Mapping Food Environments in Lansing, Michigan

(*Speakers: Kirk Goldsberry, PhD, MSU and Erica Waltz, MSU student, Summer intern with MDCH Chronic Disease Epidemiology Section*

Wednesday, September 9, 2009
2:00 – 3:30 p.m.
Washington Square Building
109 W. Michigan Ave.
Room 205

Meeting Objectives:

- Participants will review approaches and findings from two comprehensive survey and mapping exercises completed in Lansing, Michigan's local food environments.
- Participants will review methods, variables, and statistics applied during the Food Desert Project.
- Participants will understand the tie between Dr. Goldsberry and Erica Waltz's research including mapping and validity.
- Participants will review conclusions and "next steps" related to the Food Desert Project.

Time	Description	Speaker/ Facilitator
2:00 – 2:05 pm	Welcome and Introductions	Pamela Bacon, Public Health Consultant
2:05 – 2:30 p.m.	Geographic Information Systems enable us to visualize and reveal inequities within food environments. The combination of intensive data collection, geographic base data, and accessibility modeling reveals environmental disparities at fine-scales. This presentation summarizes a pilot investigation of Lansing's food environment conducted at Michigan State University.	Kirk Goldsberry, Assistant Professor MSU Geography Department
2:30 – 3:00 pm	This presentation will review the purpose, methodology, and results of a mini Food Desert Project which was conducted in the Lansing area this summer. Discussions will include tables, graphs and maps of the "healthy" food and "fast food" in Lansing, as well as future steps for expanding this project across Michigan.	Erica Waltz, MSU student, summer intern with MDCH Chronic Disease Epidemiology section
3:00 – 3:20 pm	Questions and Answers	Kirk Goldsberry, Assistant Professor MSU Geography Department Erica Waltz, MSU student, MDCH summer intern
3:20 – 3:30 pm.	Conclusion and Next Steps	Pamela Bacon, Public Health Consultant

Michigan Department of Community Health, Division of Chronic Disease and Injury Control, Cardiovascular Health, Nutrition and Physical Activity Section

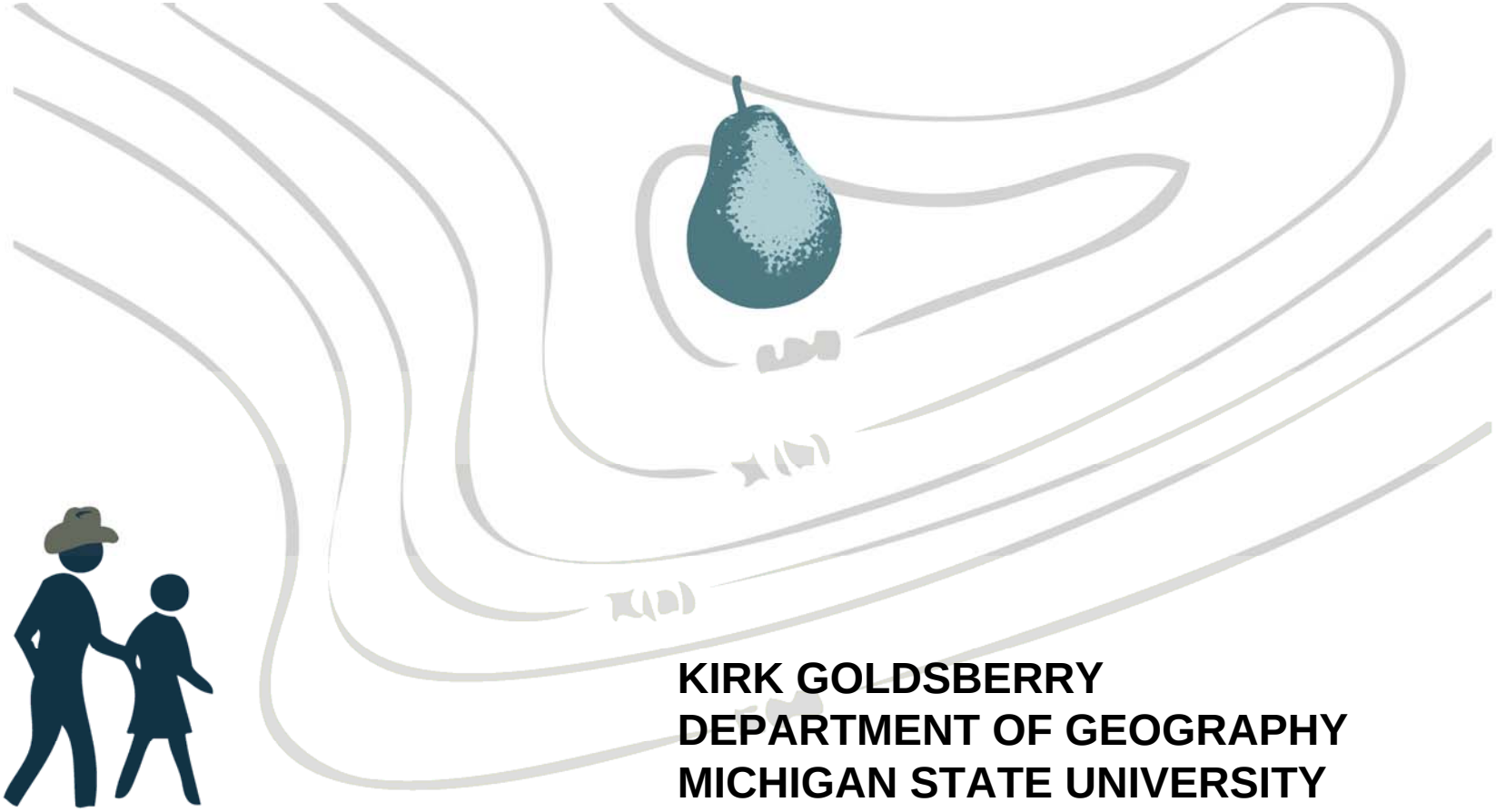
PRESENTATION WEBSITE AND AUDIO ACCESS INFORMATION

Website Access: log in to http://breeze.mdch.train.org/cvh
Audio Access: call 1-877-873-8017, enter access code 1086365

Pre-registration is required for this session. Please contact Karen Swiatkowski by email at Swiatkowskik2@michigan.gov or call (517) 335-9595 **no later than Wednesday, September 2, 2009.** If you have any questions, please contact Pam Bacon at (517) 373-3021.

NUTRITIONAL TERRAIN MAPPING:

ANALYZING PRODUCE AVAILABILITY AND ACCESSIBILITY IN LANSING, MICHIGAN



KIRK GOLDSBERRY
DEPARTMENT OF GEOGRAPHY
MICHIGAN STATE UNIVERSITY

WHAT'S THE PROBLEM?

- Urban food environments are a public health issue
- Some people have insufficient access to healthy food
- These people are vulnerable to certain health outcomes

WHAT'S THE SOLUTION?

- More precise sampling strategies
- Advanced GIS modeling
- Characterization of nutritional terrain

CONTEXT

This research merges themes from:

- GIScience
- Accessibility research
- Public Health
- Urban Geography
- Visualization

GOALS AND OBJECTIVES

- Long-term goal: Establish methods that effectively characterize “nutritional terrain”
  - Enable health officials to identify at-risk zones
  - Test unproven hypotheses linking “food deserts” to diet-related health outcomes

RESEARCH QUESTIONS

1. How can we employ GIScience to more thoroughly, and more precisely characterize urban nutritional terrain?
2. How can we determine the availability of retail produce items in urban settings?
3. How can we determine who has access to retail produce in urban settings?

BACKGROUND

- Recent research links healthy-food-access and public health
- Limitations of this research include:
  - Sampling strategies
  - Accessibility estimates

5 RECURRING LIMITATIONS

1. Coarse spatial analysis

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2. Simplified definitions of access

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4. Inadequate retailer identification

5 RECURRING LIMITATIONS

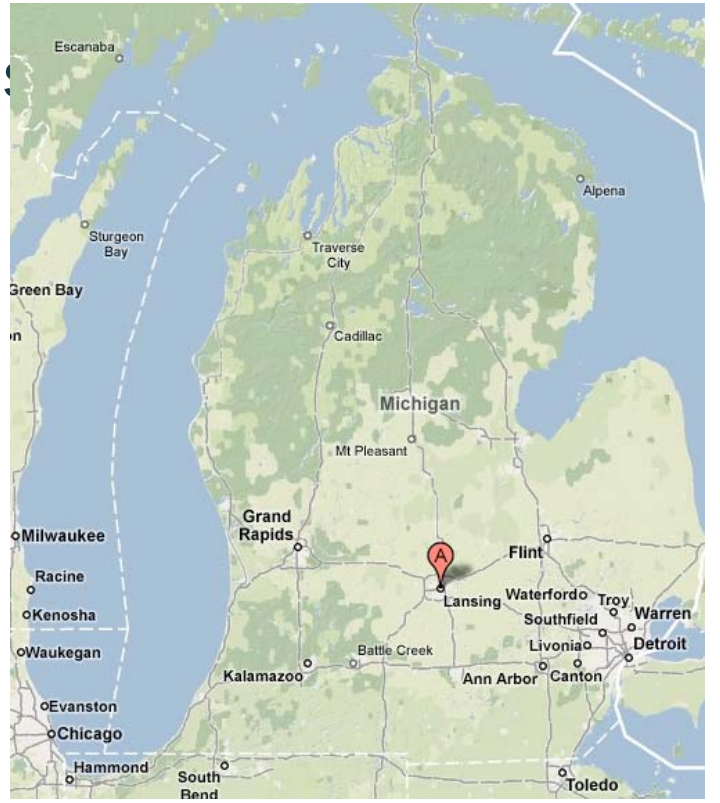
1. Coarse spatial analysis
2. Simplified definitions of access
3. Poor definitions of retail food sources
4. Inadequate retailer identification
5. Imprecise location data

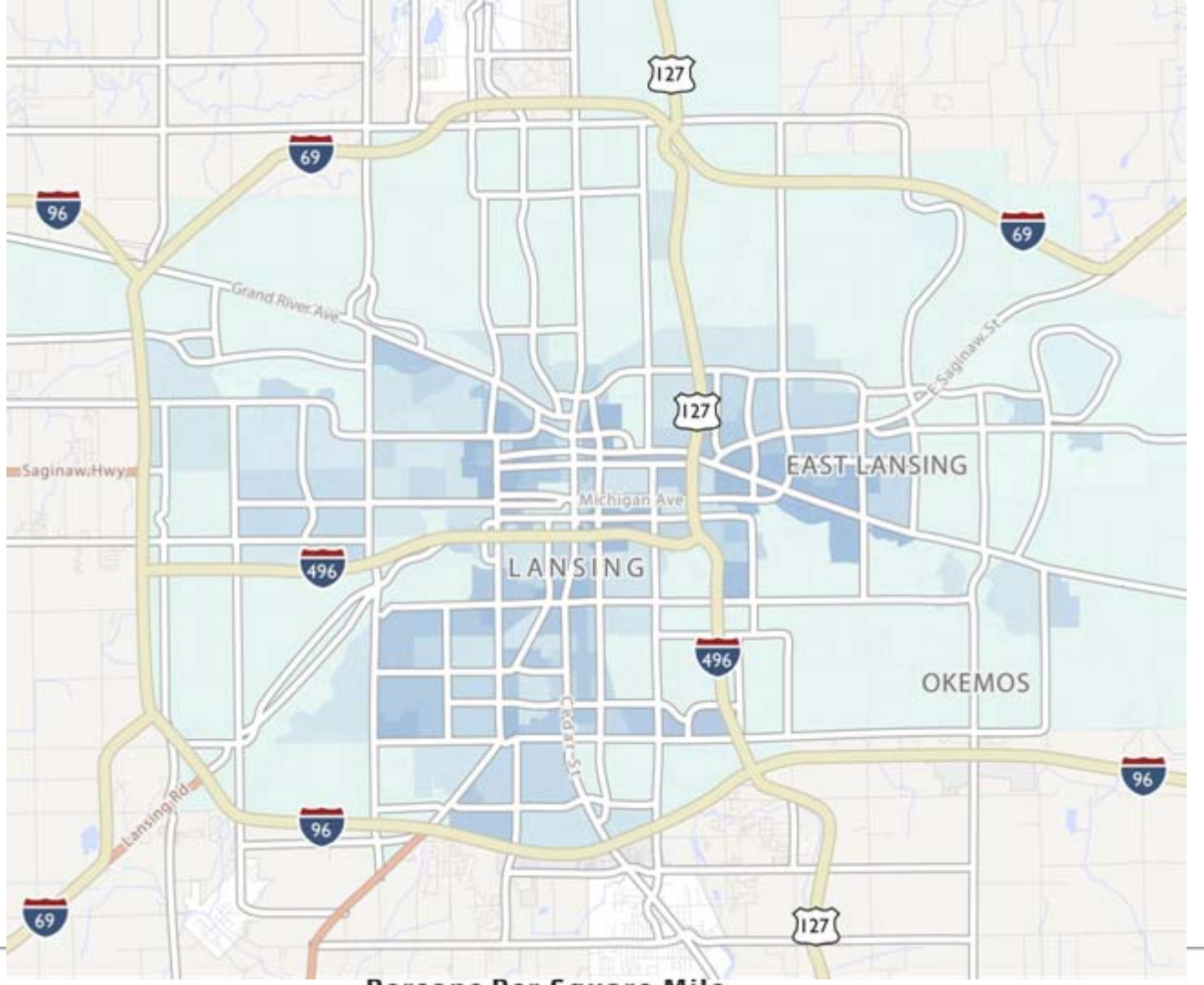
METHODS

- Study Area
- Data
- GIS Analysis

STUDY AREA: LANSING, MI

- Total Area: 152 Square Miles
- Population 2005: 251,056
  - White Population: 187,228
  - Black or African American: 34,184
  - Hispanic or Latino: 16,246
  - Asian: 10,714





