

## **Appendix A**

# **REVIEW OF TRANSPORTATION SYSTEM PERFORMANCE**

### **INTRODUCTION**

This appendix summarizes the current performance of the transportation system in Southeastern Wisconsin as it relates to public transit, the arterial street and highway system, park-ride lots, and transportation related emissions. Performance is reported for the year the most recent data are available, and is noted accordingly. Historical data and base year data from the development of VISION 2050 are also included in some measures, and is also noted accordingly.

### **PUBLIC TRANSIT PERFORMANCE**

#### **Review of Existing Transit Service**

Map A.1 shows public transit services currently provided in the Region. Below is a description of the public transit service types provided in the Region.

#### ***Commuter Transit Service***

Commuter transit service within the Region in 2019 consisted of 14 bus routes operating primarily over the freeway system with extensions over major arterial streets and highways to serve communities or major trip generators located off the freeway system. These routes principally served and connected the Milwaukee urban area to Ozaukee, Washington, and Waukesha Counties with service provided by the Milwaukee County Transit System (MCTS), Waukesha County, Washington County, and the City of Racine. Base adult fares for commuter bus service in the Region ranged from \$2.25 to \$4.50 per trip.

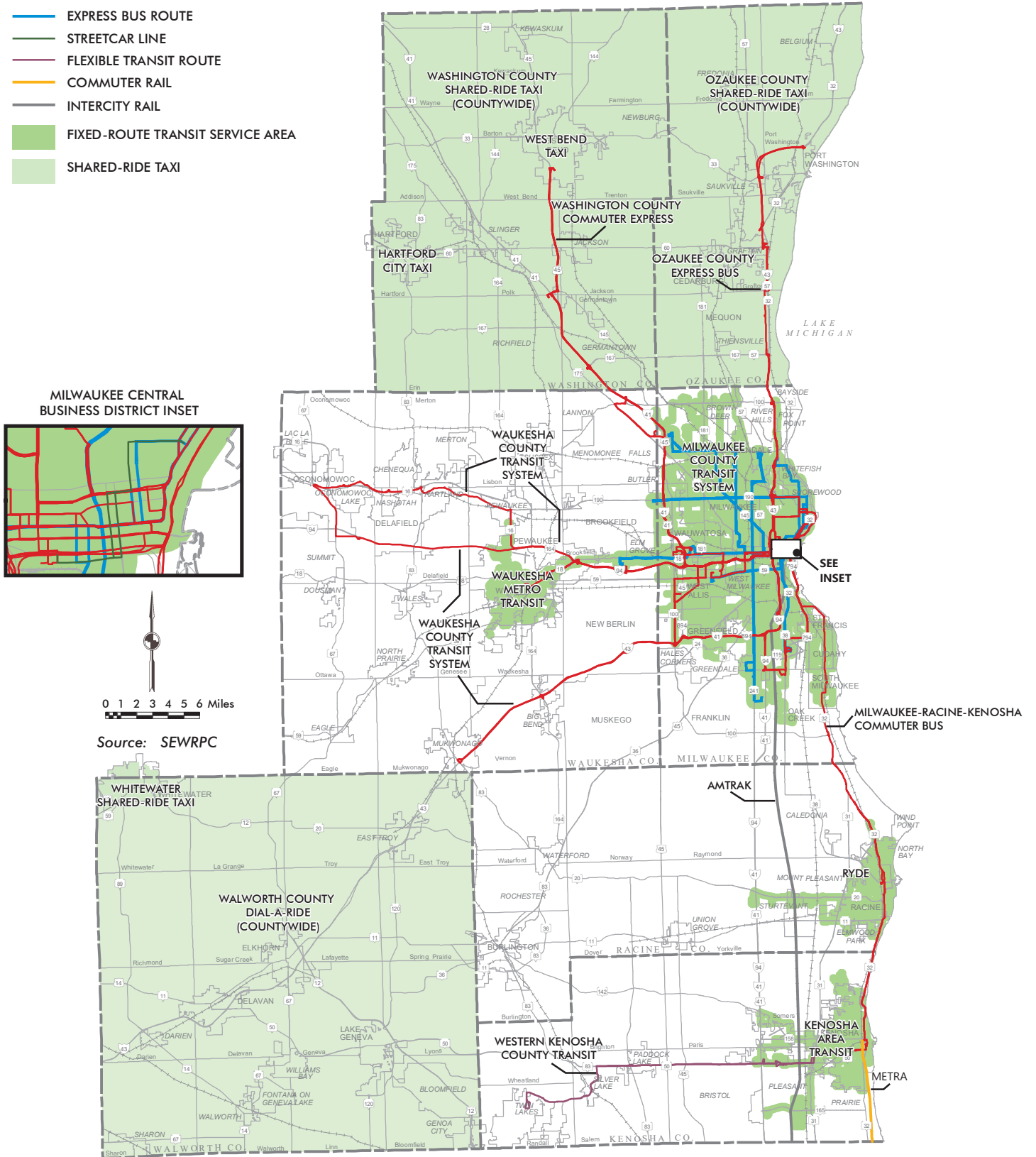
#### ***Express Transit***

Express transit service provides fixed-route bus service with higher frequency and fewer stops in order to more efficiently service major thoroughfares in an area. As of 2019, there were five express routes operating in the Region, all provided by MCTS. These routes provided service from 4:30 a.m. to 2:00

# Map A.1 Public Transit Services in the Region: 2019

## TRANSIT SERVICES

- COMMUTER BUS ROUTE
- EXPRESS BUS ROUTE
- STREETCAR LINE
- FLEXIBLE TRANSIT ROUTE
- COMMUTER RAIL
- INTERCITY RAIL
- FIXED-ROUTE TRANSIT SERVICE AREA
- SHARED-RIDE TAXI



a.m. seven days a week, with buses arriving every 10 to 30 minutes during the week and every 15 to 45 minutes on weekends. Base adult fares for express transit service was \$2.25 per trip.

### ***Streetcar***

Service on The Hop streetcar in the City of Milwaukee began in November 2018 with service approximately every 15 to 20 minutes seven days a week from 5:00 a.m. to 12:00 a.m. The Hop Streetcar is electric powered and runs on a fixed-rail guideway on public streets. The route has 18 stops, connecting Milwaukee Intermodal Station, the Historic Third Ward, City Hall, Burns Commons, and locations in between. Construction of a 0.4-mile lakefront extension is underway and is expected to open in late 2020. Extensions north to the Bronzeville District and south to the Walker's Point neighborhood are also being planned. Through an initial private sponsorship provided by Potawatomi Casino and Hotel, no fares were charged for trips on The Hop Streetcar.

### ***Fixed-Route Local Transit Service***

Fixed-route local public transit was provided in 2019 within the Kenosha, Milwaukee, and Racine urbanized areas. More information about the local transit services provided in these areas is described below.

