision making easier and more informed. By simplifying these complex and multi-faceted concepts into an easier to digest format it may become easier to interpret. This does come at a cost, where the index loses all of the detail and nuance of the individual statistics, not to mention the risk that the statistics that make up the index are not properly representative of the subject matter. The only way to mitigate these downsides is to validate the quantitative measures of the index, ideally with elements of public participation and ground truthing. With checks like these in place, it is possible to see where the index's findings may contradict reality as well as gain back some of the much-needed insight that can be so important in decision making.

This index is constructed using a composite average of the Z-scores of 5 individual statistical variables: school reading proficiency, school math proficiency, student poverty rates, teacher qualifications and graduation rates. School reading proficiency was measured using the test scores of 4^{th} graders on a state-wide reading exam known as the WASL by using a sample of the 3 elementary schools closest to the centroid of each census tract. School math proficiency used the same methodology focusing on the mathematics portion of the WASL exam. That same sample of the 3 closest elementary schools was also used to calculate the student poverty rates and teacher qualifications statistic. Student poverty was determined by the percentage of

elementary students who received free or reduced-price lunches from the school. Student poverty is the only inverted variable in this index and was done so to give positive z-scores to tracts with low student poverty rather than vice-versa. Teacher qualifications were determined by the percentage of elementary school teachers who had obtained a master's degree or higher. Graduation rates used a similar methodology, taking the 3 high schools closest to the centroid of the census tract and was determined by the percentage of students who graduated from high school on time. All data for these measures was collected from the Washington State Report Card from the Office of Superintendent of Public Instruction (OSPI).

Examining each measure one by one, we start with school reading proficiency. This data has been mapped out in figure 1 of this report. Cursory examination already tells us a lot as there is a large amount of grouping, not only with the same quintile, but a larger pattern can be found with higher reading scores found in the north than in the south. When it comes to the extremes of this statistic, areas of low and very low test scores are heavily centered around Renton and Kent towards the south-east but do continue upwards in a more limited capacity into Seattle. On the other end of the spectrum, high scores are not quite as homogenous, but is still heavily concentrated around west Seattle to the west, and Sammamish, Kirkland, and Mercer Island towards the center. Although there are some exceptions from this larger north south pattern such as Bellevue, north Seattle, and Auburn, the larger pattern is undeniable.

Math proficiency, illustrated in figure 2 shares a lot of similarities with the first map, which could be expected as the data comes from the same test. The grouping and concentration of both high and low scores is extremely similar, though not without differences. It is a relatively logical conclusion that students that excel at one subject or the other are likely to also do well in other subjects or school as a whole. With these first two measures producing such similar results and measuring relatively similar things compared to the rest of the index, I am unsure if including them both was ideal.

Student poverty rates are the third variable in the index and can be found illustrated in figure 3. Here we see that the overall grouping remains very similar to the first two variables only with even less variation. Exceptions to the north/south grouping have become very few and far between with the most notable exception being north Seattle in the north-east. These findings do make sense though as obviously students have no personal agency in their household income

that would dictate their poverty status that might cause more varied results. And it should be expected that such a statistic would heavily correlate to areas with lower property values.

The fourth and perhaps most interesting variable is teacher qualifications as depicted in figure 4. Interesting because this statistic is by far the most different from the quite apparent pattern of the first 3 variables. There remains a large amount of grouping, but the discrepancy between north and south King County is nowhere to be seen with this variable. The largest groupings of lowest qualifications are in Bellevue towards the center and Auburn/Federal Way in the south-east, far more distributed than previous variables. As for higher qualified areas the grouping is a little more spread out, but some areas that scored low in the previous variables do very well here such as in Renton towards the south-center. Some of this large shift can perhaps be explained by how tight the classifications are in this variable in comparison to the others of this index. The small range of the classes would make it comparatively easy for a few points to be a major difference in terms of classification, increasing the variation we see in the map, but it still does not account for the large shift in the pattern.

Finally, we come to graduation rates, shown in figure 5. This variable marks more of a return to the previously identified pattern as grouping remains very high with a clearer north/south delineation and much less variation than seen in the teacher qualifications variable. One major distinction in this variable is the division of Seattle with more than half of districts coming in as below moderate level. Conversely, we see Shoreline to the north-east excel into the very high category along with Bellevue, Sammamish, and Issaquah in the center. Beyond that most other areas fit with what we have seen before with Federal Way, SeaTac and South Seattle clustering the majority of low and very low classifications along the south-east.