Persons Per Square Mile

0 - 1784	1785 - 2913	2914 - 4459	4460 - 6490	6491 - 2242

NUTRITIONAL TERRAIN MAPPING

DATA

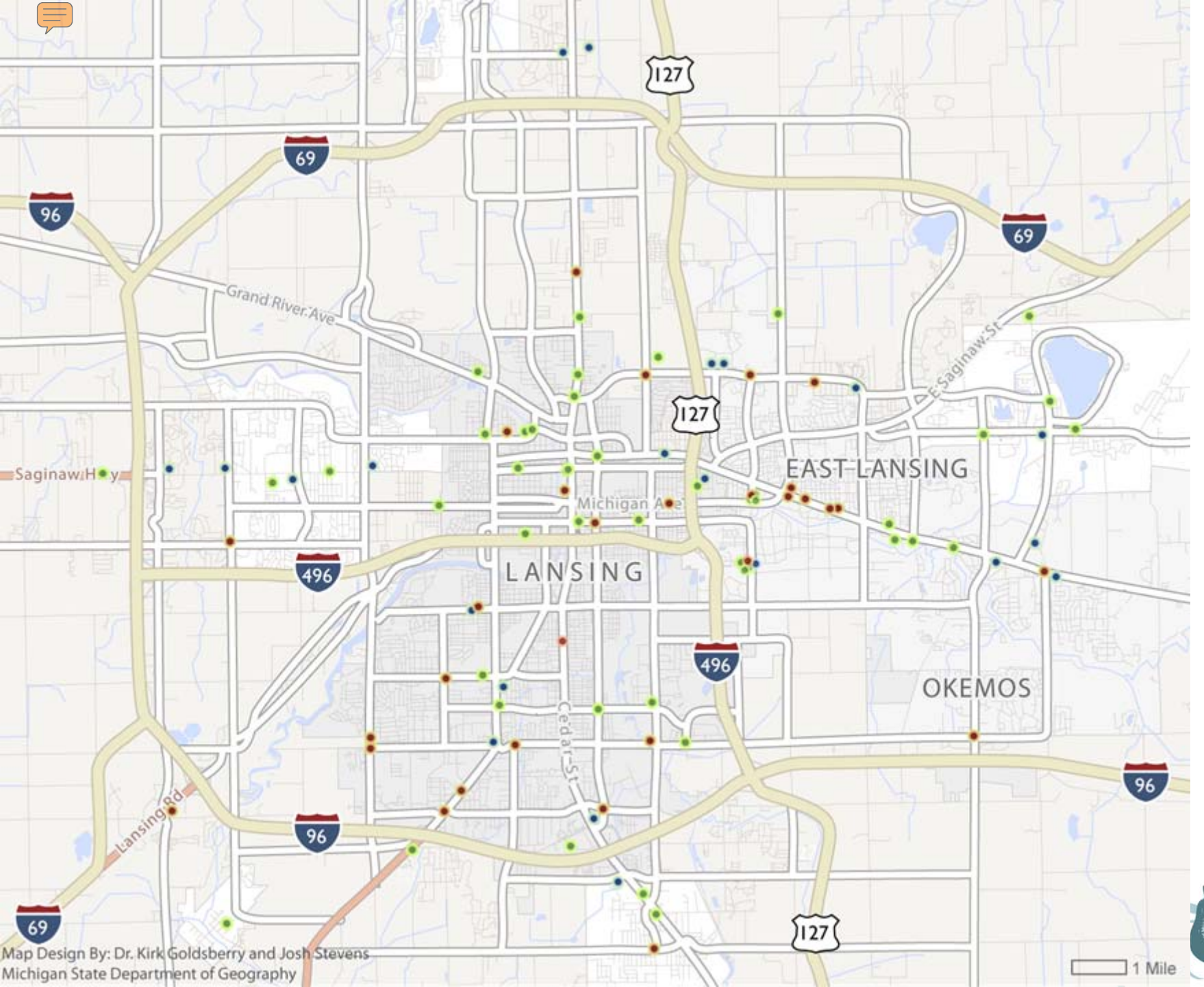
- Previous studies employ “canned” data
  - Determine suitable outlets from afar
  - Often miss important outlets
    - A brand new grocery store (not in database)
  - Often include false positives
    - A closed grocery store (still in database)
    - Falsely coded stores
      - Some gas stations are coded as “grocery stores”
      - Some “grocery stores” are liquor stores

DATA

- Our data goal: determine availability of every retail produce item in the study area
- Means: field sampling (the old-fashioned way)
- A realistic sample of what is available in Lansing
- Output: Retail produce geodatabase
  - (x,y) for every item

DATA STATS

- Our study area includes
  - 94 produce outlets
  - 447 unique produce items


127
69
96
Grand River Ave
E Saginaw St
Saginaw Hwy
EAST LANSING
Michigan Ave
496
LANSING
OKEMOS
Cedar St
Lansing Rd
1 Mile
Map Design By: Dr. Kirk Goldsberry and Josh Stevens
Michigan State Department of Geography

AVAILABILITY RESULTS

- We compiled a thorough geodatabase of produce availability in the study area
- Enables better access measures…

ACCESS?

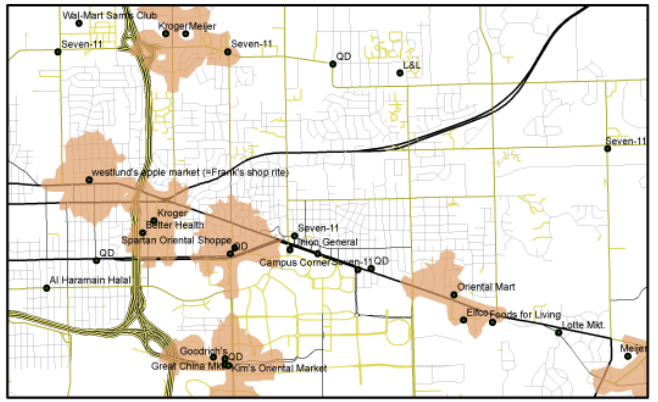
Who has access to what?

1. Model access to individual produce items
   1. Walksheds and drivesheds
2. Overlay individual access surfaces to create a realistic “container” measure of access

Outputs: 447 surfaces for pedestrians, 447 for autos, 2 overlay grids with container measures

PEDESTRIAN ACCESS: 6 INDIVIDUAL PRODUCE ITEMS

BOK CHOY



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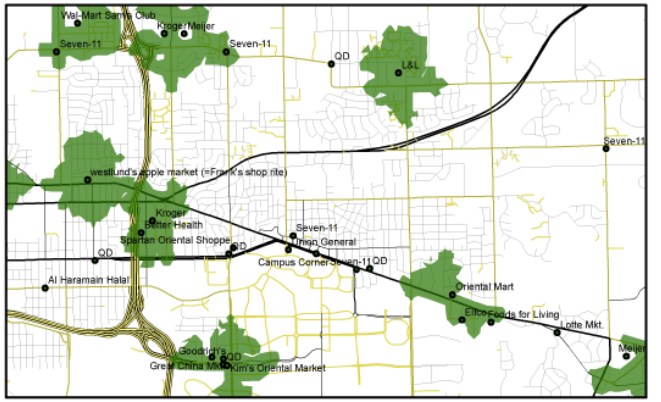
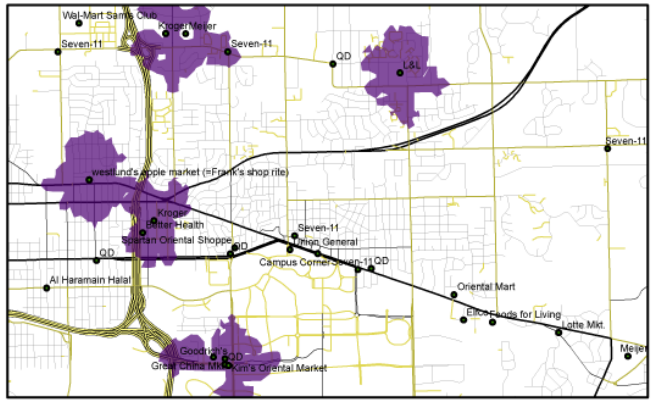
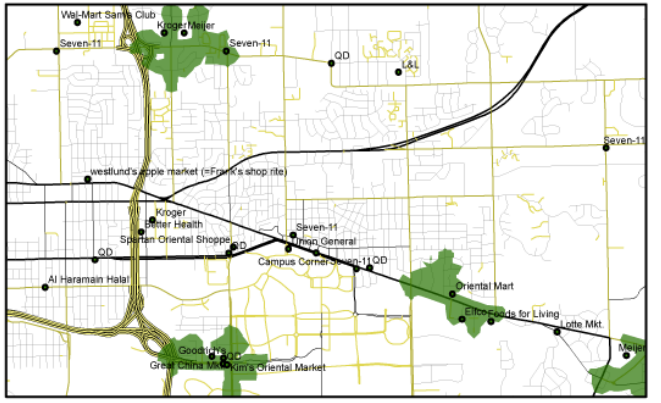


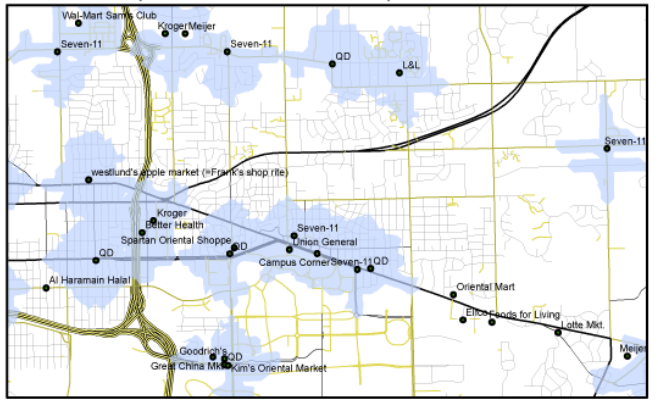
GREEN BEANS



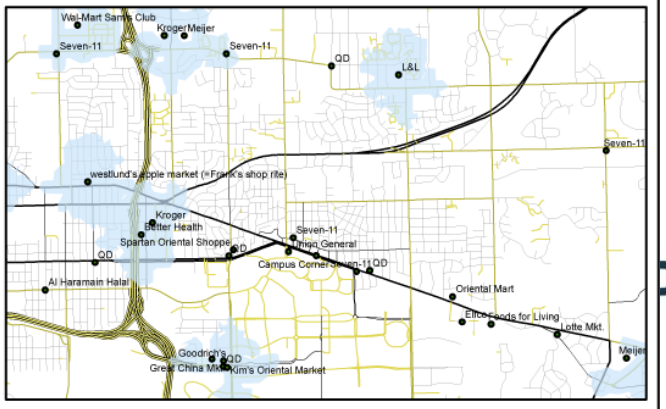
BASIL



BANANA(CONVENTIONAL)



