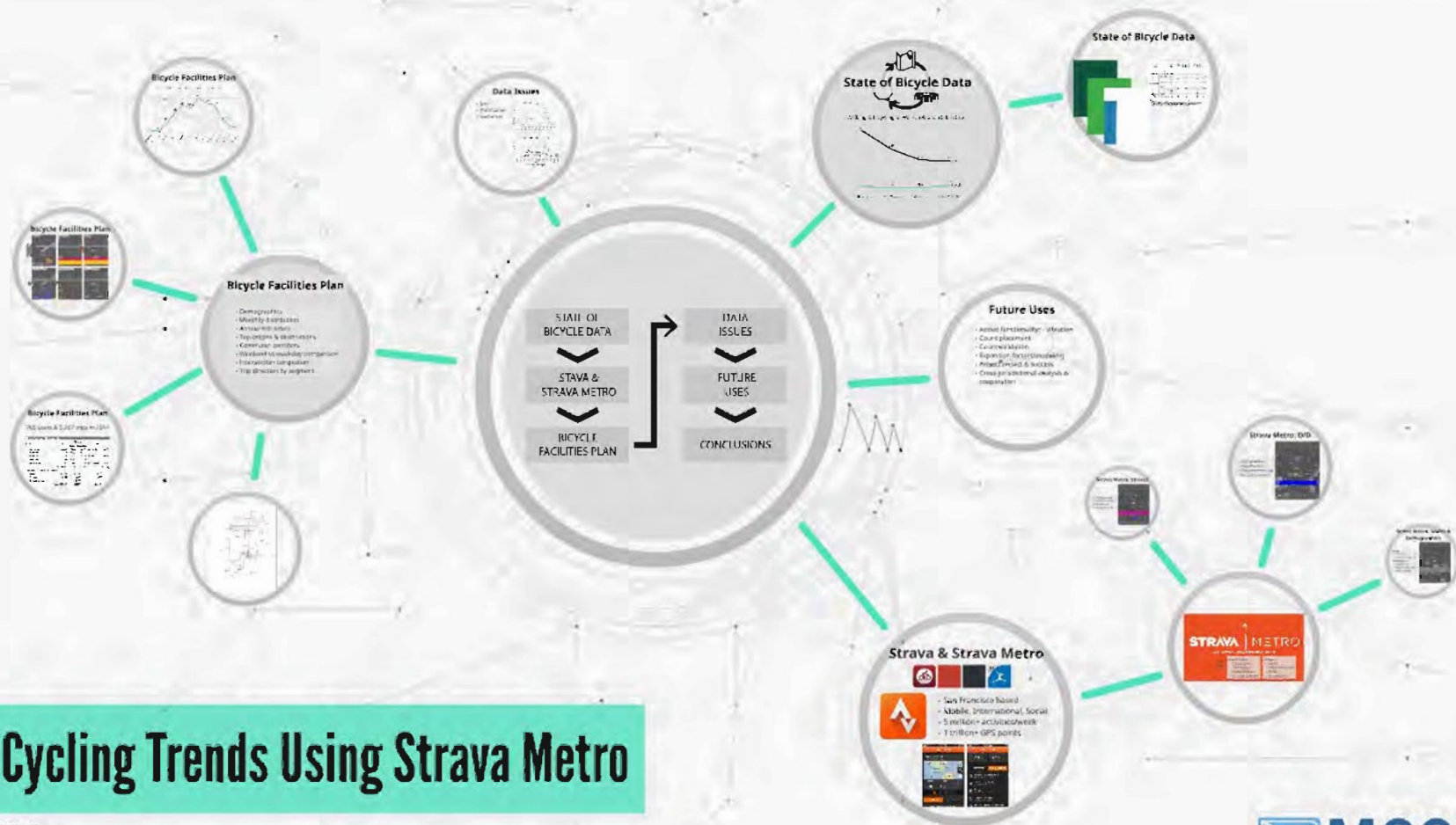


# Identifying Cycling Trends Using Strava Metro

Ryan Phelps - MCCOG  
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# Identifying Cycling Trends Using Strava Metro

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STATE OF  
BICYCLE DATA



STAVA &  
STRAVA METRO



BICYCLE  
FACILITIES PLAN

DATA  
ISSUES



FUTURE  
USES



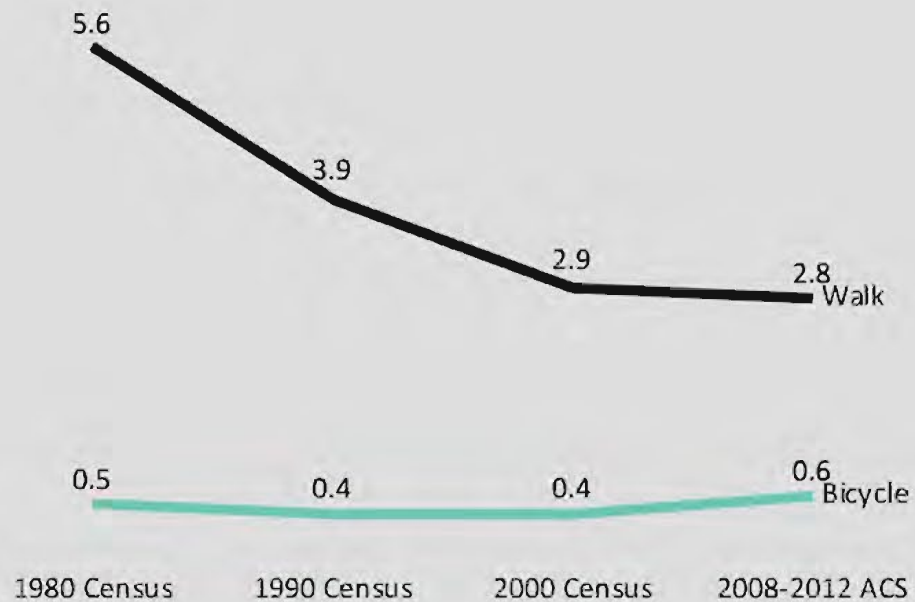
CONCLUSIONS





# State of Bicycle Data

Walking & Bicycling to Work: 1980 to 2008-2012





# State of Bicycle Data

**NCHRP**

REPORT 797

NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM

Guidebook on Bicycle Volume

Methods for Estimating Bicycling and Walking in Washington

WA-10-600.1

TCU-10-10



Transportation Planning and Research Center  
University of California, Berkeley

Federal Highway Administration Traffic Monitoring Guide

Traffic Monitoring Guide

September 2013

U.S. Department of Transportation  
Federal Highway Administration  
Office of Highway Policy Information

FIGURE 4-1 SIMPLIFIED FLOWCHART FOR SELECTING NON-MOTORIZED COUNT EQUIPMENT

1. What Are You Counting?



	Technology	1. What Are You Counting?				Cost
		Bicyclists Only	Pedestrians Only	Pedestrians & Bicyclist Combined	Pedestrians & Bicyclist Separately	
Permanent	Inductance Loops <sup>1</sup>	●			●	\$5
	Magnetometry <sup>2</sup>	○			○	\$-55
	Pressure Sensor <sup>3</sup>	○	○		○	\$5
	Radar Sensor	○	○	○		\$-55
	Seismic Sensor	○	○	○		\$5
2. How Long?	Video Imaging, Automated	○	○	○	○	\$-55
	Infrared Sensor (Active or Passive)	○ <sup>4</sup>	●	●	●	\$-55
	Pneumatic Tubes	●			●	\$-55
	Video Imaging, Manual	○	○	○	●	\$-555
	Manual Observers	●	●	●	●	\$5-555

○ indicates what is technologically possible  
 ● indicates a common practice  
 ○ indicates a common practice, but should be combined with another technology to classify pedestrians and bicyclists separately.  
 \$, \$\$, \$\$\$ indicates relative cost per data point.  
<sup>1</sup> Typically requires a unique loop configuration to separate from motor vehicle loads, especially in a traffic lane shared by bicyclists and motor vehicles.  
<sup>2</sup> Permanent installation is typical for asphalt or concrete pavements; temporary installation is possible for resurfaced, rutted surface trails.  
<sup>3</sup> Requires specific mounting configuration to avoid counting cars in main traffic; several counting pedestrians on the sidewalk.

