

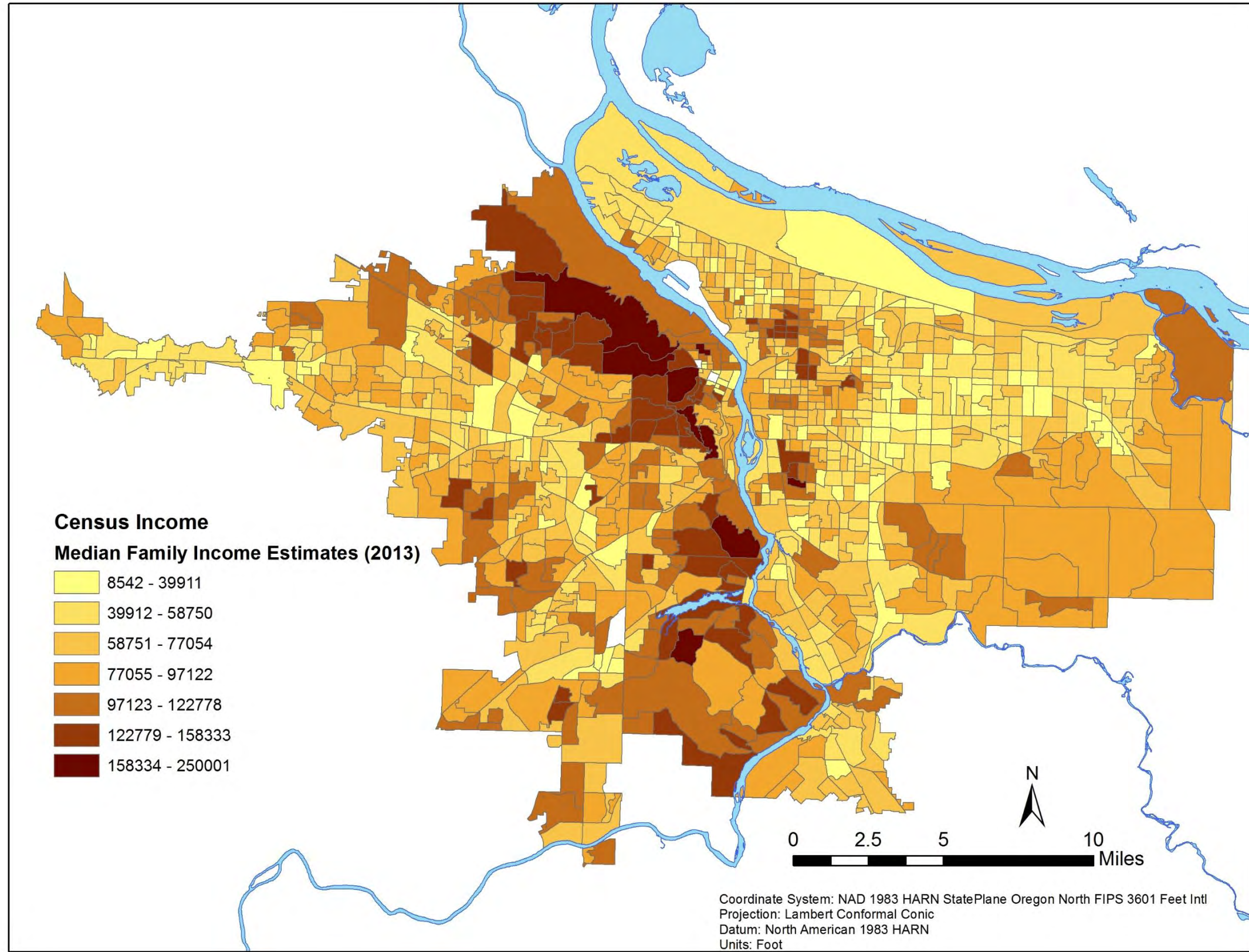
Walkability by Median Family Income in the Portland Metro Area