GREEN GRAPES

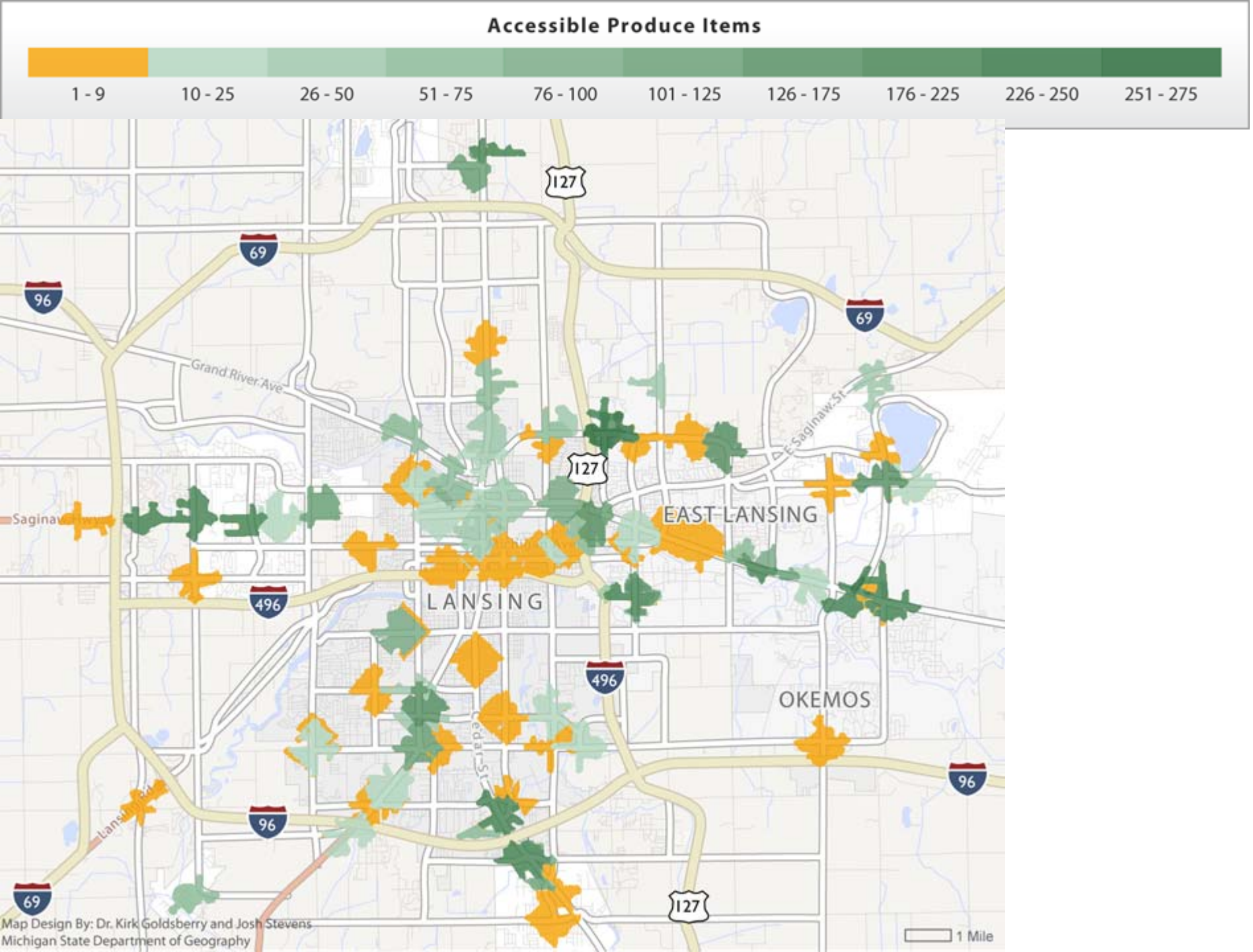


PING

CONCLUSION

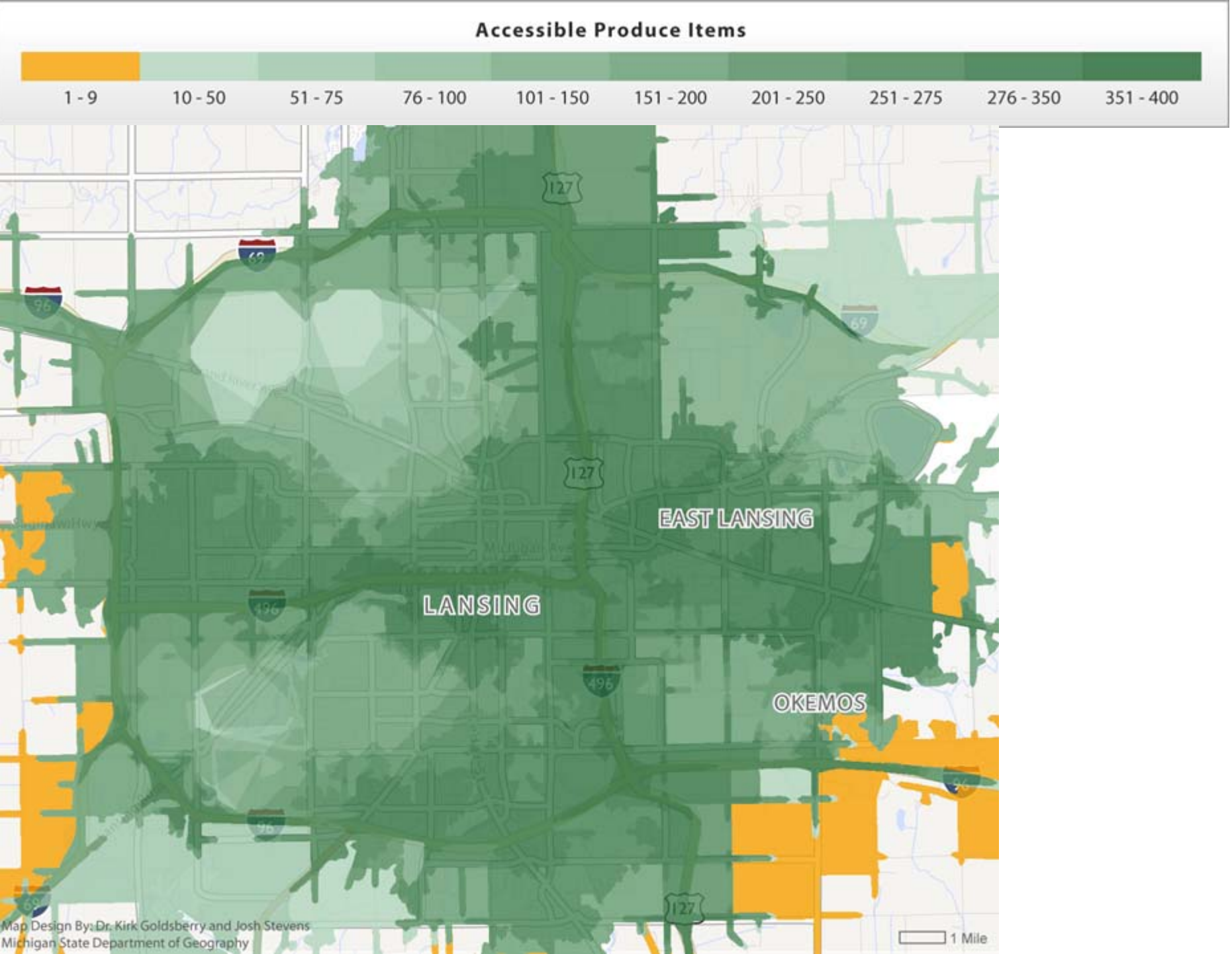
CUMULATIVE PEDESTRIAN PRODUCE ACCESSIBILITY

How many produce items are available within a 10-minute walk?


Accessible Produce Items
1 - 9
10 - 25
26 - 50
51 - 75
76 - 100
101 - 125
126 - 175
176 - 225
226 - 250
251 - 275
127
69
96
Grand River Ave
E Saginaw St
EAST LANSING
LANSING
496
OKEMOS
Cedar St
Map Design By: Dr. Kirk Goldsberry and Josh Stevens
Michigan State Department of Geography
1 Mile

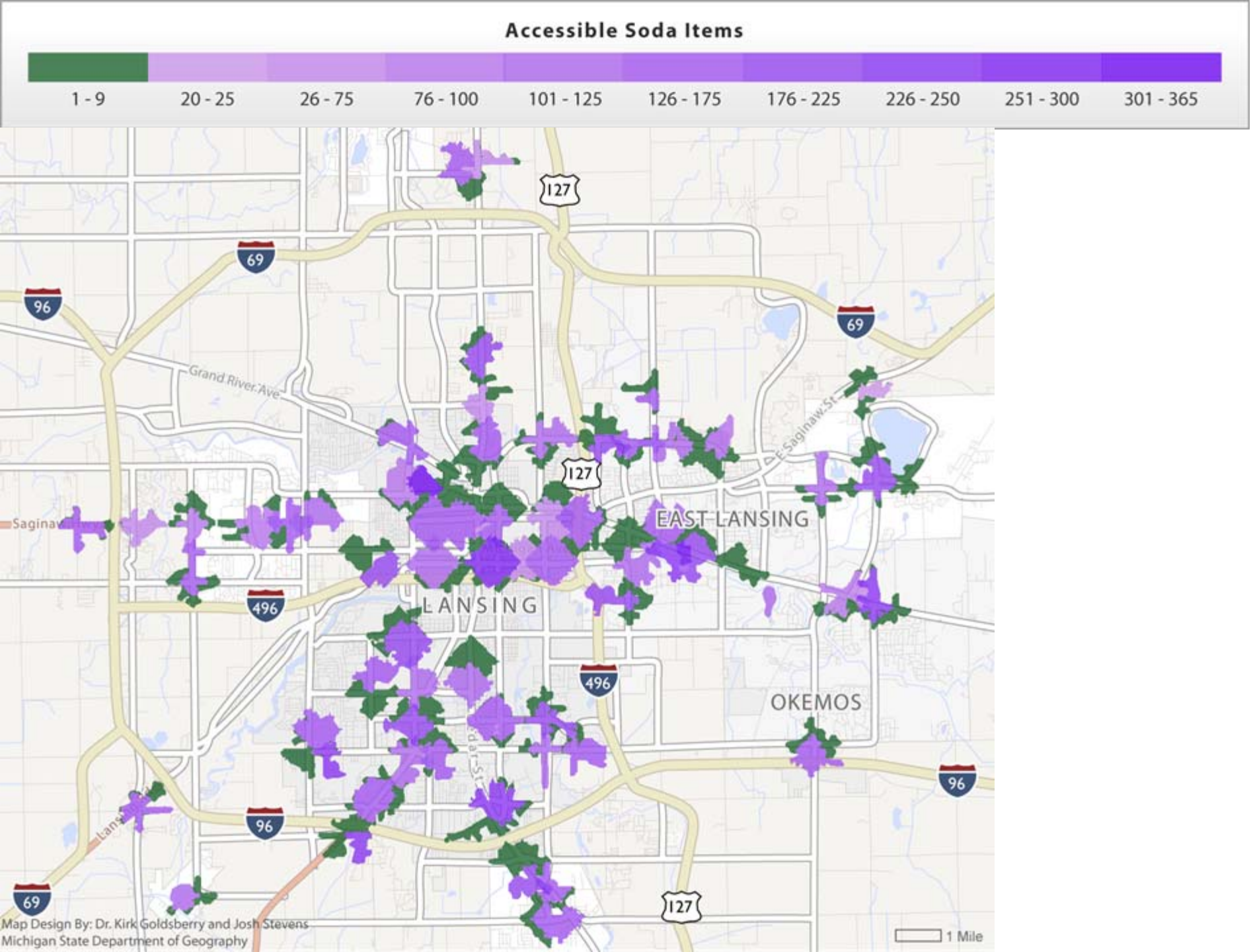
CUMULATIVE AUTOMOBILE PRODUCE ACCESSIBILITY

How many produce items are available within a 10-minute drive?


Accessible Produce Items
1 - 9
10 - 50
51 - 75
76 - 100
101 - 150
151 - 200
201 - 250
251 - 275
276 - 350
351 - 400
EAST LANSING
LANSING
OKEMOS
127
69
96
496
Map Design By: Dr. Kirk Goldsberry and Josh Stevens
Michigan State Department of Geography
1 Mile

CUMULATIVE PEDESTRAIN SOFT DRINK ACCESSIBILITY

How many soft drink items are available within a 10-minute walk?


