1. Introduction

Growing concern about the general health of the American population has sparked a scholarly interest in structural barriers to health. Obesity rates in the United States place the country at the top of the developed world in terms of percentage of youth and population as a whole that are obese. Health is defined by Audy (1971:142) as “a continuing property that can be measured by the individual’s ability to rally from a wide range and considerable amplitude of insults – chemical, physical, infectious, psychological, social.” It is widely accepted that good nutrition is a critical factor in the maintenance of optimum health. A growing literature in medical geography and urban geography includes studies of spatial barriers to exercise (such as lack of parks, walking or running paths, the presence of gangs or crime, etc.), and financial barriers to health (lack of insurance, fees for gym memberships, inability to buy fresh or nutritious food, overdependence on fast food, etc.), logistical barriers related to poverty or overwork (inability to devote time to exercise or home cooking, lack of time to travel to supermarket) (Furey et al., 2001; Larsen and Gilliland, 2009; Pearce et al., 2006, 2007; Pearson et al., 2005; Whelan et al., 2007; Wrigley et al., 2003).

Food deserts have been widely studied across geography, sociology and urban studies. The term “food desert,” typically is used to identify neighborhoods in which little to no food is available for purchase, or what is available is prepackaged and lacking in nutrition. A more complex analysis of barriers to health recognizes that lack of access to nutritious, reasonably priced food may have multiple and diverse causes. Examining the spatial distribution of a variety of food stores (including supermarket chains, convenience stores, ethnic food markets, and independently owned food marts), has become a common approach to identifying possible food deserts.

While distance to food retail outlets is an important element in the identification of food deserts, the type of store that is present also affects health outcomes. Large supermarket chain stores are more likely to stock fresh meats, fish, poultry, fruits and vegetables than smaller neighborhood stores, convenience stores or ethnic markets. Residents may be within walking distance only of stores that provide food items that are packaged and processed and are more likely to be high in salt, fat, sugar, and chemicals, and low in overall nutrition. Thus, a food desert may exist in a neighborhood where several sources of food are located if those sources do not stock the types of items that are necessary for maintaining good health. Access may also be mediated by lack of reliable transportation, inconvenient or infrequently serviced bus routes, physical and social barriers such as poor health, high rates of crime or an excess of vacant properties that may deter travel by foot or bike to food outlets. The lack of availability of safe bike parking, such as a bike rack, may also deter residents from using this mode of transportation.

A review of the food desert literature in Health & Place (2011) illustrated how sophisticated scholars have become in our ability to identify food deserts and their social and physical
attributes. While we have gotten quite good at mapping these deficient spaces, we have not advanced significantly in identifying solutions to the problem of food deserts. Authors Larsen and Gillilland (2011) argue that more attention needs to be paid by scholars to the possible solutions to the problems presented by food deserts, such as public-private partnerships, and to the politics of how these problems are addressed in specific locales.

In this paper, we develop a holistic analysis of access to the type of food that is essential for health and quality of life. We begin by identifying neighborhoods that are predominantly occupied by marginalized or vulnerable populations in south St. Petersburg, Florida, using patterns of race and income, and rates of unemployment, disability, and property vacancy data. We then use GIS to identify patterns of access to good quality, reasonably priced food in the study area, and expand to include a variety of variables, including crime rates; availability of bike paths and bike racks; bus stop location; and car ownership. Combining these variables, we identify specific areas of the city in which residents are likely to be physically isolated from the goods and services needed to maintain health. We place the current assessment of food deserts in St. Petersburg in the context of the City’s efforts to provide services to underserved neighborhoods through public-private partnerships.

2. Study Site

St. Petersburg is an economically and racially diverse urban center of approximately 250,000 people (MSPI:7). The city sits on the southern end of a Peninsula jutting into Tampa Bay, the largest estuary in the state of Florida. St. Petersburg is flanked to the west by the city of Gulfport, to the northwest by Pinellas Park, and to the north by Clearwater and Largo. These urban units run seamlessly together in a large urban conglomeration of over 900,000 people which constitutes the most densely populated county in the state (MSPI:7). Pinellas County is part of the Tampa Bay urban area, with a total population of over 2 million. Until the start of the current recession Pinellas County was one of the fastest growing areas in the state. Rapid growth of the region created an overinflated real estate market, and in the crash of 2009, many residents of the area lost their homes in foreclosures. Unemployment rose rapidly, reaching a high of over 11% in 2011 (Harrington, 2011). In this economic climate, access to nutritious and reasonably priced food becomes even more critical.

The city is marked by economic and racial segregation and ongoing racial tensions. Finally, access to services, including food, has been on the political agenda of the City for many years. Lack of services including a large supermarket chain were identified by grassroots organizations working in the Midtown neighborhood of St. Petersburg in the mid-1990s as a major concern of residents, and became a critical political issue for the city’s leaders. As a result, Sweet Bay, a large supermarket chain, opened a store in Midtown in 2005, in what was previously the largest food desert in St. Petersburg. The highly charged political process through which Sweet Bay was enticed into the Tangerine Plaza in south St. Petersburg presents an opportunity to explore the results of a public-private partnership between non-profit organizations working with the City government to attract private capital and corporate investment to the area. Several months before this research was completed, the Sweet Bay in Midtown shut down, provoking outrage among the residents of the neighborhood. Just two miles south of Midtown, another Sweet Bay was shuttered by the corporation in the same time frame. Corporate spokespersons stated the closings were based on poor economic performance of the stores. These events must call into question our
optimism about the use of public monies to lure private corporations into vulnerable neighborhoods as a solution to food deserts.

