MEMORANDUM

To: Lee Ann Prather, Janel Veile, Adam Gabany, and Michael Vanderhoof (IDOT)
From: Alta Planning + Design
Date: June 15th, 2023
Re: Illinois Active Transportation Plan – Demand Analysis

Introduction

This memo presents an overview of the approach and outcomes from the Live, Work, Play tool which evaluates both existing and suppressed demand for active transportation. Results are presented separately for both walking and biking. The composite score is built on factors that consider the location of trip generators, such as where people live and work, and trip attractors, such as schools and retail establishments where people learn and play. Additionally, the analysis considers built environment factors like intersection density as well as existing demographic or trip-making patterns. The demand analysis will generate an index of active transportation demand that is relative to the state of Illinois and considers patterns of land use.

By creating a composite heat map that considers both the location of trip generators, such as where people live and work, and trip attractors, such as schools and retail establishments where people learn and play, it is possible to develop a generalized picture of existing and latent demand across an area. The resulting generalized picture of demand can be used on its own or combined with other more detailed transportation data, such as information about areas with high concentrations of short trips to identify network gaps along existing transportation desire lines and locations that will immediately benefit from more infrastructure.

Demand Indicators

Indicators to assess walking and biking demand are presented in **Table 1**. These were selected on three dimensions of demand for biking and walking: built environment factors, proximity to trip attractors and generators, and demographic and trip-making behaviors.

Table 1: Demand Indicators

Variable	Source	Notes and Assumptions	Walk Score Weight	Bike Score Weight
Intersection Density	Smart Location Database (EPA, 2021) D3B	Weighted street intersection density, where an intersection includes locations where three or more network links meet at a single point and at least one is a non-auto-oriented facility. Higher intersection density is often used as an indicator of increased walkability, and this variable is included in the National Walkability Index (EPA, 2021) and is reported at the census block group level.	10%	0%

Variable	Source	Notes and Assumptions	Walk Score Weight	Bike Score Weight
Bike Facility Density (quality adjusted)	Illinois DOT Bicycle Facility Inventory System Data 2023	Each polygon in the demand surface is assigned the average value of a weighted bike facility density raster that indicates the proximity and quality of bike facilities. The kernel density bandwidth is 1/4 mile, and weights are applied as follows: 1 – shared road; 5 – bike lane (unprotected), buffered bike lane, counterflow bike lane, or paved shoulder; 10 – protected bike lane, shared-use path, or off road trail.	0%	15%
Proximity to Transit Stops	National Transit Map Stops (BTS, 2022)	Contains voluntarily submitted General Transit Feed Specification (GTFS) data for stops along fixed-route services. Walking and biking often serve as first-last mile connectors for transit trips.	10%	5%
Proximity to Entertainment	OpenStreetMap	Locations tagged as cinema, community center, planetarium, nightclub, theater, social center, conference center, arts center, fast food, food court, restaurant, cafe, bar, pub, aquarium, attraction, museum, theme park, or zoo in OpenStreetMap. These serve as trip generators and may increase trip-making activity in the vicinity.	5%	5%
Proximity to Grocery Stores	USDA SNAP Eligible Retailers	Retailers were filtered to remove gas stations and convenience stores. These serve as trip generators and may increase trip-making activity in the vicinity.	5%	5%
Proximity to Parks	OpenStreetMap	Locations tagged as parks in OpenStreetMap. These serve as trip generators and may increase trip-making activity in the vicinity.	10%	10%
Proximity to Schools	Homeland Infrastructure Foundation-Level Data (HIFLD)	Centroid points of public and private elementary and secondary school campuses for the 2019–2020 school year. These serve as trip generators and may increase trip-making activity in the vicinity.	10%	10%
Employment Mix	Smart Location Database (EPA, 2021), D2B_E8MIXA	Eight-tier employment entropy is used as a proxy for measuring the diversity of land uses present in a certain area. Increased land use diversity is associated with increased walkability, and this variable is included in the National Walkability Index (EPA, 2021) and is reported at the census block group level.	5%	5%

Variable	Source	Notes and Assumptions	Walk Score Weight	Bike Score Weight
Employment + Housing Mix	Smart Location Database (EPA, 2021), D2A_EPHHM	Employment and household entropy is another proxy for measuring land use mix. Higher values indicate a greater diversity of land uses, which is associated with increased walkability. This variable is included in the National Walkability Index (EPA, 2021) and is reported at the census block group level.	5%	5%
Housing Unit Density	Smart Location Database (EPA, 2021), D1A	Gross residential density on unprotected land, measured as housing units per acre and reported at the census block group level. Increased housing unit density generally indicates more people living in an area, and thus more trip-making activity.	5%	5%
Job Density	Smart Location Database (EPA, 2021), D1C	Gross employment density on unprotected land, measured as jobs per acre and reported at the census block group level. Increased job density generally indicates more people working or shopping in an area, and thus more trip-making activity.	5%	5%
Percent Zero Vehicle Households	Smart Location Database (EPA, 2021), Pct_AO0	Percent of zero-car households in the census block group. Households without vehicles available are more likely to walk or bike for their primary trip mode.	15%	15%
Walk/Bike Mode Commute Split	2020 5-Year American Community Survey (ACS)	Percentage of workers aged 16 or over who commuted to work via walking or biking, respectively, reported at the census tract level for the workers' home locations.	5%	5%
Short Trip Making	Replica Places	The percentage of modeled person trips with destinations in the study area that are less than 1 mile or less than 3 miles. This is used to estimate trips that could reasonably be converted to walking or biking modes, respectively. Data is modeled for a typical travel weekday during fall 2019.	10%	10%

Statewide Results

Demand was estimated for both walking and biking using inputs and weighting identified above. The major differences between bicycling and walking models related to the trip distances (1 mile for walking and 3 miles for biking) as well as the incorporation of existing bicycle facilities based on the most recent data provided by IDOT. Using this approach results in two similar yet distinct outputs for walking and biking as shown in **Map 1** and **Map 2** below.

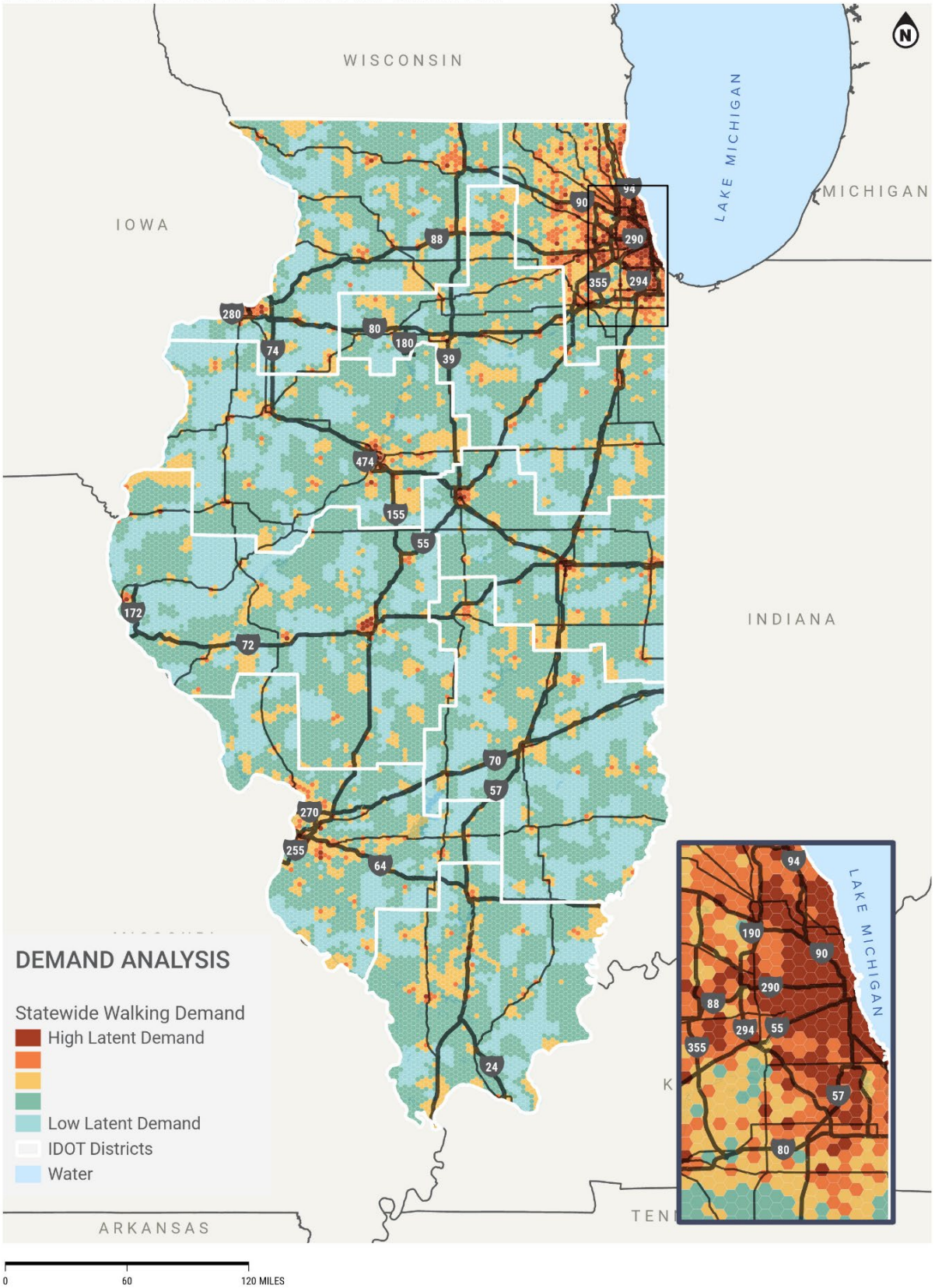
Evaluating demand on a statewide scale can be challenging given the varying built environment contexts. Illinois features both densely populated urban centers and sparse rural areas. Generally, the trip generator inputs used in the demand analysis are more common in urban areas then rural ones. This includes transit amenities, housing unit density and a walkable or bikeable distance between housing options and everyday destinations such as schools and grocery stores. Given this, areas with the highest demand for walking and biking in Illinois are within urbanized areas.

