

Access to Food Resources in San Francisco County, California

Cartographer
Grace Chan, Fundamentals of GIS, May 2, 2014
Geographic Coordinate System
NAH 1983 StatePlane California III FIPS 0403 (US Feet)
Data Sources
American Community Survey 2012, 5-Year Estimates;
TIGER 2013, U.S. Census; ReferenceUSA; GeoData@Tufts



Background

San Francisco Neighborhoods



Access to healthy foods has been recognized as key to having a nutritious diet and maintaining good health. Poor diets can lead to a range of chronic diseases, including cardiovascular diseases, cancer, diabetes, obesity and its comorbid conditions.¹ Previous research determined that low access to healthy foods are most common among low-income racial/ethnic minority populations and populations who do not have access to independent transport to shops.^{2,3}

In San Francisco, the group most at risk for obesity is Latinos. In 2009, the percentage of the Latino population in San Francisco at 56.9% exceeded both the state (29.9%) and national (25.0%) benchmarks for obesity.⁴ Coupled with income inequality among San

Franciscans and the higher than average cost of living in the city⁵, it is necessary to assess food retail distribution to determine whether vulnerable areas in San Francisco County were lacking in healthy food resources or exposed to excess unhealthy food resources.

In determining the areas vulnerable to low access to healthy foods, three measures were used to create an index: household income, Hispanic/Latino ethnicity, and access to personal transportation. Food resources of interest were grocery stores, fresh produce retailers, convenience stores, and fast food restaurants.

Method

An index was created using income, ethnicity, and availability of vehicles to depict vulnerability to having low access to healthy foods. Data was obtained, by census tract, on percent of households living in poverty, percent of Hispanic/Latino population, and percent of population who had access to at least one vehicle. These parameters were scored based on quintiles. (See Table 1) The three scores were summed to create the composite vulnerability score by census tract, with the lowest scores indicating high vulnerability. All scoring was done in Excel and joined to the San Francisco County shapefile, which was created by clipping the TIGER Census Tract shapefile with the San Francisco County neighborhood boundaries. Choropleth maps were made for each parameter and the composite score.

Table 1. Vulnerability score measures

Score	Vehicle Availability	Households Living in Poverty	Hispanic/Latino Population
	% of population with at least one vehicle	% of households living in poverty	% of population who are Hispanic/Latino
1	8 - 57	13 - 44	20 - 60
2	57 - 72	8 - 13	13 - 20
3	72 - 82	5 - 8	9 - 13
4	82 - 89	2 - 5	6 - 9
5	89 - 100	0 - 2	0 - 6

To analyze food access, addresses were obtained for healthy and unhealthy food retailers. (See Table 2) Each address was geocoded using longitudinal and latitudinal data and plotted in ArcMap. Raster analyses were performed for the data points to create a density raster for each type of food resource. The density raster illustrates the distribution of healthy and unhealthy food resources throughout San Francisco County. Both maps were set with the cell size at 50 and a search radius of 10 miles to obtain optimal visualization with adequate detail.

Healthy	Unhealthy
Grocery stores	Convenience stores
Fresh produce retailers	Fast food restaurants

The density raster maps were overlaid on the composite vulnerability choropleth map to create the two final maps. A transparency of 25% was set on the density raster maps to provide a better view of the choropleth map beneath.

Conclusion

The composite maps indicate that the most vulnerable areas appear to be in Downtown/Civic Center, Mission, the eastern part of the Western Addition, Bayview, and Treasure Island/ Yerba Buena Island. As seen in the three parameter maps, these areas have the lowest percent of the population who have access to personal transport, the highest percentage of households living in poverty, and the highest percent of the population who are Hispanic/Latino. Healthy and unhealthy food resources are similarly distributed, with their greatest concentration in the northeastern part of San Francisco County. This implies that most of the vulnerable populations have adequate access to both types of food resources, with the exception of Treasure Island. The large concentration of food resources in northeastern San Francisco may be associated with the high density of commercial spaces in the area, not shown in the maps of this analysis.

