Using location-based services data to analyze visitation to regional parks

8/1/2019

Metropolitan Parks and Open Space Commission

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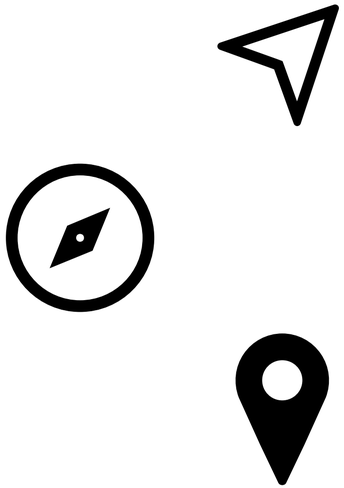
Location based services data

Take out your phones

- iPhone users go to:
  - Settings > Privacy > Location Services
- Android users go to:
  - Settings > Security & location > Location



Streetlight Data

- Our provider of anonymized location-based services data from cell phones
- Can’t identify individuals, can only look at patterns of travel
- 23% of the U.S. and Canadian adult population
- 60 billion location records/month
- Travel mode, visitor home/work location (Census block group), demographics
- Many types of analyses available

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How does Streetlight infer traveler attributes?

- First infer home location
- Then estimate demographics based on Census data of home location
- Infer travel mode using travel characteristics (e.g. speed, distance, etc.)

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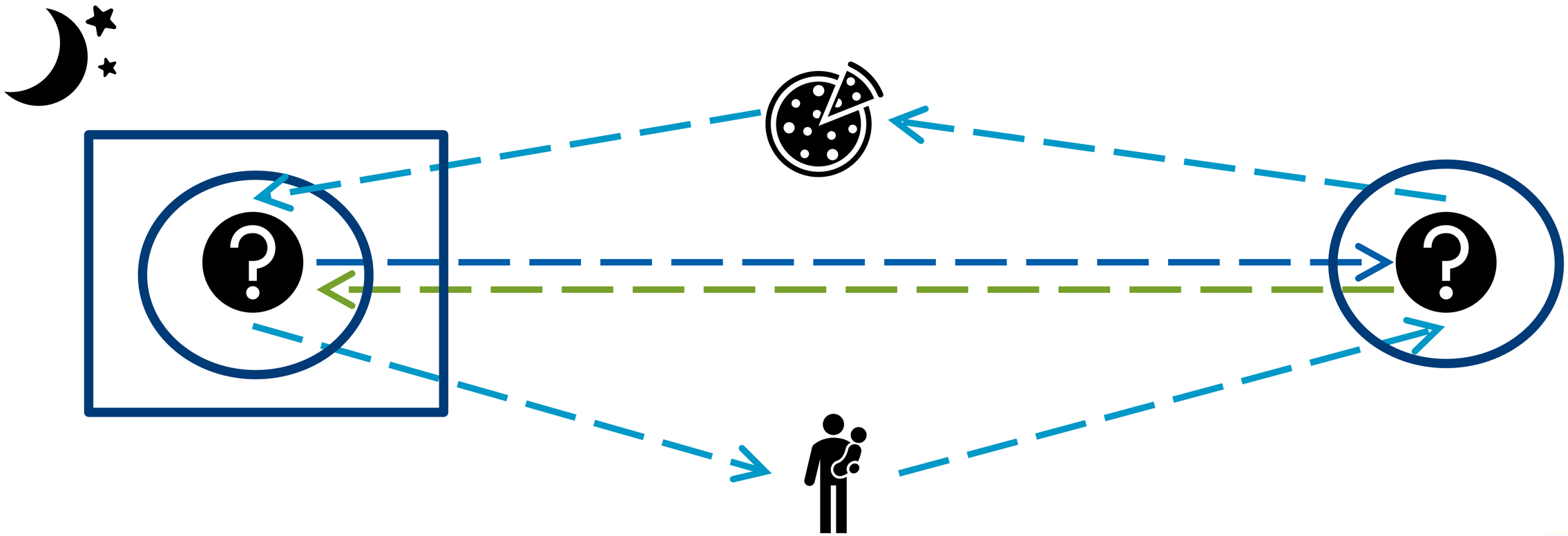
Inferring home & work location



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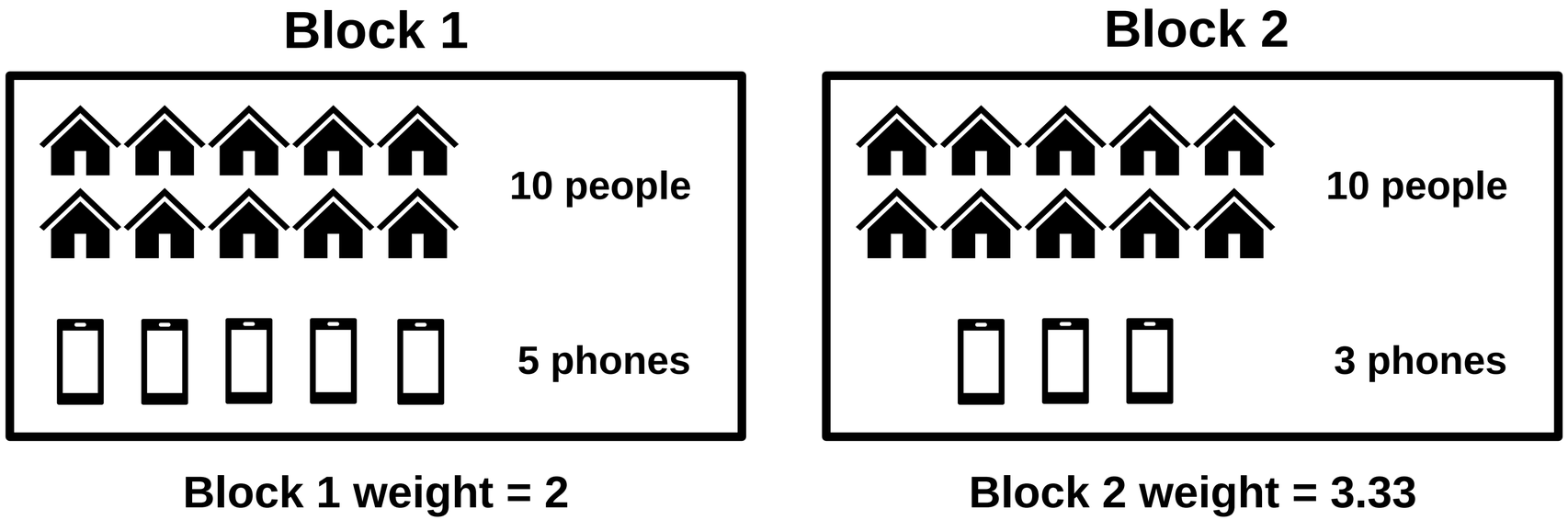
Accounting for differences in smartphone ownership rates (simplification for illustration)



Block 1 weight = 2

Block 2 weight = 3.33

Accounting for differences in smartphone ownership rates (simplification for illustration)

Block 1
weight = 2

10 visits

Block 1
20 visits

Block 2
weight = 3.3

10 visits

Block 2
33 visits

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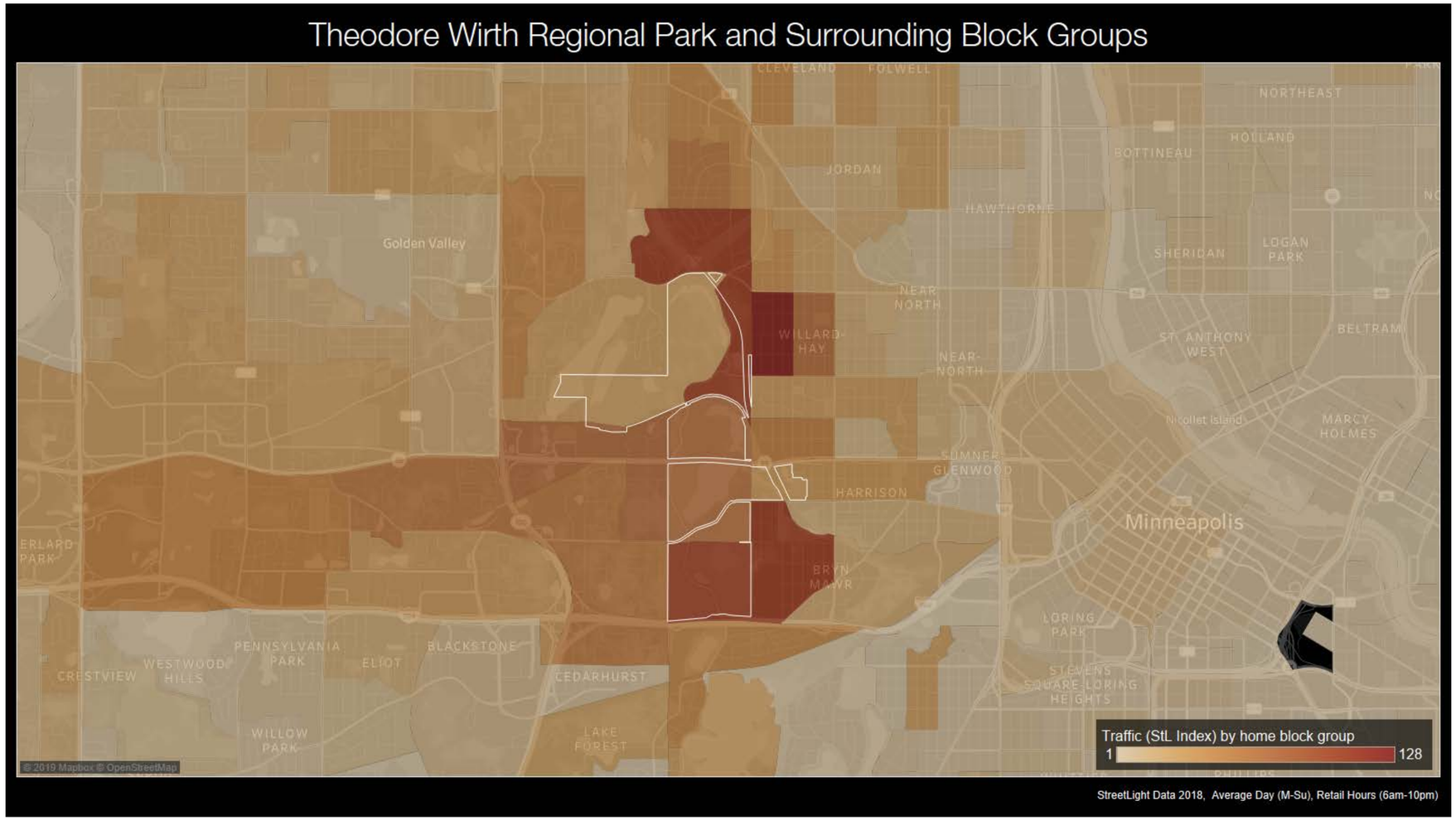
Home location data generally available at block group level



