Bridging the Gap between Local Producers and Low-Income Consumers in San Antonio, Texas

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Executive Summary:

Many systemic barriers exist between low-income communities and the resources needed to maintain resilient, thriving environments. Among these resources are fresh, healthy foods from an ample local food system, which can provide many health, social, economic, and environmental benefits. However low-income communities are often marginalized from such opportunities and often have little control over their own food source options, becoming passive members in their own food system.

This project will focus on the divide that separates local food producers from low-income consumers in San Antonio, Texas, in order to improve access to health and community development opportunities. The project includes an analysis of the locations of local food retailers and an assessment of their availability and accessibility to low-income communities.

The research showed that San Antonio has an adequate network of local food retailers; however access should be improved for priority areas, termed marginalized census block groups. Improved bus service can help remedy this situation, however ultimately the network of local food retailers should be expanded and studied further.
Introduction:

In recent years, studies have extensively explored the contributing role of environmental factors in disparities in community health and resilience. Such factors include environmental hazards and pollutants, racial residential segregation, and neighborhood resource deprivation.\(^1\) Studies have linked these factors to disproportionately increased rates of morbidity, mortality, and adverse health outcomes in low-income racial/ethnic minority neighborhoods, which consequently impacts a community’s ability to sustainably build social and economic capital.\(^2,3\)

Among the adverse health outcomes, are the constraints on the ability to access and afford a healthy diet. This day to day disparity in food access, otherwise known as the grocery gap trend, has grown over the past decades as grocery stores followed the “white flight” from urban centers to the suburbs in the mid 20\(^{th}\) century. Large chain supermarkets on the outskirts of the inner city and beyond catered to more affluent areas and the growing segment of the population that were home and vehicle owners. These larger stores provided a better quality, variety, and price of products than smaller independent inner city stores could afford, which eventually forced many out of business. Concurrently the demographics of U.S. inner cities were changing, and economic segregation became significantly more prominent in the urban landscape. This shift resulted in a decrease in the median income of many U.S. inner cities and the additional withdrawal of retail investment, leaving only those who could not afford to move elsewhere in these urban centers.\(^4\)

To this day, many low-income neighborhoods lack access to adequate grocery stores, and in particular access to healthy or specialized grocery stores. While most food retailers will not invest in opening a store if there is not a sure financial return, smaller local produce markets have the potential to fill this void. Aside from the many environmental benefits of eating locally produced food, resources such as local farmers’ markets, community gardens, and urban farms can provide health, social, and potential economic benefits to low-income communities. In other words the local food movement is not only related to environmental concerns, but to a larger multifaceted system of community resilience based on sustainability and equity.\(^5\) However as this movement grows it is critical to ensure that it does not marginalize the very populations that need its benefits the most.

Local Context:

This study will examine the relationship between local food producers and low-income consumers in the context of San Antonio, Texas. While San Antonio has been no exception to the urban flight and grocery gap trends, in recent years the grocery retail market has been flooded primarily by one statewide chain. There are currently 44

\(^1\) (Gee and Payne-Struges 2004)
\(^2\) (Lubotsky and Deaton 2003)
\(^3\) (Walker, Keane and Burke 2010)
\(^4\) (Walker, Keane and Burke 2010)
\(^5\) (Bay Localize 2009)
locations of this one supermarket chain within the San Antonio metro area, and over 120 food retailers overall.

Despite the seemingly abundant food retail market, San Antonio presents an interesting case study because it remains a predominantly working class community with over a 60% Latino population,\(^6\) close to a 19% individual poverty rate,\(^7\) and over a 26% adult obesity rate.\(^8\) Thus the local food movement has the potential to reach many low-income, marginalized neighborhoods; and local producers have the potential to fill current voids in fresh food access.

**Problem Statement:**

Local fresh food retailers have the potential to increase community resilience, decrease health disparities, and can more feasibly reach low-income consumers than large-scale chain stores. This study will investigate the relationship between local food retailers and income level in San Antonio in order to improve accessibility for these marginalized populations. It is necessary to assess the San Antonio food landscape in order to see if the grocery gap trend still exists, and whether the current network of local fresh food retailers is accessible to low-income consumers. If these resources are not accessible, key voids and methods to easily increase accessibility will be identified.

