



Madison Area Transportation Planning Board

PERFORMANCE MEASURES REPORT



Published July 2016



Madison Area Transportation Planning Board

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The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation. Information in this report is subject to change based on the final disposition of the federal transportation reauthorization bill Fixing America's Surface Transportation Act or FAST ACT.

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Regional Transportation Plan Goals and Measures

Goal: Create Connected Livable Neighborhoods and Communities

- *Miles of Pedestrian Facilities*
- *Miles of Bike Facilities*
- *BCycle Utilization*
- *Active Living Index*

Goal: Improve Public Health, Safety, and Security

- *Number and Rate of Motor Vehicle Crash Fatalities and Serious Injuries*
- *Number of Non-Motorized Fatalities and Serious Injuries*
- *County-wide Rolling Averages*

Goal: Support Personal Prosperity and Enhance the Regional Economy

- *Airline Passenger Traffic*
- *Freight Exports and Imports*
- *Housing + Transportation Costs*
- *Transit Access to Jobs*

Goal: Improve Equity for Users of the Transportation System

- *Transit Ridership*
- *Specialized Transit Ridership*
- *Fixed Route Transit Service Area*
- *Transit Coverage for Minorities and Low Income Persons*

Goal: Reduce the Environmental Impact of the Transportation System

- *Vehicle Miles Traveled*
- *Mode of Transportation to Work*
- *Air Quality*

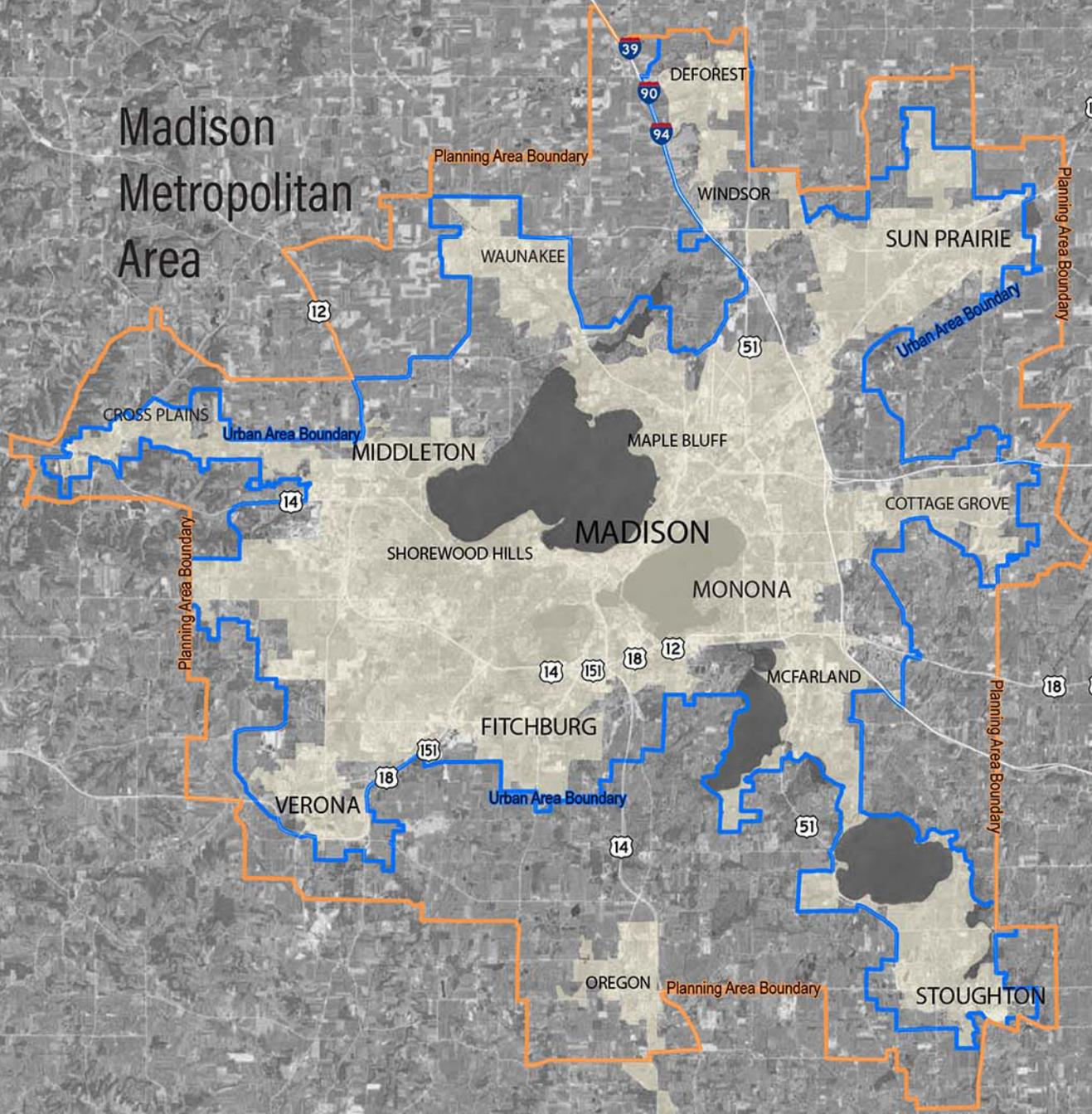
Goal: Advance System-wide Efficiency, Reliability, and Integration Across Modes

- *Transit On-time Performance*
- *Percent of Key Destinations Served by Transit*
- *Roadway Congestion*
- *Roadway Reliability*

Goal: Establish Financial Viability of the Transportation System

- *Bridge Condition*
- *Roadway Pavement Condition*
- *Buses at or Past Replacement Age*

Madison Metropolitan Area



Source: MATPB - 2015 Roadway Centerlines, WisDOT/FHWA - 2013 MPO Boundary, US Census - 2010 Urbanized Areas

Introduction

Purpose

The Madison Area Transportation Planning Board (MATPB), the Metropolitan Planning Organization (MPO) for the Madison area, creates and maintains the Regional Transportation Plan (RTP) for the Madison Metropolitan Area. The RTP, which is updated every five years, articulates the long-range transportation vision for the region. The RTP guides transportation investments and strategies to meet identified goals, integrating plans for the different transportation modes. Seven goals have been identified that describe outcomes the region will always work toward achieving. The goals and associated policies serve as a guide for infrastructure and service investment decisions and transportation policy for the region.

A series of performance measures have been developed to gauge progress in achieving the goals and help inform decisions about investments and strategies. This report provides data indicating how well the goals are being met. The report, which will be published annually, will describe how well the regional transportation system is performing over time.

The performance measures selected are not intended to be exhaustive. Rather, the list includes key measures that allow annual tracking of meaningful progress towards achieving plan goals and for which accurate, easily obtainable data is available. Some measures are applicable to more than one goal, but have been organized under the goal that fits best. Some aspects of the plan goals are not addressed by the measures due to unavailable, incomplete, or inaccurate data. It is anticipated that the list of performance measures will evolve over time as new data and measurement techniques become available. The performance measures report is intended to provide a system level overview of how the region is doing in achieving plan goals.

Report Findings

This is the first year that the Performance Measures Report has been published. Only baseline year data is available for many measures. However, data has been collected over an extended period of time for some measures. This provides information on changes in performance over time. The following are some notable trends for these measures:

Positive Trends

- Rise in BCycle utilization as measured by number of trips (+60%), miles bicycled (+225%), and average trip length (+103%) between the first full-year of operation in 2012 and 2015
- Decline in vehicular crashes resulting in fatalities (-15%) and serious injuries (-25%) between 2006 and 2014
- Decline in bicycle and pedestrian crashes resulting in fatalities or serious injuries (-20%) over the same period
- Increase in airline passenger traffic between 2010 and 2014 (+10%)
- Increase in freight imports (+50%) and exports (+22%) between 2007 and 2013
- Good overall Metro Transit on-time performance (~7% arriving late), with the percentage of buses arriving late fluctuating between 2010 and 2015, but showing steady improvement from 2013 to 2015
- Vehicle miles traveled holding steady between 2007 and 2014
- Bridge and regional roadway pavement condition good overall and holding steady

Negative Trends

- Overall decrease in transit ridership between 2011 and 2015 (-3%) following increasing trend dating back more than 20 years
- Increase in the number of buses (+17) at or past replacement age between 2011 and 2015 (+86%)



Create Connected Livable Neighborhoods and Communities

Create interconnected livable places linked to jobs, services, schools, shops, and parks through a multi-modal transportation system that is integrated with the built environment and supports compact development patterns that increase the viability of walking, bicycling, and transit.

Create Connected Livable Neighborhoods and Communities

Miles of Pedestrian Facilities

Pedestrian facilities, such as sidewalks, crosswalks, and off-street paths, are an integral component of the transportation network. Pedestrian walkways provide persons with access to the rest of the transportation network and the transit system. They also provide independent mobility for short trips. In fact, walking is the second most common mode of transportation. A fully-developed pedestrian network ensures that neighborhoods are connected and that people are able to safely and efficiently reach their destinations.

2015 was the first year that comprehensive data on pedestrian facilities has been collected for the region and serves as a baseline year. There are currently 1,339 miles of pedestrian facilities in the metro area, an increase of 26 miles in the last year.

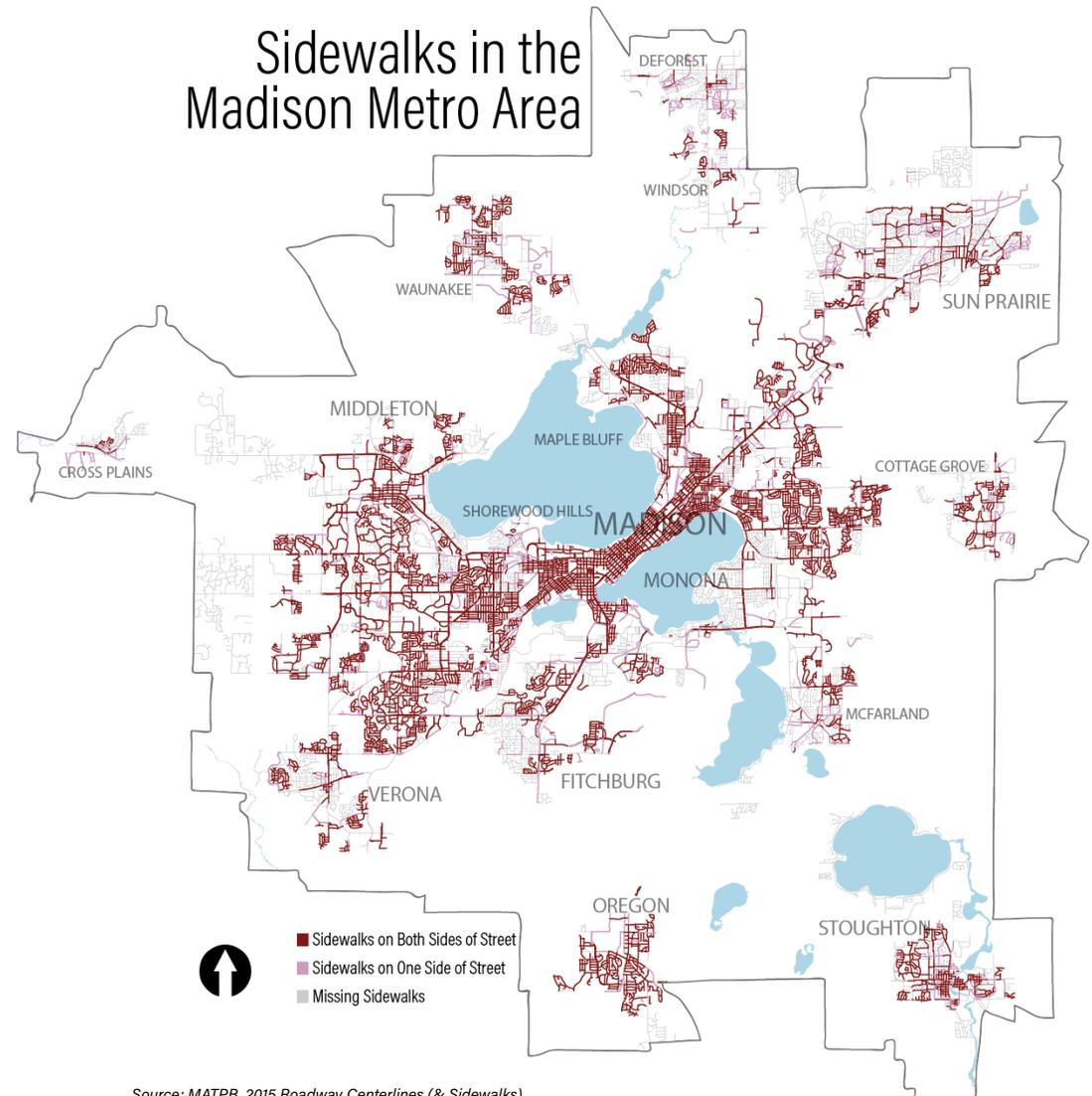
DESIRED TREND



ACTUAL TREND



Sidewalks in the Madison Metro Area



Source: MATPB, 2015 Roadway Centerlines (& Sidewalks)

Miles of Bicycle Facilities

Bicycling is an important mode of transportation and healthy recreational activity. It is efficient and convenient for trips up to 2-5 miles and is accessible to people of most ages and incomes. Bicycling facilities enhance quality of life and health, strengthen communities, increase safety, reduce congestion, and benefit the environment. Bicycle facilities come in many forms, including on-street facilities such as bike lanes (striped, buffered, protected) and bike boulevards as well as off-street facilities, such as shared-use paths and pedestrian/bicycle bridges and underpasses.

The metro area's commitment to cycling has led to the region being recognized as one of the most bicycle friendly in America. In 2015, the League of American Bicyclists upgraded the Bicycle Friendly Community status of the cities of Madison and Fitchburg to Platinum and Gold respectively, while awarding the cities of Middleton and Monona their first recognition as Bronze Bicycle Friendly Communities. In fact, Madison's status makes the city one of the top five most bicycle friendly communities in the country.

2015 will serve as a baseline year for the miles of bicycle facilities measure due to a methodology change in the measurement of the facilities. Over the next 5 years the region is expected to add a new bicycle station in downtown Madison, six new bicycle/pedestrian bridges or underpasses, and over 12 miles of new shared-use paths and trails.

DESIRED TREND



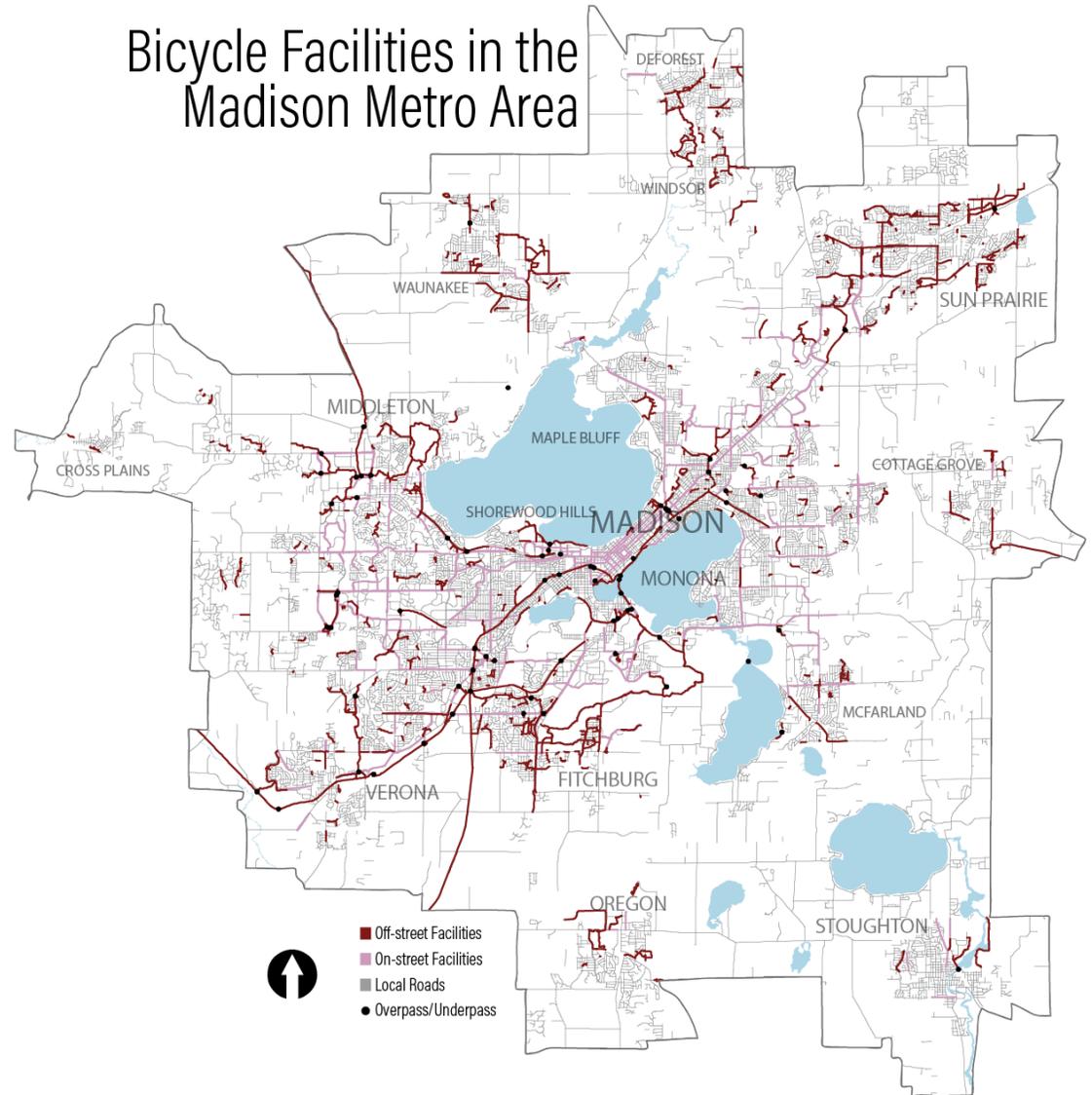
ACTUAL TREND



Bicycle Facilities in 2015

104 miles on-street in Madison	158 miles on-street in Metro Area
76 miles off-street in Madison	223 miles off-street in Metro Area

Bicycle Facilities in the Madison Metro Area



Source: MATPB - 2015 Roadway Centerlines (& On-street Bike Facilities), 2015 Bike Bridges, 2015 Off-Street Bike Facilities

BCycle Utilization

Bicycle sharing systems provide bicycles for shared use on a short-term basis, thus providing mobility at low-to no cost to ride. Locally, B-Cycle provides a bicycle sharing service that primarily serves the Isthmus area and the University of Wisconsin and Madison College campuses – areas with a well developed bicycle network and high housing and destination densities.