#### Kenosha

The Kenosha Area Transit system provided fixed-route local transit service in the City of Kenosha in 2019 over seven routes and an electric streetcar line. Local service is provided on most routes from 6:00 a.m. to 7:30 p.m. on weekdays and 6:00 a.m. to 5:00 p.m. on Saturday, with buses arriving every 30 to 60 minutes during weekday peak periods and every 60 minutes during weekday off-peak periods and on Saturday. Service was provided on the streetcar line every 15 minutes from 11:00 a.m. to 6:30 p.m. on weekdays and from 10:00 a.m. to 5:30 p.m. on Saturdays, with limited hours from January to March. The adult cash fares charged by the Kenosha area transit system were \$1.50 per trip for bus service and \$1.00 per trip for the streetcar line.

#### Racine

In 2019, the RYDE, formerly the Belle Urban System, operated by the City of Racine, provided local service over nine fixed routes. The system provided service from 5:30 a.m. to 10:00 p.m. on weekdays, 5:30 a.m. to 6:30 p.m. on Saturdays, and from 9:30 a.m. to 6:30 p.m. on Sundays. Buses arrived every 30 to 60 minutes on weekdays and every 60 minutes on Saturdays and Sundays. The adult cash fare charged by the City of Racine was \$2.00 per trip for local bus service.

#### Milwaukee

MCTS provided local transit service in the Milwaukee area in 2019 over 28 regular fixed routes, with additional limited-service shuttles. The system provided local bus service seven days a week, typically

from 5:00 a.m. to 1:00 a.m., at an adult cash fare of \$2.25 per trip. On most routes serving central Milwaukee County, buses arrived every 10 to 20 minutes during weekday peak periods and every 15 to 30 minutes during weekday off-peak periods. Buses arrived every 15 to 60 minutes on the routes serving outer portions of the County on weekdays and on most routes on weekends.

### Waukesha

Waukesha Metro Transit provided service over 10 fixed routes in 2019, with service provided from approximately 5:30 a.m. to 10:30 p.m. on weekdays, from 8:00 a.m. to 10:00 p.m. on Saturdays, and 9:00 a.m. to 7:00 p.m. on Sundays. Buses on the routes arrived every 30 to 60 minutes. The adult cash fare was \$2.00 per trip.

### **Demand-Responsive Transit**

Demand-responsive public transit was provided in rural areas of the Region through publicly operated shared-ride taxi services and in parts of Kenosha County by the Western Kenosha County Transit system via a flexible bus service. Shared-ride taxi was provided at the municipal level by the City of Hartford, the City of West Bend, and the City of Whitewater, and the county level by Ozaukee, Washington, and Walworth counties.

Each of the taxi systems in the Region operated seven days a week in 2019, with the hours of operation varying by system. Many systems require or prefer 24-hour advanced reservations. Fares ranged from \$3.00 to \$9.00 per trip and vary by provider and length of trip. Many of the taxi systems contracted with private companies to provide the services.

The Western Kenosha County Transit system's flexible bus service provided route deviation and door-to-door service throughout Kenosha County, mainly serving communities in rural western Kenosha County, with additional service provided to the City of Lake Geneva in Walworth County, the City of Kenosha, and the Village of Antioch in Illinois. Service to the Village of Antioch included connections to Metra commuter trains to Chicago. The adult cash fare charged by Western Kenosha County Transit was \$2.00 for a one-way fare with an additional \$1.00 fee for route variance.

### ***Intercity Passenger Rail***

In 2019, Amtrak provided intercity passenger rail service in Southeastern Wisconsin with stops within the Region at the Milwaukee Intermodal Station in downtown Milwaukee, General Mitchell International Airport, and Sturtevant. Under contract with the State of Wisconsin and the State of Illinois, Amtrak operated seven daily Hiawatha Service trains in each direction between Milwaukee and Chicago, with intermediate stops at General Mitchell International Airport, Sturtevant, and Glenview. As part of its

national network, Amtrak operated the Empire Builder with one daily train in each direction between Seattle/Portland and Chicago, serving Wisconsin through stops in La Crosse, Tomah, Wisconsin Dells, Portage, Columbus, and Milwaukee.

### ***Commuter Rail***

In 2019, the only commuter rail service operated in the Region was Metra's Union Pacific North Line between Kenosha and Chicago, with intermediate stops in the north shore suburbs of Northeastern Illinois. Metra is the commuter rail service division of the Regional Transportation Authority, which serves the six-county Northeastern Illinois Region. Service on this route was provided by the Union Pacific Railroad under contract with Metra and at no cost to any Wisconsin units of government.

### ***Intercity Bus Service***

In 2019, scheduled intercity bus services were provided by eight carriers: Amtrak Thruway, Badger Coaches, Inc.; Greyhound Lines, Inc.; Indian Trails, Inc.; Jefferson Lines, Inc.; Lamers Bus Lines, Inc.; Megabus; and Wisconsin Coach Lines. Intercity Bus Service currently connects the Region to Appleton, Chicago, Eau Claire, Fond du Lac, Green Bay, Madison, Manitowoc, Marinette, Menomonie, Minneapolis-St. Paul, Oconto, Oshkosh, Peshtigo, Sheboygan, Stevens Point, Waupaca, Wausau, and several communities in Michigan's Upper Peninsula.

