

# Presence of Food Deserts in Southern California Counties

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## Introduction

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Food deserts occur in areas in which people have limited access to affordable, nutritious food due to the absence of large grocery stores or supermarkets within one's home range and/or the lack of easily accessible transportation. Typically, the absence of large groceries stores is thought to occur in areas with a high percentage of people living in poverty. Impoverished people then have limited access to higher quality food which can negatively impact their health. The identification of food deserts can be a great indicator socioeconomic issues and can help to understand issues in heavily population areas such as in Southern California.

Identifying food deserts in Southern California can be accomplished by mapping the relationship of poverty levels of communities with locations of large grocery stores and supermarkets in relation to those communities. This study was conducted to assess the presence of food deserts in the Southern California counties of Los Angeles, Orange, Riverside, San Diego, San Bernardino, and Imperial by performing attribute and spatial queries and an overlay operation in ArcGIS. The food deserts in Southern California occur almost exclusively in areas of high poverty however, not all areas of high poverty are food deserts.

## Methods

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### Study Area

The study area consisted of the Southern California counties of Los Angeles, Orange, San Bernardino, Riverside, San Diego, and Imperial. Population and poverty levels were assessed within these counties which were then compared to locations of large stores to determine the presence of food deserts.

### Databases

Household and family income and population data was downloaded from the National Historical Geographic Information System accessed February 27, 2018 (Manson, 2017). The table B.17015 *Table Poverty Status In the Past 12 months of Families by Family Type by Social Security Income by Supplemental Security Income (SSI) and Cash Public Assistance Income* and the 2 GIS files for the County and the Census tract (found using the criteria: household and family, county and census tract, 2016, and dataset 2016 American Community Survey: 5-Year Data [2012-2016, Tracts & Larger Areas]) were extracted to provide data about income. Population data was extracted in the table B.01003 *Total Population* (found using criteria population, census tract, 2016, and 2016 American Community Survey: 5-Year Data [2012-2016, Tracts & Larger Areas]). Locations of grocery stores in the United States was downloaded from the database US\_Grocery\_Stores\_ESRI from ArcGIS Online accessed February 28, 2018.

### Map construction

Maps were created in ArcGIS 10.4, projected in the Universal Transverse Mercator (UTM) system, Zone 11, based on the North American Datum of 1983 (NAD 83). A general map (used as the template for the two final maps) was created by conducting two attribute queries to isolate first California then counties within California

from the rest of the United States. A spatial query then separated the Southern California counties of Los Angeles, Orange, San Bernardino, Riverside, San Diego, and Imperial creating the study area. The study area's geographical data was then linked to the demographic data (population, income and poverty level) by a table join between the two datasets. After the table join, a new attribute, titled Percent Poverty, was added with calculated values determined by Field Calculator ( $\text{Percent Poverty} = \text{Total poverty} / \text{Total population}$ ). Areas with percent poverty greater than 25% were then represented on the map using an attribute query which was then superimposed with grocery store locations in an overlay operation. Only locations of large grocery stores (annual sales of \$2 million) with a buffer zone of one mile were mapped (using an attribute query) to show areas of food deserts. Percent poverty in Southern California was shown as a qualitative gradient divided into seven categories by natural breaks.

## Results

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The highest percent of poverty is 56% while the lowest is 0% resulting in a vast range of poverty levels throughout Southern California (Fig. 1). There are only a couple areas with 0-6% of impoverished people while there are more areas with a high percent (28-56%) of impoverished people and they occupy larger areas. Food deserts are in areas with the percent of poverty greater than 25% and in areas where large grocery stores are more than a mile apart (Fig. 2). Large food deserts are present near the United States and Mexico international border and up North on the outskirts of Los Angeles county and Riverside. The food deserts in these areas encompass nearly the same areas with poverty levels more than 25% while in some coastal areas, food deserts are much smaller and do not always encompass the entire classified area of poverty. In these areas, food deserts are more intermittent, and many food deserts are either surrounded by areas of higher economic status or surround such areas. In addition, food deserts are relatively absent in the north eastern corner of Southern California down to the south east corner. The percent of people in poverty in this area is moderate to low.