Since launching in 2011, B-Cycle utilization has grown tremendously. Annual trips using the service have increased nearly every year and membership has increased by 30% since its first full year of operation. B-Cycle has demonstrated a commitment to adding stations to the community, increasing the number of stations by 13 since its launch. In 2015, utilization numbers increased across the board, with the exception of total trips. Though total trips decreased the average trip length increased 44% from 2.1 to 3.0 miles last year.

DESIRED TREND



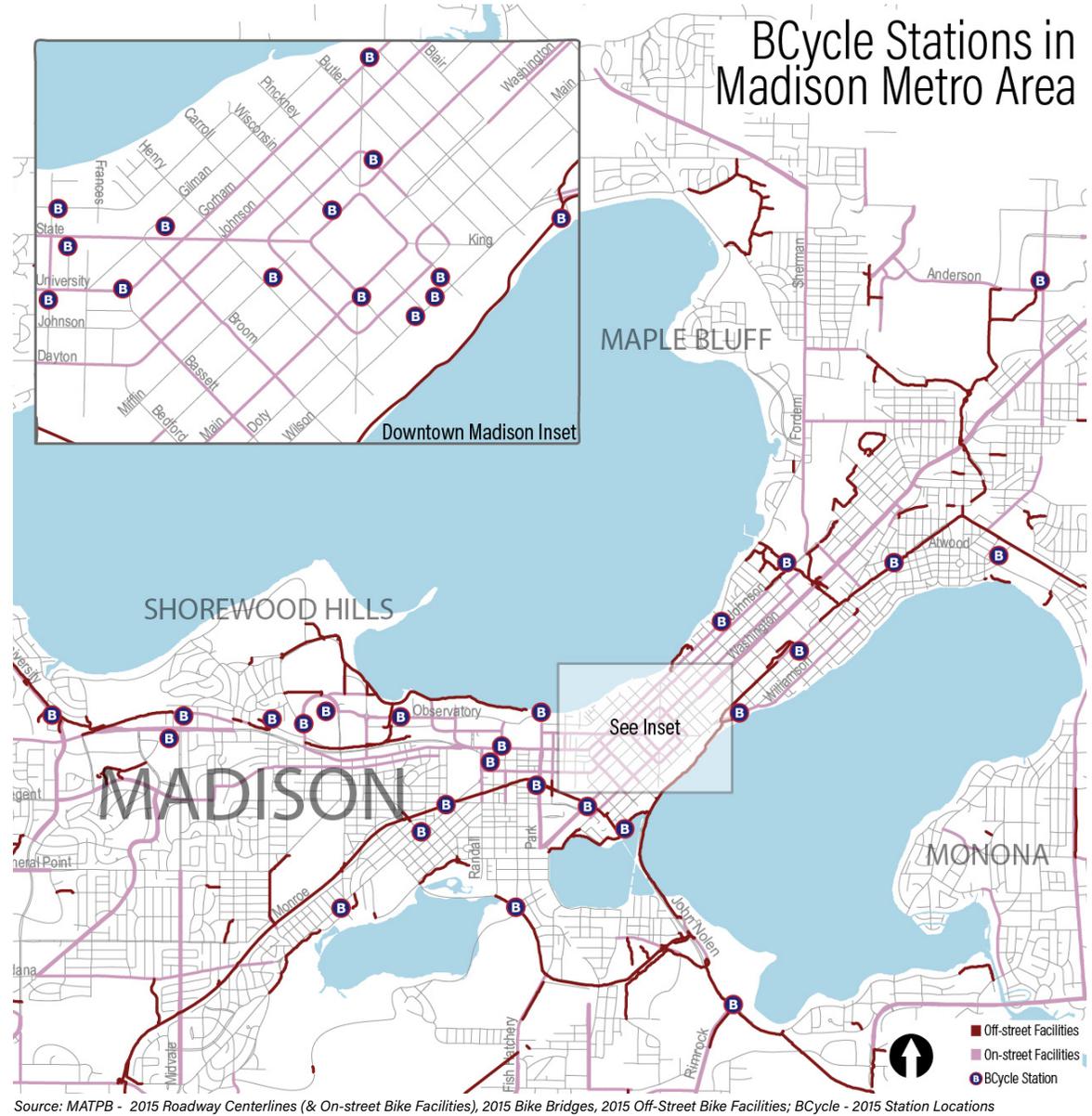
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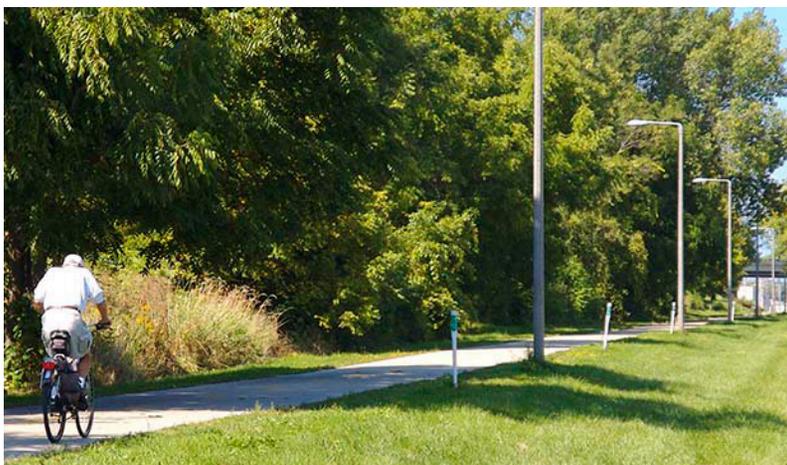


BCycle in the Madison Metro Area

Year	Trips	Members	Miles Biked	Avg Trip in Miles	Stations	Pop Served
2011*	18,501	475	39,618	2.14	27	39,664
2012	63,325	2,150	94,402	1.49	35	42,862
2013	81,662	1,843	173,940	2.13	35	42,862
2014	104,274	2,622	219,108	2.10	39	45,091
2015	101,339	2,789	307,241	3.03	40	45,465

*Partial year of data. Service Launched in June 2011.





Active Living Index

There is a strong connection between the configuration of the built environment and the health and overall well-being of residents. Environments that provide residents with the ability to live an active lifestyle have lower rates of chronic disease, obesity, depression, and mental health disorders. Tangentially, these environments lead to reduced emissions, increased safety, and a multitude of economic benefits.

To quantify the degree to which a neighborhood is conducive to active living, MATPB worked with the City of Madison and the Capital Area Regional Planning Commission to develop the Active Living Index. The Active Living Index measures the walkability of an area (based on intersection, population, and destination density), access to bicycle facilities, and access to transit and jobs via transit.

Active Living Index Rank by Score

Rank	Community	Score	Maximum	Minimum
1	Shorewood Hills	27.1	57.3	9.2
2	Madison	20.2	75.8	1.5
3	Middleton	19.6	53.0	2.6
4	Maple Bluff	19.2	47.0	7.2
5	Fitchburg	19.2	52.2	2.5
6	Sun Prairie	18.8	42.2	3.0
7	Monona	18.7	52.8	3.3
8	Verona	17.0	55.1	2.7
9	Wauunakee	16.3	38.4	5.4
10	Stoughton	15.8	52.4	4.0
11	McFarland	15.5	47.0	3.7
12	DeForest	14.5	47.1	1.5
13	Cottage Grove	14.2	33.4	6.0
14	Cross Plains	13.7	39.9	4.3
15	Oregon	13.4	46.6	1.5

Active Living Index scores were calculated for the first time in 2015. Now that the scores have been calculated, communities will be able to quantify the benefit of transportation investments through a simple visual comparative analysis. More information about the [Active Living Index](#) can be found on the [MATPB website](#).

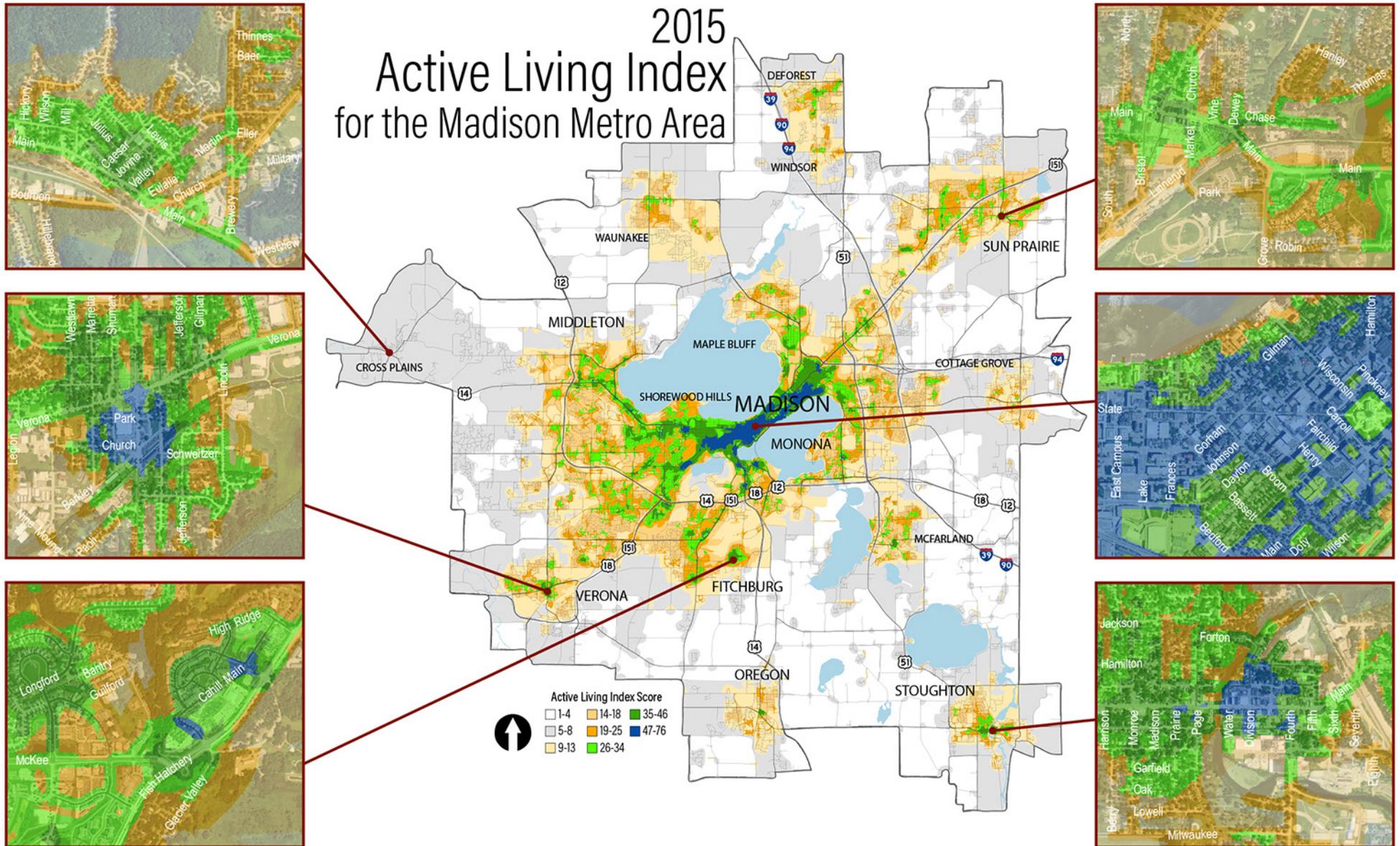
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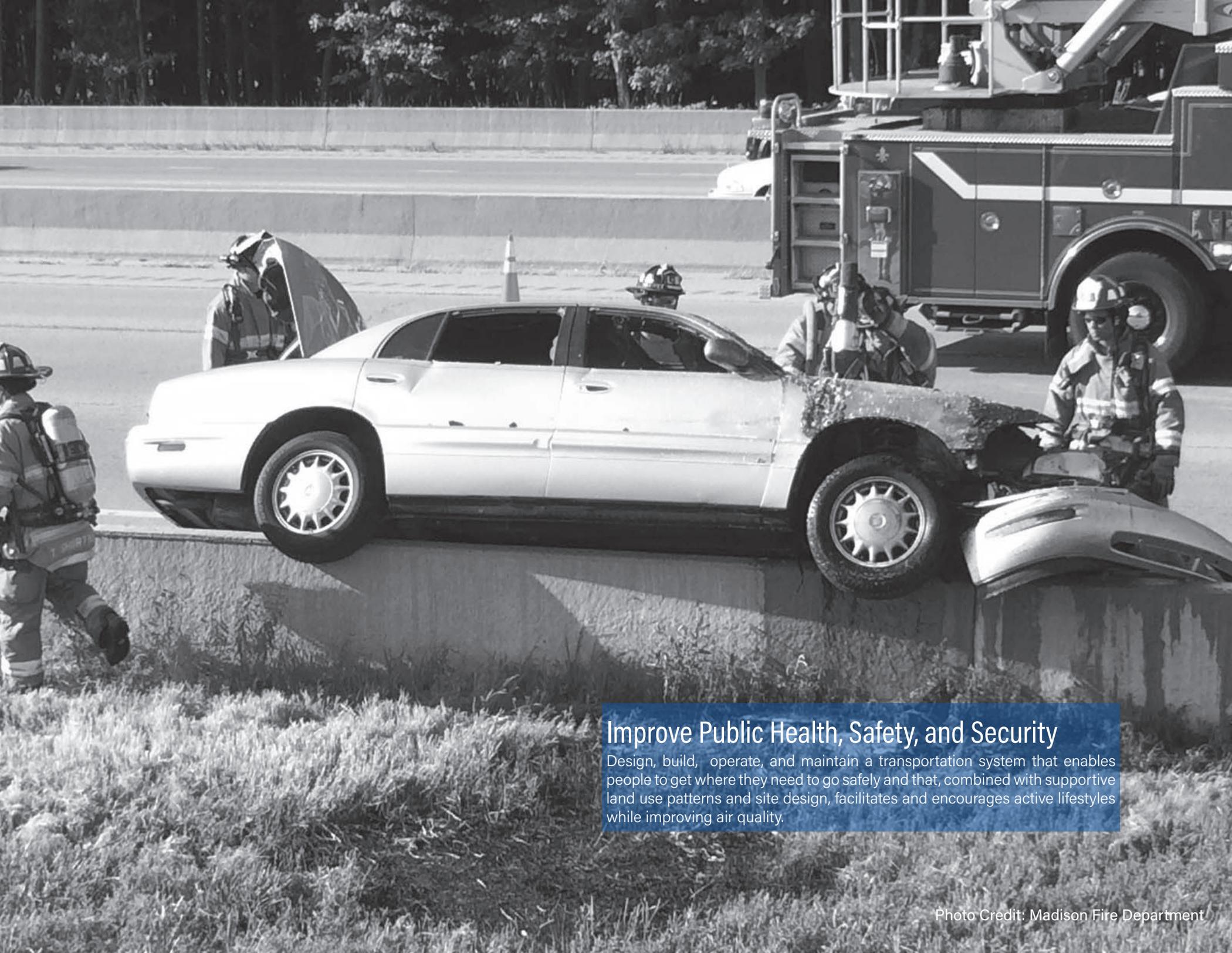
ACTUAL TREND



2015 Active Living Index for the Madison Metro Area



Source: MATPB - 2015 Roadway Centerlines, 2015 Active Living Index Scores (collaboration with CARPC, City of Madison)



Improve Public Health, Safety, and Security

Design, build, operate, and maintain a transportation system that enables people to get where they need to go safely and that, combined with supportive land use patterns and site design, facilitates and encourages active lifestyles while improving air quality.

Improve Public Health, Safety, and Security

Federal Requirements

Improving safety is a top priority and is at the heart of many transportation investment decisions. In early 2016, the Federal Highway Administration (FHWA) released rules establishing measurement of safety on the transportation network. The MATPB must now track these specific measures, and work with the Wisconsin Department of Transportation to set attainable future targets by 2017.

Motor Vehicle Crash Fatalities and Serious Injuries

Deaths as a result of motor vehicle collisions have remained relatively stable in the last five years, dropping from 33 to 28 in 2014. When normalized by estimated vehicle miles traveled (VMT), the same pattern is evident. Serious injuries are those that would result in surgery, hospitalization, or a lifestyle change. In Dane County, serious injuries declined by 25% between 2010 and 2014.