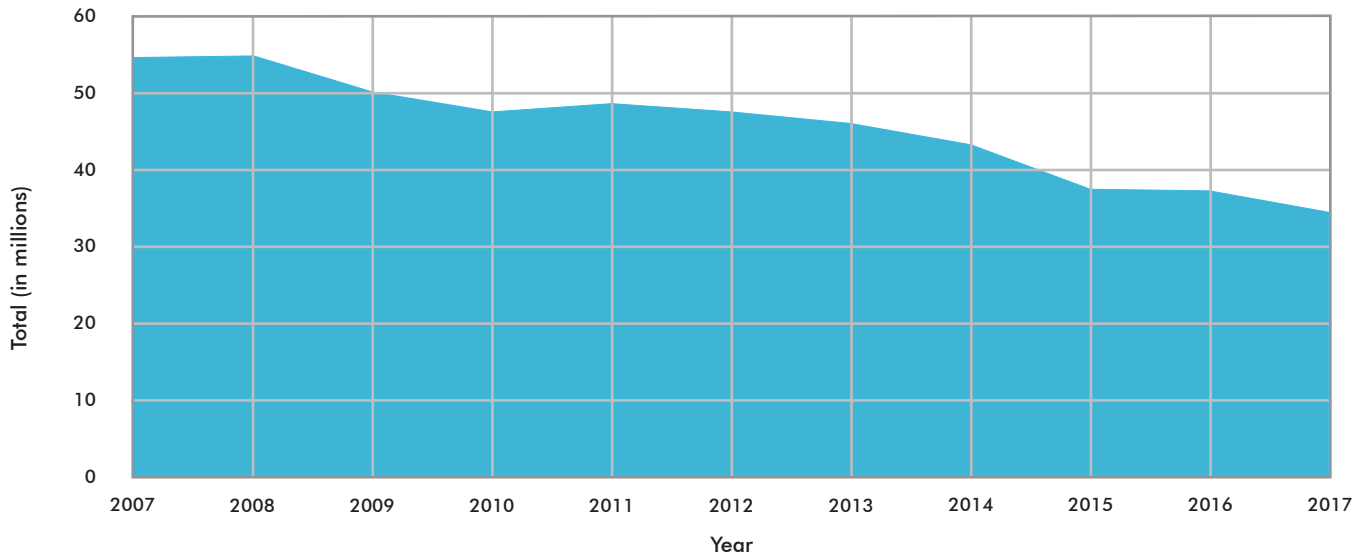
### ***Ridership and Service Levels***

As discussed in Chapter 2, ridership transit services continues to steadily decline, likely due to a variety of external reasons including demographic changes, sustained low fuel prices, an increased availability of sub-prime automobile financing, current economic conditions, and the increased availability of ride-hailing services.

Passenger boardings for intracounty fixed-route transit systems and intercounty bus systems between 2007 and 2017 are provided in Figures A.1 and A.2. Passenger boardings on intracounty transit systems have declined by 20 percent between 2014 and 2017, and by 37 percent during the ten-year period between 2007 and 2017. Similarly, intercounty bus systems have seen similar reductions in boarding rates with a decrease of 13 percent between 2014 and 2017, and 18 percent during the ten-year period between 2007 and 2017.

Annual vehicle-miles of service for intracounty transit systems and intercounty bus systems are provided in Figure A.3 and A.4, respectively, for the years 2007 through 2017. While there have been significant decreases in passenger boardings over the time period since VISION 2050 was completed, vehicle-miles of service have remained more stable with a modest decrease over the ten-year period between 2007 and 2017. Between 2014 and 2017, annual vehicle-miles of service for intracounty transit systems increased by 5 percent, during which time MCTS introduced its express service and the Zoo Interchange

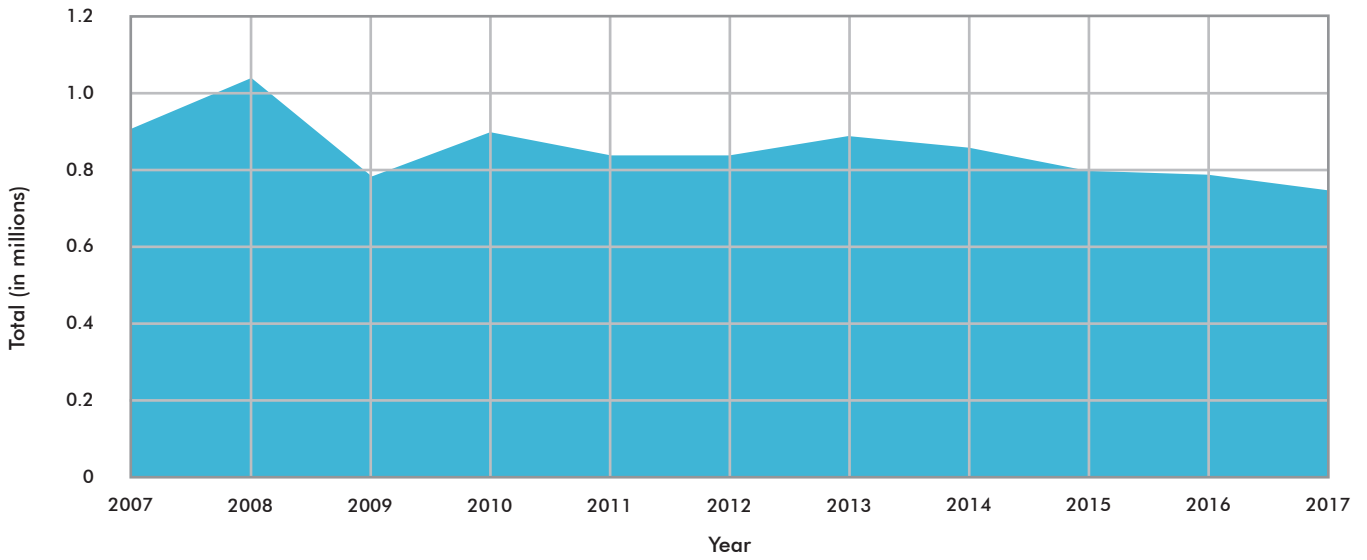
**Figure A.1**  
**Passenger Boardings on Intracounty Transit Systems in the Region: 2007-2017**



Note: Includes Kenosha Area Transit, Milwaukee County Transit System, Waukesha Metro, and RYDE.

Source: National Transit Database and SEWRPC

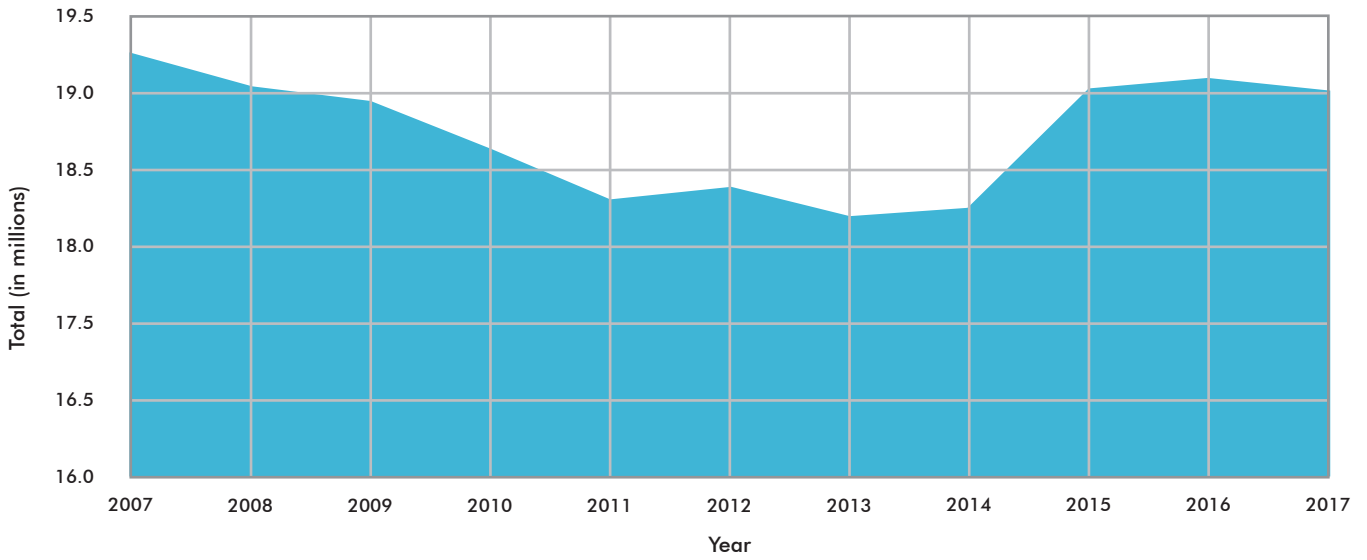
**Figure A.2**  
**Passenger Boardings on Intercounty Bus Systems in the Region: 2007-2017**