**Research Question:**

The purpose of this study is to determine the extent to which fresh, locally-produced food is accessible to low-income communities in San Antonio in order to understand how access can be improved for low-income residents in marginalized areas. The primary research questions of this study are:

- What is the distribution of local fresh food retailers in San Antonio and how does it vary across the City?
- What is the distribution of income and race in San Antonio?
- What areas are underserved by general or local food retailers and what is the relationship to the demographic data?
- How can access from low-income areas to local fresh food retailers be improved via public transit?

**Methodology:**

*Study Area:*

This study focuses on the City of San Antonio, as defined by the city limits within Bexar County. Parts of the City extend to the County border; however I chose to conduct my

\(^6\) (American Factfinder 2000)
\(^7\) (American Factfinder 2000)
\(^8\) (County Health Rankings 2009)
analysis at the city level because the majority of outlying areas of the county are sparsely populated.

Data Collection:
This study was conducted at the U.S. Census block group level because of the large geographic area that the City of San Antonio covers. This data level allowed for demographic specificity, but was simplified enough to create citywide visualization of trends.

I downloaded block group spatial data for Bexar County from the Tigerline/ESRI website. In order to examine indicators of marginalization from food retailers, I also downloaded corresponding U.S. Census Summary File 1 (SF-1) demographic data for Bexar County block groups from the Tigerline/ESRI website, which includes racial/ethnic distribution and householder data. I gathered additional demographic information, such as median income, poverty status, and vehicle ownership, from the U.S. Census Summary File 3 (SF-3), which I downloaded from the U.S. Census Bureau website. All data was based on Census 2000 information.

I downloaded a City of San Antonio boundary shapefile from the City of San Antonio GIS Department, and obtained Bexar County street data from Bexar Metro 9-1-1 Network District in order to create an address locator for food retailer addresses. In order to use local bus system information as a measure of access, I requested spatial data from VIA Metropolitan Transit, which was updated as of August 2010.

For the food retailer information, it was necessary to create my own data. I collected data from internet searches on grocery stores and local food retailers, including large-scale grocers, health food stores, farmers’ markets, and community supported agriculture pick up points. I decided not to use community gardens because they generally do not serve as a primary produce source for local consumers in San Antonio. I also did not include urban agriculture food sources because the current lack of availability in the area. I focused on grocery stores and markets and not small scale convenience stores, because I wanted to focus on the availability of healthy, and in particular, locally produced food options.

In addition to compiling the name and address of the food retailers, I rated them on a scale of 1 to 4 using healthy and locally grown indicators, 1 being a completely local and 4 having little to no locally produced food. I used a 200-mile radius standard to define the term “local,” which means the food has traveled less than a day to reach its destination. Thus farmers’ markets and community supported agriculture programs were the only completely local food retailers. While I ranked of all local supermarkets, this study focuses on the accessibility to local food retailers and thus my analysis takes only these retailers into account.
Data Preparation:

Once all of downloadable data was downloaded, I made sure that all my data was defined and projected to NAD 1983 State Plane Texas South Central FIPS 4204 Feet. Subsequently, I performed the following data preparations prior to starting my analysis:

- Joining Spatial and Demographic Data: I joined the SF-1 and SF-3 data tables to the census block groups using the common field STFID.

- City of San Antonio Boundary: Using the clip tool, I clipped the census block groups, streets, and bus stops to the city limits shapefile. New shapefiles specific to San Antonio were added to the map.

- Geocoding Food Retailer Locations: I created an Address Locator based on the streets data using the US Streets format. I then added my compiled spreadsheet of food retailers, and geocoded the addresses using the geocoding tool at 80% sensitivity. Of the 120 food retailers, 89 results were matched, 12 were tied, and 19 were unmatched. The tied and unmatched addresses required manual revisions to the street spelling, or suffix or prefix fields. After making revisions, all 120 food retailers were correctly matched.

- Demographic Data: In order to visualize and compare the demographic data distributions, I symbolized the block group layer using quantities. I selected several demographic indicators for analysis, including Black population, Hispanic population, median income, average household size, and vehicle ownership. I used natural breaks to symbolize all demographic data because this classification best represents the natural trends in the data. While it can be slightly more difficult to use for quick comparisons, natural breaks data classification was also useful because the demographic data varied greatly from group to group.

- Determining Marginalized Low-Income Areas: I used poverty status as a simple indicator of marginalization from retail opportunities primarily because total income and purchasing power are critical factors in retail store siting. I also reviewed other studies of food access and marginalization, and found that income and poverty status were the most common indicators used. While race and ethnicity can also be indicators of marginalization, San Antonio has a longstanding minority majority population that is widely dispersed throughout the city, making income and poverty status better determinants of marginalization.