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Background:
In order to create more sustainable communities and increase the quality of life people are turning to different forms of transportation. In the Portland Metro area there has been a push to increase bicycle route safety, access to public transportation, and to increase the walkability of neighborhoods. But investment in infrastructure usually occurs in areas higher with higher investment return potential. In other words moderate to high income areas that will have higher spending power. This infrastructure investment can marginalize the lower income brackets. An example: A grocery store chain will not put a store in a location where the surrounding community cannot afford to shop at it. It is my hypothesis that the walkability of an area, when compared to the average income of an area, will form a slightly left of center bell shaped curve. The idea behind this is that the less wealthy will not be able to afford to pay the cost of living in neighborhoods/block groups that are considered walkable. The peak of the curve will be left of center (towards less wealthier), and wealthier areas will not be considered as walkable. As the upper class generally prefers amenities that fall outside of walkability, such as land ownership.



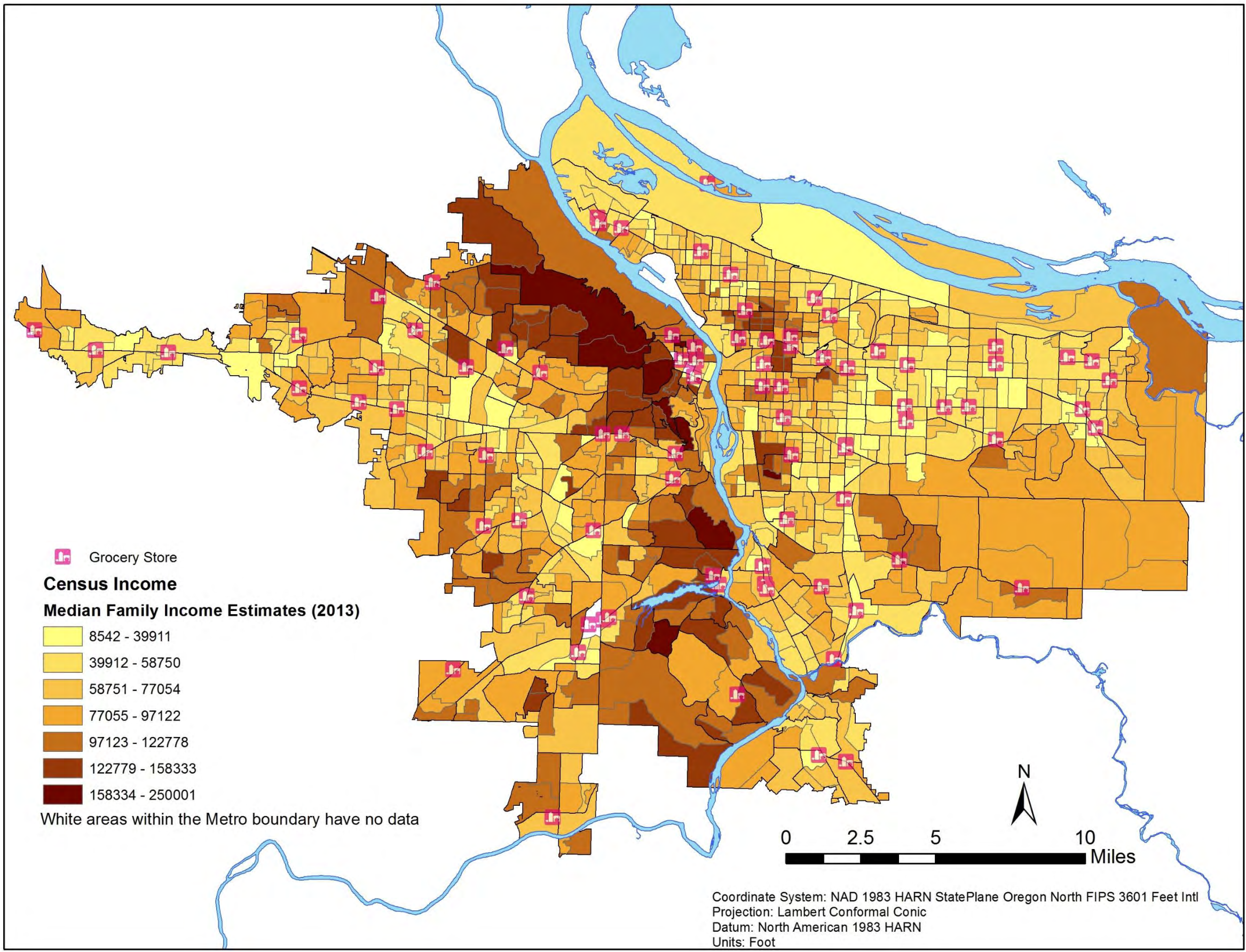
Map 1

Methods:

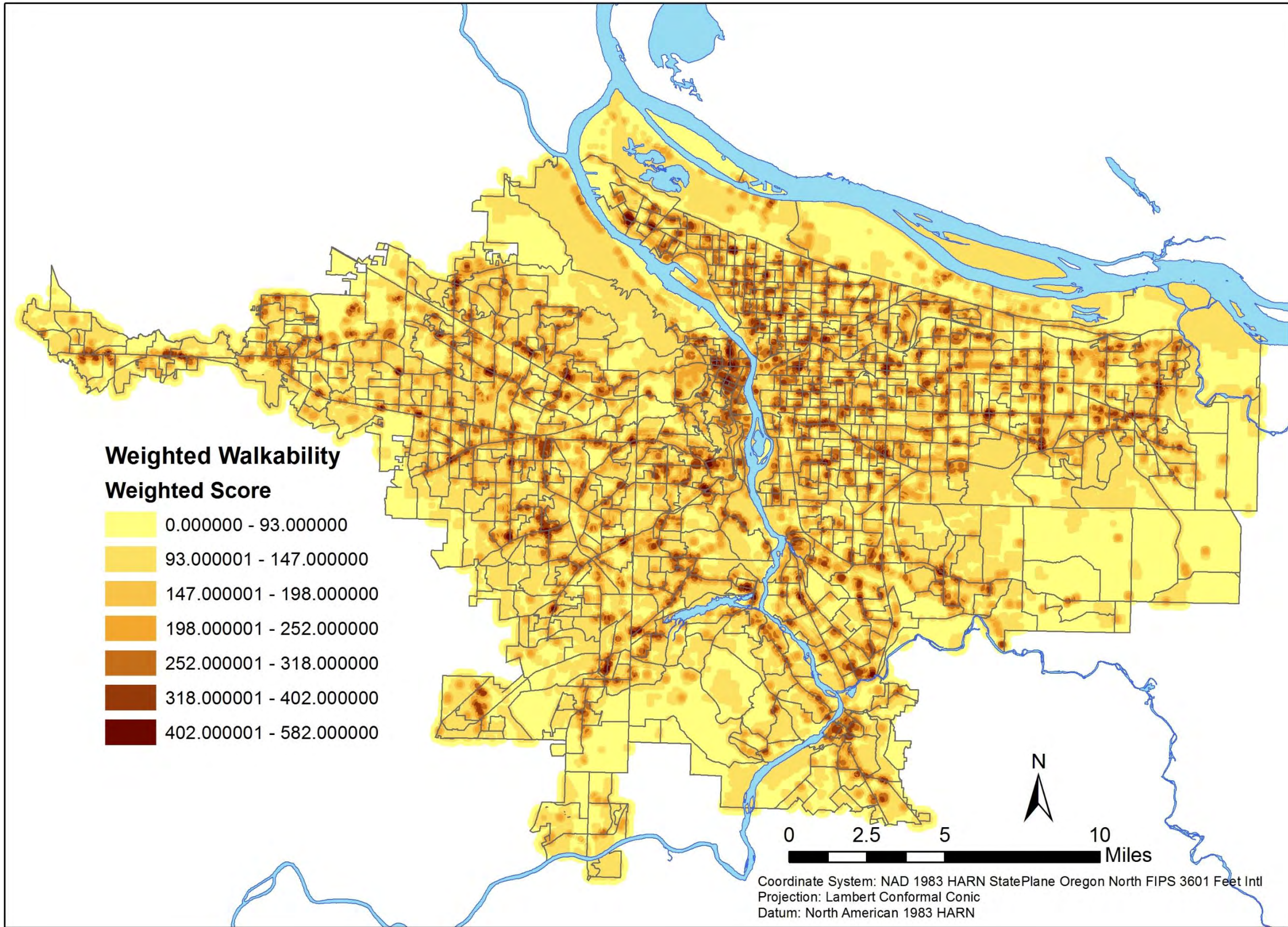
The Oregon Census data was clipped into the Portland Metro boundary, and symbolized by the Median Family Income 2013 (estimate), see map 1. Three buffers of 0.1, 0.17, and 0.25 miles were created around six different factors of walkability, see table 1, grocery stores, schools, bus stops, parks, community centers, and hospitals. The buffers joined into a single layer and a score was assigned to each buffer distance. A score of 3 was assigned to 0.1miles, 2 to 0.17, and 1 to 0.25. The scores were added to determine the unweighted walkability scores of areas throughout the Portland Metro area. A weight was then assigned to each factor based upon usage and need, see table 1. The weighted scores were added up to create the final output for the factors, see map 3. A spatial join was performed on the output of the weighted score (map 3) and the Census data (map 1). The spatial join was symbolized by normalizing the weighted factor score by the median family income, see map 4. All maps and data was symbolized using the natural breaks (Jenks) with seven classes. The walkability factors were determined by previous studies and adding other factors that aid public safety.

