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Equity Analysis of Portland's Draft Bicycle Master Plan – Findings

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To: **Ellen Vanderslice, PBOT**

From: **Jennifer Dill, Ph.D. and Brendon Haggerty**
PSU Center for Transportation Studies

Re: **Equity Analysis of Portland's draft Bicycle Master Plan – Findings**

Background

This memorandum presents the initial findings of our examination of equity as it relates provision of new bicycle facilities in the proposed 2030 Portland Bicycle Master Plan. In an effort to make cycling a more attractive mode to historically disadvantaged populations, this analysis identifies areas of the city where such populations live, work, learn, play, and shop for groceries. The City of Portland's Bureau of Transportation contracted with Portland State University to conduct the analysis. This memo provides the results of our findings.

Portland's current bicycle network has brought the city into the national spotlight as a leader in the provision of cycling infrastructure. As the city looks forward to 2030 with ambitions of becoming a truly world-class bicycling city, it is clear that if the Draft Plan is fully implemented, nearly all of the city will be covered by a dense network of bikeways. *The question of equity in the future is therefore not so much one of network coverage or lack of coverage, but of project priority and timing of implementation.* The current network, while outstanding relative to other cities, nevertheless has certain service gaps where network coverage is sparse. Identifying where service gaps overlap with disadvantaged populations can help the city prioritize projects from the Draft Plan to serve these groups.

The approach of this study was guided by a Public Health/Equity Objective developed during the planning process. This objective urged action to "perform equity gap analysis that includes demographic/income indicators overlaid with existing bike facility gap analysis to inform priority settings where people live, learn, work, and play." In addition to these four categories, we also address bicycle access to transit in recognition of the reality that many outlying neighborhoods are not within a 3-mile bikeable distance to important destinations.

Method

The majority of analysis was carried out in GIS using data provided by PBOT and the 2000 US Census. Census block groups are the unit of analysis. This unit was chosen because it is the smallest area for which income, race/ethnicity, and age data are available. There are 442 block groups in the City of Portland, with an average size of 0.30 square miles.

The analysis uses the following indicators of disadvantaged populations:

- percent of population that is a racial or ethnic minority;
- percent of population living in poverty;
- percent of population aged 1-18; and
- percent of population aged 65 or older.

We created categories for each of the equity indicators, as shown in Table 1. Language ability was also examined. However, given the time available for the analysis, we did not do so to the same extent as the other indicators and do not present those results here. Note that poverty category descriptions ("high", "medium", etc.) refer to the *portion of the population living in poverty*, not to the degree of poverty experienced (how poor they are).

Table 1: Equity Indicators

	Description	Values	# Block Groups
Income	High Poverty	> 14.75%	148
	Medium Poverty	7.04% - 14.75%	147
	Low Poverty	< 7.04%	147
Race/Ethnicity	Above citywide average percent non-white	> 21.91%	171
	At or below average citywide percent non-white	<= 21.91%	271
Age: Youth (1-18)	Above average citywide average percent youth	> 20.52 %	235
	At or below citywide average percent youth	<= 20.52%	207
Age: Older Adults (65+)	Above citywide average percent older adults	> 11.26%	180
	At or below citywide average percent older adults	<=11.26%	262

The activity types included in the analysis encompassed where people live, work, learn, work, play, access services, and access transit. The block groups were used to describe bikeway network access in relation to where people live. For other destinations listed in Table 2, new units of analysis were created. Network buffers were drawn around each destination, with distance varying depending on the type of activity (e.g. longer for work destinations than for play). The term "network buffer" refers to the distance it is possible to travel from a specific point using the existing street network, as opposed to a straight-line distance. These buffers effectively form a service area for each destination point. Demographic attributes were then calculated for each service area using the analysis technique of apportionment. Apportionment assumes an equal spatial distribution of a population within a block group and ascribes the characteristics of that population to the service area based on percentage of overlap. For example, if 23% of a block group is within a service area, then 23% of the block group's population is assigned to the service area. Service areas were then categorized according to the categories in Table 1.

Table 2: Activity Types

Activity Type	Input Data	Network Buffer Size*
Live	Census 2000 block groups	Not applicable
Work	Employment centers (includes downtown, Lloyd District, Swan Island, Central Eastside, Northwest Industrial, and Rivergate)	4 miles
Learn	K-12 schools PCC campuses	K-12: 1 mile PCC: 4 miles
Play	Parks Active Parks (includes community centers, swimming pools, tennis courts) Community Gardens	Neighborhood: 1.5 miles Active Parks: 3 miles Gardens: 1 mile
Access Services	Full service grocery stores	1.5 miles
Access Transit	MAX and streetcar stations	

*Assumption for a reasonable bicycle trip distance

The linear miles of bikeway network in each service area were then summed and divided by the area, resulting in the service metric of *bikeway miles per square mile.* This was done for both the 2009 existing network and the 2030 planned network. Comparing the average (mean) bikeway miles per square mile by the categories described in Table 1 was the first step in determining where differences in service exist. We used common statistical tests (t-test and ANOVA) to see if there were significant differences between the groups. A second layer of analysis visually displays the findings by identifying the service areas or block groups that currently have low levels of service and a disadvantaged population.

Following this method, the findings have two parts. First, we have identified significant differences in bikeway miles per square mile based on equity indicators. Second, the geographical locations of any such differences were mapped using GIS. Mapping of these differences employed a "high-low" process to identify service areas that have a higher than average percent of a given disadvantaged group, and are also in the lowest quartile of service areas in terms of bikeway miles. This process makes it easy to visualize areas with high needs and low service.

The "high-low" approach does present a problem in that it focuses on comparisons between service areas *within* activity types. For example, a low service area around a MAX/Streecar station is low service relative to other stations, but not for the city as a whole. Examples of these differences are shown in Table 3. This occurs because most destinations, particularly rail stations, are not randomly distributed throughout the City. In the case of rail stations, they are located in areas with relatively high density of bikeways. Therefore, the cut-off for the *lowest* level of bikeway service for stations is 7.0 miles per square mile. A block group with that level of service would be in the *highest* quartile.

Table 3: Examples of Quartile Cut-off Points

Bikeway miles/sq. mile (quartiles)	Block groups	K-12 Schools	Grocery Stores	MAX and Streetcar Stations
Lowest	0.0-1.50	0.00-2.70	0.54-2.64	0.94-7.00
2nd	1.51-3.66	2.71-3.44	2.65-3.40	7.01-9.07
3rd	3.67-6.53	3.45-5.58	3.41-4.41	9.08-10.05
Highest	6.54-23.56	4.59-10.13	4.42-8.48	10.06-33.08

To remedy this, there are two sets of maps, one relative only to activity types and one using the quartile cut-offs from the block groups as a consistent measure. In some cases (e.g. MAX/Streetcar stations and employment centers), there are no service areas in the lowest block group quartile. In this sense, the relative quartiles can be characterized as a more conservative measure, as using them always results in a low service area. The maps using the activity type quartiles appear in this memo. All of the maps were provided to PBOT for their use. One more consideration to make when viewing maps is that PBOT bikeways do not extend beyond city limits. Therefore, service areas that cross the city boundary are likely to appear as having fewer bikeway miles per square mile.

Findings

Following a general overview, we present the findings below by activity type. In some cases, certain groups have been given emphasis in the discussion. For example, youth are highlighted in the section covering bikeway access in school areas. Unless otherwise stated, findings refer to the status quo, not the 2030 planned network or population. This is consistent with the intention of providing a basis for prioritization of projects. The report concludes with sections focusing on development of low stress bikeways and on the phasing of planned projects.

Overview

Poverty

For most activity service areas and for block groups, the average bikeway miles per square mile are greater for low-income populations. The only exception is community garden service areas, though the difference is not statistically significant. The high level of service in high poverty areas reflects the poverty of many central city neighborhoods where there is a dense existing bikeway network.

Race

Service areas with a higher than average percentage of minorities had lower levels of service for five of the nine activity categories. However, these differences were shown to be statistically significant only for K-12 schools and full service groceries.

Age: Youth

Youth is unique among the four equity indicators, in that there are consistent findings of significant difference in service levels. For all activity service areas except community

gardens, there are fewer bikeway miles per square mile in areas with an above average percentage of youth. These findings were significant in four cases, including K-12 schools. This reflects the higher percentages of youth in outlying neighborhoods with less dense bikeway networks. The maps accompanying findings of statistical significance are helpful in clarifying these differences.

Age: Older Adults

The only finding of significance regarding older adult populations relates to full-service grocery stores. On average, grocery store service areas with higher than average older adult populations have significantly fewer bikeway miles per square mile. This is perhaps the activity most important to aging populations out of any included in this study, and represents a potential area of emphasis in the prioritization of projects.

Where People Live

Table 4 gives an overview of the mean number of bikeway miles per square mile for block groups by equity indicator. The analysis shows there are significant differences in average bikeway miles based on percent of population in poverty. On average, high poverty block groups have significantly more bikeway miles per square mile. Nevertheless, mapping the individual block groups reveals that there are some high poverty areas that have low levels of bicycle service (see Figure 1). Some of the neighborhoods containing these block groups are in fact among the best-served in all of Portland, though one or more block groups is in the high poverty/low service category. Lents is an example of a neighborhood with high network density, though a solitary block group is poorly served.

Table 4: Block group bikeway access by equity indicator

		Avg Bikeway Miles per Square Mile		Avg Low-Stress Bikeway Miles per Square Mile	
		Current (2009)	Planned (2030)	Current (2009)	Planned (2030)
Poverty	Low poverty	3.71	12.95	1.59	7.01
	Medium poverty	4.13	14.51	1.27	7.28
	High poverty	5.64*	16.98[a]	1.87*	7.75
Race	At/Below average non-white	4.56	13.86	1.80	6.75
	Above average non-white	4.38	16.31*	1.24	8.28
Youth	At/Below average age 1-18	5.42	16.10	2.16*	7.98
	Above average age 1-18	3.68*	13.68*	1.07	6.78
Older adults	At/Below average 65+	4.70	15.17	1.78	7.50
	Above average 65+	4.18	14.28	1.28	7.12
All	n=441	4.49	14.81	1.58	7.34
	Range	0 - 23.56	2.49 - 78.84	0 - 19.46	0 - 66.72

* Indicates that this is significantly different from the other categories, $p<0.05$

[a] This is significantly higher than the low-poverty group, but not the medium poverty group.

