

Identification and Geospatial Analysis of Food Deserts in St. Catharines, ON

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Agenda

- Food Deserts and Structural Insecurity
- Methodology
- Research Findings
- Discussion
- Limitations and Future Research

Food Deserts and Structural Insecurity

Definition, impacts, and complications

What is a “Food Desert”?

Definition

“neighbourhoods with limited access to food” (Behjat, Koc, & Ostry, 2013, p. 90), due to a confluence of myriad socioeconomic factors—cost of living, household income, zoning restrictions, racial/ethnic bias, and many others (Wagner, et al., 2019; MacNell, Elliott, Hardison-Moody, & Bowen, 2017; Short, Guthman, & Raskin, 2007; Larson, et al., 2013)

Access barriers

These areas typically have few grocery stores, supermarkets, or farmers’ markets, and the challenge is often compounded by limited transportation options and longer travel times to the nearest healthy food retailer

Common characteristics

Food deserts are more prevalent in low-income neighborhoods and rural or underserved urban regions, where there are fewer retail options overall and more convenience stores offering mostly processed, lower-nutritional-value foods at higher prices (MacNell, Elliott, Hardison-Moody, & Bowen, 2017)

Health Effects & Social Implications

Adverse health outcomes

Food deserts correlate with higher obesity, diabetes, cardiovascular disease, nutrient deficiencies, and worsening of preexisting mental health conditions (Compton & Ku, 2023; Deal, 2024; Lewis, et al., 2011; Testa, Jackson, Semenza, & Vaughn, 2021)

Social consequences

Limited access increases food insecurity, deepens inequality, and reduces quality of life (Ogway & Vanclay, 2021; Smith & Thompson, 2023)

Dietary patterns and long-term costs

Scarce healthy options shift diets toward processed foods, driving disparities and higher health care costs (Deal, 2024)



Complications



Zero-sum focus on Chain Groceries/Supermarkets

Numerous scholars have criticized the lack of local/ethnic retail representation in food desert research (Behjat, Koc, & Ostry, 2013; Bitler & Haider, 2011)



Higher Quality Product in Small Retailers*

Many have been shown to offer a higher quality of product—especially produce (Bitler & Haider, 2011)



Structural Insufficiency of Ethnic Retailers

Tendency to explicitly “[privilege] the specific needs of target ethnic populations” (Short, Guthman, & Raskin, 2007, p. 360) at the expense of broader populace



Progressive Diet Culture

Significant push towards nutritional education based around low-income diets, with particular focus on fast food, pre-cooked meals, and non-perishables (see figures like Liam Layton aka @the_plant_slant)

Methodology

Digital Cartography



QGIS

Open-source digital mapping/geospatial analysis software



Data Sources

- ArcGIS Hub
- Niagara Open Data
- Manual Collection (point data)



Point Data Consideration

More comprehensive selection of food retailers: chain groceries/supermarkets, restaurants, variety stores, independent grocers/delis/ethnic markets, farmers markets, foodbanks



Geospatial Analysis

Identification of Potential Food Deserts

- Census data used to establish median household income (Statistics Canada, 2021)
- Comparison to updated Vulnerability to Food Insecurity Index of \$70,000/year (St-Germain, Li, & Tarasuk, 2025)

Visual Analysis

- Variety of available food retailers
- Concentration of available food retailers

