Divvy Bike Stations in Chicago, Illinois
Accessibility, Location, & Expansion of Divvy Bike Stations

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Introduction

- The Divvy bike system consists of manual and electric bikes.
- Launched a network of docking systems throughout the Chicago area in 2013, with the first station installed within the loop.
- In 2019, Divvy expanded outwards from the loop and to lower-income communities.
- There are currently 950 Divvy bike stations in Chicago.

Research Questions

- What is the distribution of Divvy bike stations across the Chicago area?
- Do population or median household income influence the number of stations?
- Where can the city use more Divvy bike stations?
- How accessible are Divvy bike stations in different areas of the city?

Methodology

- **Geographically weighted regression** was used to look at the relationship between number of bike stations vs population and median household income.
- **Optimized hot spot analysis and optimized outlier analysis** was used to locate hot and cold spots around the city, along with outliers to locate bike station distribution across the city.
- **Buffer analysis** was used to find potential new station locations.
- **Network analysis** was used to show walking accessibility to each station.
- Criteria for all analysis included:
  - Population by zip code
  - Median household income by zip code
  - Divvy bike stations
  - Bike routes
  - Major streets
  - Zip code boundaries

Bike Station Distribution
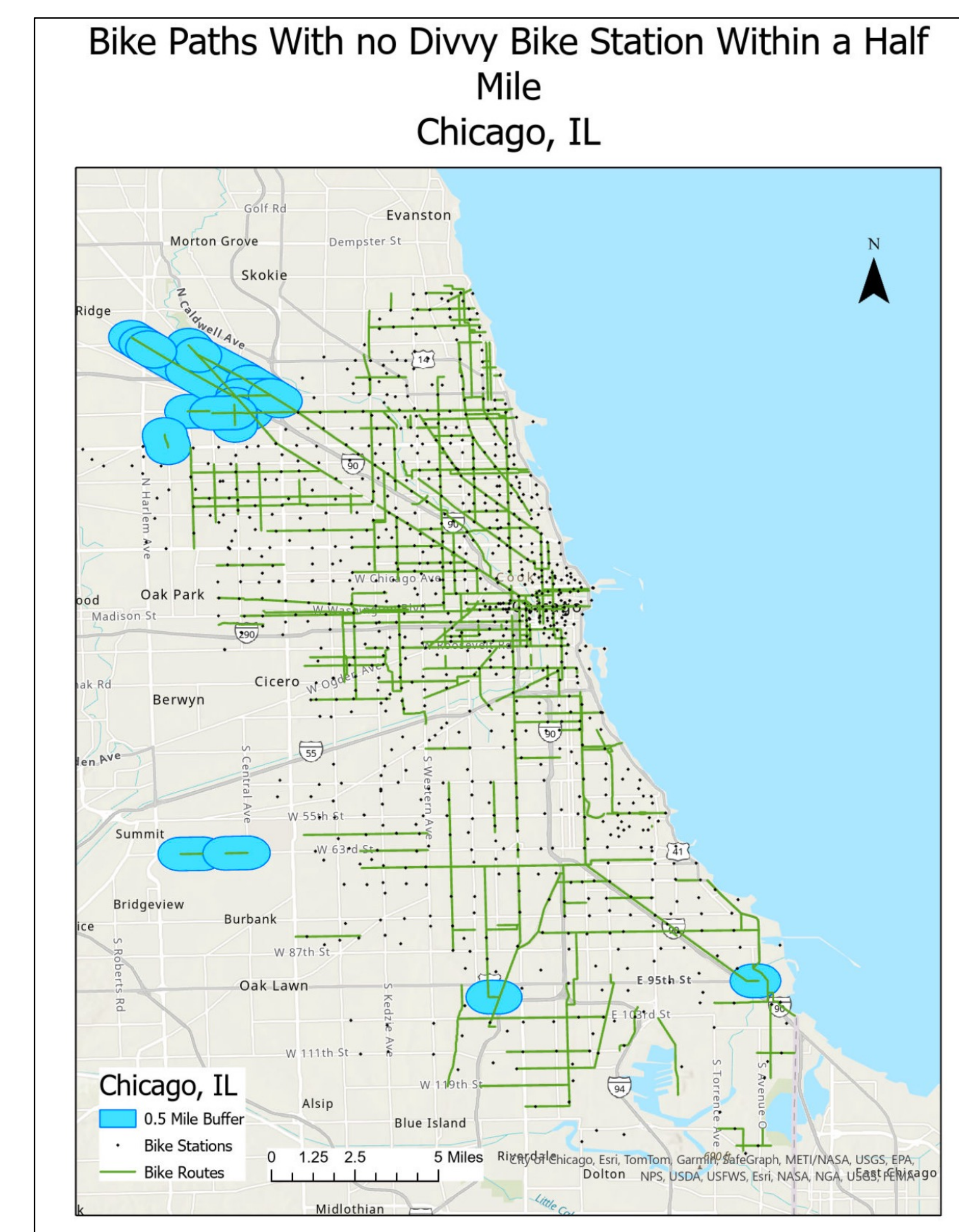

Count of Divvy Bike Stations Per Zip Code
Chicago, IL
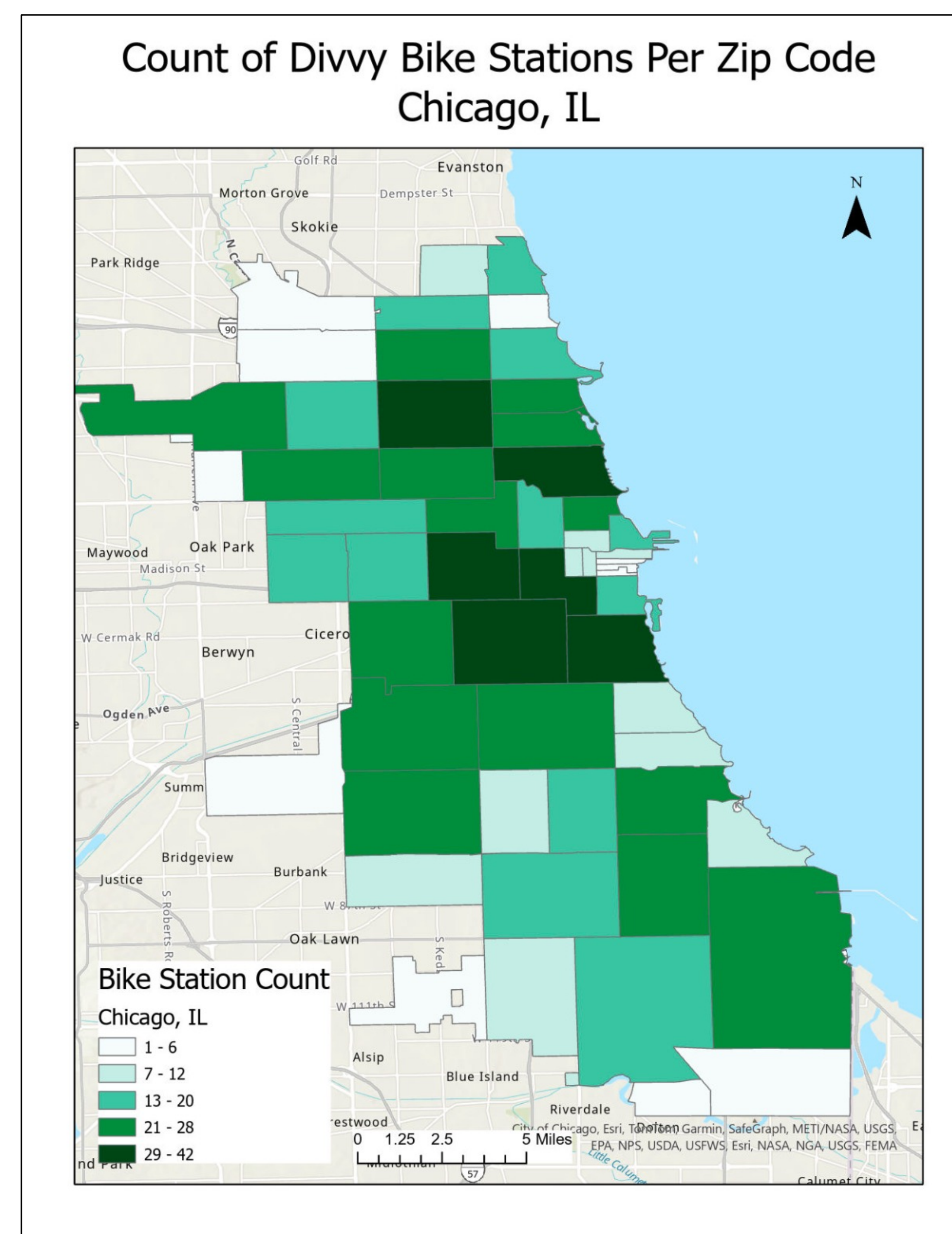
- Lakeview and the loop area have the most of stations.
- More suburban areas and edge of the city limits have the least amount.