This analysis found only one grocery store within Treasure Island, which has a population of approximately 2,500.⁶ Further examination of the resources and needs of this population is needed to determine whether interventions to increase healthy food resources in this area are warranted. Although the Presidio and Lakeshore were scored as moderately vulnerable to low access to healthy foods, a large portion of these tracts are made up of national parks. Therefore the lack of food resources in those areas is not surprising.

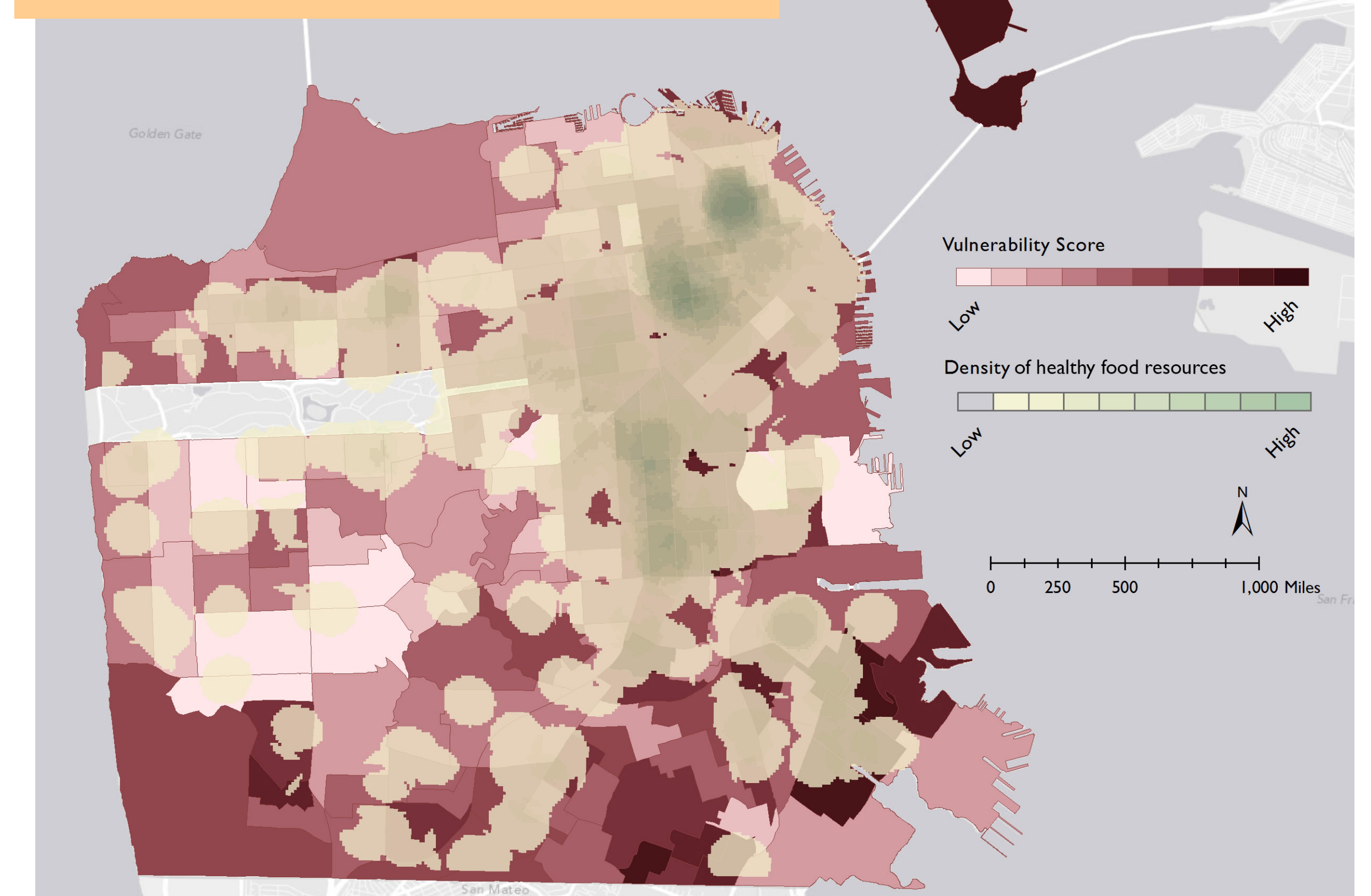
Limitations

While the maps highlight the location of establishments generally known to be healthy or unhealthy, there exists other retailers and resources from which San Franciscans get their food that are not captured in the analysis. Further examination of all food resources available to residents will be necessary for a more complete analysis of healthy food resource distribution. Additionally, there may be other socioeconomic and environmental factors that contribute to residents' ability to access healthy foods. For example, access to public transportation, neighborhood safety, and walkability of the streets of hilly San Francisco were not included in the vulnerability index and will need to be considered in future analyses.