Using the Federal Poverty Rate in 2000 and average family for San Antonio (2.77 ~ 3), I determined an income threshold that indicates poverty status ($13,290). I then selected by attributes in the Median Income data field for all census block groups with median income at or below this figure. I exported this selection to create a new “Marginalized Block Groups” layer.
• Determining Walkability: To examine local food retailers’ direct service area, I used a ¼ mile buffer around each that represents an acceptable walking distance. This measure is based on urban planning standards for walkability.

I also examined bus stops falling into these ¼ mile buffers. Using the select by location tool I created a shapefile and layer of the bus routes intersecting a quarter mile radius of local food retailers. I used the select by attribute tool to identify the all the bus stops on these routes intersecting the direct service area (this was necessary because the bus stops and bus routes were two separate shapefiles). To get a better understanding of bus frequency, I used the select by attributes tool to select only frequent bus routes. I exported this layer to my map and symbolized it differently from the less frequent routes.

○ Network Analysis: In order to propose a new bus route or bus route extension, I used the network analysis tool based on the street network. Based on gaps in bus service between marginalized block groups and local food retailers, I “created network locations” or selected desirable points to be included in a bus route. The network analyst tool then “solved” the scenario by creating new routes based on these desirable points.

Findings:

This study includes the following maps:
• Figure 1: Food Retailer Distribution
• Figure 2: Population Distribution by Race and Ethnicity
• Figure 3: Average Household Size
• Figure 4: Median Income Distribution
• Figure 5: Identifying Marginalized Block Groups
• Figure 6: The Relationship between Local Food Retailer Distribution and Median Income
• Figure 7: Local Food Accessibility to Households without Vehicles
• Figure 8: Bus Routes with Stops within a Quarter Mile of Local Food Retailers
• Figure 9: Bus Routes with Frequent Stops within a Quarter Mile of Local Food Retailers
• Figure 10: Potential Bus Route to Improve Access for Marginalized Block Groups
Population Distribution by Race and Ethnicity
San Antonio, Texas

Hispanic Population Distribution 2000
- 0 - 31%
- 33 - 52%
- 53 - 71%
- 72 - 87%
- 88 - 100%

African American Population Distribution 2000
- 0 - 4%
- 5 - 10%
- 11 - 22%
- 23 - 44%
- 45 - 85%

Projected Coordinate System: NAD 1983 State Plane Texas South Central FIPS 4204 Feet
Sources: U.S. Census Bureau; ESRI, City of San Antonio, Bexar Metro 911 Network District

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Average Household Size
San Antonio, Texas

Average Household Size 2000

- 0.00 - 1.79
- 1.80 - 2.37
- 2.38 - 2.88
- 2.89 - 3.37
- 3.38 - 4.44

Projected Coordinate System: NAD 1983 State Plane Texas South Central FIPS 4204 Feet
Sources: U.S. Census Bureau; ESRI, City of San Antonio, Bexar Metro 911 Network District

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Median Income Distribution
San Antonio, Texas

Household Median Income
- $0.00 - 24,338
- $24,338 - 37,763
- $37,763 - 55,833
- $55,833 - 83,911
- $83,911 - 171,469

Projected Coordinate System: NAD 1983 State Plane Texas South Central FIPS 4204 Feet
Sources: U.S. Census Bureau; ESRI, City of San Antonio, Bexar Metro 911 Network District
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December 1, 2010
Identifying Marginalized Block Groups
San Antonio, Texas

Projected Coordinate System: NAD 1983 State Plane Texas South Central FIPS 4204 Feet
Sources: U.S. Census Bureau; ESRI, City of San Antonio, Bexar Metro 911 Network District

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December 1, 2010
The Relationship between Local Food Retailer Distribution and Median Income
San Antonio, Texas

Projected Coordinate System: NAD 1983 State Plane Texas South Central FIPS 4204 Feet
Sources: U.S. Census Bureau; ESRI, City of San Antonio, Bexar Metro 911 Network District
Author: Laura Muraida
December 1, 2010
Local Food Accessibility to Households without Vehicles
San Antonio, Texas