Note: Includes Waukesha County, Kenosha-Racine-Milwaukee Commuter Bus, Washington County Commuter Express, Ozaukee County Express, and Western Kenosha County Transit.

Source: National Transit Database and SEWRPC

**Figure A.3**  
**Annual Vehicle-Miles of Service for Intracounty Transit Systems in the Region: 2007-2017**

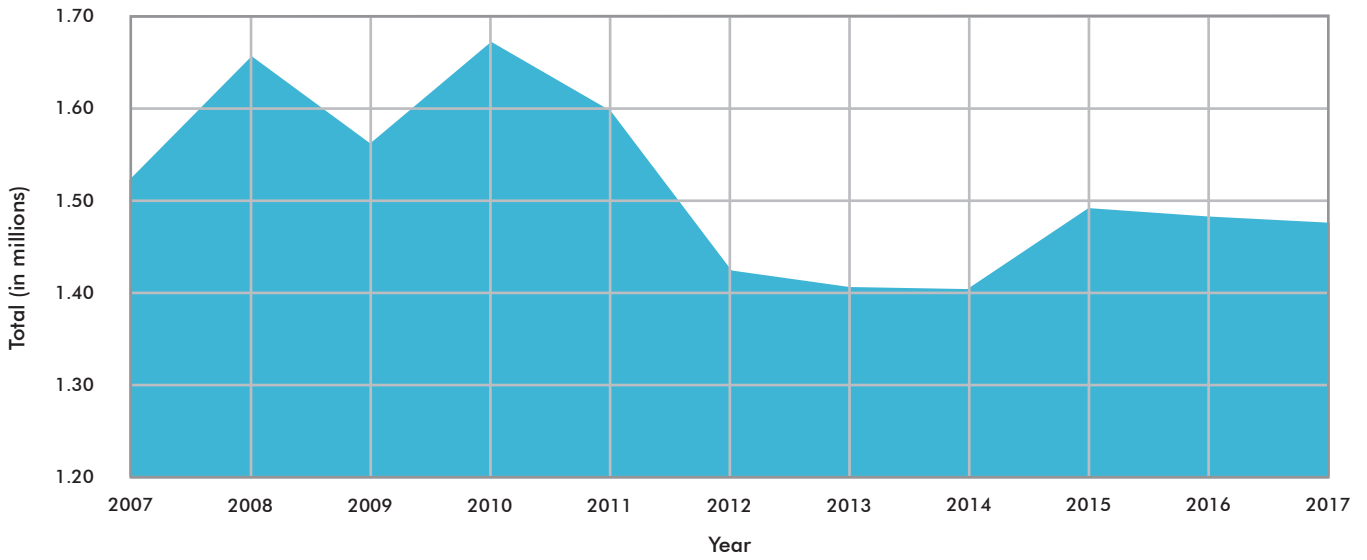


Includes Kenosha Area Transit, Milwaukee County Transit System, Waukesha Metro, and RYDE.

Source: National Transit Database and SEWRPC



**Figure A.4**  
**Annual Vehicle-Miles of Service for Intercounty Bus Systems in the Region: 2007-2017**



Note: Includes Waukesha County, Kenosha-Racine-Milwaukee Commuter Bus, Washington County Commuter Express, Ozaukee County Express, and Western Kenosha County Transit.

Source: National Transit Database and SEWRPC

Litigation Settlement routes were initiated; however, annual vehicle-miles of service decreased by 2 percent overall during the ten-year period between 2007 and 2017. Similarly, annual vehicle-miles of service for intercounty bus have increased by 5 percent between 2014 and 2017, but decreased by 3 percent between 2007 and 2017. Table A.1 shows revenue vehicle-hours and revenue vehicle-miles in 2014 and 2017 for intracounty transit and intercounty bus services in the Region.

For demand-responsive public shared-ride taxi service, both passenger boardings and annual vehicle-miles of service have increased since 2014 and over the ten-year period between 2007 and 2017 as shown in Figures A.5 and A.6, respectively.

Ridership on Amtrak's Hiawatha Service between 2000 and 2018 is shown in Figure A.7. Ridership increased from 766,167 in 2008 to 858,000 in 2018, a 12 percent increase. Ridership on the Hiawatha service has continued to grow since 2014 with a 7 percent increase in ridership between 2014 and 2018. No major service improvements were implemented between 2008 and 2018.

### **Bus Vehicle Age**

The average age of buses operated by transit operators in the Region was about 6.6 years in 2017, approximately the same average age as in 2016. Commission staff monitors and sets regional targets for bus vehicle age as part of the Federal Transit Asset Management process discussed in Appendix B.

### **Transit Safety and Reliability**

Table A.2 provides a comparison of transit safety performance based on criteria established by the Federal Transit Safety Performance Process. The rate of fatalities per 100,000 revenue vehicle miles increased between 2014 and 2017 for intracounty transit systems, while the rate of injuries and safety events decreased or stayed the same for all other transit services. In previous years, Commission staff reported bus reliability as the total number of service calls reported. As such, in 2017 the number of service calls increased over 100 percent from 531 in 2016 to 1,103 in 2017. The Federal Transit Administration now defines bus reliability as the mean distance between major mechanical failures. Therefore, Commission staff will begin monitoring these data to reflect the updated transit safety performance measures. As shown in Table A.2, the average revenue vehicle miles between service calls decreased for intracounty transit systems and intercounty bus systems.