Pedestrian and Bicycle Fatalities and Serious Injuries

Pedestrian and bicyclist deaths and injuries have fallen in recent years, with a 46% decrease from 2010 to 2014.

County-wide Five-Year Rolling Averages

Rolling averages smooth out aberrations that may skew data between years. To develop the averages, counts and rates are added for a series of years and averaged for the time period. Rolling averages show that fatalities and injuries have dropped relatively constantly since the 2006-2010 period.

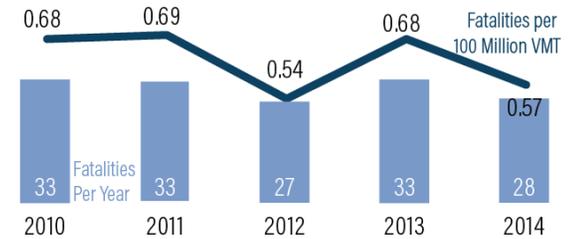
Five-Year Rolling Averages:

Motorized and Nonmotorized Fatalities and Serious Injuries

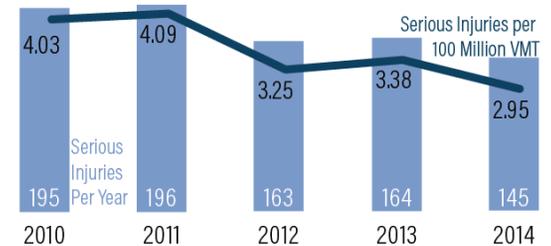
	2006-2010	2007-2011	2008-2012	2009-2013	2010-2014
Vehicular Fatalities	36.2	34.4	31.2	31.6	30.8
Vehicular Fatality Rate	0.742	0.711	0.645	0.651	0.632
Vehicular Injuries	229.0	216.6	193.4	179.8	172.6
Vehicular Injury Rate	4.697	4.478	4.002	3.702	3.541
Nonmotorized Inj. and Fat.	46.4	45.8	44.0	41.4	37.0



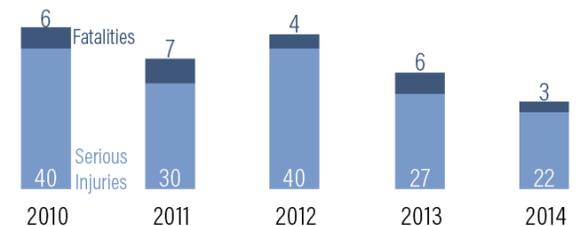
Dane County Motor Vehicle Fatalities & Rates

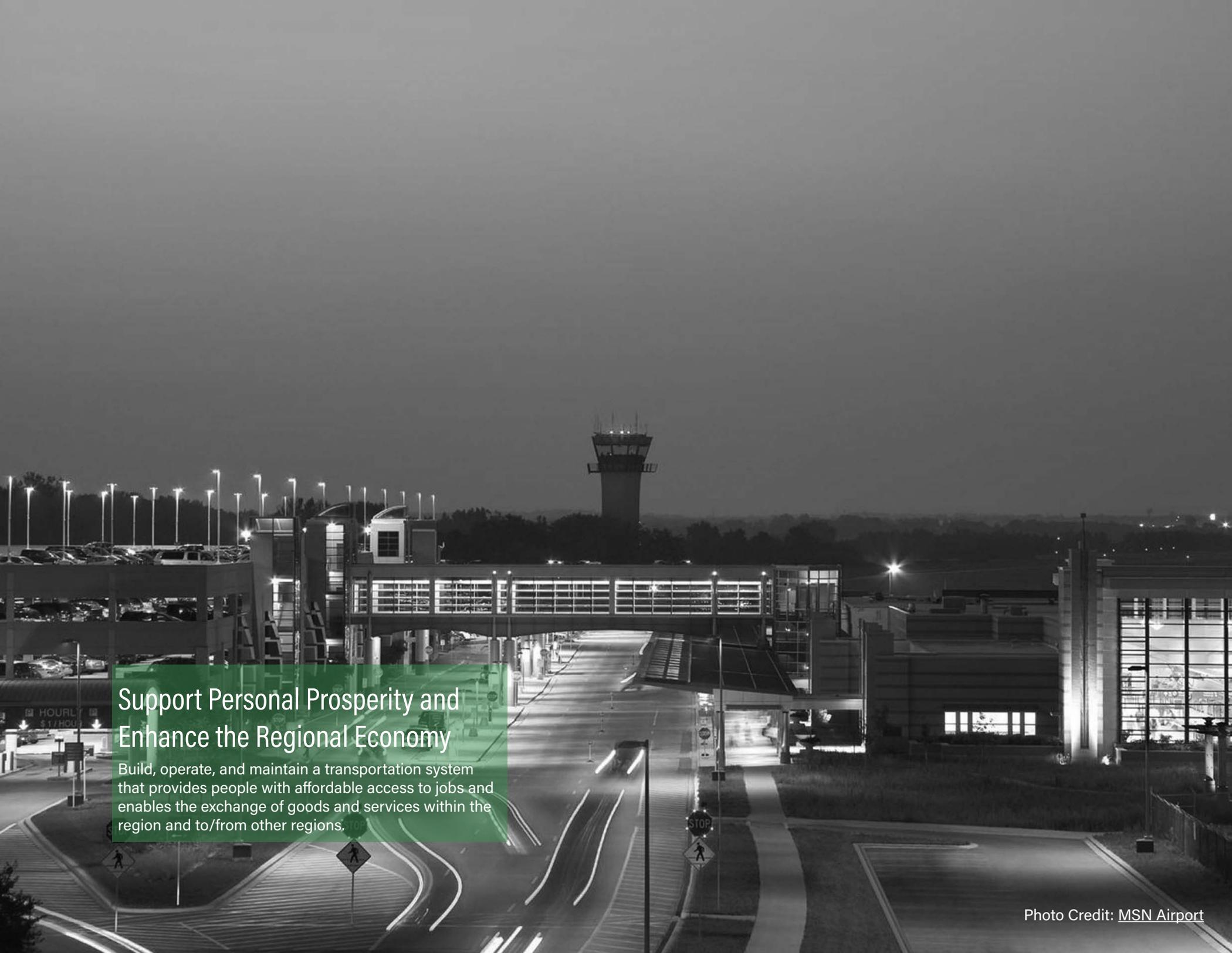


Dane County Motor Vehicle Serious Injuries and Rates



Dane County Pedestrian and Bicycle Fatalities and Serious Injuries





Support Personal Prosperity and Enhance the Regional Economy

Build, operate, and maintain a transportation system that provides people with affordable access to jobs and enables the exchange of goods and services within the region and to/from other regions.

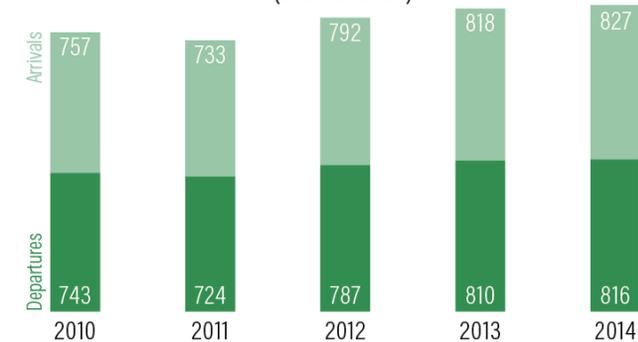
Support Personal Prosperity and Enhance the Regional Economy

Airline Passenger Traffic

Airline passenger traffic can be used to monitor business success as well as personal financial well-being. In fact, the area's largest private sector employer, Epic Systems, uses the airport for approximately 1,200 staff flights weekly.¹ Some flights are bound for the area as a tourist destination, injecting money directly into the local economy. Each flight requires a trip to and/or from the airport, meaning that the success of the airport is tied to the quality and reliability of the greater transportation network. During the Great Recession, departures and arrivals fell at Dane County Regional Airport. However, both arrivals and departures have increased each year since 2011.



Dane County Regional Airport (MSN)
Annual Passenger Volume
(in thousands)



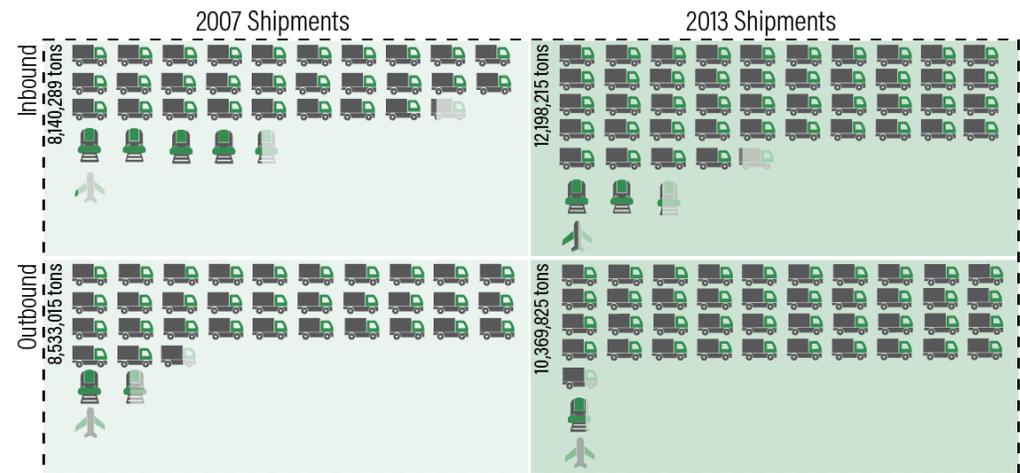
Source: Dane County Regional Airport Monthly Activity Report

Freight Imports and Exports

The rise of e-commerce has had a dramatic impact on the amount of freight being shipped to and from the region. At the same time, the rise of just-in-time manufacturing has placed increased pressure on maintaining a reliable transportation network. Freight tonnage originating in and bound for Dane County has surged in recent years. Interestingly, freight tonnage has increased only on roadways, with major declines in rail and air freight.



Freight Tonnage to and From Dane County

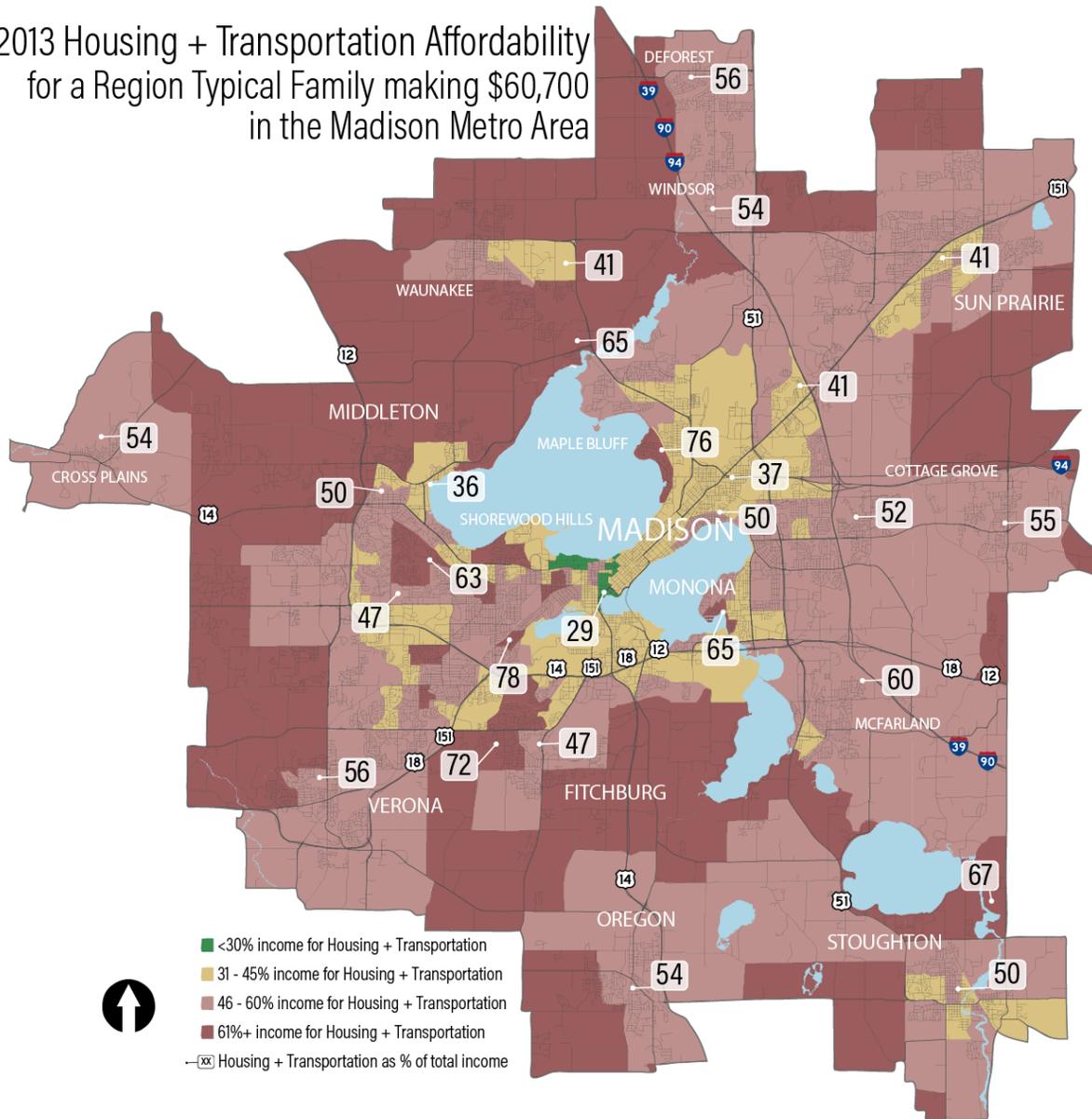


Each symbol represents 250,000 tons of freight - the equivalent of over 83,000 full-sized pickup trucks. Airplane symbol represents air and all other modes.

Source: 2013 IHS Transsearch, 2007 Global Insight Dane County commodity flow data

1. Ivey, Mike. "Epic Systems Driving \$30 Million Parking Expansion at Airport." Madison.com. The Capital Times, 8 Oct. 2013.

2013 Housing + Transportation Affordability for a Region Typical Family making \$60,700 in the Madison Metro Area



Housing + Transportation Costs

Traditionally, affordable housing has been defined as housing that costs no more than 30% of household income. However, this measure of housing affordability is not holistic as it fails to take into account the interrelatedness of housing to a household's second biggest expense, transportation. A typical household in Dane County has 2.35 people, has 1.22 workers, makes \$60,694 per year, spends over \$17,500 per year on housing, and spends nearly \$13,000 per year on transportation costs, according to an analysis of US Census Bureau data by the Center for Neighborhood Technology (CNT).

The [Housing + Transportation tool](#), created by the CNT, determines location affordability using neighborhood, household, and travel characteristics to estimate total household transportation cost. When adding transportation costs to the housing affordability formula, a 45% threshold for determining affordability is recommended.

Applying the affordability threshold of 15% of a typical income household, transportation costs are not affordable to households with typical income in most parts of the metropolitan area (page 13). Only portions of the Isthmus are affordable, encompassing only 9% of the regional population. However, many areas, particularly those near transit corridors and bus transfer points, are near-affordable. As one would expect, rural areas and suburbs that are not part of the contiguous core urban area have higher transportation costs.

Housing costs deviate from transportation trends in that some of the most and least expensive housing is found within the core of the urban area (right). At the same time, relatively inexpensive housing can be found in suburban locations, such as Sun Prairie and Stoughton.

Looking at housing and transportation costs together, it is apparent that urban and dense suburban locations – mostly those with good transit service – are the most truly affordable locations for a typical household.