2.1 Study Neighborhoods: Establishing Vulnerability

Initial analysis and research into the history of the city led us to focus on three neighborhoods of St. Petersburg, all of which present concerns regarding vulnerable populations, lack of access to essential services, and health patterns: Midtown, Southwest St. Petersburg, and Southeast St. Petersburg. Midtown is a locally recognized area of the city that has been the focus of city planning efforts for several decades. Southwest and Southeast St. Petersburg are names given by us to clusters of neighborhoods revealed in our analysis as being vulnerable to lack of access to good quality food and in need of attention from city officials.

2.1.1 Race and class:

Pinellas County, like much of the American South, remains quite racially and economically segregated. Figure 1 shows the distribution of the African-American population in the county, highlighting the concentration of African-Americans in south St. Petersburg.

Figure 1: Distribution of African-American population in Pinellas County.

Figure 2: Concentration of race distribution in the study area.
Figure 3: Distribution of poverty within the study area.

Midtown in the 1970s, but these efforts were largely unsuccessful (MSPI:6). Following the shooting death by police of a young African-American man in the neighborhood in 1996, Midtown erupted in riots, precipitating renewed focus on the social and economic isolation of the neighborhoods’ residents. In 2000, the City of St. Petersburg received a UIRA grant that enabled city officials to direct investment into Midtown. The most significant result of the redevelopment efforts in the early years of the new millennium was the negotiations that led to the building of a major chain grocery store (Sweetbay) in the heart of Midtown in 2005.

“Midtown residents have witnessed the completion of the award winning Tangerine Plaza which includes a Sweetbay supermarket and 11,000 square feet of additional retail space. The plaza is the southern anchor of the revitalized 22nd St. S. historic district, which includes the Boys and Girls Club’s Royal Theater, the Johnnie Ruth Clarke Health Center at the Mercy Hospital site, the Manhattan Casino, the revitalized Jordan Park housing community, the Carter G. Woodson African-American History Museum and the Seaboard railroad station.” (St. Petersburg City website, 2009).
Despite the increase in services over the past decade, the Midtown area continues to exhibit characteristics of a socially vulnerable population. The median income of the neighborhood is $28,717, compared to $45,258 for Pinellas County as a whole (U.S. Census, 2010). Thirty-two percent of the population of Midtown has income that is below the poverty line; 10% do not own a car. Over fourteen percent of households in Midtown consist of unmarried women with children (U.S. Census, 2010).

Following decades of focus on Midtown, in 2010, city officials and planners began to turn their attention to another neglected neighborhood (City of St. Petersburg, 2010a). The Child’s Park neighborhood, founded in 1911, lies between 1st and 18th Avenues South and 34th Street South and 49th Street South. Child’s Park is the heart of Southwest St. Petersburg, which also includes the Twin Brooks, Perry Bayview and Clam Bayou neighborhoods. Twin Brooks extends from 49th Street in the west to 34th Street South in the east, and from 18th Avenue South on the northern edge to 26th Avenue South. Perry Bayview extends from 26th Avenue South to 30th Avenue South, and from the edge of Clam Bayou and 38th Street South to 34th Street South. Finally, Clam Bayou Neighborhood encompasses the territory between 30th Avenue South and 38th Avenue South, and between 34th Street South and Clam Bayou in the west.
The Child’s Park neighborhood association, founded in 1992, has been working for improved services such as a revitalized city gym for residents, new basketball and tennis courts, the extension of the Pinellas Trail bike path through the area, and programs for youth and neighborhood safety. No plan for the siting of a grocery store has yet been proposed for this neighborhood; yet Child’s Park fills all the criteria of a food desert (City of St. Petersburg, 2010b).

The Child’s Park neighborhood is 88% African-American (compared to 22.4% for the city as a whole), and the poverty rate is 28.5% compared to 9.2% for the city. Home ownership is 8% below the average for the city (City of St. Petersburg, 2008). The neighborhood’s median income is $22113 compared to $34597 for the city, and crime is 80% higher (Baker, 2008).

When Child’s Park is combined with the Twin Brooks, Perry Bayview and Clam Bayou neighborhoods, Southwest St. Petersburg constitutes a significant area of south St. Petersburg and exhibits characteristics of a socially and economically vulnerable population. Twenty-nine percent of the population of Southwest St. Petersburg is below the poverty level; 22% of households are constituted of unmarried women with kids; 9.8% of this largely African-American population is without work (U.S. Census, 2010). Figure 4 highlights the concentration of residents who are currently not working in the two areas of Midtown and Southwest St. Petersburg. In addition, the Southwest St. Petersburg area (which contains portions of the Lakewood Terrace and Bayou Highlands neighborhoods) also has a high concentration of residents who are not working. Figure 5 demonstrates the spatial pattern of median income across the study area. The median income for Pinellas County as a whole is $45258 (U.S. Census, 2010). All of the study area neighborhoods have median incomes below this average except for the small neighborhood of Broadwater. Midtown and Southeast St. Petersburg have median incomes of $28717 and $28880, respectively, both substantially below the county average. Parts of Midtown have median incomes below $25,000.
Within the Southwest St. Petersburg area, Census Tract 201.01 stands out as a vulnerable hotspot (Table 1). With 12.7% unemployment, a median income of only $29,079 and 36.3% of the population collecting Social Security Income, this area exhibits higher than average statistics in key variables that indicate social vulnerability. The complex spatial array of data provided by the Figures allows us to identify very specific areas in which residents are likely to be suffering from economic and social isolation and hence, experiencing significant barriers to access to high quality, but affordable food.