## **ARTERIAL STREETS AND HIGHWAY PERFORMANCE**

### **Pavement Condition**

The Commission coordinates with the State, county, and local governments to monitor pavement conditions using a combination of the International Roughness Index (IRI), used by the State, and the

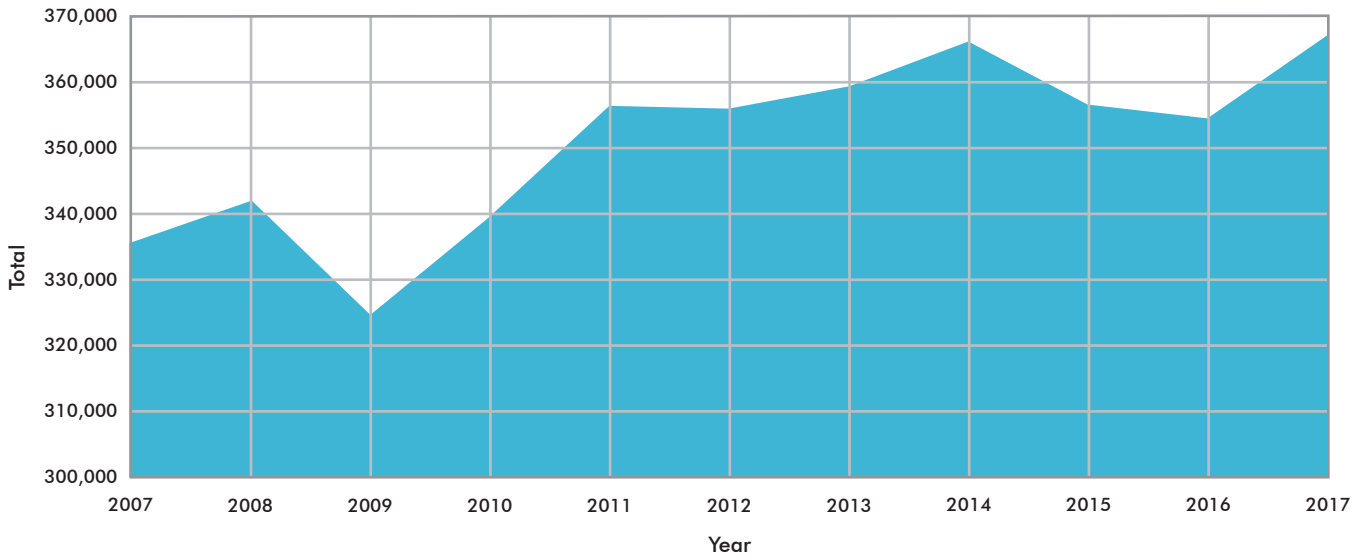
**Table A.1**  
**Fixed-Route Public Transit Service Levels: 2014 and 2017**

<b>Average Weekday Transit Service Characteristics</b>	<b>2014<sup>a</sup></b>	<b>2017</b>
<b>Revenue Vehicle-Hours</b>		
Rapid Transit		
Commuter Rail	10	10
Commuter Bus	290	300
Express Bus	470	840
Local Transit	3,860	3,690
<b>Total</b>	<b>4,630</b>	<b>4,840</b>
<b>Revenue Vehicle-Miles</b>		
Rapid Transit		
Commuter Rail	100	100
Commuter Bus	6,400	6,100
Express Bus	5,800	10,000
Local Transit	47,000	45,900
<b>Total</b>	<b>59,300</b>	<b>62,100</b>

<sup>a</sup> The revenue vehicle-hours and revenue vehicle-miles for 2014 vary slightly from those reported in VISION 2050 due to changes in the methodology for calculating average weekday service.

Source: National Transit Database, MCTS, and SEWRPC

**Figure A.5**  
**Passenger Boardings on Public Shared-Ride Taxi Systems in the Region: 2007-2017**

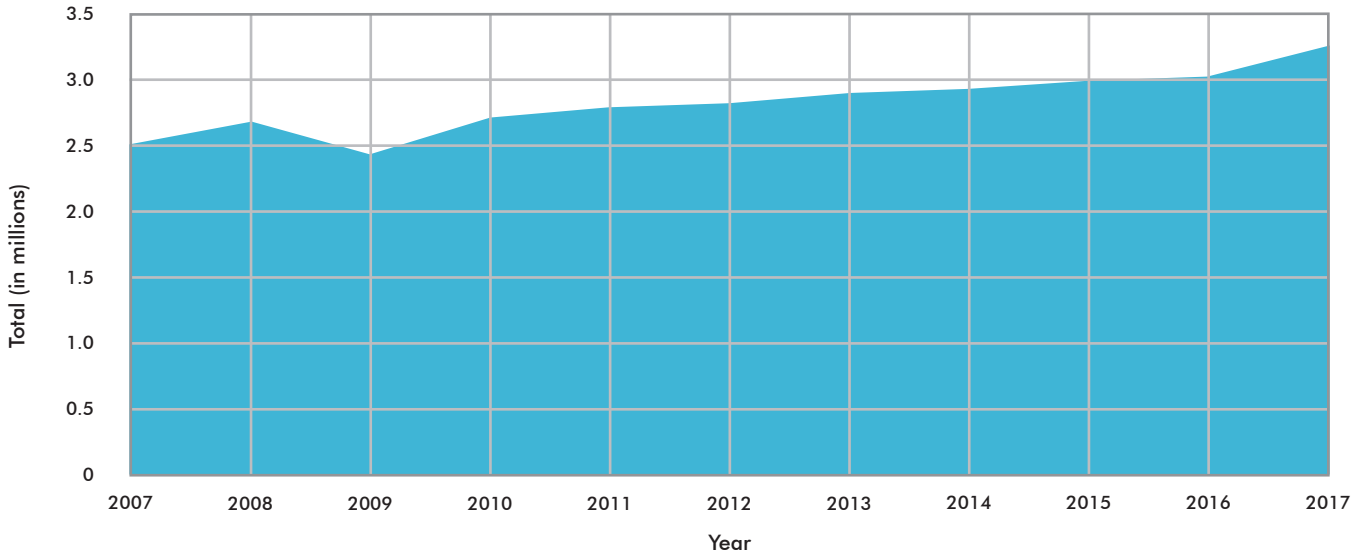


Note: Includes taxi service in Washington County, Ozaukee County, City of Whitewater, City of Hartford, City of West Bend, and Walworth County Dial-a-Ride.