Parks visitation research

- Annual use estimate (how many people visit Regional Parks System)
  - Counts taken in parks system during summer months
  - Input to funding formulas
- Visitor study (who? where do they come from?)
  - Intercept survey in parks (~ every five years)
  - Local/non-local visitation %
  - Demographics
  - Seasonal visitation
  - Vehicle multiplier

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Streetlight + Parks

- Currently, we can’t provide park- or trail-level representative data
- Streetlight shows promise in providing park- and trail-level data
- Streetlight may even be able to provide useful data *within* a given park or trail
- Comparing Streetlight to supplemental park- and trail-level data collected in 2020 visitor study

Comparison of Streetlight to U of M Visitor Survey

- 2016 University of Minnesota study collected some park-level data
- Compared Streetlight visitation to the survey data
- In general, Streetlight suggests higher non-local travel, slightly more people of color, and slightly more lower-income visitors than the U of M study

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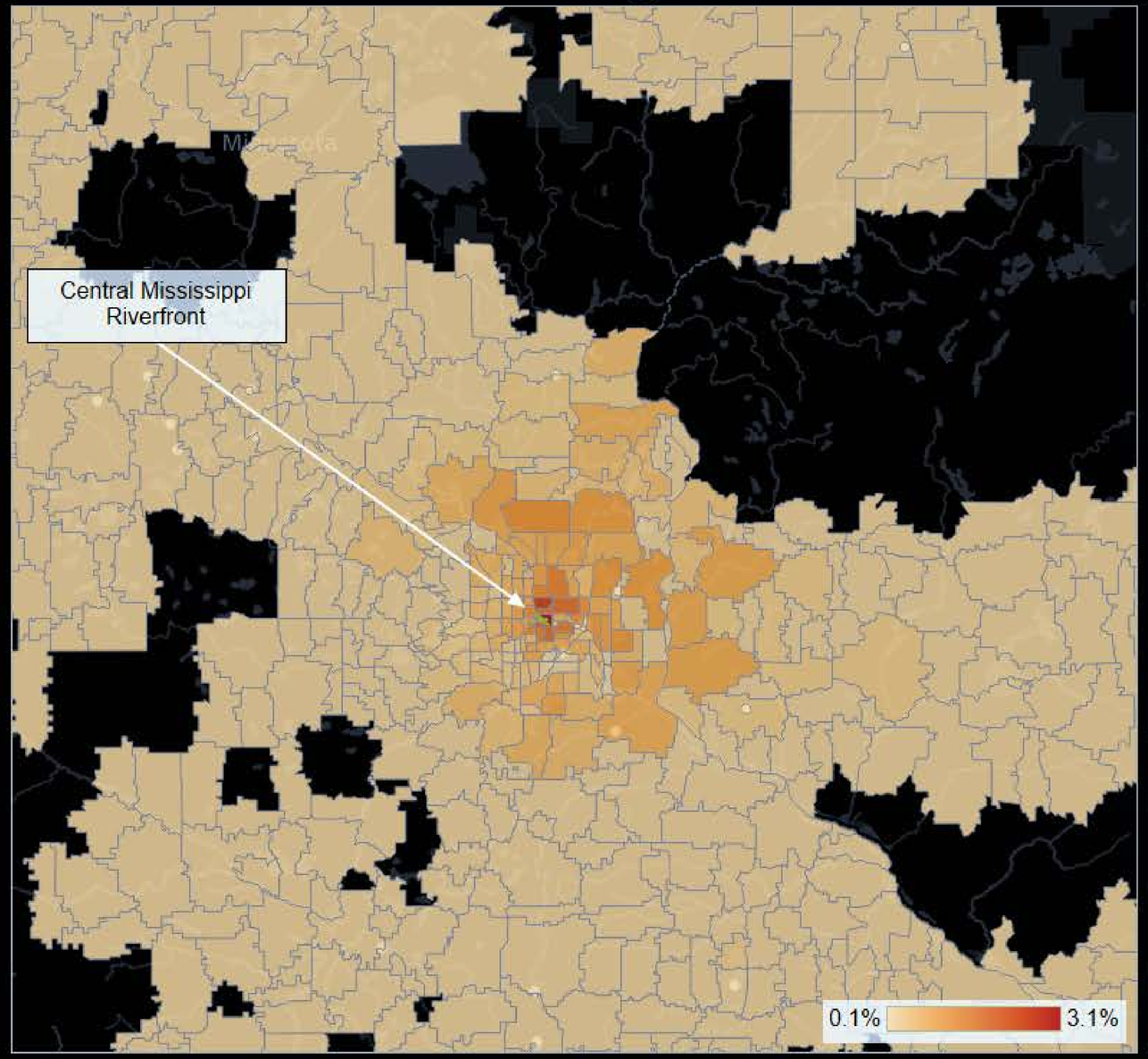
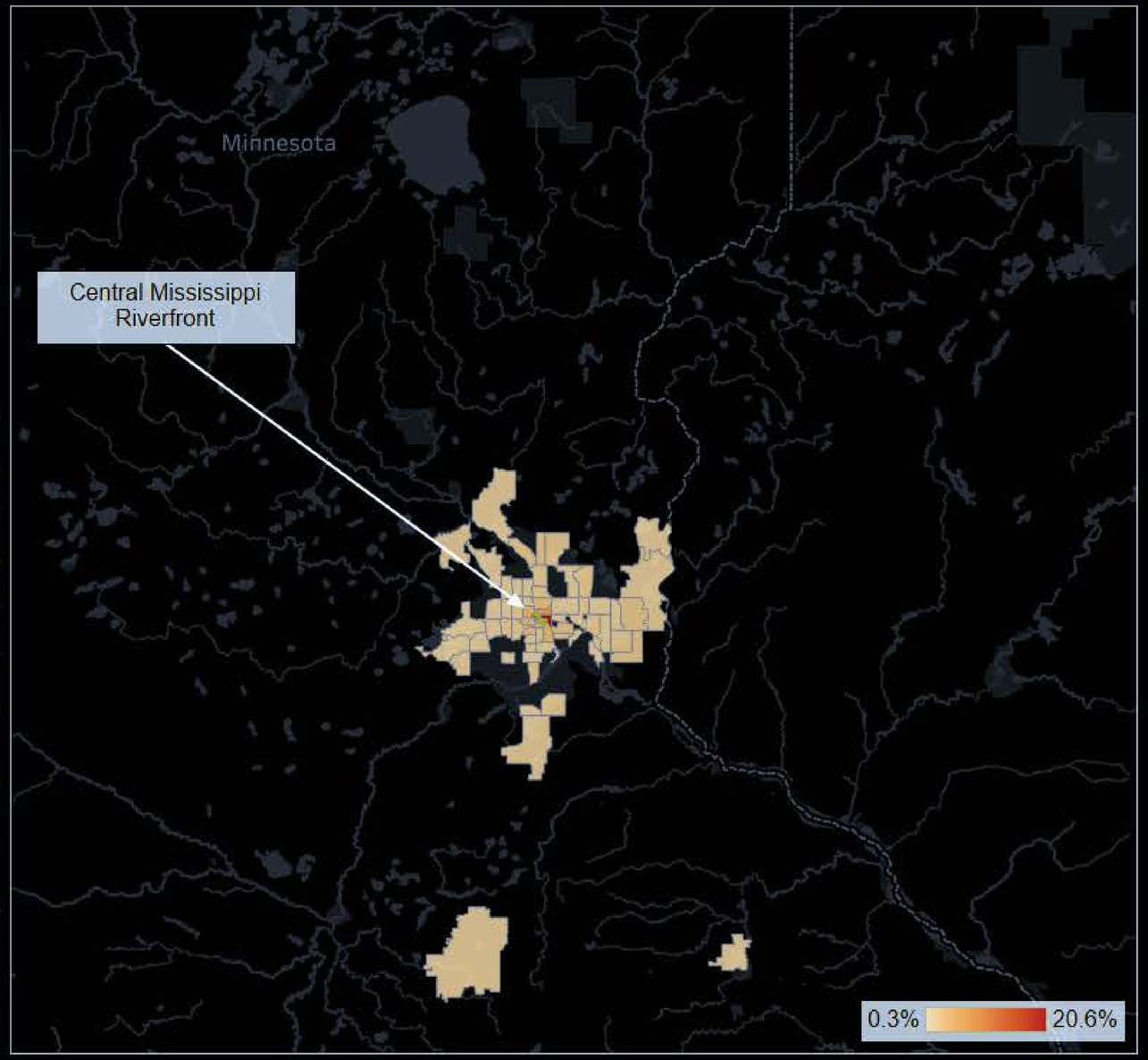
Central Mississippi Riverfront