**FIGURE 4-1 SIMPLIFIED FLOWCHART FOR SELECTING NON-MOTORIZED COUNT EQUIPMENT**

**1. What Are You Counting?**



	Technology	Bicyclists Only	Pedestrians Only	Pedestrians & Bicyclist Combined	Pedestrians & Bicyclist Separately	Cost
<p><b>2. How Long?</b></p> <p>↑ Permanent</p> <p>↓ Temporary/Short Term</p>	Inductance Loops <sup>1</sup>	●			◐	\$\$
	Magnetometer <sup>2</sup>	○				\$-\$\$
	Pressure Sensor <sup>2</sup>	○	○	○	○	\$\$
	Radar Sensor	○	○	○		\$-\$\$
	Seismic Sensor	○	○	○		\$\$
	Video Imaging: Automated	○	○	○	○	\$-\$\$
	Infrared Sensor (Active or Passive)	○ <sup>3</sup>	●	●	◐	\$-\$\$
	Pneumatic Tubes	●			◐	\$-\$\$
	Video Imaging: Manual	○	○	○	●	\$-\$\$\$
	Manual Observers	●	●	●	●	\$\$-\$\$\$

○ Indicates what is technologically possible.

● Indicates a common practice.

◐ Indicates a common practice, but must be combined with another technology to classify pedestrians and bicyclists separately.

\$, \$\$, \$\$\$: Indicates relative cost per data point.

<sup>1</sup> Typically requires a unique loop configuration separate from motor vehicle loops, especially in a traffic lane shared by bicyclists and motor vehicles.

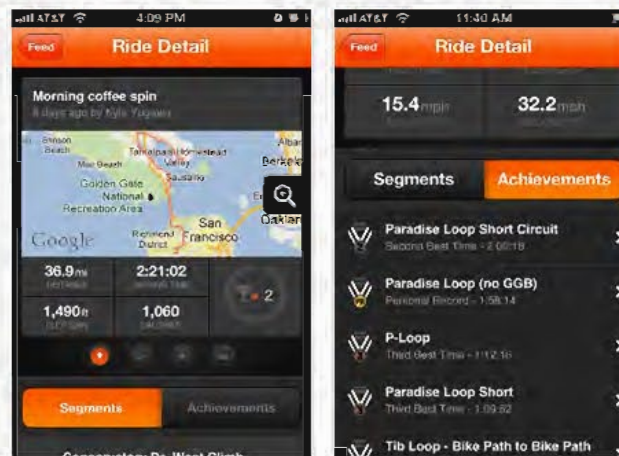
<sup>2</sup> Permanent installation is typical for asphalt or concrete pavements; temporary installation is possible for unpaved, natural surface trails.

<sup>3</sup> Requires specific mounting configuration to avoid counting cars in main traffic lanes or counting pedestrians on the sidewalk.

# Strava & Strava Metro



- San Francisco based
- Mobile, International, Social
- 5 million+ activities/week
- 1 trillion+ GPS points

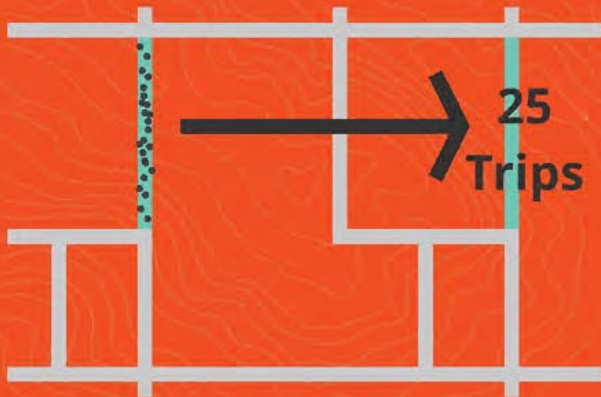






# STRAVA | METRO

Data-Powered Cycling and Pedestrian Planning



## Data Includes:

- Trip purpose
- Time stamps
- Path & direction
- User age & gender

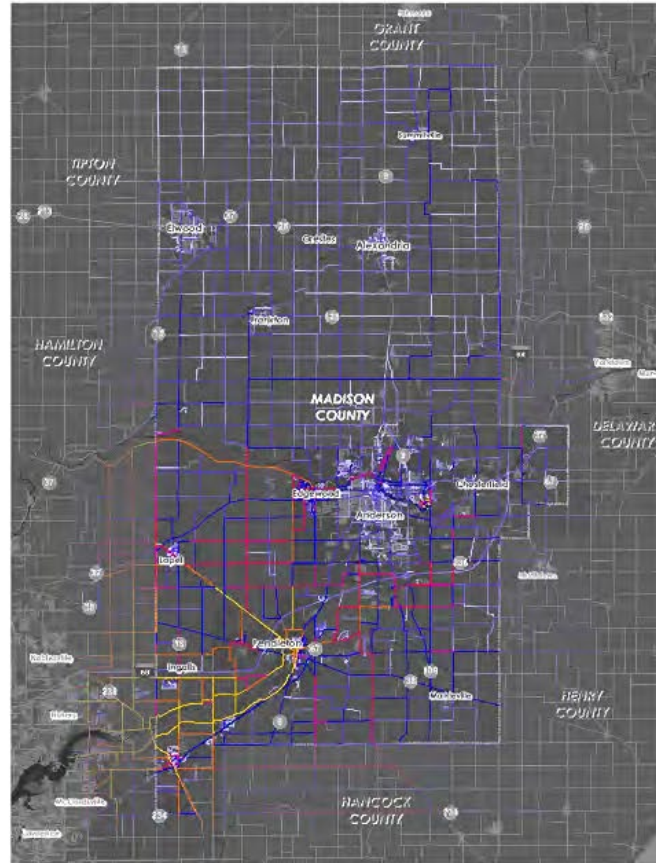
## Datasets:

- Streets
- Origin/Destination
- Nodes
- Demographics



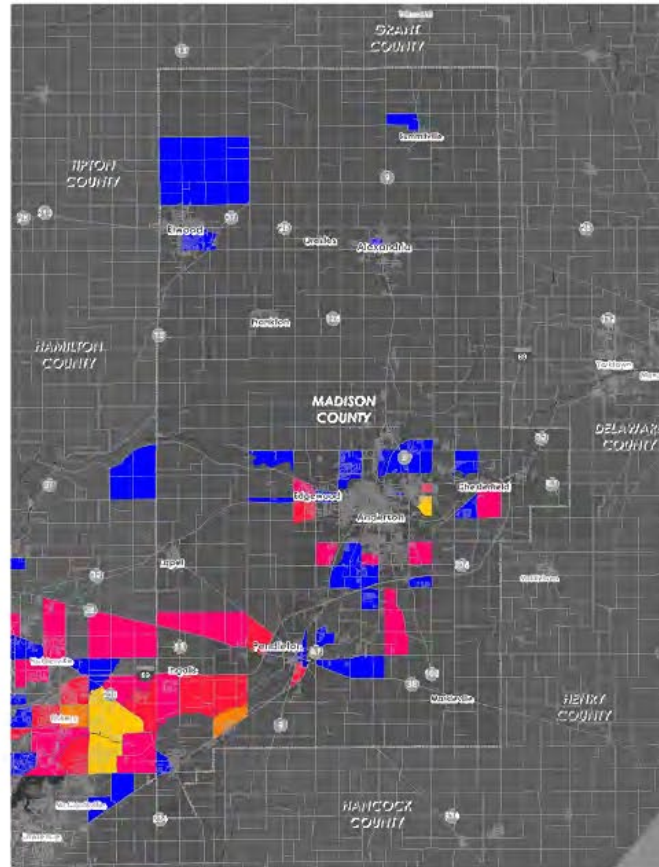
# Strava Metro: Streets

- Total trip counts
- Total user counts
- Trip purpose
- Average trip time



# Strava Metro: O/D

- Trips generated
- Trips attracted
- Polygons intersected
- Internal vs external



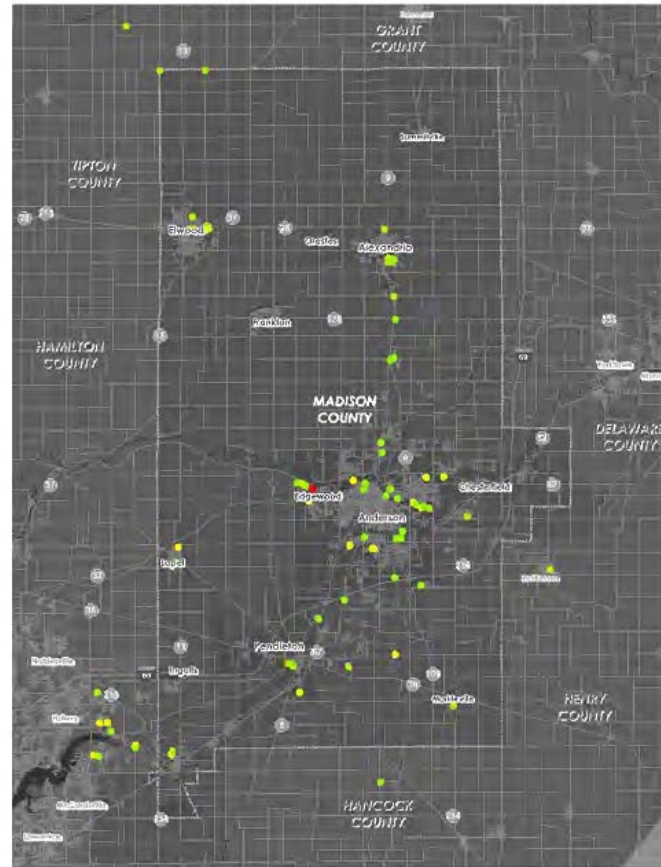
# Strava Metro: Nodes & Demographics

## Nodes

- Wait times
- User congregation

## Demographics

- Age cohorts
- Gender breakdown
- Home county





# Bicycle Facilities Plan

- Demographics
- Monthly distribution
- Annual trip totals
- Top origins & destinations
- Commuter corridors
- Weekend vs weekday comparison
- Intersection congestion
- Trip direction by segment

