Appendix B: Map Methods and Notes

The *Regional Equity Atlas* includes a variety of styles and types of maps, which can be defined by methods, underlying data, themes, classifications/colors, or generally by their function within the Atlas. What follows is an overview of four of the basic "kinds," identified primarily by their general appearance, which tends to reflect Geographic Information Systems (GIS) methods utilized. These maps are: Surface-statistical, Neighborhood/City, Network-based, and Census Geography. Most maps in the Atlas fit one of these general kinds. After the overview, a list can be found of maps by number and title, followed by a "1," "2," "3," or "4" (or "5" for "Other" type), which correspond to the overview descriptions. When you look for information about each map in this appendix, you will find one of these numbers and know to refer to the appropriate overview description for a more complete account. The overview description number is followed by notes pertaining to the specific map listed. Other sources of information about the maps can be found in "A Few Equity Atlas Conventions" on page 7; in notes related to the Neighborhood Summary Table in appendix A; and in a more complete methods document available online at www.clfuture.org.

[1] SURFACE-STATISTICAL MAPS

Surface-statistical maps ("surface" maps) are found primarily in Chapter 2: Demographics. These maps depict a particular variable, such as population, in smooth, blob-like patterns spread across the region. They are good at illustrating general patterns—concentrations, deficits—the spatial distribution of various populations and sometimes how they changed during the 1990s. When you see these maps you'll find a legend title that reads "Total within circle 2/3 mile wide," and different colors that correspond to value-classes in the legend, usually with "cool" colors, such as blues, corresponding to little, less, or sometimes decreasing, and "warm" and "hot" colors corresponding to more, much, most, and sometimes increasing (this "cool/hot" approach is used for most maps in the Atlas, but be forewarned: sometimes "hot" colors correspond roughly to "bad," such as in "bad parks access," which is represented by a low score, not a high one, and "cool" colors have higher values than the warm and hot colors). Very low-density or insignificant change values in the surface demographic maps have been set to "clear"—see-through; thus, locations with these low values can appear to be colors of other spatial features graphically drawn underneath the demographic surface "layer." (Maps are made up of a bunch of different graphical layers and drawn one on top of the other.)

The statistic used in the demographic maps of chapter 2 is a sum, or total, of a given variable within a particular area. That particular area, chosen for this project, is a circle with a radius of a third of a mile, about 6 city-blocks (a circle 2/3 of a mile, or about 12 city-blocks, wide). Given the regional scale of these maps and the underlying source data, the 1/3 mile "search" radius produces a good balance between detail and generalization. Too small—too much detail overwhelms the general patterns. Too big—too much generalization undermines the detail. Legend values tell you how much or many of a given variable, such as people, are within the circle. When you see these maps, picture yourself standing at a particular location in a particular color: the color and associated range of values in the legend tell you how much or many of X are within a circle drawn around

you. Since, when doing these measurements, the circles overlap one another, the result also shows concentrations and deficits, i.e., a spatial distribution. The closer each measurement gets to a "hot spot," for example, the higher the values become. As the search circle moves away from the hot spot, values become smaller. Typically, surface-statistical maps reflect some kind of generalization of underlying "raster" data, which is described further below. (See also "A Few Equity Atlas Conventions" on page 7. Note that the "Proximity to Natural Habitat" map in the Parks and Nature chapter is also a surface map, but with slightly different features.)

[2] NEIGHBORHOOD/CITY MAPS

Neighborhood/city maps can be found in various chapters of the Atlas. Use of neighborhood and city geographies was one of the later developments during the Atlas project; consequently, they are not used as consistently as they should have been—considering how important they became to being able to cross-reference a wide variety of demographic and livability access variables. Equity analyses envisioned during the project depended on being able to compare, say, a location's poverty rate to its level of access to one of the relevant resources, such as to parks, and also, to compare those findings with what could be found in other locations. To do this type of cross-referencing, many mapped variables have been summarized by neighborhood and city geographies and placed in the Neighborhood Summary Table in appendix A. But the Atlas itself doesn't quite provide the needed graphical support of the tabular data.

All neighborhood maps in the Atlas represent an aggregation of some underlying data, whether based on "interpolated" Census demographic data, an average by neighborhood of rasterized street network distances to a livability resource, or an average of access scores also originally calculated at locations along a rasterized street network. (See "Raster Data" on page 131.) In short, neighborhoods and cities have been used to simplify, to generalize data to geographies that are likely to be relevant to Atlas users.

Note that, for analytical and graphical reasons, a few neighborhoods have been altered from the original spatial data. For example: the newer city of Damascus cuts into the Rock Creek neighborhood, and the city of Happy Valley has numerous "holes" or fragments. Happy Valley's holes have been "filled" (as have holes in other neighborhoods or cities) and it has been merged with Rock Creek; Damascus is shown in its entirety—which means a portion of the Rock Creek neighborhood has been included in maps and analyses only as a part of Damascus. A more detailed description of neighborhood maps and methods can be found in the Neighborhood Summary Table and its overview and key to terms (appendix A). In addition, the methods document available at www.clfuture.org is specifically designed as a primer for using the neighborhood summary information found in the table and maps.

[3] NETWORK-BASED MAPS

Early on, the *Regional Equity Atlas* project settled on a particular approach toward producing information that could be used in regional equity analyses. Half of that approach entailed measuring "access," and the core component of access was usually distance measurements. Further, distance measurements were always supposed to emphasize walking, or walkable, distances. Hence, the use of the street network in most access variable analyses, plus the use of primarily walking distance thresholds in distance classifications (such as 0 to 1/4 mile, 1/4 to 1/2 mile, and so on, up to about 1 mile, beyond which walking access begins to become meaningless). Maps that show the street network in a range of colors are here called "network-based maps." They are easy to recognize in the Transportation, Health and Design, and Parks and Nature chapters. The maps depict a spindly, somewhat faintly colored street network throughout the four-county Portland-Vancouver metropolitan area. The network has been turned into 'raster cells', each with a value, which get color-coded based on a range of distances or other relevant values. The street network is overlaid on other map features; thus, as with the "clear," see-through 'color' of the demographic surfaces, other spatial features, such as dark gray-shaded cities or lighter gray-shaded urban area, show through the network. Methods utilized in network-based maps are not 100% consistent for every variable depicted in such maps. But core features remain the same from map to map, enough to group them together.