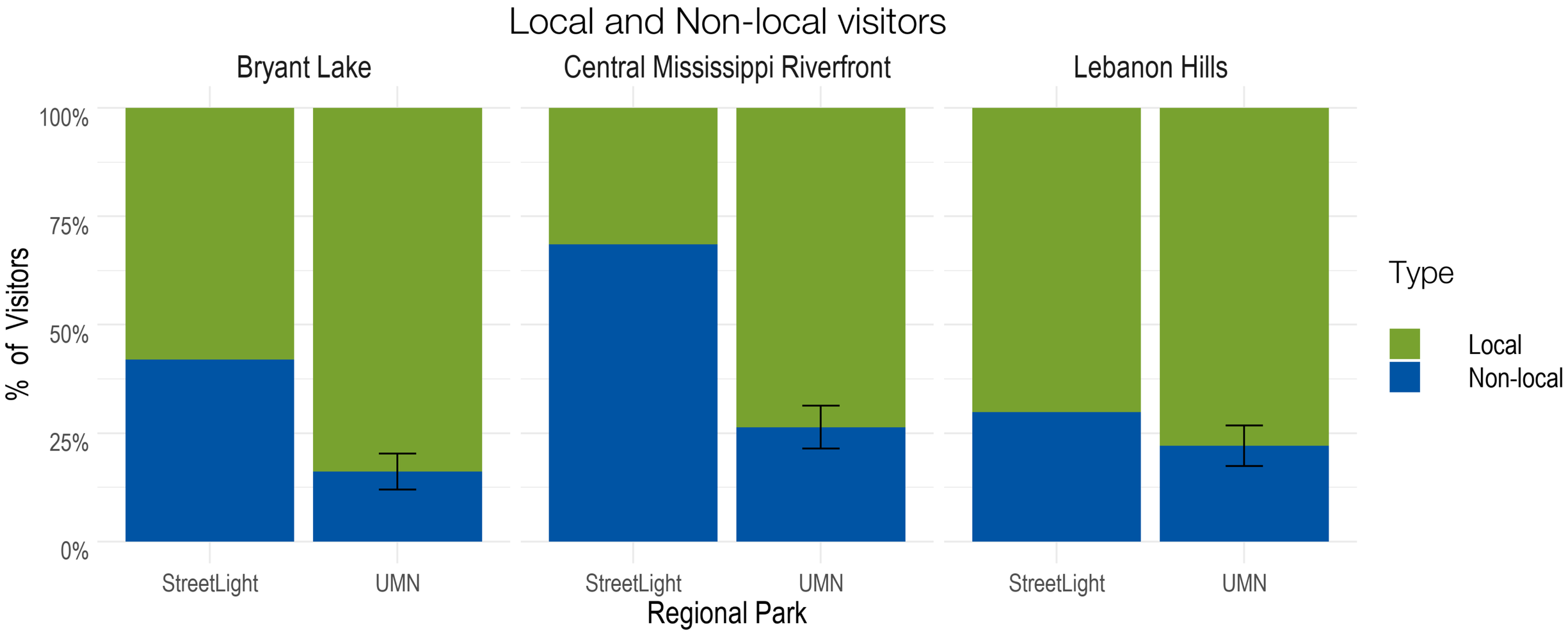
StreetLight



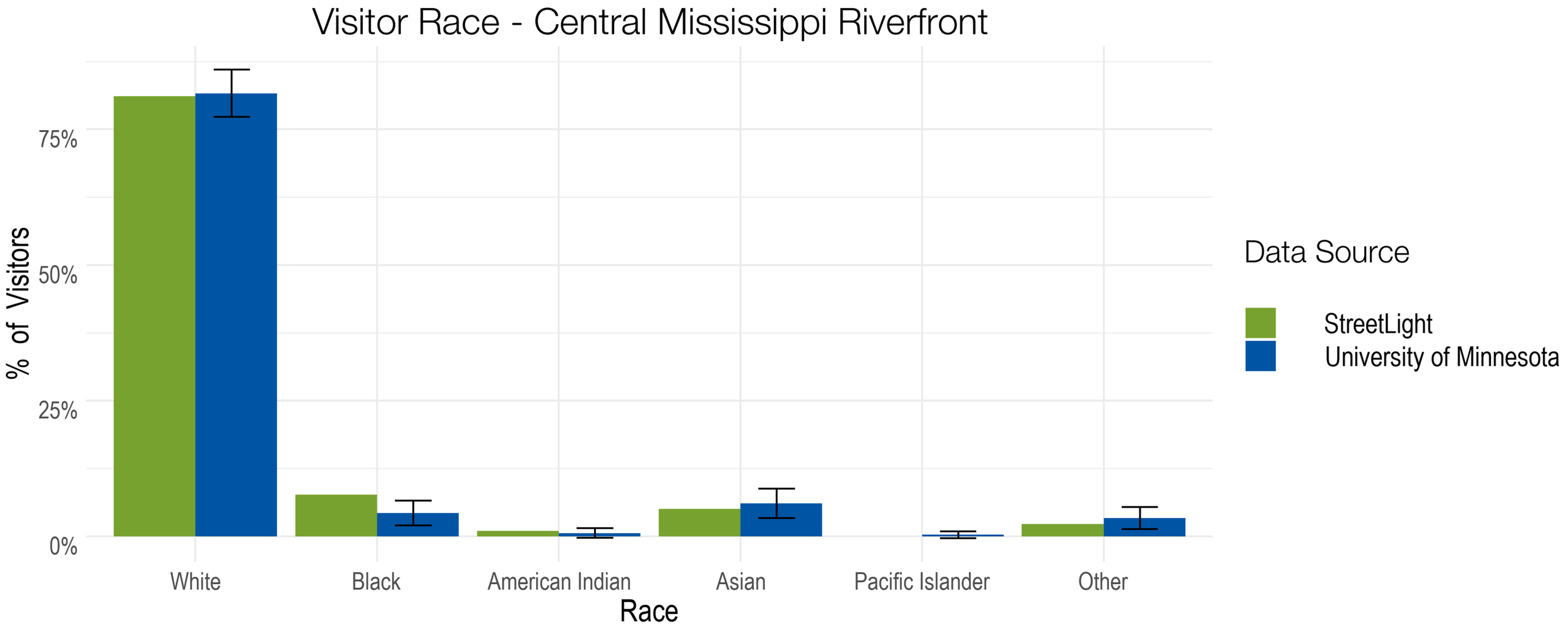
University of Minnesota



Streetlight generally captured more non-local visitation than the U of M visitor study



U of M Visitor Study and Streetlight generally agree on race



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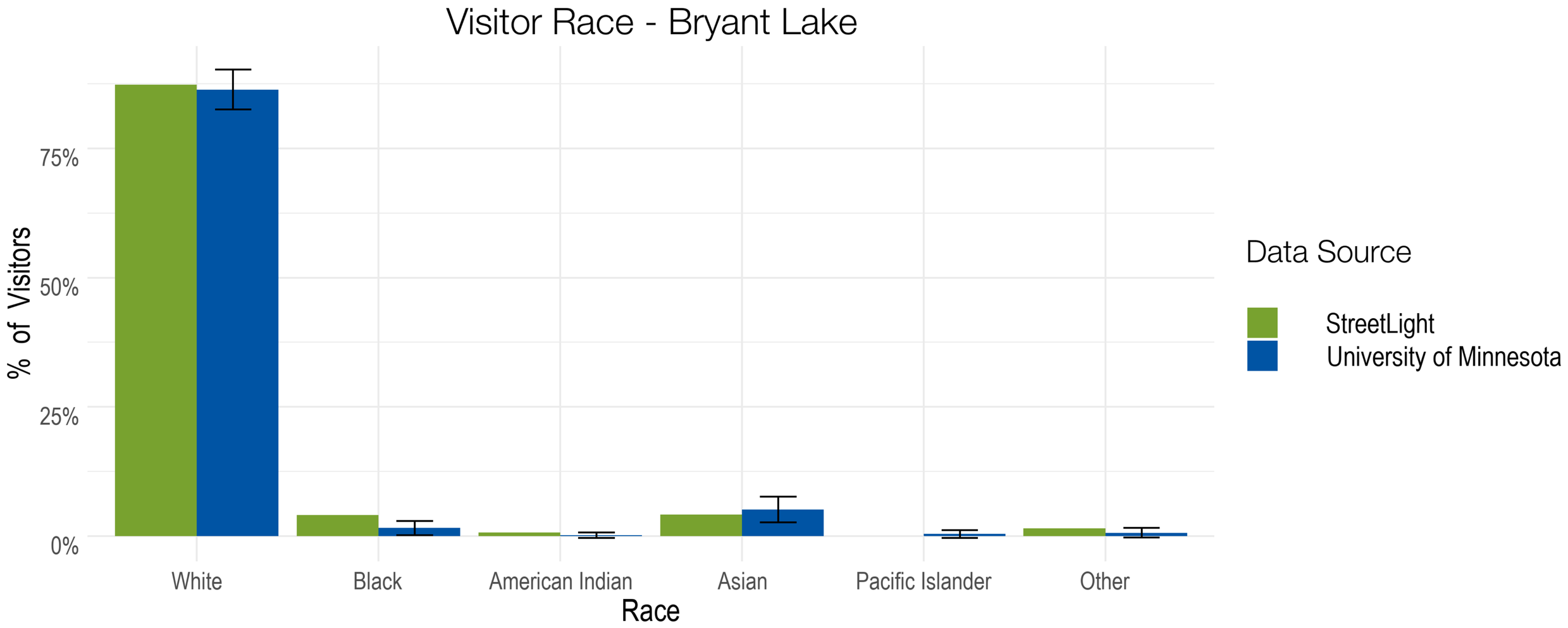