Bike Station Accessibility

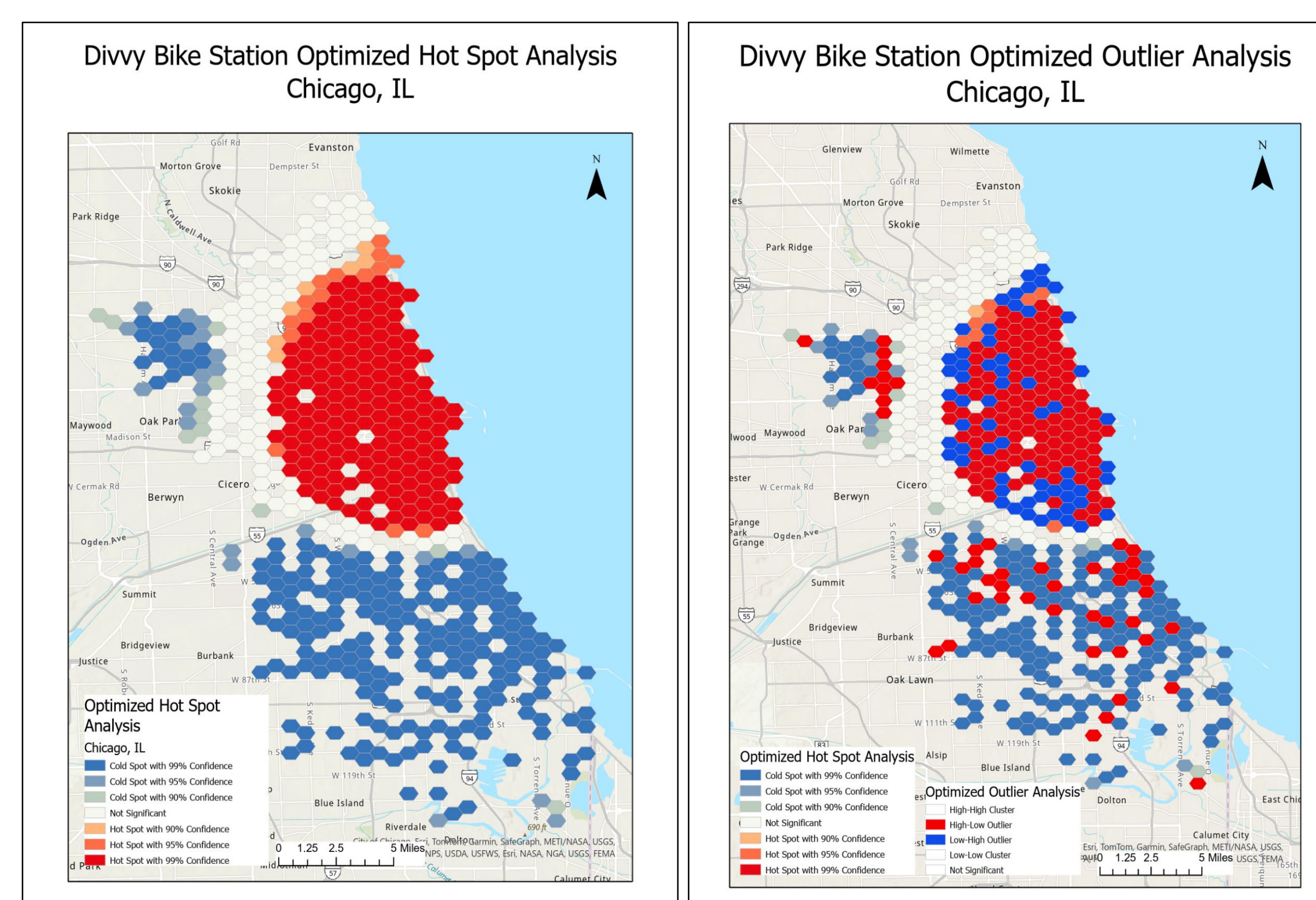Divvy Bike Stations Accessibility by 5, 10, & 15 Minute Walk
Chicago, IL
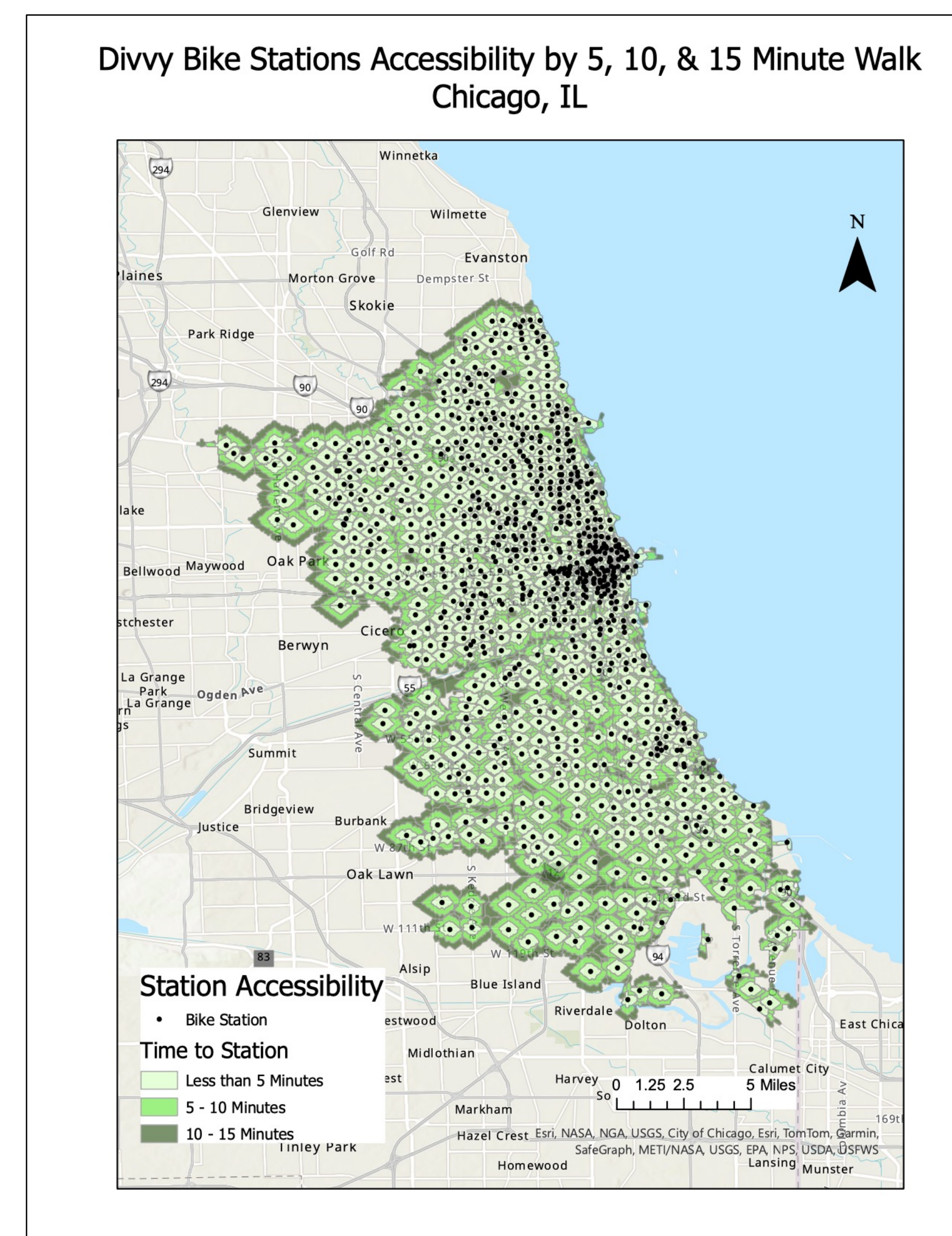
- Most stations in the north side of the city are within a 5 or less minute walk of each other, making the north side more accessible.
- The south side stations are more spread out, as there are more stations that are in the 5-10, or 10-15-minute range.