Similarities and differences in the composite demand results between biking and walking can be summarized as the following:

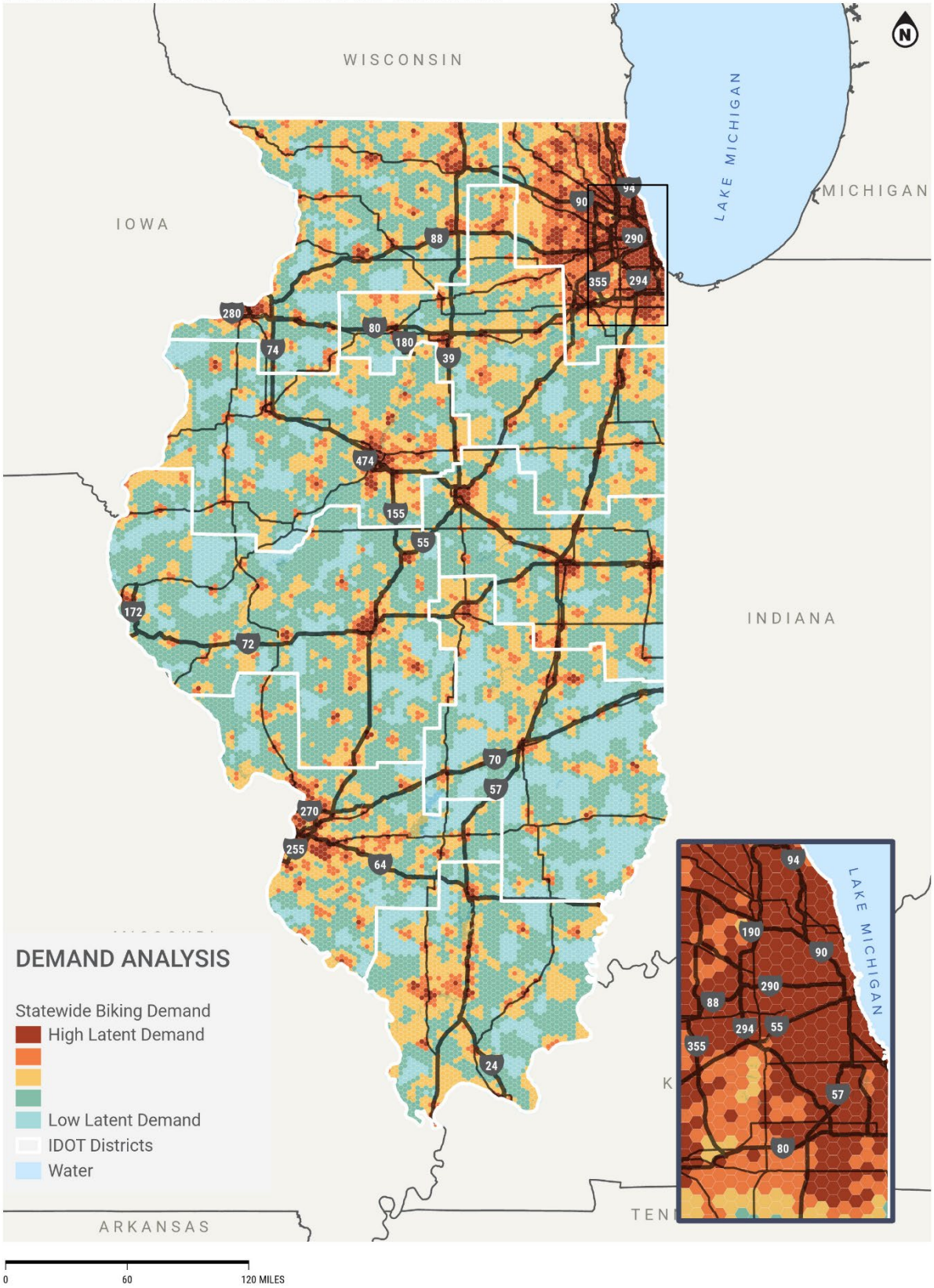
- Both biking and walking demand are concentrated near urban centers in Illinois.
- Walking demand is generally highest near urban cores, while biking demand extends further beyond the core downtown. This reflects longer typical trip distances for bikes (i.e. larger bike-sheds).
- In addition to urban areas, biking demand also follows major interstate and state routes, such as route 57, route 55, and route 80.

On the maps that follow, the data is displayed in hexagons that were sized to correspond to census tracts. Proportional allocation was used to correctly assign values where the hexagon crossed one or more census boundaries. The use of the hexagons decreases the “boundary effect” which can occur when geographic analyses are too influenced by geographic boundaries that are not necessarily related to the underlying data.

Map 1. Illinois Statewide Walking Demand Analysis



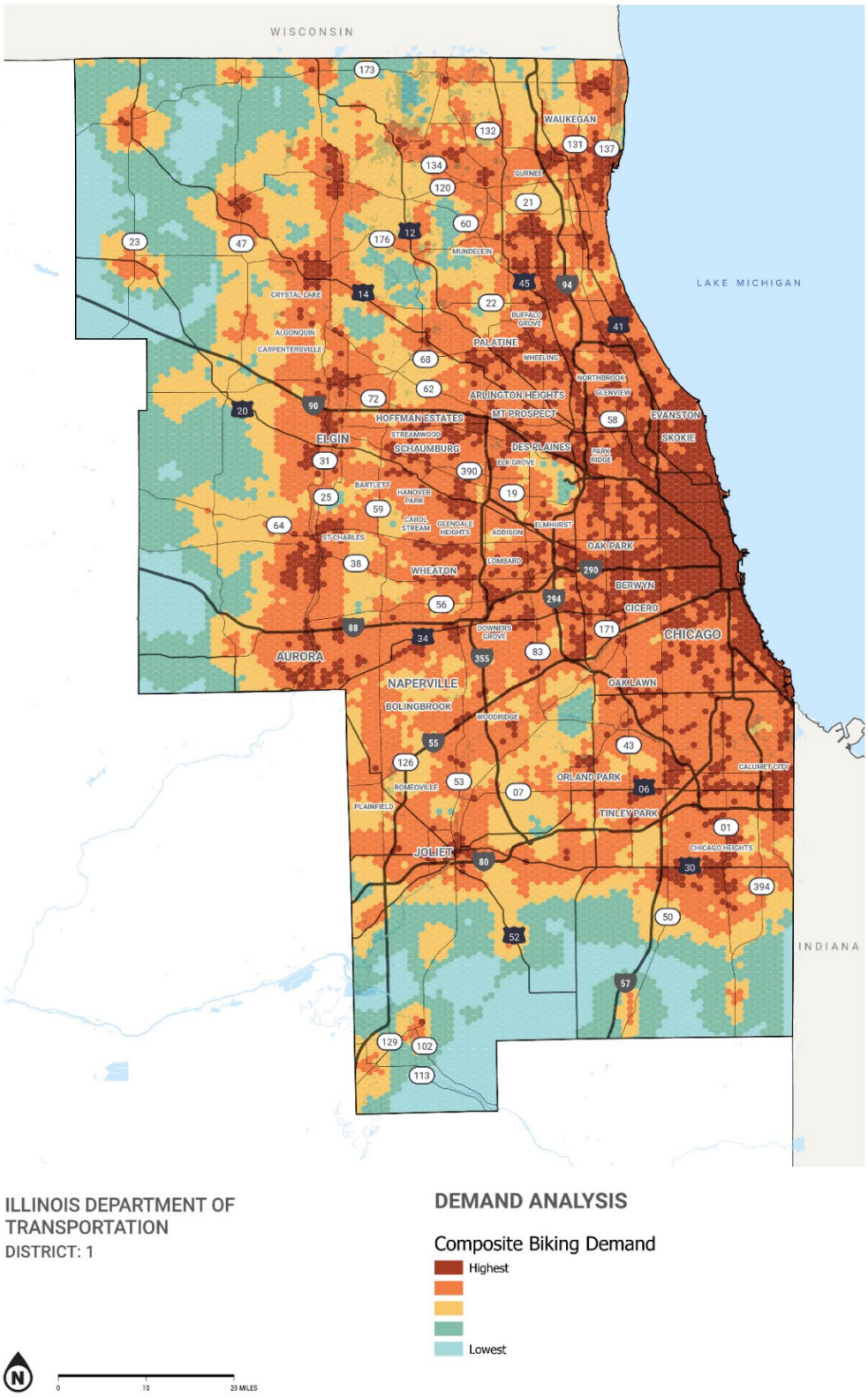
Map 2. Illinois Statewide Biking Demand Analysis