Source: MATPB - 2015 Roadway Centerlines, Center For Neighborhood Technology - 2013 Housing, Transportation, & H+T Scores

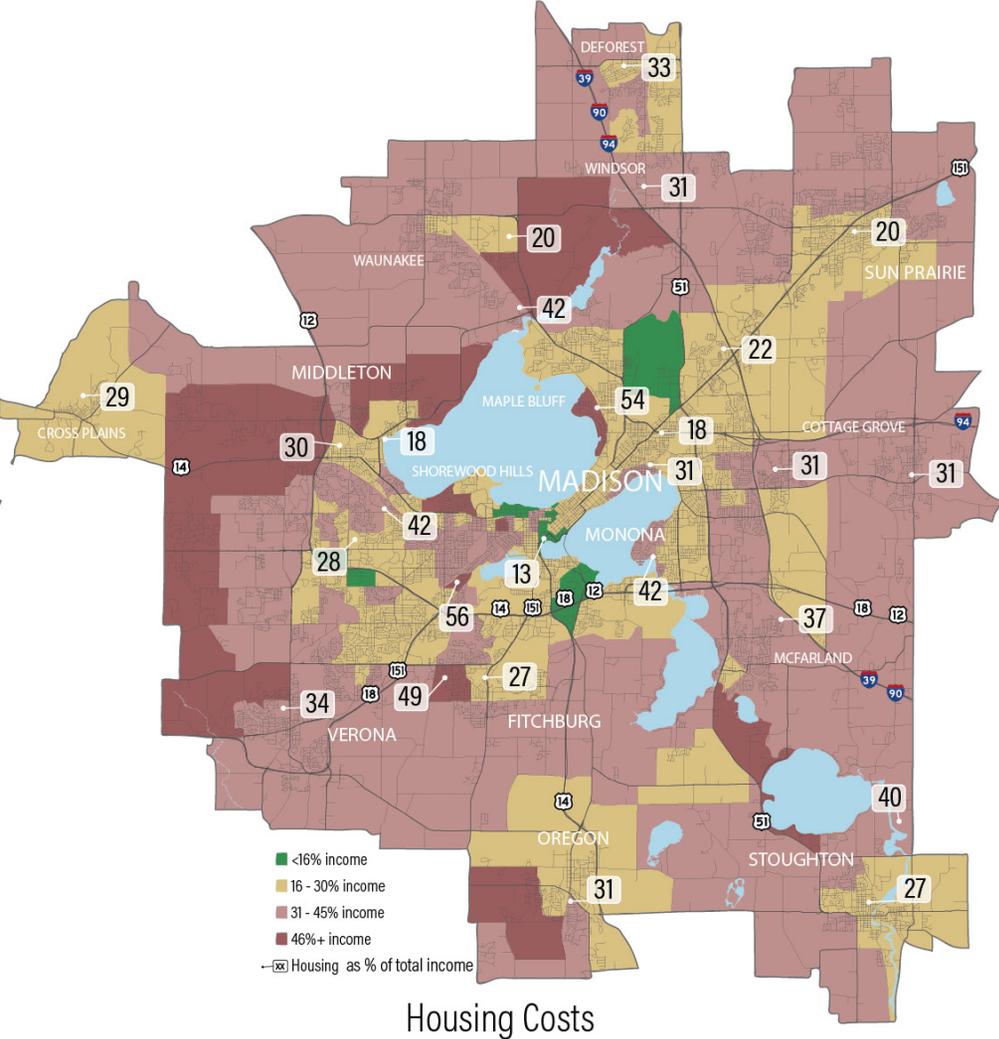
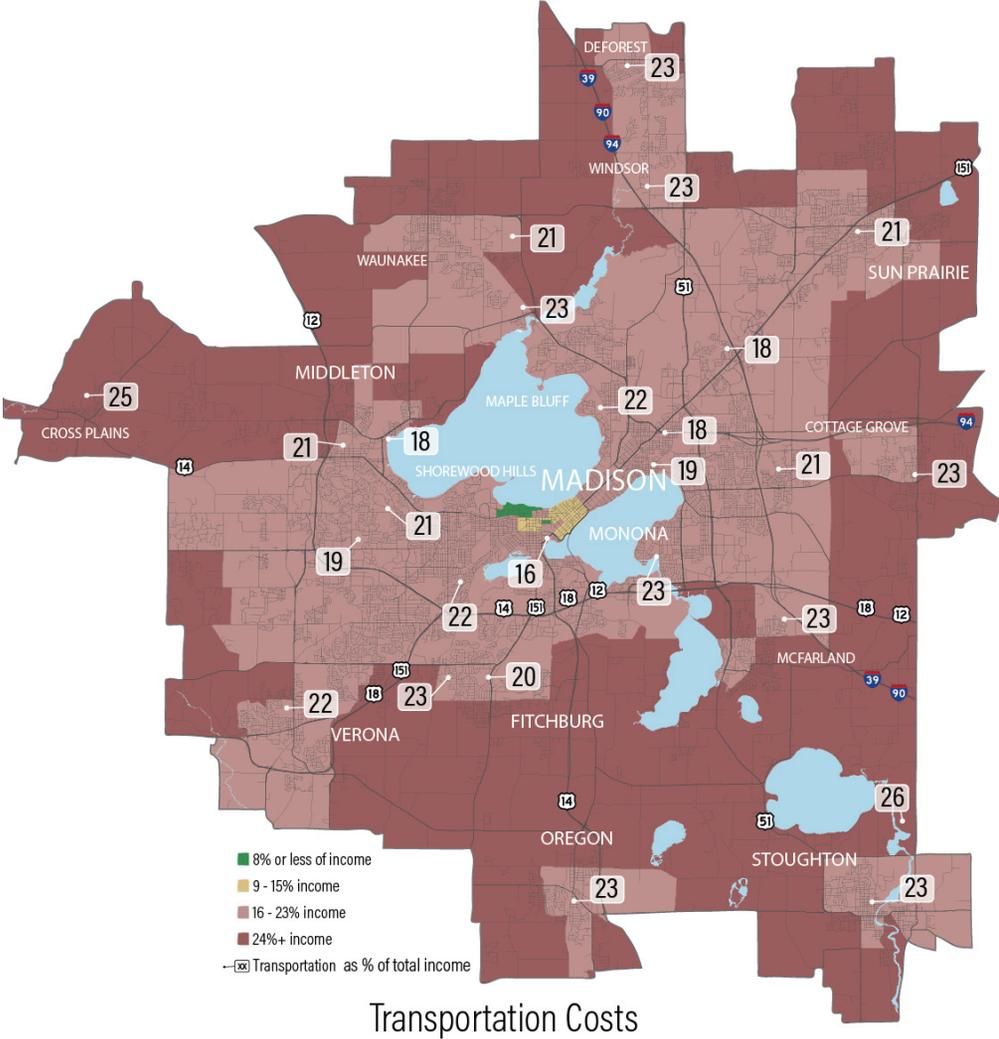
DESIRED TREND



ACTUAL TREND

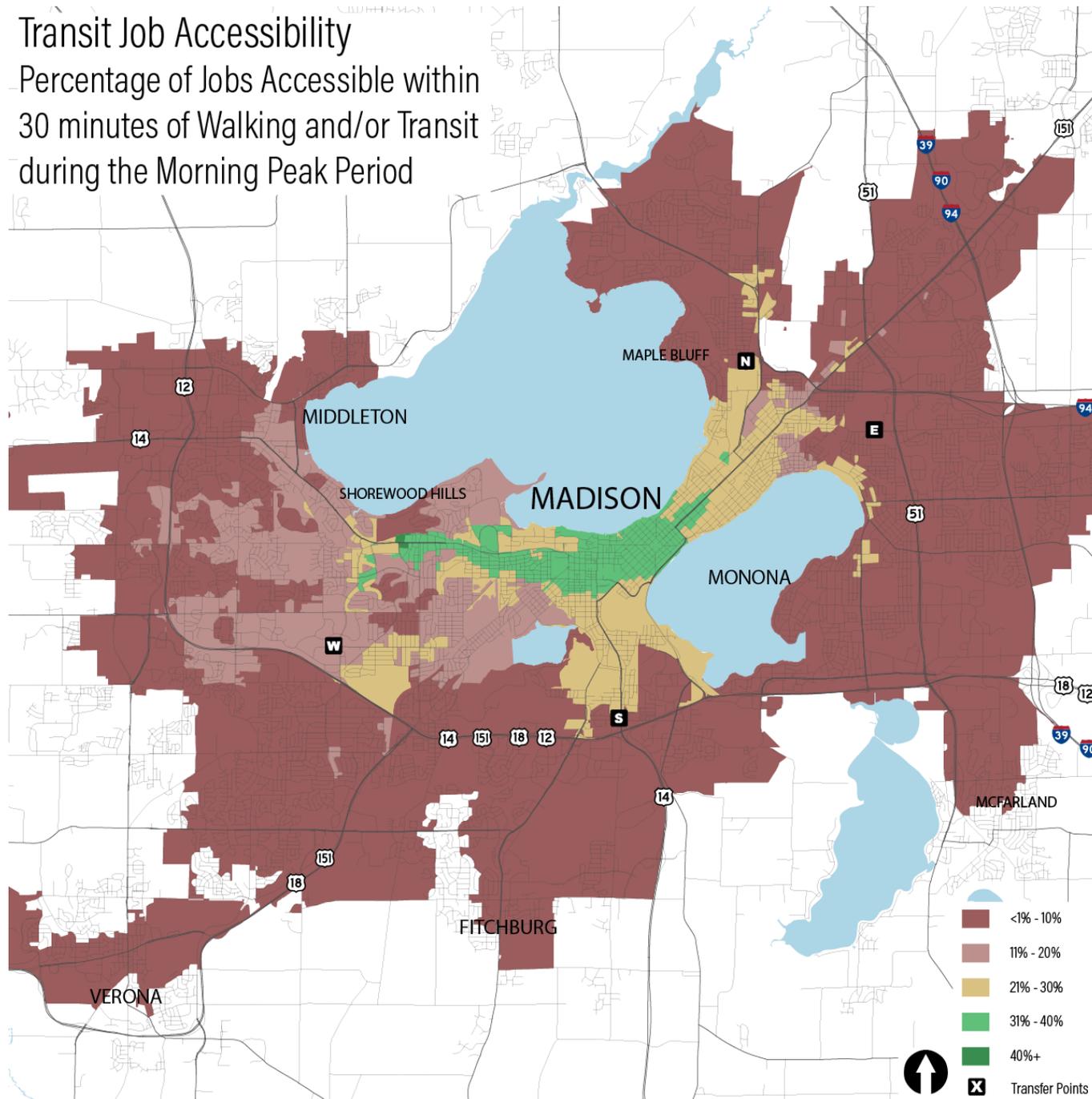


Regional Affordability for a Typical Dane County Family making \$60,700



Transit Job Accessibility

Percentage of Jobs Accessible within 30 minutes of Walking and/or Transit during the Morning Peak Period



Transit Access to Employment

According to US Census data, more than 6% of commuters in the Madison Urban Area use public transportation to get to work. Most bus service in the Madison area is provided by Metro Transit, a City of Madison-owned transit system with service extending into several other communities. Public transit gives people a low-cost, stress-free alternative to driving that conserves fuel and reduces emissions.

The Transit Job Accessibility map shows the percentage of jobs in the Madison Urban Area that a person residing within each Census Block can access within 30 minutes (page 14) and 45 minutes (page 15) by walking and/or using public transit. A commute of 30 minutes or less is desirable while many people in the Madison area would likely consider a 45-minute commute tolerable. Longer commutes can be made but are not competitive with driving or other modes.

Residents in central Madison can access more jobs in the region than people living around the periphery for several reasons. First, central Madison is in the middle of Metro Transit's service area, allowing them to travel in all directions to access jobs. Second, service levels are higher in central Madison with more frequent service and more routes available. Third, jobs are regionally concentrated around the University of Wisconsin campus and Capitol Square.

Commuters using transit in the Madison Urban Area have longer commutes on average than those using other modes while covering shorter distances. The average Madison area transit commuter is estimated to spend about 33 minutes getting to work, compared with about 20 minutes for other modes.

It is estimated that only 52,750 people or 12% of the urban area population can access 50% or more of the jobs within 45 minutes.

Source: MATPB - 2015 Roadway Centerlines, Metro Transit - 2015 routes/stop locations, InfoUSA - 2010 employment locations. Areas in white are not served by transit.

DESIRED TREND

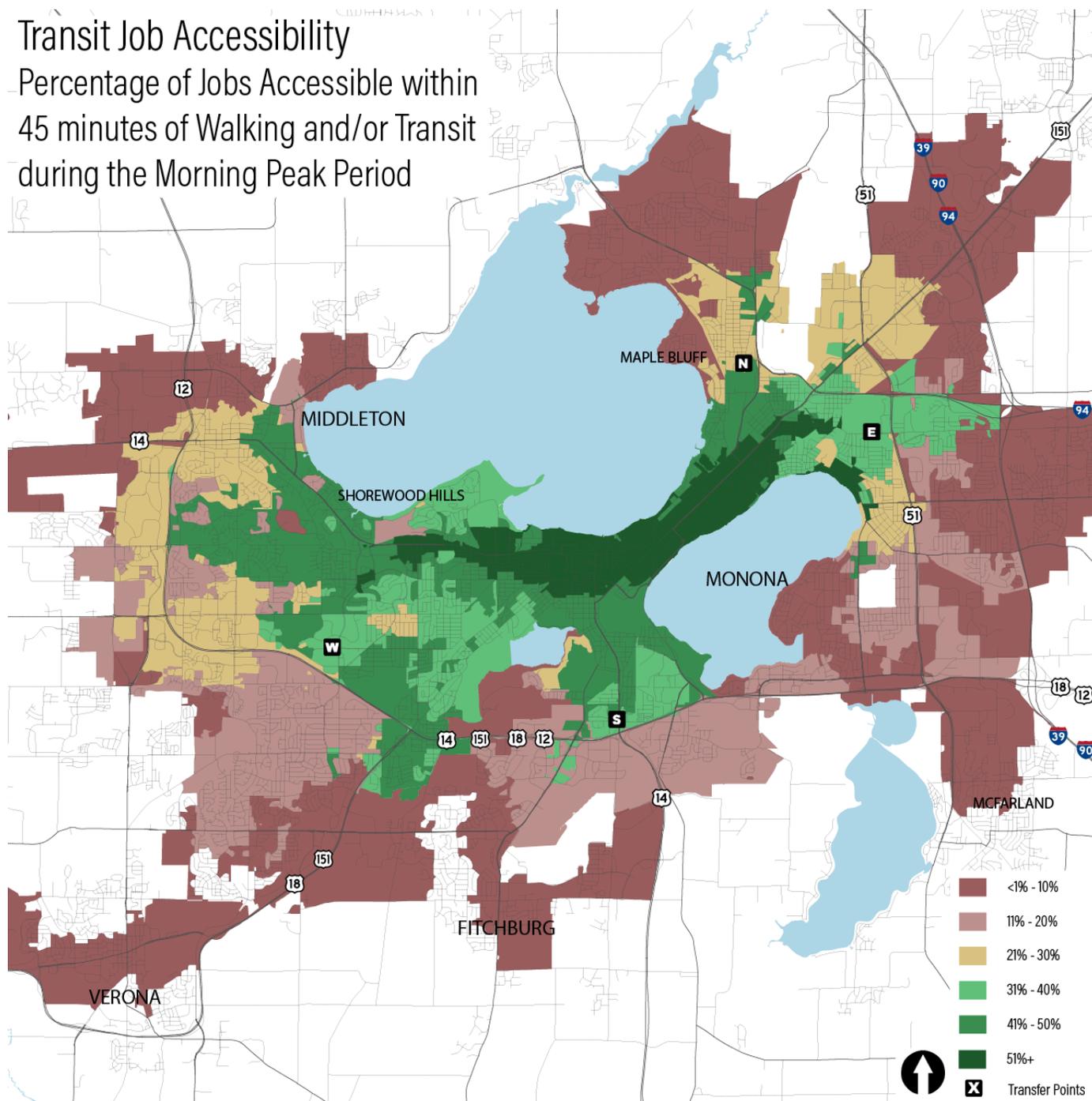


ACTUAL TREND



Transit Job Accessibility

Percentage of Jobs Accessible within
45 minutes of Walking and/or Transit
during the Morning Peak Period



Source: MATPB - 2015 Roadway Centerlines, Metro Transit - 2015 routes/stop locations, InfoUSA - 2010 employment locations. Areas in white are not served by transit.



Improve Equity for Users of the Transportation System

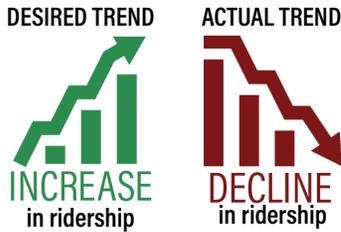
Provide an equitable level of transportation facilities and services for all regardless of age, ability, race, ethnicity, or income.

Improve Equity for Users the Transportation System

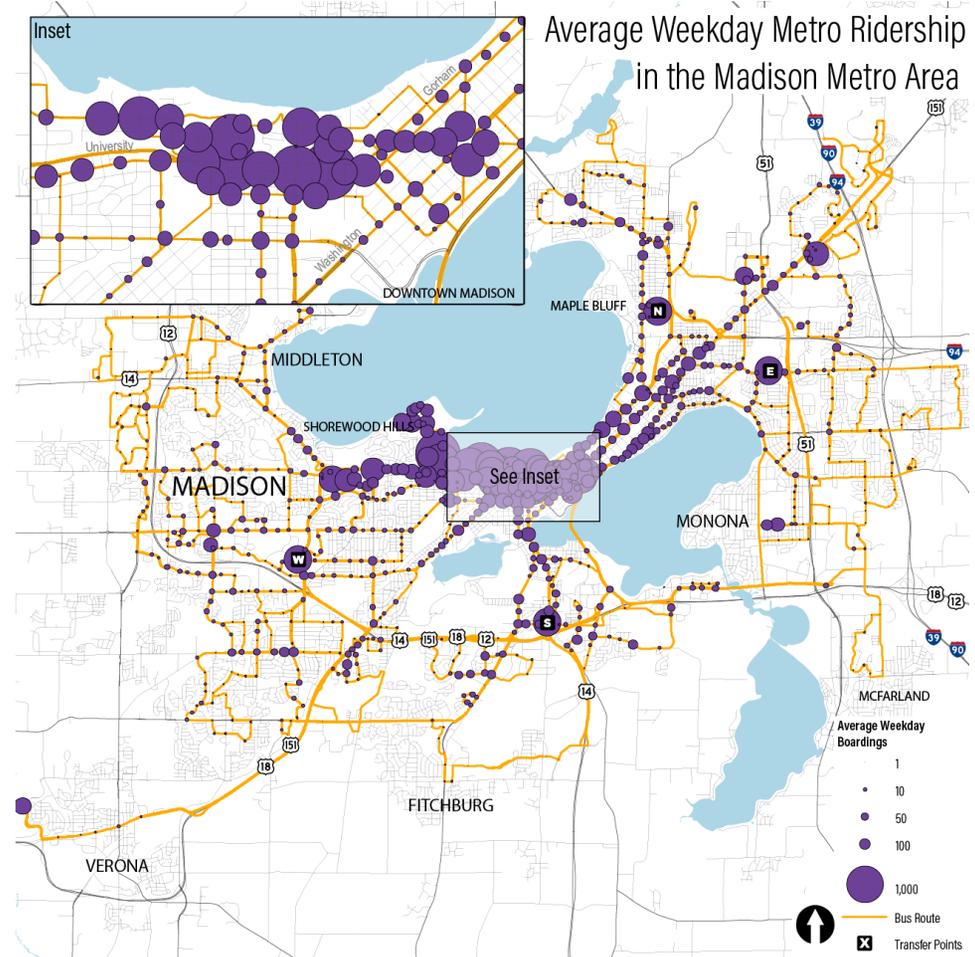
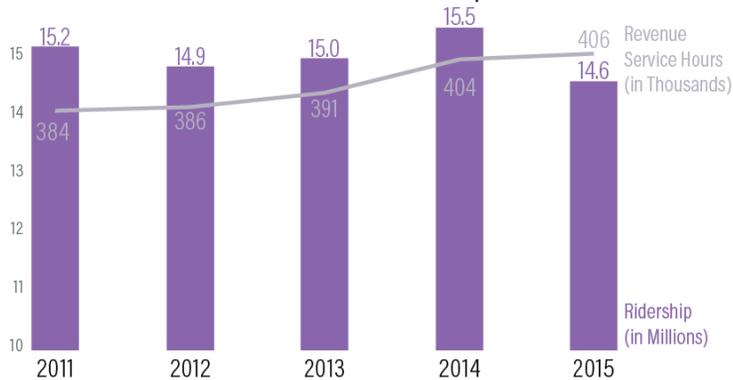
Transit Ridership

Efficient and well-used public transit service is a key component of a well-balanced transportation system that serves all users. Two transit systems operate fixed-route bus service – Madison Metro Transit and Monona Transit – in the Madison Urban Area.