Now combining all of these measures and examining the composite map depicted in figure 6 we do still see a lot of the patterns that were previously apparent carry over. Grouping is overall very consistent, but especially so with lower scores, concentrating in areas around Burien, Renton, and Kent. Conversely on the other end, very high opportunity is also highly concentrated, primarily in more suburban areas including Sammamish, Issaquah, Snoqualmie and Redmond. These groups on both ends are rather monolithic representing the vast majority of these classifications, but there are pockets outside of them such as Bellevue scoring low/very low and Mercer Island and West Seattle classified as very high opportunity. There are only 2 visible

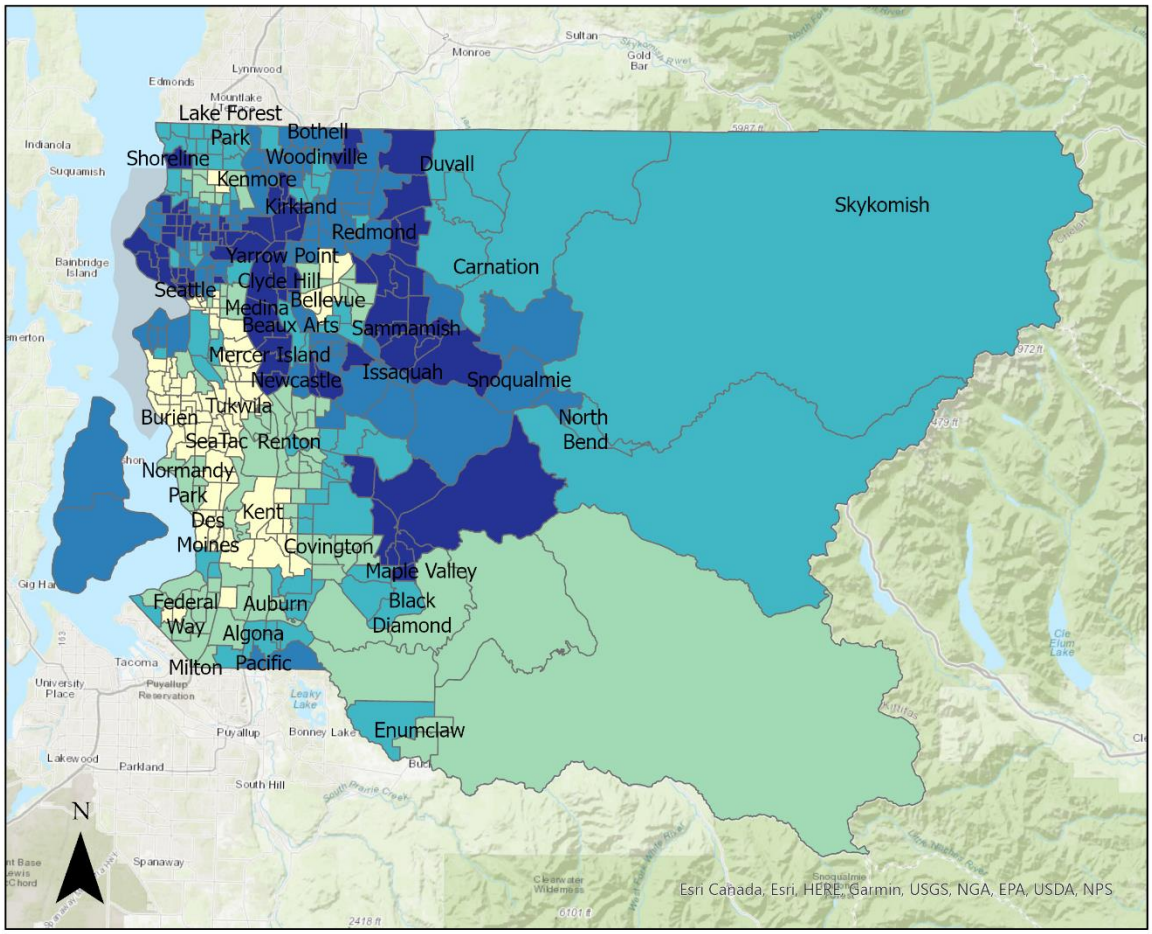
instances of a very high opportunity tract bordering a very low one in the areas around Mercer Island and Bellevue. Mercer island is of course separated by lake Washington, similarly, the Bellevue transition is separated by lake Sammamish, justifying the sudden shift with a geographic barrier. All in all, the composite scores for King County cover a wide range, with fairly well spaced quintile classifications, suggesting that the wide range is not the work of outliers alone. Instead, it indicates that according to the measures of this index there is wide variance in educational opportunity in King County and looking at this map that inequality is nothing if not concentrated. By these variables not only is opportunity highly concentrated (primarily in Sammamish), but the lack of opportunity is as well (centered around Burien).

