

WALKING TO THE PARK: A COMPARISON OF PARK ACCESSIBILITY FOR NORTHEAST PORTLAND RESIDENTS



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The goal of this exploratory research project is to provide more information to interested stakeholders about the state of parks accessibility (by walking) for Portland's low-income and non-white populations. Parks provide numerous mental and physical health benefits to people of all ages. In the past, low-income and non-white communities in cities across the nation have been found to have less access to parks compared to their higher income or white counterparts. This study used network analysis measure to the average walking distance for residents who live in block groups with primarily non-white residents, white residents, low-income residents, and high income residents in order to provide information regarding the equity of park access in Portland's Northeast neighborhoods.

STUDY AREA

Given the limited resources and time frame associated with this project we determined that looking at one quadrant of the city would be a reasonable study size. The total population of the study area is 105,959 and total park area is 402.5 acres. Based on preliminary research, the neighborhoods within the Northeast Neighborhood Coalition were found to have a relatively diverse population in terms of race/ethnicity and income. In addition, northeast Portland has been identified as an area in need of attention in terms of park infrastructure development as identified in the City of Portland's Parks 2020 Vision. These two factors led to the decision to use Portland's northeast quadrant as the study area for this project.

METHODS

After conducting a literature review of similar studies in different locations we determined that block groups would be an appropriate unit of measurement for this analysis. Block groups were the most commonly used unit of measurement for these types of analyses and given our scale of analysis (neighborhood as opposed to city or region wide), block groups provide the appropriate level of detail in comparison to census tracts. Census blocks were deemed too small of an analysis unit given that racial/ethnic composition and median household income is sensitive information to show on a map.

The study area boundary was created in ArcGIS using the select by attribute feature to select neighborhoods from the citywide dataset that were listed as part of the Northeast Coalition of Neighbors. After the study area was determined, block groups whose centroids were within these neighborhoods were selected for analysis and exported as a new layer. The City of Portland strives to have all residents live within a half mile of at least one neighborhood park (Neighborhood Parks <30 acres). The ORCA (parks) layer was used to locate parks in the neighborhoods and clipped from the rest of Portland. The select by attribute tool was again used to remove all unit types except for "parks" and "schools" since the public schools are attached to or are considered to be parks. We dissolved the park polygons by name field and then calculated the sum of the total acreage of each park to exclude parks under one acre.

METHODS CONTINUED

New variables were created and added to the American Community Survey file so that a variable for the percentage of the population that is non-white and not Hispanic was included. The ACS file was then spatially joined with the U.S. Census block groups shapefile based on FIPS ID, a unique identifier. We chose demographic groups that were in the highest and lowest quintiles of the percentage of non-white residents and median household income based on equal intervals and created choropleth maps using these variables.

In previous studies that have been conducted on this topic, both Euclidean distance and network analysis has been used to measure distances. We determined that network analysis would provide a more fine-tuned measurement of walking distances. Using Portland's RLIS streets shapefile file, we created a street network dataset. We then used the Network Analysis Service Area tool to create half mile buffers around each park in the study area combined into one simple polygon to show what areas in Northeast Portland are outside of this goal.

Next, we used the Network Analysis Closest Facility tool to create facility locations (parks) and incidents (target block centroids) to calculate the average distance from the center of the block groups within the target demographics to the edge of the nearest park. This ensured that a block group could travel to the nearest park even if it is outside of the block or neighborhood.

T-Test

Using the distances derived from the network analysis we used SPSS to conduct a t-test to test for statistical differences between average park distances for block groups in the lowest quintile for medium household income to those in the highest quintile for medium household income. The same process was followed for block groups in the lowest quintile of block groups based on percentage of the residents that were non-white (and not Hispanic).

LIMITATIONS

- This analysis assumes that people want to travel to the park closest to their house, which is likely not how people always use parks in reality.
- This analysis only compared the distance to the nearest park, it did not include any information about the quality of the nearest park and it is highly likely that parks throughout the study area differ in terms of facilities present and level of maintenance or development.
- This analysis does not represent all of Portland, it just shows a snapshot of one part of the city.