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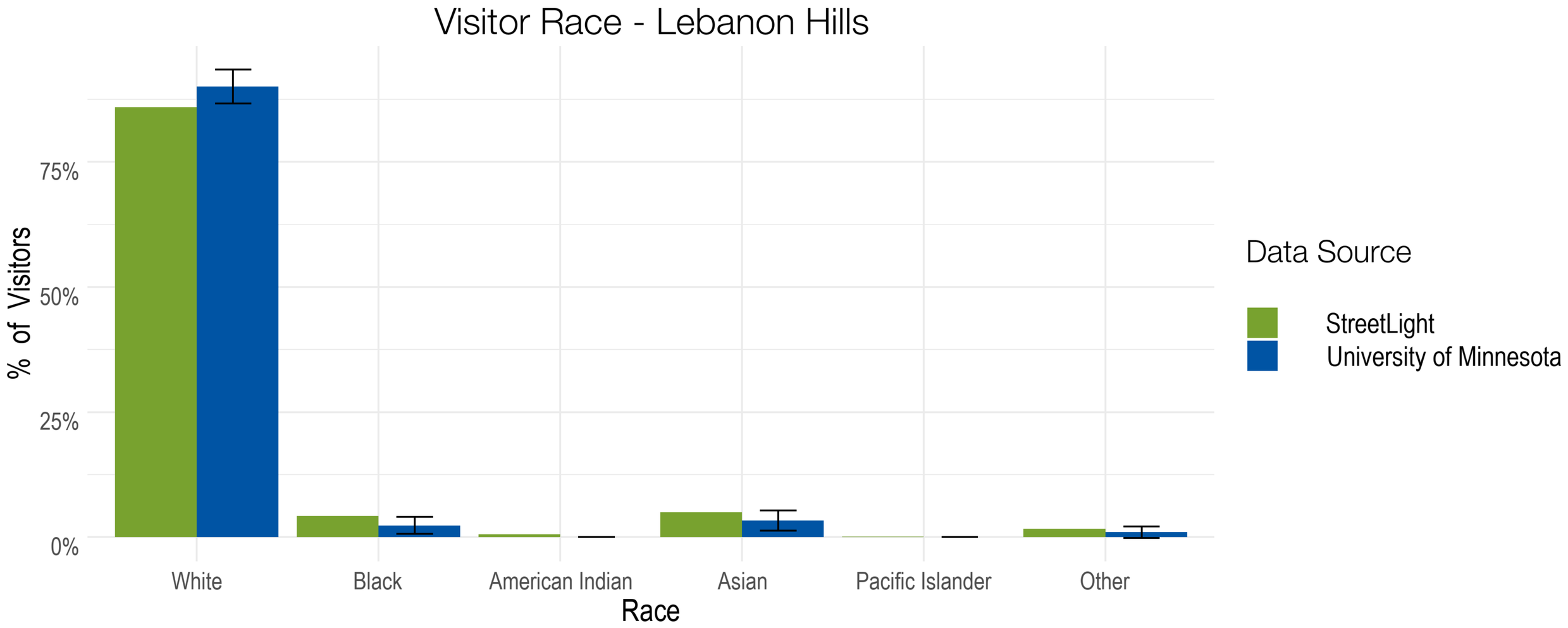
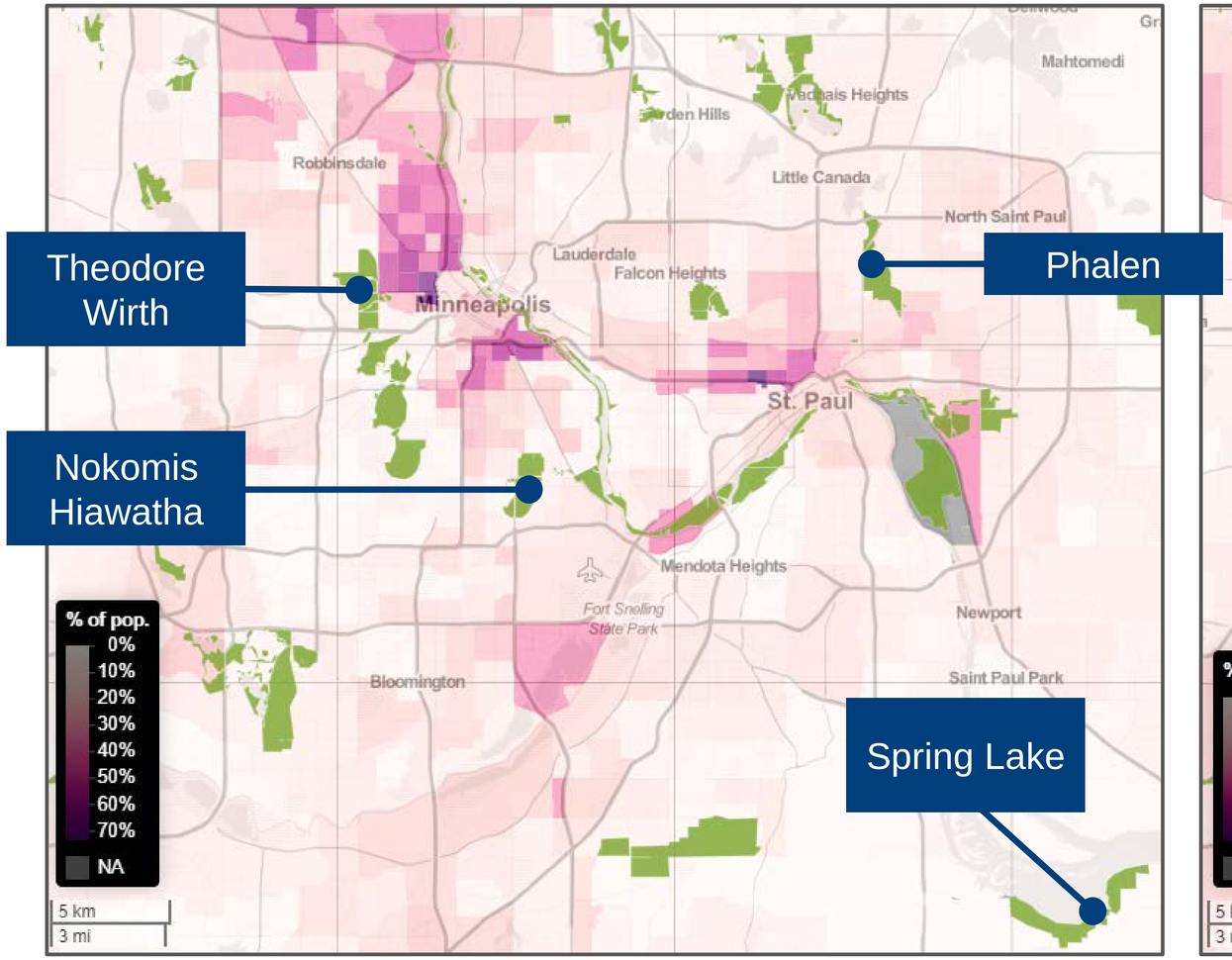


Additional demographic analysis of parks using Streetlight

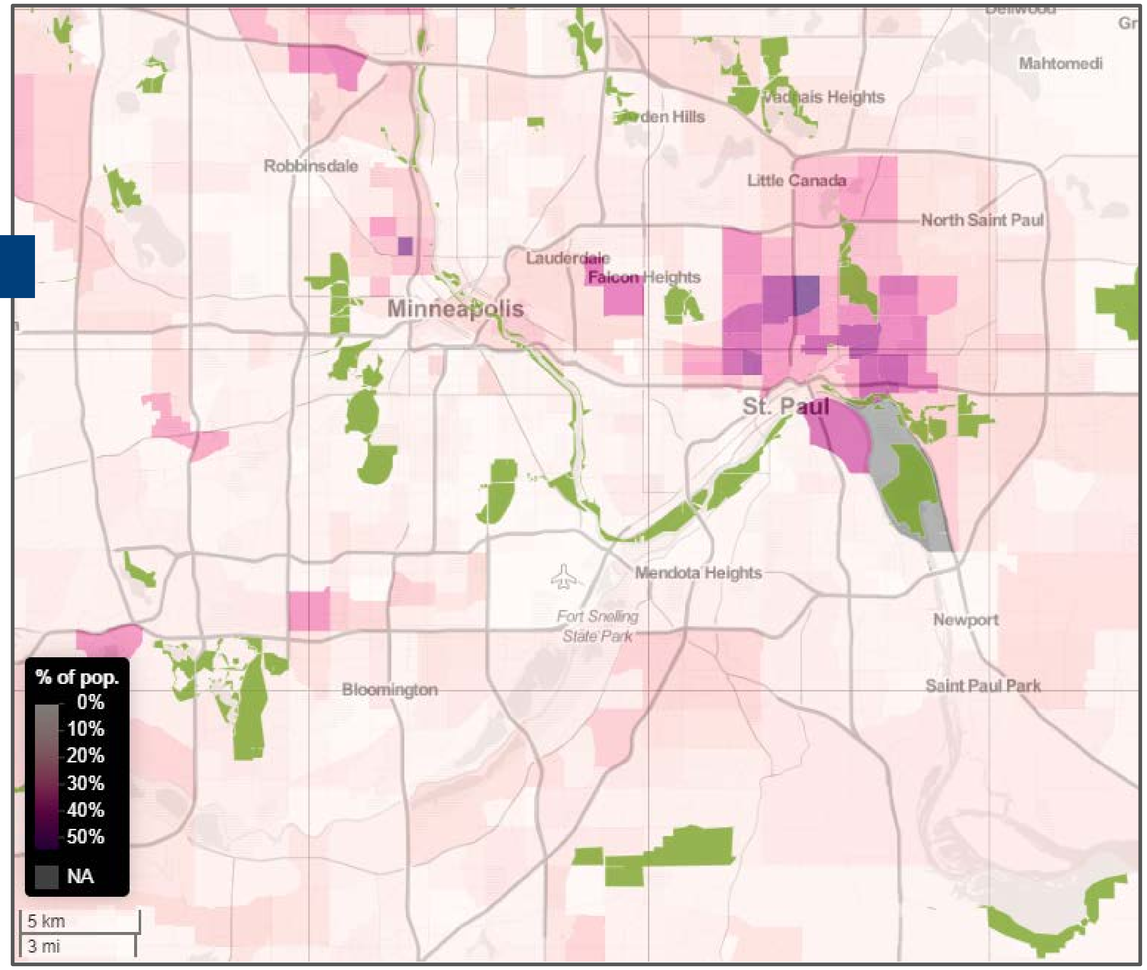
- U of M study did not collect park-level data for parks in close proximity to large populations of color
- Conducted Streetlight analyses for select parks based on Census demographics
- Demographics across parks moved in generally expected ways

Census data (American Community Survey)

