

The Tulsa Food Waste Project

A Suitability Analysis

Introduction

Food waste has become a significant concern in the discussion of food access and diet's impact on the environment. Grocery stores are a major contributor of waste due to company policies. Expiration dates are a large part of the controversy, as most sell by and use by dates listed on food items are arbitrarily selected based on grocer and manufacturer standards, leading to the disposal of substantial amounts of edible food. There have been several models developed throughout the United States to minimize waste from grocery stores, including the development of stores selling donated food provided by organizations with strict standard policies.¹ Out of concerns that many families would be opposed to buying these items as groceries, investment in a food service operation selling reduced price, ready prepared meals from donated perishable items is a proposed pilot to address food waste within Tulsa, Oklahoma.

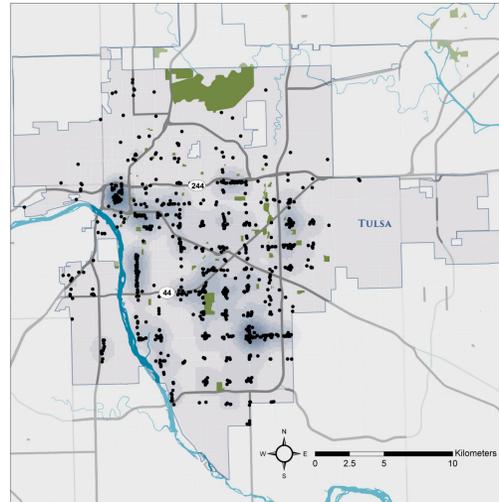
In order to optimize profits and overall business viability, the location for the potential quick service restaurant should not only be in an area near a high number of low income families, but also in a place with a high intensity of restaurants to encourage purchases from clientele in all socioeconomic classes. The goal for this model is to find the regions within Tulsa best suited for the operation.

Methodology

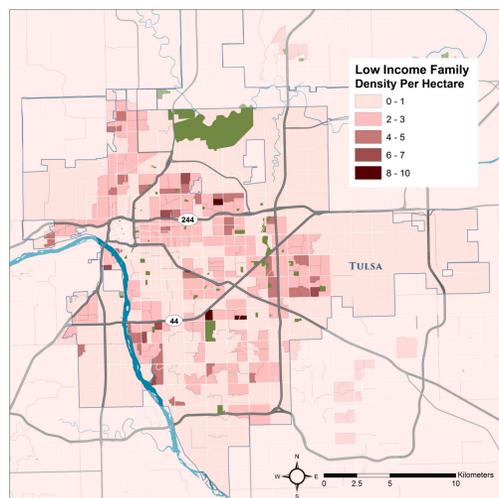
- Information regarding Tulsa restaurant locations was obtained from Reference USA. The website provided names and georeferenced locations for 1,094 restaurants within the city. A kernel density analysis was performed to highlight the intensity of restaurants, with the areas of highest restaurant density depicted in a dark blue.
- American Community Survey data was utilized to indicate low income housing within Tulsa city limits. The average family size in the United States is slightly above three people.² A threshold for low income was established as family earnings below \$45,000, which is an approximated low income total for a family of four.² This data is presented as family density per hectare in block groups.
- The restaurant kernel density analysis was overlaid on low income block group data to visually present the two desirable features for the restaurant location. A zonal statistics tool provided data about mean restaurant density in relation blocks groups within Tulsa to assess suitability.
- Retail locations currently up for rent were obtained from cityfeet.com. Of the facilities posted at the