The maps all rely on the street (and/or trail) network for at least the distance-to-resource component of any network-based composite access variable (often, the map is the street network distance-to-resource measure). The street network was developed from Metro RLIS and Clark County GIS spatial data. Since walking access was to be emphasized throughout the Atlas, street segments obviously inaccessible to pedestrians were removed from the core dataset prior to distance analyses. But be forewarned: the final street spatial data does not exclude all streets inaccessible to pedestrians (only freeways, their on- and off-ramps, and

similar roads were removed). For the parks access analyses, trails were added to the network.

Street network distance measurements could follow one of two methods: vector analysis or raster analysis. This isn't an important point to develop here, but note that distance measurements along the network used one of the two methods. The method used is identified in each map's note and elsewhere. With measurements of distance along the network in hand, the network is either already in a rasterized form or it is converted to a raster dataset (basically into very small squares), which allows distance to be combined with other variables that have been similarly rasterized, producing a composite access variable, such as a transit access or parks access score based on distance, population, and amount of the accessible resource (see "Raster Data" below).

[4] CENSUS GEOGRAPHY MAPS

The Atlas project began with analyses of Census Bureau demographic data by Census geographies—tracts, block groups, and later by blocks. The Bureau provides a host of demographic variables, all summarized by these geographies. Variables by block group and by block remain at the core of all demographic variables in the Atlas, and as a part of most access variables, which utilize population counts. But maps created out of 'Census polygons'—out of, say, block groups—were very unpopular in early Atlas draft focus groups. They exist now in the Atlas in a few places, primarily where interpolation of the variable in question is problematic. For example, median household income can't be interpolated to some other geography, such as to a neighborhood, retaining any real-world meaning. Thus, it remains as one of the few Census geography maps in the Atlas. These maps are easy to spot: they state the unit of analysis as being a "Census block group," for example, and the variable being mapped is simply an unadulterated Census variable or one that has been directly calculated from Census variables at the stated geographic level. A couple Census geography maps utilize after-market data, where 1990 data has been normalized to 2000 boundaries by Geolytics Inc., East Brunswick, New Jersey.

[5] OTHER TYPES

For maps that don't fit nicely into one of the above categories, the numeral "5" is placed after their titles in the Map Notes section below. Most of these "other" type maps are found in the Schools chapter, which relies on many variables by school or by school district. Their interpretation is obvious from information in the maps alone.

RASTER DATA

Finally, three of the four kinds of Atlas maps rely in some manner on raster data. The generic form of "raster" has to do with computer or TV screens and their pixels—little squares covering the screen. In a raster-based map or analysis, smooth and continuous real-world geographic features are represented by a bunch of squares (a matrix of squares, or cells; sometimes called "grids," too). Raster data simplify the spatial world into a bunch of squares, which are faster and easier to work with. That's what you'd see if you zoomed into a given raster-based map closely. Rather than a smooth line, for example, you'd see jagged edges, pixilation.

From an analytical perspective, on the other hand, raster data actually exist in a table, where each table record corresponds to the geographic, or spatial, coordinate of the center of every cell in your study area; locations are represented by X-Y coordinates (like latitude and longitude), spaced at intervals described by the cell dimensions (such as a "1-acre cell," which reflects X-Y coordinates spaced about every 200 feet). Depending on the variable in question, each location will have a value that reflects some aspect of the variable, such as the amount of the variable, at that particular location. In short, raster data actually behave like data at points, and the whole set of points are defined by how the analyst describes such things as the cell size or the extent of the study area.

The demographic raster data underlying the surface, neighborhood, and network maps in the Atlas have been "interpolated" from "vector" data—allocated to raster cells from tabular data attached to "vector polygons," which are the Census Bureau's geographies, such as the blocks and block groups mentioned above. The Census Bureau provides data, such as population counts, for areas within finite boundaries. Those boundaries are represented by line-work and the variables exist as tabular attributes in GIS. For Atlas analyses, these geographies and their associated counts have been split apart into raster cells, with each cell assigned a portion of the block count, before being allocated to some other area, such as to neighborhoods, or generalized into a statistical surface. This is one type of "interpolation," what has been called "fractional interpolation."

For raster data underlying the surface maps and neighborhood/city summaries, the fractional interpolation is akin to "areal" interpolation—because the amount assigned to each cell is based on a given block's count, such as total population, divided by the total number of cells in the block, and the

total number of cells in the block is more or less a function of the "size" of the cell and the size of the block; hence, "areal," as in area and size. For example, if a Census block has 100 people and, based on the spacing of raster coordinates (i.e., the "size" of each cell) 10 locations fall within the Census block, each cell, each location within the block, receives an interpolated population value of 10. In the real-world those 100 people could be anywhere in the block; perhaps all 100 are at locations corresponding to only 5 of our 10 cells. But we don't know that and there's no expedient way to tell. For purposes of Atlas mapping and analyses, whether those people are in 5 or all 10 of the cells doesn't matter a great deal—because we end up aggregating the data to larger areas, such as to neighborhoods or to search circles 2/3 of a mile wide.

For raster data underlying network-based maps and analyses (for population used in the access measures), the interpolation method is strictly fractional—because Census block counts are divided evenly by the number of network cells that fall within a given block, and the number of network cells that fall within a given block has no direct relationship to the area of the block. Other raster data variables, such as street network distance-to-resource, exist for network-based maps and analyses.