Accessible Soda Items
1 - 9
20 - 25
26 - 75
76 - 100
101 - 125
126 - 175
176 - 225
226 - 250
251 - 300
301 - 365
127
69
96
Grand River Ave
E Saginaw St
EAST LANSING
LANSING
496
OKEMOS
Map Design By: Dr. Kirk Goldsberry and Josh Stevens
Michigan State Department of Geography
1 Mile

CUMULATIVE AUTOMOBILE PRODUCE ACCESSIBILITY

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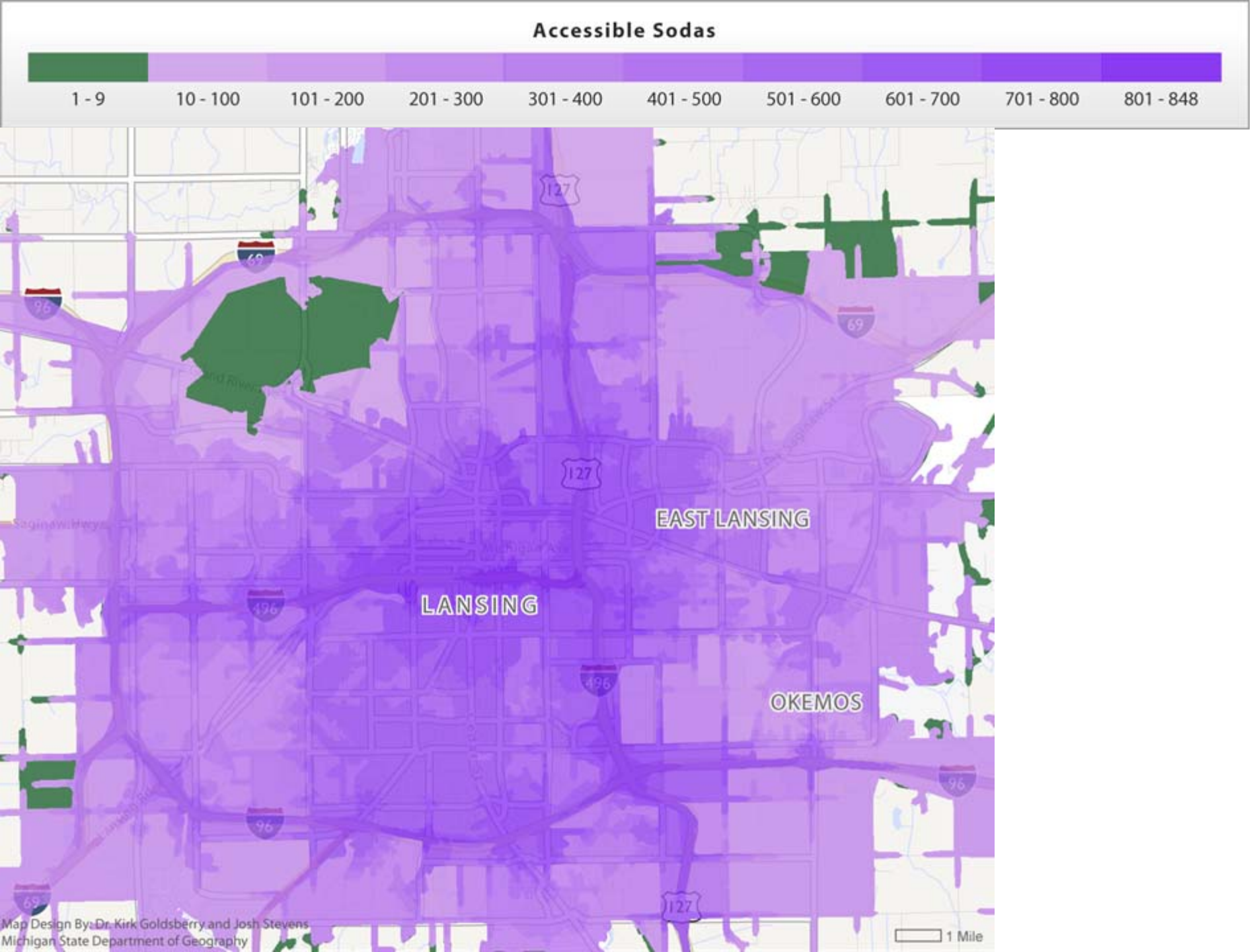
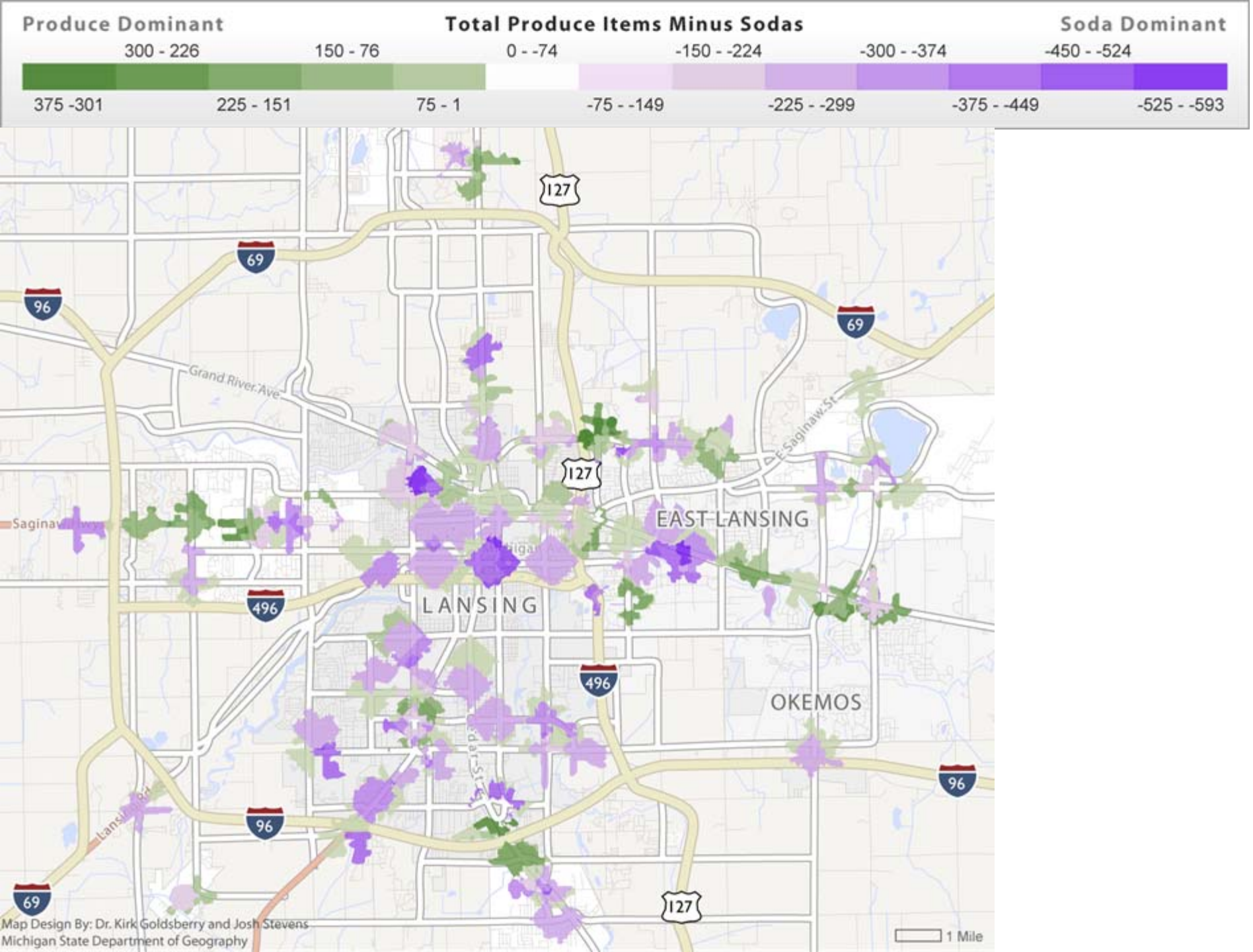

Accessible Sodas
1 - 9
10 - 100
101 - 200
201 - 300
301 - 400
401 - 500
501 - 600
601 - 700
701 - 800
801 - 848
EAST LANSING
LANSING
OKEMOS
Map Design By: Dr. Kirk Goldsberry and Josh Stevens
Michigan State Department of Geography
1 Mile

Produce versus Soft Drinks

- Comparing Apples to Orange Sodas

Number of Produce Items minus Number of Soft drink items

- Positive numbers indicate a “Produce Dominant” food environment
- Negative Numbers indicate a “Soft Drink Dominant” food environment


Produce Dominant
Total Produce Items Minus Sodas
Soda Dominant
300 - 226
150 - 76
0 - -74
-150 - -224
-300 - -374
-450 - -524
375 -301
225 - 151
75 - 1
-75 - -149
-225 - -299
-375 - -449
-525 - -593
127
69
96
496
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E Saginaw St
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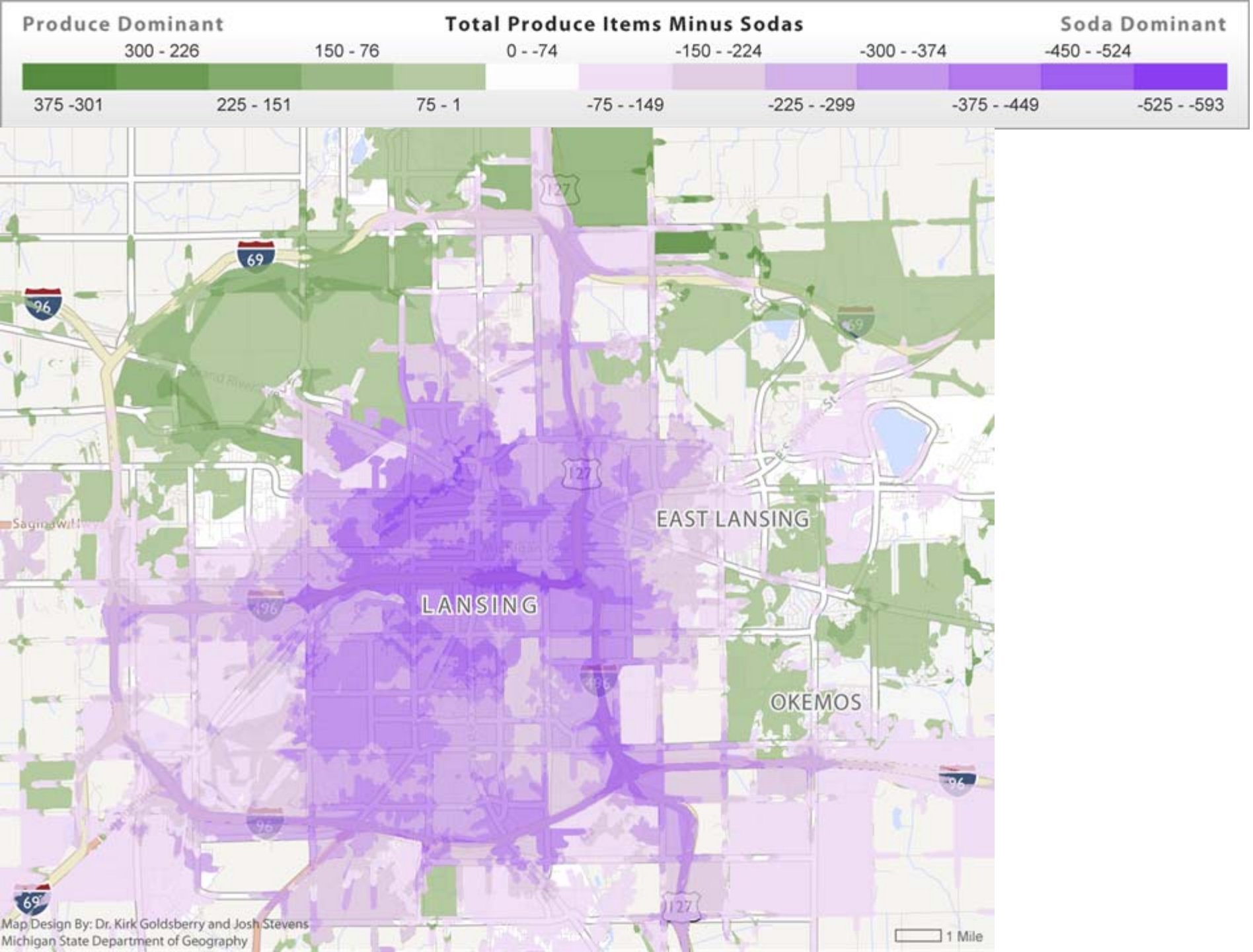
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-375 - -449
-525 - -593
EAST LANSING
LANSING
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1 Mile

GENERAL FINDINGS

- Food environments vary considerably within an urban area
  - Some zones are healthier than others
- GIS is useful for visualizing food environments at the city-scale

LOCAL FINDINGS

- The Lansing Area Food Environment is generally more soft-drink oriented
- Many local residents have no pedestrian access to any fresh produce items
- Student neighborhoods have the lowest access to produce

NEXT STEPS

- What does this mean?
  - Does it matter?
- How can we expand our characterization of the food environment?
  - Restaurants, liquor stores…
- Correlate with Obesity Data

NUTRITIONAL TERRAIN MAPPING:

ANALYZING PRODUCE AVAILABILITY AND ACCESSIBILITY IN LANSING, MICHIGAN

THANK YOU! QUESTIONS?

KIRK GOLDSDBERRY

FOOD DESERTS

In Lansing, MI

Erica Waltz, MDCH

September 9, 2009

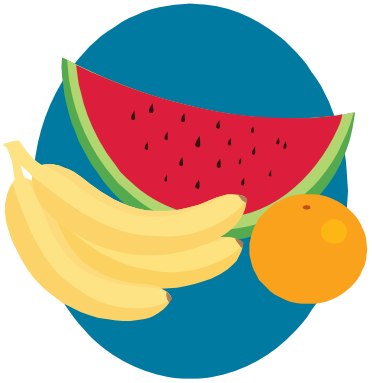
Outline

- What is a food desert?
- Reasons for the project
- Methods for both parts
- Project findings with retail locations
  - Key findings
- Project comparison
- Project findings with restaurant locations
  - Key findings
- Weaknesses/Future Steps
- Closing

What is a “Food Desert?”