# Bicycle Facilities Plan

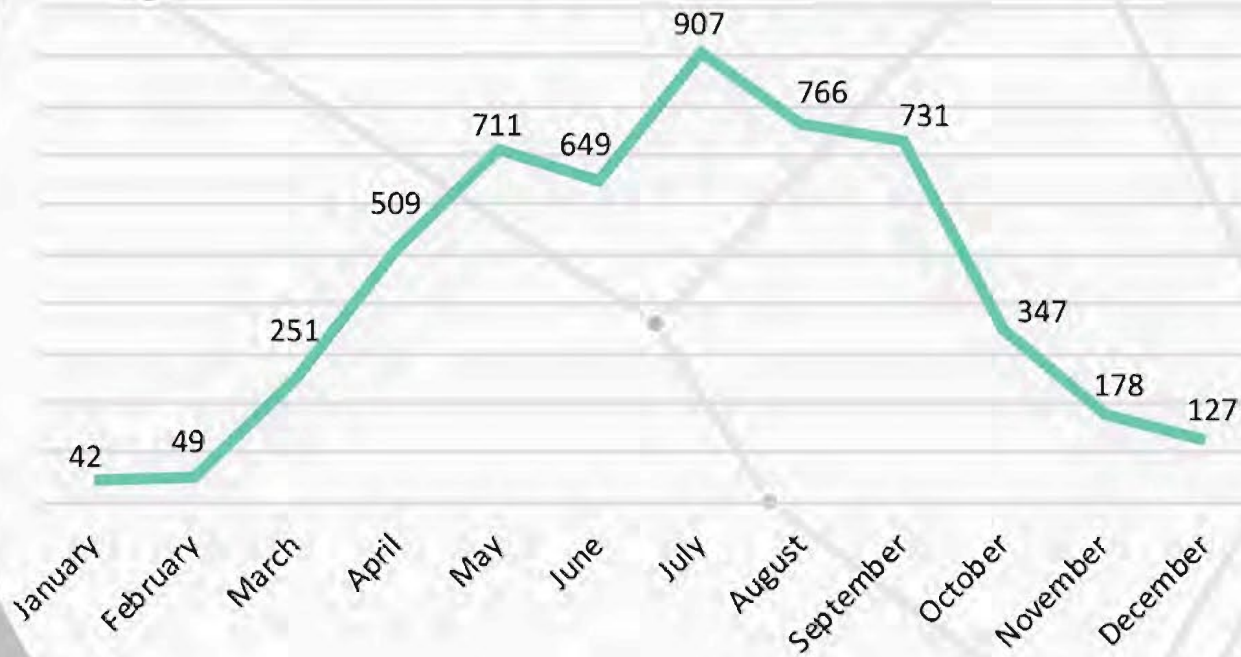
765 users & 5,267 trips in 2014

**Bicycle Demographic Comparison**

Age	ACS	Strava		NHTS	
		Total	Reported		
Under 25	23.5%	9.8%	12.0%	Under 16	39.0%
25 to 44	47.4%	38.0%	46.5%		
45 to 54	13.8%	23.3%	28.6%	16-64	55.0%
55 to 64	14.3%	9.0%	11.1%		
65 and over	1.1%	1.4%	1.8%	65 and Over	6.0%
<b>Total</b>	100.1%	81.5%	100.0%		100.0%
<b>% Means of Trans. By Gender</b>					
Male	63.3%		85.5%		76.0%
Female	36.7%		9.8%		24.0%
Blank Gender	--		4.7%		--
<b>Total</b>	100.0%		100.0%		100.0%