With composite scores ranging from -1.566 to 1.231 it is clear that the students on these extremes are having very different educational experiences and empirically from this index, a student from the Sammamish area will have far more opportunities to succeed compared to a student in Burien. Even the ranges of the less extreme classifications are far too apart for the educational opportunity of King County to be considered equitable by the standards of this index. Within the Moderate classification alone the data ranges nearly 0.5 points from -0.184 to 0.320. This wide variation of scores paired with the immense grouping of the classifications illustrates not only great variance within the county's education systems, but systematic variance where the same areas consistently score low and the same areas consistently score high, and that means there is much more work to be done to ensure greater educational equity.

References

Seattle GeoData, Municipal Boundaries. Seattle Wa: Seattle Geodata, 11/19/2020. https://data-seattlecitygis.opendata.arcgis.com/datasets/d508083ebd7d444b9997639af845937d_1

Washington State King County School Reading Proficiency 2010-2011



School Reading Proficiency

Z-Score Quintiles

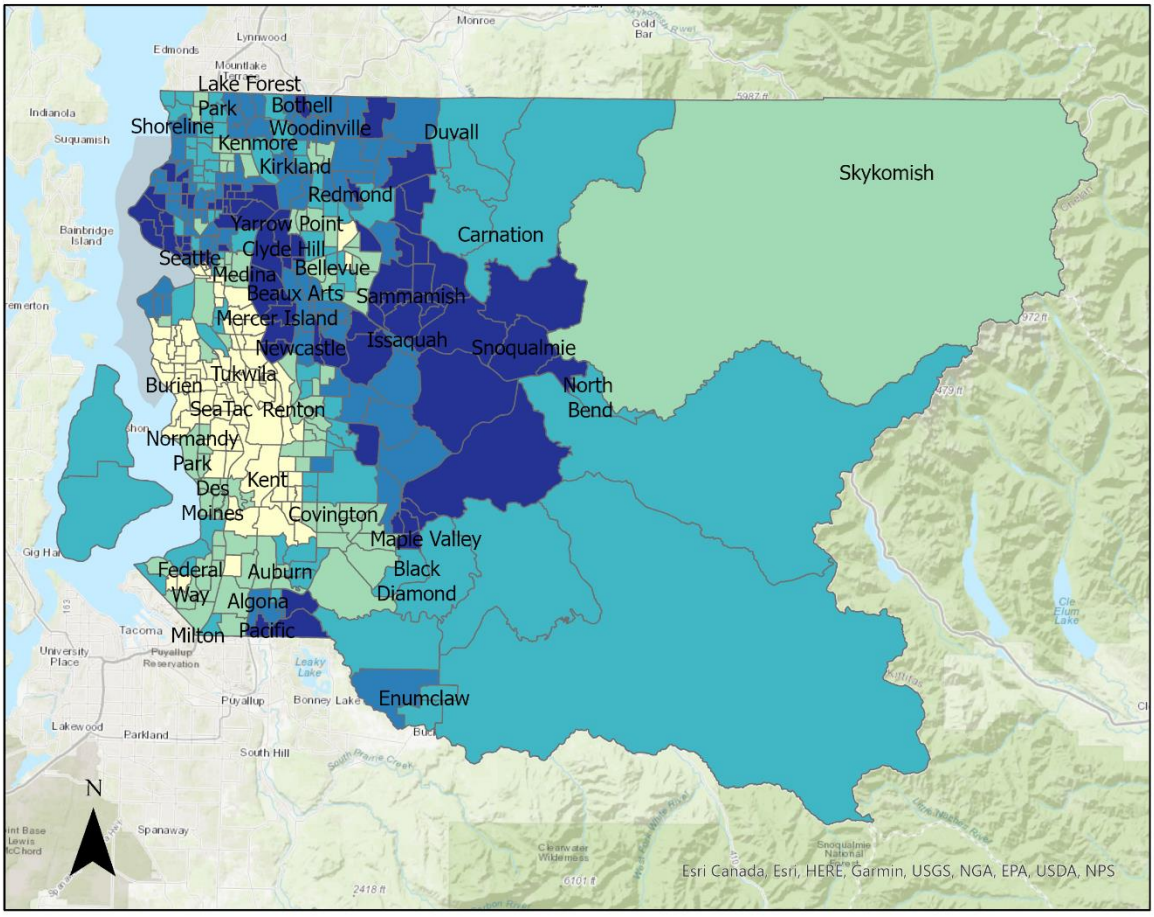
- Very Low (≤ -0.87)
- Low (≤ -0.29)
- Moderate (≤ 0.53)
- High (≤ 0.97)
- Very High (≤ 1.55)