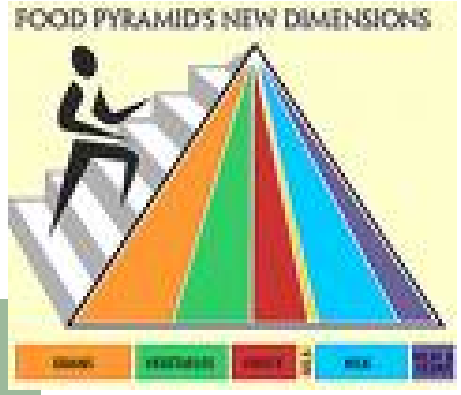
- An area where there is little or no access to healthy foods
- Too many unhealthy food choices nearby

  ex: fast food
- Grocery stores are further away



Why are we doing this?

- Trying to fill a data gap
- To better understand food environments
- Educate MDCH and its partners for future program planning
- Possible template for research in other areas across Michigan



Methods- Data Source

- Used Michigan Department of Agriculture's database for food licensing codes on food establishments such as grocery stores, convenience stores, restaurants etc.
- Gave us establishment name, location, phone number, etc.
- We used 2 codes:
  - Retail Food Establishment (RFE)= party stores, produce markets, grocery stores
  - Food Service Establishment (FSE)= restaurants, coffee shops, drive-in, bar, nightclub

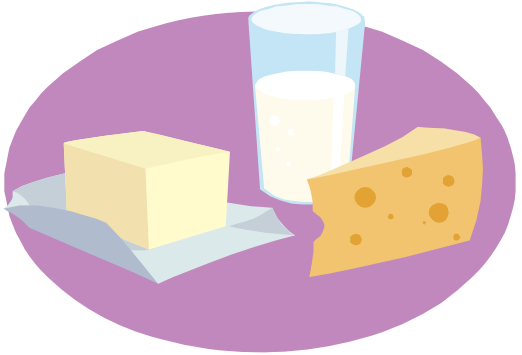
Methods- Data Source

- 1st half: We're going to cover Retail Food Establishments (RFE)
- 2nd half: We're going to cover Food Service Establishments (FSE)

Retail Locations

Methods- Survey/Variables for Retail Establishments

- Does your establishment sell:
  -whole grains?
  -fresh fruit?
  -1+ type of fresh fruit?
  -fresh vegetables?
  -1+ type fresh vegetables?
  -low or non-fat dairy products?
  -lean protein?
  -fried foods?
  -sugar sweetened beverages?
  -non-sugar sweetened beverages? (excluding 100% fruit juices)



Definition of Variables

- A comprehensive list was made of items that constitute as the variables

  ex: “Sugar Sweetened Beverages” consist of

  - Regular soda
  - Diet soda
  - Sweetened tea
  - Sweetened coffee
  - Fruit drinks
  - Sports drinks
- Collaborated with other sections within MDCH to create approved list

Methods- Analyzing Data

- Created grading scale from 0-8
  - Max of 8 variables because we left out the “Fried foods” variable and the “Sugar sweetened beverages” variable
- Breakdown:

  7-8= A (offering the most healthy options)

  5-6= B

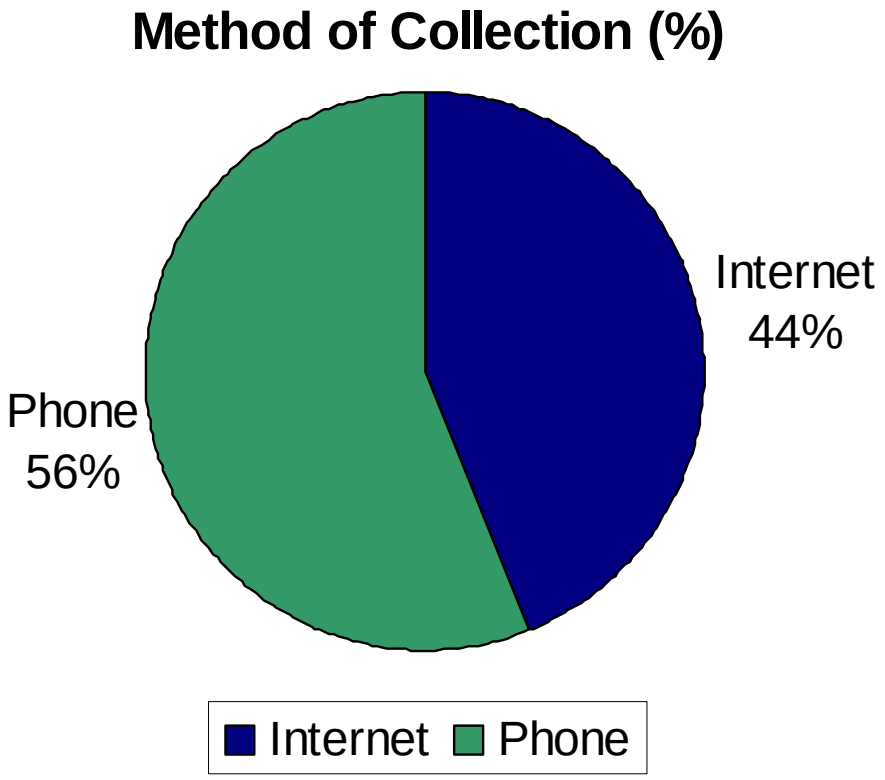
  3-4= C

  1-2= D (offering the least healthy options)

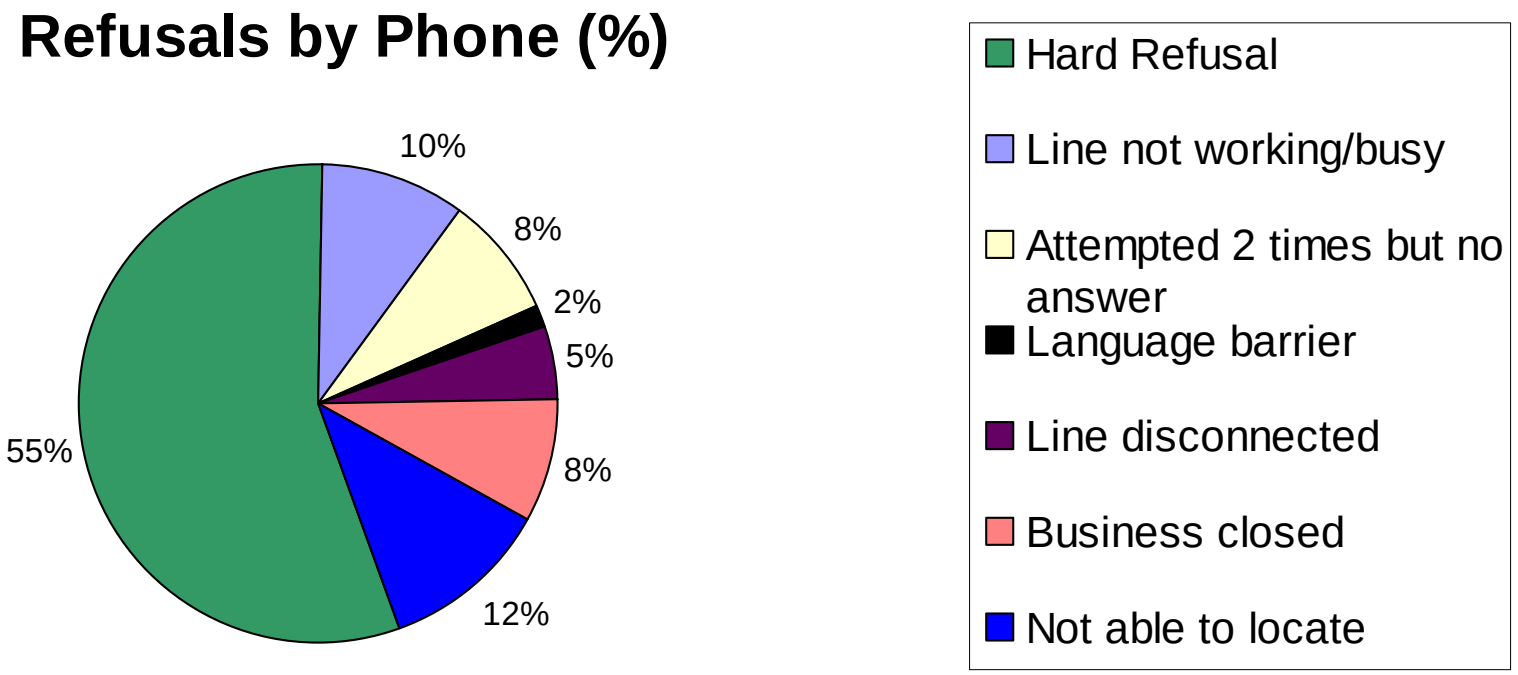
Methods- Data Collection

- Conducted internet searches first
- Phone surveys

Key Findings for Retail



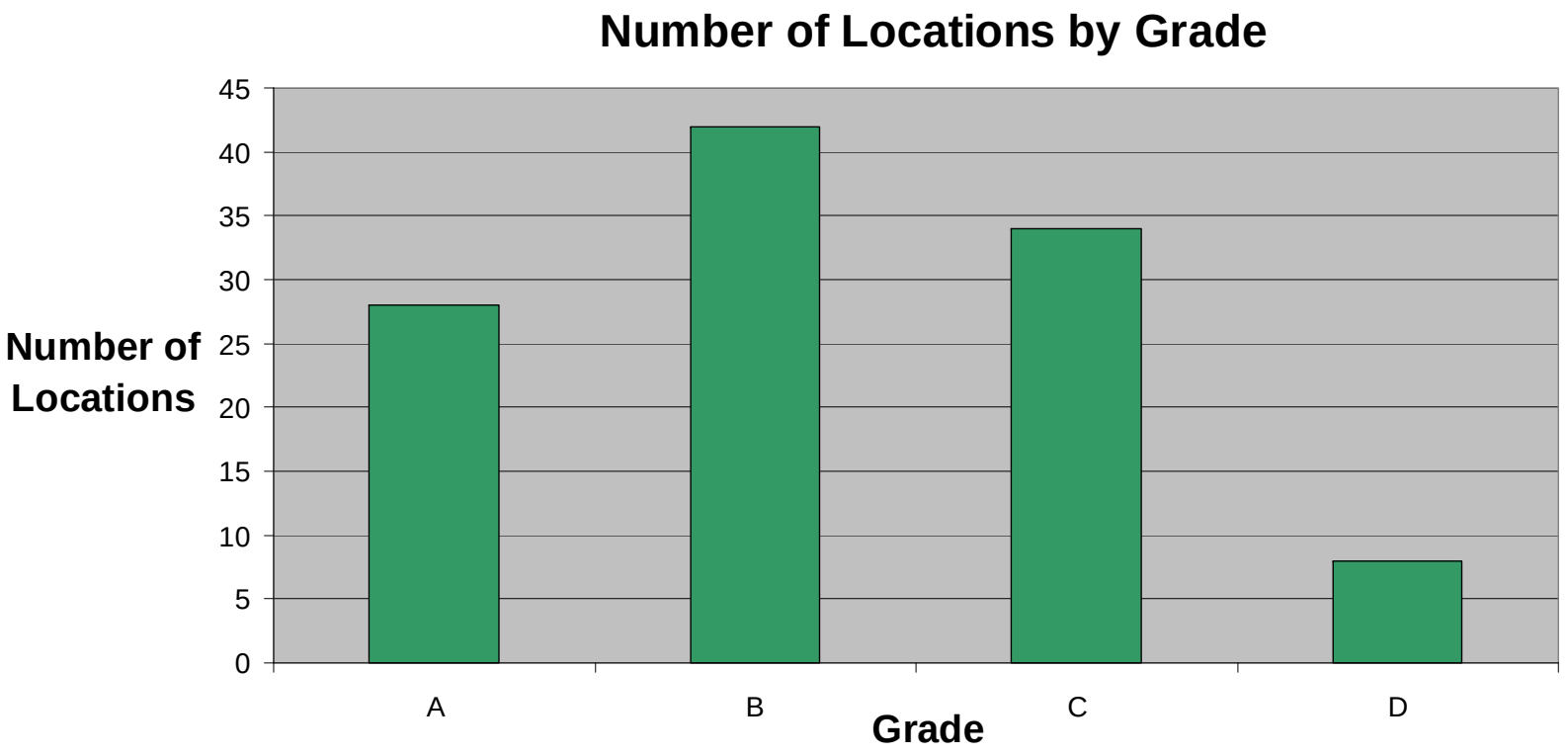
Key Findings for Retail



Key Points for Retail Establishments:

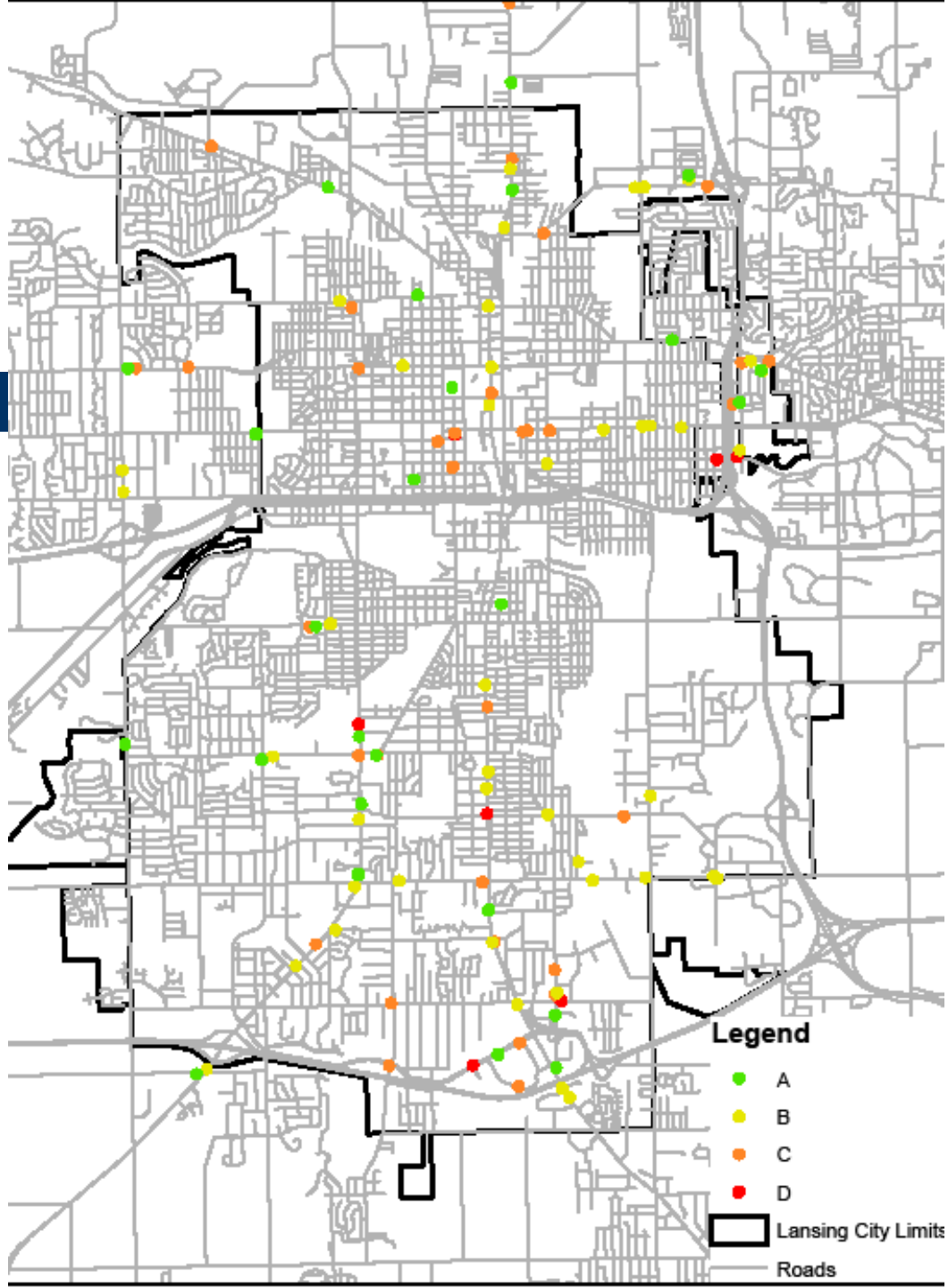
	Yes (%)	No (%)
Whole Grains?	68 (60.7%)	44 (39.3%)
Fresh Fruit?	69 (61.6%)	43 (38.4%)
1+ Type of Fruit?	63 (56.3%)	49 (43.8%)
Fresh Vegetables?	43 (38.4%)	69 (61.6%)
1+ Type of Vegetables?	37 (33.0%)	75 (67.0%)
Low/Non-fat Dairy?	86 (76.8%)	26 (23.2%)
Lean Protein?	103 (92.0%)	9 (8.0%)
Fried Foods?	98 (87.5%)	14 (12.5%)
Sugar-Sweetened Beverages?	101 (90.2%)	11 (9.8%)
Non-sugar sweetened drinks?	105 (93.8%)	7 (6.3%)

Distribution of Grades



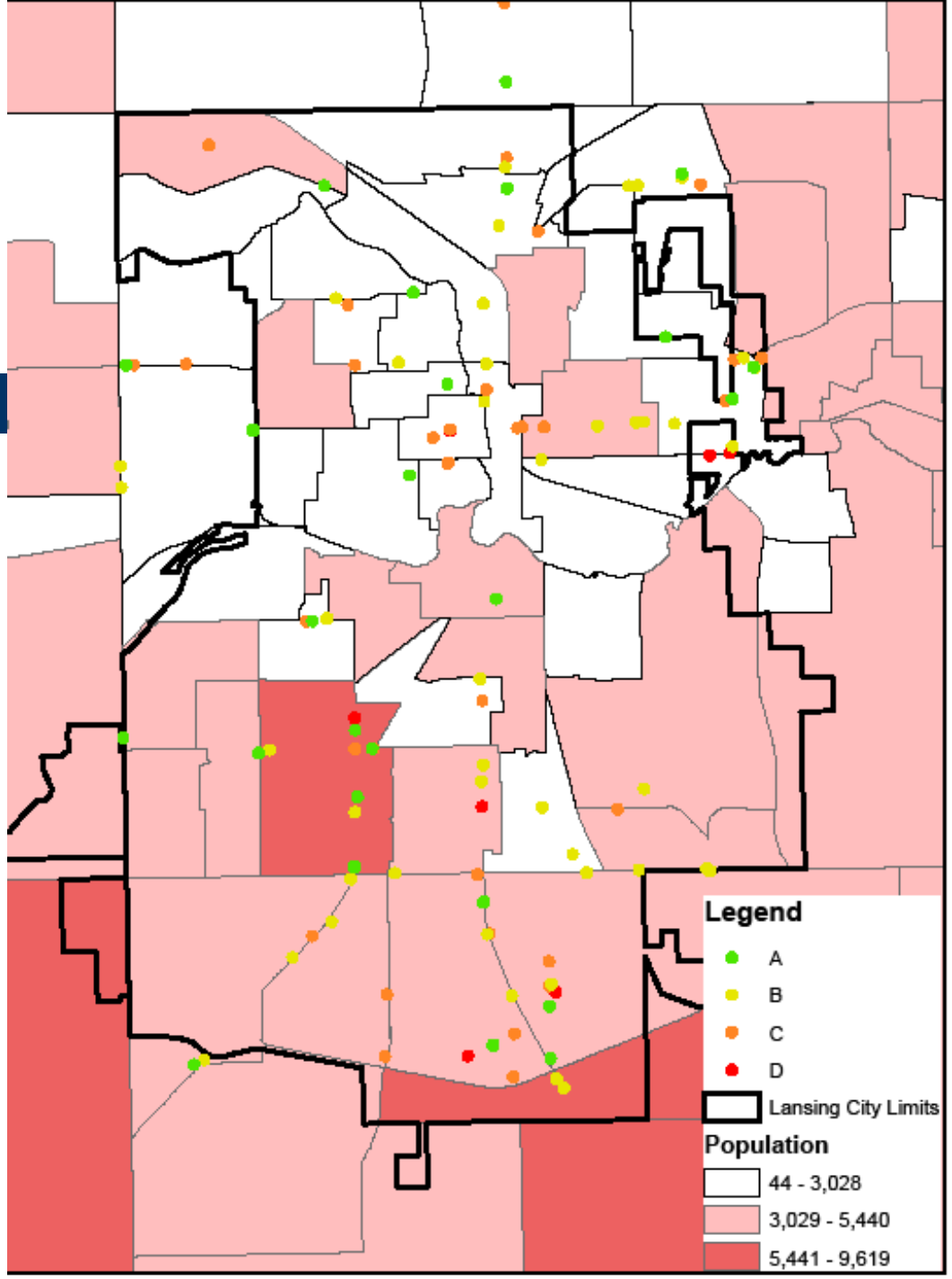
Retail Locations

- The “grades” are color coded so green is good to red is bad
- The locations follow the main roads, MLK, Cedar St, Michigan Ave
- Discrepancies between Lansing city limits and location mailing addresses.



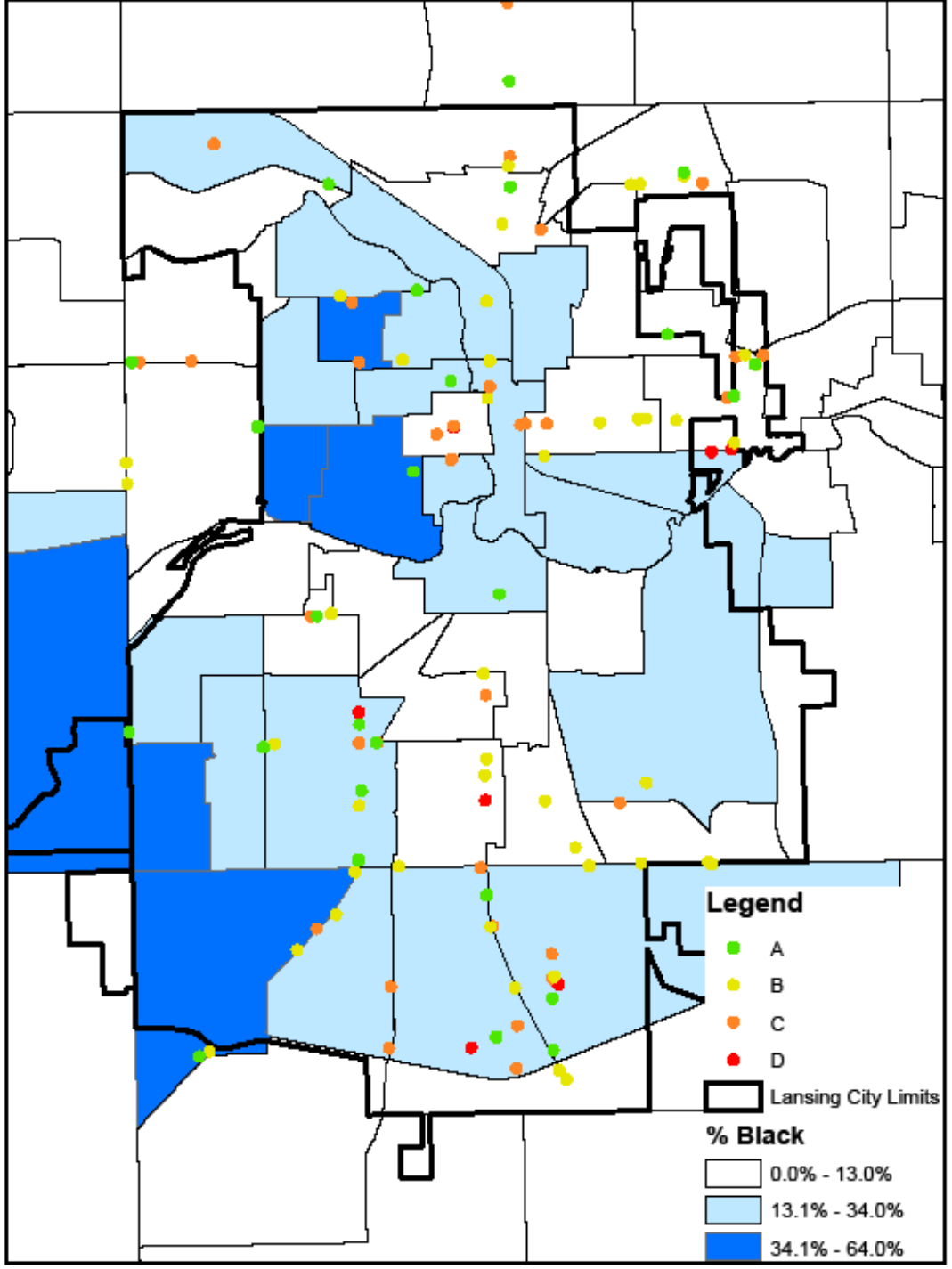
Retail by Population

All locations by population (based on 2000 census tracts)