Factors In Weighted Walkability Score:	Buffer (miles)	Weight (In Map 3 and 4)
Grocery Store	0.1, 0.17, 0.25	30
Parks	0.1, 0.17, 0.25	20
Bus Stops	0.1, 0.17, 0.25	20
Schools	0.1, 0.17, 0.25	20
Community Center	0.1, 0.17, 0.25	7
Hospitals	0.1, 0.17, 0.25	3

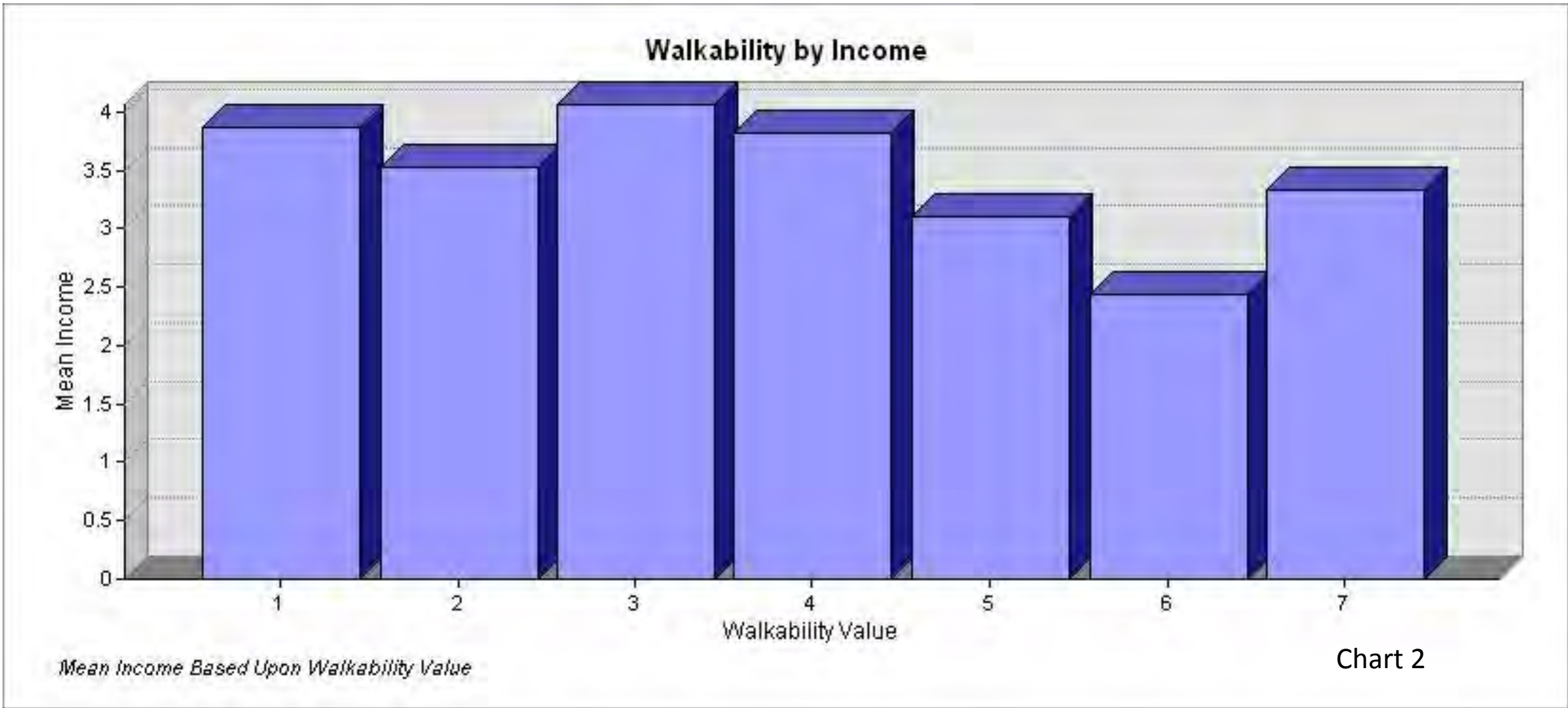
Table 1



Map 2



Map 3



References:
Villanueva, K., Giles-Corti, B., Bulsara, M., Trapp, G., Timperio, A., McCormack, G., & Van Niel, K. (2014). Does