Where race and ethnicity are concerned, many of the same block groups are affected. There is no significant difference in average bikeway miles per square mile between block groups based on percent minority population. As with poverty, the reality is that certain block groups with an above average percentage of minorities are currently underserved.

Neighborhoods bordering the Columbia River in the eastern part of the city fall into this category, although the presence of the airport presents connectivity issues and suggests that most of the population in this block group is concentrated in its southern portion, near areas of higher network density.

Although no significant differences were found between block groups with a high percentage of older adult population, block groups with a higher than average percentage of youth have significantly fewer bikeway miles per square mile. This is likely due to the location of such block groups primarily in outer neighborhoods with less-dense bikeway networks.

Figures 1-5 show several block group clusters that are both underserved and home to disadvantaged populations. From the maps, it is clear that several clusters are underserved, including the area of the King/Sabin/Woodlawn neighborhoods, the Foster-Powell neighborhood, St. Johns, Roseway, Montavilla, and the Aragay/Wilkes neighborhoods in far northeast Portland. It is also evident that differences in age are more prevalent in outlying areas, whereas differences in poverty and race are more common in inner neighborhoods. Figure 5 displays service gaps and the geometric mean of all indicators. Darker areas represent higher percentages of disadvantaged population.

Figure 1 Where people live: Service gaps & Poverty

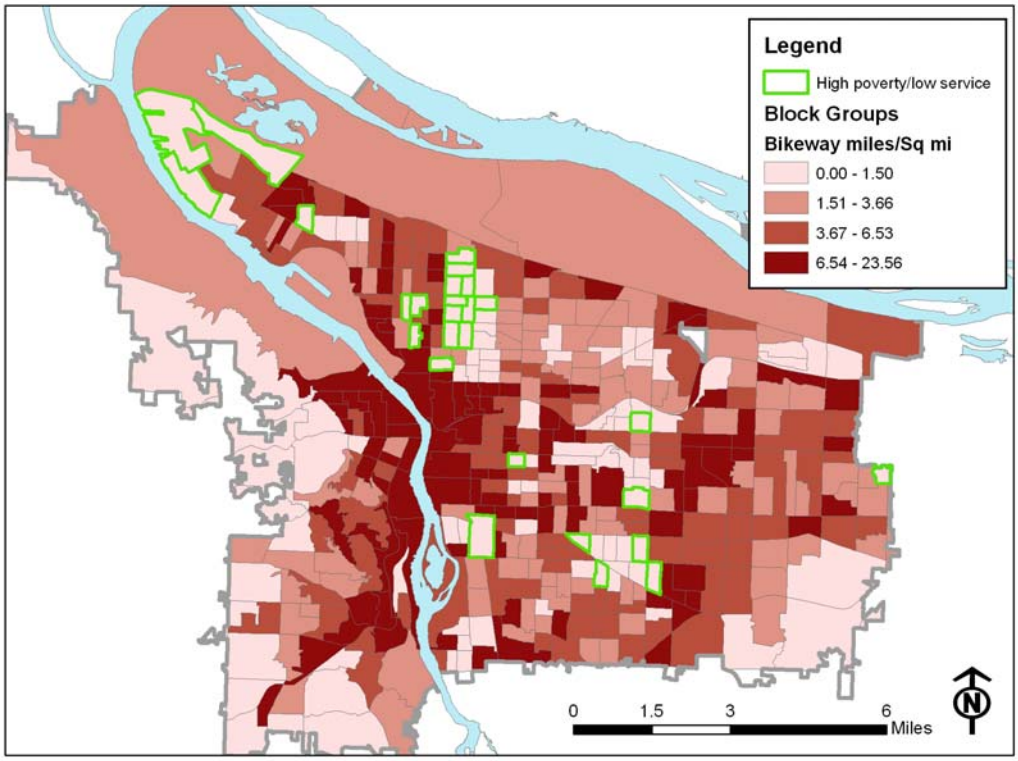


Figure 2 Where people live: Service gaps & Non-White Population

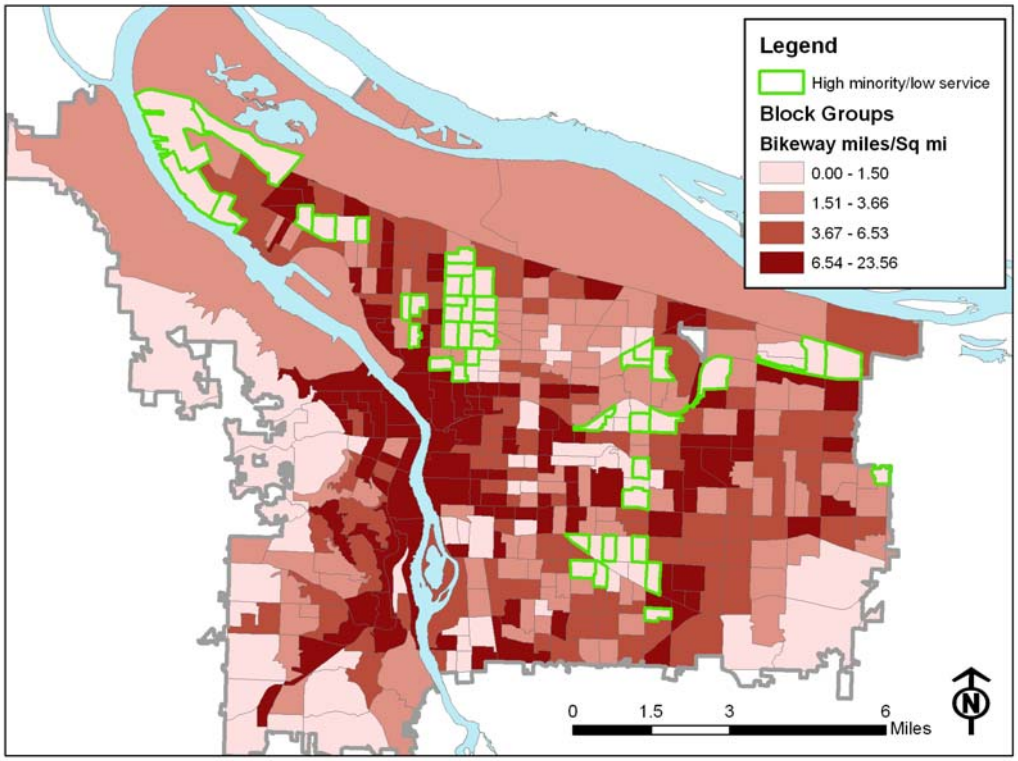


Figure 3 Where people live: Service gaps & Youth

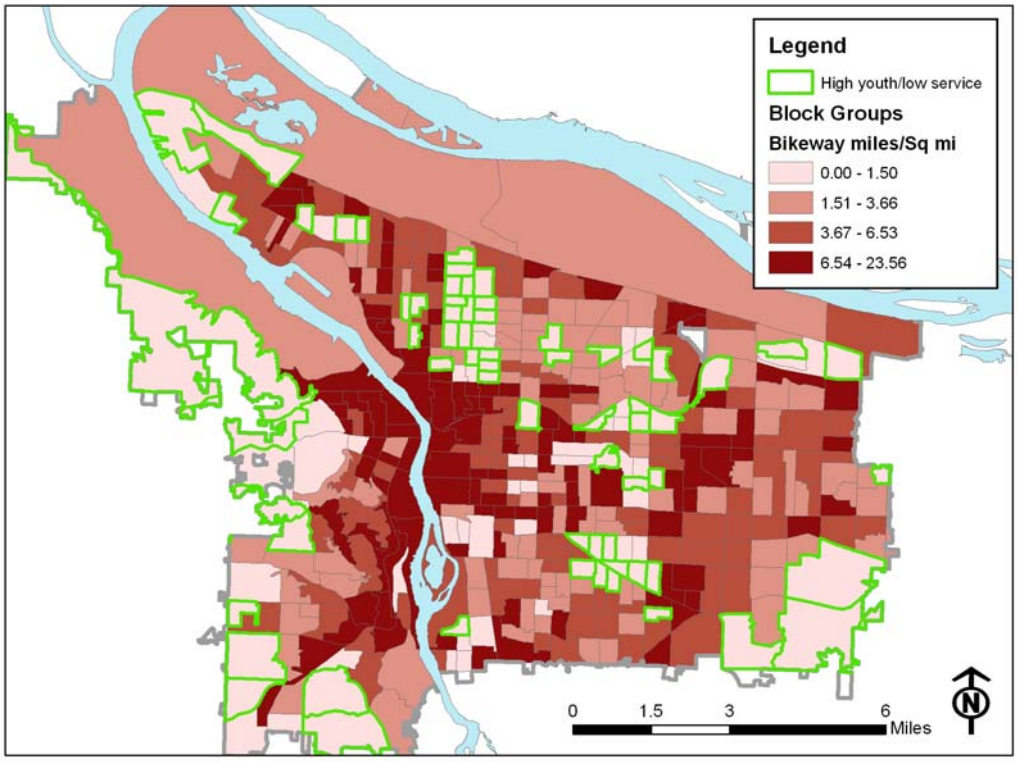


Figure 4 Where people live: Service gaps & Older Adults

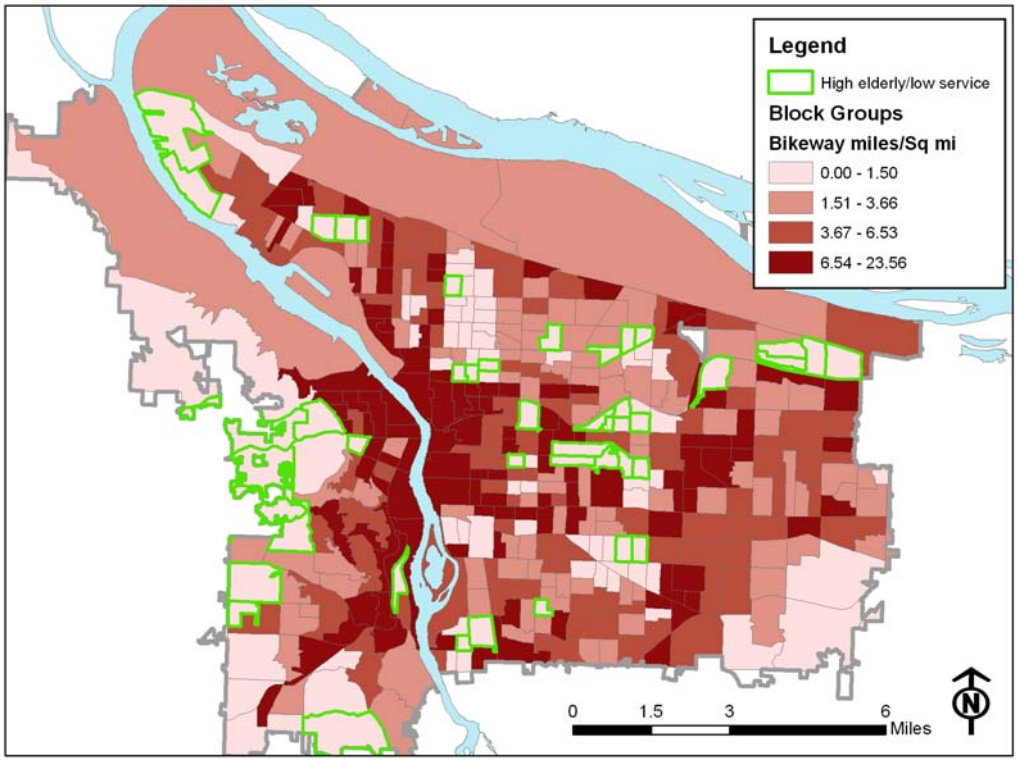
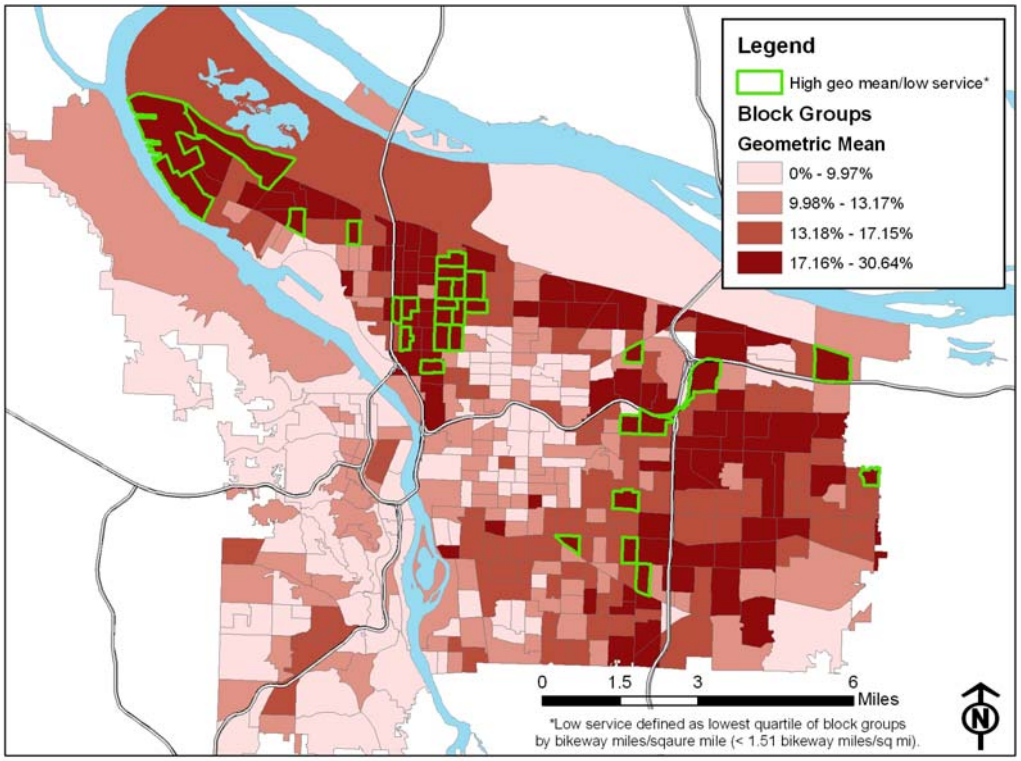


Figure 5 Where people live: Service gaps & Geometric Mean



Where People Work

Based on data from Dr. Dill's GPS study of bicyclists, a four mile buffer was created around each of six major employment centers. These include Downtown, the Lloyd District, Rivergate, the Northwest Industrial District, Swan Island, and the Central Eastside Industrial District. Buffers drawn around the central point of each of these districts constitute a bikeable service area for each employment center. Five of these service areas have similar figures for bikeway miles per square mile, between 3.5 and 4. The exception is the Northwest Industrial District, which currently has 5.2 bikeway miles per square mile. Whereas the percent of the population below poverty in this catchment area is high, the percentages of the population representing minorities, youth, or older adults are all at or below average.