SOURCES & DATASETS

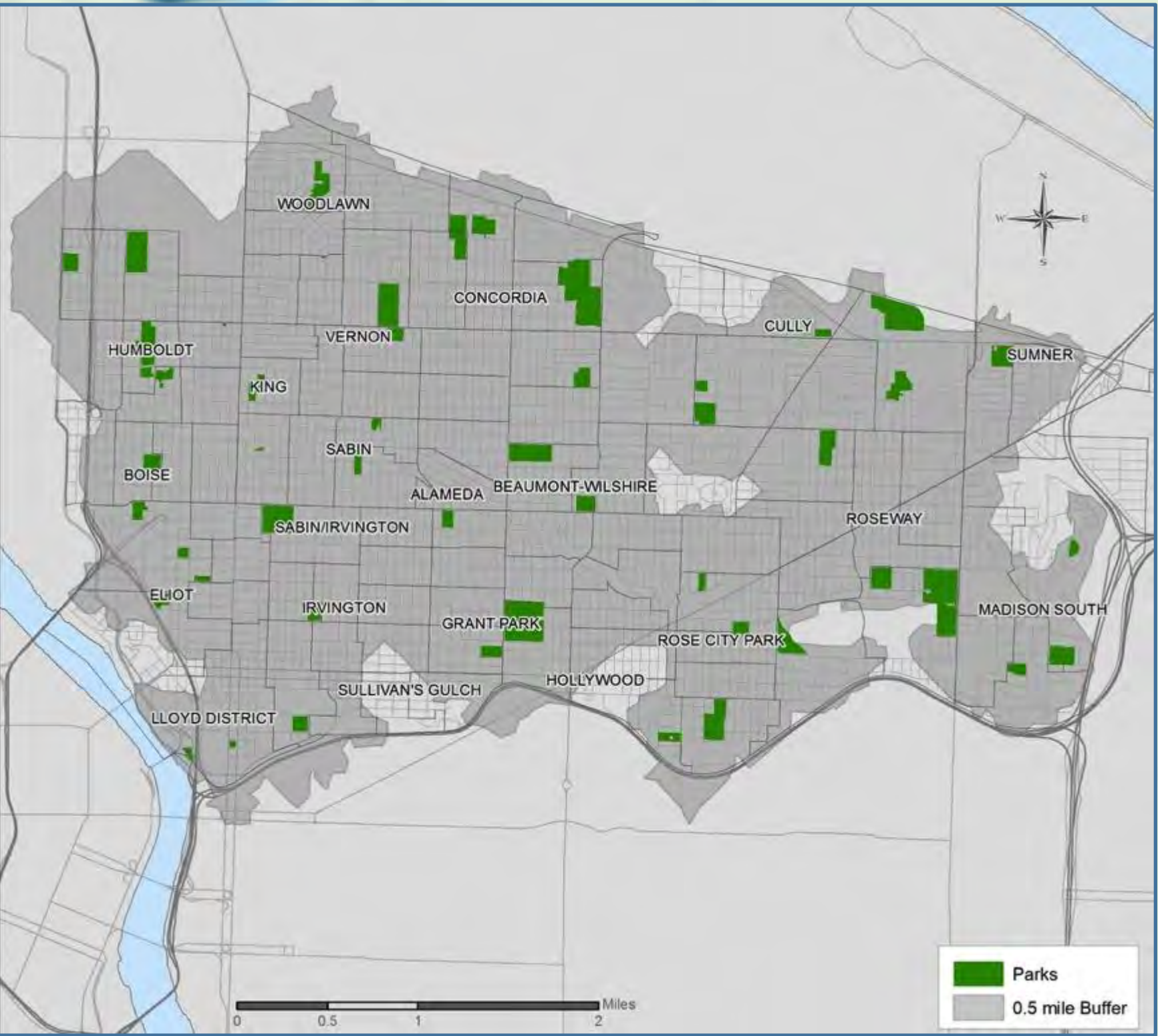
American Community Survey 5 year estimate (2009-2014):
Excel dataset at the block group level with FIPS ID, total population, total population for all racial and ethnic groups, median household income