the walkability of neighbourhoods affect children's independent mobility, independent of parental, socio-cultural and individual factors?. *Children's Geographies*, 12(4), 393-411.

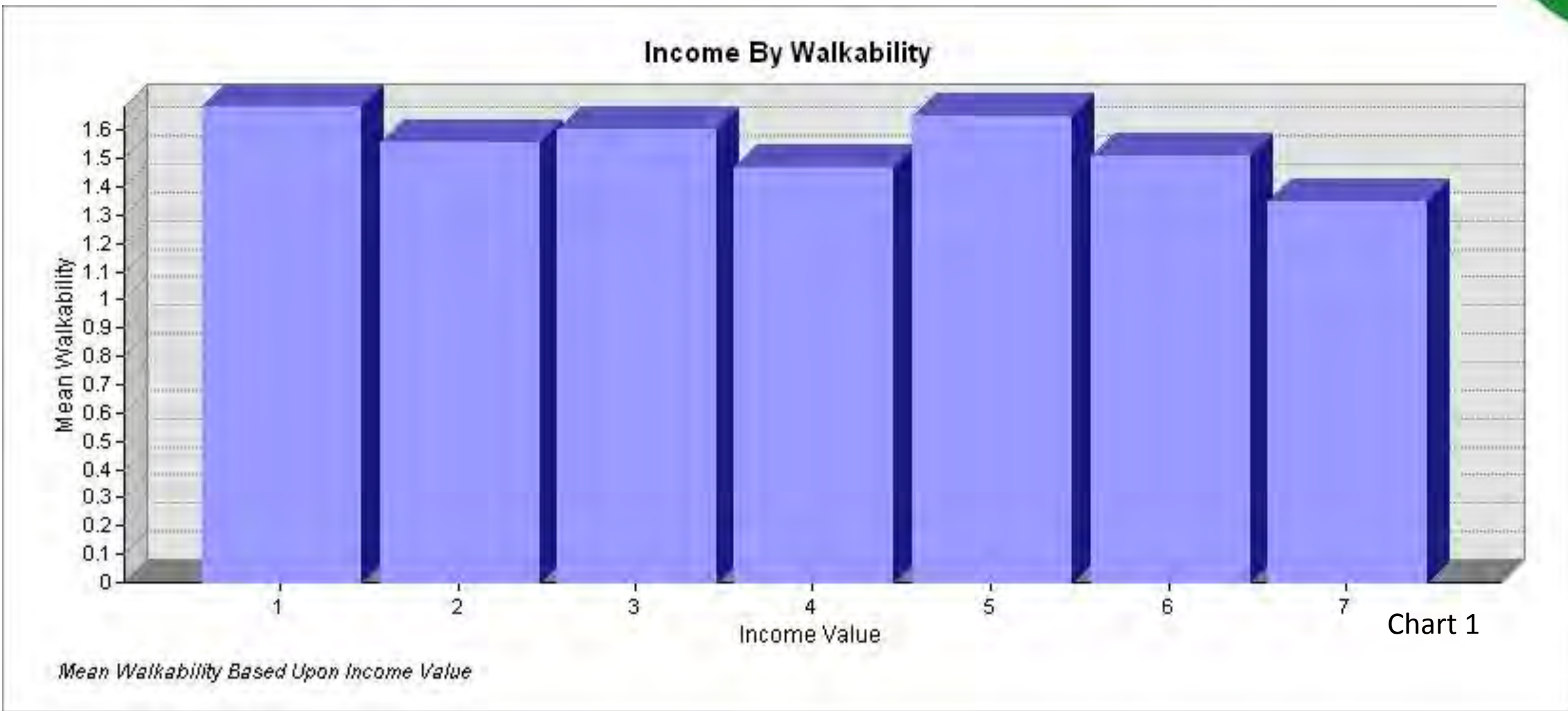
Leslie, E., Saelens, B., Frank, L., Owen, N., Bauman, A., Coffee, N., & Hugo, G. (2005). Residents' perceptions of walkability attributes in objectively different neighbourhoods: a pilot study. *Health & place*, 11(3), 227-236.