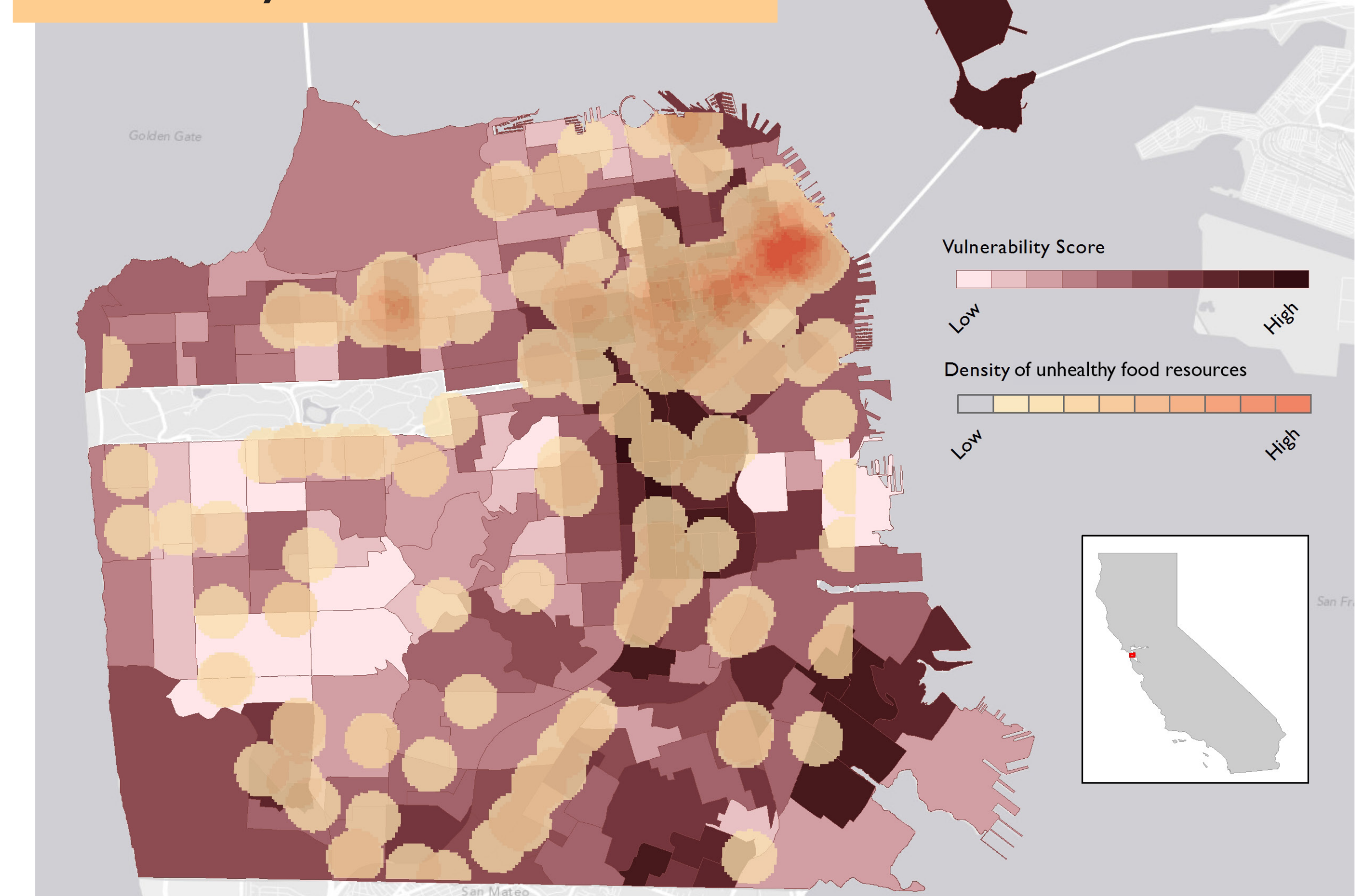
References

- World Health Organization. Diet. 2014. <http://www.who.int/topics/diet/en/>;
- Morland K, Wing S, Diez-Roux A, Poole C. Neighborhood characteristics associated with the location of food stores and food service places. *American Journal of Preventive Medicine* 2002. 22(1):23-9.
- Coveney J, O'Dwyer L. Effects of mobility and location on food access. *Health & Place* 2009. 15(1): 45-55;
- California Health Interview Survey. CHIS 2009 Adult Public Use File. Los Angeles, CA: UCLA Center for Health Policy Research.
- Community Health Status Assessment: City and County of San Francisco. San Francisco Department of Public Health. 2012.
- U.S. Census Bureau. Census 2010.