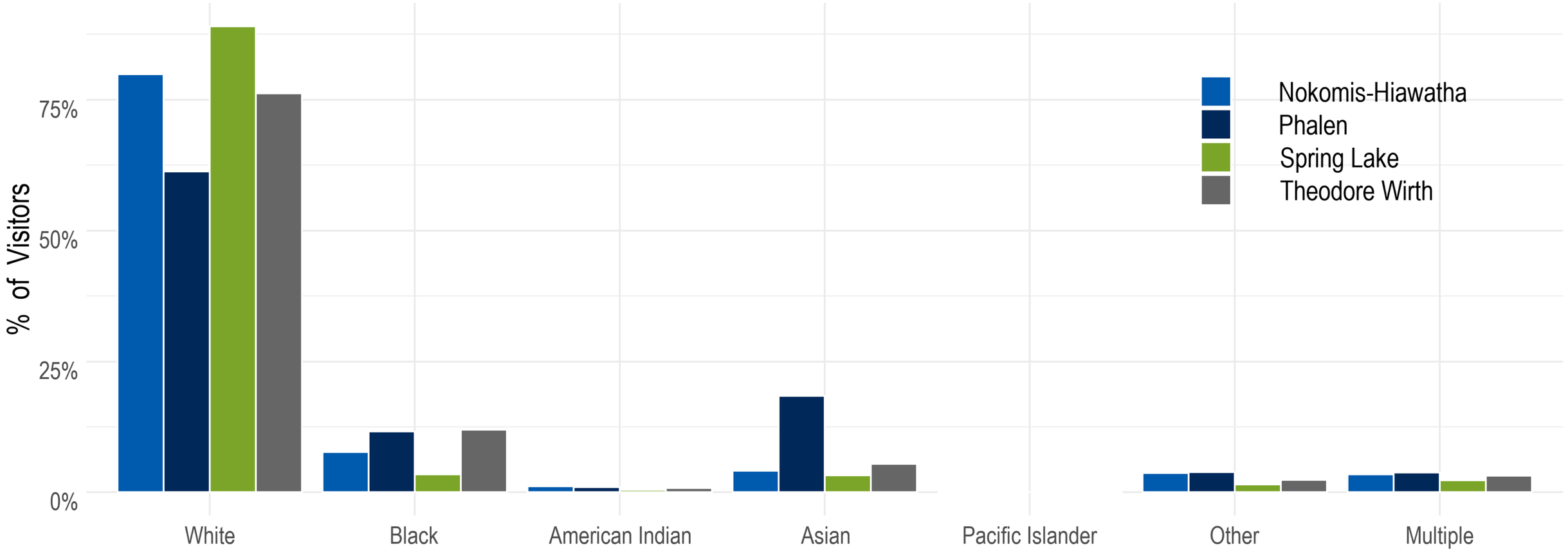
% Black



% Asian

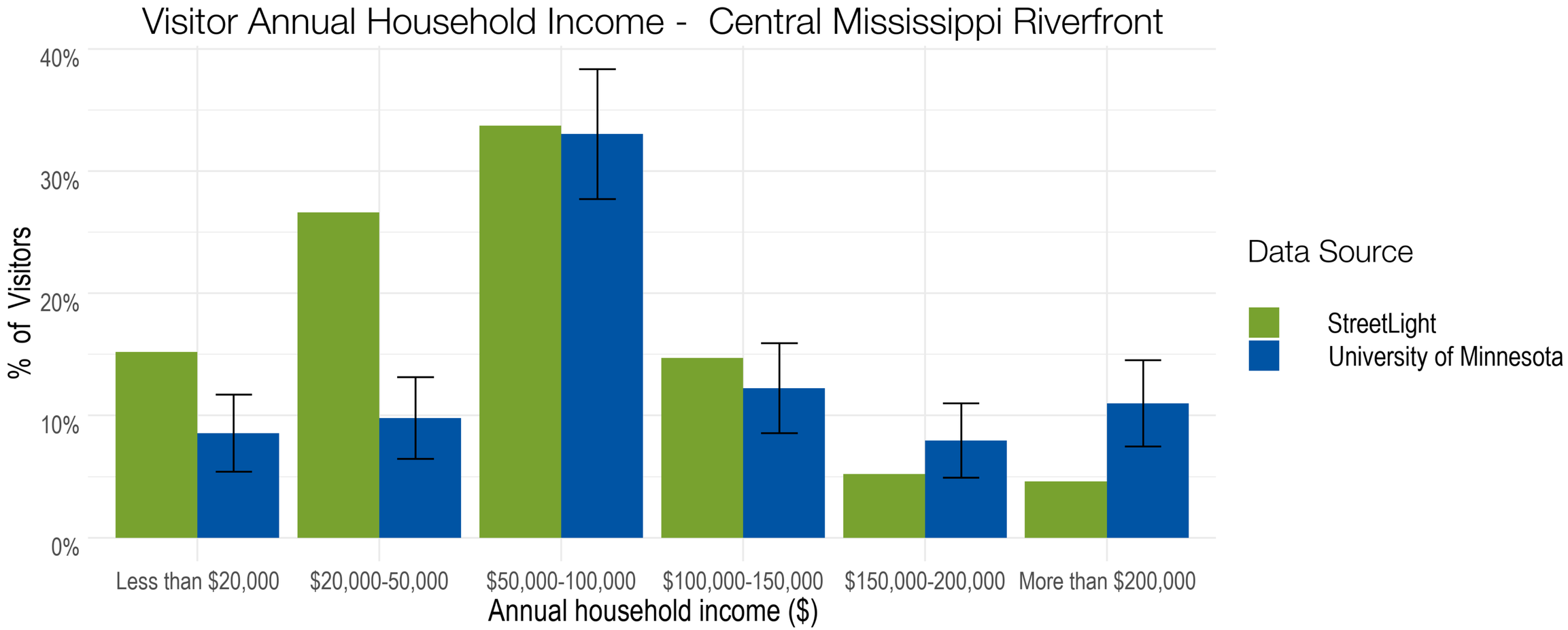


Racial variations across parks generally as expected



2018 StreetLight, retail hours (6am-10pm)

Income distributions generally align; U of M visitor study had fewer lower-income visitors (+ sizable missing values)



Using Streetlight for analysis within in a park

- Using Como Regional Park, we used Streetlight to analyze usage within a park
- Usage varies by season/day-of-week/time-of-day
- Dense activity in zoo/conservatory, pavilion, parking lots, etc.