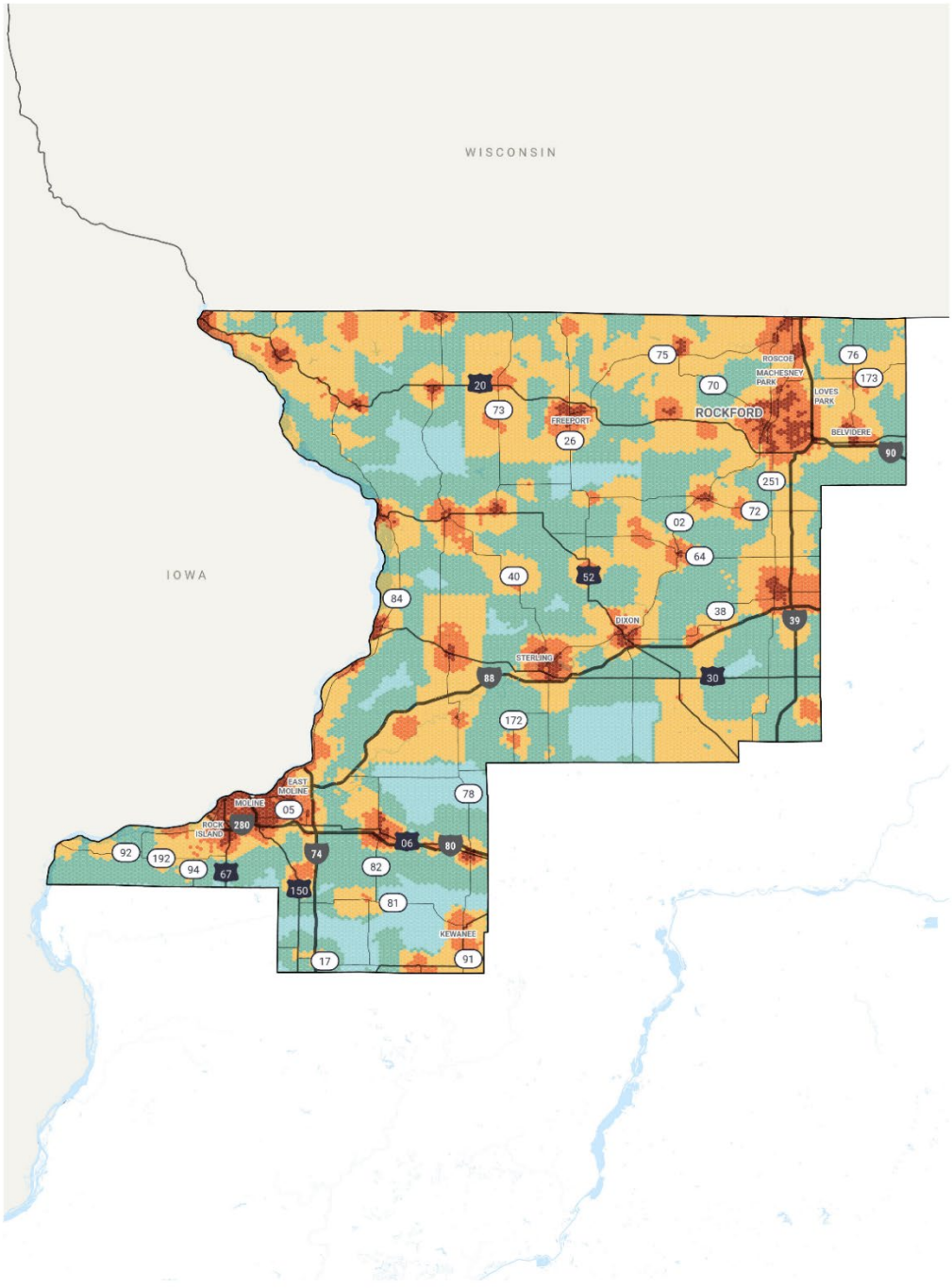


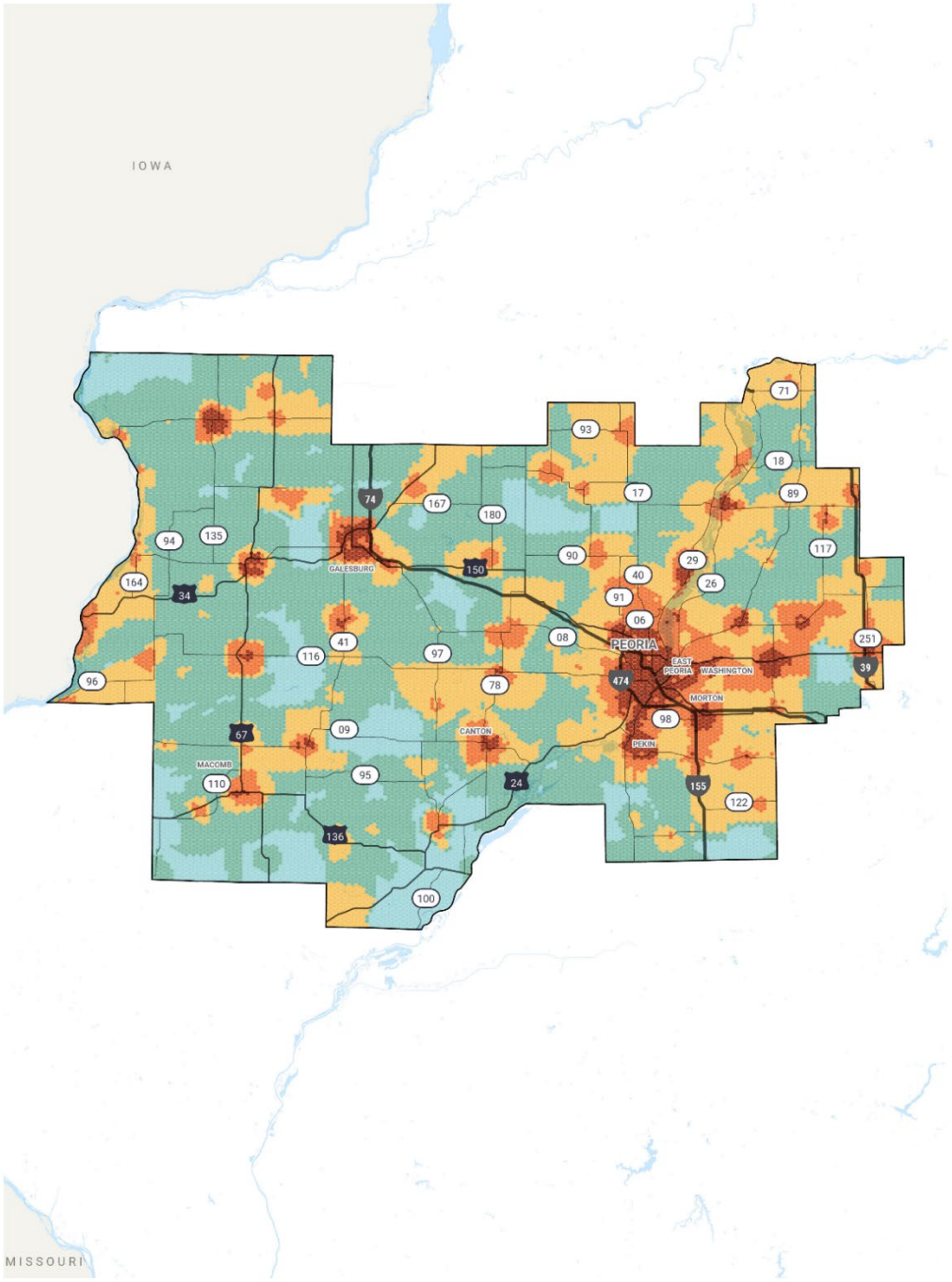
District Results

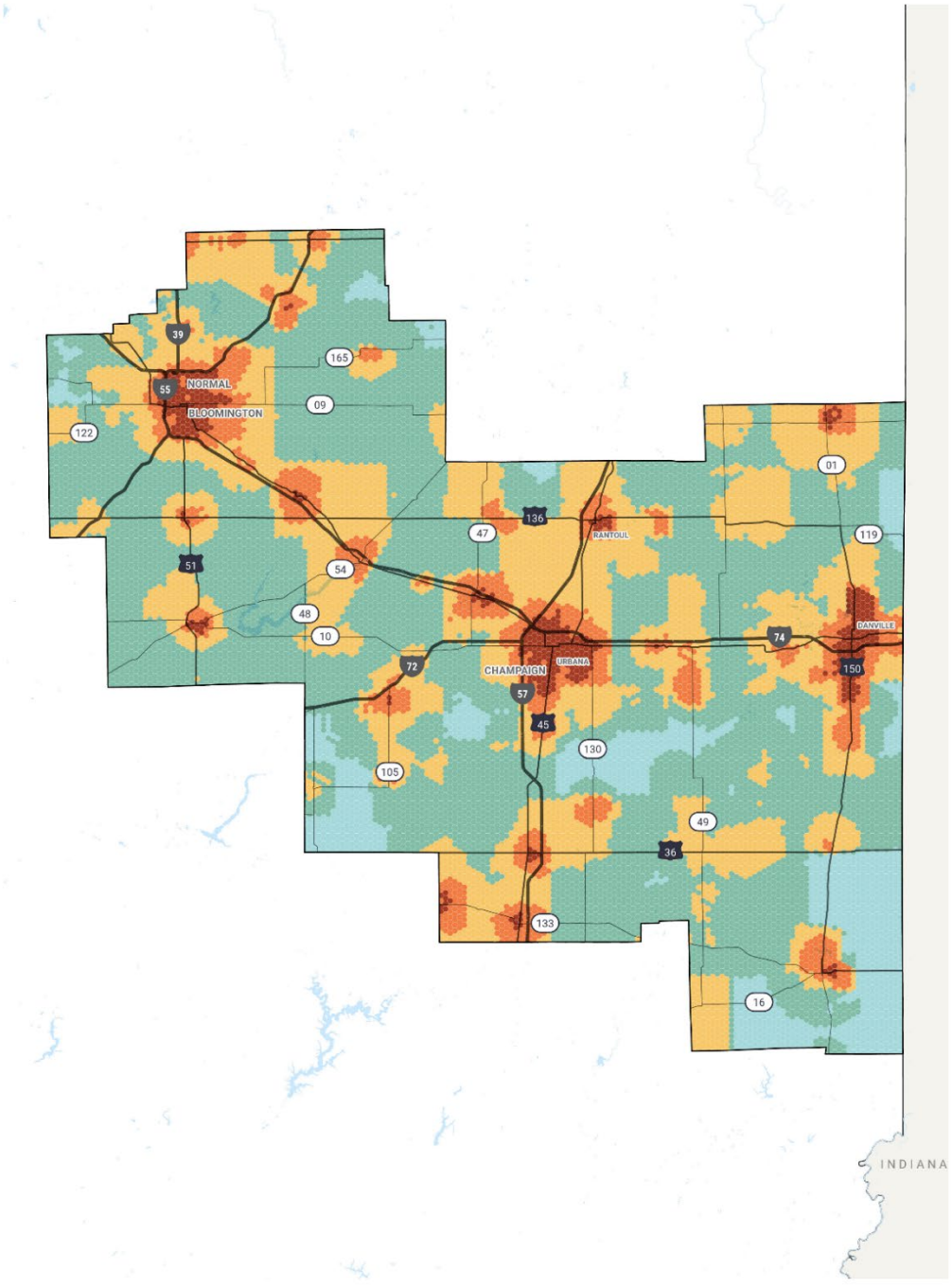
In addition to the statewide demand analysis, an analysis was completed for each district at a more refined scale with a map that highlights the areas with the greatest demand in each district. The following maps below show demand within each district and identify the highest pockets of demand relative to the district rather than to the state as a whole. The results are similar to the statewide composite score, yet provide a greater granularity to pockets of demand, particularly within the urban areas in Illinois. Outputs from the composite District level walking and biking demand analysis will help inform recommendations across the state and within each District.