Metro Transit, serving Madison as well as neighboring partner communities including Middleton, Fitchburg, Verona, has seen increasing fixed-route ridership nearly every year since 1990; however, ridership dropped almost 6% in 2015 despite a similar level of service. Although the causes of this drop in ridership are not completely understood, a number of factors may be contributing. Ridership related to the UW and the Madison Metropolitan School District seem to be affected more than the system overall – possibly resulting from changes in students’ residences and mild winters. A 30% drop in gas prices and strong economy have led to an increase in vehicle miles traveled which may in turn be contributing to lower ridership. The downward trend in overall ridership has only been observed for a little over a year, but is large enough to be a concern.

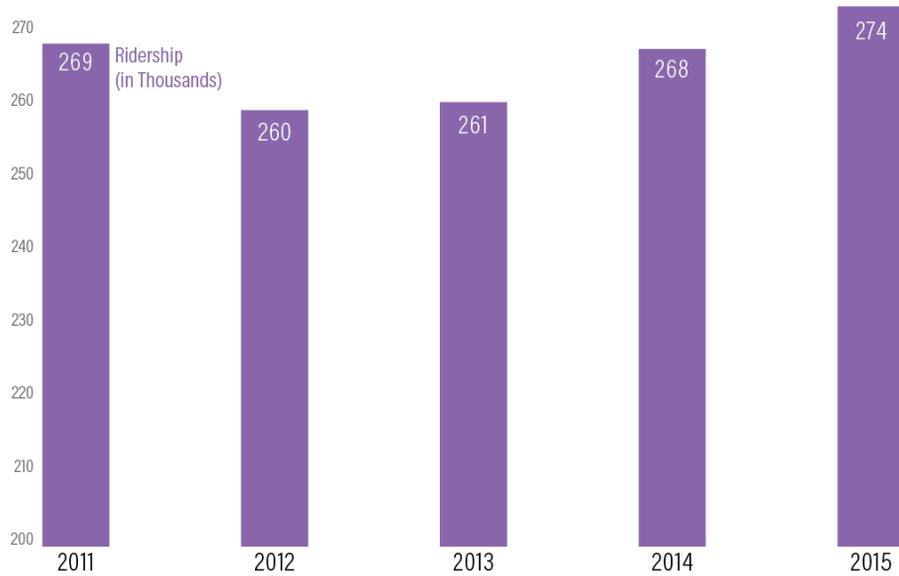


Metro Transit Fixed-Route Ridership and Service Hours



Source: MATPB - 2015 Roadway Centerlines, Metro Transit - 2015 routes, stop locations/ridership

Metro Paratransit Ridership

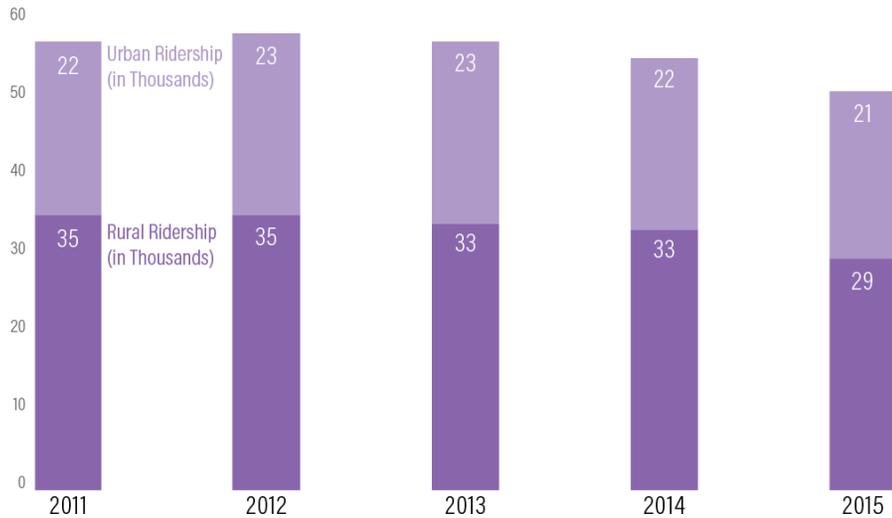


Specialized Transportation Ridership

Transportation service targeting seniors and people with disabilities is provided by an array of different programs and partnerships between public agencies, non-profits, and private transportation operators. A one-call center operated by Dane County Department of Human Services helps users navigate the various programs.

Dane County's Group Access Service, which covers the cities of Madison, Middleton, and Monona, and its Rural Senior Group Transportation Program, which covers the rest of the county, provide regularly scheduled accessible group rides for seniors to destinations like congregate meal sites, community centers, and shopping. Use of the rural service has declined slightly in the last five years. Metro Transit's paratransit service provides the majority of door-to-door accessible service for people with disabilities in the Madison area, which saw a small ridership drop in 2012 that has recovered.

Dane County Group Ride Program Ridership



Fixed Route Transit Service Area

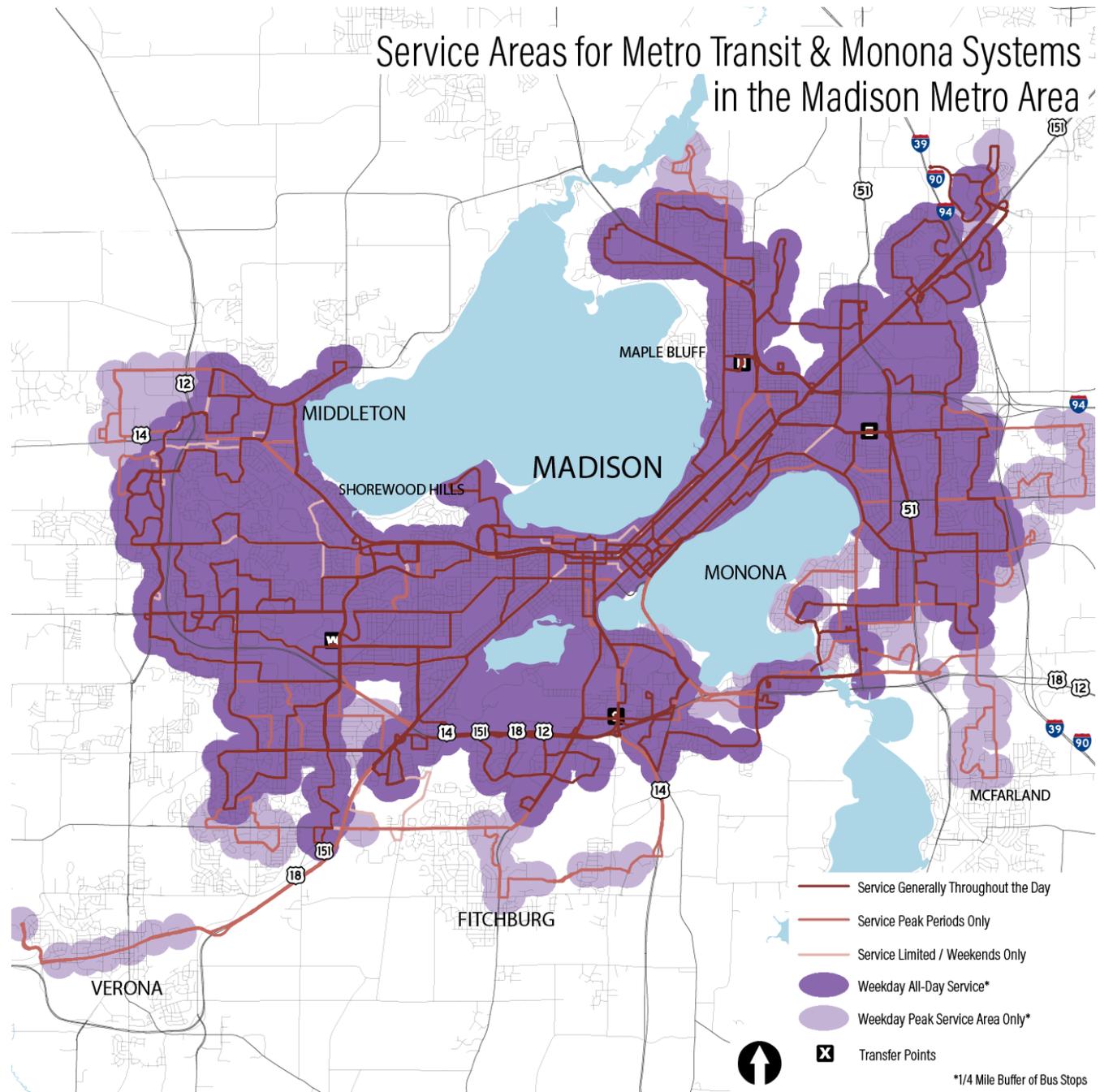
Fixed-route transit service provides transportation open to the public on set routes using reliable schedules with buses stopping to pick up and drop off passengers at signed bus stops. Riders use the service for many purposes but surveys show that routine trips like work and school commutes are much more likely to be made by transit. Service area coverage is an important metric because it shows the population that has access to this service.

The fixed-route transit service area is defined as a 1/4-mile buffer from a bus stop, equivalent to about a five-minute walk. All-day service covers more than 55 square miles and roughly 65% of all residents living within the Madison Urban Area. Peak period-only routes extend coverage on weekday mornings and afternoons to 69 square miles and over 71% of residents. Peak period service is useful for traveling to first shift jobs, but does not provide all-day mobility to people for many other trips.

DESIRED TREND



ACTUAL TREND



Source: Metro Transit, March 2015 transit routes and stops.

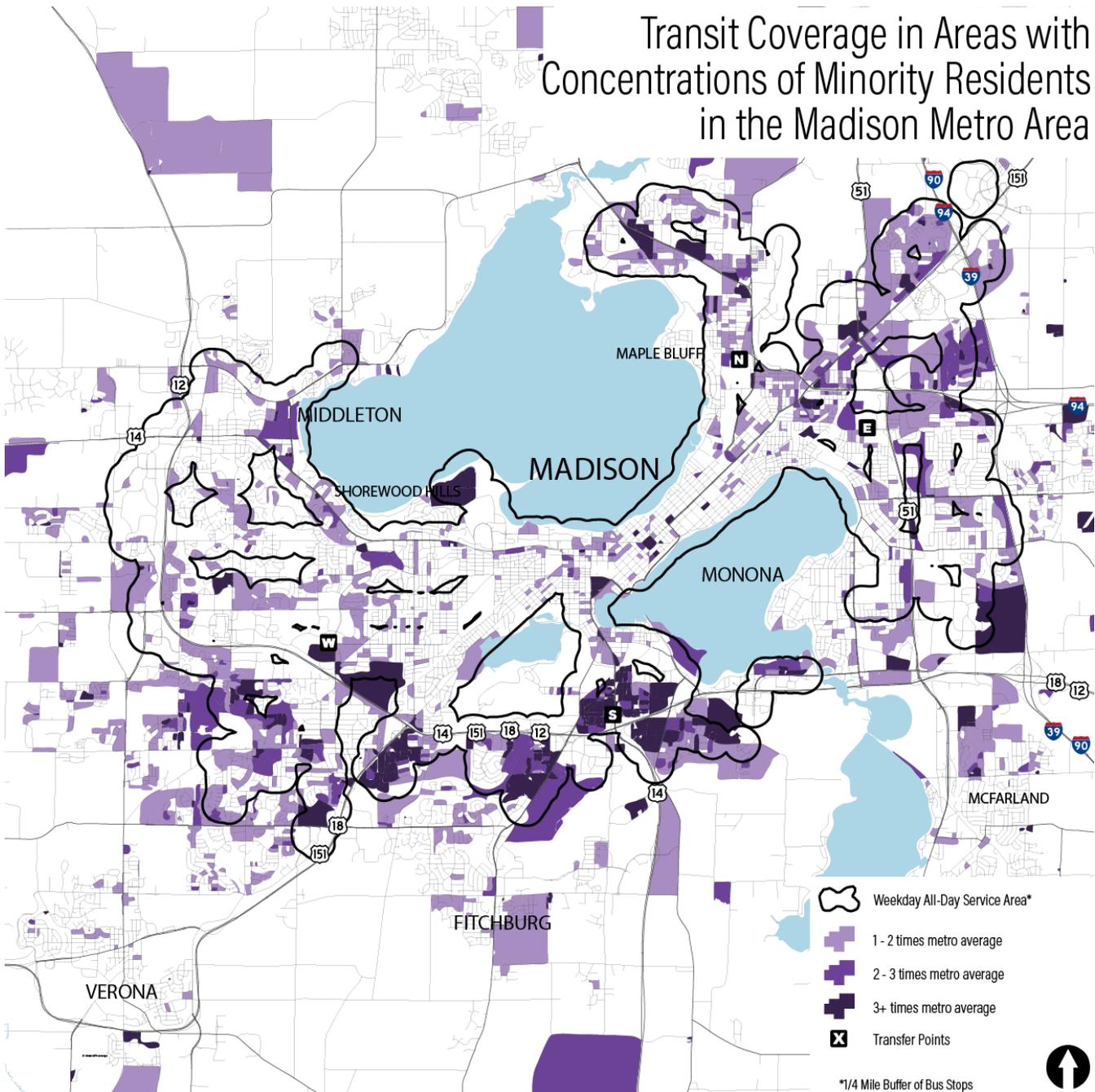
Transit Coverage in Areas with Concentrations of Minority Residents in the Madison Metro Area

Transit Coverage for Minorities and Low Income Persons

Transit accessibility is important for all people but especially for minorities and low-income families because they are more likely to rely on public transit than other segments of the general population.

The 2015 Metro Transit On-board Survey provides a glimpse into who uses the public transportation system in the region. The survey revealed that an estimated 27% of transit riders are minority individuals (Black/African American, Asian, and other/multiple races) and 37% of riders, excluding college/university students, indicated they have a household income below \$35,000 per year. By comparison, the general population in the region is about 17% minority and the average regional household income is over \$60,000.

Overlaying the all-day fixed-route bus service area with census blocks with high concentrations of minority and low-income residents provides a visual representation of populations that have access to public transit. Overall, an estimated 78% of low-income residents and 58% of minority residents in the Madison Urban Area have access to all-day bus service.