Percentage of Households without Vehicles 2000

- 0 - 6%
- 7 - 15%
- 16 - 25%
- 26 - 42%
- 43 - 77%

Projected Coordinate System: NAD 1983 State Plane Texas South Central FIPS 4204 Feet
Sources: U.S. Census Bureau; ESRI, City of San Antonio, Bexar Metro 911 Network District
Author: Laura Muraida
December 1, 2010
Bus Routes with Stops within a Quarter Mile of Local Food Retailers
San Antonio, Texas

Projected Coordinate System: NAD 1983 State Plane Texas South Central FIPS 4204 Feet
Sources: U.S. Census Bureau; ESRI, City of San Antonio, Bexar Metro 911 Network District, VIA
Author: Laura Muraida
December 1, 2010
Bus Routes with Frequent Stops within a Quarter Mile of Local Food Retailers
San Antonio, Texas

Projected Coordinate System: NAD 1983 State Plane Texas South Central FIPS 4204 Feet
Sources: U.S. Census Bureau; ESRI, City of San Antonio, Bexar Metro 911 Network District, VIA

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Potential Bus Routes to Improve Access for Marginalized Block Groups
San Antonio, Texas

- Potential Stops
- Potential Route Extension 1
- Potential Route Extension 2
- Potential New Route
- Bus Routes in Walking Distance of Local Food Retailers
- Quarter Mile Buffer
- Marginalized Block Groups

Projected Coordinate System: NAD 1983 State Plane Texas South Central FIPS 4204 Feet
Sources: U.S. Census Bureau; ESRI, City of San Antonio, Bexar Metro 911 Network District, VIA

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Analysis:

*What is the distribution of local fresh food retailers in San Antonio and how does it vary across the City?*

Figure 1 shows the distribution of local food retailers in comparison to all major food retailers. This research shows that there is a surprisingly large amount of local fresh food retailers in San Antonio. Within the city limits, 26 out of 106 food retailers are completely local food vendors.

Figure 1 shows that the majority of local food vendors are centrally located, with the exception of the far north side, which has several local retail food options. Contrarily, the far west, far east, and southeast areas are noticeably lacking in such options. This is probably related to the sprawling nature of the outer city. These areas tend to be more conducive to big box retail, rather than small scale stores.

*What is the distribution of income and race in San Antonio?*

Figures 4 and 5 depict income related data for San Antonio. Figure 4 shows that median income levels are significantly lower in the inner city than in the outer parts of the city, and in particular the far north side. The majority of central block groups have median incomes below $25,000.

Figure 5 highlights census block groups that are at or below the federal poverty threshold for the average family size in San Antonio, which is $13,290 for 3 people. The majority of these block groups, termed “Marginalized Block Groups,” are clustered in groups within the central city. Figure 3 shows that several of the marginalized block groups have average family sizes larger than the city average, and thus are substantially below the federal poverty line.

Figure 2 reveals San Antonio’s large minority population. A moderate to large Hispanic population is distributed throughout the city, but is highly concentrated on the west side of the city. The African American population is less centrally concentrated, with its highest distribution on the east side. Both of these areas with high minority concentrations represent areas of moderate to low income.

*What areas are underserved by general or local food retailers and what is the relationship to the demographic data?*

In terms of overall availability, there appears to be an adequate number of general food vendors within San Antonio. Figure 1 shows this closing grocery gap in the city at large. This is in part due to the fact that big box chain stores are able to stock large inventories and reduce prices, allowing them to cater to a wide household income range.

In terms of local food retailers, they are also adequate in number; however they generally follow a centralized north to south axis, leaving few local options available to the west and southeast sides. The west side in particular, as the demographic data shows, has larger than average household sizes, lower median income, and a high Hispanic population concentration. While there might be adequate grocery stores of varying
qualities, local food retailers such as farmers’ markets could provide additional benefits to the community.

The majority of local food retailers are situated in areas with moderate to low-income, however only two are located with the marginalized block groups. Vehicle ownership data shows that these marginalized block groups tend to have lower rates of vehicle ownership, meaning the available local food retailers may still not be accessible.

*How can access from low-income areas to local fresh food retailers be improved via public transit?*

As the research shows, local food retailers tend to be on streets with direct bus access, thus there are a large number of bus stops and routes within a short walking distance of a quarter mile. Figure 8 depicts this potentially high accessibility level to local food retailers. However as Figure 9 demonstrates, most of these bus lines do not run on a frequent basis. Nonetheless, frequent bus lines do provide adequate access to 13 marginalized block groups.