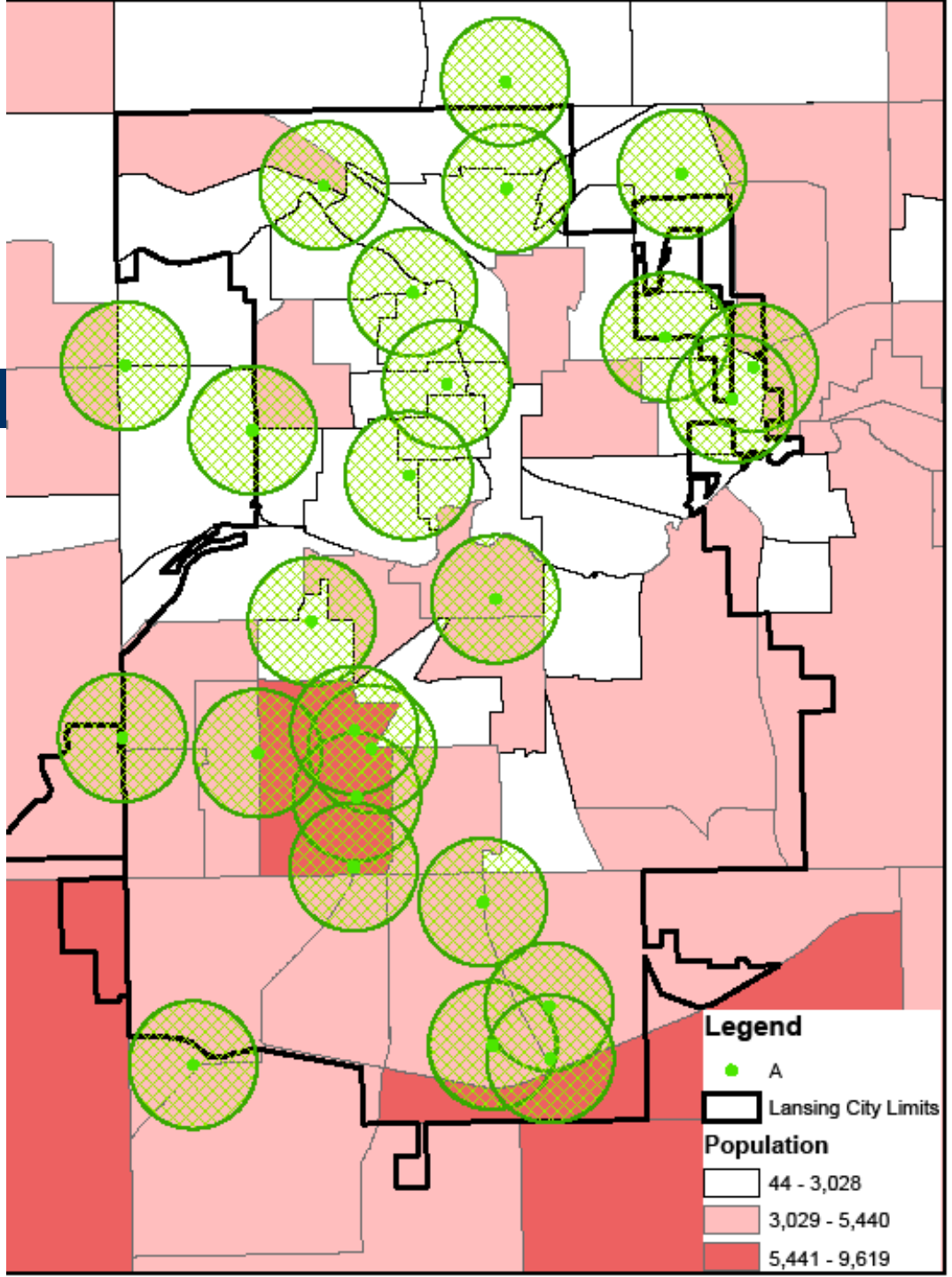
Retail by % Black

All locations by prevalence of black population



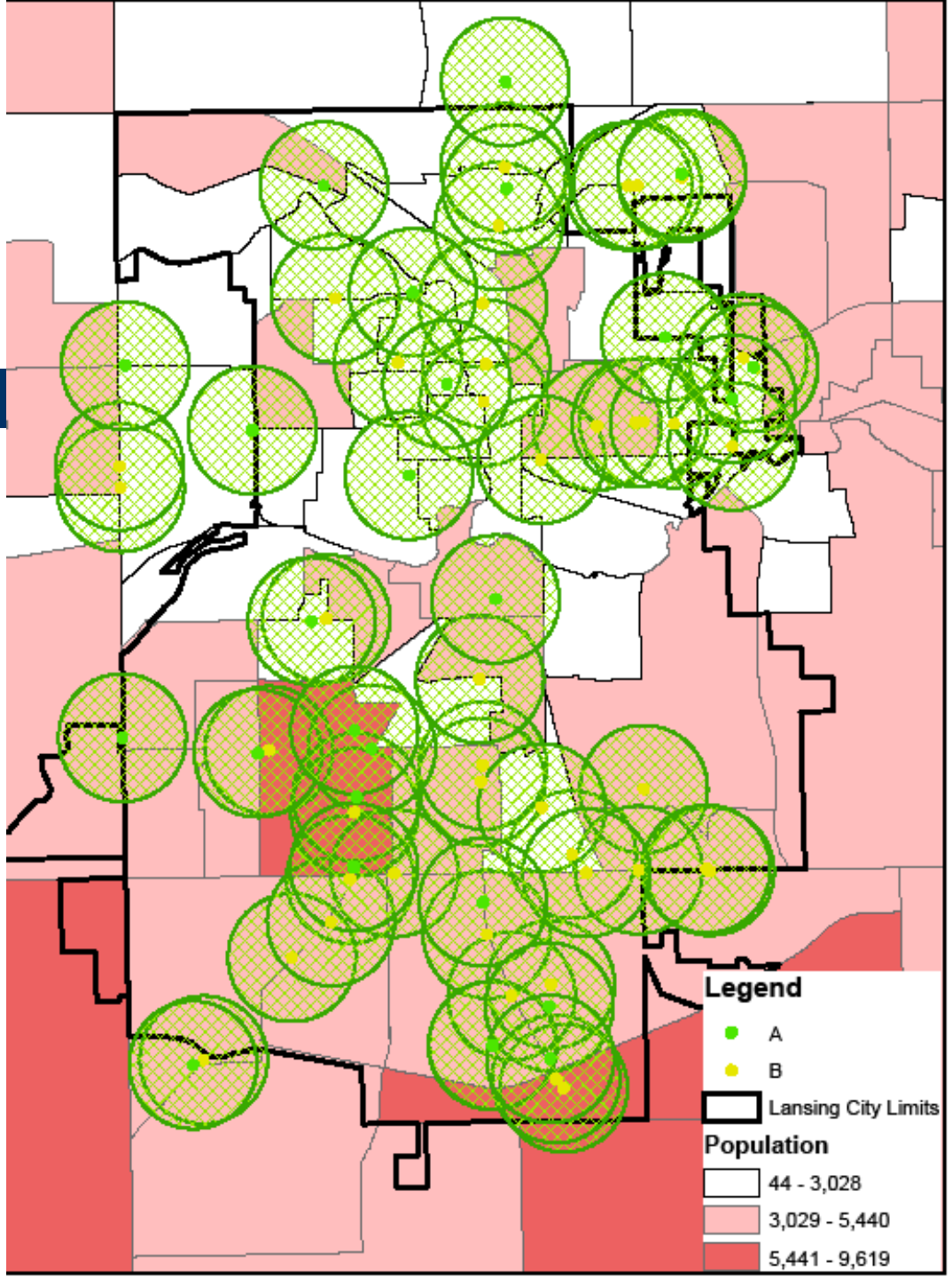
Retail ‘A’ locations with buffer

- The A locations with a 0.5 mile buffer around them to give an idea of coverage.
- The census tract with the most people is fairly well covered.
- A lot of the other locations are where the fewest people live. It appears that the light pink areas are where “healthy food” locations are needed.



Retail ‘A’ and ‘B’ with Buffer

The A and B locations with a 0.5 mile buffer around them to give an idea of population coverage.



In Comparison to Professor Goldsberry's Research

- Cross comparison with locations that sold produce (fruit + vegetables)
  - Kirk had 32 locations in Lansing
  - We had 72 locations in Lansing
  - We were unable to reach 5 of the locations on his list
  - Both projects had varying number of establishments and locations for Meijer, Kroger, Quality Dairy, L & L, and Seven-11
    - He had one location for Speedway, we had 12
    - We had L & L's he did not

Restaurant Locations

Restaurants- Method of Collection

- Using the MDA licensing codes, we conducted a web-based search on “fast food” type restaurants
- Looked up menus online
- Originally planned to conduct phone surveys as well
  - Lacked phone numbers from MDA

Methods- Survey/Variables for Restaurants

- Does your establishment have a drive-thru/drive-in/delivery option?
- Do customers pay before they consume their food?
  - If NO to both then exclude from data set
- Does your establishment sell:
  - Whole grains?
  - Fresh fruit?
  - 1+ fresh fruit?
  - Fresh vegetables?
  - 1+ fresh vegetables?
  - An entrée that includes a fruit/veg?
  - Low/non-fat dairy?
  - Lean protein?
  - Fried foods?
  - Sugar sweetened beverages?
  - Non-sugar sweetened beverages? (excluding 100% fruit juice)

Key Findings- Restaurants

- 56.5% of locations require that the customer pays before consuming the food
- Over one third of the locations have a drive-thru or delivery option available
  - These are criteria that are generally present in “fast food” type restaurants

Key Findings- Restaurants

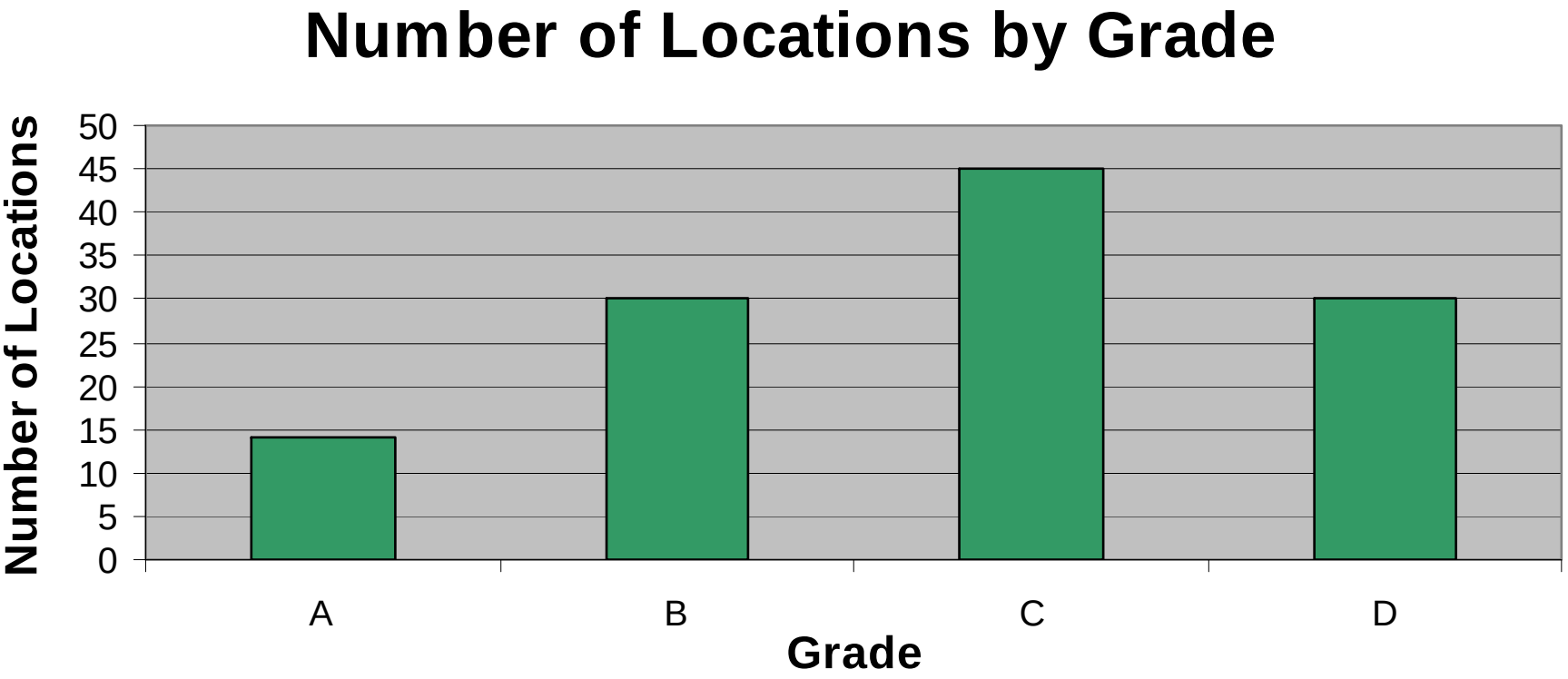
	Yes (%)	No (%)
Drive-thru?	77 (36.8%)	132 (63.2%)
Consumers pay before they consume?	118 (56.5%)	91 (43.5%)
Whole Grains?	41 (34.5%)	78 (65.5%)
Fresh Fruit?	40 (33.6%)	79 (66.4%)
1+ Type Fresh Fruit?	18 (15.1%)	101 (84.9%)
Fresh Vegetables?	34 (28.6)	85 (71.4%)
1+ Type Fresh Vegetables?	33 (27.7%)	86 (72.3%)
Entrée that includes fruit/veg?	118 (99.2%)	1 (0.8%)
Low/non-fat Dairy?	102 (85.7%)	17 (14.3%)
Lean protein?	81 (68.1%)	38 (31.9%)
Fried Foods?	104 (87.4%)	15 (12.6%)
Sugar-Sweetened Beverages?	119 (100%)	0 (0%)
Non-sugar Sweetened Beverages?	119 (100%)	0 (0%)