Source: National Transit Database and SEWRPC

**Figure A.6**

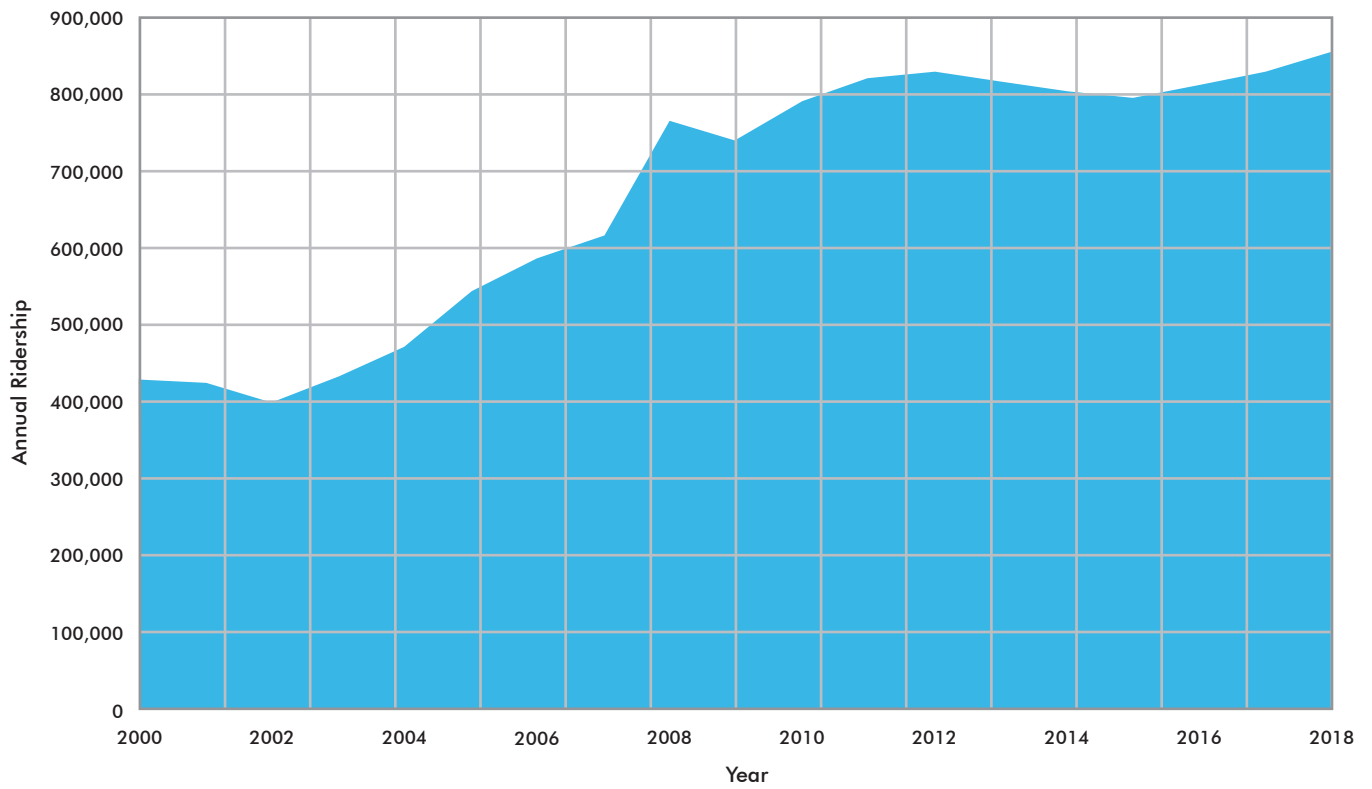
**Annual Vehicle-Miles of Service for Public Shared-Ride Taxi Systems in the Region: 2007-2017**



Note: Includes taxi service in Washington County, Ozaukee County, City of Whitewater, City of Hartford, City of West Bend, and Walworth County Dial-a-Ride.

Source: National Transit Database and SEWRPC

**Figure A.7**  
**Annual Ridership on Amtrak Hiawatha Service: 2000-2018**



Source: Amtrak and SEWRPC

**Table A.2**  
**Transit Safety Performance: 2014 and 2017**

	<b>Fatalities per 100,000 Revenue Vehicle Miles</b>		<b>Injuries per 100,000 Revenue Vehicle Miles</b>		<b>Safety Events per 100,000 Revenue Vehicle Miles</b>		<b>System Reliability<sup>a</sup></b>	
	2014	2017	2014	2017	2014	2017	2014	2017
Intracounty Transit Systems	0.00	0.01	0.49	0.29	0.31	0.24	22,134	17,940
Intercounty Bus Systems	0.00	0.00	0.00	0.00	0.00	0.00	51,784	20,977
Shared-Ride Taxi	0.00	0.00	0.14	0.05	0.03	0.03	N/A	N/A

Note: Performance categories are based on safety performance criteria established under the National Public Transportation Safety Plan pursuant to 49 CFR Part 673, Public Transportation Agency Safety Plan.

<sup>a</sup> System Reliability is measured as revenue miles operated divided by the number of major mechanical failures. The large difference between 2014 and 2017 is primarily due to changes in how major mechanical failures were reported to the National Transit Database.

Source: National Transit Database and SEWRPC

Pavement Surface Evaluation and Rating (PASER) scale, used by county and local governments in the State. For the purposes of a more general analysis and evaluation of pavement conditions in the Region, scores from these two rating systems are designated as good, fair, and poor, as follows: for state trunk highways, a roadway with an IRI of less than 1.5 is considered in good condition, an IRI between 1.5 and 3.5 is considered in fair condition, and an IRI of more than 3.5 is considered in poor condition. For county and local trunk highways, a roadway having a PASER of 7 or more is considered in good condition, a PASER of 5 or 6 is considered in fair condition, and a PASER of 4 or less is considered in poor condition.

As of the most recently available data (2016 for State trunk highways and 2017 for county and local trunk highways), 51.4 percent of pavement is in good condition, 39.2 percent of pavement is in fair condition, and 9.4 percent of pavement is in poor condition. Map A.2 shows the current condition of pavement in Southeastern Wisconsin, with the percent change in pavement condition by category since 2013 shown in Table A.3.

### **Bridge Condition**

Similarly, the Commission monitors bridge condition in the Region using bridge sufficiency ratings provided by WisDOT. These data are collected through bridge inspections performed by WisDOT and local municipalities following federal guidelines for bridge inspection and maintenance. A bridge sufficiency rating scale of 0 to 100 is used, with 0 being a failing structure and 100 being a structure in perfect condition. Ratings are based on four factors: structural adequacy and safety; serviceability and functional obsolescence; essentiality for public use; and special reductions. For the purposes of this analysis, sufficiency ratings are designated as good, fair, and poor, as follows: a bridge with a sufficiency rating of 80 or greater is considered to be in good condition, a bridge with a sufficiency rating of 50 to 79.9 is considered to be in fair condition, and a bridge with a sufficiency rating less than 50 is considered to be in poor condition.

As of 2018, 74.1 percent of bridges were rated in good condition, 18.2 percent were rated in fair condition, and 7.7 percent were rated in poor condition. Map A.3 shows bridge condition in the Region and Table A.4 lists bridge structure condition by count and percent, including the percent change since 2013.