For the marginalized block groups that do not have frequent or any direct bus route access, I used a network analysis to extend existing routes or create new ones. To create the routes, I used access to a local food retailer as the primary factor and access from a marginalized block group as a secondary factor.

*Potential Route Extension 1* connects existing bus service on the far west side to a segregated and marginalized block group in the northwest. This route extension would allow the population in this block group to better access local retail food outlets to the north and south.

*Potential Route Extension 2* connects a cluster of marginalized block groups to a series of local retail vendors directly to the north. This extension would be highly feasible with existing service, and targets a large population and several local food opportunities.

The proposed *Potential New Route* services the aforementioned southeast side. It would connect a series of marginalized block groups on the south and east sides to the scattered existing local food retailers. These areas also have limited bus service, thus the new route would be a great improvement in local food accessibility.

**Conclusion & Recommendations:**

This study revealed that San Antonio has a closing grocery gap, as well as a moderate network of local food retailers. However, additional research is needed to draw more accurate conclusions about local food retailer accessibility and potential.

The research reveals that local food retailers are highly accessible via existing bus routes, and have direct service areas comprised of mainly moderate to low income populations. However there are gaps in availability and accessibility throughout the city. These gaps include several key marginalized areas with median incomes below the federal poverty
level. While bus routes can be extended and developed to reach these areas, it would be most beneficial to develop opportunities for small scale local food retailers to move directly into these marginalized areas. Additional studies are needed to measure the success and benefits of existing local food retailers in marginalized areas. These issues should be incorporated in future sustainability, resilience, and community development discussions in San Antonio.

Research Limitations:
This study was conducted with 2000 Census demographic data. As San Antonio has continued to grow over the past 10 years, it can be presumed that this data has changed.

Local food retailer data acquisition was also problematic, as many small scale vendors do not have adequate public information available. I attempted to double check the existence of several of the local food vendors, however I was unable to speak with any contacts. Additionally, the majority of local retail vendors are not in permanent locations and are only available certain days of the week and certain times. This is a critical determinate of local food accessibility, particularly for working populations, but was not taken into account because I could not obtain the data for all of the retailers.

The bus system data provided by VIA Metropolitan Transit also lacked some specificity about bus frequency. Their method of data management was difficult to translate into meaningful data fields. A more thorough analysis would include bus frequency and local retail vendor frequency data to generate an accurate depiction of accessibility.

References:
Shturman, Orly. (2009). Farm to Table: A Fresh Food Accessibility Study in Dallas, Texas.
Appendix A:

**Detailed Methodology:**

**Study Area:**
This study will focus on the City of San Antonio, and specifically marginalized and low-income areas. I will use U.S. Census block group data for Bexar County, because this is the smallest and most specific data unit. I will restrict my analysis to within the City of San Antonio boundary as the outlying communities of the county are rural and spatially segregated from the City’s urban fabric.

**Data Collection:**
I gathered spatial data for San Antonio, including the City of San Antonio boundary and streets from the City of San Antonio GIS Department; Bexar County Census tract, block group, and block boundaries from ESRI, and local bus system and bus stop data from VIA Metropolitan Transit. I also gathered SF1 and SF3 demographic data on the Census tract, block group, and block level from the Census Bureau. Within this demographic data I focused on the following risk indicators: population density, median and per capita income levels, poverty levels (based on federal poverty rates), private vehicle ownership, single householder family distribution, renter-occupied housing distribution, and racial/ethnic distribution. I joined the spatial and demographic data and add the food outlet location data for analysis.

- **Data Collection Process:**
  - Download data
  - Extract all files
  - Save to data folder
  - Define coordinate system (if not defined)
  - Project data to **Texas South Central State Plane (NAD83, survey feet)**
  - Add spatial data to Arc Map
  - Join demographic data tables to geographic data
  - Symbolize demographic data using Quantities under Layer Properties, Symbology tab
  - Calculate block group area using calculate geometry option in the attribute table
  - Use area to calculate population densities
  - Under symbology tab, select Quantities, select desired population (total, racial, etc) normalized over calculated area

I then collected data from websites and Google Earth on grocery stores and alternative food retailers, including large-scale grocers, health food stores, farmers markets, and community supported agriculture pick up points. I decided not to use community gardens because most gardens in the service area do not serve as primary produce sources for local consumers. I also did not include urban agriculture food sources because the current lack of availability in the area.