Overall, using rasterized data allows relatively easy combination and calculation of composite access measures derived from a variety of important variables. In general, this approach is called "raster overlay."

MAP NOTES

Chapter 1: Regional Equity

MAP 1-1. PORTLAND METROPOLITAN REGION [5]

The six darker counties at center view identify the "Portland-Vancouver Primary Metropolitan Statistical Area (PMSA)," based on U.S. Census 2000 definition. Note that only cities within the PMSA are shown in this map.

Chapter 2: Demographics

The following applies to all surface-type maps in chapter 2: For a given location, colors represent the sum of values within 1/3 mile radius: If you were standing in a given color, its legend values apply to a circle 2/3 of a mile wide with you at its center. The mean ("m") & standard deviation ("sd") are based on data within the UGB/A and incorporated locations only (i.e., "urban areas" depicted in the orientation map, Example 1 on page 7). The box labeled "clear" in legends means see-through, where densities or change in densities are very low, and where dark gray city area, light gray UGB/A unincorporated area, beige non-UGB/A unincorporated area, or even the blue of the major rivers, show through the demographic surface, which has been graphically drawn over other map layers. "Clear" can appear to be any of these colors. It does not, however, mean white: white areas on maps are not in the study area. Spatial data sources for these maps include ESRI 2002-04, Metro Data Resource Center RLIS 2004-05, Clark Co. GIS 2004, and Oregon Geospatial.

MAP 2-1. 2000: DISTRIBUTION, POPULATION PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total within circle 2/3 mile wide: m=870, sd=779
Variable based on U.S. Census Bureau SF1 2000 P1 block-level.

MAP 2-2. CHANGE 1990-2000: DISTRIBUTION, POPULATION PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total change within circle 2/3 mile wide: m=192, sd=315
Variable based on U.S. Census Bureau STF1 1990 P1 & SF1 2000 P1 block-level.

MAP 2-3. CHANGE 1990-2000: HOUSING UNITS PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total change within circle 2/3 mile wide: m=78, sd=131
Variable based on U.S. Census Bureau STF1 1990 H1 & SF1 2000 H1 block-level.

MAP 2-4. 1938 RESIDENTIAL SECURITY MAP

Map courtesy of Metroscape Magazine published by the Institute for Portland Metropolitan Studies, Portland State University.
Original Source: National Archives.

MAP 2-5. 2000: DISTRIBUTION, AFRICAN AMERICANS* PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total within circle 2/3 mile wide: m=32, sd=112
Variable based on U.S. Census Bureau SF1 2000 P8 block-level. *non-Hispanic

MAP 2-6A. CHANGE 1990-2000: DISTRIBUTION, AFRICAN AMERICANS* PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total change within circle 2/3 mile wide: m=12, sd=31
Variable based on U.S. Census Bureau STF1 1990 P10 & SF1 2000 P8 block-level. *non-Hispanic

MAP 2-6B. CHANGE 1990-2000: DISTRIBUTION, AFRICAN AMERICANS (NORTH/NORTHEAST PORTLAND)

Same as map 2-6a but zoomed-in to North/Northeast Portland.

MAP 2-7A. 1990: DISTRIBUTION, HISPANICS* PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total within circle 2/3 mile wide: m=23, sd=47
Variable based on U.S. Census Bureau STF1 1990 P10 block-level. *"Hispanic" refers to a place of origin rather than a race; thus, 'Hispanics' can be of any race.

MAP 2-7B. 2000: DISTRIBUTION, HISPANICS* PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total within circle 2/3 mile wide: m=68, sd=135
Variable based on U.S. Census Bureau SF1 2000 P8 block-level. *"Hispanic" refers to a place of origin rather than a race; thus, 'Hispanics' can be of any race.

MAP 2-8A. 1990: DISTRIBUTION, ASIANS*
PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total within circle 2/3 mile wide: m=25, sd=46
Variable based on U.S. Census Bureau STF1 1990 P10 block-level. *Asians & Pacific Islanders, non-Hispanic

MAP 2-8B. 2000: DISTRIBUTION, ASIANS*
PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total within circle 2/3 mile wide: m=60, sd=88
Variable based on U.S. Census Bureau SF1 2000 P8 block-level. *Asians, Native Hawaiian or other Pacific Islanders, non-Hispanic

MAP 2-9A. 1990: DISTRIBUTION, NATIVE AMERICANS*
PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total within circle 2/3 mile wide: m=5.4, sd=9.4
Variable based on U.S. Census Bureau STF1 1990 P10 block-level. *American Indian or Alaska Native, non-Hispanic

MAP 2-9B. 2000: DISTRIBUTION, NATIVE AMERICANS*
PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total within circle 2/3 mile wide: m=9.6, sd=12.6
Variable based on U.S. Census Bureau SF1 2000 P8 block-level. *American Indian or Alaska Native, non-Hispanic

MAP 2-10. CHANGE 1990-2000: DISTRIBUTION, WHITES*
PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total change within circle 2/3 mile wide: m=94, sd=252
Variable based on U.S. Census Bureau STF1 1990 P10 & SF1 2000 P8 block-level. *non-Hispanic

MAP 2-11A. 1990: DISTRIBUTION, CHILDREN* IN POVERTY
PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total within circle 2/3 mile wide: m=21, sd=43
Variable based on U.S. Census Bureau STF3 1990 P117 reallocated by block-to-block group ratio of children under 18 for whom poverty status is determined. *persons under 18 years of age

MAP 2-11B. 2000: DISTRIBUTION, CHILDREN* IN POVERTY
PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total within circle 2/3 mile wide: m=26, sd=44
Variable based on U.S. Census Bureau SF3 2000 P87 reallocated by block-to-block group ratio of children under 18 for whom poverty status is determined. *persons under 18 years of age