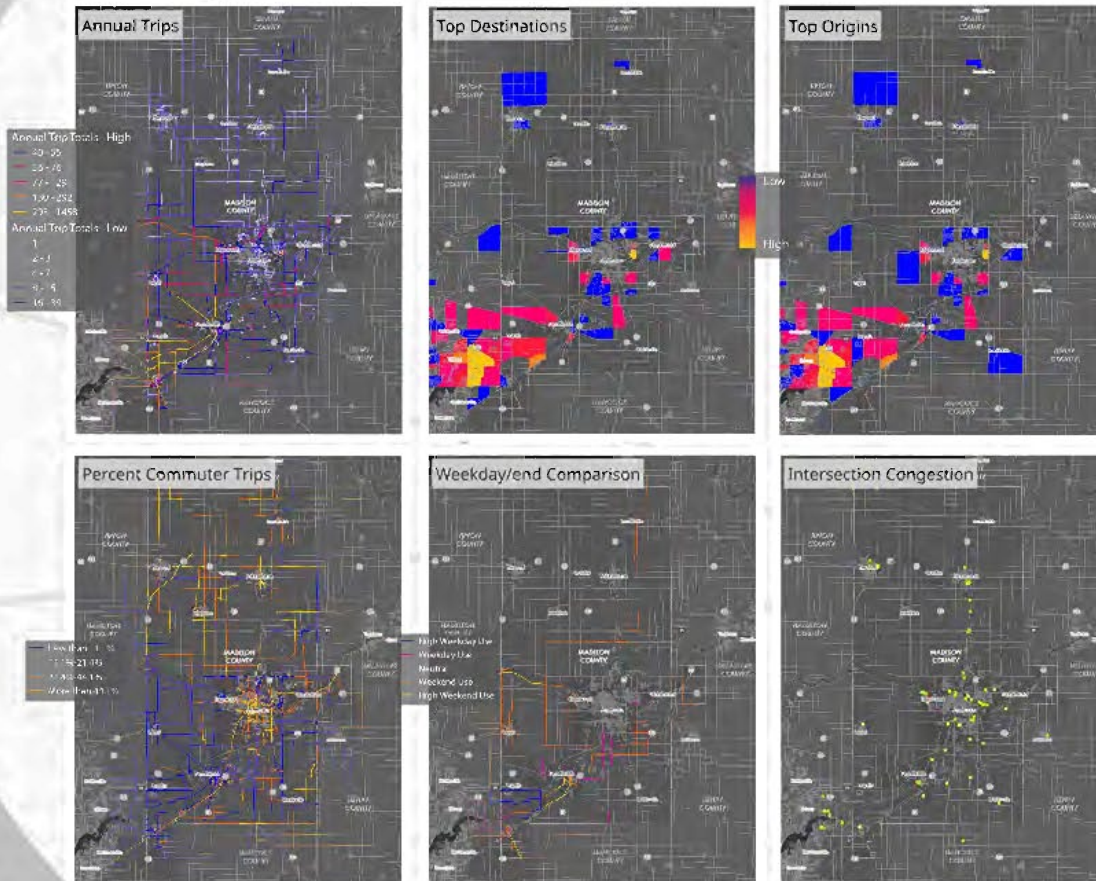
# Bicycle Facilities Plan

Monthly Trip Distribution: 2014





# Bicycle Facilities Plan





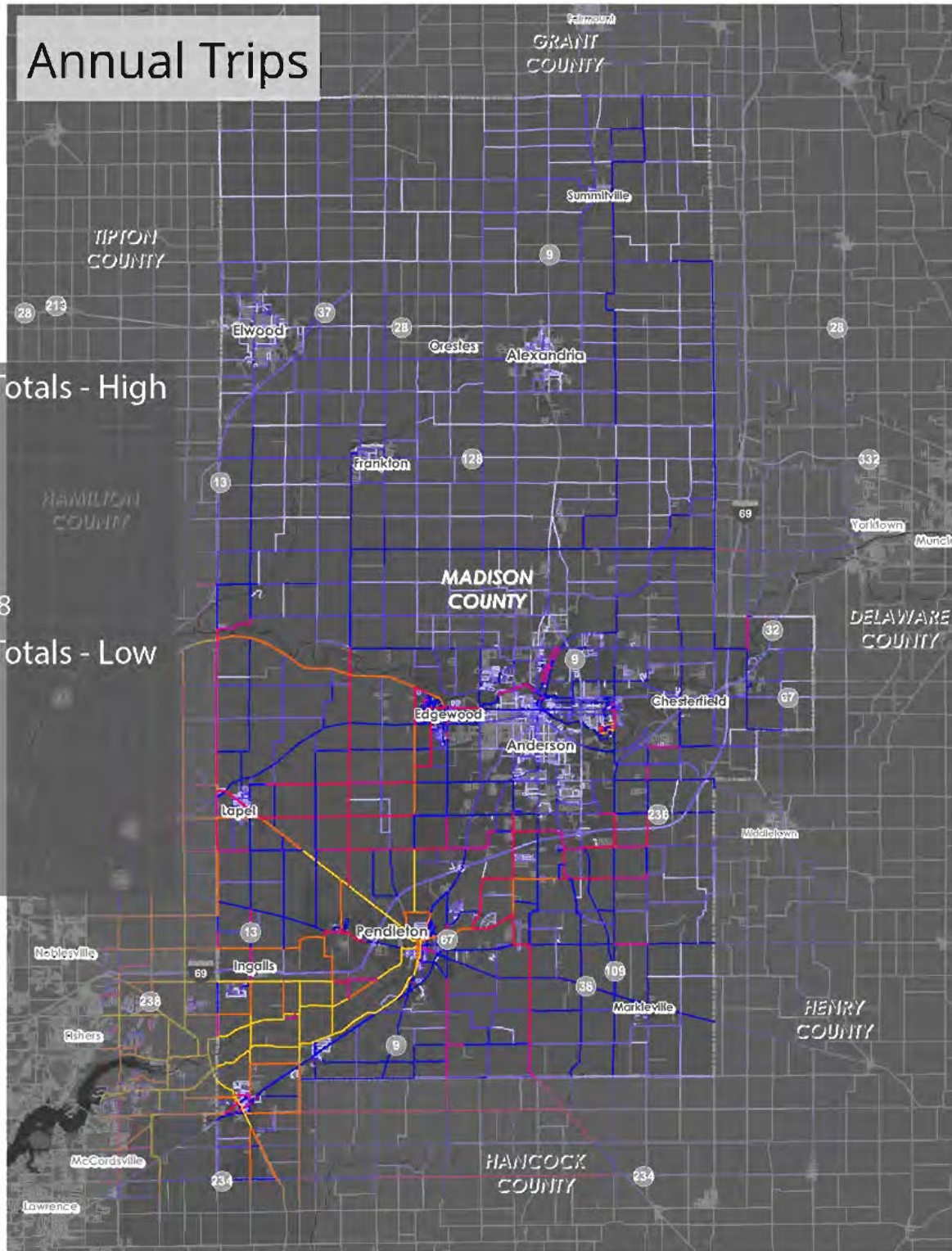
# Annual Trips

## Annual Trip Totals - High

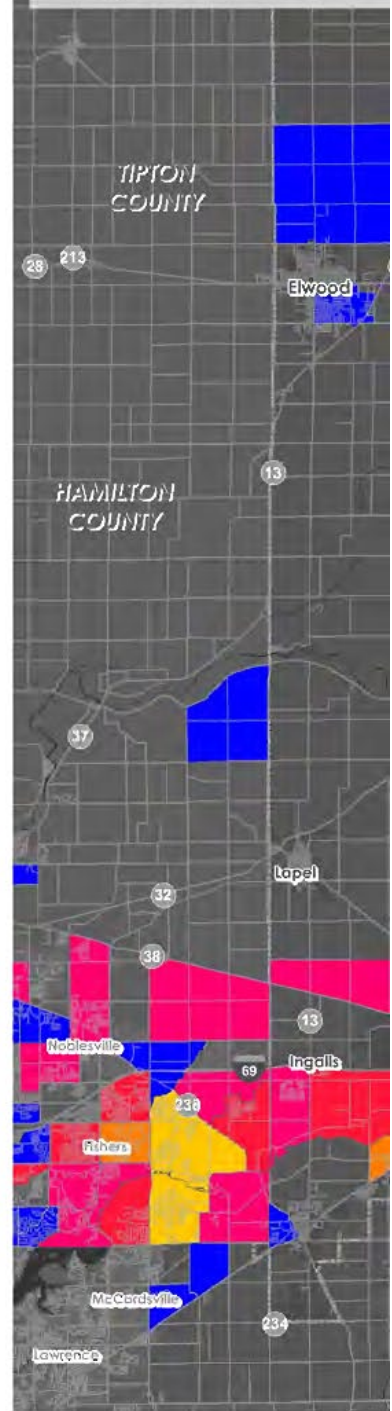
- 40 - 55
- 56 - 76
- 77 - 129
- 130 - 292
- 293 - 1458