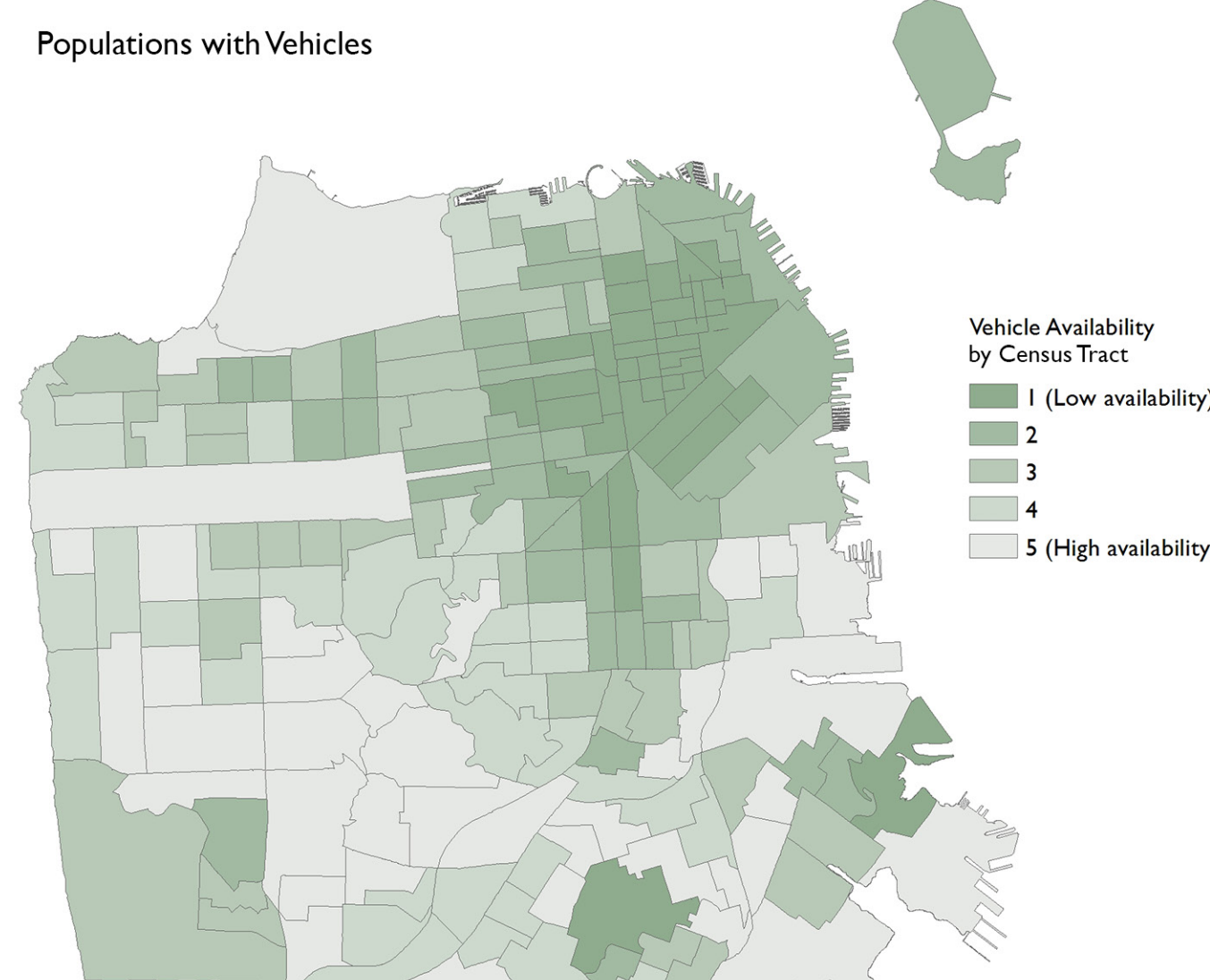
Healthy Food Access in SF



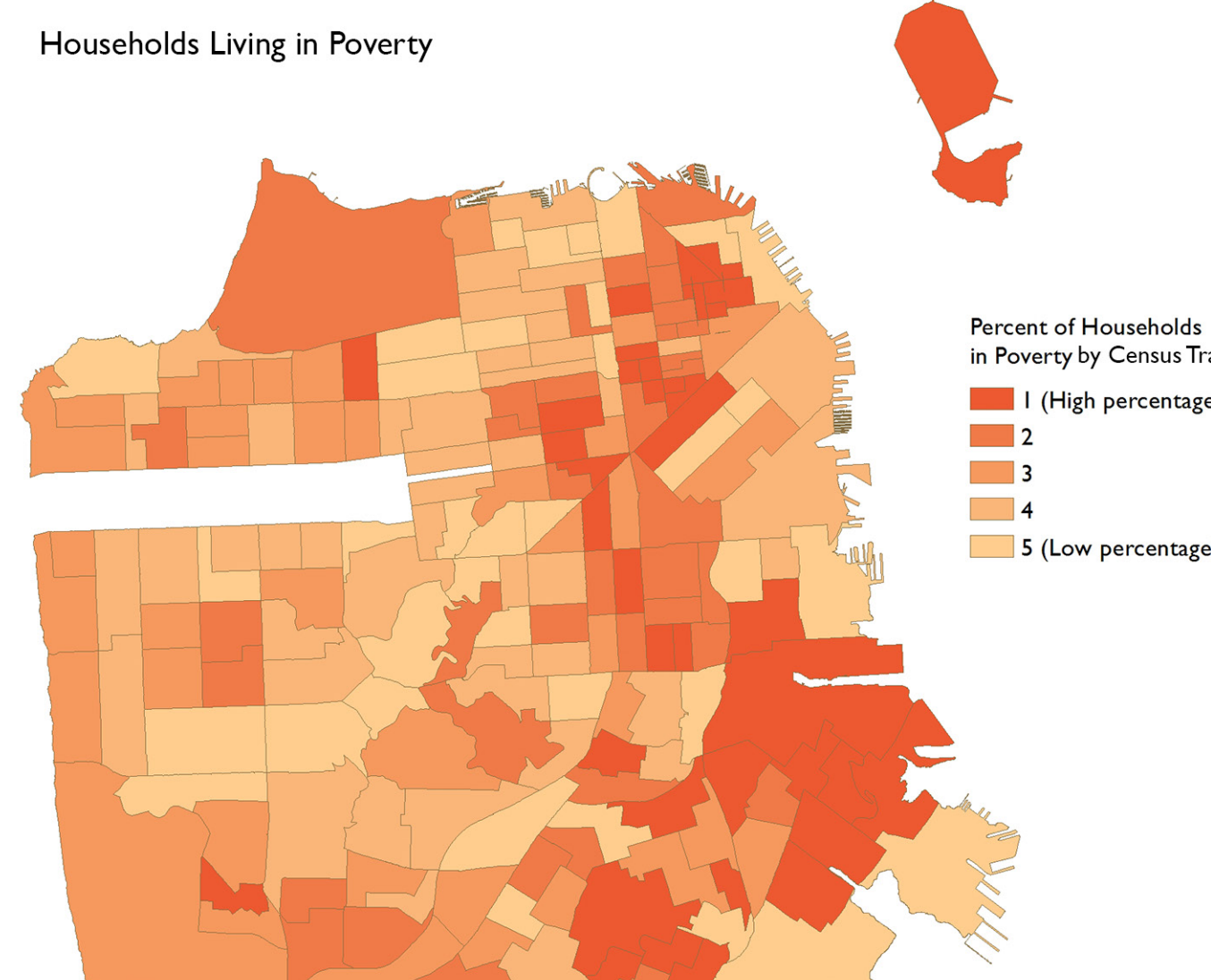