MAP 2-12. CHANGE 1990-2000: DISTRIBUTION, CHILDREN* IN POVERTY
PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total change within circle 2/3 mile wide: m=5, sd=29
Variable based on U.S. Census Bureau STF3 1990 P117 & SF3 2000 P87 each reallocated by block-to-block group ratio of children under 18 for whom poverty status is determined. *persons under 18 years of age

MAP 2-13. 1990 & 2000: NEIGHBORHOOD CHILD POVERTY RATES RELATIVE TO REGIONAL RATES
PORTLAND-VANCOUVER METROPOLITAN AREA [2]

Criteria: Child poverty rates that decreased (violet to light blue) or increased (yellow to red) between 1990 and 2000, combined with one of the following four factors:
Child poverty rates that were below regional rates in both 1990 and 2000; rates that were below the average in 1990 & above it in 2000; rates that were above the average in 1990 & below it in 2000; or rates that were above the average in both years. “No change” neighborhoods can be above or below the regional rate in either year. “N/A” applies to neighborhoods with fewer than 100 people and, in most cases, way under 100. 1990 regional rate=12.9%, 2000 regional rate=12.2% (region defined by neighborhoods in the map). “Regional rate” here is synonymous with “regional value (RV).” This is one of only a few neighborhood maps that include neighborhoods within Yamhill and Columbia counties. It is an older version—before it became apparent that access-variable data would not be available for locations in these counties. Variable based on U.S. Census Bureau STF3 1990 P117 & SF3 2000 P87, each reallocated by block-to-block group ratio of population under 18 for whom poverty status is determined prior to being summarized by neighborhoods and cities.

MAP 2-14. 1989: MEDIAN HOUSEHOLD INCOME, BY CENSUS BLOCK GROUP
PORTLAND-VANCOUVER METROPOLITAN AREA [4]

in 1999$: Note that this map’s legend colors diverge at the 1999 regional value (RV), not the 1989 one. 1989 RV (in 1999$)=$42,600; 1999 RV (in 1999$)=$47,100
Variable based on U.S. Census Bureau STF3 1990 P80A.

MAP 2-15. CHANGE 1990-2000: UPPER-INCOME* HOUSEHOLDS
PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total change within circle 2/3 mile wide: m=14, sd=22
*Households with incomes equal to or greater than $100,000 in 1989 or $125,000 in 1999. A degree of change will reflect the difference in income thresholds used to define ‘upper-income’: Inflation adjustment of 1989$ to 1999$ would dictate a cutoff at $137K for 2000 data; however, 2000 Census aggregations include cutoffs at only 100K, 125K, 150K, and so forth. Variable based on U.S. Census Bureau STF3 1990 P80 & SF3 2000 P52, each reallocated by block-to-block group ratio of owner-occupied housing prior to being rasterized and generalized into a statistical surface.

Chapter 3: Housing

MAP 3-1A. SINGLE-FAMILY HOUSING AFFORDABILITY (~2004), BY NEIGHBORHOOD OR CITY
PORTLAND-METRO AREA [2]

Affordability Index: a neighborhood with a legend value ≥1 means a household making at least the median income could theoretically buy the median priced single-family home in that neighborhood without spending more than roughly 1/3 of household income on mortgage and related payments. Regional Value (RV)=0.73. The index is the ratio of estimated housing purchasing power of the region’s median household income over the median price of single-family homes by neighborhood sold during the 2003-05 period. “Housing purchasing power” is based on the 2004 tri-county median household income of $51,000 (derived from Census Bureau’s American Community Survey data) and contemporary lending climate, such as mortgage rate of 6%, down payment of ~$10,000, and an affordability criterion of not paying more than roughly 1/3 of household income on housing costs. Simply put, the index is $159,770 (i.e., housing purchasing power for the region’s median income household) divided by the median sale price of homes in each neighborhood. Thus, the index, if multiplied by 100 and expressed as a percentage, would roughly express how much of the median home in a given neighborhood the region’s median household income could afford. Classification approximates “natural breaks,” which is a standard statistical method that groups the most similar values together. (See also “Housing” in Appendix A: Neighborhood & City Summary Table.)

MAP 3-1B. SINGLE-FAMILY HOUSING AFFORDABILITY: 2004 INCOMES, 1995 PRICES, BY NEIGHBORHOOD OR CITY

PORTLAND-METRO AREA [2]

Affordability Index: See above note. This map replaces 2004 median sale price data in the above analysis with median price of homes by neighborhood sold during the 1993-1997 period (inflation adjusted to 2004$). It uses the same legend as Map 3-1a, but has no neighborhoods with values in the 0.19-0.26 range. In essence, the map shows how affordable single-family homes would be today if housing price increases between about 1995 and 2004 only kept pace with inflation.

MAP 3-2. PERCENT CHANGE 1990-2000: MEDIAN VALUE OWNER-OCCUPIED SINGLE-FAMILY HOUSING,* BY CENSUS BLOCK GROUP

PORTLAND-VANCOUVER METROPOLITAN AREA [4]

Percent change: RV=+75%
RV 1990=$96,900 (in 2000$); 2000=$170,000
* "specified owner-occupied" housing only, described as either single-family detached or single-family attached on less than 10 acres with no business on property. Variable based on U.S. Census Bureau STF3 1990 H61A & SF3 2000 P76. Map relies on second-party 1990 Census data by block group normalized to 2000 block groups by Geolytics, E. Brunswick, NJ. In some cases change may reflect artifacts of normalization method.