## Annual Trip Totals - Low

- 1
- 2 - 3
- 4 - 7
- 8 - 15
- 16 - 39

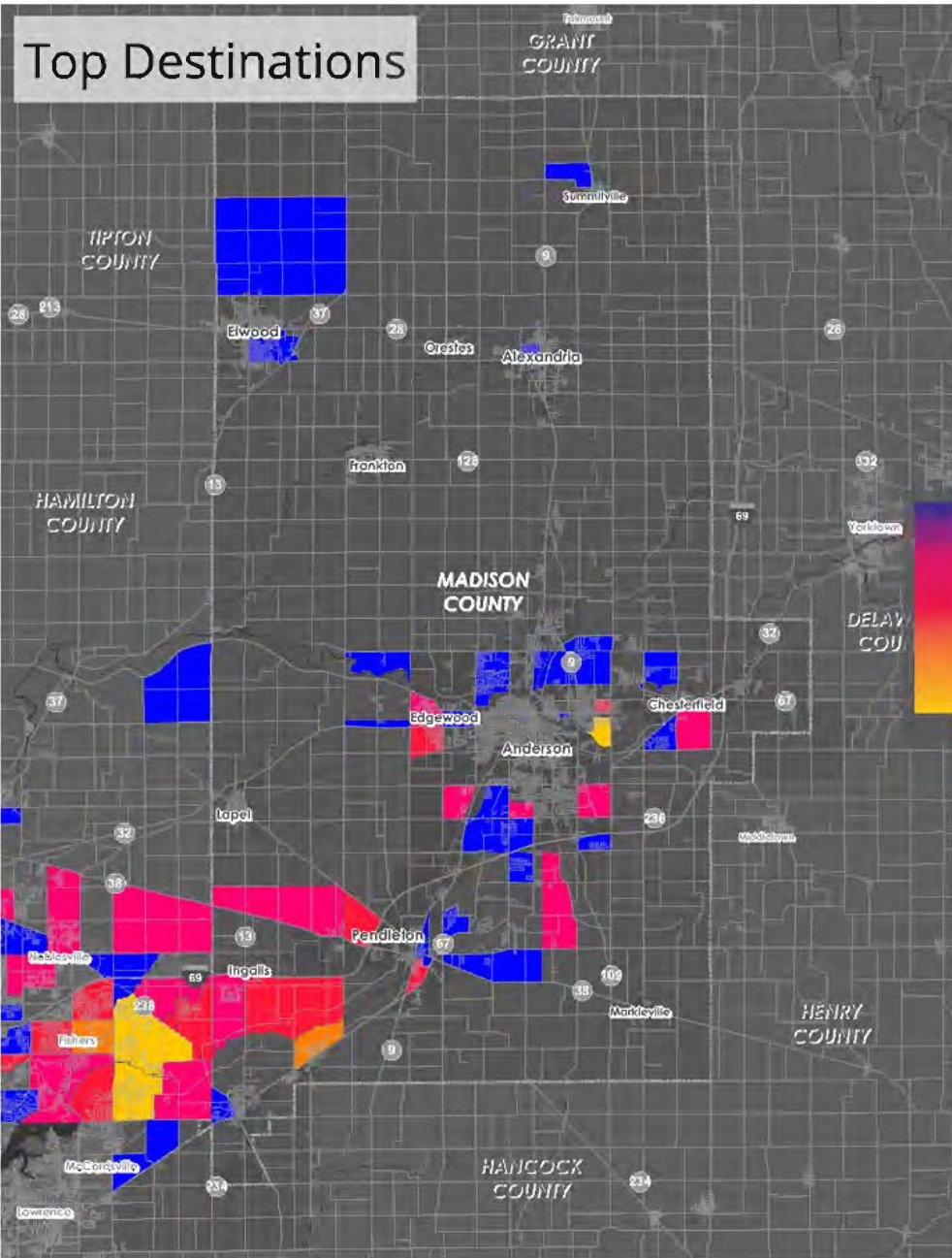


# Top Destinations

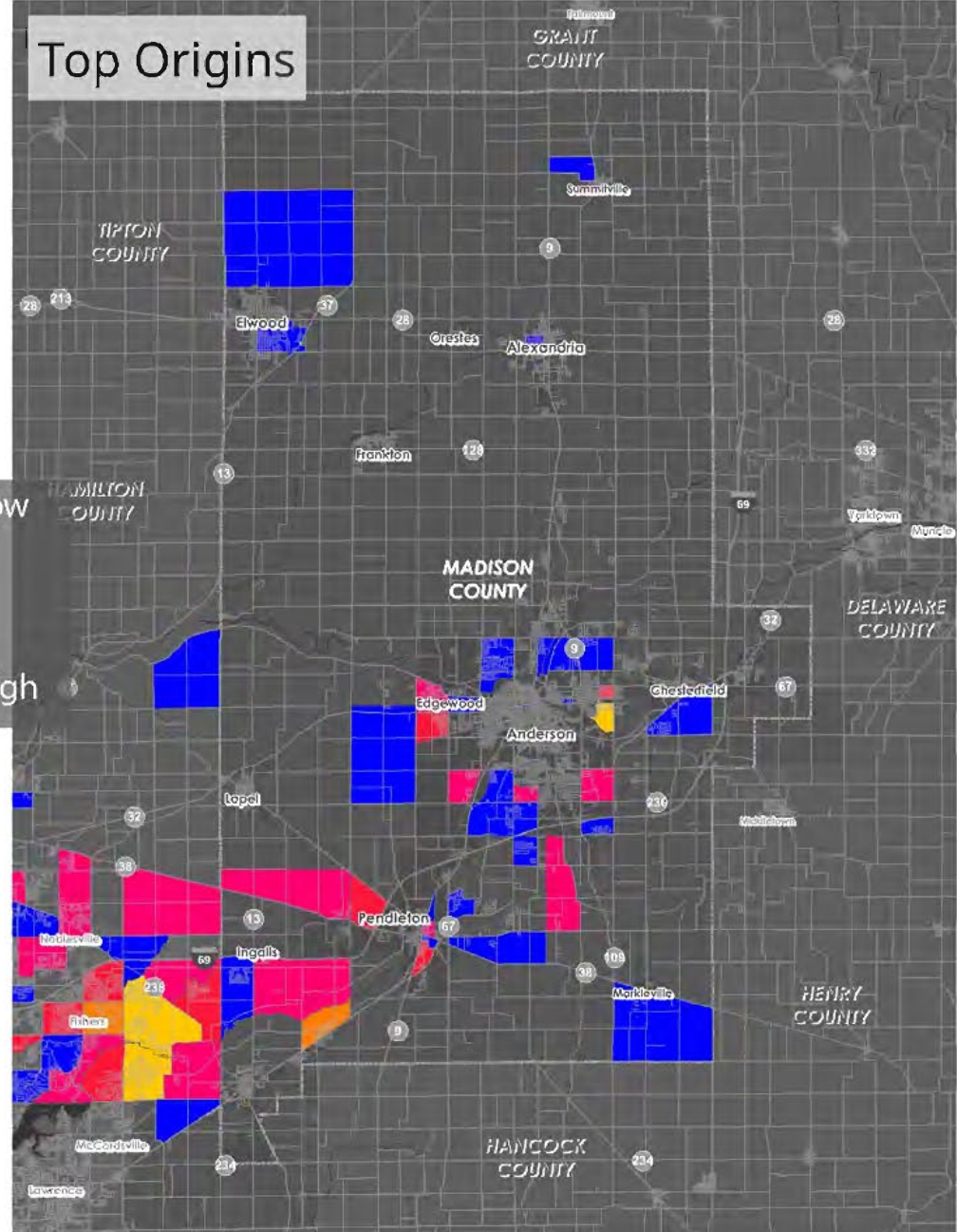




# Top Destinations



# Top Origins



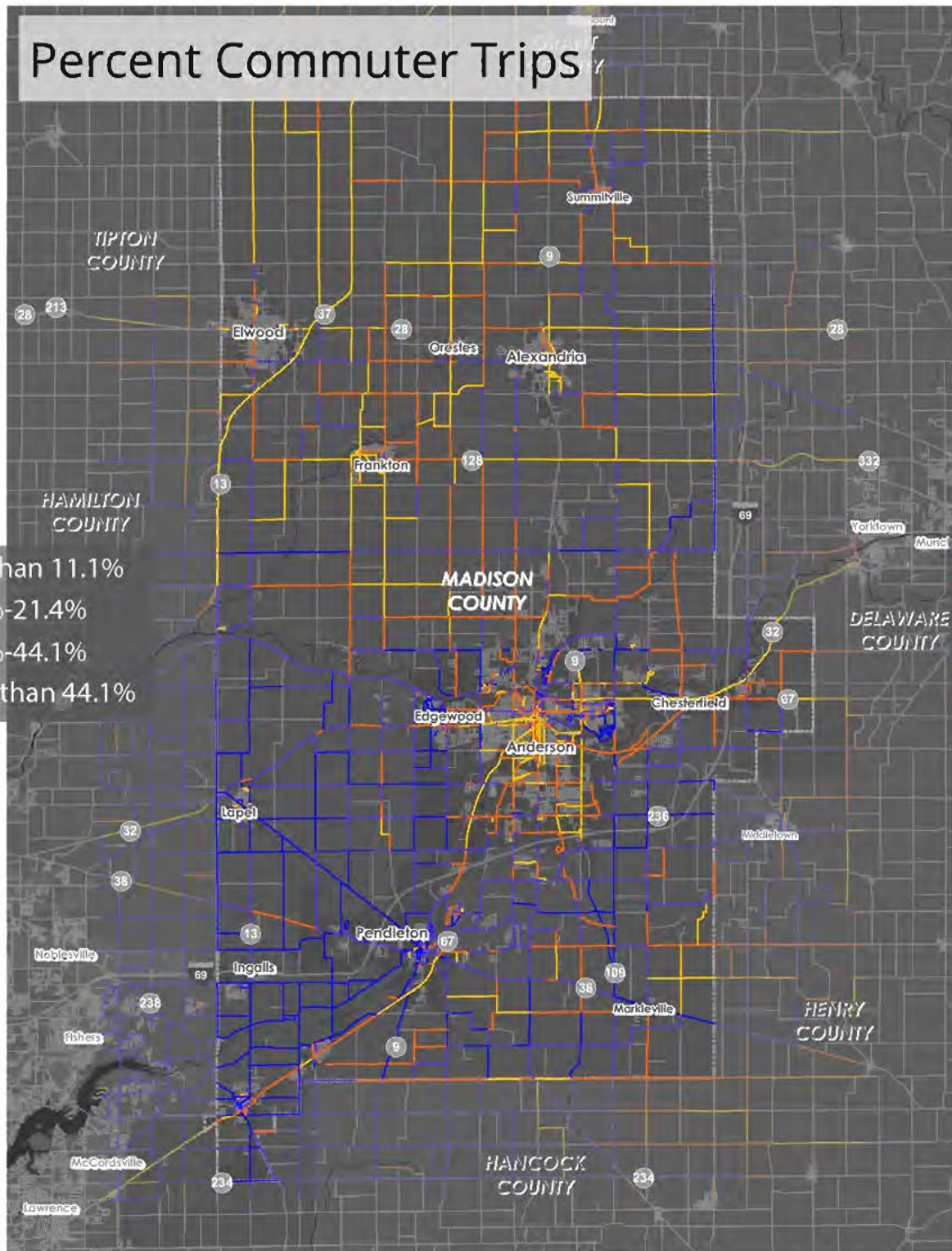