Unhealthy Food Access in SF



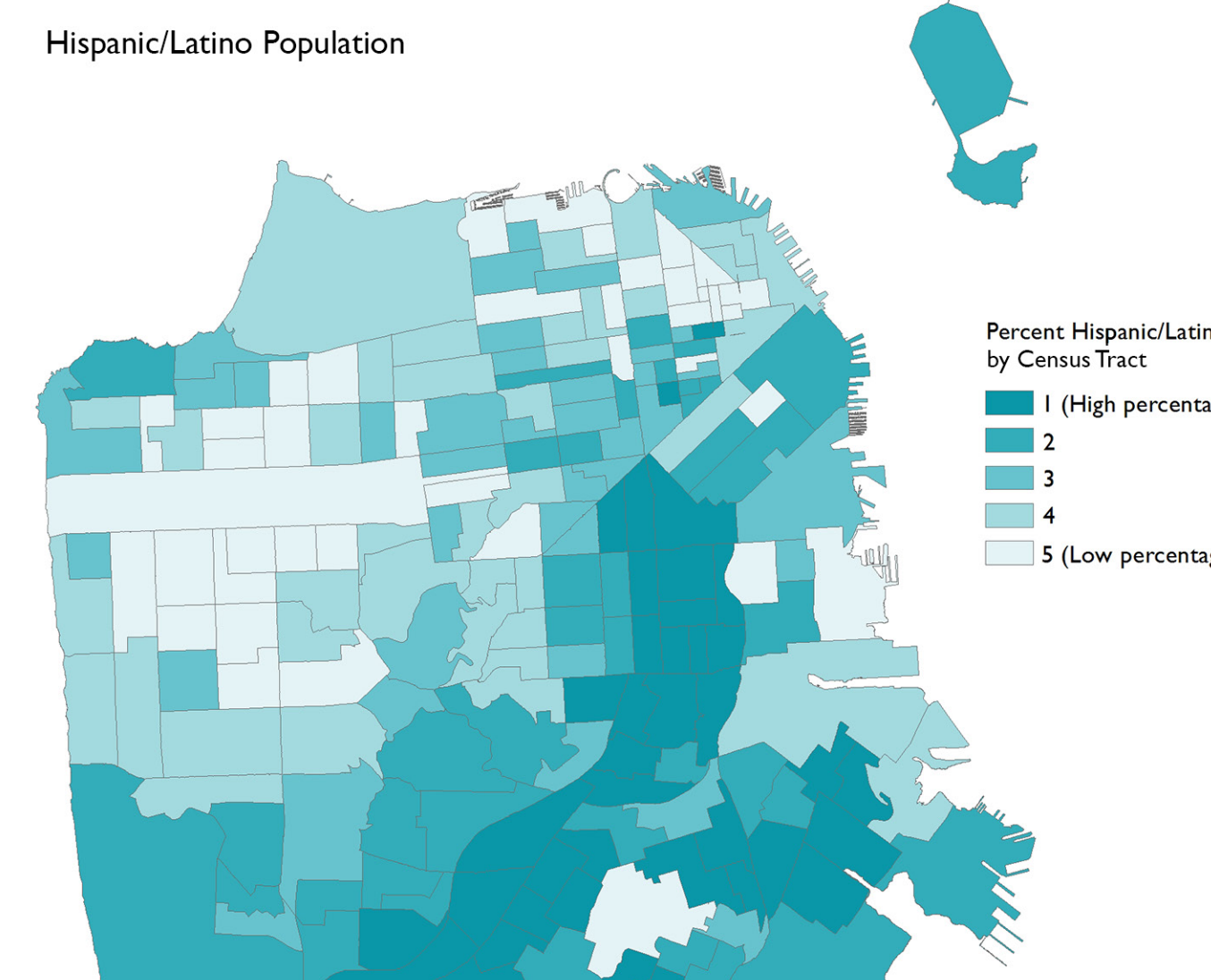