MAP 3-3. PERCENT CHANGE ~1995-2004: MEDIAN SALEPRICE* SINGLE-FAMILY HOMES, BY NEIGHBORHOOD OR CITY

PORTLAND-METRO AREA [2]

Percent change: RV=+35.7%
1995 median price based on sales during the 1993-1997 period; 2004 median price based on sales during the 2003-2005 period. Housing units and price data based on Metro DRC RLIS "taxlot.shp" attributes, Feb. 2006. Single-family housing units identified in source data using various attributes; sale price exists as a single attribute. Median in each period based on a minimum of 10 sales per neighborhood. Outlier prices, such $0 or $1, ejected from dataset prior to final calculations. *sale prices inflation adjusted

MAP 3-4. CHANGE 1990-2000: COST-BURDENED RENTER-HOUSEHOLD RATE, BY NEIGHBORHOOD OR CITY

PORTLAND-VANCOUVER METROPOLITAN AREA [2]

Percentage-points: RV=+3.1
Think of the "cost-burdened renter-household rate" as you would a poverty rate. Cost-burdened renter households are households spending 30% or more of their income on rent and utilities. The denominator for the rate is all renter households (by neighborhood). Change is the 2000 rate minus the 1990 rate. EX: in 2000 15% of neighborhood A's renter-households were spending 30% or more of their income on rent (i.e., they were cost-burdened). In 1990, 10% were. The change is thus calculated 15% minus 10%, which equals a 5-point increase. Note that increases can be the result of a shrinking denominator rather than an increasing numerator; i.e., cost-burdened renters could have remained at the same count in both 1990 and 2000, yet the count of all renter-households could have shrunk. EX: CBRHH in 1990 & 2000=10. Renter-HH in 1990=100, in 2000=67. CBRHH rate 1990=10%, 2000 rate=10/67X100=15%. The rate has increased 5-points, but only because the denominator has shrunk. Variable based on U.S. Census Bureau STF3 1990 H51 & SF3 2000 H71, each reallocated by block-to-block group ratio of households prior to summary by neighborhoods and cities.

MAP 3-5. CHANGE 1990-2000: SHARE OF SINGLE-FAMILY HOMES RENTED RATHER THAN OWNED, BY NEIGHBORHOOD OR CITY

PORTLAND-VANCOUVER METROPOLITAN AREA [2]

Percentage-points: RV=-3.5 (RV 1990=19.4%, 2000=15.9%)
See also examples in note above pertaining to calculation of change, but substitute "cost-burdened renter-household rate" with "share of single family homes rented rather than owned." The variable is calculated as thus: year-2000 renter-occupied single-family homes as a percentage of all year-2000 occupied single family homes, minus year-1990 renter-occupied single-family homes as a percentage of all year-1990 occupied single-family homes. 'Single-family homes' in this case are occupied houses with 1 unit detached or attached. Variable based on U.S. Census Bureau STF3 1990 H22 & SF3 2000 H32, each reallocated by block-to-block group ratio of occupied housing prior to summary by neighborhoods and cities.

MAP 3-6. CHANGE 1990-2000: DISTRIBUTION, RENTED SINGLE-FAMILY HOMES*

PORTLAND-VANCOUVER METROPOLITAN AREA [1]

Total change within circle 2/3 mile wide: m=+1, sd=18
*Single-unit detached or attached, renter occupied. Variable based on U.S. Census Bureau SF3 2000 H32 & STF3 1990 H22, each reallocated by block-to-block group ratio of occupied housing prior to being rasterized and generalized into a statistical surface.

MAP 3-7. 2000: MINORITY HOME-OWNERSHIP GAP, BY CENSUS TRACT

PORTLAND-VANCOUVER METROPOLITAN AREA [4]

Under-representation (percentage-points): RV=3.8 points
Calculated as thus: minority households as a percentage of all households minus minority home-owning households as a percentage of all home-owning households. If minority ownership rates were equal to or greater than the share of minority households among all households, then "gap" would equal 0 or less. Note that "minority" households include all households except those with a White, non-Hispanic householder; therefore, the gap also shows the over-representation of Whites in the home-owning class. EX: if minority households are 10% of a tract's households and 5% of the home-owning households, then by definition Whites are 90% of the households, but 95% of the home-owning ones. The gap as depicted in the map would be 10% minus 5%= 5 points, 5 points of minority under-representation in the home-owning class. But it is also 5 points of White over-representation. Variable based on U.S. Census Bureau SF3 2000 H6, H9, & HCT44.

Chapter 4: Schools

Note: "AY" means "Academic Year," such as "AY2002"= September 2002-June 2003.

MAP 4-1. 2000: MEDIAN HOUSEHOLD INCOME, BY SCHOOL DISTRICT

PORTLAND-VANCOUVER METROPOLITAN AREA [5]

2000$: median among school districts=$48,679
Source: National Center for Education Statistics School District Demographic System, U.S. Census Bureau SF3 2000 P52.

MAP 4-2. AY2002: TEACHER TRAINING & EXPERIENCE, BY PUBLIC ELEMENTARY SCHOOL

PORTLAND METROPOLITAN AREA (OREGON SIDE ONLY) [5]

Rank-score (in parentheses count of schools in each class): median school has score of 3.
This map combines into a single score a given school's values on teacher training (in average number of years) and on experience (in percentage of teachers with an advanced degree). To produce the score, each sub-variable's data distribution has been split into 4 classes with about the same number of schools in each class (known as "quantiles," which is a type of ranking; hence "rank-score"). Each class is then scored 0-3 points: 0 for the least training, 0 for the least experience, 3 for the most, and so forth. Both data distributions are then added together, producing a score ranging from 0-6. Sub-variables based on Oregon Department of Education "Oregon Report Card" data, 2002/2003. http://www.ode.state.or.us/
Regular public elementary schools only (excludes alternative, vocational, special education, etc.).

MAP 4-3. ACCESS TO TEACHER TRAINING & EXPERIENCE AT PUBLIC ELEMENTARY SCHOOLS, BY NEIGHBORHOOD OR CITY

PORTLAND-METRO AREA [2]

Score (z-score): Regional Value (RV)=0 (average of neighborhood scores).
This map uses the un-scored source data for teacher training and teacher experience described in the note above, but allocates schools to neighborhoods and cities using a distance-related method. The sub-variables can then be considered in an access-measure scheme at the neighborhood level. If only one school is allocated to a neighborhood, then the neighborhood's score depends on that school's teacher training and teacher experience values. If more than one school is allocated to a neighborhood, the neighborhood's score is an average of values for the 2 or more allocated schools -- but each school is weighted depending on how close it is to the given neighborhood relative to the other schools allocated to the same neighborhood. Each sub-variable is then standardized ('z-scored') and added together to produce the composite z-scores found in the legend. z-scores: 0 is average, negative is worse, positive is better, and the range of values is typically -3 to +3. This map uses natural breaks for the final scored data distribution, a standard statistical method that groups the most similar values together.