# Weekday/end Comparison

# Intersection Congestion



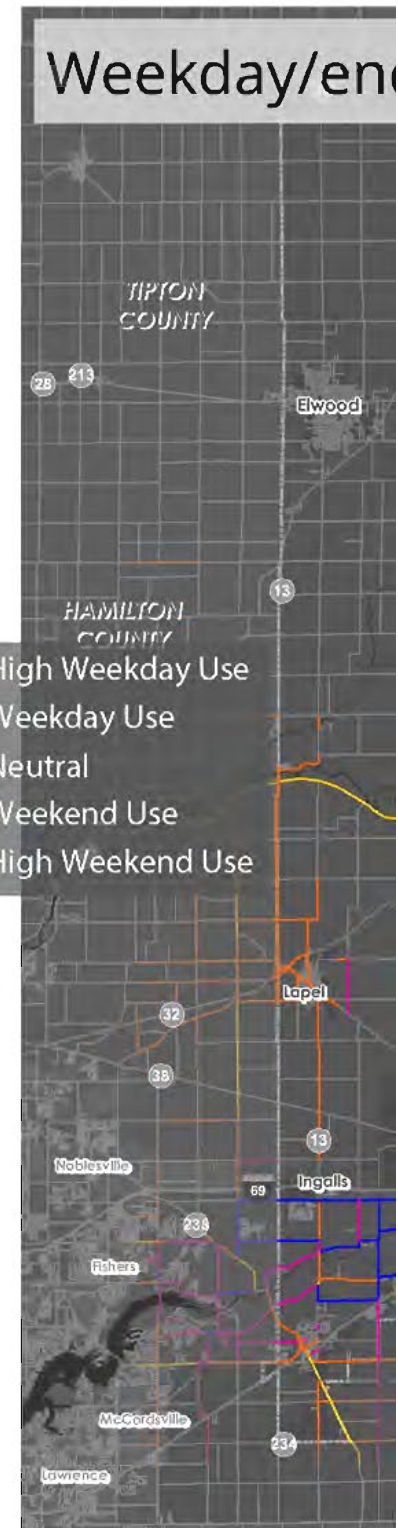
# Percent Commuter Trips

- Less than 11.1%
- 11.1%-21.4%
- 21.4%-44.1%
- More than 44.1%



# Weekday/weekend

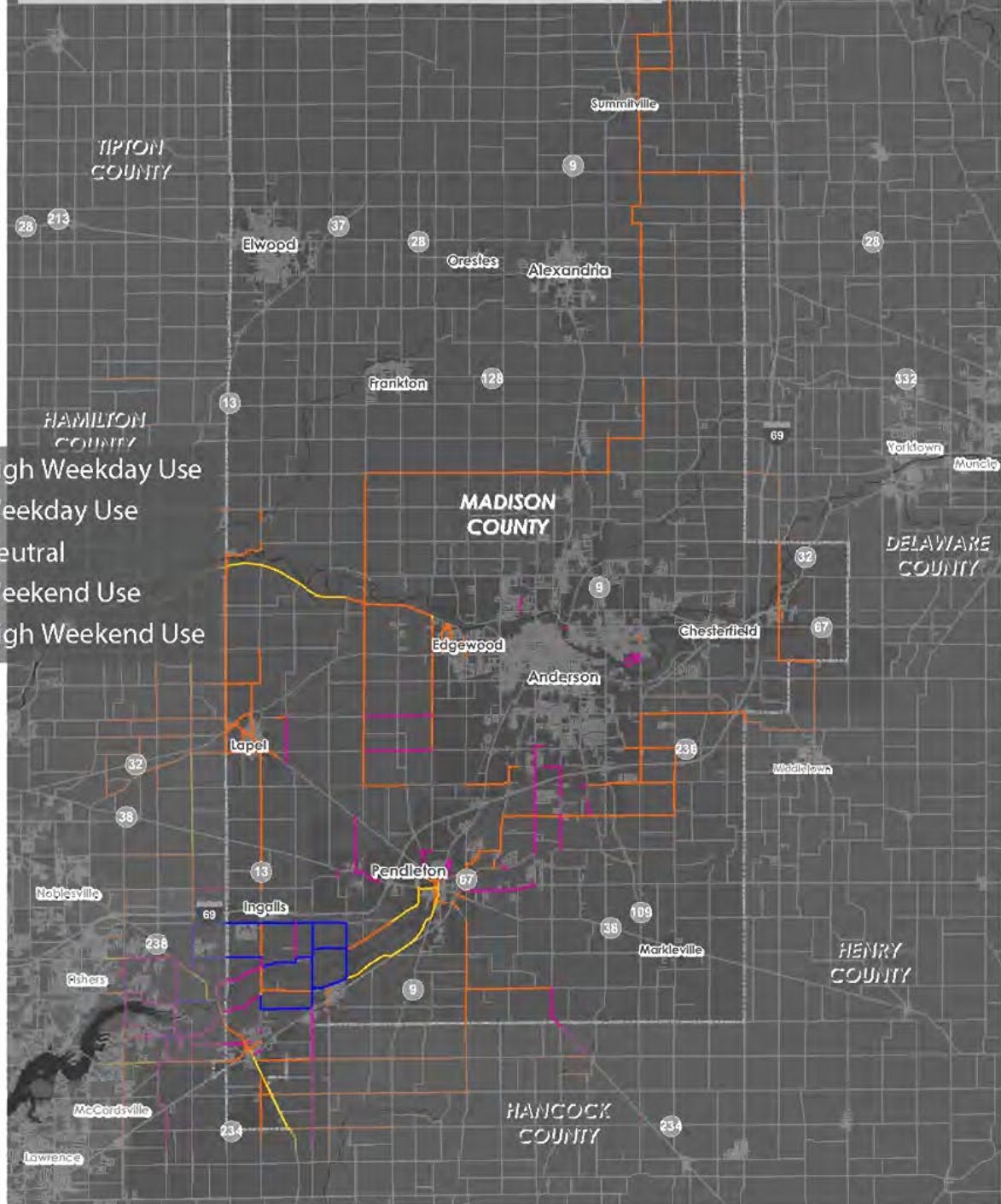
- High Weekday Use
- Weekday Use
- Neutral
- Weekend Use
- High Weekend Use