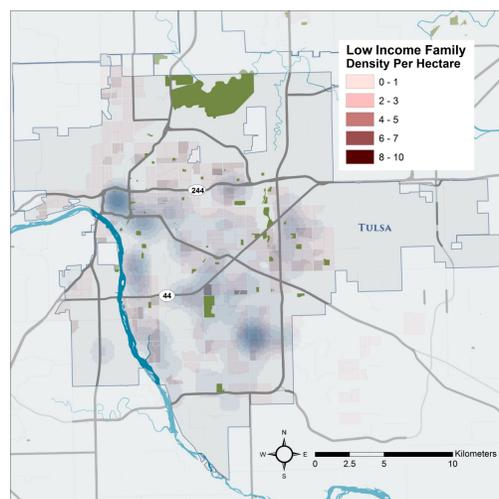
Map 1: Restaurant Intensity



Map 2: Low Income Family Density



Map 3: Low Income Families in relation to Restaurant Intensity



time of data collection, 148 retail facilities within Tulsa met the minimum space requirement of 1,000 square feet.

Results

Twelve block groups were chosen based on comparison of restaurant intensity and low income family density. Though the locations selected were chosen because they had high values in both factors, the results were weighted more toward sites with higher low income family density values rather than restaurant intensity, as this population is the target for this program. These block groups were depicted in relation to facilities currently up for rent within Tulsa.

Highlighted within the final map are the areas in Tulsa with the highest suitability. These particular sites were chosen because they maximized intensity of restaurants, density of low income families or had the highest balance of the two factors out of the block groups identified.