### Table 1: Neighborhood Characteristics.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Midtown</th>
<th>Southwest St. Pete</th>
<th>Southeast St. Pete</th>
<th>Pinellas County</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>76.4</td>
<td>80.5</td>
<td>57.6</td>
<td>8.9</td>
</tr>
<tr>
<td>White</td>
<td>9.4</td>
<td>16.4</td>
<td>36.5</td>
<td>86</td>
</tr>
<tr>
<td>Unemployed</td>
<td>11.4</td>
<td>9.8</td>
<td></td>
<td>4.6</td>
</tr>
<tr>
<td>Below Poverty</td>
<td>31.88</td>
<td>27.9</td>
<td>25.3</td>
<td>12</td>
</tr>
<tr>
<td>Median Income</td>
<td>28,717</td>
<td>33,669</td>
<td>28,880</td>
<td>45,258</td>
</tr>
<tr>
<td>SSI</td>
<td>36.7</td>
<td>29</td>
<td>31</td>
<td>36</td>
</tr>
<tr>
<td>Food Stamps</td>
<td>22.8</td>
<td>18.6</td>
<td>18.3</td>
<td>7.2</td>
</tr>
<tr>
<td>Owner Occupied</td>
<td>51.5</td>
<td>65.9</td>
<td>70.5</td>
<td>70.3</td>
</tr>
<tr>
<td>Vacant Properties</td>
<td>24.5</td>
<td>16</td>
<td>24.2</td>
<td>18.8</td>
</tr>
<tr>
<td>Without Car</td>
<td>10</td>
<td>2.3</td>
<td>5.6</td>
<td>3.1</td>
</tr>
<tr>
<td>Public Transport</td>
<td>5.3</td>
<td>3.3</td>
<td>0.6</td>
<td>1.9</td>
</tr>
<tr>
<td>Walk to Work</td>
<td>3.4</td>
<td>1.3</td>
<td>0</td>
<td>1.7</td>
</tr>
</tbody>
</table>

*Source: Authors, US Census*

### 2.1.2 Other Measures of Vulnerability:

Midtown and Southwest St. Petersburg have relatively high percentages of unemployed residents (11.4% and 9.85 compared to a county average of 4.6%). Both neighborhoods suffer from an excess of vacant properties. Fully 25% of properties in Midtown are vacant, while 16% of properties in Southwest St. Petersburg were vacant in 2010 (U.S. Census, 2010). In Southeast St. Petersburg, 24% of properties are vacant. Vacant properties can contribute to the impact of food deserts by decreasing the willingness of residents to walk to the grocery store. Passing empty properties or vacant lots can be frightening for residents because such properties often become occupied by the homeless or sites for illicit activities such as the sale of drugs or stolen property.

An additional measure of social vulnerability is the proportion of the population dependent on social security income. In Midtown, 36.7% of residents are currently collecting social security; in Southeast St. Petersburg, the percentage is 31%. Southwest St. Petersburg’s rate of dependence
on social security income is slightly lower at 29%, but still high enough to signal a population which may have limited financial resources and be especially vulnerable to the problems created by lack of access to reasonably priced, nutritious food. Overall county rates of collection of SSI are high (36%), due to the high proportion of the population that is elderly. Perhaps a more compelling indication of economic vulnerability is the percentage of the population for each area that is currently using food stamps. While the countywide percentage is just a little over 7%, the Midtown percentage is 23%, and the other two neighborhoods have close to 18% of their populations collecting Food Stamps (U.S. Census, 2010).

3. Measuring Access to Food and Other Services

The City of St. Petersburg created a map of potential food deserts in the City in 2010 (see Figure 6, below). Census Tracts were identified in which residents were more than one mile from a major grocery store. Using this methodology, census tracts in Midtown and Southwest St. Petersburg (as well as a few other areas in the city) were identified as trouble spots. We used a different approach to identifying areas of concern for access to food.

Spatial barriers to access to healthy food have several components. First is the issue of mere proximity: are stores located within walking distance of residential neighborhoods? Are there neighborhoods where it is not possible to walk to a store that sells groceries? Are there neighborhoods where it is not possible to walk to a supermarket chain store, but it is possible to walk to a convenience store?

Large supermarket chains that traditionally stock a wide variety of fresh meats and fruits and vegetables may be absent from poor neighborhoods for a variety of reasons, including lack of potential profit for the store, the presence of gangs or crime related violence, aesthetic reasons, etc. When large supermarket chain stores are absent, residents are more likely to purchase food at a convenience store or local foodmart. Previous studies have suggested that convenience stores are less likely to stock nutritious, fresh food of high quality, and more likely to stock prepackaged or prepared foods that are high in salt, fat, sugar and chemicals. Readymade foods

Source: Map downloaded from www.pinellasindicator.org, data source: US Dept of Agriculture

![Figure 6: Map indicating low access to food](image)
such as hotdogs, burgers, sandwiches and snack foods such as chips, etc., are generally readily available at convenience stores and foodmarts. Spatial access includes both the spatial distribution of different types of stores and the availability of specific foods within stores. Data was gathered on food availability across store types within the sample areas.