# Weekday/end Comparison

- High Weekday Use
- Weekday Use
- Neutral
- Weekend Use
- High Weekend Use

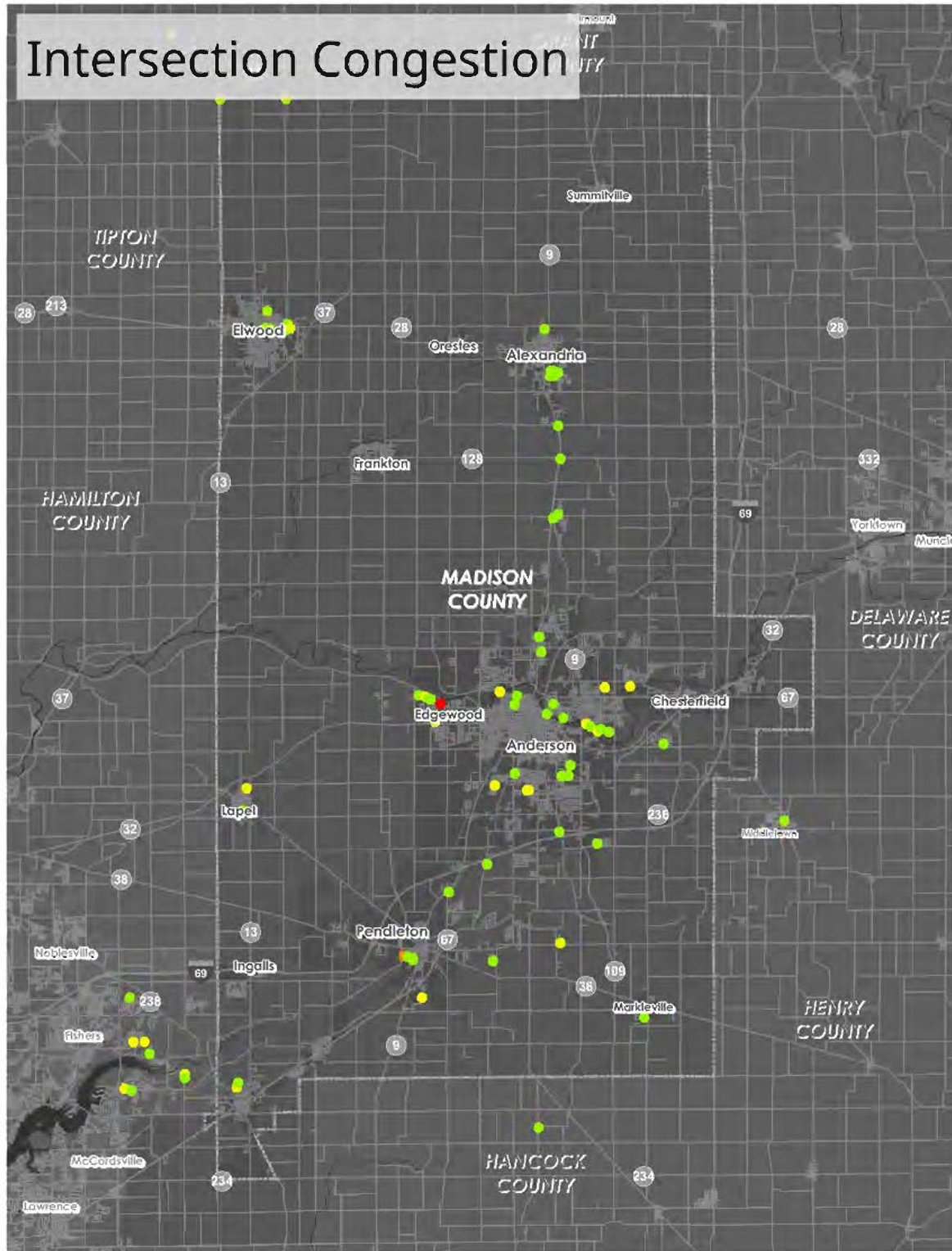


# Intersection



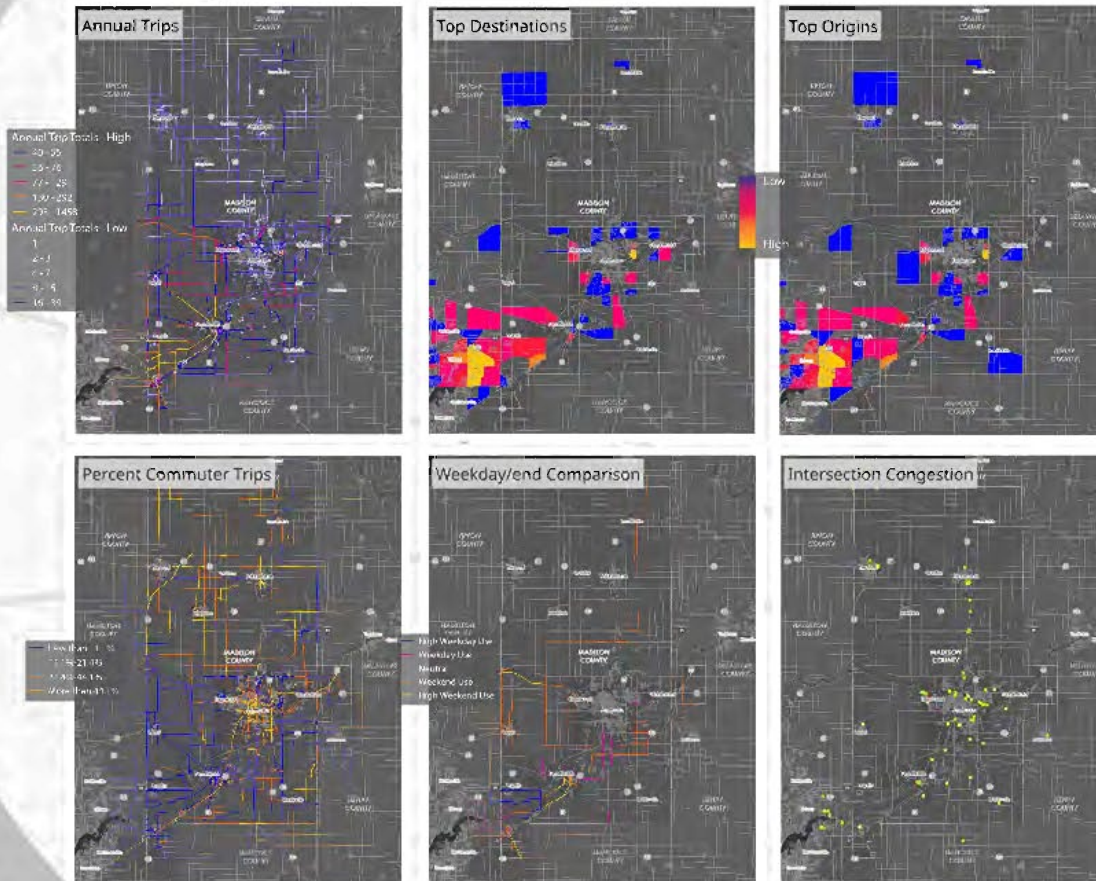


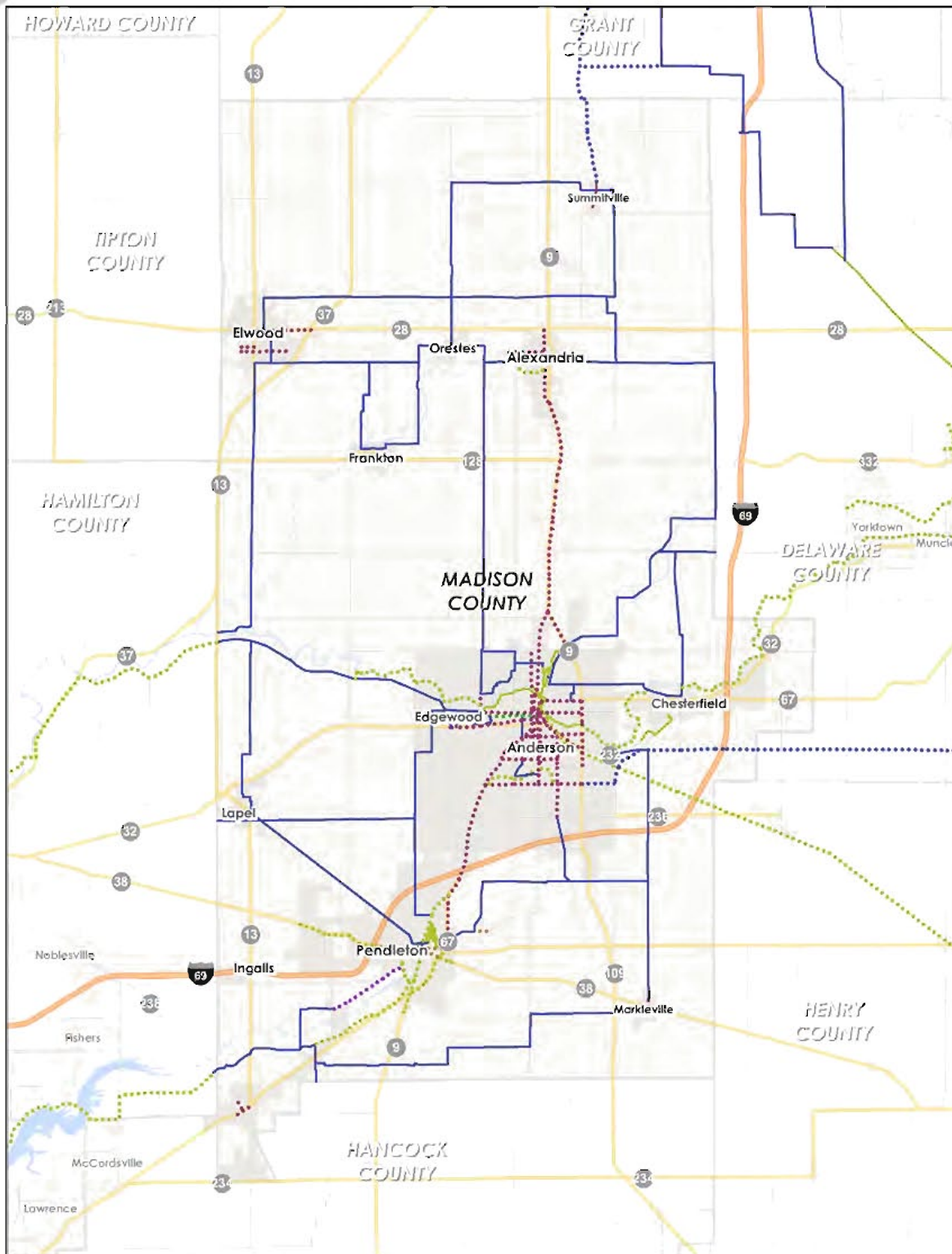
# Intersection Congestion



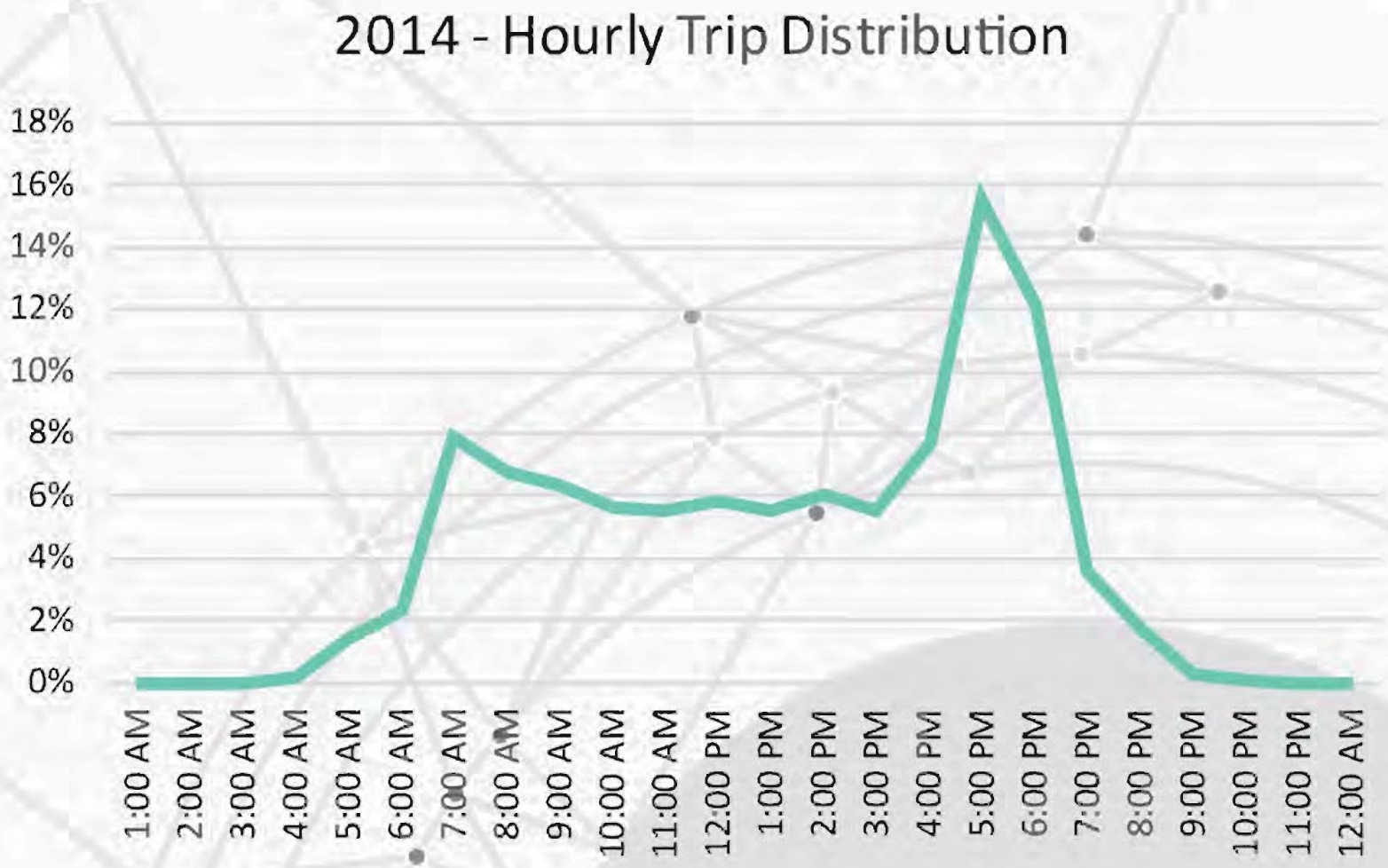


# Bicycle Facilities Plan





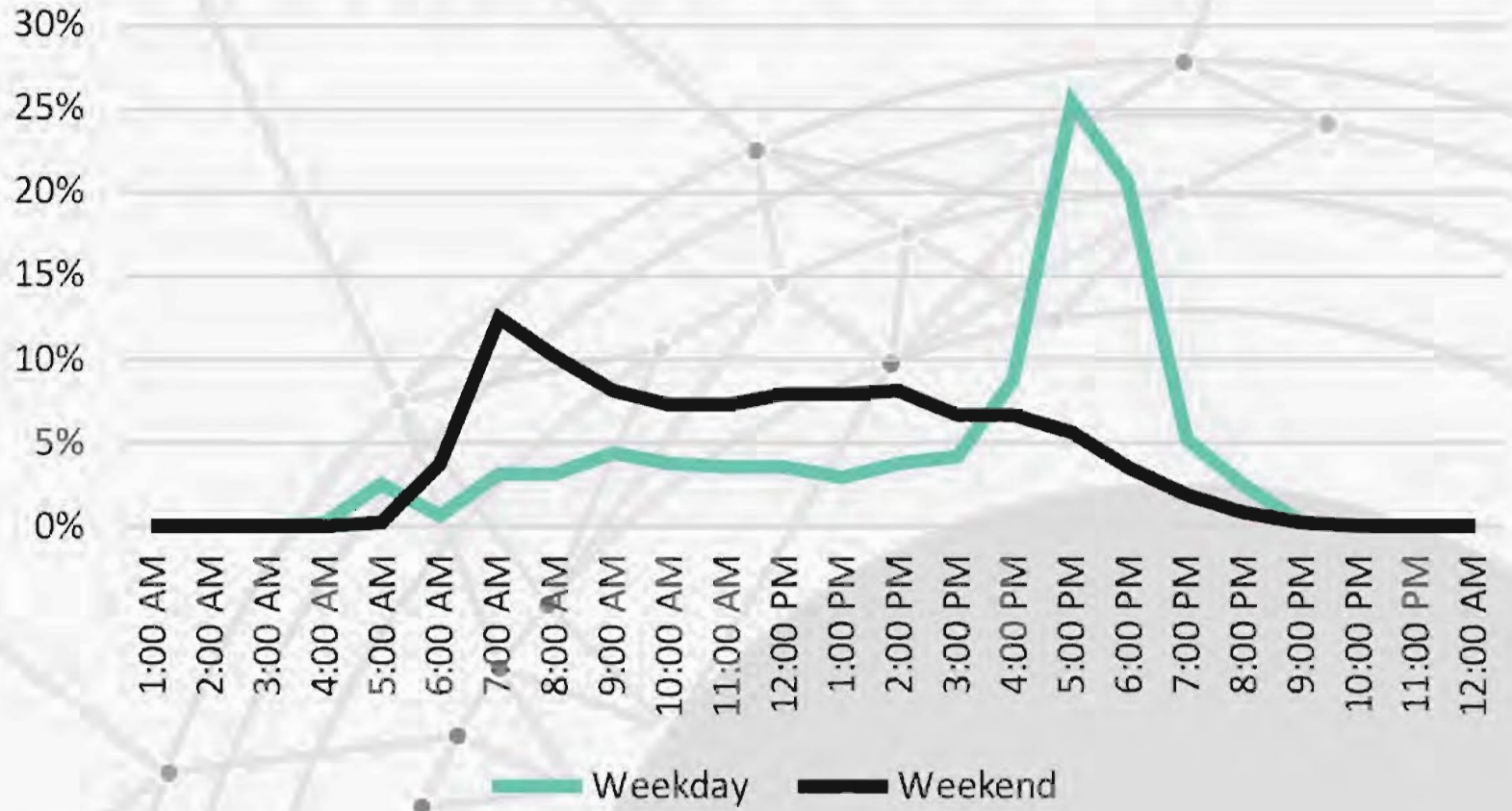




2014 - Hourly Trip Distribution