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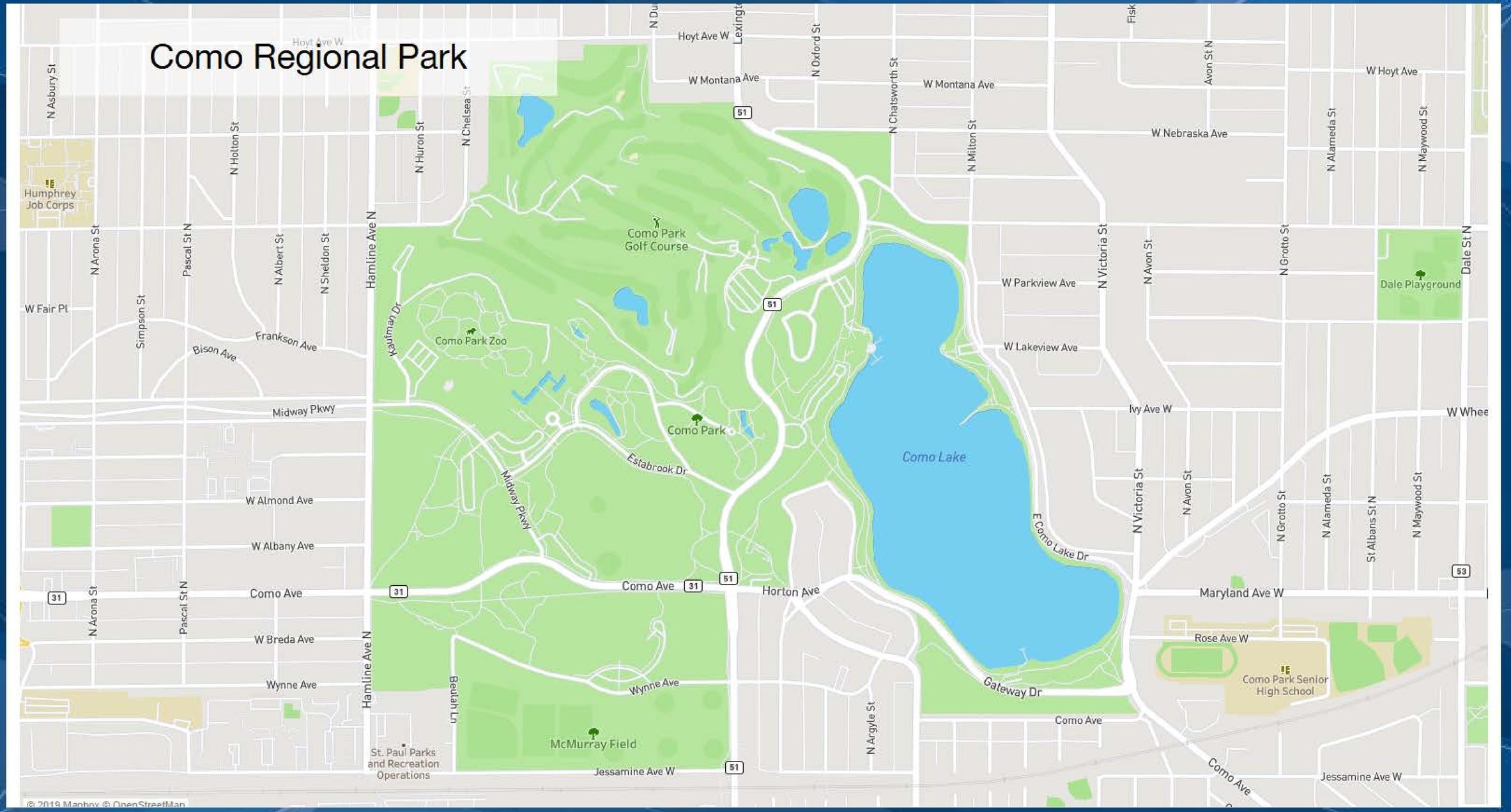
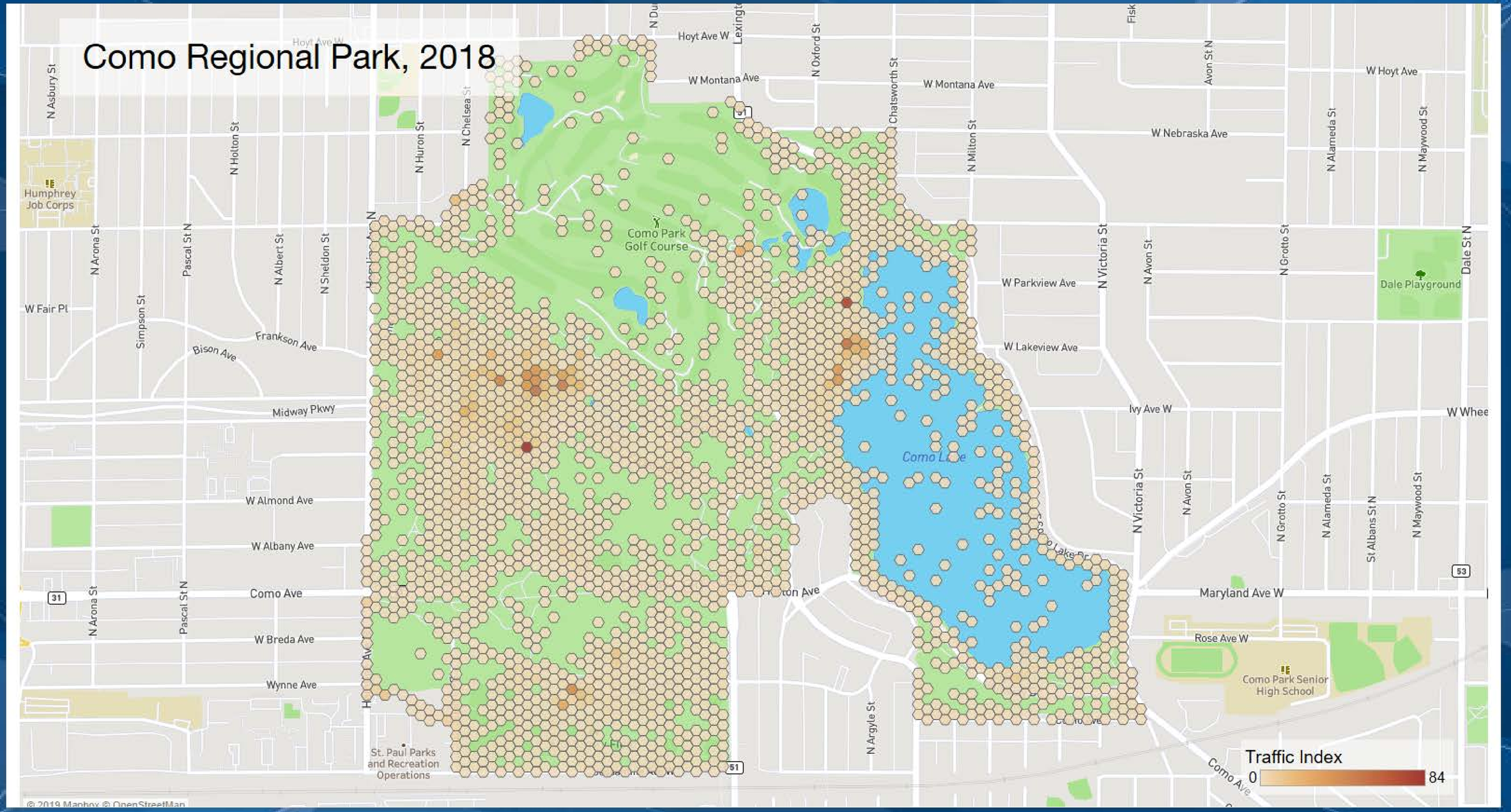
Como Regional Park




Como Regional Park, 2018
Hoyt Ave W
W Montana Ave
W Nebraska Ave
W Hoyt Ave
N Asbury St
N Holton St
N Huron St
N Chelsea St
N Oxford St
Chatsworth St
N Milton St
Avon St N
N Alameda St
N Maywood St
Humphrey Job Corps
Como Park Golf Course
W Parkview Ave
W Lakeview Ave
N Victoria St
N Avon St
N Grotto St
Dale St N
Dale Playground
W Fair Pl
N Arona St
Simpson St
Pascal St N
N Albert St
N Sheldon St
Frankson Ave
Bison Ave
Midway Pkwy
Ivy Ave W
W Whee
Como Lake
W Almond Ave
W Albany Ave
Como Ave
W Breda Ave
Wynne Ave
Maryland Ave W
Rose Ave W
Como Park Senior High School
St Albans St N
N Argyle St
St. Paul Parks and Recreation Operations
Traffic Index
0
84
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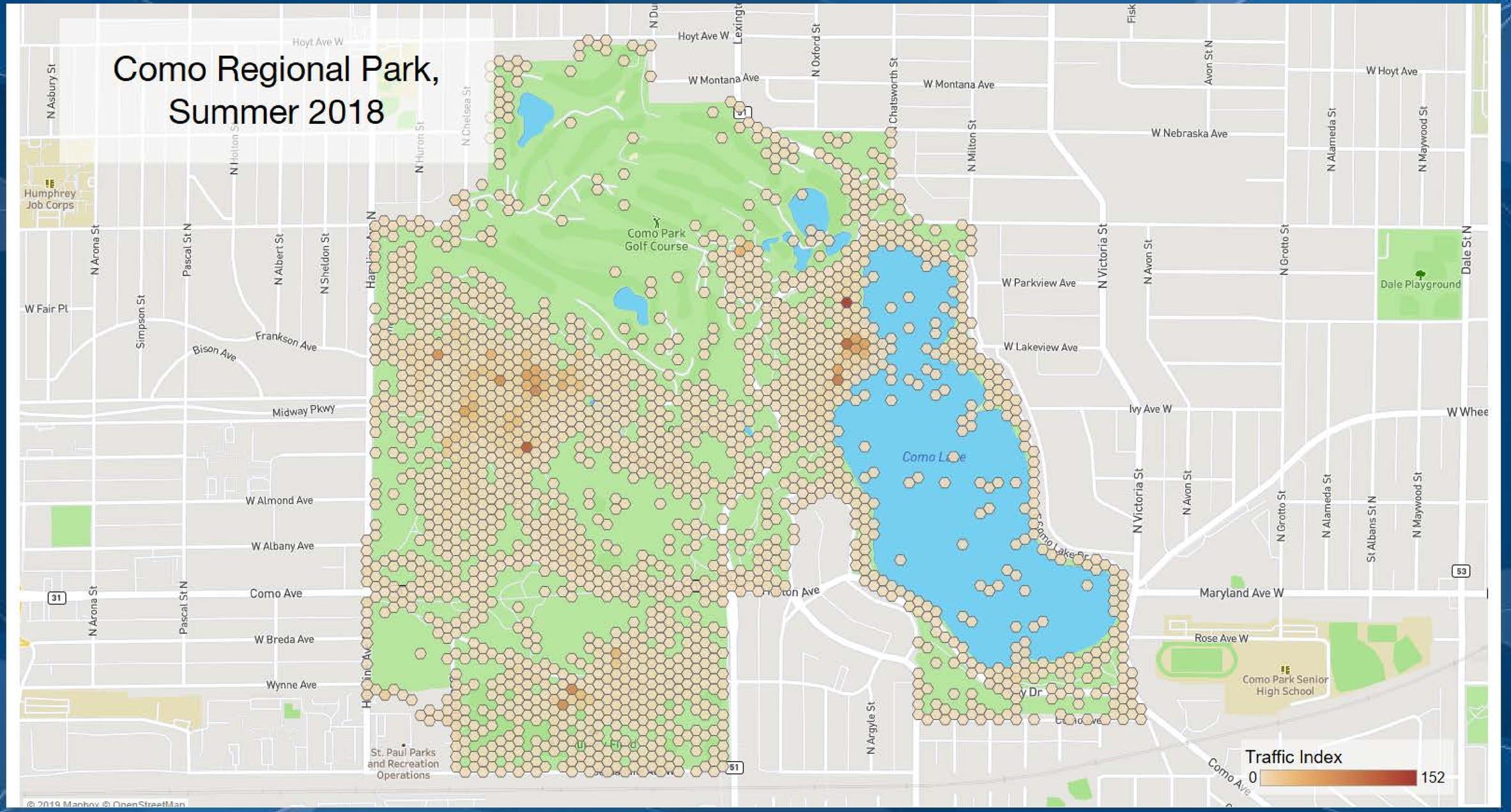
Como Regional Park,
Summer 2018
Traffic Index
0
152
Como Park Golf Course
Como Lake
Dale Playground
Como Park Senior High School
St. Paul Parks and Recreation Operations
Humphrey Job Corps
Hoyt Ave W
W Montana Ave
W Nebraska Ave
W Parkview Ave
W Lakeview Ave
Ivy Ave W
W Hoyt Ave
W Fair Pl
Frankson Ave
Bison Ave
Midway Pkwy
W Almond Ave
W Albany Ave
Como Ave
W Breda Ave
Wynne Ave
Maryland Ave W
Rose Ave W
N Asbury St
N Arona St
Simpson St
Pascal St N
N Albert St
N Sheldon St
N Huron St
N Chelsea St
N Oxford St
Chatsworth St
N Milton St
N Victoria St
N Avon St
N Grotto St
N Alameda St
St Albans St N
N Maywood St
Dale St N
N Argyle St
Como Lake Dr
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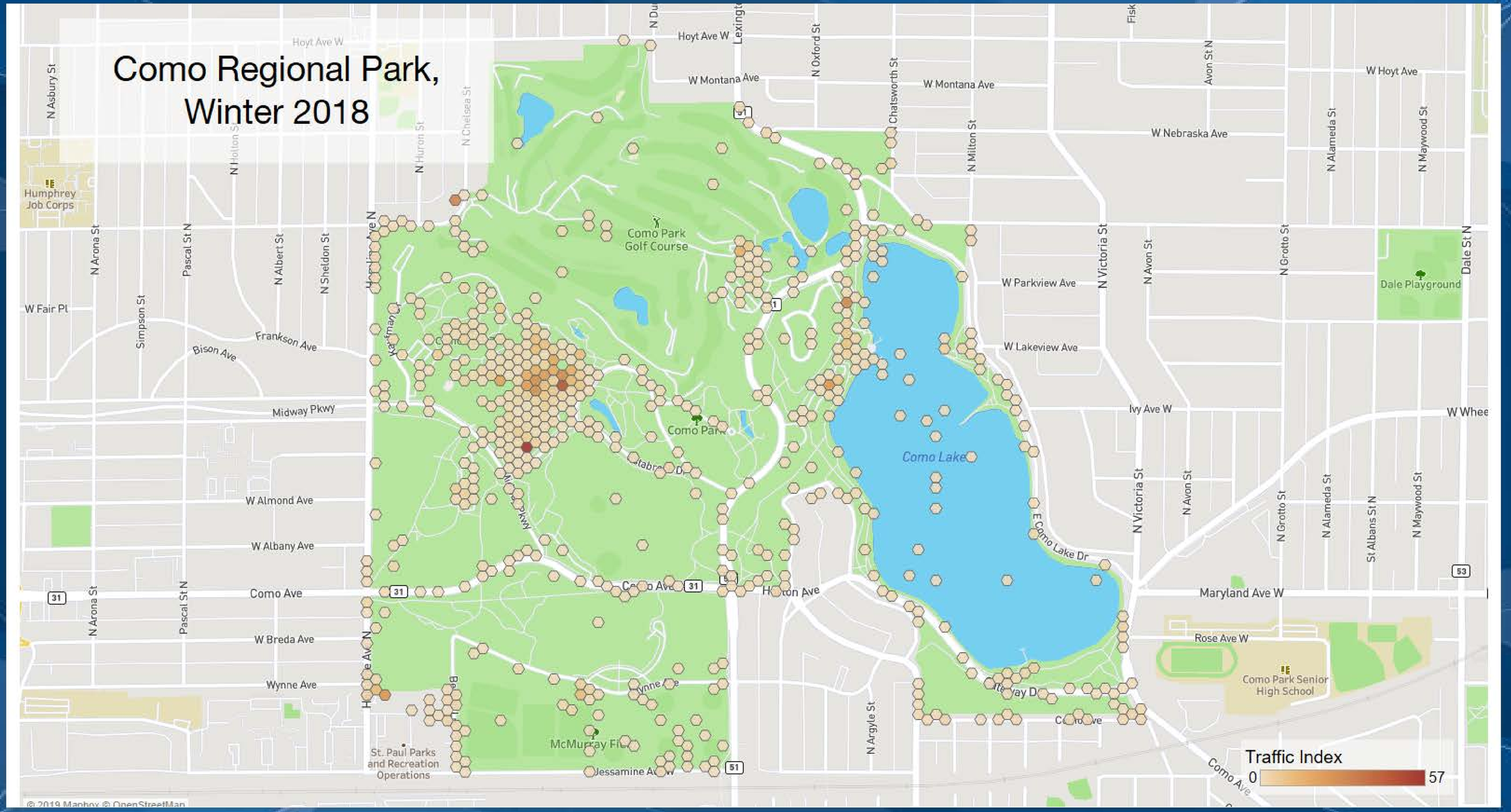
Como Regional Park,
Winter 2018
Hoyt Ave W
W Montana Ave
W Nebraska Ave
W Hoyt Ave
N Asbury St
N Holton St
N Huron St
N Chelsea St
N Oxford St
Chatsworth St
N Milton St
N Alameda St
N Maywood St
Humphrey Job Corps
Como Park Golf Course
W Parkview Ave
W Lakeview Ave
N Victoria St
N Avon St
N Grotto St
Dale Playground
Dale St N
W Fair Pl
N Arona St
Simpson St
Pascal St N
N Albert St
N Sheldon St
Frankson Ave
Bison Ave
Midway Pkwy
Como Lake
Ivy Ave W
W Almond Ave
W Albany Ave
Como Ave
W Breda Ave
Wynne Ave
E Como Lake Dr
Maryland Ave W
Rose Ave W
Como Park Senior High School
St Albans St N
McMurray Fi
St. Paul Parks and Recreation Operations
N Argyle St
Traffic Index
0
57
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Example: Equity Analysis (proof of concept)