MAP 4-4A. AY1999: PERCENT STUDENTS ELIGIBLE FOR FREE/ REDUCED PRICE MEALS, BY PUBLIC ELEMENTARY SCHOOL

PORTLAND-VANCOUVER METROPOLITAN AREA [5]

Percent:
Source: National Center for Education Statistics CCD 1999/2000, regular public elementary schools only (excludes alternative, vocational, & special education). http://nces.ed/gov/ccd

MAP 4-4B. AY2003: PERCENT STUDENTS ELIGIBLE FOR FREE/ REDUCED PRICE MEALS, BY PUBLIC ELEMENTARY SCHOOL

PORTLAND-VANCOUVER METROPOLITAN AREA [5]

Uses same legend as Map 4-4a.
Source: National Center for Education Statistics CCD 2003/2004, regular public elementary schools only (excludes alternative, vocational, & special education). http://nces.ed/gov/ccd

MAP 4-5A. AY1997: PERCENT WHITE* STUDENTS, BY PUBLIC ELEMENTARY SCHOOL

PORTLAND-VANCOUVER METROPOLITAN AREA [5]

Percent:
*White, non-Hispanic. Source: National Center for Education Statistics CCD 1997/1998, regular public elementary schools only (excludes alternative, vocational, & special education). http://nces.ed/gov/ccd

MAP 4-5B. AY2003: PERCENT WHITE* STUDENTS, BY PUBLIC ELEMENTARY SCHOOL

PORTLAND-VANCOUVER METROPOLITAN AREA [5]

Uses same legend as Map 4-5a.
*White, non-Hispanic. Source: National Center for Education Statistics CCD 2003/2004, regular public elementary schools only (excludes alternative, vocational, & special education). http://nces.ed/gov/ccd

MAP 4-6A. AY1997: STUDENT-TEACHER RATIO, BY PUBLIC ELEMENTARY SCHOOL

PORTLAND-VANCOUVER METROPOLITAN AREA [5]

Students per teacher: AY1997 median=22, 2003=20+ (+ means 'strong', i.e. leaning toward 21)
Source: National Center for Education Statistics CCD 1997/1998, regular public elementary schools only (excludes alternative, vocational, & special education). http://nces.ed/gov/ccd

MAP 4-6B. AY2003: STUDENT-TEACHER RATIO, BY PUBLIC ELEMENTARY SCHOOL

PORTLAND-VANCOUVER METROPOLITAN AREA [5]

Uses same legend as Map 4-6a.
Source: National Center for Education Statistics CCD 2003/2004, regular public elementary schools only (excludes alternative, vocational, & special education). http://nces.ed/gov/ccd

Chapter 5: Transportation

MAP 5-1. CHANGE 1990-2000: SHARE OF WORKERS WHO DROVE TO WORK ALONE, BY CENSUS BLOCK GROUP

PORTLAND-VANCOUVER METROPOLITAN AREA [4]

Percentage-points: RV= -0.73 (1990=73.89%, 2000=73.16%)
Workers age 16+ who drove to work alone by car, truck, or van, or who took a taxi, as a percentage of all workers 16+, including those who worked at home: 2000 minus 1990. Variable based on U.S. Census Bureau STF3 1990 P49 and SF3 2000 P30. Map relies on second-party 1990 Census data by block group normalized to 2000 block groups by Geolytics, E. Brunswick, NJ.

MAP 5-2. TRANSIT ACCESS: WALKING DISTANCE TO NEAREST TRANSIT STOP*

PORTLAND-VANCOUVER METROPOLITAN AREA [3]

Street distance: m=2660ft (~1/2 mile), sd=4800ft (~9/10 mile); 4-county neighborhood mean=2710ft, sd=4830ft
* Transit stops merged into a single point location where more than one stop falls within an area equal to about 1 city-block (260X260ft). Analysis based on TriMet & C-TRAN transit stops only: Wilsonville, Canby, and Molalla (out of view) data not assessed. TriMet bus and MAX stops furnished by TriMet & reflect data available as of April 2005; streetcar current as of December 2004. C-TRAN service area stops furnished by C-TRAN, January 2005. Street distance based on vector network analysis.

MAP 5-3. WALKING DISTANCE TO NEAREST TRANSIT STOP: AVERAGE BY NEIGHBORHOOD OR CITY

PORTLAND-VANCOUVER METROPOLITAN AREA [2]

City Blocks (1 block=280ft): RV=10
This map relies on the network-distance data depicted in Map 5-2 and described in its note, averaged by neighborhood or city geography. (See also Neighborhood Summary Table.)

MAP 5-4. TRANSIT ACCESS: SUMMARY SCORE
PORTLAND-VANCOUVER METROPOLITAN AREA [3]

Score: urban area mean=5.933, sd=3.024; Neighborhood mean=5.95, sd=3.029
See next note for description.

MAPS 5-5A, B, & C. TRANSIT ACCESS: COMPONENTS OF THE SUMMARY SCORE (ZOOMED TO SW CLACKAMAS COUNTY) [3]

The transit access summary score is based on adding together two scored spatial data layers—rasterized data allocated to the street network (see map overview note 3 plus "Raster Data"). In short, 1 layer is the network distances shown in Map 5-2; the other is total population relative to the level of service within a small area—call it a 'transit-shed'. Each of these layers have been scored from 0 to 5 and added together, producing a summary score with a range of 0 to 10, shown in Map 5-4. Map 5-5a shows the distance component; 5-5b shows the population relative to service level component; and 5-5c shows the summary score once again, each zoomed into the SW Clackamas County area. The legends show the classes used in scoring (see below).