Source: Metro Transit. March 2015 transit routes and stops. US Census - 2010 Minority Population by Census Block

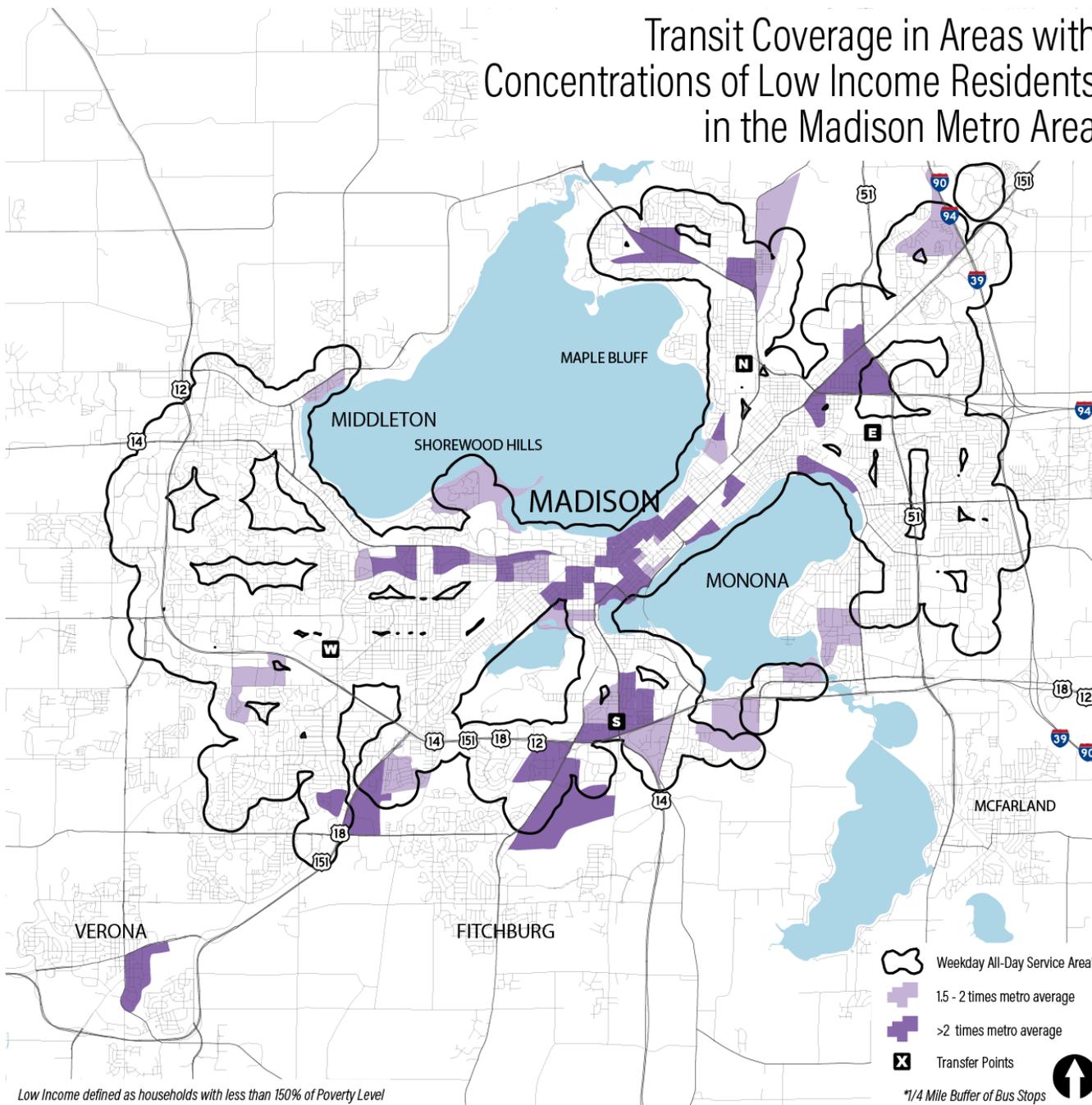
DESIRED TREND

INCREASE
in coverage and population served

ACTUAL TREND

UNKNOWN

Transit Coverage in Areas with Concentrations of Low Income Residents in the Madison Metro Area



Low Income defined as households with less than 150% of Poverty Level
 Source: Metro Transit. March 2015 transit routes and stops. CTPP - 2010 Poverty Level by TAZ

- ### Related Links and Information:
- [2015 Madison Metro Transit On-board Passenger Survey](#)
 - [2013 - 2017 Transit Development Plan for the Madison Urban Area](#)
 - [Title VI Non-Discrimination Program / Limited English Proficiency Plan](#)
 - [Section 5310 Program Management and Recipient Coordination Plan](#)
 - [Public Transit Trends in the Madison Area](#)
 - [Metro Transit Paratransit Service Area Map](#)
 - [Group Access Service Information](#)



Reduce the Environmental Impact of the Transportation System

Ensure that the transportation system is designed, built, operated, and maintained in a way that protects and preserves the natural environment and historic and cultural resources, and is supportive of energy conservation.

Reduce the Environmental Impact of the Transportation System

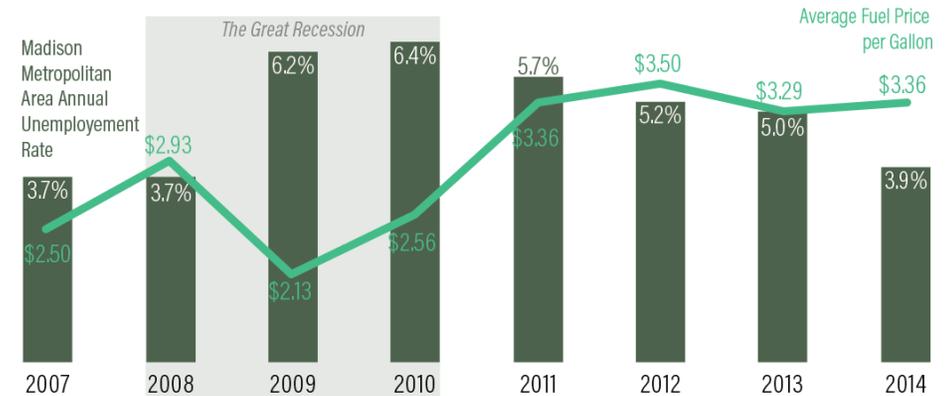
Vehicle Miles Traveled

Vehicle Miles Traveled (VMT) is a measure of all of the miles driven within an area within a specified time-frame. Lower VMT means that fewer pollutants are released into the atmosphere and that area residents are diverting trips to other, more environmentally friendly alternatives.

VMT peaked in 2005 at the peak of the housing boom and height of the 2000s economic growth. In late 2007 fuel-oil and heating-oil prices began to rise as the "housing bubble" burst. The result was the Great Recession in which local unemployment increased to over 6 percent while national unemployment increased to 10 percent at its height. Mid-recession, inflation-adjusted gas prices fell to pre-recession numbers. The region's relatively strong economy compared to the rest of the state coupled with relatively low fuel prices may account for the slight increase in VMT throughout the recession. In 2011, unemployment began to gradually decline while at the same time, fuel costs reached their highest levels in years. VMT contraction lagged behind the fuel price increases in 2011, but factored in VMT reductions in 2013 and 2014.



Madison Metro Area Unemployment Rate & Average Annual per Gallon Fuel Prices (inflation adjusted to 2014)



Average Daily Vehicle Miles Traveled (VMT) and Average Annual per Gallon Fuel Prices (inflation adjusted to 2014)



Source: WisDOT - VMT, BLS - Unemployment Rate, EIA - Average Annual Fuel Price in Wisconsin

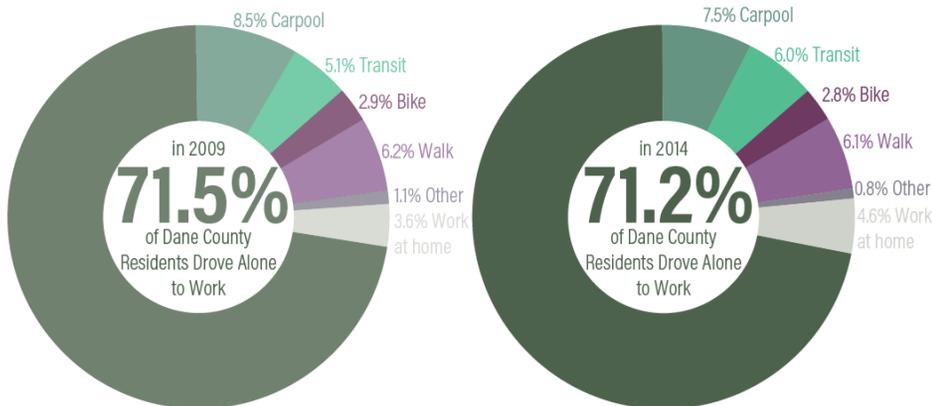
Mode of Transportation to Work

Commuting to work is one of the most predictable and common trips made by adults. About 70 percent of people aged 16 and older are part of the workforce population - roughly 46 percent of total population. Work trips most often occur during congested time periods and are the largest contributor to travel time delay. They are also slightly longer than trips for other purposes and anchor travel for other purposes. In all, commuting represents more than 28 percent of all miles of personal travel.²

In Dane County, over two-thirds of all resident commuting occurs by driving to work as a single occupant in a vehicle (SOV) - something that has remained relatively consistent over time. There have been changes in the mode-split of non-SOV trips, including a decrease in carpooling, increase in transit ridership, and an increase in the number of people working from home.



Mode of Transportation to Work in Dane County



Source: 2010 US Census

Number of Vehicles Needed to Carry 45 People



Source: FHWA Freeway Management Program

Air Quality

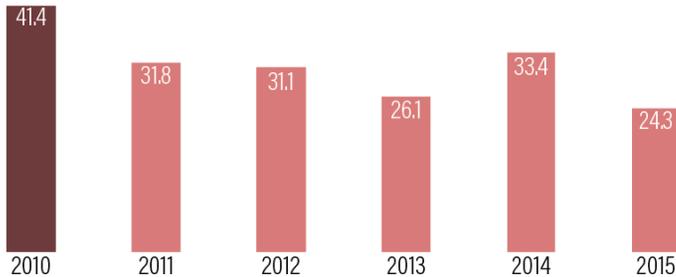
Examining the air quality of a region is one of the best ways of measuring the impact of the transportation system on the environment. Emissions from transportation account for 26% of total U.S. greenhouse gas emissions – second only to the electricity sector. The Clean Air Act provides standards for a variety of pollutants including ozone, particulate matter (PM 2.5), carbon monoxide, nitrogen dioxide, sulfur dioxide, and lead. Each of these air pollutants can be linked to specific adverse environmental impacts. PM 2.5 is a component of acid rain, which changes the nutrient balance of lakes and streams. It also damages culturally important monuments, statues, and buildings by staining and damaging stone.

Monitoring air quality is important not only for the environment, but also for the health of everyone in the region. Particle pollution can be absorbed into the body through the lungs and has been linked to a variety of serious health conditions or illnesses such as coughing/difficulty breathing, decreased lung function, asthma, irregular heartbeat, nonfatal heart attacks, and premature death in people with heart or lung disease.

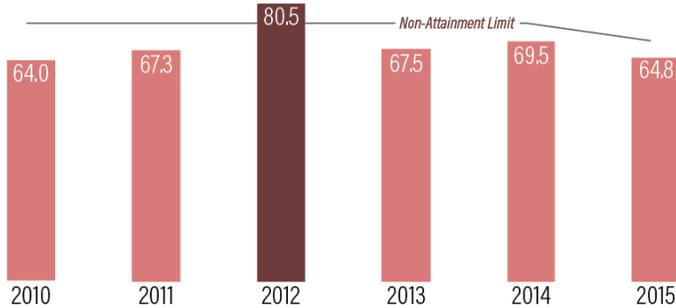
In the Madison region, PM 2.5 and ozone are measured daily from the University of Wisconsin - Madison campus. Over the last six years, PM 2.5 levels have steadily declined. The region's current PM 2.5 levels pose no significant health risk. The region's ozone levels, however, are not trending down. Ozone levels have remained relatively

consistent, posing a moderate health concern for area residents. In 2012, levels on some summer days were high enough to be considered "unhealthy for sensitive groups," such as people with asthma, older adults, child, teenagers, and people who are active outdoors.

24-Hour PM_{2.5} Levels*
in Micrograms/Cubic Meter (LC)



8 Hour Ozone Levels*
in Parts per Billion



No Health Concern Moderate Health Concern Unhealthy for Sensitive Groups

*Average of four highest reading days in the year.



Dane County Car Facts 2015



\$12,847

Annual Transportation Costs



1.75

Autos Per Household



21,865

Vehicle Miles Traveled
per Household



10.01

Annual Tons of Greenhouse Gas
Emissions per Household

Source: CNT - Dane County Fact sheet, 2015

Source: US EPA



Advance System-wide Efficiency, Reliability, and Integration Across Modes

Design, build, operate, and maintain an efficient transportation system with supportive land use patterns that maximizes mobility, minimizes unexpected delays, and provides seamless transfers between all modes.

Advance System-Wide Efficiency, Reliability, and Integration Across Modes

Transit On-time Performance

Reliability is crucial for a transit system. People using transit are more likely to be traveling to work and unreliable transportation options can result in people arriving late to work through no fault of their own. Further, many trips require transfers between buses – missed transfers can strand riders for up to an hour. When these things happen, riders are likely to stop using transit.

Lateness for this analysis is defined as a bus that arrives at a time point five or more minutes late. The time periods are each spring and fall semester between the first and last days of class, weekdays only, excluding Thanksgiving and Spring Breaks.

Metro Transit's on-time performance has fluctuated between about 6% and 10% for the past five years with performance improving overall since 2013. The on-time performance numbers represent high reliability for an urban transit system. However, Metro's timed transfer ("pulse") system requires a very high level of on-time performance and routes and schedules have been created and adjusted to achieve this – in some cases sacrificing travel time in favor of reliability.

On-time performance is the worst during the afternoon peak periods when traffic congestion is worse. Some routes perform better than others. In many cases, late buses are the result of traffic congestion caused by accidents and road construction as well as other events that are beyond Metro's control.

DESIRED TREND



DECLINE
in percentage
of late buses

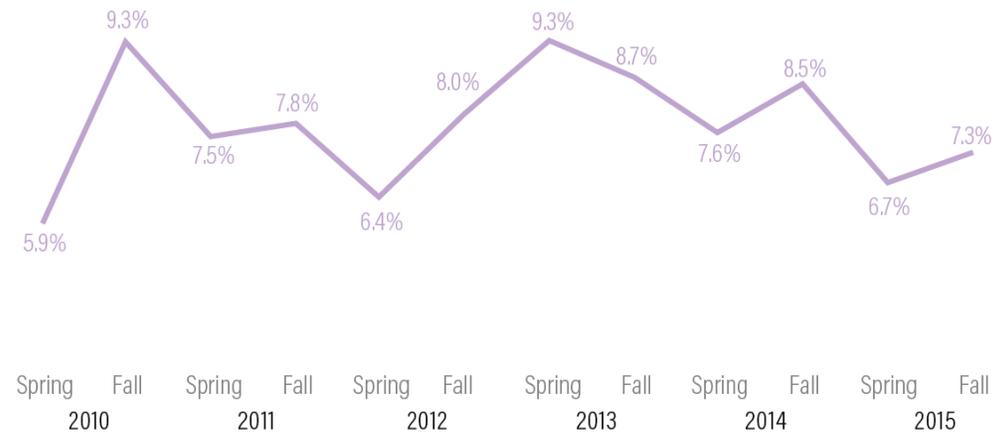
ACTUAL TREND



DECLINE
in percentage
of late buses

Madison Metro Transit On-Time Performance

Buses Arriving 5 or More Minutes Late to Time Points



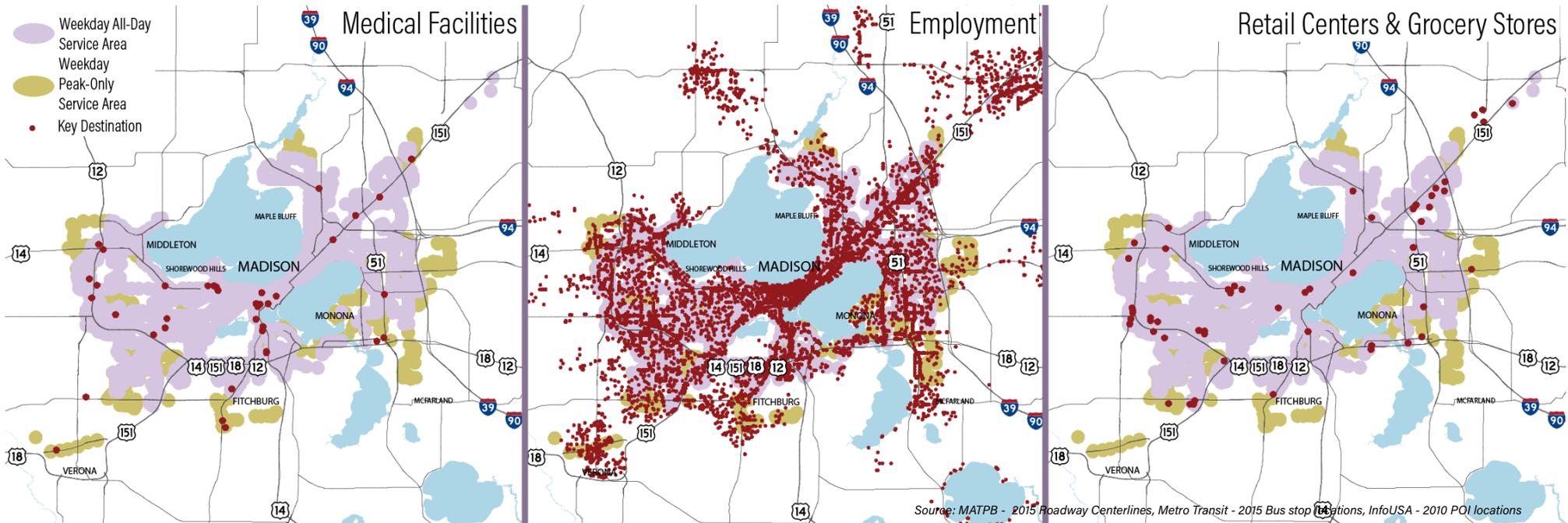
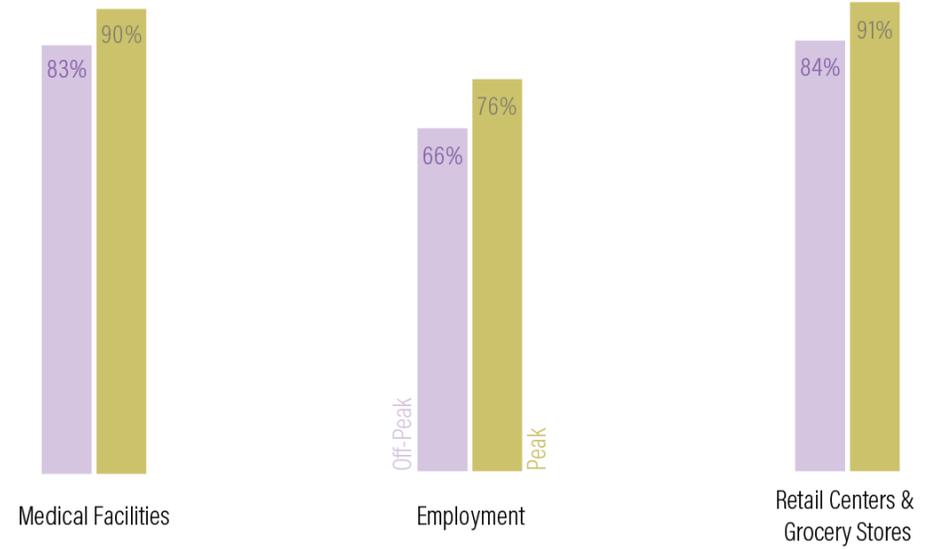
Source: Metro Transit

Percent of Key Destinations Served by Transit

To provide utility to riders, transit must serve the places that people want to go. Key destinations include jobs, medical facilities, and grocery/retail stores. With the exception of some jobs, it is important that these destinations are accessible not only during morning and afternoon peak periods, but also throughout the day and on weekends.