The population within biking distance of Rivergate is both high-poverty and above average percent minority. It is important to note that improvements in this area are important, but would serve a limited number of people compared to the other employment centers. The service area is home to about 26,000 people, or four percent of the population living within all six catchment areas. Connectivity is limited by geography and the street network. Swan Island is also a high poverty and above average percent minority area, with approximately 69,000 residents within biking distance.

Where People Learn

Consistent with findings from Safe Routes to School studies, a 1-mile travel distance was used to generate buffers around the K-12 schools, resulting in service areas for each of the 192 public and private K-12 schools. Like other analyses, service areas with high poverty have significantly more bikeway miles on average (Table 5). However, the service areas with a higher than average minority population have significantly fewer bikeway miles per square mile. Perhaps more importantly, areas for schools in with above average share of youth also have significantly fewer bikeway miles per square mile. In 2009, school areas with an above average share of youth averaged just 3.13 bikeway miles per square mile, compared to 5.17 bikeway miles for areas with below average percent youth population. The difference is also significant when looking just at the low-stress network, and the planned 2030 network.

Table 5: K-12 School bikeway access by equity indicator

		Avg Bikeway Miles per Square Mile		Avg Low-Stress Bikeway Miles per Square Mile	
		Current (2009)	Planned (2030)	Current (2009)	Planned (2030)
Poverty	Low poverty	2.39	9.65	1.14	4.67
	Medium poverty	3.55*	11.02	1.29	5.37
	High poverty	4.92*	13.95*	1.36	6.11
Race	At/Below average non-white	4.15	11.94	1.49	5.10
	Above average non-white	3.45*	11.75	1.00	6.18
Youth	At/Below average age 1-18	5.17	14.28	2.01	6.32
	Above average age 1-18	3.13*	10.48*	0.89*	5.08*
Older adults	At/Below average 65+	3.99	11.95	1.44	5.67
	Above average 65+	3.73	11.76	1.11	5.35
All	n=441	3.87	11.87	1.29	5.53
	Range	0-10.13	2.12-24.45	0-4.55	0-14.31

* Indicates that this is significantly different from the base (lower/lowest) category, p<0.05

Figure 6, Figure 7, and Figure 8 highlight the locations of school service areas with low levels of bikeways and disadvantaged populations (poverty, non-white population, and youth). By several equity indicators, schools in North and Northeast Portland are underserved, as are those in the Foster-Powell area of Southeast and parts of East Portland. The individual schools that are underserved are listed in the appendix. Figure 9 shows the location of block groups with high poverty and above average percent youth.