All Data collected from the Washington State Report Card and the Office of Superintendent of Public Instruction (OSPI) for the 2010-2011 school year.

Scores taken from the 4th Grade WASL reading exam.

Figure 1

Washington State King County School Math Proficiency 2010-2011



School Math Proficiency

Z-Score Quintiles

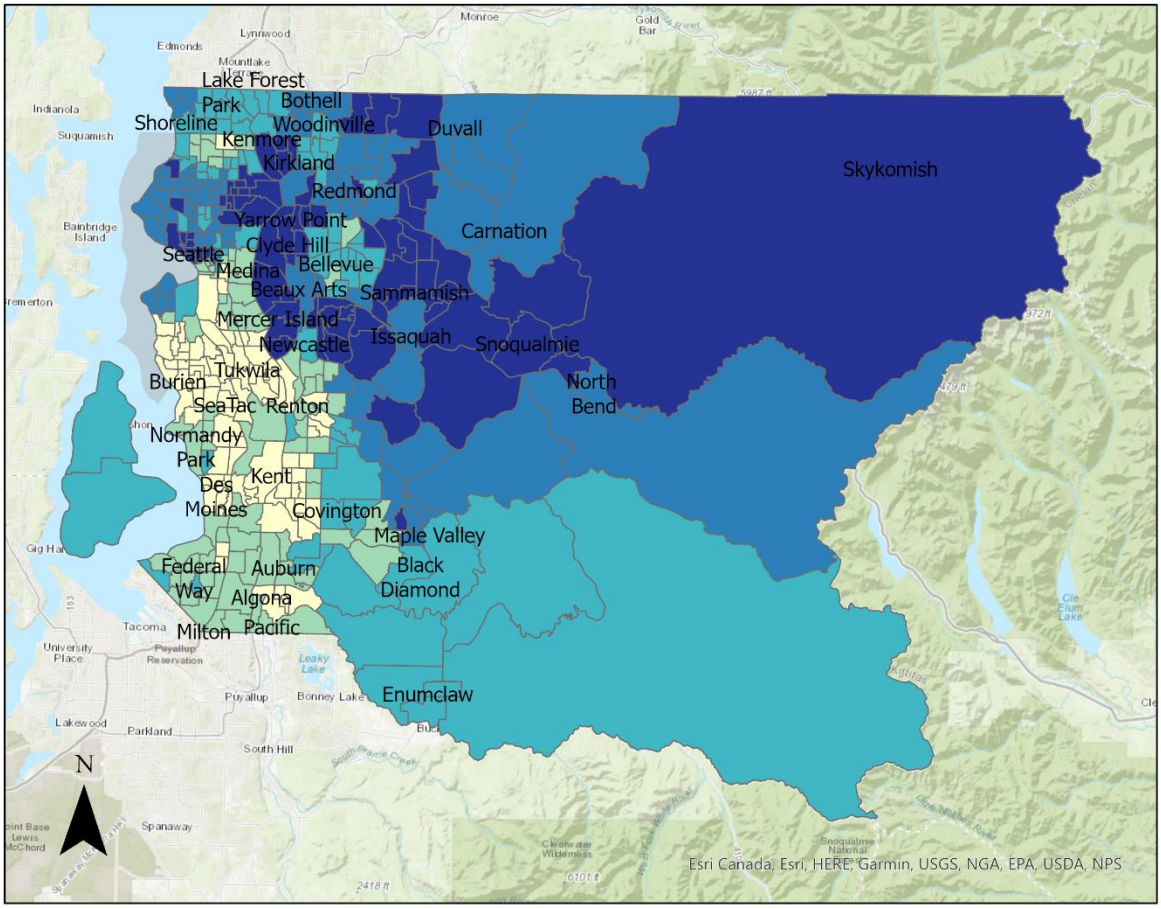
- Very Low (≤ -0.98)
- Low (≤ -0.23)
- Moderate (≤ 0.42)
- High (≤ 1.00)
- Very High (≤ 1.69)

All Data collected from the Washington State Report Card and the Office of Superintendent of Public Instruction (OSPI) for the 2010-2011 school year.