Biking Demand by District




WISCONSIN
IOWA
ROCKFORD
ROSCOE
MACHESNEY PARK
LOVES PARK
BELVIDERE
FREEPORT
DIXON
STERLING
EAST MOLINE
MOLINE
ROCK ISLAND
KEWANEE
ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT: 2
DEMAND ANALYSIS
Composite Biking Demand
Highest
Lowest
0
20
40 MILES


IOWA
MISSOURI
GALESBURG
PEORIA
EAST PEORIA
WASHINGTON
MORTON
PEKIN
CANTON
MACOMB
74
150
34
67
24
155
474
ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT: 4
DEMAND ANALYSIS
Composite Biking Demand
Highest
Lowest
0
20
40 MILES



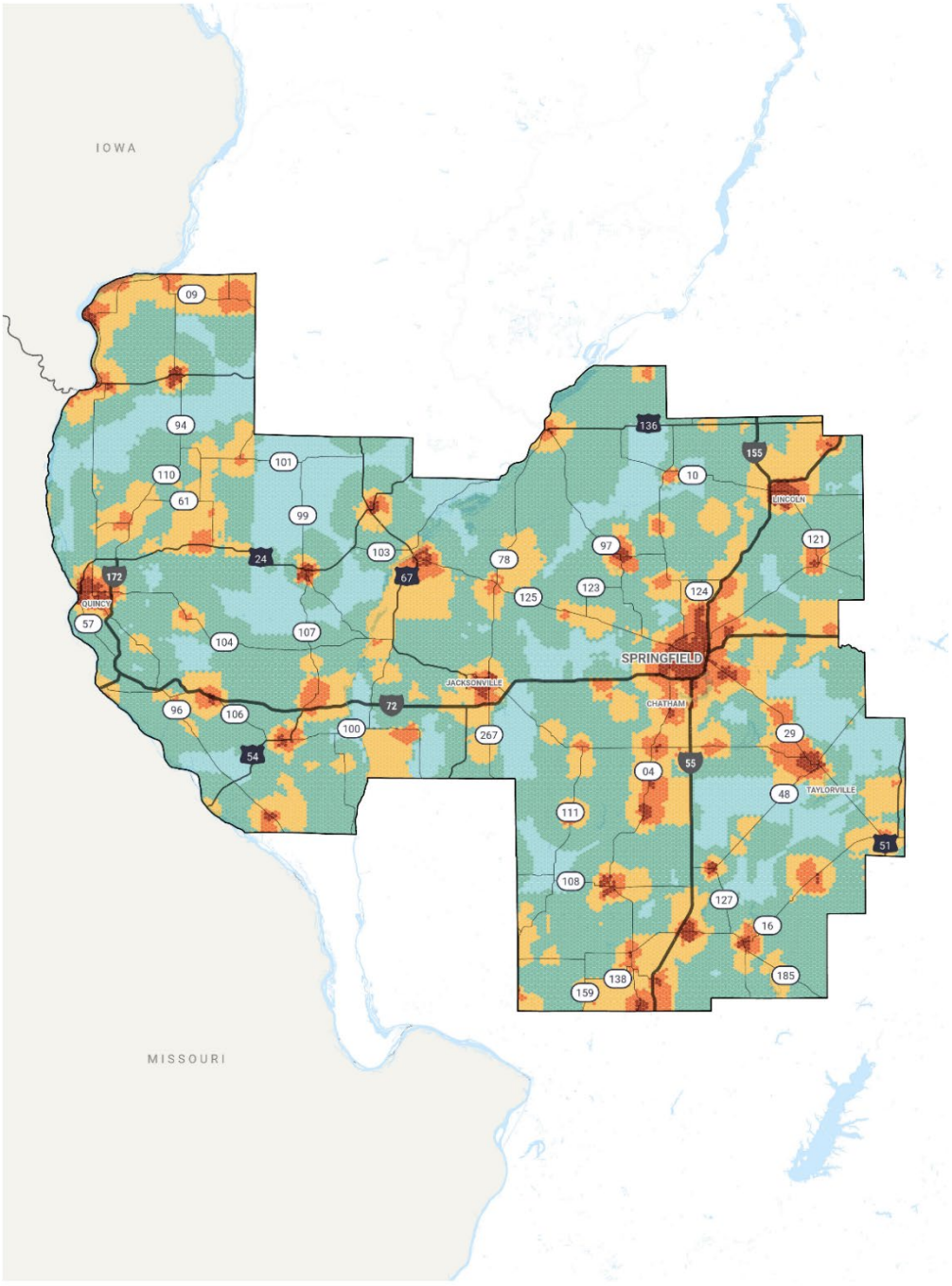
ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT: 5

DEMAND ANALYSIS

Composite Biking Demand
Highest
Lowest

N

0 10 20 MILES



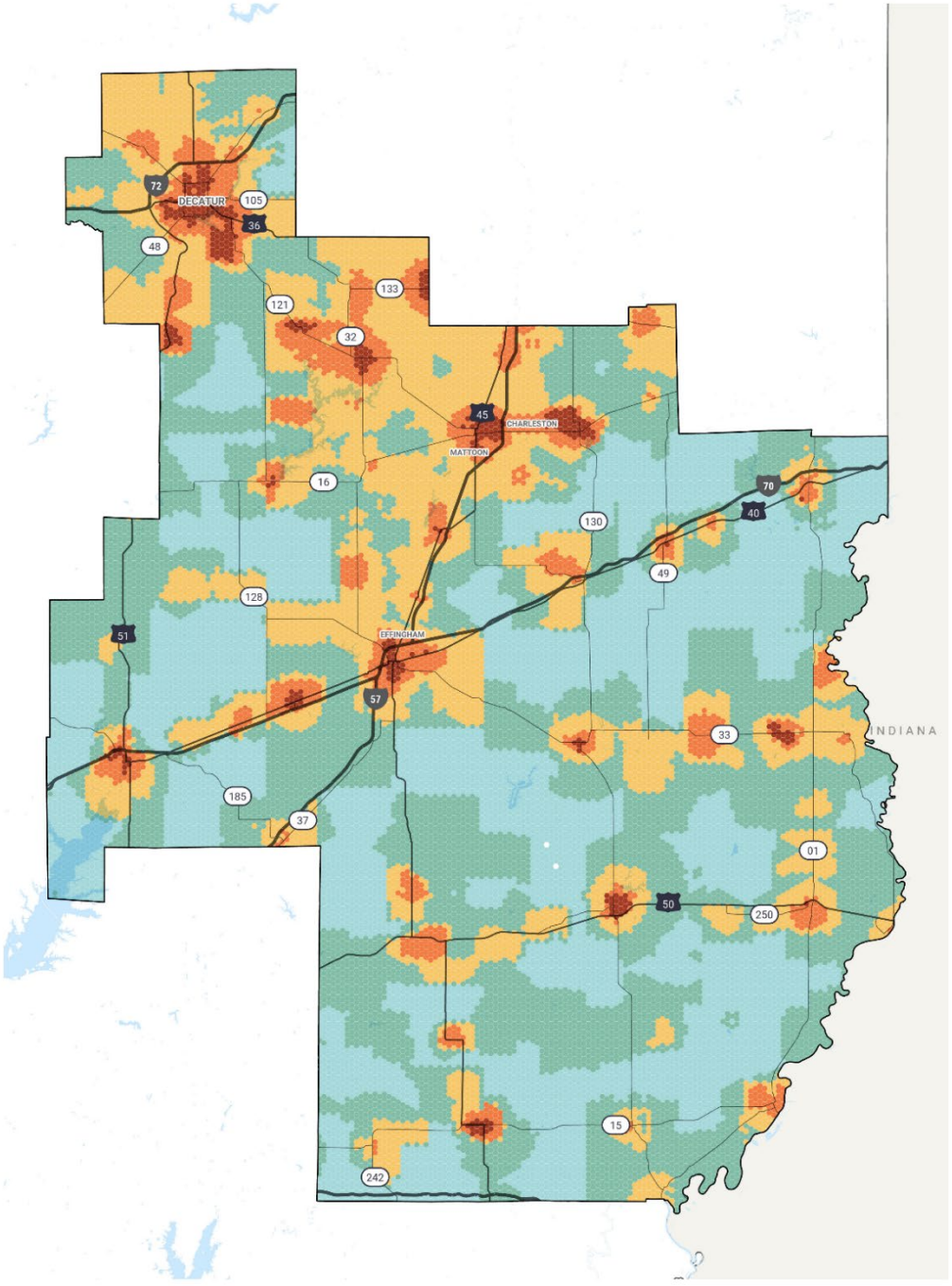
ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT: 6

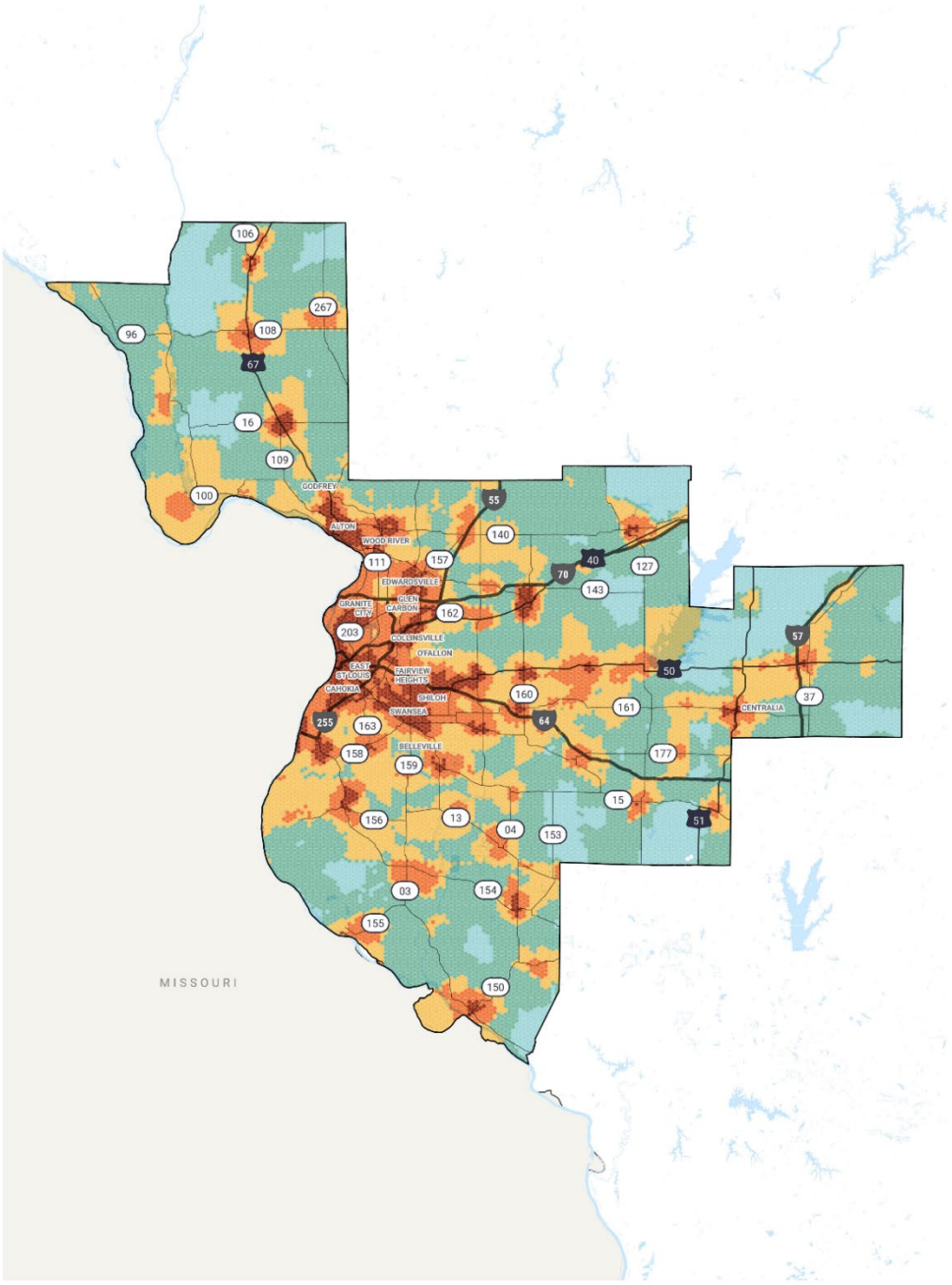
DEMAND ANALYSIS

Composite Biking Demand

Highest

Lowest


DECATUR
CHARLESTON
MATTOON
EFFINGHAM
INDIANA
72
105
36
48
121
133
32
45
16
130
70
40
49
128
51
57
33
185
37
01
50
250
15
242
ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT: 7
DEMAND ANALYSIS
Composite Biking Demand
Highest
Lowest
N
0
10
20 MILES



ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT: 8

DEMAND ANALYSIS

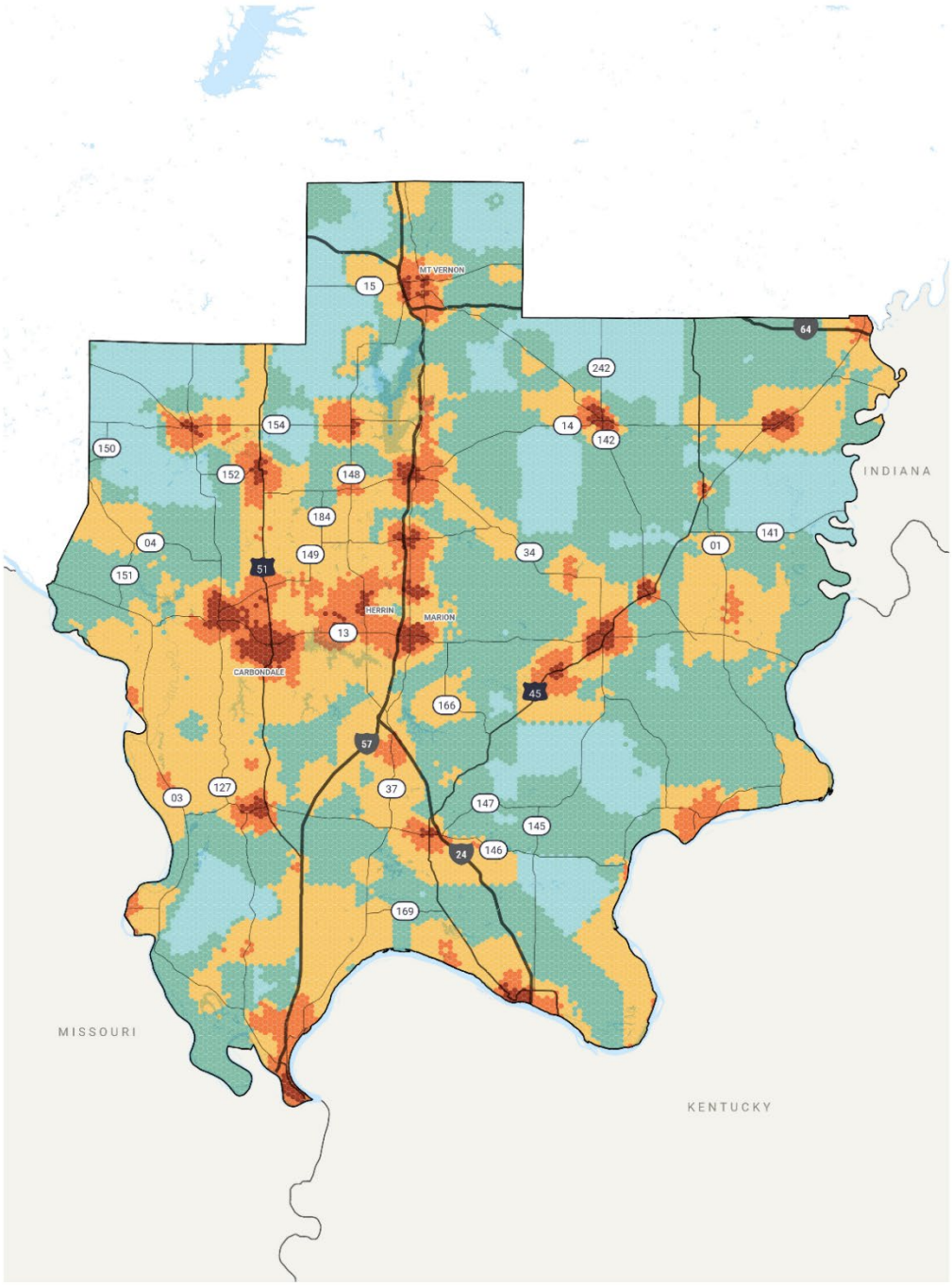
Composite Biking Demand

Highest

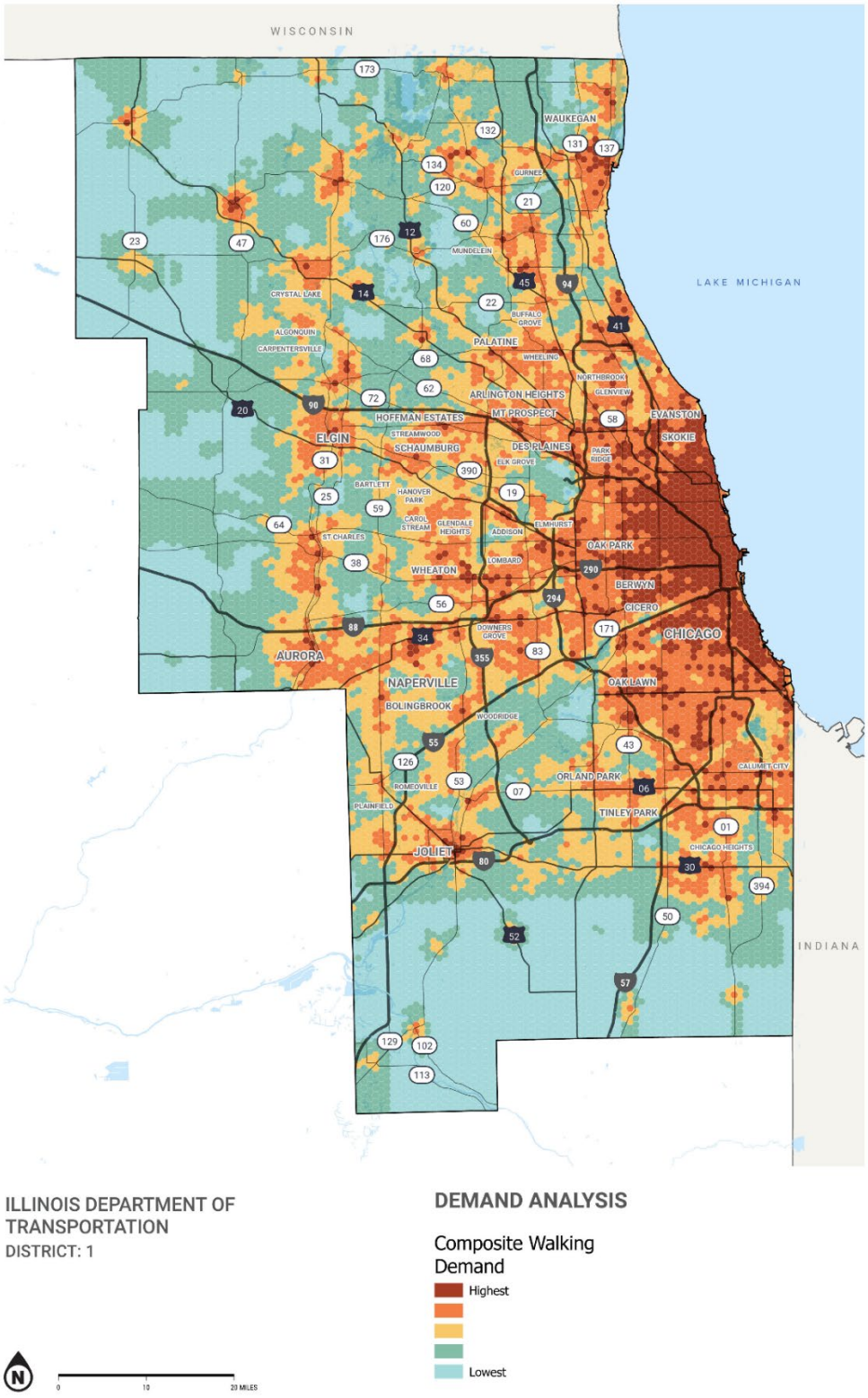
Lowest

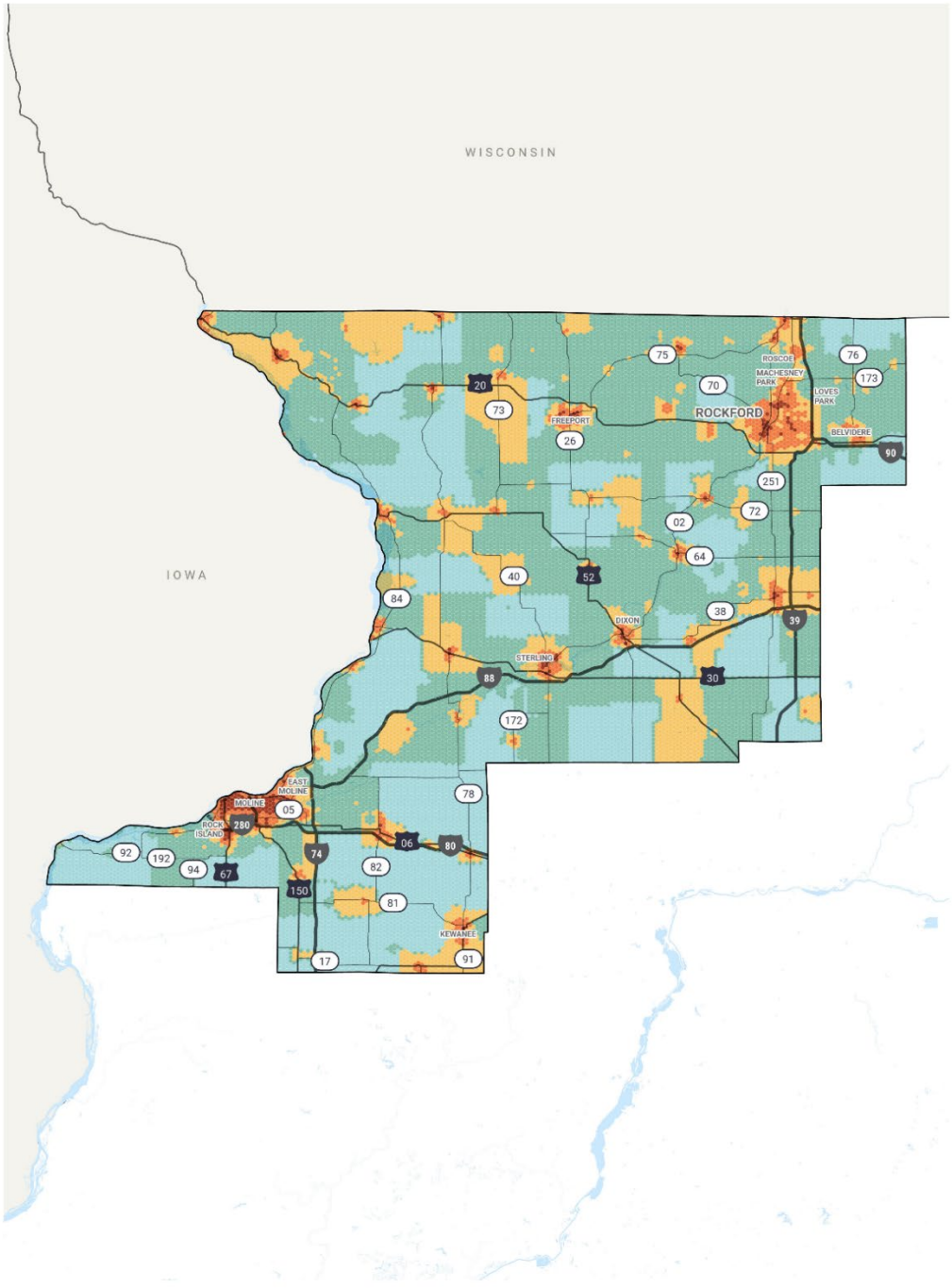
N

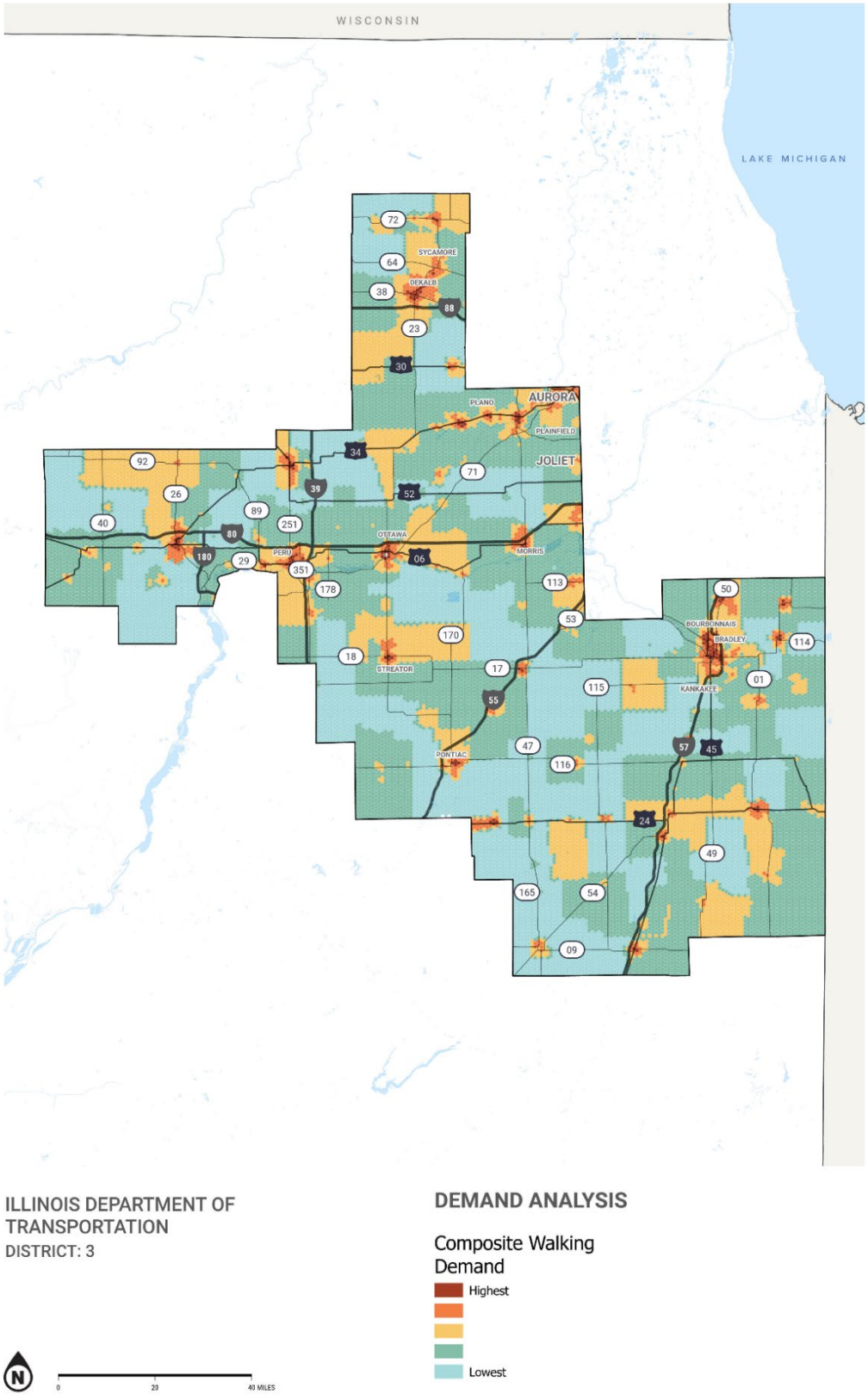
0 20 40 MILES