Figure 6 Where people learn (K-12): Service gaps & Poverty

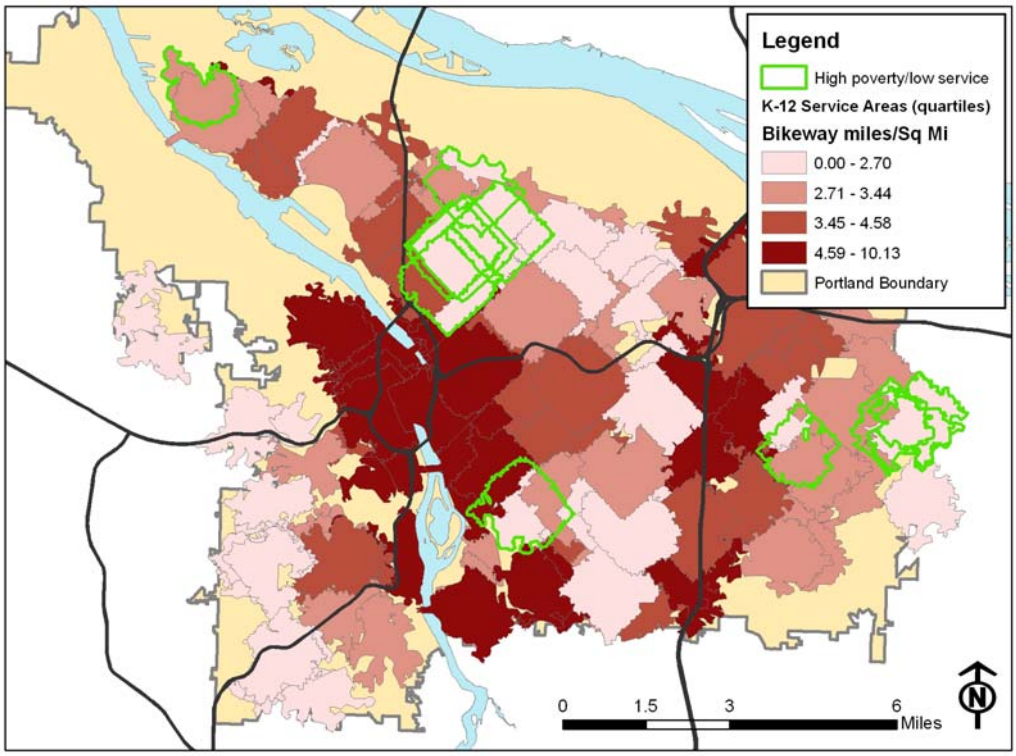


Figure 7 Where people learn (K-12): Service gaps & Non-White Population

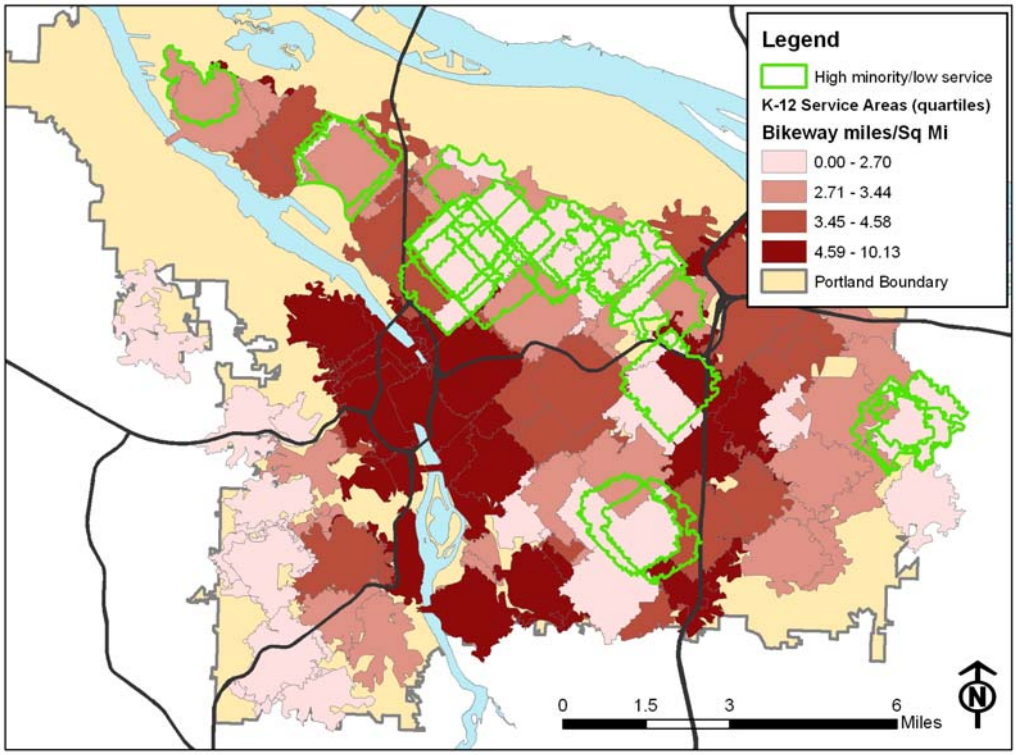


Figure 8 Where people learn (K-12): Service gaps & Youth

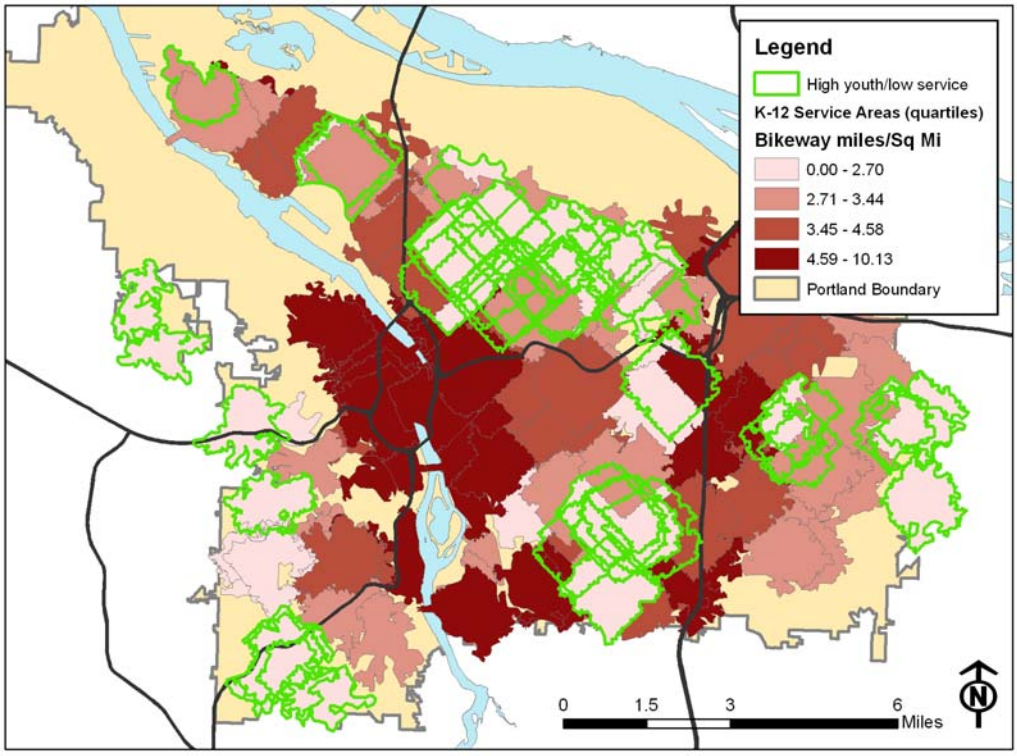
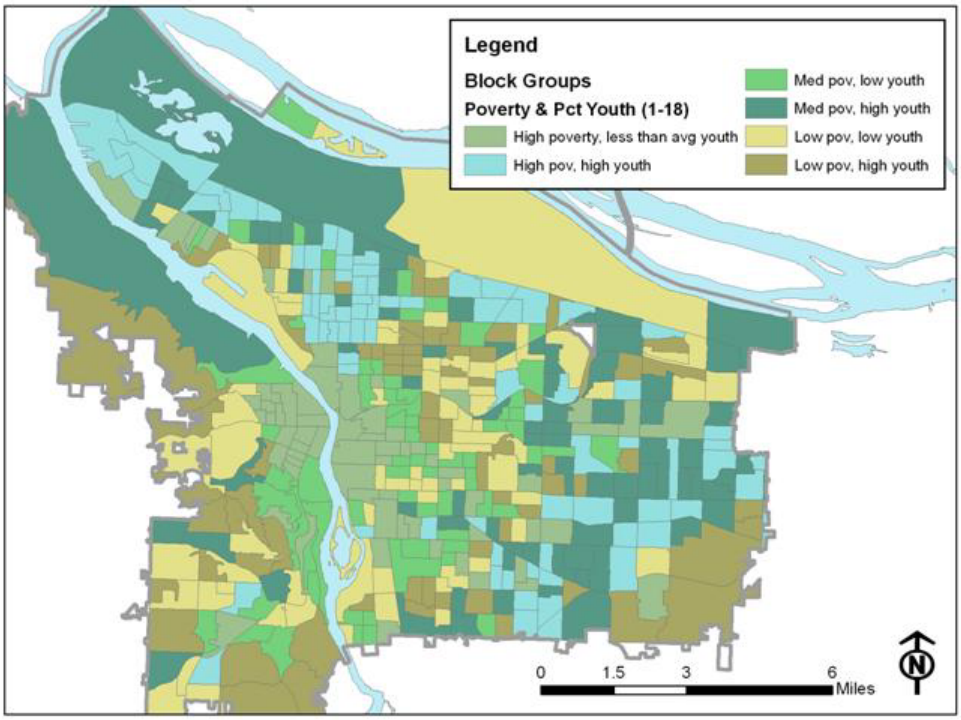


Figure 9 Block groups: Youth & Poverty



Campuses of Portland Community College were treated in the same manner as employment centers, in that a 4-mile travel distance was assumed for each of the three campuses. All three service areas have nearly the citywide average percentage of youth, about 20%. On average, higher poverty areas have higher levels of service, as do areas with above average percent minority. However, in this case averages do a poor job of telling the story. The range of service is substantial, from 0.77 bikeway miles per square mile in the PCC Sylvania service area to 3.58 near PCC Cascade. The PCC Southeast service area is near the mean, with 2.74 miles. These disparities continue in the 2030 plan, with the range of 3.89 – 10.78 bikeway miles per square mile. The service area of PCC Cascade has both high poverty and an above average percent age of minorities, and that of the Southeast campus has a higher than average percentage of older adults.

Where People Play

Three types of recreational destinations were included in the analysis, each with a different travel distance dictating the service area. For neighborhood parks (excluding golf courses and cemeteries), the network buffer was drawn at 1.5 miles. For active parks, which include more developed facilities such as community centers, tennis courts or swimming pools, a distance of 3 miles was used. The service area of a community garden was drawn as a 1-mile network buffer.

Scattered throughout Portland, the 170 neighborhood parks stand out as being similarly accessible to most groups. There is little difference based on poverty, except that high poverty areas average significantly more bikeway miles than low poverty areas. Only the Alberta Park service area has high poverty and a low level of service. There are no

significant differences based on percent minorities or older adults. Park service areas with above average percent youth, however, average significantly fewer bikeway miles per square mile.