## Figures

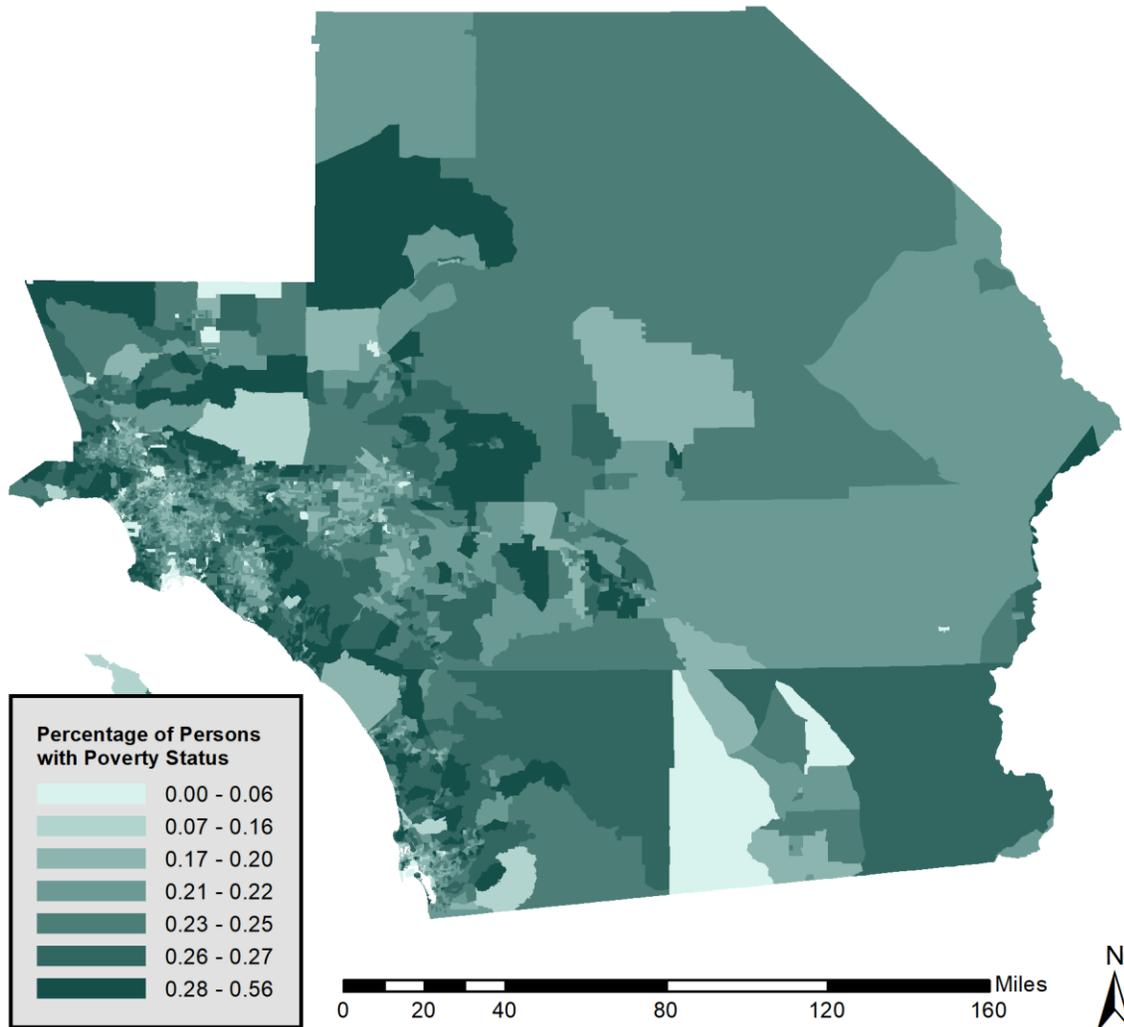


Figure 1: Percent of people in poverty based on the 2012-2016 household and family income and population Census tracts throughout the Southern California counties of Los Angeles, Orange, San Diego, San Bernardino, and Imperial.