- Problem: don’t have park-level demographic data
- Problem: What is the reference demographic when a park draws from multiple jurisdictions?
- Solution (proof of concept in progress):
  - Use statistical model to find parks where race most strongly predicts visitation, controlling for other factors (e.g. distance, population, etc.)

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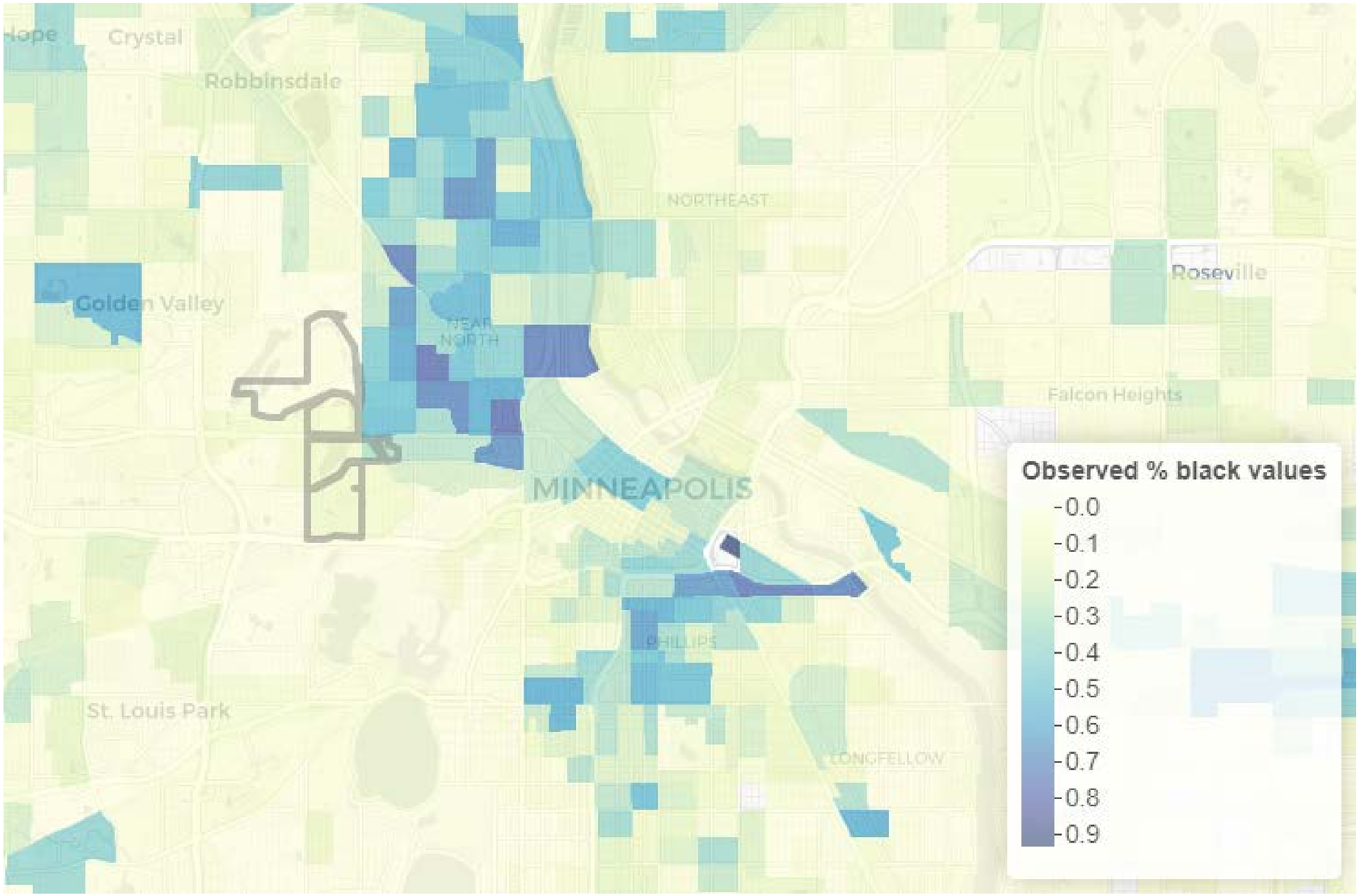
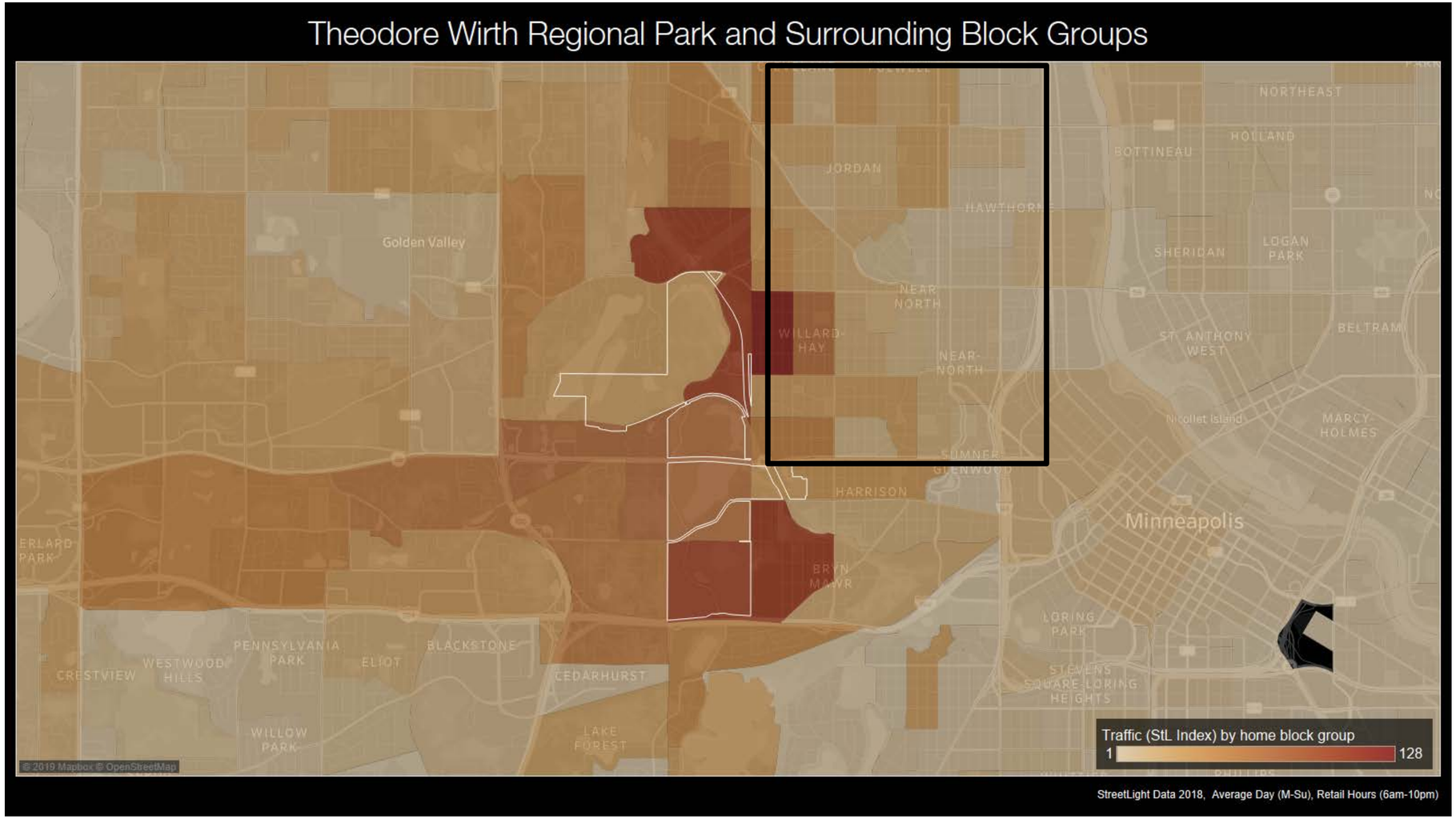
Example: Equity Analysis at Theodore Wirth