Rundle, A., Neckerman, K. M., Freeman, L., Lovasi, G. S., Purciel, M., Quinn, J., ... & Weiss, C. (2009). Neighborhood food environment and walkability predict obesity in New York City. *Environ Health Perspect*, 117(3), 442-447.

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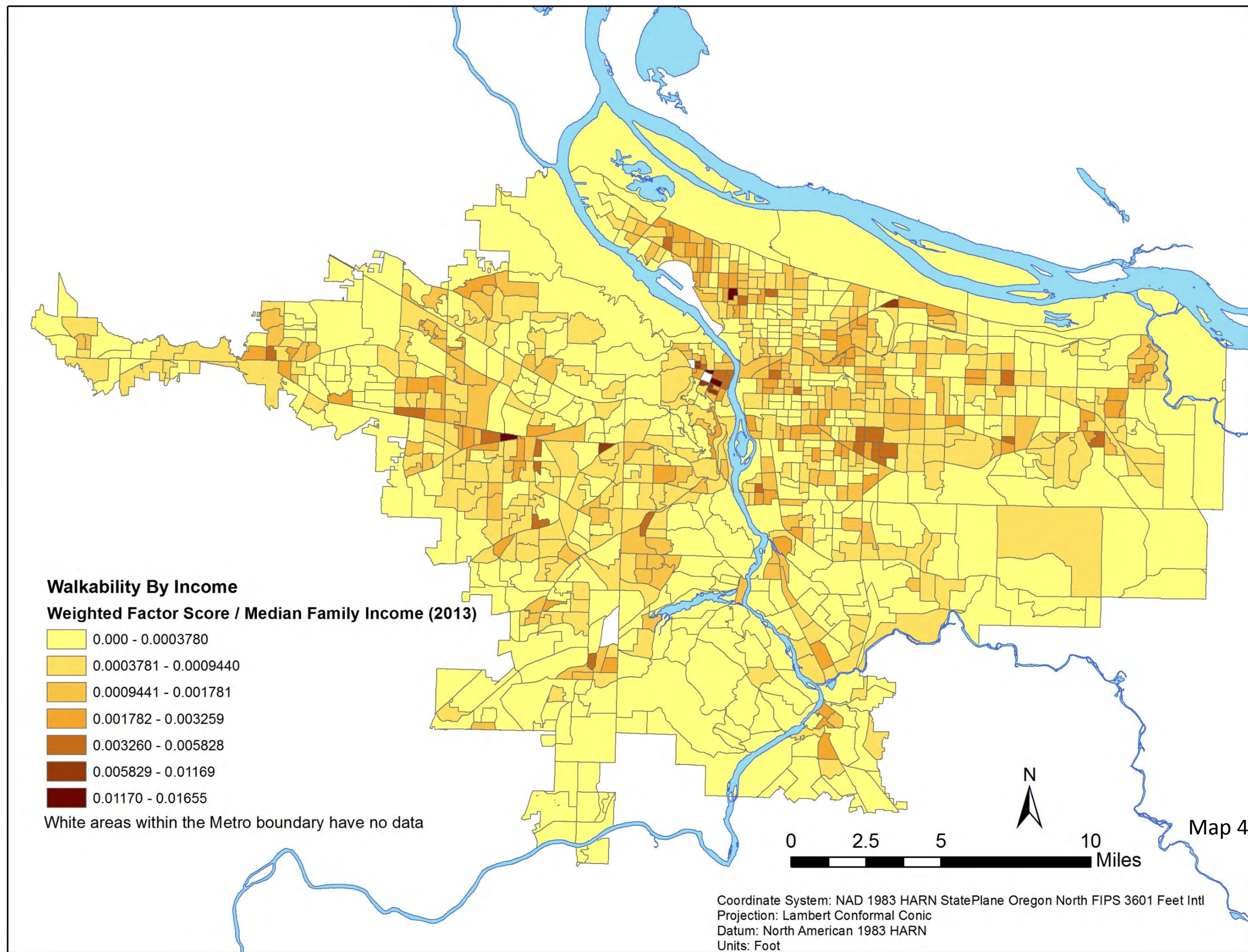
Oregon Metro RLIS Data: <http://www.oregonmetro.gov/rlis-live>: Accessed April 30, 2015

Reference USA: <http://www.referenceusa.com/Static/Home>: Accessed May 20, 2015



Income Value Breaks:

1: 40,368 2: 54,667 3: 70,313 4: 89,102 5: 115,625 6: 158,333 7: 250,000



Map 4

Results:

The mean weighted walkability score is 48 and the maximum score is 350. For the 2013 Income estimates the mean was 61,665. The walkability score on average got lower the further away from the city center you went, with the exception of concentrated pockets. The highest walkability scores were in block groups that fell close to the median income level. The block group with the highest walkability/median income had a walkable score of 140 with an income of 8,542 which fell well below the mean. The highest income of 250,001 has a walkability score of 80. The walkable scores that fell closest to the mean were 50 and their incomes fell around the mean at 51,900 and 70,391. Over all it appears that walkability is not directly affected by income, but as chart 1 shows walkability does trend toward lower income, but the lowest income bracket does correlate with lower walkability.

Conclusion:

While the walkability of an area may not be directly affected by the income the lower incomes make up some of the least walkable areas. The lowest 1% in income, less than 37,000, make up less than 1/5 of the most walkable areas, and make up the majority of the scores that fall between 25%-50% in the walkability score. Since the largest buffer was 0.25 miles this only shows extremely walkable areas. Another study with showing highly walkable areas (less than 0.25 miles), medium walkable areas (less than 0.5 miles) and less walkable area (less than 1 mile), would be more intensive and yield more detailed and accurate results. Also this study only took into consideration five different Grocery Store Chains, Whole Foods, Safeway, Fred Meyer, Albertsons, and Food Front. A study including every grocery store in the Portland Metro area would be more accurate and again yield better results. Time and access to data were two major constraints for this study. It should be noted that I did not differentiate between school types, different schools may demand different distances for walkable access. Another factor that would enhance this study is determining the presence of sidewalks, as they are a leading factor in walking safety.