Medical and retail centers are more concentrated in the City of Madison and have a higher level of transit accessibility than jobs. 2015 is the first year this measure was collected and will serve as a baseline year.

Percent of Destinations Served by Transit within Metropolitan Planning Area Boundary, 2015



Roadway Congestion and Reliability

Roadway congestion is common during the morning and afternoon rush hour periods on heavily traveled regional roadways. Related to congestion is travel time reliability - the variability in travel times that can occur from one day to the next. For most commuters, congestion is understood, anticipated, and planned for.

Drivers generally budget extra time to allow for routine delays, whereas unanticipated variability or delays can be a source of frustration as it can make commuters late for work, cause buses to run late, make business travelers late for appointments or meetings, cause truckers to be charged for late deliveries, and can disrupt the just-in-time delivery process. In many cases, rush hour congestion is difficult or impossible to solve due to physical constraints, costs, and the negative impacts of roadway expansion; however, reliability can be improved through a variety of operational enhancements or incident response management techniques.

There are seven commonly accepted sources of congestion that can lead to travel time reliability issues:

1. Physical Bottlenecks (40%) - Capacity limitations due to design of motorway
2. Traffic Incidents (25%) - Crashes and accidents that impeding travel lanes
3. Work Zones (10%) - Construction activities that result in physical changes to motorway
4. Weather (15%) - Snow, rain, or other events that change driver behavior and impact flow
5. Traffic Control Devices (5%) - Poorly timed signals, rail crossings, etc.
6. Special Events (5%) - Sporting events, concerts, etc. that cause surges in traffic demand
7. Fluctuations in Normal Traffic - Day-to-day variations that lead to high-demand days

Complicating things, many of these sources of congestion can trigger another source to occur (weather event causing crash, special event making work zone bottleneck worse, etc.). This means that significant payoffs can be expected by implementing a comprehensive [congestion management process](#) that includes

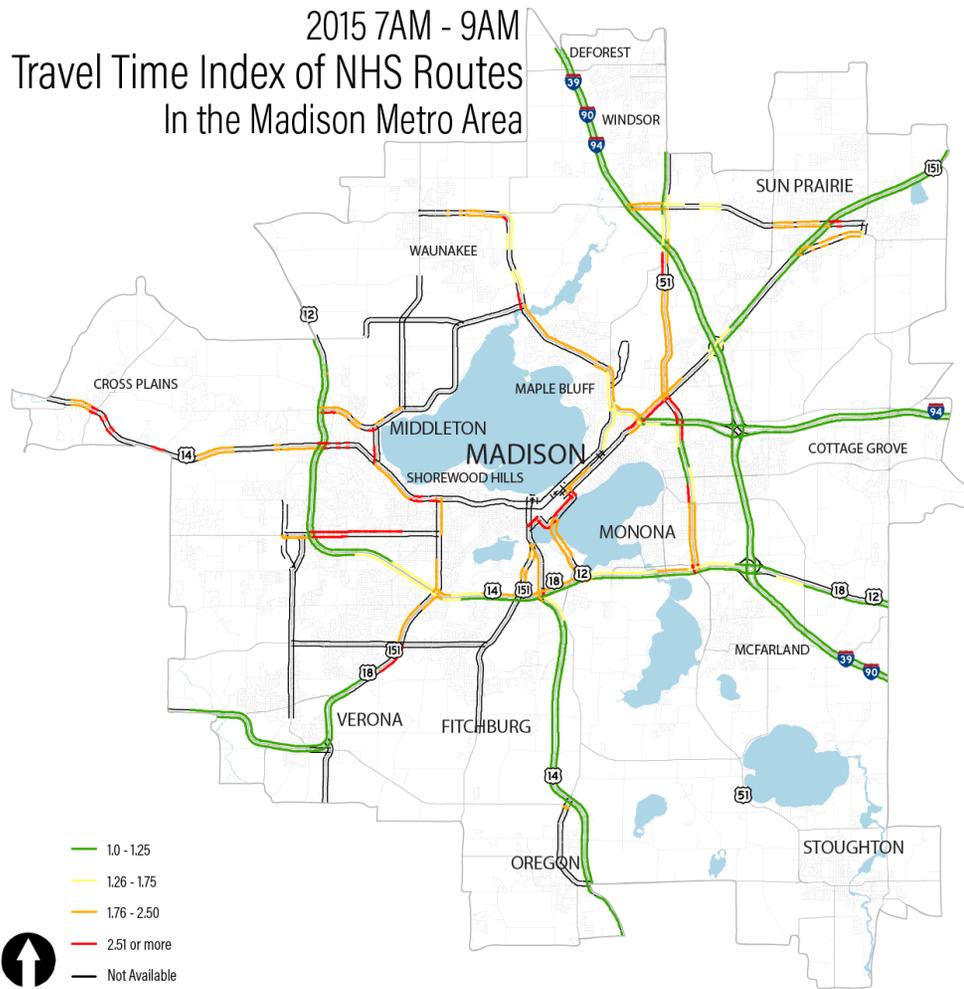


Source: Madison.com

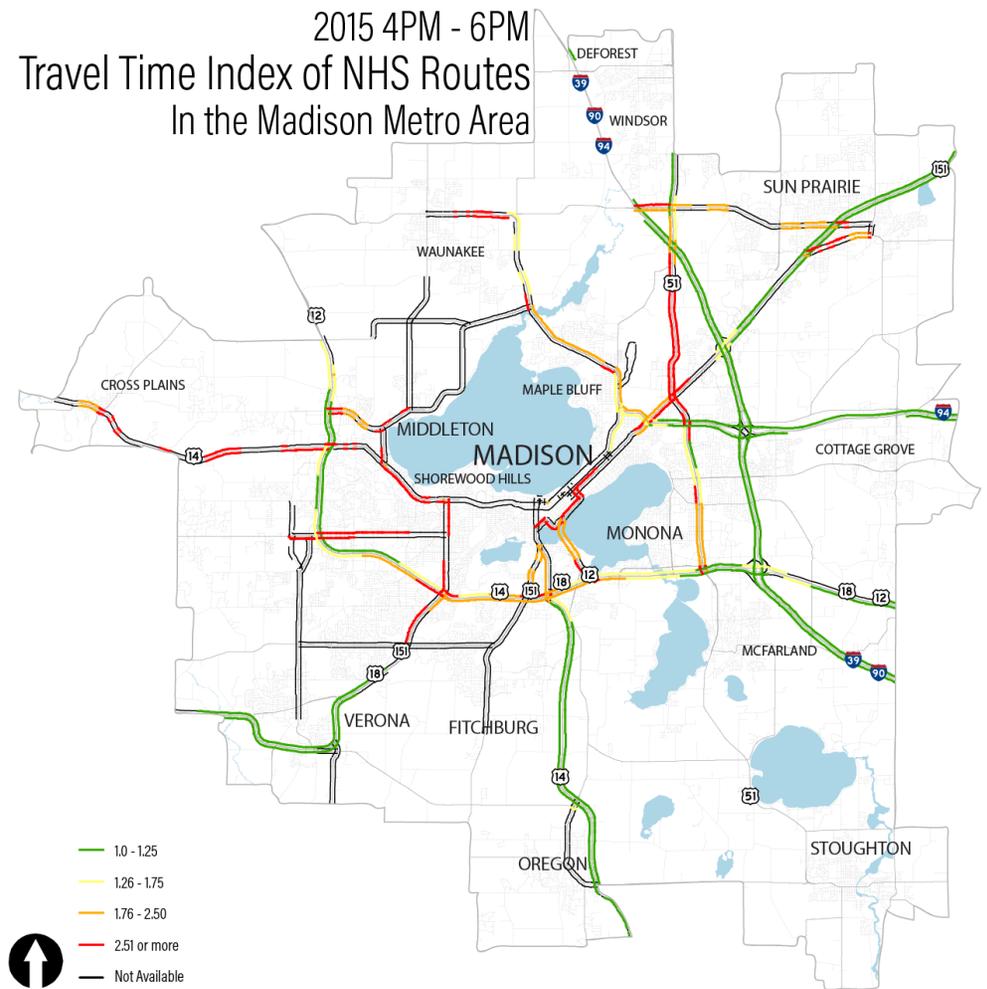


Source: Madison.com

2015 7AM - 9AM Travel Time Index of NHS Routes In the Madison Metro Area



2015 4PM - 6PM Travel Time Index of NHS Routes In the Madison Metro Area



transportation demand and system management and operations strategies such as transit and ride-sharing incentives, traffic signal coordination, traveler information, and enhanced incident response, along with physical bottleneck relief through targeted capacity expansion where feasible.

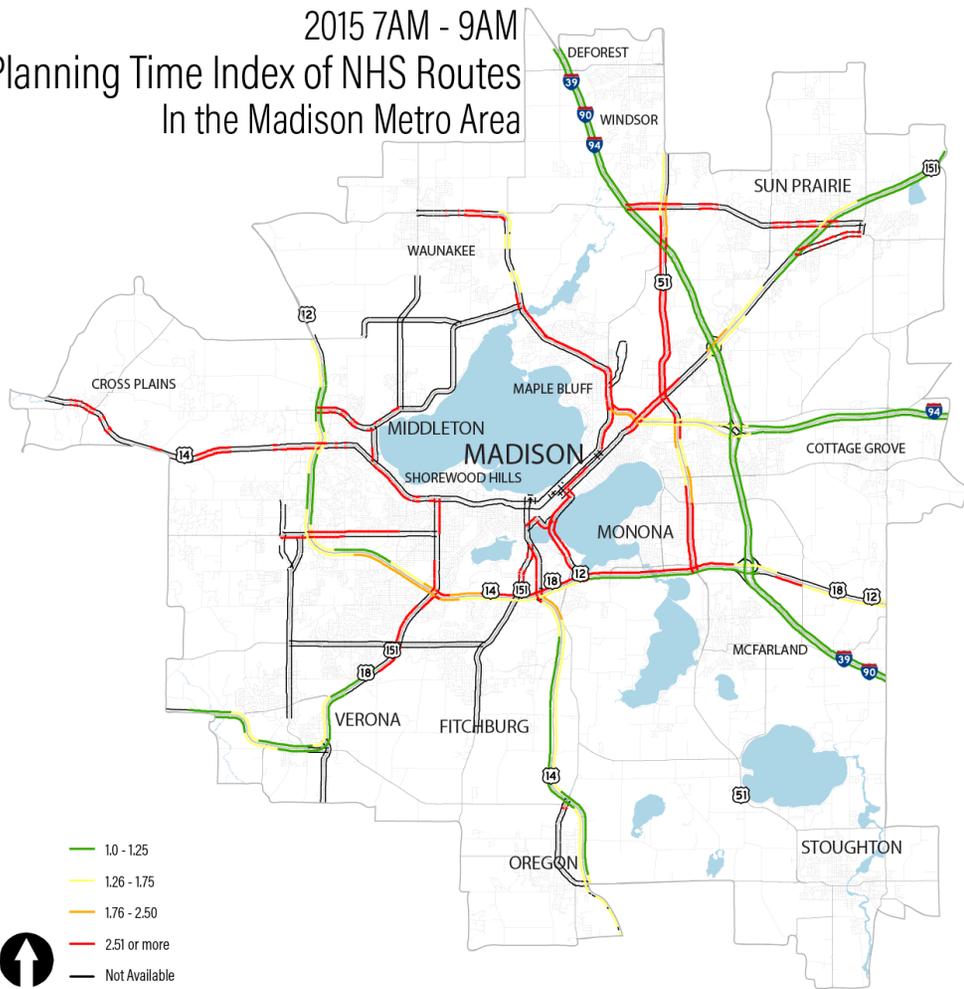
The most accepted measure of congestion is Travel Time Index (TTI), while the most widely accepted measure of reliability is Planning Time Index (PTI).

Travel Time Index is defined as the average time it takes to travel on a roadway during the peak period relative to the time when no congestion is present. This means that if a commute along a corridor would take 15 minutes without congestion

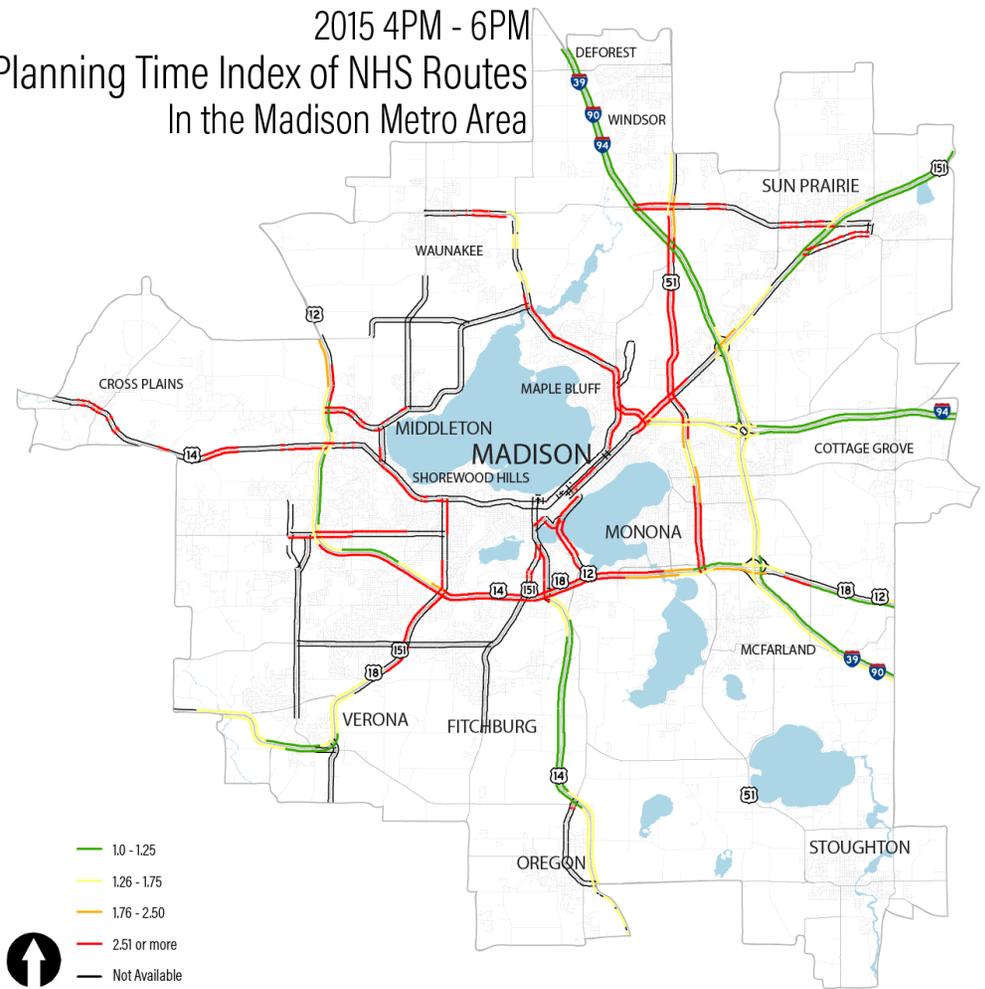
and it has a TTI of 1.60 at 4pm, the trip will take 24 minutes at that particular time. The most congested roads in the area include John Nolen Drive, Verona Road, and Stoughton Road. Overall, system-wide TTI during the morning rush hour is 1.49, while the evening rush hour is 1.60

Planning Time Index is defined as a measure of time that should be planned for when an adequate buffer is included in a trip to ensure on-time arrival 95% of the time. This means that if a driver were to have a 15 minute trip on a corridor with a PTI of 1.60, they should plan allot 24 minutes for their commute to make ensure they are on time 19/20 times (15 minutes x 1.60 = 24 minutes). The above maps show PTI for the Madison Metro Area. The interstate highways experience the least

2015 7AM - 9AM
 Planning Time Index of NHS Routes
 In the Madison Metro Area



2015 4PM - 6PM
 Planning Time Index of NHS Routes
 In the Madison Metro Area



variable conditions while the Beltline, Stoughton Road, and John Nolen Drive are among those that are highly variable. Overall, system-wide PTI during the morning rush hour is 2.63, while the evening rush hour is 3.12.

2015 will serve as a baseline year for both TTI and PTI.





Establish Financial Viability of the Transportation System

Achieve and maintain a state of good repair for the existing transportation system, invest in cost-effective projects, and ensure adequate, reliable funding to meet current and future needs.