City of Portland RLIS: City boundary, neighborhoods, ORCA, streets

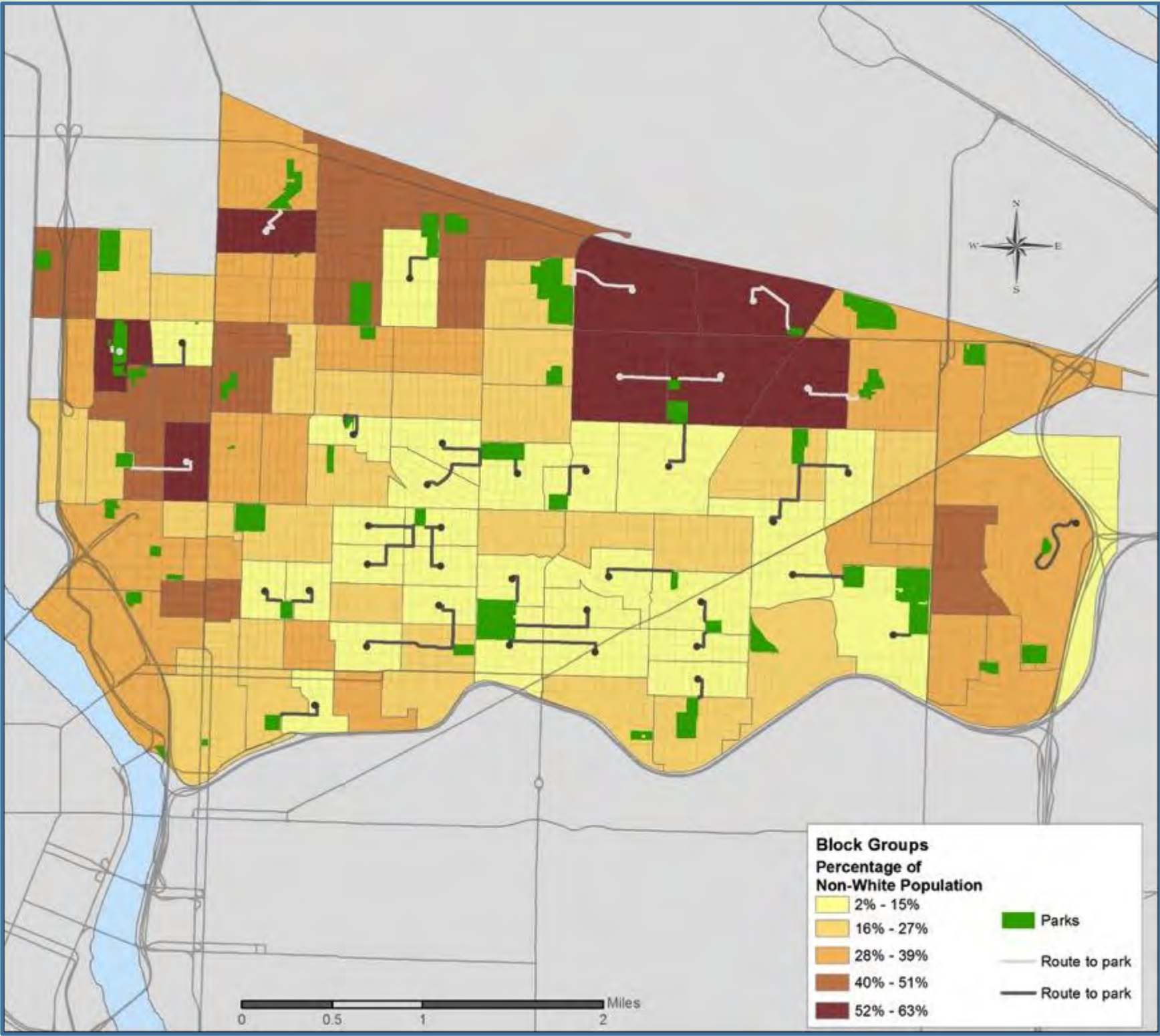
Lloyd, Christopher D. "Ch. 6 Network Analysis." *Spatial Data Analysis: An Introduction for GIS Users*. Oxford: Oxford UP, 2010. 75-84.

"Parks 2020 Vision: Northeast." *City of Portland: Parks and Recreation*. N.p., 1999. Web. 10 Apr. 2016. <<https://www.portlandoregon.gov/parks/article/89446>>.