Hot Spot & Outliers

Divvy Bike Station Optimized Hot Spot Analysis
Chicago, IL

Divvy Bike Station Optimized Outlier Analysis
Chicago, IL

- There is a clear distinction between the hot spots and cold spots.
- The north side of the city contains the majority of the bike stations.
- Cold spots are predominately located on the south side of the city.
- There are a few outliers, high-low clusters located mostly in the south and west side, while low-high clusters are scattered throughout the north side.

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Median Household Income vs Divvy Bike Station Count
Chicago, IL

Population vs Divvy Bike Station Count
Chicago, IL

- The dark green areas are where the relationship between bike station counts, and the respective explanatory variable are the strongest.
- Median household income and bike counts have the strongest relationship in the north side of the city.
- Population and bike counts have the strongest relationship in the loop and more suburban areas in the northwest.
- These coefficients are very small, so these demographic factors may not pull as much weight when determining bike station distribution.

Buffer Analysis

Bike Paths With no Divvy Bike Station Within a Half Mile
Chicago, IL

- Looking to see where Divvy could add more stations, a buffer was created along bike routes where there was no station within a half mile.
- There is opportunity for expansion in the upper west side, and parts of the west and south side.

Conclusions

- More Divvy bike stations are in higher income areas.
- Higher population does not always equate to more stations.
  - Ex: the loop has a lot of stations, but a lower population density.
- The north side has better access to bike stations.
- There is still room for more Divvy bike locations across the city.

Data Sources

- Demographic Information:
  - *Median household income* by Chicago Health Atlas (https://chicagohealthatlas.org)
  - *Chicago Population Counts* by Department of Public Health (https://www.chicago.gov)
- Bike Information:
  - *Bike Routes* by Department of Transportation (https://www.chicago.gov)
  - *Divvy Bicycle Stations* by City of Chicago (https://gbfs.divvybikes.com/gbfs/2.3/gbfs.json)
  - *Major Streets* by City of Chicago (http://www.cityofchicago.org)
  - *About Divvy* (https://divvybikes.com/about)
- Boundaries:
  - *Boundaries – Zip Codes* by City of Chicago (http://www.cityofchicago.org)