Relevant Census Data

2021 Census of Population – St. Catharines (Statistics Canada, 2021)

Population: 136,803

Land Area (square kilometres): 96.20

Population Density (per square kilometre): 1,422.1

2020 Median Household Income (individuals 15+): \$38,000

2020 Median Household Income - Full-time (individuals 15+): \$58,800

2020 Median Household Income - Part-time (individuals 15+): \$15,700

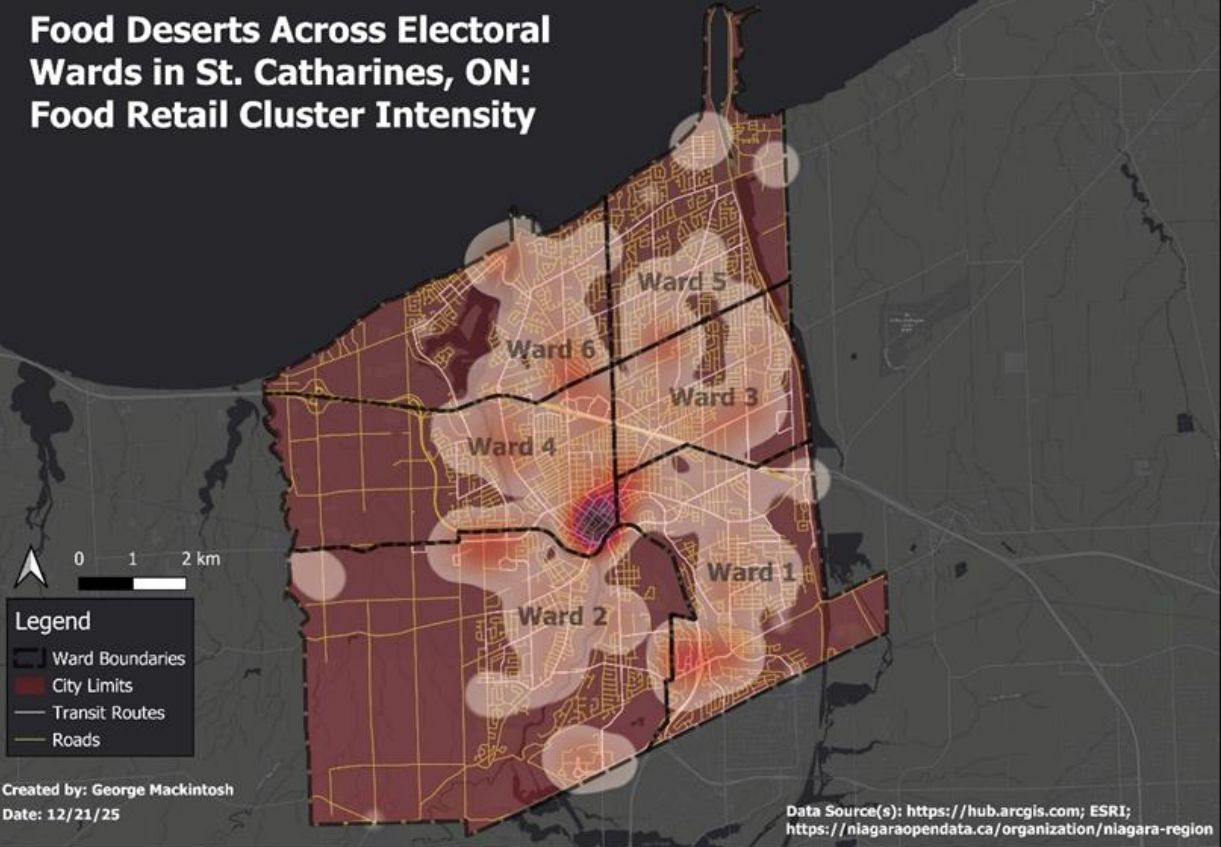
2020 Median Household Income - Dual-income: \$77,000