Table 6: Neighborhood park bikeway access by equity indicator

		Avg Bikeway Miles per Square Mile		Avg Low-Stress Bikeway Miles per Square Mile	
		Current (2009)	Planned (2030)	Current (2009)	Planned (2030)
Poverty	Low poverty	2.73	9.68	1.02	3.29
	Medium poverty	4.16	11.40	1.72	5.45
	High poverty	4.82*	13.20*	1.44	5.65
Race	At/Below average non-white	3.57	10.88	1.27	4.14
	Above average non-white	4.72	12.55	1.78	6.32
Youth	At/Below average age 1-18	5.15	14.20	2.00	5.77
	Above average age 1-18	3.23*	9.68*	1.10*	4.43*
Older adults	At/Below average 65+	4.14	11.00	1.74	5.06
	Above average 65+	3.82	12.21	1.09*	4.85
All	n=441	4.01	11.52	1.46	4.97
	Range	0-22.61	0-29.78	0-13.53	0-18.01

* Indicates that this is significantly different from the base (lower/lowest) category, $p<0.05$

The 28 service areas surrounding the city's active parks have more bikeway miles in high poverty areas and areas with above average percent minority. The opposite is true for areas with above average percentages of youth and older adults. Mapping these service areas shows that there are no areas with high poverty and low service, and that several low-service areas in the southern part of the city have higher than average percentages of youth and older adults.

Community garden service areas, on average, have fewer bikeway miles per square mile in high poverty areas and in areas with above average percent minority population. While these differences are not statistically significant, areas with above average percent minorities have substantially fewer bikeway miles per square mile. Only the Vermont Hills Community Garden service area has a higher than average percentage of older adults and low service, while several gardens have higher than average youth and low service.

Where People Access Services

The unit of analysis for access to services is a 1.5 mile network buffer around the 61 full-service grocery stores within the City of Portland. Consistent with other destinations, the analysis shows that on average, there are significantly more bikeway miles per square mile in high poverty service areas. In contrast, service areas with a higher than average percentage of minorities have significantly fewer bikeway miles per square mile. Fortunately, the difference disappears entirely under the 2030 plan, but this finding can help guide project priority in the short term

Figure 10 through Figure 12 show the locations of underserved service areas with disadvantaged populations, which vary by equity indicator. North Portland is an area of underserved populations living in poverty and underserved minorities. Far Southeast

Portland is home to higher than average percentages of minorities and seniors who do not have good bikeway access. In addition to illustrating differences in bikeway access, the service areas also reveal service gaps for full service grocery stores. The New Columbia area is notable in this respect. The area is lacking in grocery stores in addition to facilities to access them.

Figure 10 Where people shop for food: Service gaps & poverty

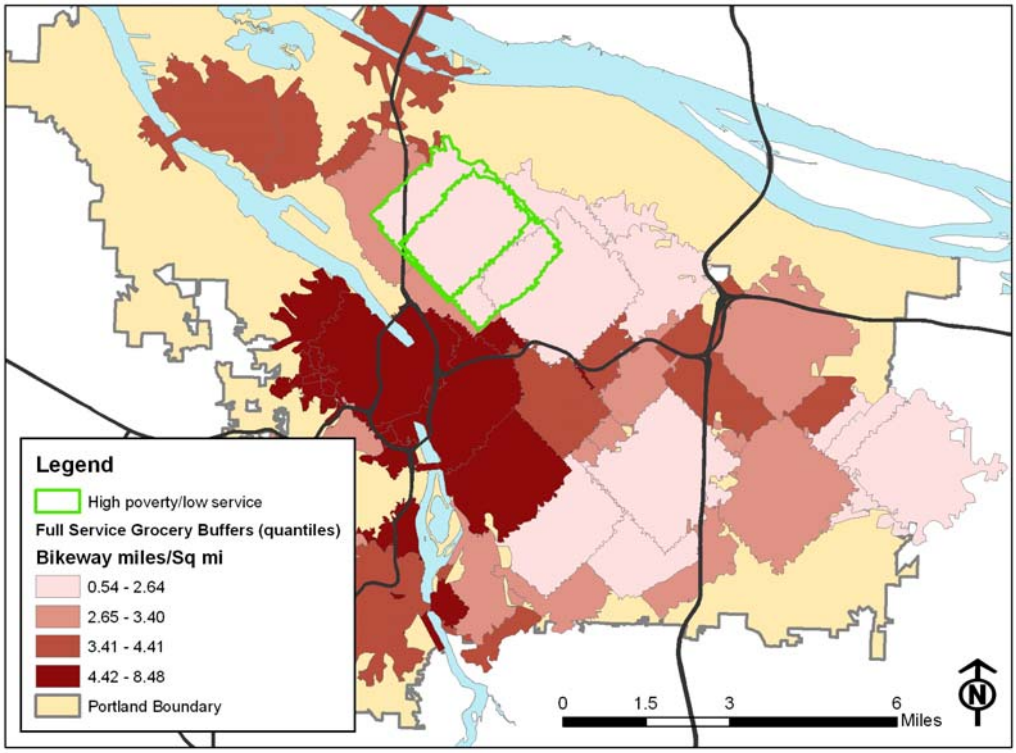


Figure 11 Where people shop for food: Service gaps & non-white population

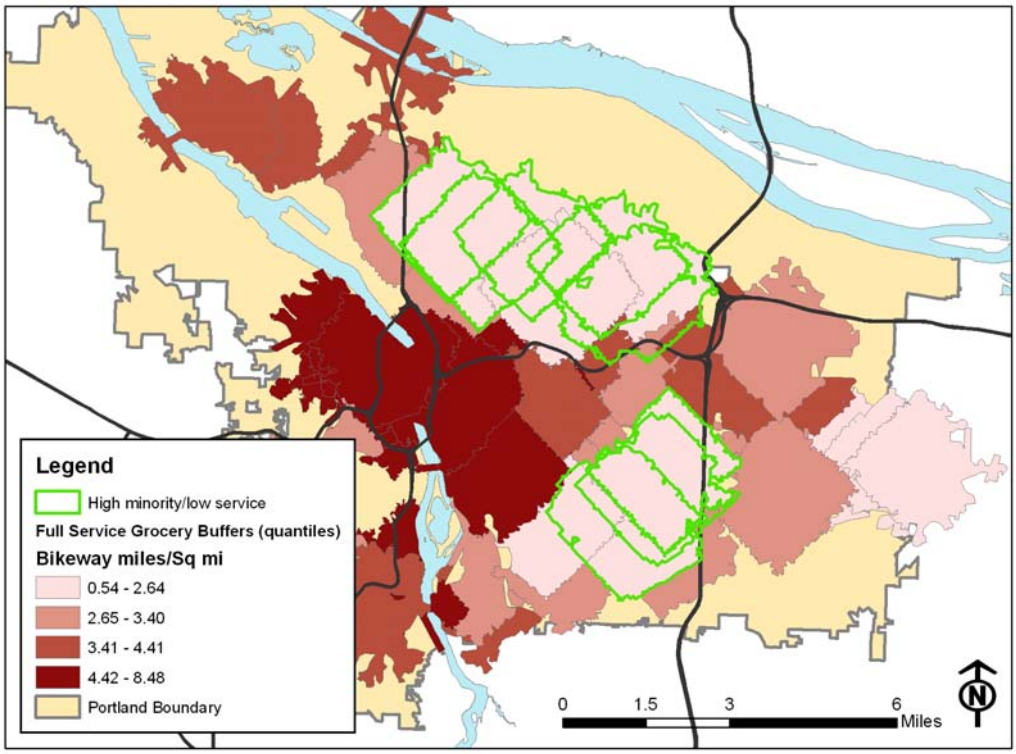
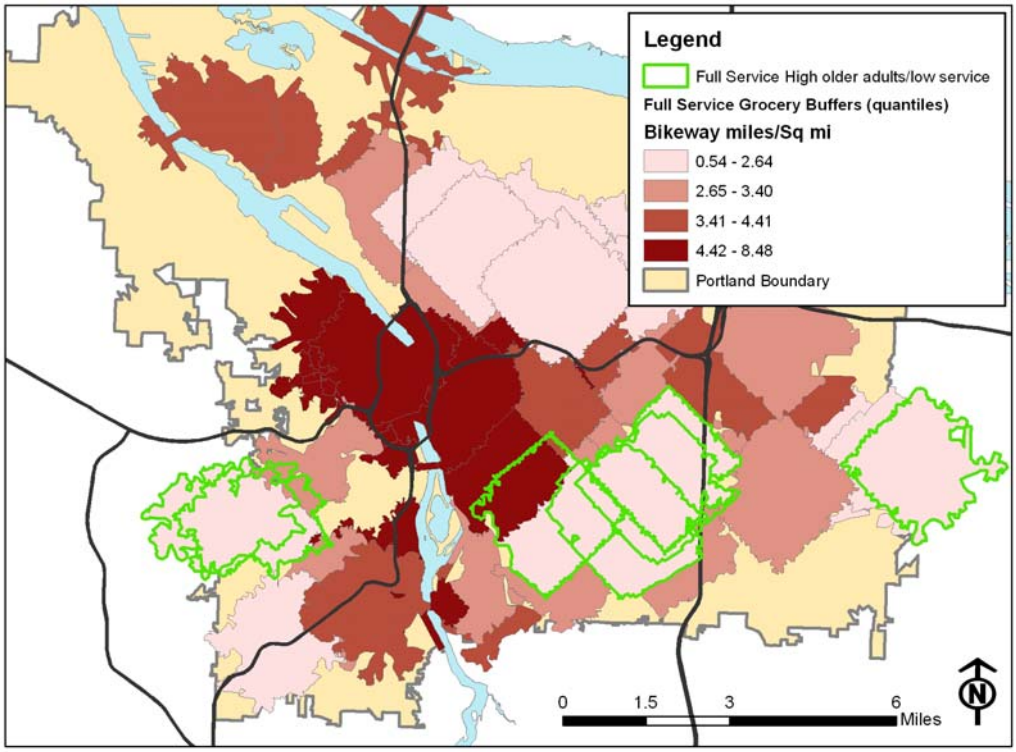