Using the City of St. Petersburg’s occupational license list for retail stores, we compiled a comprehensive list of stores that sold food, geocoded the addresses and produced a preliminary map of food outlets. Supermarket chain stores (Publix, Winn-Dixie, Sweet Bay) were included as well as convenience stores known to sell significant amounts of food items (i.e., 7-11); ethnic markets and independently owned foodmarts (Figure 7). Gas stations and bookstores, known to sell some food items, were excluded because these are not considered to be outlets where families are likely to purchase groceries for home preparation.

We then used a half mile buffer from each food outlet to identify areas in south St. Petersburg in which residents were unlikely to walk to the store to purchase food. Several areas present as current food deserts in Figure 7.

To more fully understand the barriers to access to good quality, nutritious food, we collected data on availability, price and quality of a set of food items from stores within the study area in

Figure 7. Half-mile buffer around small and large food retail.

Source: Authors, US Census
Table 2. Price of Items in Select Supermarkets, St. Petersburg, Florida.

<table>
<thead>
<tr>
<th>ITEM/STORE *</th>
<th>APPLES</th>
<th>LOW FAT MILK</th>
<th>GRND BEEF</th>
<th>WHOLE CHK</th>
<th>EGGS</th>
<th>BLK BEANS</th>
<th>WW BREAD</th>
<th>OVER ALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.59</td>
<td>3.19</td>
<td>1.29</td>
<td>1.39</td>
<td>1.59</td>
<td>.81</td>
<td>1.79</td>
<td>N/A</td>
</tr>
<tr>
<td>B</td>
<td>2.49</td>
<td>3.19</td>
<td>2.69</td>
<td>2.39</td>
<td>1.59</td>
<td>.79</td>
<td>1.59</td>
<td>GOOD</td>
</tr>
<tr>
<td>C</td>
<td>2.49</td>
<td>3.19</td>
<td>2.69</td>
<td>2.39</td>
<td>1.59</td>
<td>.79</td>
<td>3.69/2</td>
<td>GOOD</td>
</tr>
<tr>
<td>D</td>
<td>2.49</td>
<td>3.19</td>
<td>3.49</td>
<td>1.49</td>
<td>1.59</td>
<td>.79</td>
<td>1.59</td>
<td>N/A</td>
</tr>
<tr>
<td>E</td>
<td>2.49</td>
<td>3.19</td>
<td>3.49</td>
<td>1.29</td>
<td>1.59</td>
<td>.79</td>
<td>1.59</td>
<td>GOOD</td>
</tr>
<tr>
<td>F</td>
<td>2.49</td>
<td>3.19</td>
<td>3.49</td>
<td>1.29</td>
<td>1.59</td>
<td>.79</td>
<td>1.59</td>
<td>GOOD</td>
</tr>
<tr>
<td>G</td>
<td>0.99</td>
<td>3.19</td>
<td>2.69</td>
<td>1.29</td>
<td>1.59</td>
<td>.79</td>
<td>1.69</td>
<td>GOOD</td>
</tr>
<tr>
<td>H</td>
<td>3.99</td>
<td>3.19</td>
<td>2.99</td>
<td>1.39</td>
<td>4.59</td>
<td>.80</td>
<td>1.79</td>
<td>AVG</td>
</tr>
</tbody>
</table>

Source: Authors and project staff.

*ITEM/STORE (SUPERMARKETS)
A = SWEETBAY, 18TH AVENUE SOUTH AND 22ND STREET SOUTH (MIDTOWN)
B = PUBLIX, 34TH STREET SOUTH AND 54TH AVENUE SOUTH (PINELLAS POINT)
C = PUBLIX, SEVILLE SQUARE, 54TH AVENUE SOUTH (PINELLAS POINT)
D = PUBLIX, 7999 9TH STREET NORTH (NORTHSIDE)
E = PUBLIX, 1700 34TH STREET NORTH (DOWNTOWN)
F = PUBLIX, 250 3RD STREET SOUTH (DOWNTOWN)
G = SWEETBAY, 7491 4TH STREET NORTH (NORTHSIDE)
H = WINN DIXIE, 1049 62ND AVENUE NORTH (NORTHSIDE)

January of 2010. The availability, price and appearance (for example, bruising of fruits and vegetables, freshness, spoiling, etc.) of food on offer at each establishment were recorded within a three day time period to eliminate discrepancies in pricing over time. Two hypotheses were tested. One, we hypothesized that larger supermarket chain stores will have lower prices overall than smaller stores. Two, we hypothesized that the foods available in the smaller, neighborhood or convenience stores would be more costly, less variable and would be dominated by packaged, high fat or high salt foods.. Collection was done over a three day period in order to decrease the possible effect of routine re-pricing activities at the stores. Based on this data, we came to the conclusion that small grocery stores and ethnic markets were not an appropriate source of nutritious and reasonably priced food. Table 2 shows the differential in prices across the major supermarkets surveyed and Table 3 shows the prices and availability of foods at the small stores surveyed.

Focusing on the stores located within the study area (Supermarkets A and F), we see that the prices for Supermarket A, which is the Sweet Bay lured to Midtown by the City in the early 2000s, are somewhat lower than the prices at the other supermarkets. Supermarket F, which is on the eastern edge of Midtown exhibited slightly lower prices for chicken, eggs and bread than the other markets. The small food stores surveyed in the study area (stores 14, 15, 16) confirmed the hypothesis that fresh food items would be difficult to find and that prices would be higher than supermarket prices. Store 15 was an anomaly, as this was a produce mart located in Midtown. It
is one place where patrons may get a variety of fresh fruits and vegetables. The price per pound of apples, for example, was considerably lower here than at the major supermarkets.