2020 Median Household Income - Dual-income (after tax): \$69,500

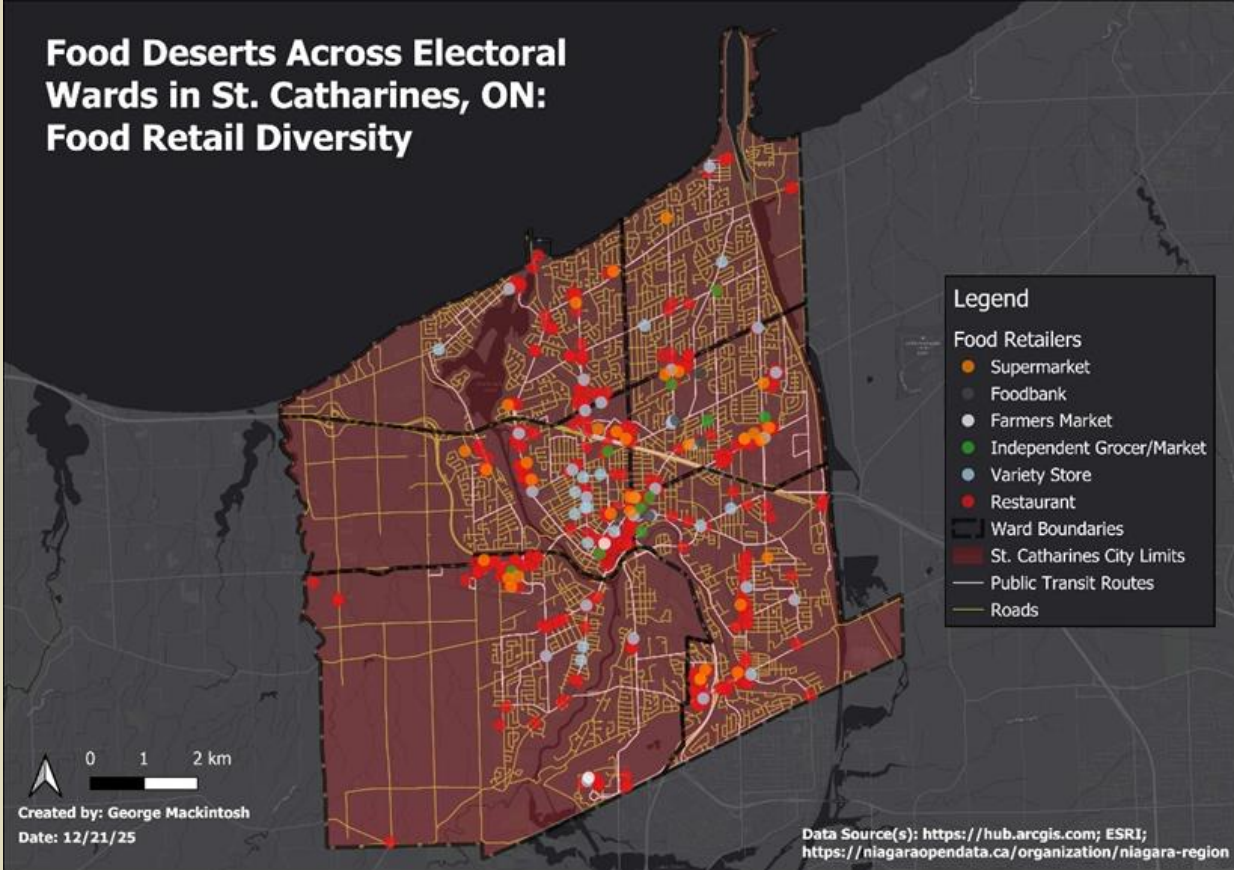
Research Findings

Digital Maps

**Food Deserts Across Electoral Wards in St. Catharines, ON:
Food Retail Cluster Intensity**



**Food Deserts Across Electoral Wards in St. Catharines, ON:
Food Retail Diversity**



Total # of Food Vendors: 514

Discussion

Discussion



Potential to Mask Presence

Including such a wide variety of food retailers in the data had the potential to mask the existence of food deserts, despite scholarly precedent



Clear Evidence of Food Deserts

Various sizes and severity identified throughout the city, with Grantham (Ward 5) a particularly stark example



Economic Insecurity Worsens Impact

Dual-income households (after taxes) fail to meet \$70,000 median household income threshold for food insecurity—single-earner households significantly below cutoff



Chain Grocers/Supermarkets Still Dominant Source of Food

Grocery stores/supermarkets remain primary supplier of food for urban residents, should still be weighted accordingly—desertification significantly worse without presence of supplemental sources

Limitations & Future Research

Limitations



Time Constraint

Necessitated streamlining, use of/reliance on pre-existing data sets, generalization of analysis



Data Accuracy

Possibility of data being incomplete and/or inaccurate



Census Timeline

Reliance on 2021 census data = outdated demographic and income data, may not reflect current economic/ social climate in St. Catharines



Community Gardens

Enhance community gardens to increase local access to fresh foods and foster community engagement.

Future Research

01

Updated Data Sets

Use of chronologically updated data to improve accuracy

02

Extended Research Timeline

Facilitate more nuanced geospatial analysis

03

Ward-Specific Data

Car ownership, public transit use, employment status, average number of residents per household, consumption habits/restrictions, health comorbidities, etc.

Thank You

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