- **Food Source Data Creation and Collection Process:**
Compile list of retail food source addresses from Google Earth and retail websites such as HEB, Wal-Mart, La Fiesta, Sun Harvest, etc into excel sheet
Format excel data to use US Streets with Zone address locator, and include a column “Retail Food Source Type” to indicate level of availability of locally produced food
Create Address Locator in ArcCatalog (US Streets with Zone)
Add address locator to Arc Map
Add retail food source address excel data
Geocoded addresses with San Antonio street data
Verified accuracy using find tool
Edited and matched several unmatched addresses due to errors in the data
Symbolize geocoded addresses as Food Sources

I then sorted my food source address data using “locally grown” and quality indicators. I used the 200-mile radius standard to define the term, which means the food has traveled less than a day to reach its destination. True locally produced food outlets will include active farmers markets and community supported agriculture programs. The next category will be grocery stores that have a commitment to buying locally produced food and publish the amount of local food on their shelves. This includes Whole Foods and Sun Harvest. The third category will be large high quality grocery stores, which mainly includes big box chain stores that have varying degrees of local produced food, however it is not an integral part of their business strategy. The final category is smaller grocery stores that have a limited selection of health and local foods; this includes Handy Andy and La Fiesta.

Steps:
- Edited “Food Source Type” field using Editor toolbar
- Select by Attribute within the Food Sources layer for “Food Source Type”
- Export selected data to create a new shapefile and layer of specific type of food source
- Repeat selection and export steps for each type of food source
- Symbolize each food source layer differently if relevant
- Turn on and off layers to visualize difference in availability

Determining Marginalized Areas of Need:
Poverty status will be used as a simple indicator of marginalization in order to focus on specific low-income Census block groups (while Census tracts, block groups and blocks were all downloaded, block groups will be the primary geography used in the analysis). Different studies use a variety of indicators for marginalization; however income will be the simplest method to determine barriers to healthy local food options, leading to exclusion from this burgeoning sustainable market.

Using the Federal Poverty Rate in 2000 and average family for the City I will determine an income threshold that indicates poverty status. I will then select by
attributes in the Median Income data field for all Census block groups with median income at or below this figure. I will export this selection to create a new “Marginalized Block Groups” layer. Food source, bus, and street data will be clipped to these areas for analysis.

Add education, unemployment, AND/OR vacancy?

- Steps:
  - Obtain average family size (2.77 ~ 3) for area from SF3 Census data
  - Obtain Federal Poverty Rate corresponding with average family size from Census data (Household of 3 threshold = $13,290)
  - Select by Attributes in block group data Median Income field for block groups at or below identified poverty income
  - Export selected block groups as a shapefile and layer
  - Name selected block groups “marginalized block groups”
  - Clip food source and bus stops to marginalized area(s)

- Direct Service Area and Gaps in Service Provision in Marginalized Area:
  Once I have determined the marginalized block groups, I will use buffers around food outlets in the area to examine accessibility. I will use a walking distance buffer of a quarter mile, based on urban planning standards for walkability. I will also use a larger buffer to represent a short driving distance. I will focus mainly on accessibility to local retail food outlets.

  - Steps:
    - Use buffer tool with clipped food sources as the input layer to create “local food sources_buffer” layer

Walkability: I will then examine which bus stops fall into these buffers. Using the Select by Location tool I can create a shapefile and layer of bus routes within a quarter mile radius of local food sources. I will use the select by attribute tool to identify which bus lines have stops within a quarter mile of a local food outlet. I will then create a quarter mile buffer representing which areas have walkable access to these bus lines, and dissolve the area into one shapefile.

  - Steps:
    - Use buffer tool with clipped bus stops as the input layer to create “bus stops_buffer” layer
    - Open “marginalized bus stops clipped” layer’s attribute table to identify which lines stop at each bus stop
    - Turn on city wide bus system layer if not on
    - In the city wide bus system layer, select by attribute for identified lines servicing bus stops within marginalized areas
    - Export this selection as a shapefile and layer
    - Name is “AccessibleBusLines”
    - Use the buffer tool with “accessiblebuslines” as the input layer to create a buffer around the lines
    - Dissolve the buffer to create a singular shapefile
Network Analysis Steps: In order to propose a new bus route or bus route extension, I used the network analysis tool based on the street network. Based on gaps in bus service between marginalized block groups and local food retailers, I “created network locations” or selected desirable points to be included in a bus route. The network analyst tool then “solved” the scenario by creating new routes based on these desirable points.