Figure 12 Where people shop for food: Service gaps & older adults



Where People Access Transit

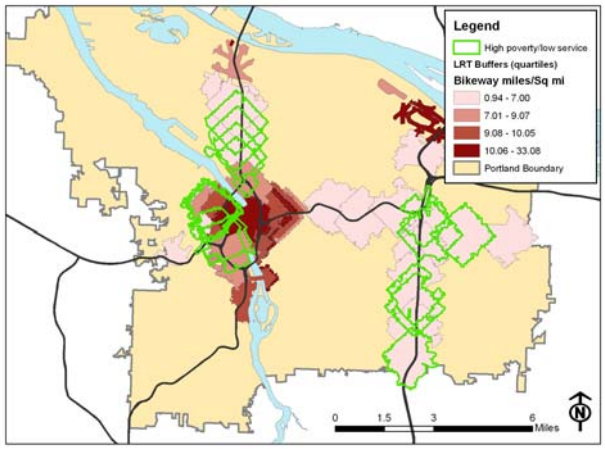
Similar to the findings on neighborhood parks, access to streetcar and light rail stations is equitable to all groups. Analysis revealed no significant differences in any category based on average bikeway miles per square mile. However, the maps below show that there are indeed many areas with limited bikeway access to transit. *It is important to note that the average bikeway density around the rail stations is substantially higher than the city as a whole* (about 8.5 miles/sq mi versus 4.5 miles/sq mi, respectively). The comparison is relative to other MAX and streetcar service areas. When the same comparison is made using the quartiles from the analysis of block groups, there are no LRT service areas in the lowest quartile with any disadvantaged population.

Table 7: MAX and Streetcar station bikeway access by equity indicator

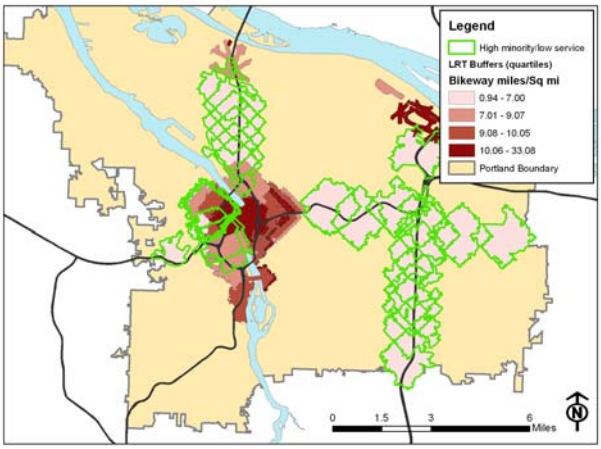
		Avg Bikeway Miles per Square Mile		Avg Low-Stress Bikeway Miles per Square Mile	
		Current (2009)	Planned (2030)	Current (2009)	Planned (2030)
Poverty	Low poverty	7.40	19.83	2.52	11.04
	Medium poverty	8.13	15.61	2.66	6.95
	High poverty	8.61	21.26	2.81	8.41
Race	At/Below average non-white	8.74	21.75	3.11	8.43
	Above average non-white	7.93	17.45*	2.11	8.15
Youth	At/Below average age 1-18	9.01	22.04	3.12	8.86
	Above average age 1-18	6.17	13.04*	1.32*	6.13*
Older adults	At/Below average 65+	8.86	20.89	2.86	8.54
	Above average 65+	7.69	19.15	2.60	7.93
All	n=441	8.46	20.30	2.77	8.33
	Range	0.94-33.08	7.38-29.53	0-5.53	0-20.45

* Indicates that this is significantly different from the base (lower/lowest) category, $p<0.05$

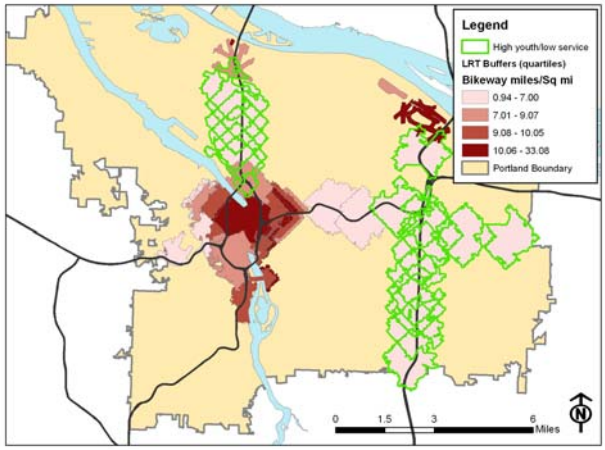
Figure 13 Where people access transit: Service gaps & disadvantaged populations



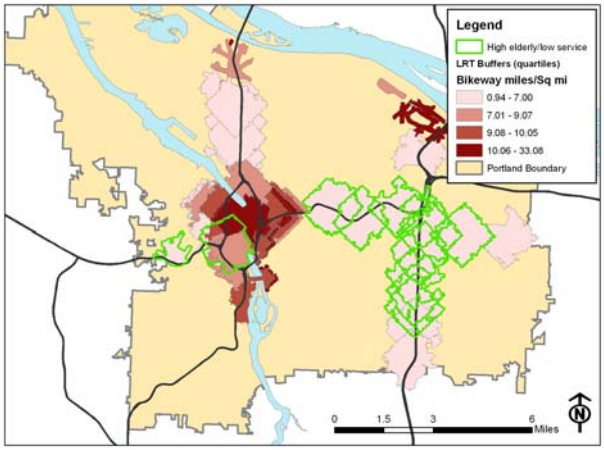
Poverty



Minorities



Youth



Older Adults

Low Stress Bikeways

Bikeways that are perceived safe and easy to navigate have the capacity to attract more riders. Therefore, as part of this analysis, existing and planned bikeways were coded by stress level to determine the extent of low stress bikeway access. Presently, only two categories of bikeways are considered low stress: bike boulevards and off street paths. The 2030 plan adds a new type of bikeway also considered low stress, the advisory bike lane. A map of the 2009 low stress bikeway network shows that there is relatively sparse coverage, mostly concentrated in the innermost neighborhoods (see Figure 14). A second map (Figure 15) shows the extent of the 2030 coverage.

Obviously, there are large gaps in the existing network. These gaps largely coincide with those in the general bikeway network but gaps in the low stress network are more extensive. There no low stress bikeways in much of North Portland, St. Johns, Montavilla, East Portland, nor in a large area in south-central Southeast Portland. Southwest Portland also stands out in this respect. In the present network, the only significant differences at the block group level are based on percent minority and percent youth. Whereas areas of

higher than average minority populations have significantly more low stress bikeway miles, areas with high youth populations have significantly fewer than those with below average youth. These differences are eliminated by the planned 2030 low stress network.

Generally, areas with higher than average percentages of older adults and youth are found in the same outlying areas as these service gaps. As these groups are particularly sensitive to safety and comfort of bikeways, prioritizing low stress facilities in these areas would better meet the needs of these disadvantaged populations.

Figure 14 2009 Low Stress Bikeway Miles/Square mile by Block Group

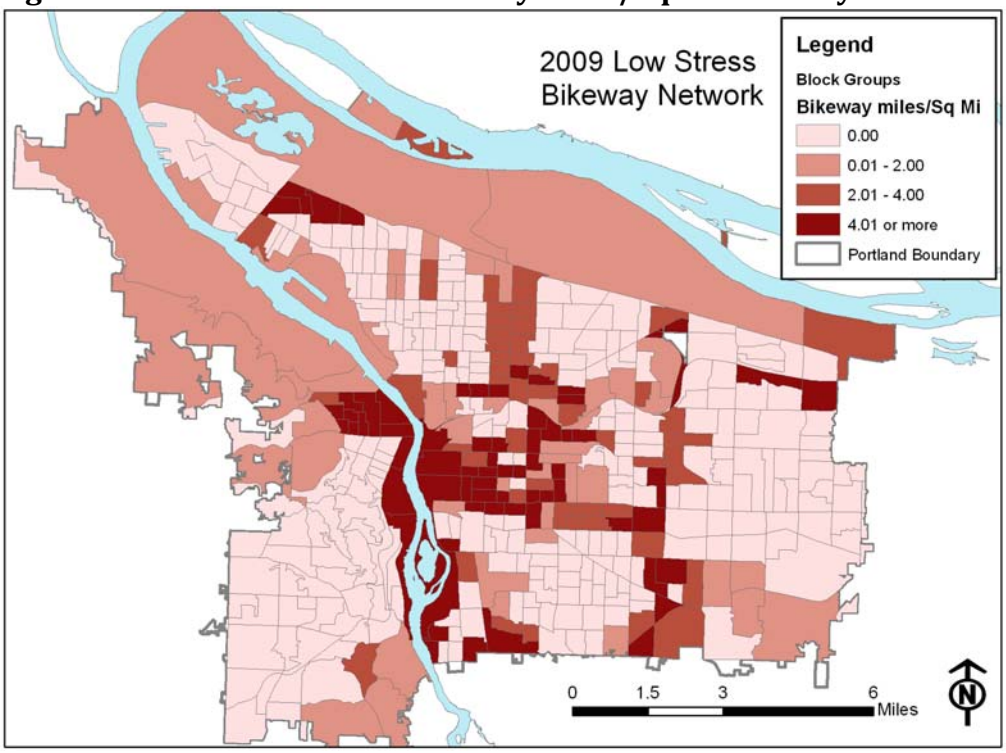
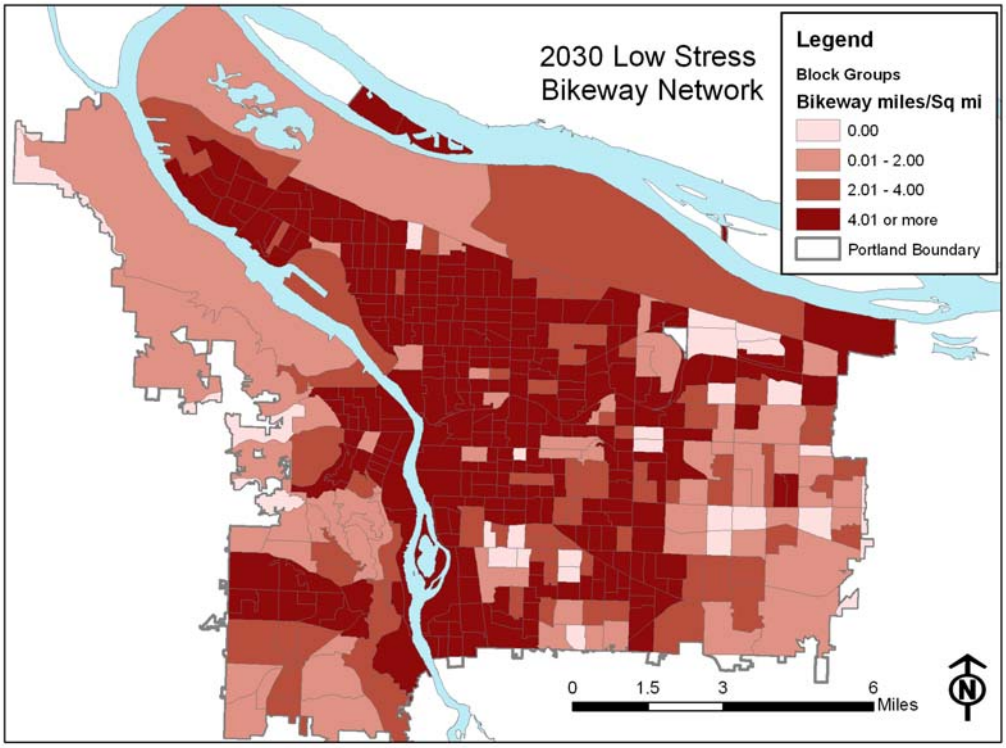