Table 3. Price and Availability at Small Stores, St. Petersburg, Florida.

<table>
<thead>
<tr>
<th>ITEM/STORE**</th>
<th>APPLES</th>
<th>LOWFAT MLK</th>
<th>EGGS</th>
<th>WW BREAD</th>
<th>BLK BEANS</th>
<th>MEAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.69/1</td>
<td>3.69</td>
<td>1.99</td>
<td>2.49</td>
<td>0</td>
<td>3.89/12 HOT DOG</td>
</tr>
<tr>
<td>2</td>
<td>.99/LB</td>
<td>3.69</td>
<td>1.99</td>
<td>2.49</td>
<td>0</td>
<td>3.99 HOT DOG</td>
</tr>
<tr>
<td>3</td>
<td>.99</td>
<td>4.99 whole</td>
<td>3.49</td>
<td>1.29 white</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>.99</td>
<td>2.99</td>
<td>1.99</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>2.99 whole</td>
<td>1.99</td>
<td>1.99 white</td>
<td>1.39</td>
<td>1.99 HOT DOGS</td>
</tr>
<tr>
<td>6</td>
<td>3.99/5 LBS</td>
<td>3.79 2%</td>
<td>3.99/18</td>
<td>2.29</td>
<td>6.79/6 LBS</td>
<td>7.99/8 OZ GB</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>2.99 whole</td>
<td>0</td>
<td>1.99 white</td>
<td>2.49 CHILI BEANS</td>
<td>1.79 HOT DOGS</td>
</tr>
<tr>
<td>8</td>
<td>.59 each</td>
<td>4.99</td>
<td>0</td>
<td>2.49</td>
<td>1.29 KIDNEY</td>
<td>2.99/LB GB</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>3.99</td>
<td>2.99</td>
<td>NO PRICE</td>
<td>1.49</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>0</td>
<td>4.99 2%</td>
<td>0</td>
<td>1.99</td>
<td>1.29</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>0</td>
<td>4.99 2%</td>
<td>0</td>
<td>2.49</td>
<td>.99</td>
<td>1.49 HOT DOGS</td>
</tr>
<tr>
<td>12</td>
<td>0</td>
<td>2.99</td>
<td>2.79</td>
<td>2.49</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>13</td>
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<td>1.59</td>
<td>3.19 HOT DOGS</td>
</tr>
<tr>
<td>14</td>
<td>.50 each</td>
<td>0</td>
<td>0</td>
<td>NO PRICE</td>
<td>1.19 CHILI BEANS</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>.99</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1.49</td>
<td>1.99 HAM HOCKS</td>
</tr>
<tr>
<td>16</td>
<td>0</td>
<td>4.79</td>
<td>0</td>
<td>2.19</td>
<td>.99</td>
<td>2.69 GB</td>
</tr>
</tbody>
</table>

Source: Authors and project staff.

** ITEM/STORE**
1 = 7-11, 8319 9TH STREET NORTH (NORTHSIDE)
2 = 7-11, 2110 9TH STREET NORTH (DOWNTOWN)
3 = BOSNIA FOOD STORE, 6508 4TH STREET NORTH (NORTHSIDE)
4 = CITY PRODUCE MARKET, 2701 4TH STREET NORTH (DOWNTOWN)
5 = DISCOUNT FOOD MART, 2157 CENTRAL AVENUE (DOWNTOWN)
6 = GFS, 3131 4TH STREET NORTH (NORTHSIDE)
7 = LUCKY 9 FOUR MART, 901 9TH STREET NORTH (DOWNTOWN)
8 = MICKEY’S MARKET, 1535 4TH STREET NORTH (DOWNTOWN)
9 = PK’S FOOD STORE, 4343 HAINES RD NORTH (NORTHSIDE)
Figure 8. Half-mile buffer with major food retail. Recently closed stores are also identified

Source: Authors, US Census.
Midtown, Southwest St. Petersburg and Southeast St. Petersburg are highlighted (Figure 8). Two areas in which 25 – 50% of the population earns income below the poverty level are not within walking distance of a major grocery store or a neighborhood store. These are Child’s Park (the northern section of Southwest St. Petersburg), the northern and very southern sections of Southeast St. Petersburg (between Lake Maggiore and Coquina Key), and significant portions of eastern Midtown. These neighborhoods are predominantly populated by minorities and have high rates of unemployment. Figure 7 clearly shows the limited impact of the location of the Sweetbay supermarket in Tangerine Plaza. While this store does break up what would otherwise be an appalling large food desert, it is not sufficient to meet the needs of a population which faces many economic challenges and may have limited mobility.¹

3.1 Transportation

Access is not simply about location of services; mobility is fundamental to access. Mobility may be influenced by a variety of factors, including health, age, income, car ownership, and the character of the surrounding area. Lack of car ownership presents a barrier to access to healthy foods if stores are not within walking distance of residential neighborhoods. People who must walk to the grocery store are less likely to purchase items in bulk, which in turn impacts the price per unit and overall expenditures on food. Riding the public bus to the grocery store presents similar limitations. Even when poor working families own cars, it may be logistically difficult to drive further to a store that stocks better quality and a great variety of food; a family in which the head of household works more than one job may find that time is a serious barrier to healthful eating. Similarly, families without cars may find that bus routes are too complex or time-consuming to make this a reasonable way to get to the store.