- Close proximity to large Black population
- Should be reflected in demographics of visitors

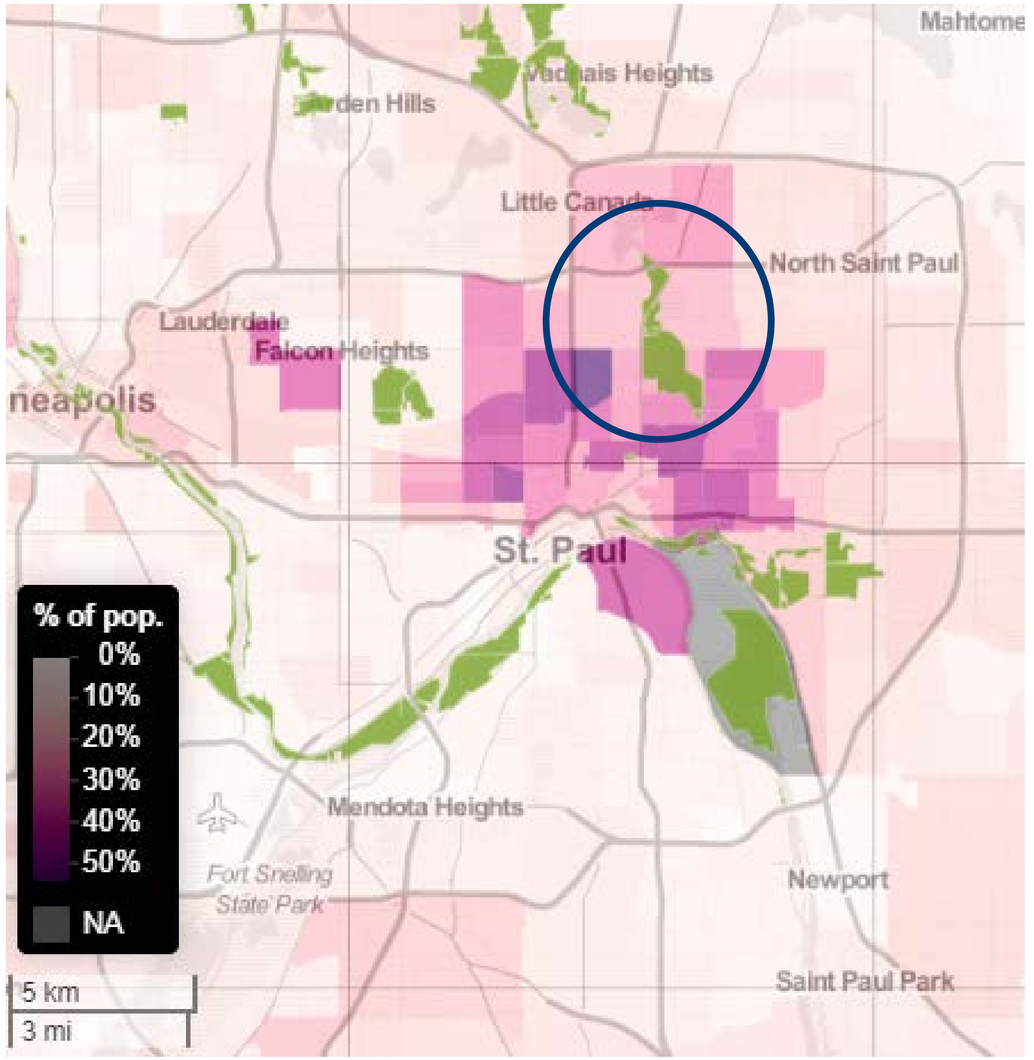


Theodore Wirth home location of visitors



Example: Equity Analysis at Phalen

- Close proximity to large Asian population
- Should be reflected in demographics of visitors



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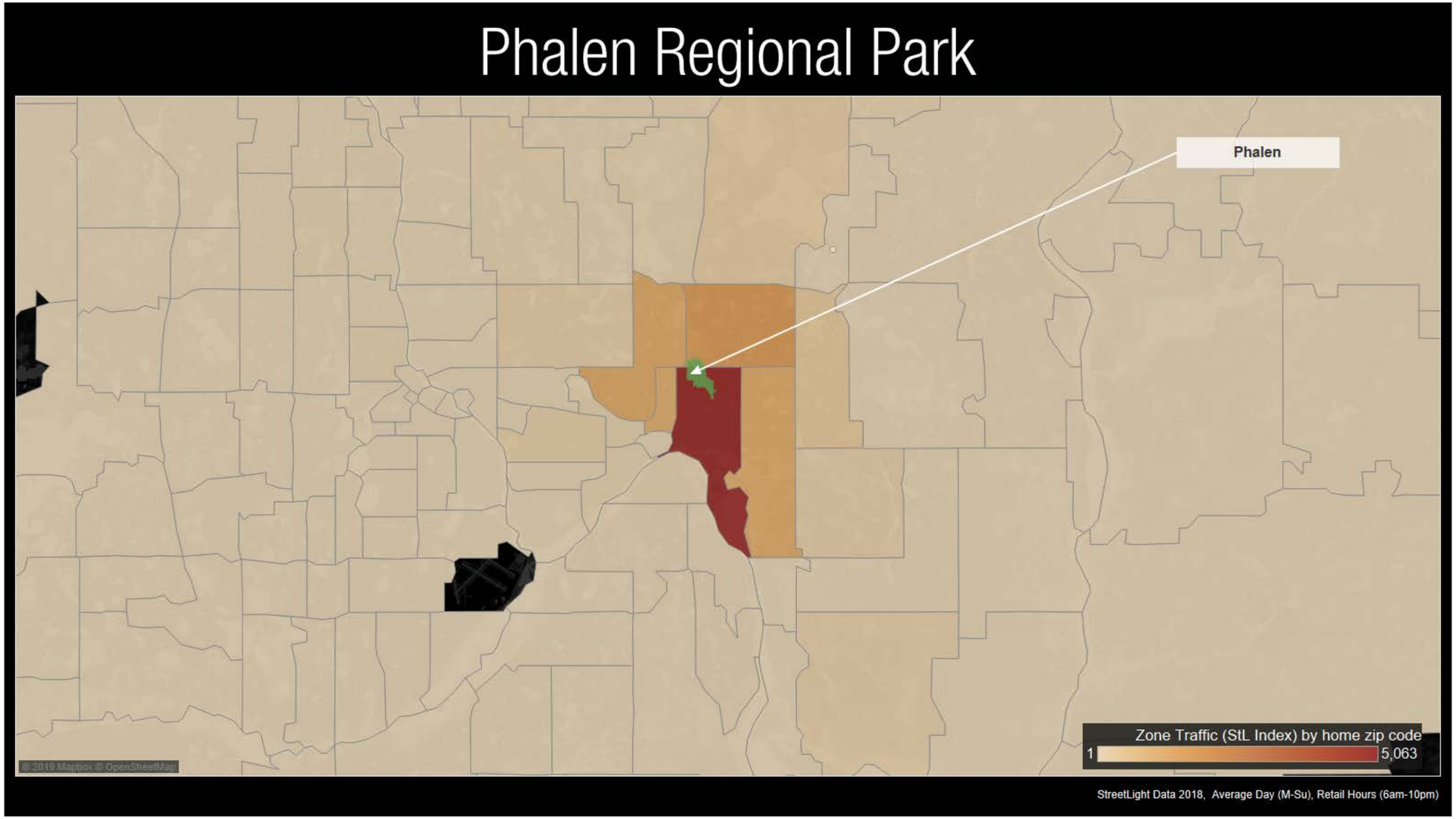
Phalen home location of visitors



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