Populations with Vehicles



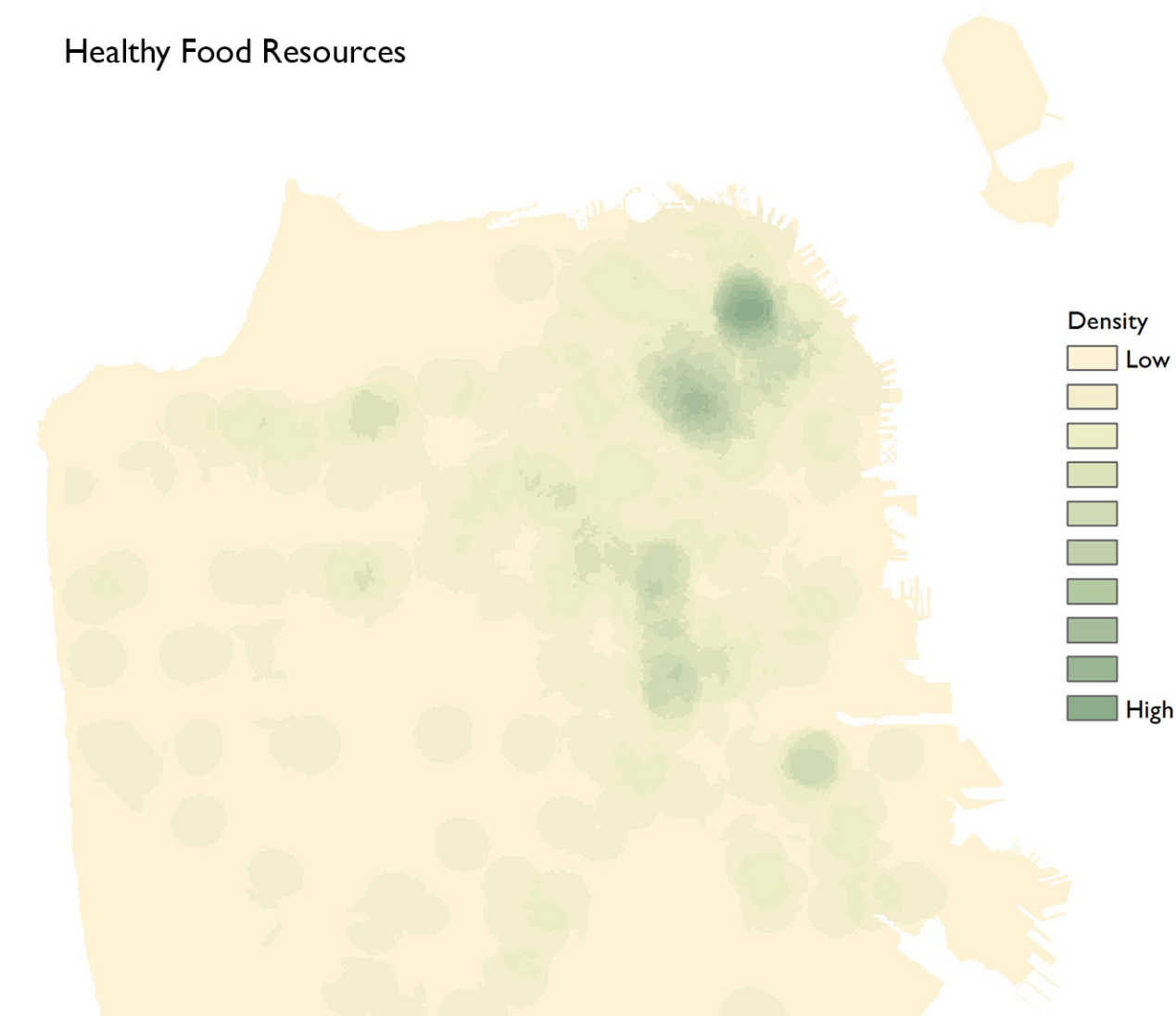
Households Living in Poverty



Hispanic/Latino Population



Healthy Food Resources



Unhealthy Food Resources