Figure 15 2030 Low Stress Bikeway Miles/Sq mi by Block Group



Phasing

Planned projects have been assigned an initial prioritization based on three phases. To better understand any equity issues that may arise from the timing of implementation, the original metric was further refined to integrate phasing. The resulting measures are: phase one bikeway miles per square mile, phases one & two (summed) bikeway miles per square mile, and phase three bikeway miles per square mile. The rationale for combining phases one and two is that phase two miles may not be a good indicator of early implementation. For example, if a block group had a high number of bikeway miles installed during phase one, but a low number during phase two, the phase two number alone would not give an accurate picture of the service experienced in that block group, Conversely, phase three calculations are intended to reveal whether any group will be impacted by later implementation. For the purposes of this analysis, the data used includes proposed phasing as of August, 2009.

Bikeway miles in each phase were calculated for equity indicators by block group. As illustrated in table, very few significant differences were found. There are no differences based on poverty until phase three, when high poverty are scheduled to receive significantly more facilities than low poverty areas . Likewise, there are no significant differences based on percent minority population until phase three, when block groups with a higher than average percent minority population average significantly more bikeway miles per square mile. Block groups with an above average percentage of youth, on average, receive significantly fewer bikeway miles per square mile until phase three.

No significant differences were found based on the percentage of older adults within block groups.

Table 8: Planned Bikeway Phasing and Equity Indicators

		Average Bikeway Miles per Square Mile		
		Phase 1 only	**Phases 1 & 2**	**Phase 3 only**
Poverty	Low poverty	3.64	5.12	7.81
	Medium poverty	5.11	5.11	9.40
	High poverty	3.70	5.31	11.67[a]
Race	At/Below average non-white	3.69	5.12	8.73
	Above average non-white	3.33	5.28	11.03*
Youth	At/Below average age 1-18	4.11	5.87	10.23
	Above average age 1-18	3.06*	4.58*	9.10
Older Adults	At/Below average 65+	3.52	5.31	9.85
	Above average 65+	3.59	4.99	9.29
All	n=441	3.59	4.99	9.62
	Range	0-14.09	0-41.71	0-78.84

* Indicates that this is significantly different from the other categories, p<0.05
[a] This is significantly higher than the low-poverty group, but not the medium poverty group.

Figure 15 Geometric Mean, Gaps, and Phase 1 Bikeway Miles per Square Mile

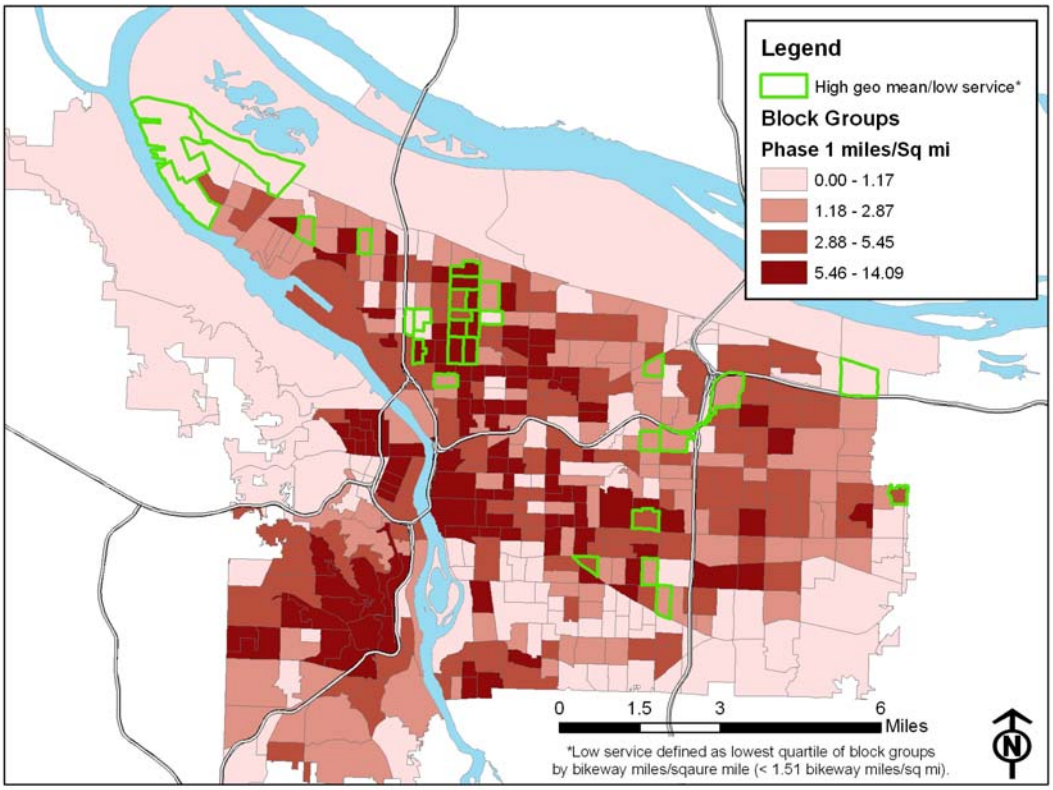


Figure 16 Geometric Mean, Gaps, and Phases 1 & 2 Bikeway Miles per Square Mile

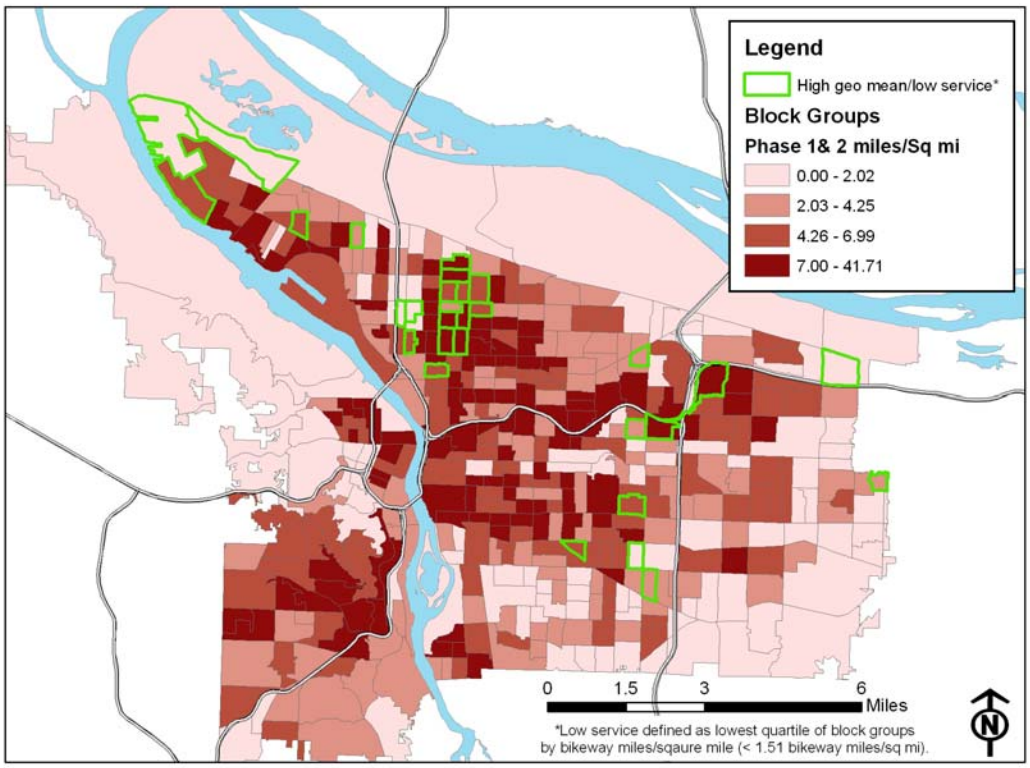
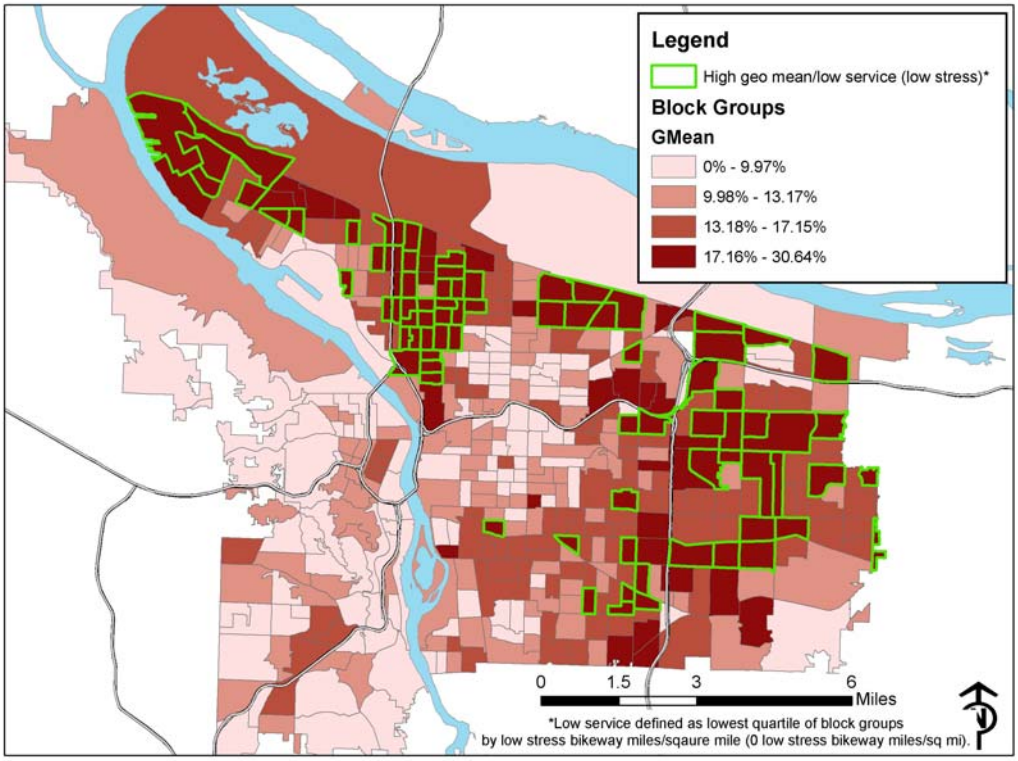