### **Traffic Congestion and Delay**

#### ***Congestion on the Arterial Street and Highway System***

Traffic congestion on the arterial street and freeway system may be categorized as moderate, severe, or extreme, with each level characterized by travel speed, operating conditions, and level of service, (see Table A.5). The freeway system represents only about 8 percent of total arterial system mileage,



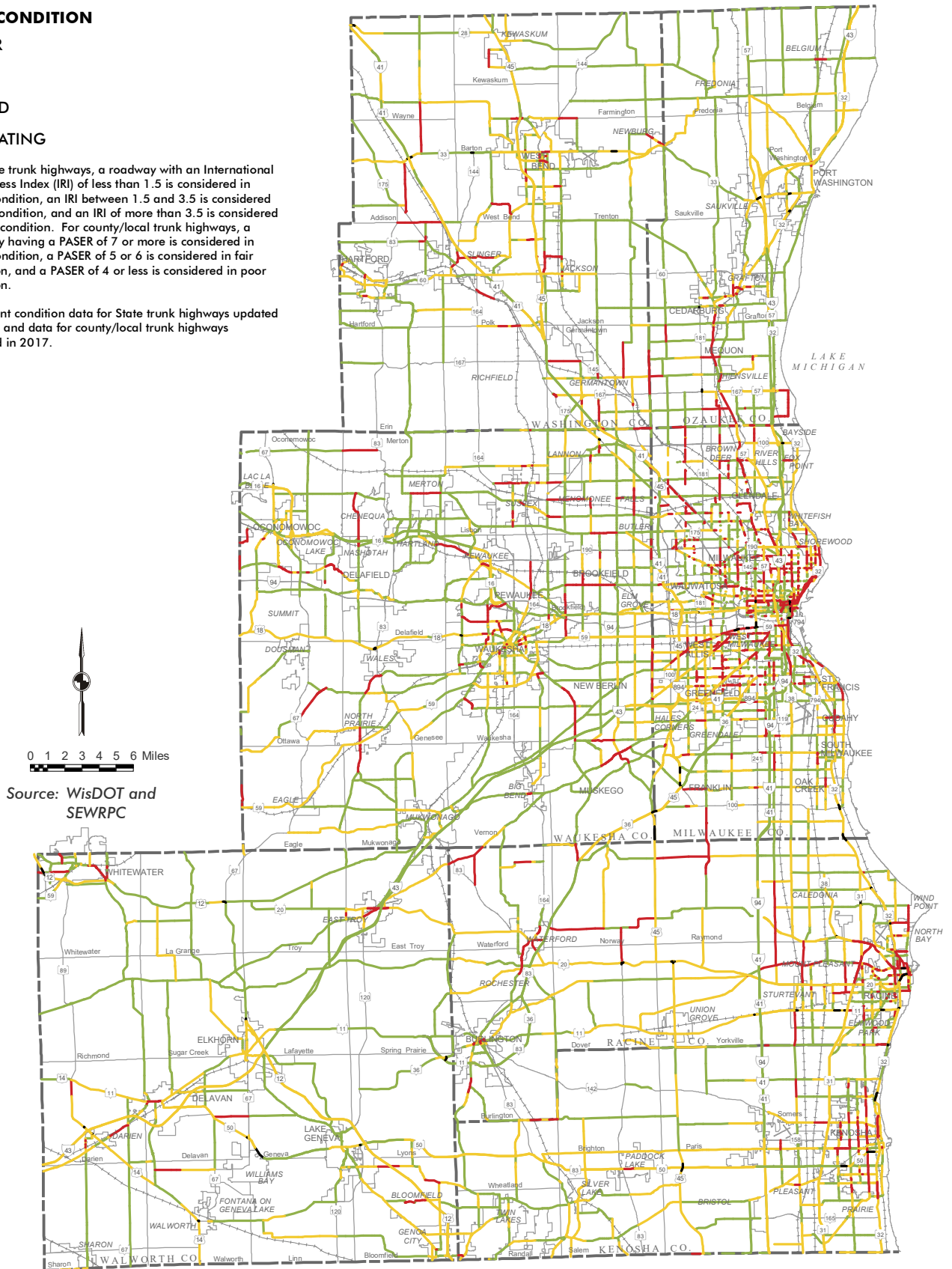
## Map A.2 Pavement Condition on Arterial Streets and Highways in the Region: 2016/2017

### PAVEMENT CONDITION

- POOR
- FAIR
- GOOD
- NO RATING

Note: For state trunk highways, a roadway with an International Roughness Index (IRI) of less than 1.5 is considered in good condition, an IRI between 1.5 and 3.5 is considered in fair condition, and an IRI of more than 3.5 is considered in poor condition. For county/local trunk highways, a roadway having a PASER of 7 or more is considered in good condition, a PASER of 5 or 6 is considered in fair condition, and a PASER of 4 or less is considered in poor condition.

Pavement condition data for State trunk highways updated in 2016 and data for county/local trunk highways updated in 2017.



Source: WisDOT and SEWRPC

**Table A.3  
Pavement Condition of Arterial Streets and Highways**

Condition <sup>a</sup>	Base Year (2013)		2016 (State Facilities) and 2017 (Local and County Facilities) <sup>b</sup>		Percent Change 2013 to 2016/2017
	Miles	Percent	Miles	Percent	
Poor	380	10.6	338	9.4	-11.3
Fair	1,239	34.7	1,410	39.2	13.0
Good	1,958	54.7	1,849	51.4	-6.0
<b>Total</b>	<b>3,577</b>	<b>100.0</b>	<b>3,598</b>	<b>100.0</b>	<b>-</b>

<sup>a</sup> For state trunk highways, a roadway with an International Roughness Index (IRI) of less than 1.5 is considered in good condition, an IRI between 1.5 and 3.5 is considered in fair condition, and an IRI of more than 3.5 is considered in poor condition. For county/local trunk highways, a roadway having a PASER of 7 or more is considered in good condition, a PASER of 5 or 6 is considered in fair condition, and a PASER of 4 or less is considered in poor condition.

<sup>b</sup> The data year for state trunk highways is 2016 and the data year for local/county trunk highways is 2017.