Another aspect of our research was to map the statistics involving car ownership in the study areas. Figure 9 illustrates the spatial variability of car ownership in the study area. Neighborhoods in Child’s Park and Midtown where lack of car ownership is between 25 and

¹ Lakewood Estates, south of Lake Maggiore, might also constitute a food desert based solely on spatial accessibility; however, this neighborhood is of a higher median income and has a much lower poverty rate. As we will see later, Lakewood Estates is a neighborhood with high levels of car ownership and low crime rates, and as such is not considered a vulnerable population.
50% of households are evident. The percentage of the county’s overall population that does not own a car is 3.1%. Ten percent of Midtown’s population is without a car, and 5.6% of Southeast St. Petersburg’s population is similarly carless. Only Southwest St. Petersburg has a lower than average rate of carelessness. When that neighborhood is broken down into its constituent parts, Child’s Park stands out as having specific areas with high rates of lack of automobile ownership.

Over 5% of Midtown residents indicated in the census that they rely on public transportation, and 3.4% indicated that they walk to work. For Southwest St. Petersburg, the comparable statistics were 3.3% relying on public transportation and only 1.3% walking to work (refer to Table 1). This makes sense when one sees that Midtown is much closer to the business centers of downtown St. Petersburg and the 4th Street corridor, while parts of Southwest St. Petersburg are relatively isolated.

### 3.1.1 Bus Stops

If residents are not driving to the store, and live too far from a food outlet to walk, then riding the bus may be an option. While we did not conduct a detailed analysis of bus times and frequencies, Figure 10 shows the availability of bus stops in the study area.

---

**Figure 10. Distribution of bus stops with respect to food retail stores.**

![Distribution of Bus Stops, Food Retail Centers and Race](source)

*Legend*
- **Red** Chain Supermarkets
- **Blue** Small Food Retail
- **Blue** Bus Stops
- **Midtown**
- **Childs Park**
- **Twin Brooks**
- **Perry Bayview**
- **Clam Bayou**
- **Broadwater**

*Source:* Authors, US Census. Bus stop data provided by Pinellas Suncoast Transit Authority (PSTA).
With the exception of the central area of Child’s Park, parts of Clam Bayou and Broadwater, bus stops appear to be accessible to most of the study area. Lakewood Estates, south of Lake Maggiore, stands out as a neighborhood for which bus service is limited to the perimeter. This neighborhood, as noted above, does not exhibit qualities of social vulnerability other than its minority status.

3.1.2. Bike Routes and Racks

Access to nutritious, reasonably priced food for populations without cars may be possible if stores that provide these goods are within walking or biking distance, and the infrastructure is such that residents feel safe and comfortable traversing their neighborhoods on foot or bike.

Comparing census data among major cities, bicycle ridership correlates inversely with the percent of low income residents, suggesting that low income residents are likely to depend on bicycles for access to essential services (Dill and Carr, 2000). A study published in the Oregon
Johns, Dixon, & McHan

Journal of Physical Activity and Health estimated that replacing motorized transportation with a bicycle saves $544 per capita annually (Gotschi, 2011). Bicycle ridership facilitates affordable access to nutritious food and physical exercise necessary to maintain a healthy lifestyle.

In the state of Florida, bicycles are legally defined as vehicles, and cyclists (bicycle riders) must adhere to the same laws as motorists: riding with the flow of traffic, stopping at stop signs, and yielding to pedestrians. However, cyclists are not provided equal infrastructure. Many multi-lane “corridors” lack on-street bicycle lanes, and businesses provide vast automobile parking lots without a single bicycle rack, creating a transportation hierarchy that undermines the “bicycle equals vehicle law.” This may explain a common observation: bicyclists find no harm in riding on sidewalks or running red lights and motorists tend to mistakenly treat them as pedestrians. As a result, confusion among both parties may be disproportionately endangering low income citizens who depend on bicycles for subsistence.

Numerous studies suggest that bicycle infrastructure can directly influence ridership by affecting the perceived safety of bicycling within an area (Dill and Carr, 2000; Pucher and Komanoff, 1999; Hunt and Abraham, 2006; Krizek and Jo Johnson, 2006.) We adopted principles discussed in these studies to assess (with geographic information systems) how well Midtown and Southwest St. Petersburg meet the needs of their low income residents who depend on a bicycle for obtaining sufficient and nutritious food. One variable that may impact the willingness of residents to ride a bike to a food store is the availability of a safe place to park one’s bike, such as a bike rack. Figure #10 identifies the stores in the study area that have bike racks and those that do not. Only four of the stores in the Midtown area have bike racks; none of the stores in Southwest or Southeast St. Petersburg offer bike racks for their customer’s use.

3.1.3. Walkability

As with bicycles, the infrastructure and the safety of the neighborhood will influence whether or not residents feel comfortable walking to the grocery store. The potential impact of multiple vacant properties on the walkability of a neighborhood has already been discussed. Both study
neighborhoods have high rates of vacancy following the 2008 recession and the foreclosure crisis in Florida. Another important variable impacting walkability is the area’s crime rate.