Scores taken from the 4th grade WASL mathematics exam.

Figure 2

Washington State King County Student Poverty Rates 2010-2011



Student Poverty Rates

Z-Score Quintiles (Inverted)

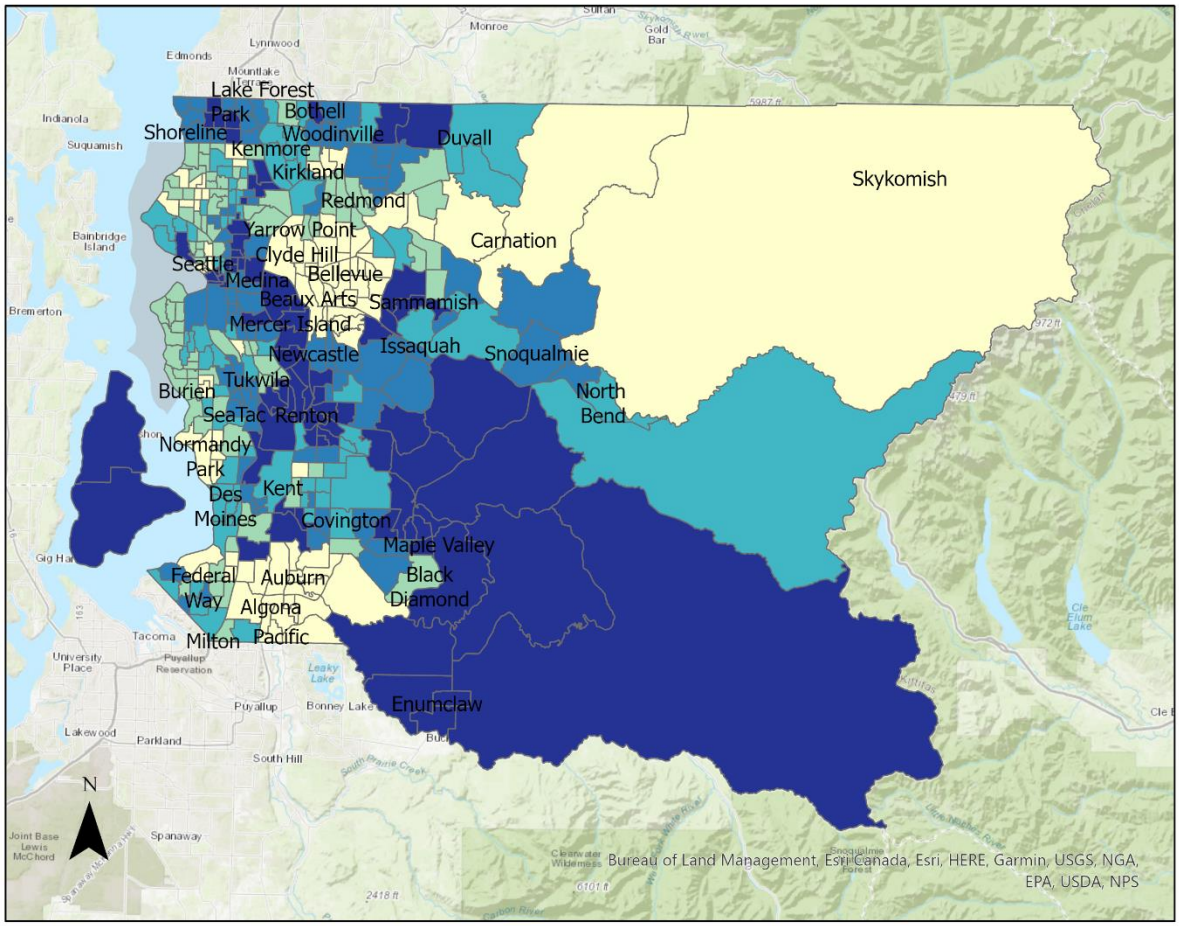
- Very Low (≤ -1.10)
- Low (≤ -0.30)
- Moderate (≤ 0.60)
- High (≤ 0.95)
- Very High (≤ 1.56)

All Data collected from the Washington State Report Card and the Office of Superintendent of Public Instruction (OSPI) for the 2010-2011 school year.