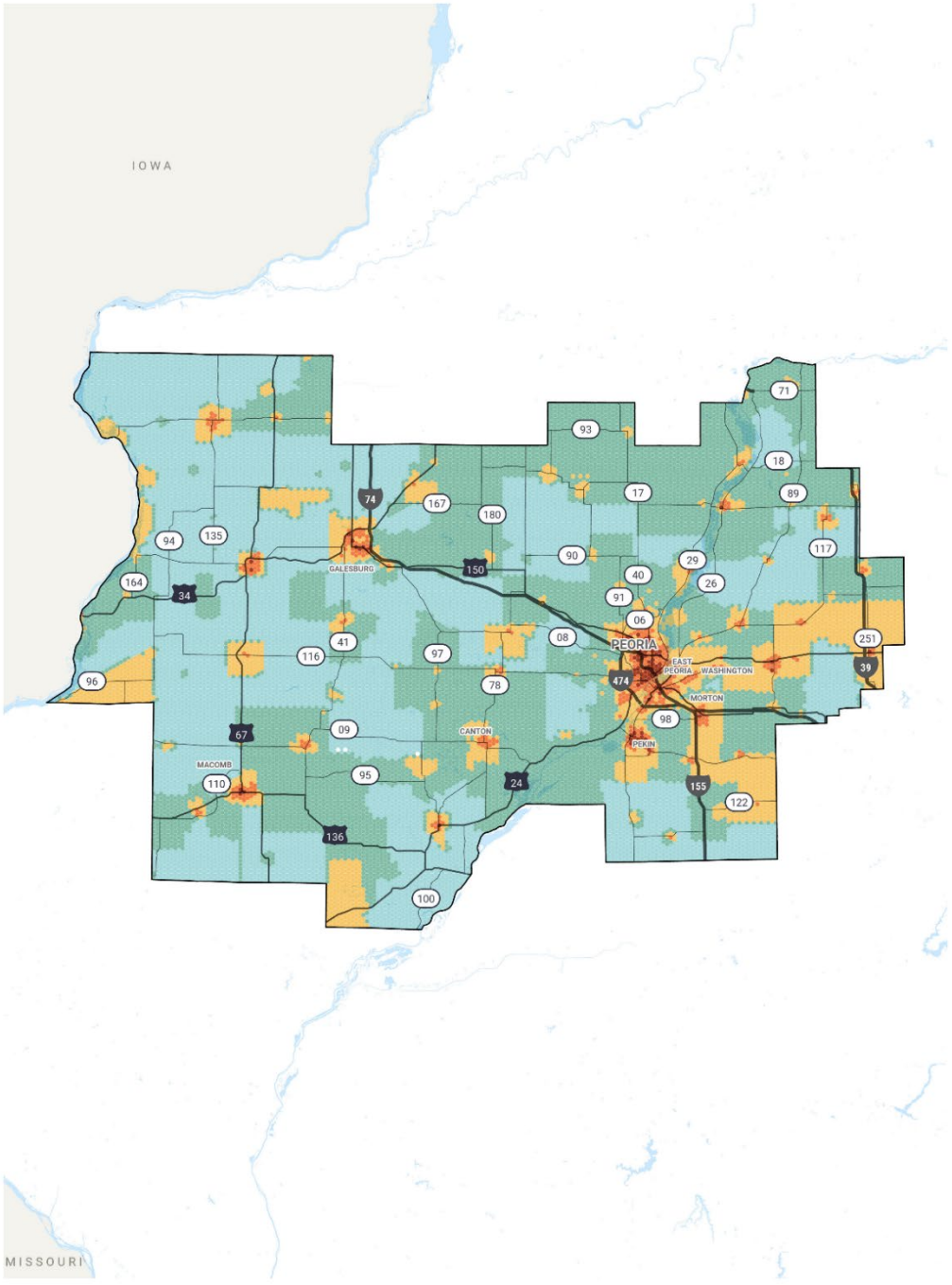

MT. VERNON
CARBONDALE
HERRIN
MARION
INDIANA
MISSOURI
KENTUCKY
15
64
242
14
142
154
150
152
148
184
04
149
34
01
141
151
51
13
45
166
57
03
127
37
147
145
24
146
169
ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT: 9
DEMAND ANALYSIS
Composite Biking Demand
Highest
Lowest
N
0
10
20 MILES