There is probably no better established phenomenon in crime analysis than the concentration of crimes among both people and places—the empirical assertion that a small minority of people and places account for the majority of crimes has been repeatedly confirmed by reviews. Hot Spot analysis focuses on evolution of the geographical concentration of crime incidents. Hotspot analysis implies descriptions of small and concentrated clusters (hotspots). Sometimes the hotspot method is used for extreme autocorrelation analysis to determine whether or not high incidents of crimes cluster spatially. Hotspot analysis has some unique features including the identification of spatial clusters, ad hoc boundaries, and forecasting (Gorr and Harries 2003); hence hotspot analysis when integrated in a GIS provides a valuable tool in neighborhood safety assessment.

All crime incidents data obtained from St. Petersburg police were geo-coded using built-in geo-coding engines within ArcGIS prior to performing any analysis. To perform the Hot Spot analysis with ArcGIS, a spatial join was created between the crime data and census tract data to count the number of crimes within the given census tract within the software, ArcGIS.

While there is no absolute definition of a “hotspot,” there are seven commonly used “hotspot” analysis routines available in CrimeStat that can be integrated into commercial GIS to create visual presentations. They are mode, the fuzzy mode, hierarchical nearest neighbor clustering (Everett 1974; D’Andrade 1978), risk adjusted nearest neighbor hierarchical clustering (Levine 2004), the Spatial and Temporal Analysis of Crime routine (STAC; Block et. al1995), K-means clustering (Everett 1974; McBratney and deGrujiter 1992), and the local Moran statistic (Anselin 1995). Hot Spot Analysis in ArcGIS uses the Getis-Ord Gi* statistic (See Appendix B); this is the method we used in this study.

The resultant z-scores and p-values indicate crime incidents with either high or low spatial clustering, with high clustering indicating the existence of a hotspot. This tool works by looking at each crime incident(s) within the context of space and proximity of neighboring crime...
incidents. A map showing high value can be interesting but may not be an indicator of a statistically significant hotspot. A well-known fact is that emerged hotspots can happen by chance. Therefore, it is important to test any hotspot against a random distribution through a Monte Carlo simulation, for example. To be a statistically significant hotspot, a map feature (crime incident, in our case) will have a high value and will be surrounded by other features with high values as well. The local sum for a feature and its neighbors is compared proportionally to the sum of all features; when the local sum is very different from the expected local sum, and that difference is too large to be the result of random chance, hence a statistically significant z-score will be noted and the resultant map will indicate statistically significant results.

In the study area, the range of drug crime density varies between \((0 – 400)\), whereas gun related crime density varies between \((0 – 109)\), indicating dominance of drug related crime over gun related crimes. The highest standard deviations were consistent with the areas of high crimes. In the case of crime incident hotspots, the clustering could be due to a high concentration of potential victims (e.g., in a shopping mall), particular land uses that encourage crimes (e.g., an area with a concentration of bars and adult bookshops) (Levine, Wachs, and Shirazi 1986), a common activity (e.g., a drug trade “center”), a location where many offenders live, or a neighborhood where a rash of incidents suddenly occur (e.g., vehicle thieves often hit a neighborhood for a short period of time (Levine, Wachs, and Shirazi 1986). Hotspot analysis of crime incidents, when overlaid with other socio-economic data, reveals geographical complexities of people, place and utilization of place and the asymmetry of convergence of a given phenomenon.

Figures 12, and 13 highlight the spatial concentration of gun and drug related crimes in the Midtown, Southwest and Southeast St. Petersburg neighborhoods. Southeast St. Petersburg (as well as Lakewood Estates, directly south of Lake Maggiore) does not appear as a high crime area. The concentration of drug activity and crimes involving guns in Midtown and Southwest St. Petersburg, especially Child’s Park, clearly undermines the walkability of these neighborhoods. Figure 14 illustrates hot spot analysis of crime concentration for the study area.
4. Discussion

Our original interest in identifying potential food deserts in the racially and economically diverse southside of St. Petersburg expanded as we explored the data to include a more complex analysis of access to food for the city’s most vulnerable populations. Concentrations of racial minority and lower income populations south of Central Avenue create neighborhoods in which political and social unrest are likely. In the mid-1990s, grassroots organizing among the predominantly African-American population of Midtown led to a concerted effort by city officials to address the lack of services in the neighborhood. In this process, a clearly defined food desert was ameliorated through the siting of a Sweet Bay supermarket. Other services such as a Post Office, medical clinics and shops were lured to the area through tax breaks and the efforts of the mayor and other city officials. The grassroots campaign that precipitated these efforts was energized after the police shooting death of young Tyron Lewis in 1996. The relationship between the city’s police force and the relatively impoverished African-American southside has been volatile over the years, and remains so today. We return to a discussion of Midtown below.

Recent attention has turned to the neighborhood directly to the west of Midtown. Dominated by Child’s Park, the area we have named Southwest St. Petersburg includes five sub-neighborhoods, and shares many characteristics with Midtown. The Southwest St. Petersburg area is also predominantly African-American and has a higher than average poverty and unemployment rate. The region has a surplus of vacant properties and a higher than average concentration of crime. Into this volatile mix, we can also add the lack of a major supermarket within walking range of the majority of residents. While small food stores provide little access to fresh foods, are overpriced, and emphasize pre-packaged, high fat foods, even these are not readily available to the residents of much of Southwest St. Petersburg. While the location of the Sweet Bay market in Midtown was of benefit to the area, it is not sufficient to meet the needs of much of the population in these vulnerable neighborhoods, particularly those spatial areas to the west and east of Sweet Bay’s walkability buffer. Child’s Park is a neighborhood of particular concern.