Establish Financial Viability of the Transportation System

Bridge Condition

Bridge sufficiency is a method for expressing the condition of a bridge developed by FHWA and stored in the National Bridge Inventory. Approximately 55% of the sufficiency rating is based on a structural evaluation of the bridge, 30% from the obsolescence of its design, and 15% essentiality of the bridge to the public.

A bridge's sufficiency rating is important not only for safety, but also for funding. A sufficiency rating of 80 or less qualifies a bridge for federal repair funding, while a score of 50 or less qualified a bridge for federal replacement funding. Federally funded bridge projects still require a 20% local funding match.

In the Madison area, more than 90 percent of all bridges are in good (80+) to fair (50-79.9) condition. In fact, 84% of all bridges are in good condition. This maintains a regional trend that has held for more than 5 years. A total of 9 bridges with a poor sufficiency rating are programmed for replacement in the next five years, while 10 bridges with a fair rating are programmed for rehabilitation work.

Bridge Condition by Sufficiency Rating within Metropolitan Planning Area Boundary, 2015



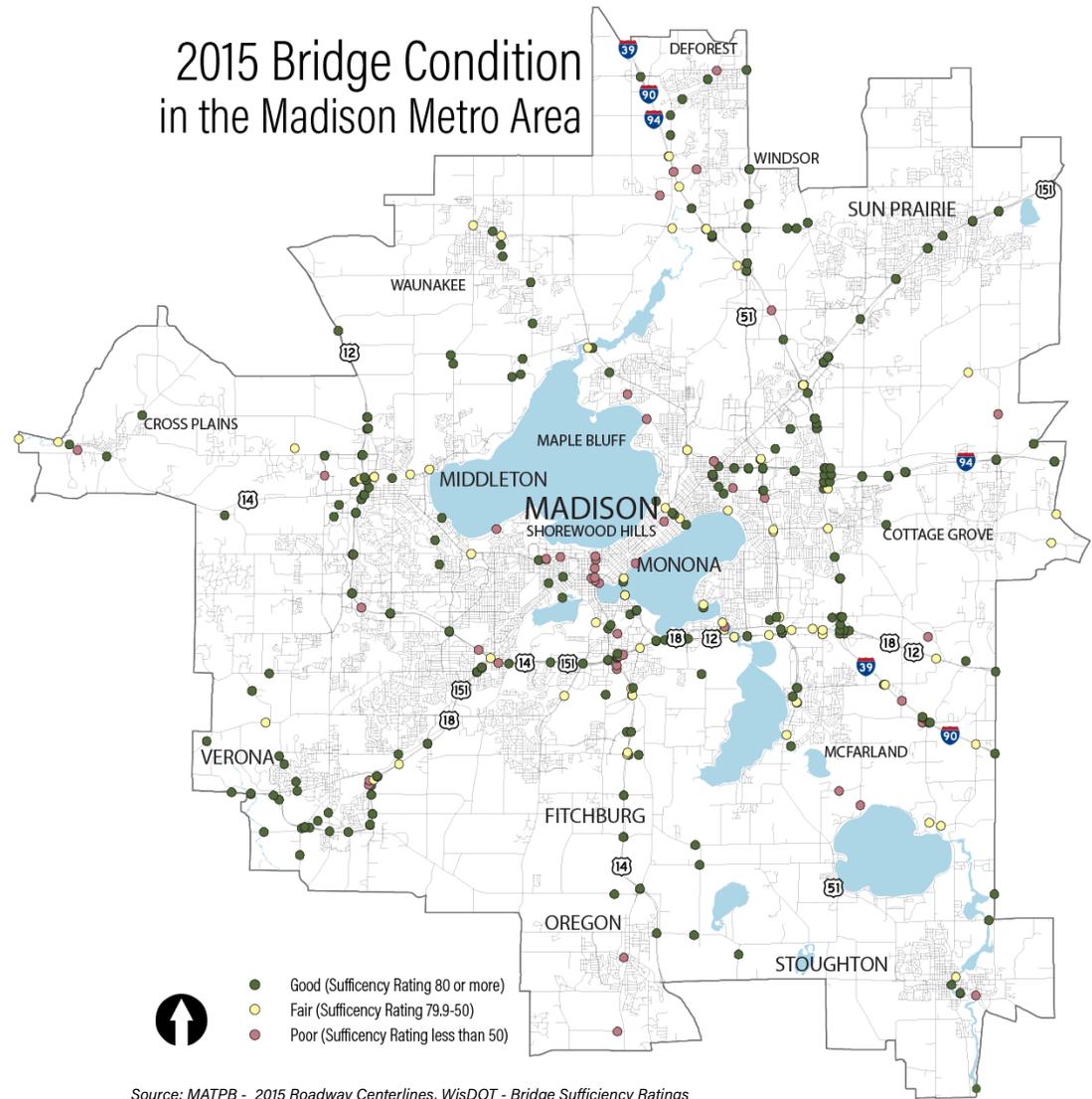
DESIRED TREND



ACTUAL TREND

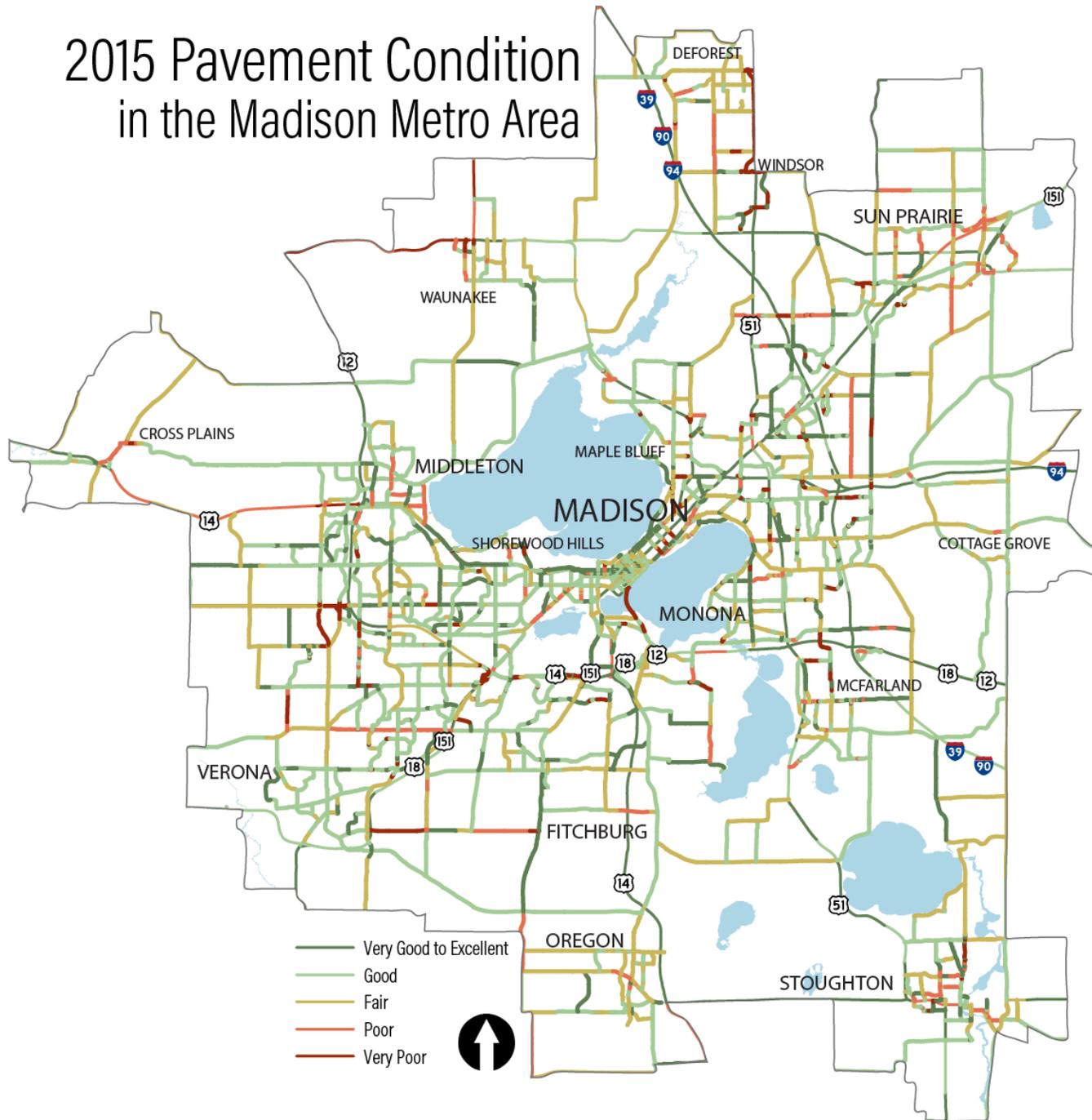


2015 Bridge Condition in the Madison Metro Area



Source: MATPB - 2015 Roadway Centerlines, WisDOT - Bridge Sufficiency Ratings

2015 Pavement Condition in the Madison Metro Area

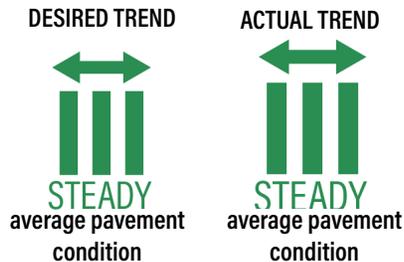
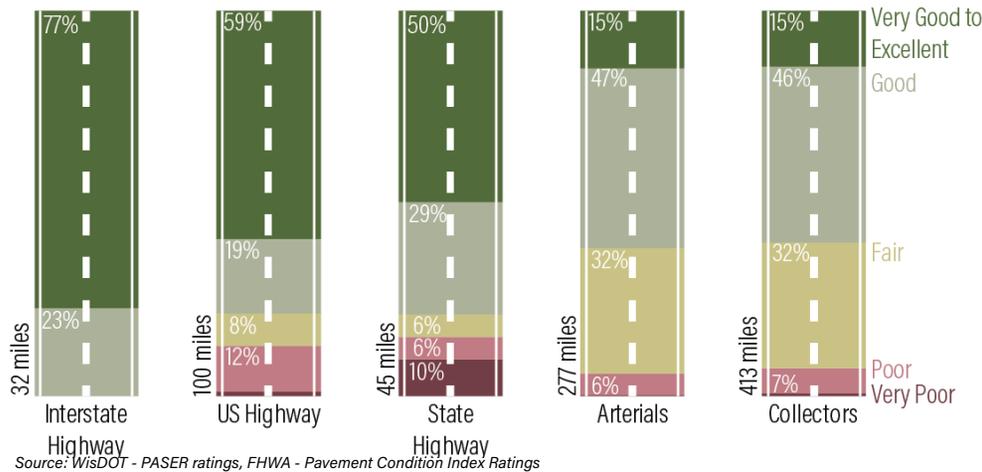


Roadway Pavement Condition

Timing road maintenance projects appropriately extends the useful life of the roadway and saves money over the life of the pavement. Extreme pavement degradation can be minimized by performing preservation treatments early in the life-cycle of a roadway.

Roadways with a "fair" Pavement Condition Index (PCI) score are generally nearing the end of their repairable life. Lower volume roads routinely fall into this category, while high-volume, regional mobility corridors rarely do. In the Madison area, 65% of all roads are in good or excellent condition, 27% are fair, and 8% are poor or very poor. All of the Interstate highways in the area have a PCI of at least "good."

2015 Pavement Condition by Roadway Type
within Metropolitan Planning Area Boundary

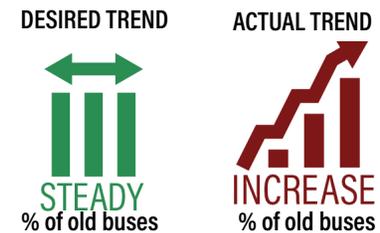
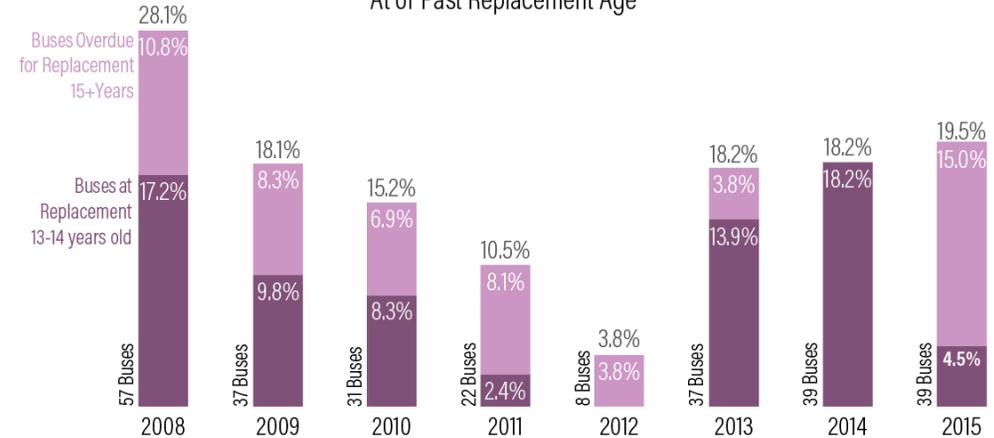


Buses At or Past Replacement Age

Like any vehicle, buses cost more to operate and repair near the end of their life; however, replacing buses is expensive and not always possible due to funding constraints. Also, Metro uses its oldest buses for supplemental school service, other peak only service, and as backups for buses in service. These buses log far fewer miles per day. Thus, it makes financial sense to maintain some older buses in its fleet for such limited service.

Between 2008 and 2012, the number of buses at (13-14 years) or past replacement (15+ years) age precipitously declined year-after-year due to a more aggressive replacement schedule and an unexpected influx of Federal American Recovery and Reinvestment Act (ARRA) funding. Due to a sharp decline in Federal funding available to Metro with a change in Federal transit programs, the percentage of the fleet at or near replacement has reached 2009 levels once again.

Metro Transit Buses
At or Past Replacement Age



Performance Measures Overview

Measure	Desired Trend	Actual Trend	Analysis
Miles of Pedestrian Facilities	 Increase in miles of facilities	 Increase in miles of facilities	26 miles of pedestrian facilities were completed in 2015.
Miles of Bicycle Facilities	 Increase in miles of facilities	 Unknown	This is the first year comprehensive data has been collected using this methodology.
BCycle Utilization	 Increase in utilization	 Increase in utilization	BCycle miles biked increased by nearly 1/3 and trip lengths increase by 44%.
Active Living Index Score	 Increase in community scores	 Unknown	This is the first year comprehensive data has been collected using this methodology.
Injuries and Fatalities	 Decline in injuries and fatalities	 Decline in injuries and fatalities	Using five-year rolling averages, motorized and non-motorized fatalities and serious injuries have declined nearly every year.
Airline Passenger Traffic	 Increase in passengers	 Increase in passengers	Passenger volume has been increasing, rising nearly 9% since 2010.
Freight Exports and Imports	 Increase in total freight tonnage	 Increase in total freight tonnage	Inbound and outbound freight volumes have increased and shifted to on-road options.
Housing + Transportation Costs	 Steady Housing + Transportation Costs	 Steady Housing + Transportation Costs	Combined housing and transportation costs have increased due to a sharp rise in the costs of housing metro-wide.
Transit Access to Jobs	 Increase in job accessibility percentages	 Unknown	This is the first year comprehensive data has been collected using this methodology.
Transit Ridership	 Increase in ridership	 Decline in ridership	A 30% drop in gas prices, strong economy, and mild winter may have contributed to the drop in ridership.
Specialized Transit Ridership	 Steady ridership	 Steady ridership	Metro Paratransit ridership has returned to 2011 levels, while Dane County Group Ride Program ridership has leveled off.
Fixed Route Transit Service	 Increase in coverage and population served	 Increase in coverage and population served	Metro Transit continues to add routes that increase peak and all-day coverage and population served.
Transit Service for Minorities and Low Income Persons	 Increase in coverage and population served	 Unknown	This is the first year comprehensive data has been collected using this methodology.
Vehicle Miles Traveled	 Steady total VMT	 Steady total VMT	VMT data is only available through 2014, meaning gas price drops are not accounted for with this dataset. 2015 may see sharp increased in VMT.
Mode of Transportation to Work	 Decline in # of residents driving to work alone	 Steady # of residents driving to work alone	A little more than 71% of work-related trips are single occupant vehicles and have been for the past five years.
Air Quality	 Decline in air pollution levels	 Steady air pollution levels	Air pollution levels are tied to SOV utilization and VMT - both of which have remained steady over the last five years.
Transit On-time Performance	 Decline in percentage of late buses	 Decline in percentage of late buses	A transfer point-based system relies on strong on-time performance. The system will continue to perform well as routine route modifications take place.
Percent of Key Destinations Served by Transit	 Increase in number of destinations covered	 Unknown	This is the first year comprehensive data has been collected using this methodology.
Roadway Congestion	 Decline in congestion	 Unknown	This is the first year comprehensive data has been collected using this methodology.
Roadway Reliability	 increase in reliability	 Unknown	This is the first year comprehensive data has been collected using this methodology.
Bridge Condition	 Steady bridge sufficiency ratings	 Steady bridge sufficiency ratings	Federal, State, Regional, and Local agencies have demonstrated a strong commitment to maintaining bridge condition. More than 90% are "good."
Roadway Pavement Condition	 Steady average pavement condition	 Steady average pavement condition	65% of all roads are in "good" or "excellent condition and all Interstate highways in the area have a PCI of at least "good."
Buses at or Past Replacement Age	 Steady percentage of old buses	 Increase in percentage of old buses	The end of ARRA funding has meant the return of fleet age to pre-2008 levels.