Figure 17. Geometric Mean, Low-stress Gaps, and Phase 1 Bikeway Miles per Sq. Mi.



Appendix: Lists of Underserved Destinations

Full Service Grocery Locations: Above Avg % Older Adults, Low Service			
Name	**Address**	**% Older Adults**	**Population**
Food Front Hillsdale	6344 SW Capitol Hwy	16.1%	7222
Albertsons (SUPERVALU Inc.)	5415 SW Beaverton Hillsdale	15.2%	12061
Fubonn Supermarket	2850 SE 82nd Ave, Ste #1	14.1%	26504
Food 4 Less (Kroger)	7979 SE Powell Blvd	12.8%	29471
Trader Joe's	4707 SE 39th Ave	11.7%	31868
Save-A-Lot (SUPERVALU Inc.)	6828 SE Foster Rd	11.7%	37667
Save-A-Lot (SUPERVALU Inc.)	17420 SE Division St	11.6%	18854
Full Service Grocery Locations: Above Avg % Minority, Low Service			
Name	**Address**	**% Minority**	**Population**
Safeway	5920 NE M L King Blvd	55.6%	34488
Alberta Cooperative Grocery	1500 NE Alberta Street	46.7%	38215
New Seasons Market Concordia	5320 NE 33rd Ave	38.2%	30354
Albertsons (SUPERVALU Inc.)	NE Cully Blvd	27.4%	26924
Food 4 Less (Kroger)	7979 SE Powell Blvd	25.7%	29471
Fubonn Supermarket	2850 SE 82nd Ave, Ste #1	24.8%	26504
Safeway	6901 N.E. Sandy Blvd	23.3%	28609
Save-A-Lot (SUPERVALU Inc.)	6828 SE Foster Rd	22.2%	37667

Neighborhood Parks: Above Avg % Minority, Low Service		
Name	**% Minority**	**Population**
Alberta Park	54.9%	2747
NE Ainsworth Blocks	53.4%	2239
Sabin HydroPark	41.0%	2502
Chimney Park	36.3%	161
Wellington Park	27.1%	1702
Essex Park	25.8%	1740
Montavilla Park	24.5%	1606
Columbia Children's Arboretum	24.1%	5
Mt Scott Park	24.0%	2376
Glenhaven Park	23.7%	871
Smith and Bybee Wetlands Natural Area	22.6%	40

Neighborhood Parks: High Poverty, Low Service		
Name	**% Below Poverty**	**Population**
Chimney Park	22.0%	735
Smith and Bybee Wetlands Natural Area	19.0%	208
Alberta Park	16.5%	16665
Mt Scott Park	15.0%	15862

Neighborhood Parks: Above Avg % Youth, Low Service		
Name	**% Youth**	**Population**
Chimney Park	30.0%	735
Linnton Park	29.1%	37
Clatsop Butte Park	28.1%	270
Tryon Creek State Natural Area	27.6%	286
Forest Heights Park	27.4%	335
Jordan Park	27.4%	5
Eastridge Park	27.3%	357
Lynchwood Park	26.9%	7964
Maricara Natural Area	26.9%	2006
Tryon Creek State Natural Area	25.9%	286
Roger Tilbury Memorial Park	25.9%	58
Alberta Park	25.8%	16665
NE Ainsworth Blocks	25.6%	15324
Sabin HydroPark	25.0%	17983
Mt Scott Park	24.9%	15862
Maricara Natural Area	24.5%	3084
SW Thomas & 53rd Park	23.1%	3334
Powell Butte Nature Park	22.9%	1161
Dickinson Park	22.7%	1930
Essex Park	22.6%	13519
Moonshadow Park	22.6%	904
Wellington Park	22.4%	12948
Hamilton Park	22.4%	6116
Wilshire Park	22.3%	14247
Smith and Bybee Wetlands Natural Area	21.9%	208
April Hill Park	21.8%	2028
Montavilla Park	21.7%	13469
Columbia Children's Arboretum	20.6%	60
Glenhaven Park	20.6%	8816

K-12 Schools: Above Avg % Minority, Low Service		
Name	**% Minority**	**Population**
King ES	60.7%	16231
Woodlawn ES	58.9%	8967
St Andrew Nativity School	57.6%	17906
Oregon Outreach Inc	51.9%	16096
Vernon ES	51.1%	17032
De Paul Treatment Cts Inc.	39.8%	10561
Sabin ES	36.5%	17842
Rigler ES	35.0%	11808
Sitton ES	34.4%	5147
Peninsula ES	34.0%	10693
Alliance HS	33.5%	13319
Open Meadow CRUE	30.9%	10592
Scott ES	29.1%	12729
Alder ES	27.6%	6819
Marysville ES	25.8%	15551
Harold Oliver Intermediate Ctr	25.2%	8836
Harold Oliver Primary Ctr	25.2%	8836
Lynch View ES	24.7%	7601
SE Works Community Learning Center	23.9%	17345
Madison HS	23.7%	8254
Vestal ES	23.6%	13818

K-12 Schools: Above Avg % Youth, Low Service		
Name	**% Youth**	**Population**
Alder ES	29.3%	6819
Lynch View ES	29.2%	7601
Sitton ES	28.7%	5147
Harold Oliver Intermediate Ctr	28.4%	8836
Harold Oliver Primary Ctr	28.4%	8836
Woodlawn ES	27.4%	8967
Forest Park ES	27.4%	367
King ES	26.8%	16231
Lincoln Park ES	26.8%	9062
Lynch Wood ES	26.6%	6931
St Andrew Nativity School	26.4%	17906
David Douglas HS	26.3%	7976
French American School	26.0%	182
Mill Park ES	25.4%	7596
Peninsula ES	25.2%	10693
Vernon ES	25.0%	17032
Oregon Outreach Inc	24.9%	16096
Sabin ES	24.8%	17842
Rigler ES	24.6%	11808
Mt Scott Park Center for Learning MS	24.6%	11859
De Paul Treatment Cts Inc.	24.4%	10561
Open Meadow CRUE	24.3%	10592
Marysville ES	24.2%	15551
Alliance HS	23.7%	13319
SE Works Community Learning Center	23.6%	17345
Alameda ES	23.2%	16686
Bridlemile ES	23.2%	4562

Jackson MS	23.2%	5096
Scott ES	23.1%	12729
Arleta ES	22.9%	15853
Stephenson ES	22.7%	2784
Beaumont MS	22.4%	14575
Sylvan Learning Ctr	22.3%	14028
Mt Scott Park Center for Learning HS	22.0%	17723
The Madeline School	21.9%	16610
Islamic School of Portland	21.4%	6951
East Sylvan MS	21.2%	1461
Vestal ES	21.1%	13818
Markham ES	20.9%	6588
Woodstock ES	20.7%	11863
Roseway Heights	20.7%	10853

K-12 Schools: High Poverty, Low Service

Name	% Below Poverty	Population
King ES	23.3%	16231
Oregon Outreach Inc	22.6%	16096
St Andrew Nativity School	21.2%	17906
Sitton ES	20.1%	5147
Alder ES	18.2%	6819
Lynch View ES	17.0%	7601
Harold Oliver Intermediate Ctr	16.9%	8836
Harold Oliver Primary Ctr	16.9%	8836
Woodlawn ES	16.7%	8967
Lincoln Park ES	15.1%	9062
Vernon ES	15.0%	17032
Grout ES	14.9%	13737