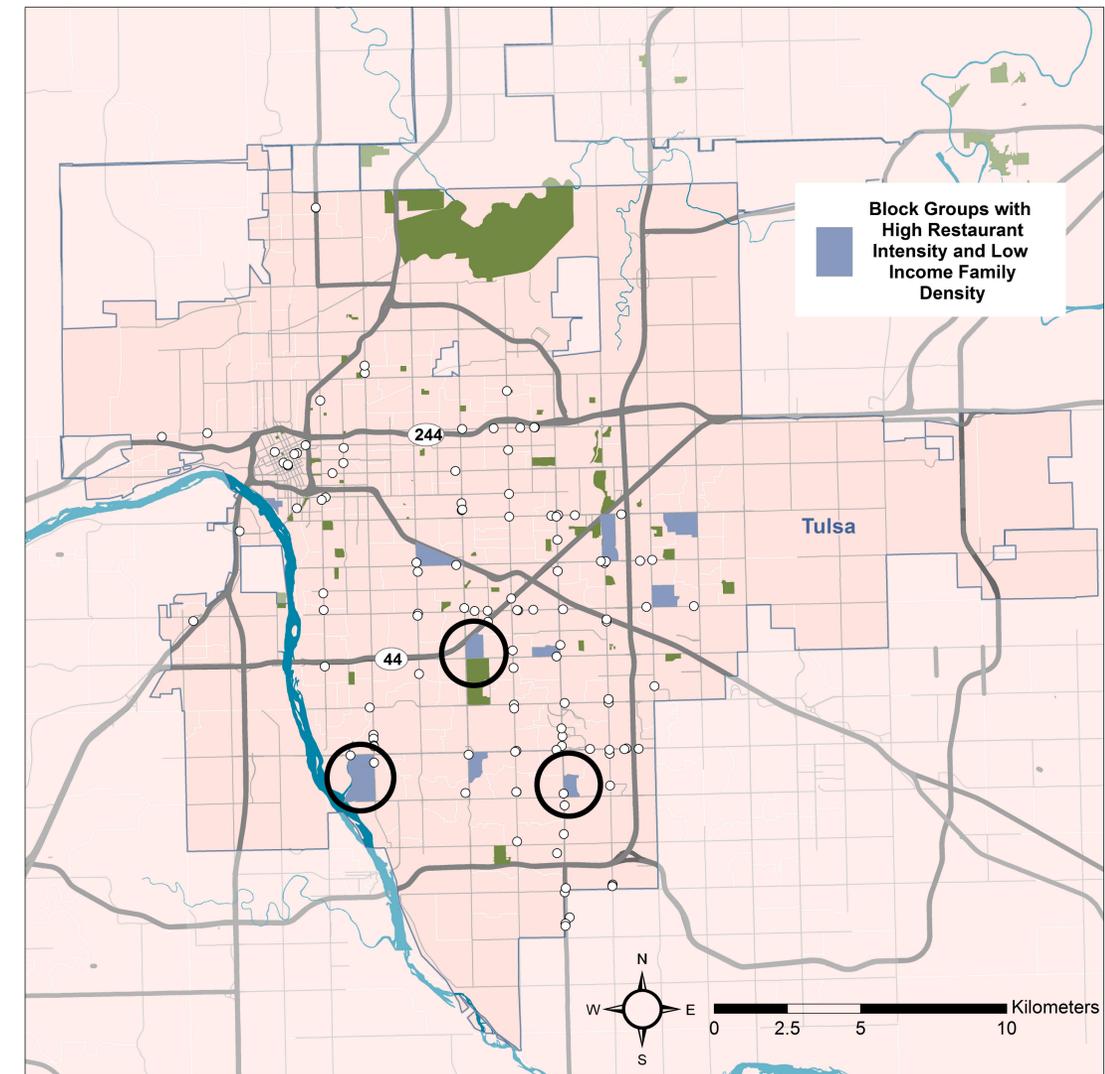
Discussion

There are several concerns relating to the data, particularly the method utilized to describe low income families. This model would likely benefit by increasing the maximum income to \$55,000 as including families that do not meet low income may be more beneficial than excluding families that do, like those with large household sizes. As the variation in density is low, there is some concern that this may alter the target population, resulting in significant changes to the focus areas within Tulsa city limits. Additionally, the data is presented as density per hectare in block groups, which generalizes the population over the entire group. The population data from the American Community Survey are statistical estimates developed from a small sample population, so there is some error in the overall density measures.

Information regarding restaurant locations was obtained from Reference USA, which purportedly is updated monthly. Though it is possible there are some locations listed that may no longer be in service, it is more likely this data omits restaurants that have newly opened or are not represented as food service operations.

Furthermore, the open retail facilities data likely includes locations that are not actually available, however, this information can be easily corroborated by the listing contact. Investigation into other potential sites, including available land for development, should be considered. Zoning requirements may be a potential complication if

Map 4: Areas with Highest Restaurant Suitability in Tulsa



building a facility is deemed appropriate. This is less likely to be a significant factor in areas where retail locations are currently up for rent.

The analysis methods utilized are somewhat flawed, however, they are still useful in assessing suitability of areas within the city, providing a framework to begin investigating individual sites. Though concerns regarding the demographic data are important, the portrayal of low income family density in the model provides useful information about income variation in Tulsa. The analysis of restaurant intensity in relation to low income density is relevant because it indicates areas within Tulsa that maximize the criteria for the location of the pilot program. While the model could be consulted to assess the benefits of locations, it should be noted that other factors including city ordinance rules must also be taken into consideration. This information alone is not enough to base a decision about which facility to choose.

Julia Kelly, RD
NUTR0231: Introduction to GIS, December 2014
Oklahoma State Plane Projection

Sources

Map

United States Geological Survey, United States Census Bureau, Geofabrik, American Community Survey, Resource USA, and Cityfeet.com

Text

2. Rauch, Doug. "In the Old Days, You'd Smell the Milk." Interview by Hope Reeves. *The New York Times*. The New York Times, 09 Nov. 2013. Web. 12 Dec. 2014. <<http://www.nytimes.com/2013/11/10/magazine/doug-rauch-wants-to-sell-outdated-food-at-junk-food-prices.html>>.

2. Roberts, Brandon, Deborah Povich, and Mark Mather. *Low Income Working Families: The Growing Economic Gap*. Issue brief. The Working Poor Families Project, 2012. Web. <http://www.workingpoorfamilies.org/wp-content/uploads/2013/01/Winter-2012_2013-WPFP-Data-Brief.pdf>.