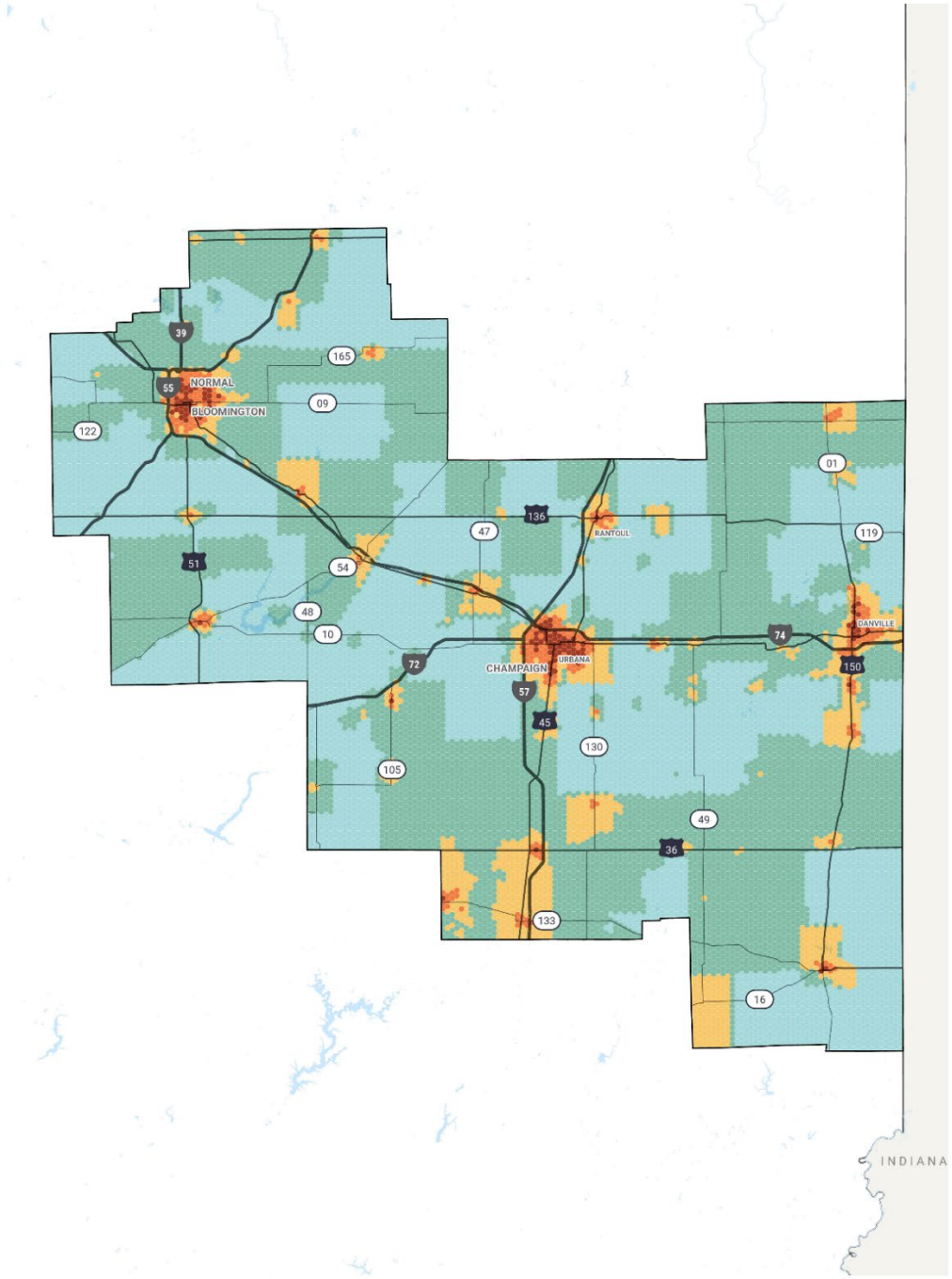
Walking Demand by District




WISCONSIN
IOWA
ROCKFORD
FREEPORT
DIXON
STERLING
ROSCOE
MACHESNEY PARK
LOVES PARK
BELVIDERE
EAST MOLINE
MOLINE
ROCK ISLAND
KEWANEE
ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT: 2
DEMAND ANALYSIS
Composite Walking Demand
Highest
Lowest
0
20
40 MILES


WISCONSIN
LAKE MICHIGAN
AURORA
PLANO
PLAINFIELD
JOLIET
SYCAMORE
DEKALB
OTTAWA
PERU
MORRIS
STREATOR
PONTIAC
BOURBONNAIS
BRADLEY
KANKAKEE
ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT: 3
0
20
40 MILES
DEMAND ANALYSIS
Composite Walking Demand
Highest
Lowest


IOWA
MISSOURI
GALESBURG
PEORIA
EAST PEORIA
WASHINGTON
MORTON
PEKIN
CANTON
MACOMB
74
150
34
67
474
155
24
136
ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT: 4
DEMAND ANALYSIS
Composite Walking Demand
Highest
Lowest
0
20
40 MILES



ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT: 5

DEMAND ANALYSIS

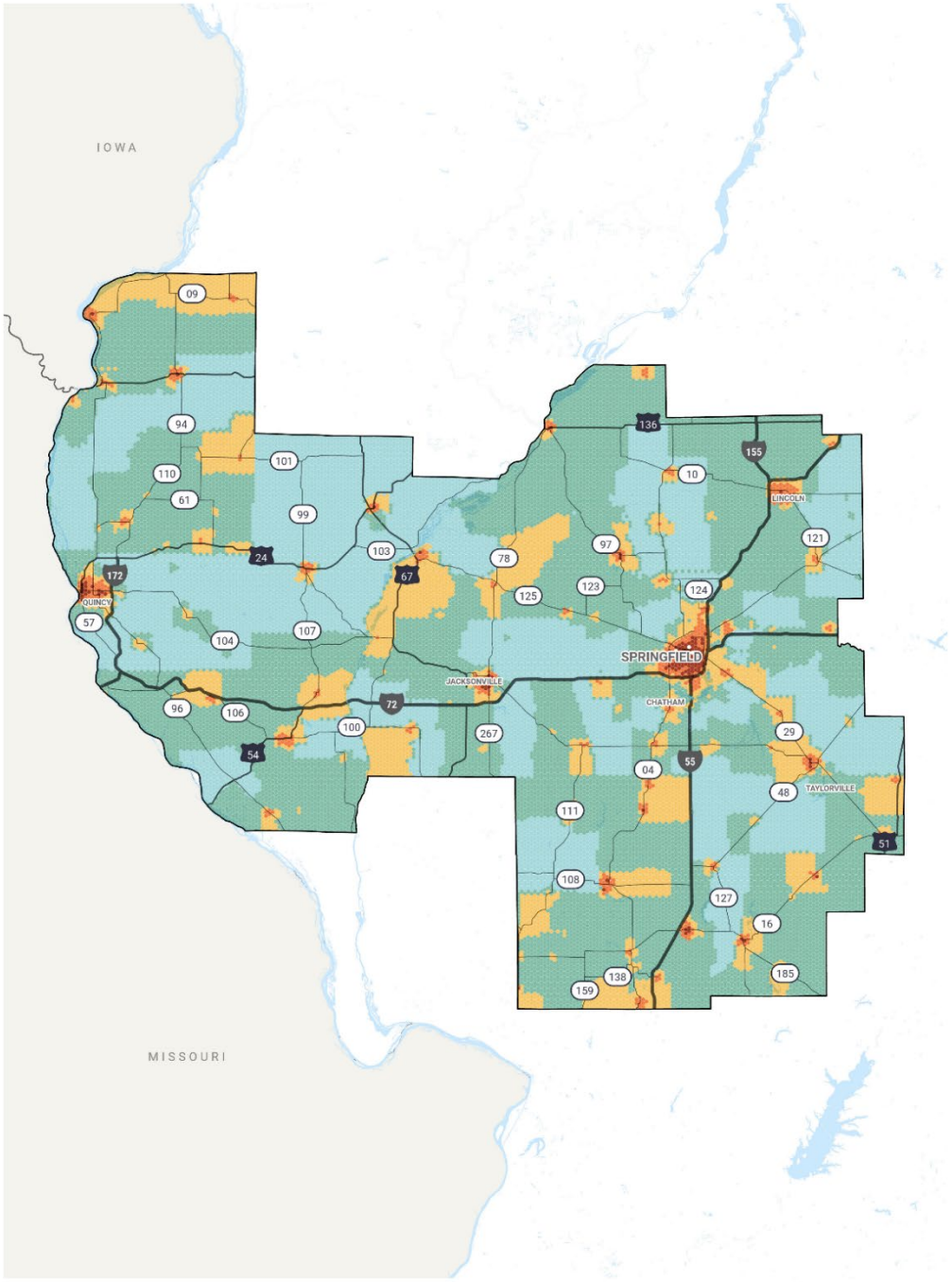
Composite Walking Demand

Highest

Lowest

N

0 10 20 MILES



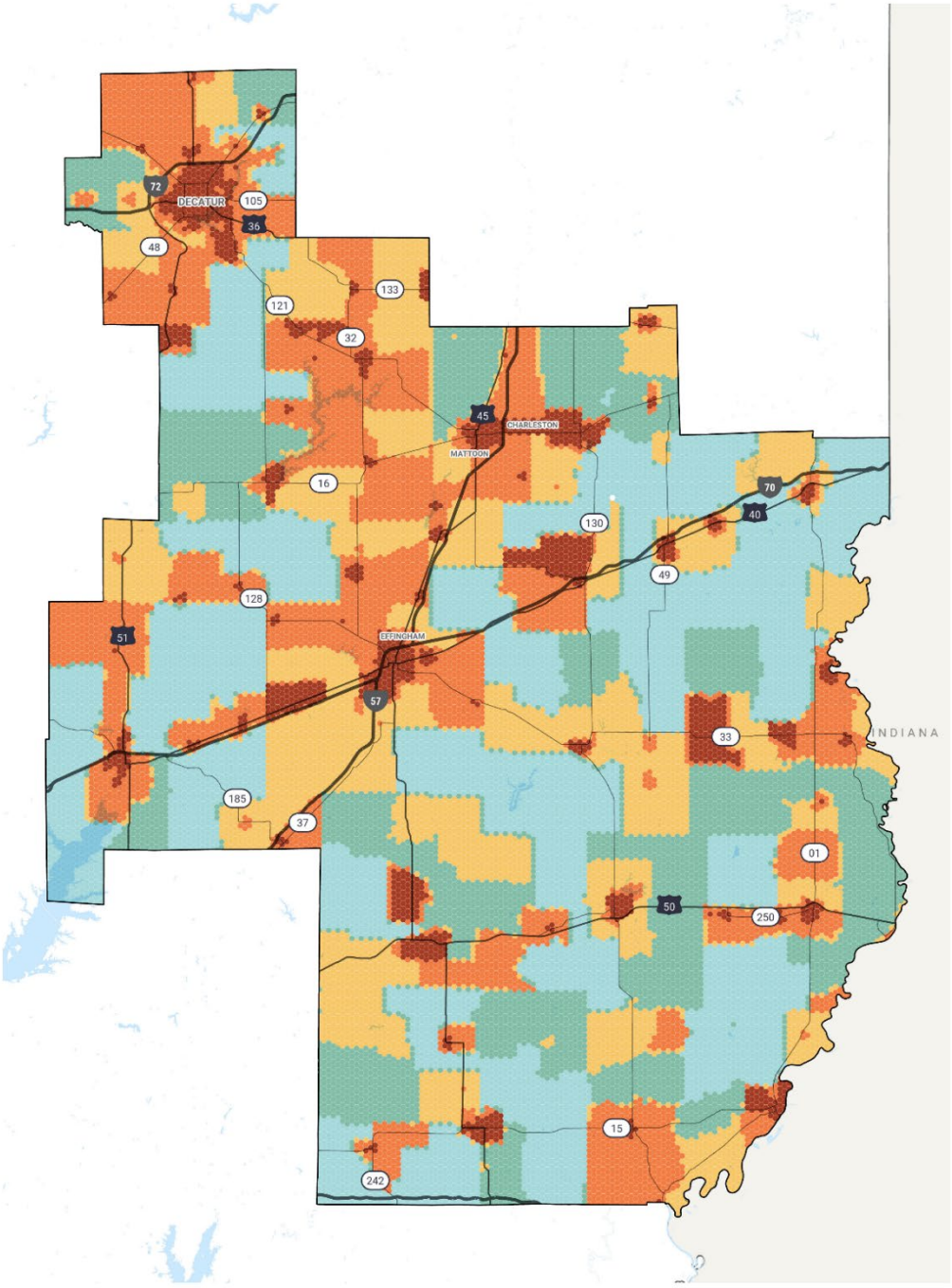
ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT: 6