MAP 5-5A. WALKING DISTANCE, IN CITY-BLOCKS (1 BLOCK=280FT)

Walking distances have been scored thus:
5 points for locations less than 2 blocks from a transit stop
4 points for locations between 2 & 3 blocks
3 points for locations between 3 & 5 blocks (3.000001 to 5)
2 points for locations between 5 & 8 blocks (5.000001 to 8)
1 point for locations between 8 & 10 blocks (8.000001 to 10)
0 points for locations beyond 10 city-blocks.

MAP 5-5B. POPULATION DISTRIBUTION RELATIVE TO SERVICE LEVEL

Total population within a 1/4 mile search radius divided by total capacity-weighted transit trips within same area:
RV=221
This spatial data layer is used to approximate the "amount" of service available to people living near transit stops to which distance measurements have been made. It is part of the general function that describes access as a phenomenon dependent on 1) distance to resource and 2) amount of resource relative to population. It is actually made up of sub-variables itself: 2000 population, transit trip data (frequency of service), and capacity estimates. Since there are no tried-and-true standards that could guide the classification of these data once combined into the "population vs. service level" variable, the regional value, which is an average of the variable within the urban area, is used as a middle cut-off. If you can envision a circle with a 1/4 mile radius (a little less than 10 city-blocks wide), picture the number of people living in that area and the number of transit trips passing through that area within an hour. That is what the values in the legend stand for, with the exception that MAX trips are weighted 4 times as much as bus trips, and streetcar trips are weighted 1.5 times as much as bus trips (for carrying more people per trip). In general, the more trips there are, or the fewer people there are to move, the lower the variable value will be (and the better/higher its score). Picture 10,000 people within a 10-block wide circle with only 2 trips passing through the area each hour, versus 500 people within the same sized area – with 4 trips passing through the area each hour. In terms of pedestrian-scale access, the second area is better served. The "population vs. service level" variable has been scored thus:

0-25=5 points
26-75=4 points
76-221=3 points
222-500=2 points
501-1,000=1 point
>1,000=0

To understand "score," the only addition to this conceptualizing is each location's actual distance from the nearest transit stop: those who live closer to a stop are better off than those who live farther, population vs. service level being equal for both people (locations). Map 5-4 and Map 5-5c show the results of adding the two layers together. Data: Population based on U.S. Census 2000 SF1 block-level. Analysis based on TriMet & C-TRAN transit service only: Wilsonville, Canby, and Molalla not assessed. TriMet bus and MAX data furnished by TriMet & reflect most recent data available as of May 2005; streetcar current as of December 2004. C-TRAN service area stops and trip data furnished by C-TRAN, January 2005.

MAP 5-5C. TRANSIT ACCESS: SUMMARY SCORE (ZOOMED TO SW CLACKAMAS COUNTY)

See description for maps 5-5a, b, & c.

MAP 5-6. TRANSIT ACCESS SUMMARY SCORE: AVERAGE BY NEIGHBORHOOD OR CITY
PORTLAND-VANCOUVER METROPOLITAN AREA [2]

Average score: RV=5.95
An average by neighborhood or city of the network-level data depicted in Maps 5-4 and 5-5c, described in their notes. Neighborhoods and cities highlighted with a red boundary are described in the text in the context of an equity analysis. (See also Appendix A: Neighborhood Summary Table.)

MAP 5-7. NORTH PORTLAND TRANSPORTATION PROJECTS STUDY AREA

Map courtesy of TriMet.

Chapter 6: Health and Design

MAP 6-1. PERCENT SIDEWALK COVERAGE AROUND SCHOOLS, BY ELEMENTARY AND MIDDLE SCHOOL
PORTLAND-METRO AREA [5]

Percent: median school has value of 28.6%
Percentage length of streets, extending 1 mile from elementary schools or 1.5 miles from middle schools, having sidewalks along at least one side of the street without a break. Based on Metro Data Resource Center 2002 regional sidewalk inventory. Network-distances based on vector analysis.

MAP 6-2. ACCESS TO GROCERY OR NATURAL FOOD STORES: SUMMARY SCORE
PORTLAND-VANCOUVER METROPOLITAN AREA [3]

Score: urban area mean=3.98, sd=2.822 (excludes major unpopulated locations)
Neighborhood mean=3.96, sd=2.83 (excludes major unpopulated locations)
An additive scoring of two spatial variables: network distance to closest store and population per store/s by closest store/s service area. A service area can be based on more than 1 store if 2 or more stores are less than a 1/4 mile network distance apart; hence the need to divide service area population by the number of stores (it is assumed that 2 stores, 3 stores, etc., can serve twice as many, 3 times as many people as 1). Prior to being added together, the two sub-variables in the composite summary score are scored thus:

Network distance (in miles)
0-1/4=5 points
1/4-1/2=4 points
1/2-3/4=3 points
3/4-1=2 points
1-1 1/4=1 point
Locations beyond 1 1/4 miles from the closest grocery store are scored zero (or marked "No pop" for not populated) regardless of any other factor, presuming walking-access to grocery stores ceases to be relevant beyond 1 1/4 miles.

Total population per store/s, by closest store/s service area:
274-2,400=5 points
2,401-4,179=4 points
4,180-6,129=3 points
6,130-8,379=2 points
8,380-12,022=1 point
>12,022=0
Classes reflect natural breaks, a standard statistical classification that groups the most similar values together. Stores are full-service grocery or natural food identified by the Multnomah County Food Policy County for Multnomah County stores, and by the Coalition for a Livable Future for Clackamas, Washington, and Clark County stores, from the Oregon Department of Agriculture's list of licensed food retailers (Clackamas, Washington and Multnomah Counties, 2003-2004) and Clark County Health Department of Licensing, Food Access Point Database (for Clark County, 2004).