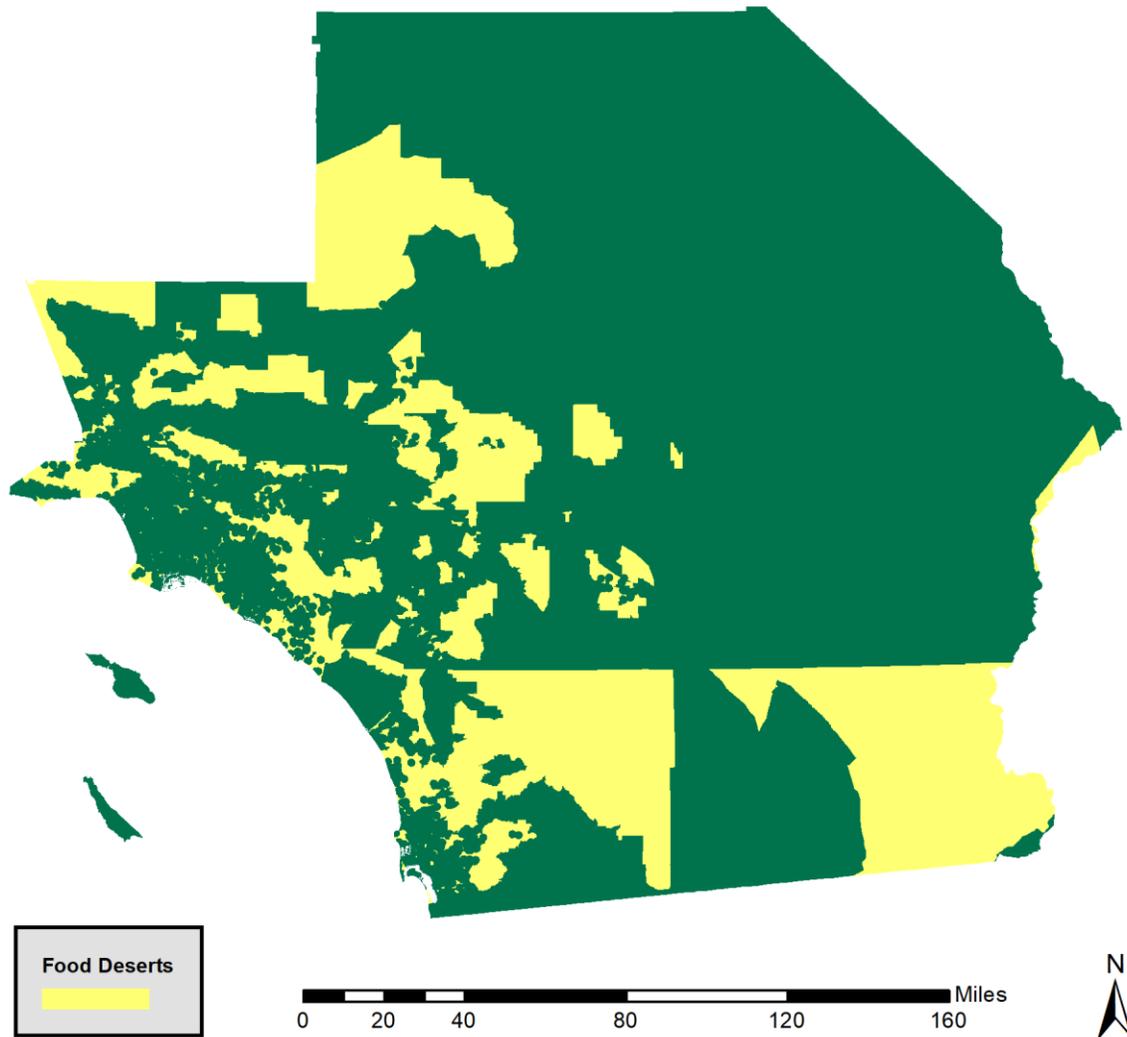


Figure 2: Locations of food deserts throughout Southern California in the counties of Los Angeles, Orange, Riverside, San Diego, San Bernardino, and Imperial assessed on proximity of impoverished people to large groceries.

## Conclusion

The food deserts in Southern California are associated with high levels of poverty in which more than 25% of the population is considered to live in poverty. In these areas, large grocery stores are more than one mile away or and the people within these areas do not have access to transportation to get to grocery stores thereby limiting their access to healthy, nutritious food. This can be a contributing factor to poor health in these areas which can be assessed in another study focusing on how socioeconomic status can influence health specifically in relation to the presence of food deserts. The food deserts in Southern California also illustrate that just because an area has high poverty, it does not necessary mean that it is a food desert. Some of the areas with high poverty were not entirely in classified as a food desert based on visually comparing the two figures. To better compare how food

deserts are associated with poverty levels, it would be beneficial to have zoomed in on areas where it was harder to define areas of different poverty levels. These areas most likely are result of residential areas of different socioeconomic status clustered in a small area.

The large food desert areas may be a result of agriculture in Southern California. Large tracts of land would be partitioned for large scale farming which would increase the distance to grocery stores. Also, this could explain the higher percentage of poverty in these areas in that the people living in residence may be farm laborers such as migrant workers. In addition, some of the areas in Southern California is desert so large scale residential areas are farther apart.