Methods- Analyzing Data

- Created grading scale from 0-9
  - There were 9 variables after we removed the exclusion criteria, and the “Fried Foods” as well as the “Sugar sweetened beverages” variable
- Breakdown:
  - 8-9= A (most healthy food options)
  - 6-7= B
  - 4-5= C
  - 2-3= D (least healthy food options)
  - 0-1= F

Note: There were no locations with an “F” score

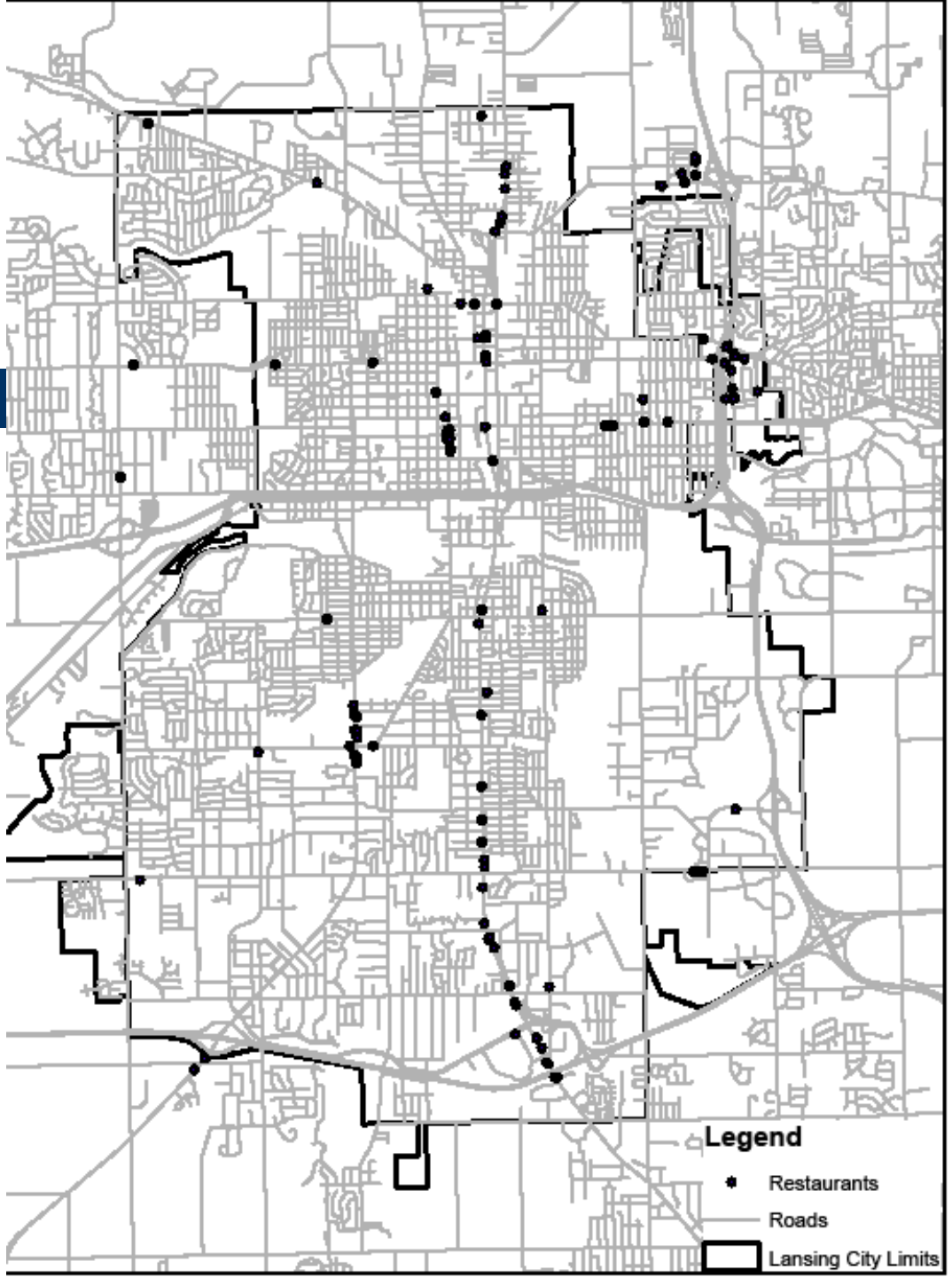
Key Findings- Restaurants



Note: The grade a location receives can be misleading due to the actual number of healthy options on a location's menu

Restaurants and Roads

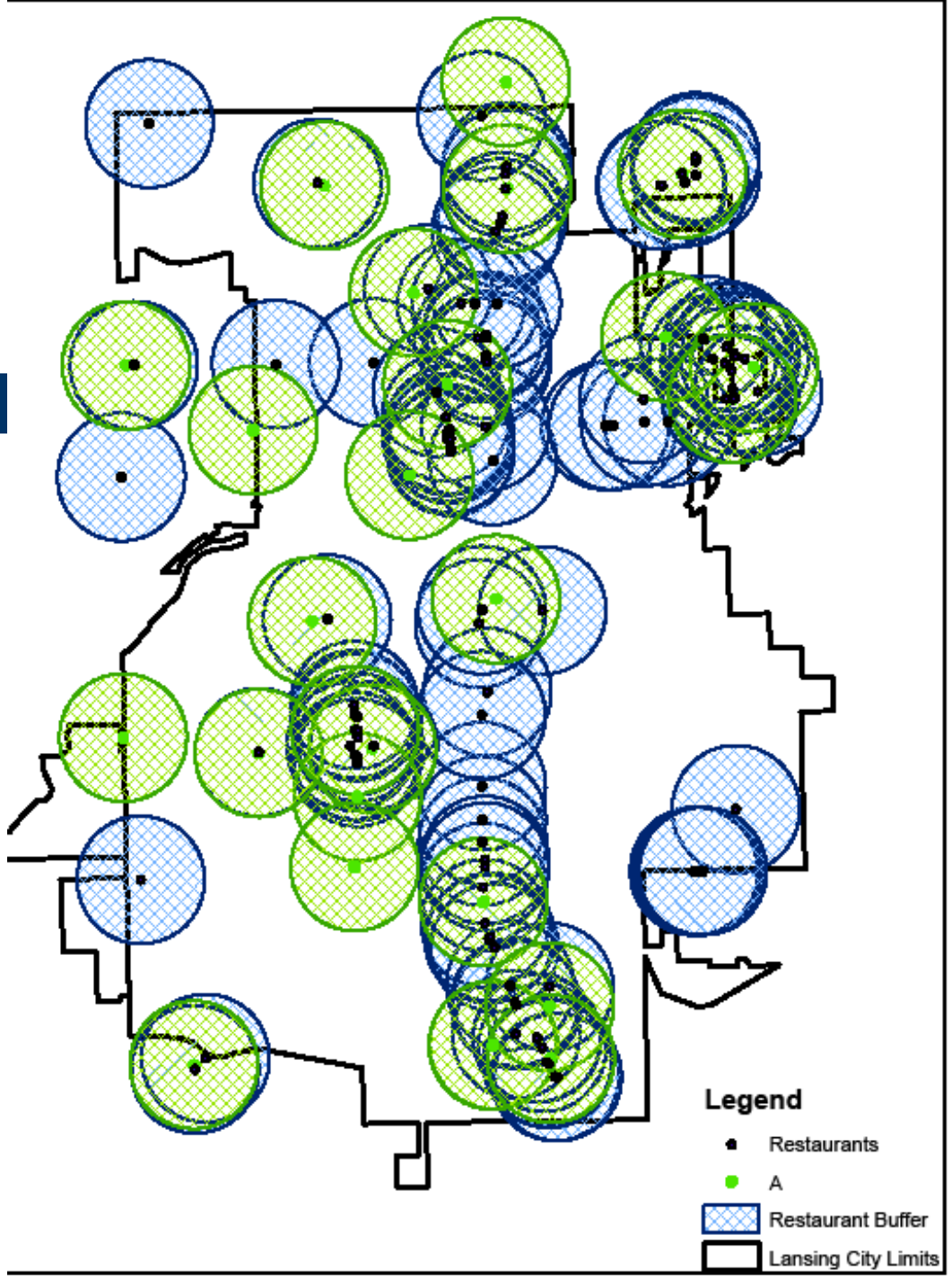
The restaurant locations have a similar pattern as the retail food. They follow Cedar St. and MLK.



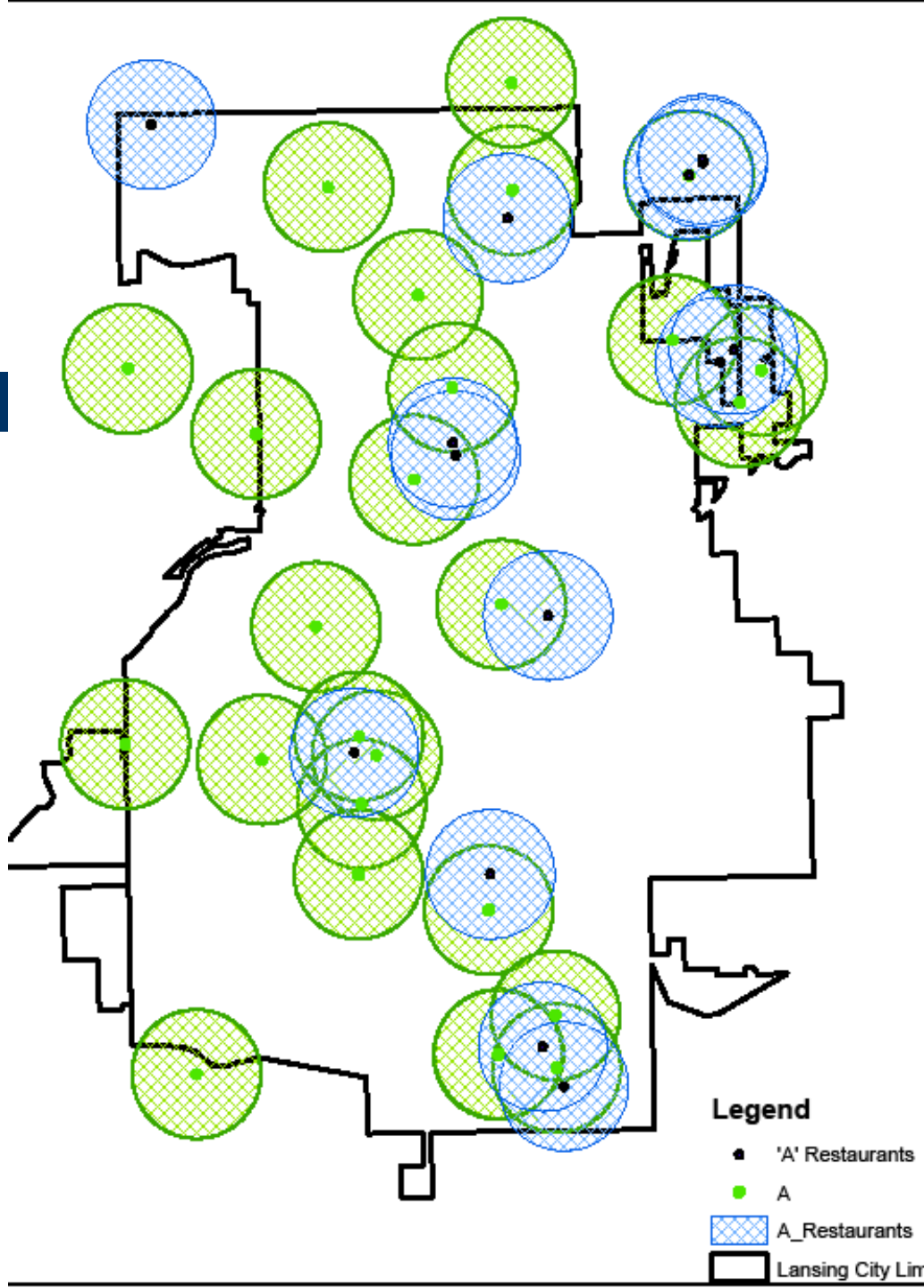
Restaurant and ‘A’ buffers

I know it is messy!

Most of these locations cover the same areas. So if there is a fast food location close there is also a healthy food option.



‘A’ Retail and Restaurants



Weaknesses

- Lacking phone surveys for restaurant type locations
  - We had planned on researching these like the retail locations, but we lacked phone numbers from MDA
- We were not able to reach all locations
- Couldn’t search the stores in person
- Had to trust what the person on the phone was saying was what they actually sold
- Web pages/menus could be incorrect or lacking information
- Establishments with multiple locations were represented by information researched on one location

Conclusions/Future Uses

- Expand to other cities
- Project was not perfect but it helped fill a data gap in the state
- Make the technology available to other cities so they can perform their own food desert

Contact Info:

- Questions?
  - Contact:

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