Percentage of elementary school students receiving free or reduced-price lunches. Z-Scores inverted to match composite index.

Figure 3

Washington State King County Teacher Qualifications 2010-2011



Teacher Qualifications

Z-Score Quintiles

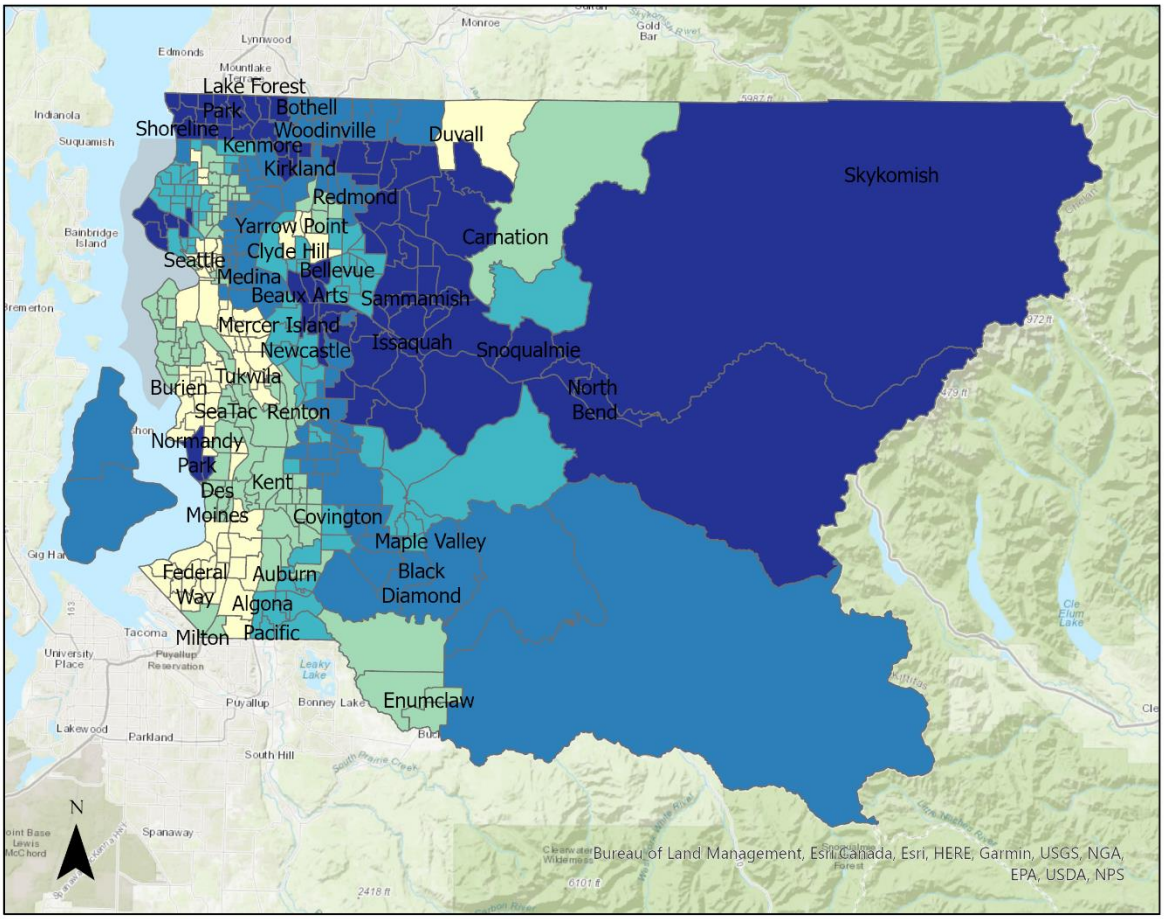
- Very Low (≤ -0.05)
- Low (≤ 0.16)
- Moderate (≤ 0.37)
- High (≤ 0.58)
- Very High (≤ 1.20)

All Data collected from the Washington State Report Card and the Office of Superintendent of Public Instruction (OSPI) for the 2010-2011 school year.