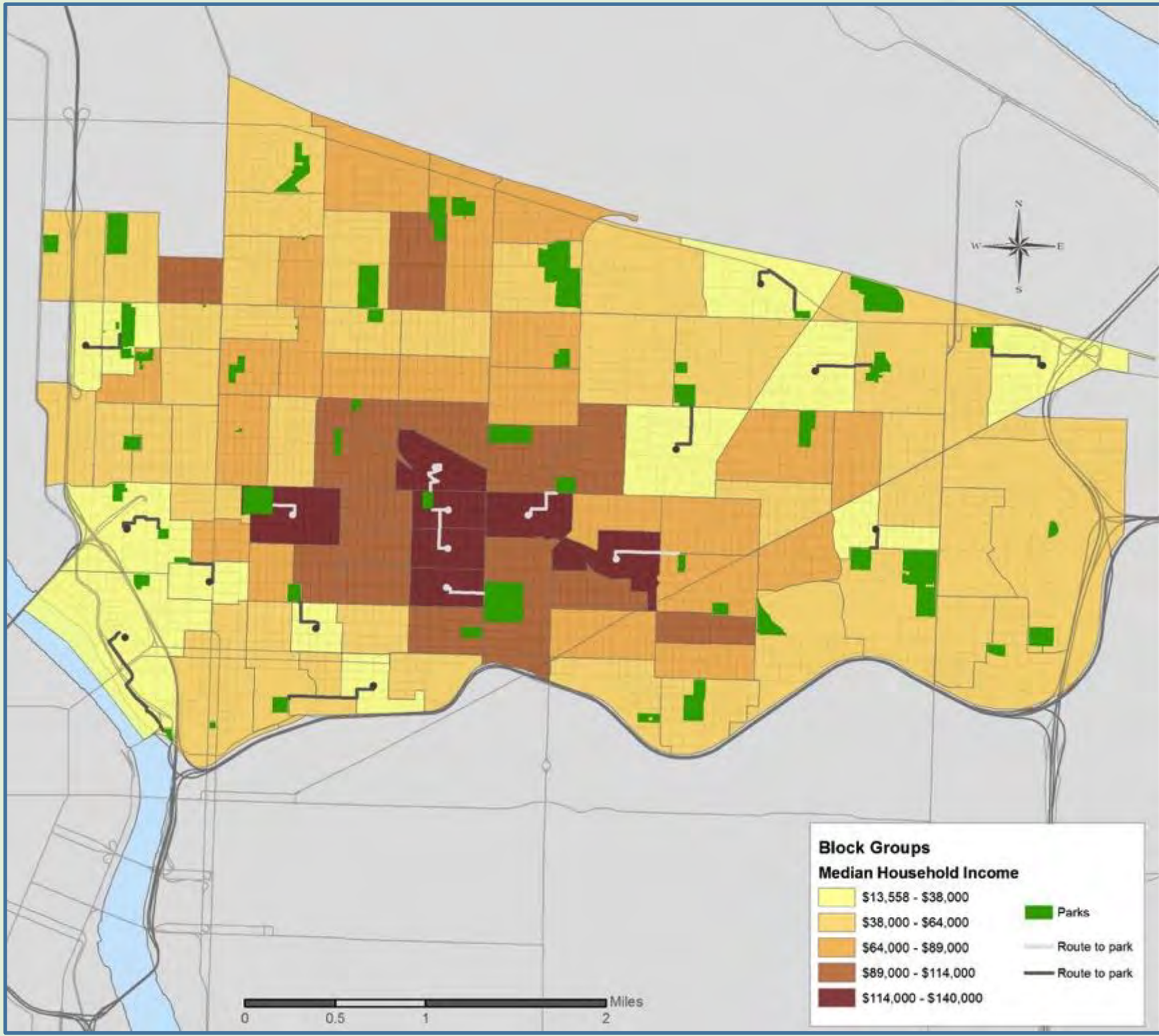
U.S. Census 2010: Block groups



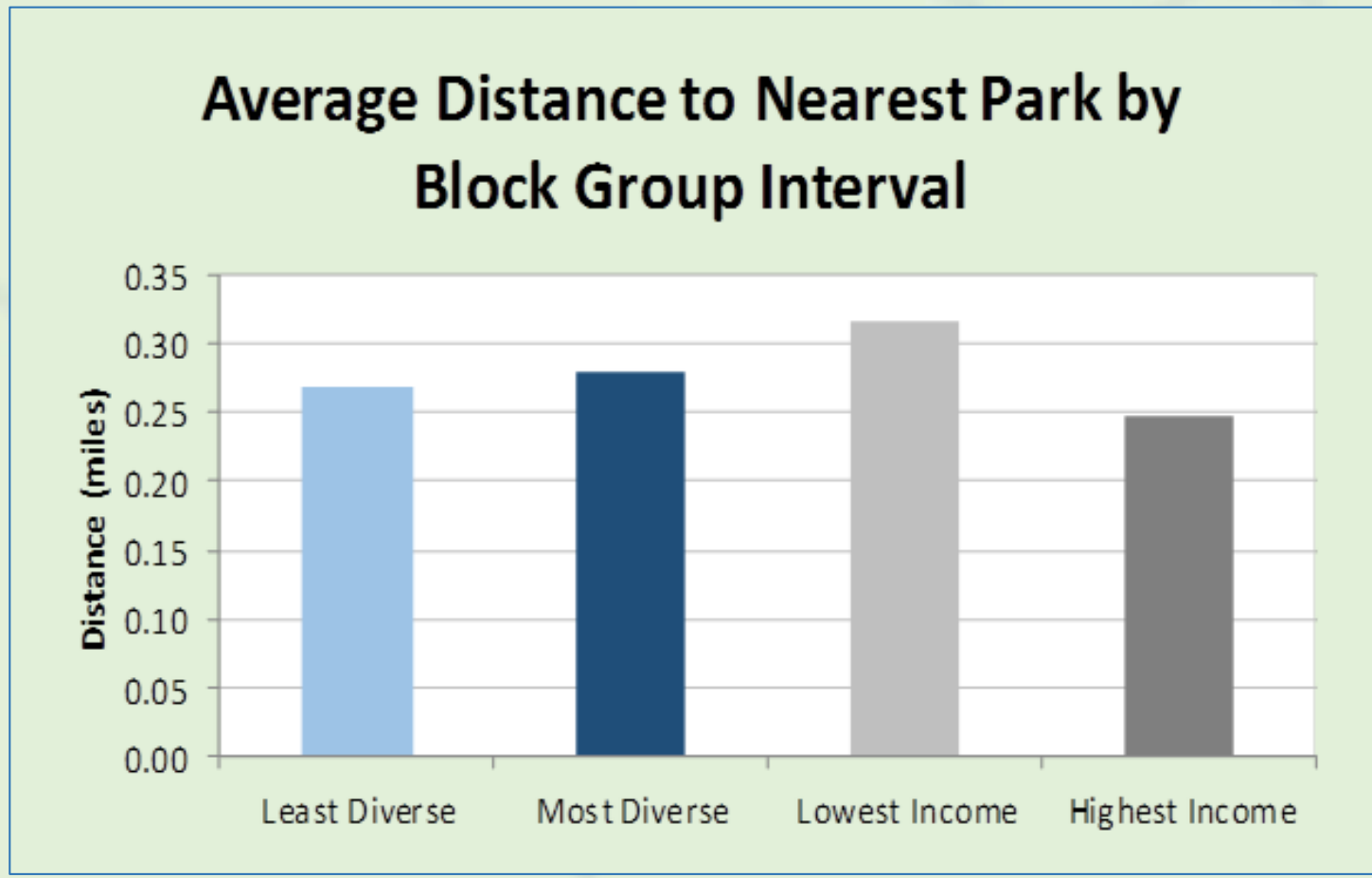
Park Buffer
This service area map highlights the areas included in the 0.5 mile buffer around each park in Northeast Portland. The areas outside of this buffer would be considered out of the ideal range.



Park Access by Diversity
This network analysis map shows the shortest route for each study block in the lowest and highest quintile of non-white populations to the nearest park over one acre.



Park Access by Income Range
This network analysis map shows the shortest route for each study block in the lowest and highest quintile of median household income to the nearest park over one acre.



FINDINGS

- The City of Portland appears to be meeting its park access goals for residents living within the Northeast Portland study area. A few small areas within the study area were found that were not within a half mile of a neighborhood park, however these areas are not residential areas so it is not necessary for these areas to have high park access.
- There are no statistically significant differences between average distance to the nearest park between lowest income vs. highest income and between least diverse vs. most diverse.
- Further analysis is needed to compare quality of parks in order to provide a clearer picture of potential differences in access to parks for different demographic groups in Northeast Portland.

Block Group Intervals	Total Population	# Block Groups (n)	Average Distance (ft)	Significance
Least Diverse	30,994	30	1419.7	0.843
Most Diverse	44,244	8	1479.9	
Lowest Income	13,317	12	1666.8	0.363
Highest Income	6,582	7	1305.6	