DEMAND ANALYSIS

Composite Walking Demand

Highest

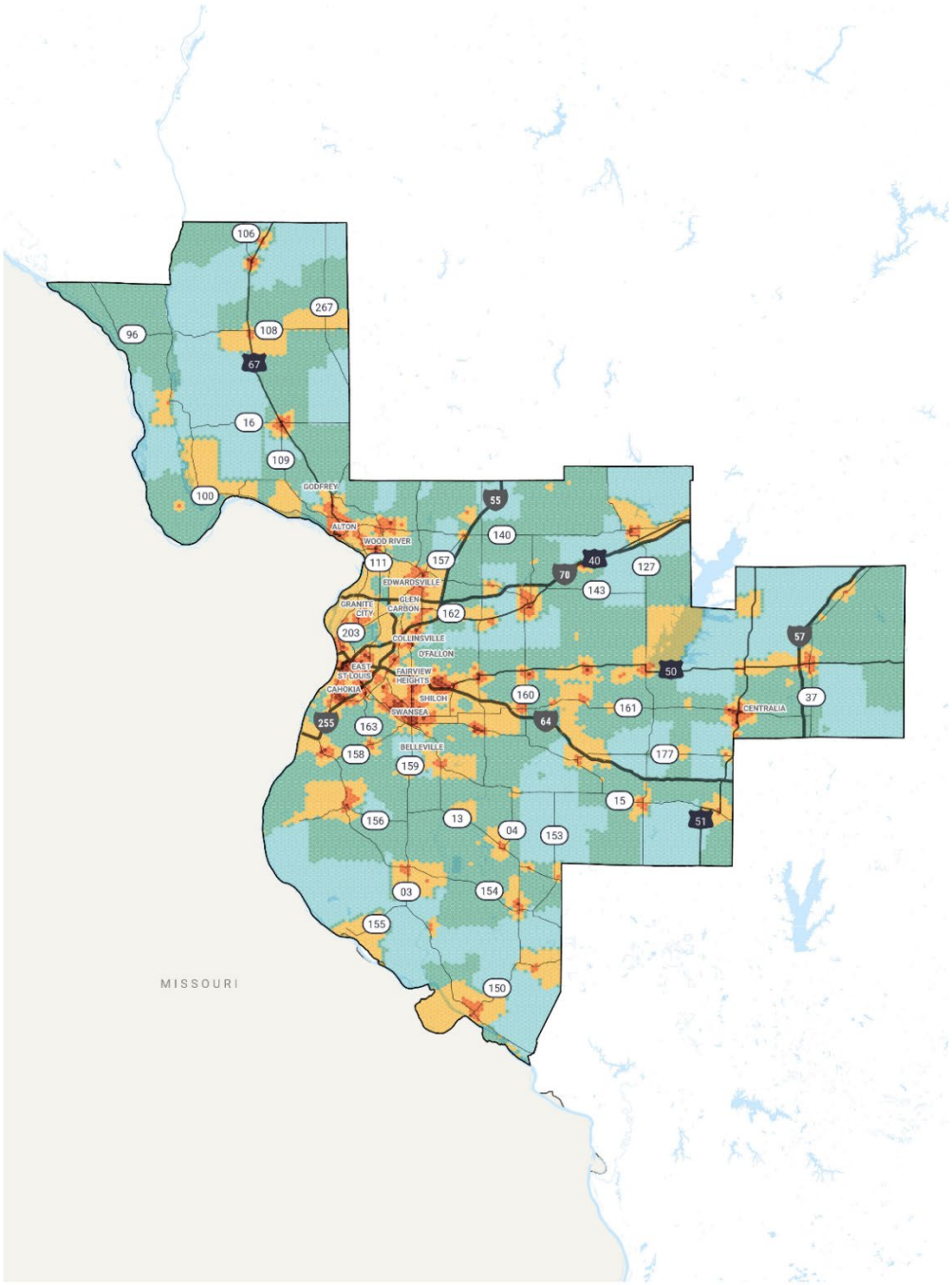
Lowest

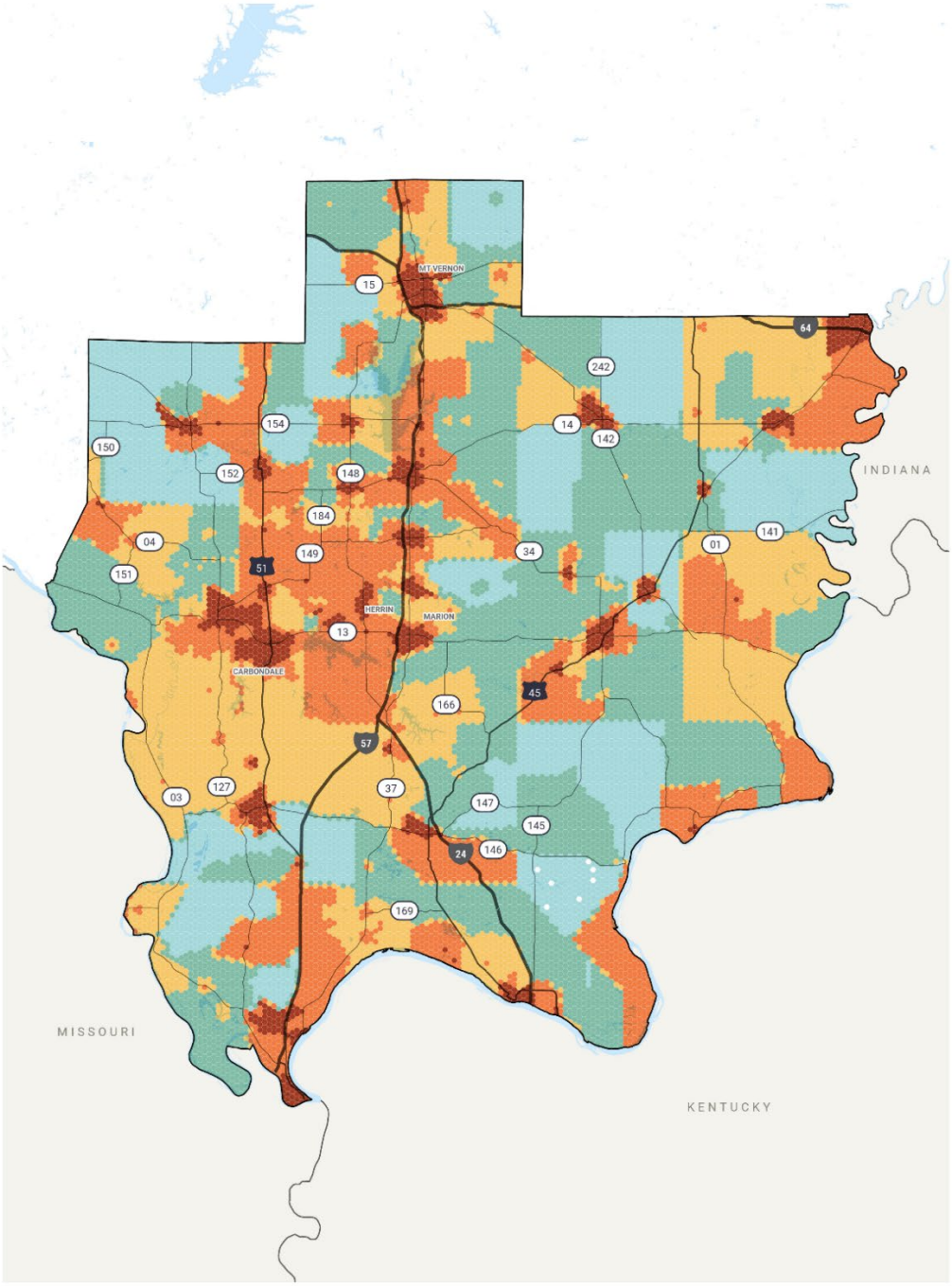


ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT: 7

DEMAND ANALYSIS

Composite Walking Demand
Highest
Lowest


106
267
96
108
67
16
109
100
GODFREY
ALTON
WOOD RIVER
55
140
111
157
40
70
127
143
EDWARDSVILLE
GLEN CARBON
GRANITE CITY
162
203
COLLINSVILLE
OFALLON
EAST ST. LOUIS
FAIRVIEW HEIGHTS
CAHOKIA
SHILOH
SWANSEA
160
161
64
57
50
37
CENTRALIA
255
163
BELLEVILLE
158
159
177
15
156
13
04
153
51
03
154
155
150
MISSOURI
ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT: 8
DEMAND ANALYSIS
Composite Walking Demand
Highest
Lowest
N
0
20
40 MILES


MT. VERNON
CARBONDALE
HERRIN
MARION
INDIANA
MISSOURI
KENTUCKY
ILLINOIS DEPARTMENT OF TRANSPORTATION
DISTRICT: 9
DEMAND ANALYSIS
Composite Walking Demand
Highest
Lowest
0
10
20 MILES