MAP 6-3. ACCESS TO GROCERY OR NATURAL FOOD STORES SUMMARY SCORE: AVERAGE BY NEIGHBORHOOD OR CITY

PORTLAND-VANCOUVER METROPOLITAN AREA [2]

Average score: RV=4
An average by neighborhood or city of the network-level score depicted in Map 6-2 and described in its notes. (See also Appendix A: Neighborhood Summary Table.)

MAP 6-4. DIESEL PARTICULATES, NORTH AND NORTHEAST PORTLAND, 2005

Map courtesy of the Oregon Department of Environmental Quality.

Chapter 7: Parks and Nature

MAP 7-1. PARKLAND ACCESS: WALKING DISTANCE TO NEAREST PUBLIC PARK OR GREENSPACE

PORTLAND-VANCOUVER METROPOLITAN AREA [3]

Street distance (miles): urban area mean=0.38, sd=0.43
Street-network distance to nearest public park or greenspace among a set of parks and greenspaces from Clark Co. GIS 2004 and Metro Data Resource Center 2003 Parks Inventory. Excludes stadiums, fairgrounds, select parkways, schools and trails. Parks not completely comparable between Clark County data and Metro data. EX: Metro includes a wider variety of "open space," usually private. Open space includes golf courses, cemeteries and common space, in addition to such features as urban open spaces or greenways. Parks include community centers, tennis courts, a rifle range, et al. Network analysis completed on public parks only. Street network includes trails. Network distances based on raster cost-distance analysis: distances are measured from rasterized locations along the street and trail network to parkland access points modeled by the intersection of streets and parkland boundaries. Manual corrections were made for the most obvious errors; modeling of "access points" can only be considered as being a little better than not using access points at all (i.e., being able to access a park at any location along its boundary).

MAP 7-2. PUBLIC PARKLAND ACCESS: SUMMARY SCORE

PORTLAND-VANCOUVER METROPOLITAN AREA [3]

Score: urban area mean=7.473, sd=1.909
The access to public parks and greenspaces summary score is based on adding together two scored spatial data layers—rasterized data allocated to the street network (see map overview note 3 plus "Raster Data"). In short, one layer is simply the network distances shown in Map 7-1; the other is total population relative to total parkland-acres within nearest park service areas—call them "park-sheds." Each of these layers have been scored from 0 to 5 and added together, producing a summary score with a range of 0 to 10, shown in Map 7-2.

The walking distance layer (in miles) has been scored:
0-1/8=5 points
1/8-1/4=4 points
1/4-1/2=3 points
1/2-3/4=2 points
3/4-1=1 points
>1 mile=0

The population per park-acre by nearest park service area layer (also referred to as "per-capita park-acres" in the text), has been scored:
0-250=5 points
251-500=4 points
501-1,000=3 points
1,001-2,000=2 points
2,001-4,000=1 points
>4,000=0

MAP 7-3A. PUBLIC PARKLAND ACCESS: WALKING DISTANCE TO NEAREST PUBLIC PARK OR GREENSPACE

PORTLAND-VANCOUVER METROPOLITAN AREA (PORTLAND AREA) [3]

Same as map 7-1, but zoomed-in to the Portland area.

MAP 7-3B. PUBLIC PARKLAND ACCESS: SUMMARY SCORE

PORTLAND-VANCOUVER METROPOLITAN AREA (PORTLAND AREA) [3]

Same as Map 7-2, but zoomed-in to the Portland area.

MAP 7-4. PUBLIC PARKLAND ACCESS SUMMARY SCORE: AVERAGE BY NEIGHBORHOOD OR CITY

PORTLAND-VANCOUVER METROPOLITAN AREA [2]

Average score: RV=7.43
An average by neighborhood or city of the network-level data depicted in Maps 7-2 and 7-3b, described in their notes. Classes approximate natural breaks. (See also Appendix A: Neighborhood Summary Table.)

"Natural habitat" in the following maps based on Metro's 'Goal 5' Regional Riparian Corridor & Wildlife Habitat Inventories 2002, excluding "impact areas" and developed flood plains. Source: Metro Data Resource Center Sept. 2004.

MAP 7-5. PROXIMITY TO NATURAL HABITAT

PORTLAND-METRO AREA [1]

Percent habitat cover within circle 1/2 mile wide: UGB mean=26%, sd=27%
Percent cover reflects sum of habitat acres within 1/4 mile search radius (i.e. 1/2 mile wide) divided by sum of area within 1/4 mile search radius times 100. Methods include

rasterization to 1/4-acre cells: habitat fragments of less than approximately one 1/4-acre in the original vector source data are not counted. There is no habitat spatial data toward the outer edge of the multi-colored surface; thus, edge-colors are not a reliable indicator of percent cover near the edge. Data, however, extend far enough beyond the urban growth boundary to produce reliable values within the boundary.

MAP 7-6. NATURE NEARBY: PERCENT POPULATION WITHIN A 1/4 MILE OF NATURAL HABITAT, BY NEIGHBORHOOD OR CITY

PORTLAND-METRO AREA [2]

Percent: RV=64%
Locations within a 1/4 linear mile search radius of natural habitat are identified; population estimated at these locations is summed by neighborhood or city and then divided by total population by neighborhood or city (x100). Population based on U.S. Census SF1 2000 block-level. (See also Appendix A: Neighborhood Summary table.)

MAP 7-7. NATURAL HABITAT-ACRES PER CAPITA, BY NEIGHBORHOOD OR CITY

PORTLAND-METRO AREA [2]

Acres per 1,000 people: RV=54
The sum of habitat-acres by neighborhood divided by the sum of population by neighborhood (x1000). Population based on U.S. Census SF1 2000 block-level. (See also Appendix A: Neighborhood Summary Table.)