Percentage of teachers who have obtained a master's degree or more.

Figure 4

Washington State King County Graduation Rates 2010-2011



Graduation Rates

Z-Score Quintiles

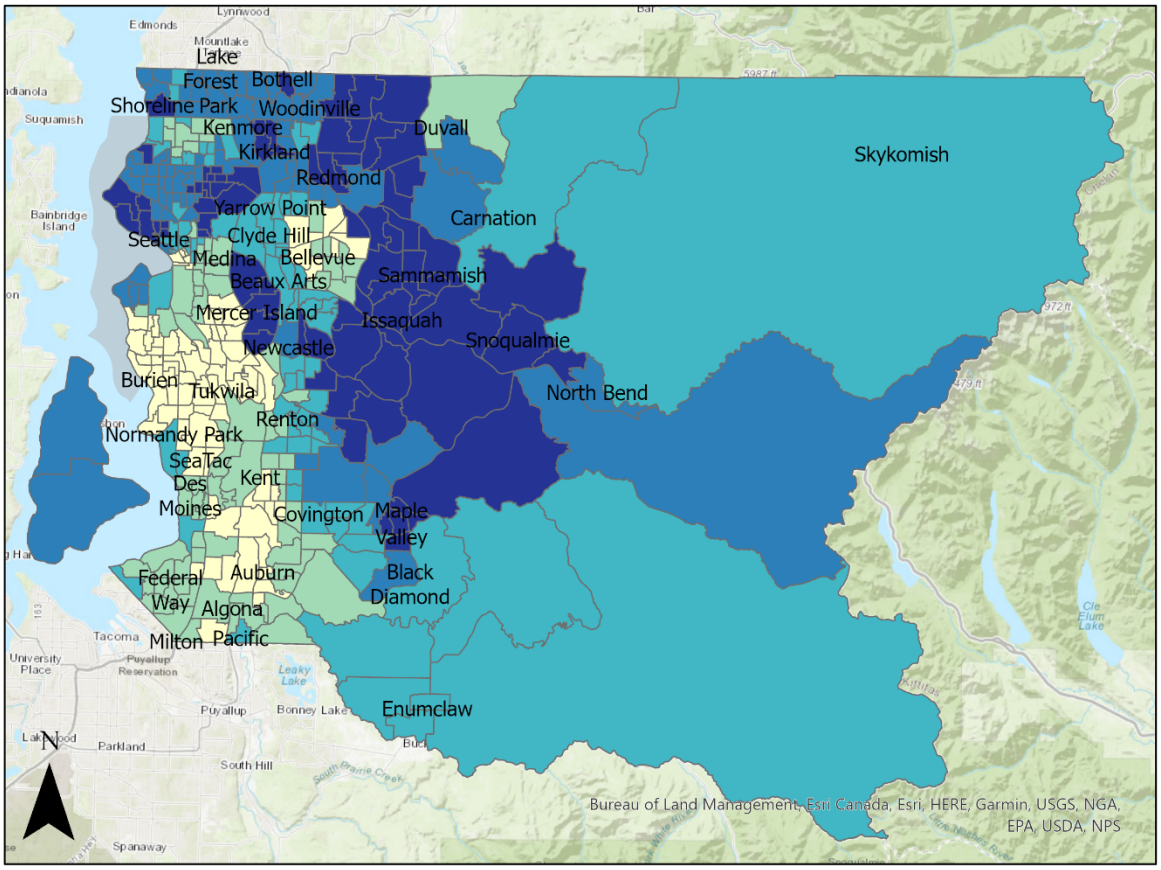
- Very Low (≤ -0.59)
- Low (≤ 0.10)
- Moderate (≤ 0.39)
- High (≤ 0.88)
- Very High (≤ 1.37)

All Data collected from the Washington State Report Card and the Office of Superintendent of Public Instruction (OSPI) for the 2010-2011 school year.

Percentage of high school students who graduate on time.

Figure 5

Washington State King County Education Opportunity Index 2010-2011



Education Opportunity Index

Composite Score

- Very Low (≤ -0.72)
- Low (≤ -0.18)
- Moderate (≤ 0.32)
- High (≤ 0.69)
- Very High (≤ 1.23)

All Data collected from the Washington State Report Card and the Office of Superintendent of Public Instruction (OSPI) for the 2010-2011 school year.

Figure 6