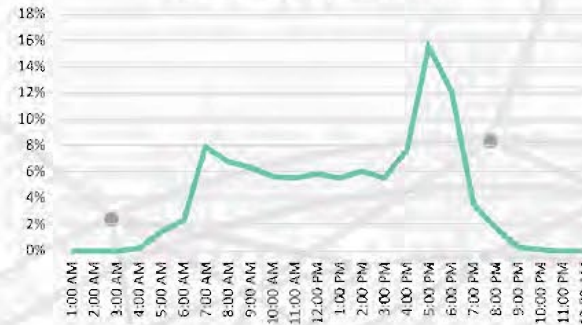
# 2014 - Hourly Trip Distribution



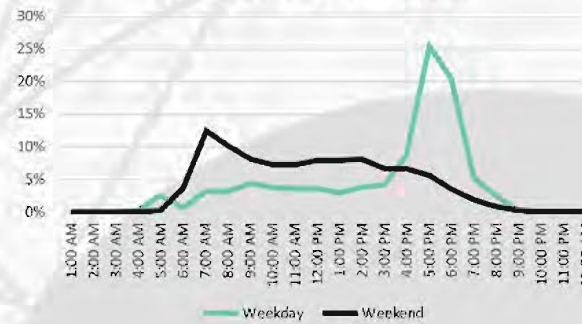
# Data Issues

- Bias
- Distribution
- User error

2014 - Hourly Trip Distribution



2014 - Hourly Trip Distribution



# Future Uses

- Added functionality? - vibration
- Count placement
- Count validation
- Expansion factors/modeling
- Project impact & success
- Cross-jurisdictional analysis & cooperation