Southeast St. Petersburg, while sharing many characteristics of economic and social vulnerability with the other two study areas, has a centrally located supermarket (Save-a-lot) which serves most of the area residents. There are some blocks to the north and south of Save-a-lot’s walkability buffer that cannot be easily reached without a car. This neighborhood, however, shows lower rates of crime, and lower rates of dependence on public transportation and foot travel. Hence, we view Southeast St. Petersburg as an area to watch, but would not classify it as a food desert. Table 4 illustrates the overall assessment of the three areas.
Table 4: Neighborhood Analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>Midtown</th>
<th>Southwest St. Pete</th>
<th>Southeast St. Pete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Predominantly Minority</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Low Median Income</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>High Poverty Rate</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>High Unemployment</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>High percentage on Food Stamps</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>High percentage of Vacant Property</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>High Percent without Car</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>High Percent Use Public Transport</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>High Percent Walk to Work</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Hot Spot for Gun Crime</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Hot Spot for Drug Crime</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Significant Areas outside Supermarket Buffer</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

NOTES:
*High = above County Average
*Low = below County Average

Source: Authors

Nutritious food is an important element in maintaining good health. Poor and minority populations are particularly vulnerable to heart disease, vascular disease, and diabetes. Addressing the lack of walkability due to friction of distance, fear from crime and vacant properties, lack of automobiles and poor bike infrastructure will be an important step in increasing the health of the residents of Southwest St. Petersburg. Lack of economic opportunity underscores the problem of food deserts. Neighborhoods with populations with above average median incomes and little problem with poverty are not impacted by distance from food outlets with fresh fruits and vegetables and a variety of reasonably priced options for nutritious consumption. While the economic and social impacts of the recent recession have national reach, the impacts are also concentrated in particular places, shaped by long histories of social isolation, segregation and the history of racial discrimination. The neighborhoods identified in this study illustrate clearly that the legacy of deprivation persists in south St. Petersburg, and the efforts of the city’s administration to ameliorate the lack of service in Midtown, while helpful, does not go far enough to bring access to good food and a higher quality of life to the residents of Midtown, Southwest St. Petersburg, and Bayou Highlands.

Despite the city’s efforts to bring economic development to Midtown from the mid-1990s to the mid 2000s, the neighborhood remains a troubled space. Gas prices are consistently higher in Midtown than other areas of the city (Sharockman et. al., 2006); social statistics continue to mark the neighborhood as one of poverty, dislocation, and struggle. While median home prices quadrupled in the area during the economic boom of the late 1990s, residents of Midtown were
unable to keep up with the rising costs of living. During the last decade, Midtown lost over 5,000 residents (Sharockman, et al. 2006). In early 2013, the Sweetbay grocery store that was so lauded as a solution to the food vulnerability of Midtown, closed. Today it stands empty and boarded up. A sister store just two miles south, on 62nd Avenue South, also shut down and remains empty. The reaction of the residents of Midtown to the closing of the supermarket was one of anger and shock. “Older people, these young girls that don’t have cars, walking to the store with baby carriages,...where are they going to go? That’s a big hole in the south side of St. Petersburg. When you move something like that, all of us are going to have to pay for it.” (Harwell and Stanley, 2013). With the closing of the Sweetbay, the nearest large grocery store is Wal-Mart, a two mile walk.

The loss of the Sweetbay store from Midtown raises important questions for scholars interested in solutions to the problem of food deserts. Despite the tax incentives and infrastructure provided by the City of St. Petersburg and its non-profit partners to lure Sweetbay to Tangerine Plaza, the corporation had no allegiance to the community. Sweetbay’s corporate headquarters calls the store “underperforming.” In fact, 33 Sweetbay stores across Florida are marked for closure this year. This turn of events hints that both public officials and scholars have been approaching food deserts from the wrong perspective: we have been viewing the lack of nutritious, fresh food as the problem. When Sweetbay supplied such food, not enough shoppers could afford to buy the higher priced items to meet the store’s profit targets. If local residents do not have money to purchase fresh food, nor the time to cook meals from scratch, they will continue to buy cheaper, prepackaged and less healthy foods. The problem may well be one of demand, rather than supply. It would be instructive to investigate the shopping habits of residents of a food desert like Midtown or Child’s Park. Nowhere in the literature can we find an exploration of the actual experience of residents living in a food desert.

While scholars have approached food deserts as local problems, the fact is that food deserts are a symptom of problems that persist at the societal, not the local, scale. The causes of ill-health are multivariate but fundamentally arise from a foundation of urban decay, poverty, unemployment, underemployment, racial segregation and the social and spatial isolation of the poor. Without economic growth that can offer a living wage, and an educational system that offers real opportunity for the poor, the private sector cannot be relied upon to solve the problem of food deserts. There is no long term incentive for investment by large corporate food stores such as Publix and Sweetbay as long as residents of neighborhoods such as Child’s Park and Midtown cannot afford to buy high quality food. We will continue to see the kind of disinvestment from poor neighborhoods that is now occurring in St. Petersburg, despite the efforts of government officials and non-profit organizations to work with the private sector. The private sector cannot meet a community’s social needs if that community cannot pay for them. This is a truism that comes back to haunt us as we note that the spaces characterized as food deserts are multiplying, rather than diminishing.

Acknowledgements:

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