Source: WisDOT and SEWRPC

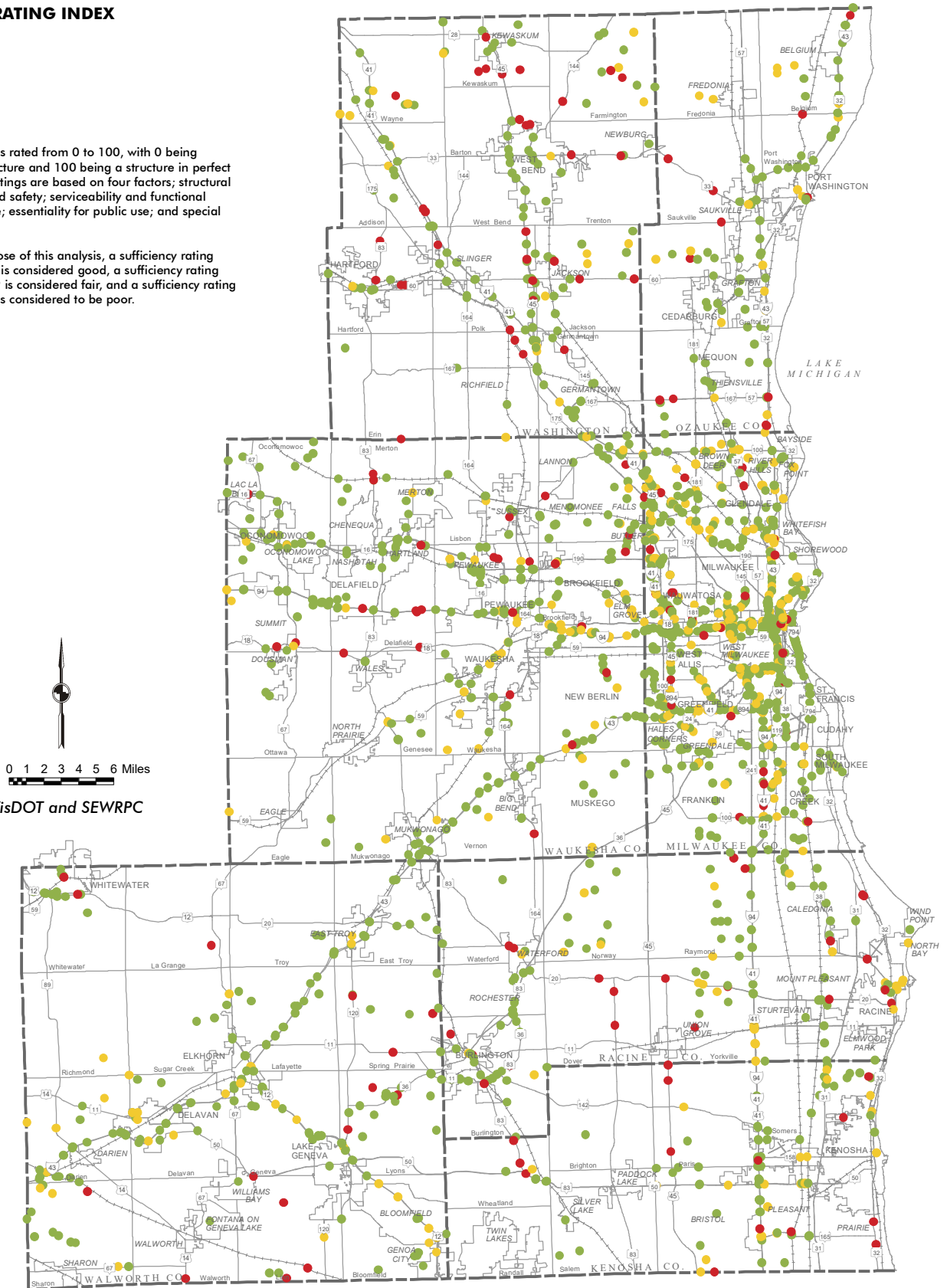
# Map A.3 Bridge Structure Condition in the Region: 2018

## SUFFICIENCY RATING INDEX

- POOR
- FAIR
- GOOD

Note: Each bridge is rated from 0 to 100, with 0 being a failing structure and 100 being a structure in perfect condition. Ratings are based on four factors; structural adequacy and safety; serviceability and functional obsolescence; essentiality for public use; and special reductions.

For the purpose of this analysis, a sufficiency rating of 80 to 100 is considered good, a sufficiency rating of 50 to 79.9 is considered fair, and a sufficiency rating of 0 to 49.9 is considered to be poor.



Source: WisDOT and SEWRPC

**Table A.4**  
**Bridge Structure Condition in the Region: 2013 and 2018**

Sufficiency Rating <sup>a</sup>	2013		2018		Percent Change 2013-2018
	Number of Bridges	Percent	Number of Bridges	Percent	
Poor	81	4.3	156	7.7	79.1
Fair	441	23.3	371	18.2	-21.9
Good	1,372	72.4	1,508	74.1	2.3
<b>Total</b>	<b>1,894</b>	<b>100.0</b>	<b>2,035</b>	<b>100.0</b>	<b>-</b>

<sup>a</sup> Each bridge is rated from 0 to 100, with 0 being a failing structure and 100 being a structure in perfect condition. Ratings are based on four factors; structural adequacy and safety; serviceability and functional obsolescence; essentiality for public use; and special reductions. For the purpose of this analysis, a sufficiency rating of 80 to 100 is considered good, a sufficiency rating of 50 to 79.9 is considered fair, and a sufficiency rating of 0 to 49.9 is considered to be poor.

Source: WisDOT and SEWRPC

**Table A.5  
Freeway and Surface Arterial Traffic Congestion Levels**

<b>Freeway</b>			
Level of Traffic Congestion	Level of Service	Average Speed	Operating Conditions
None	A and B	Freeway operates at free-flow speed	No restrictions on ability to maneuver and change lanes.
None	C	Freeway operates at free-flow speed	Ability to maneuver and change lanes noticeably restricted.
Moderate	D	Freeway operates at 1 to 2 mph below free-flow speed	Ability to maneuver and change lanes more noticeably limited. Reduced driver physical and psychological comfort levels.
Severe	E	Freeway operates at up to 10 mph below free-flow speed	Virtually no ability to maneuver and change lanes. Operation at maximum capacity. No usable gaps in the traffic stream to accommodate lane changing.
Extreme	F	Freeway average speeds are 20 to 30 mph or less	Breakdown in vehicular flow with stop-and-go, bumper-to-bumper traffic.

<b>Surface Arterial</b>			
Level of Traffic Congestion	Level of Service	Average Speed	Operating Conditions
None	A and B	70 to 100 percent of free-flow speed	Ability to maneuver within traffic stream is unimpeded. Control delay at signalized intersections is minimal.
None	C	50 to 100 percent of free-flow speed	Restricted ability to maneuver and change lanes at mid-block locations.
Moderate	D	40 to 50 percent of free-flow speed	Restricted ability to maneuver and change lanes. Small increases in flow lead to substantial increases in delay and decreases in travel speed.
Severe	E	33 to 40 percent of free-flow speed	Significant restrictions on lane changes. Traffic flow approaches instability.
Extreme	F	25 to 33 percent of free-flow speed	Flow at extremely low speeds. Intersection congestion with high delays, high volumes, and extensive queuing.

Source: SEWRPC

but carries about 39 percent of total regional average weekday vehicle-miles of travel. Given the utilization of the freeway system, a much greater proportion of the freeway system—as compared to the surface arterial street system—experiences extreme and severe peak-hour traffic congestion, as well as experiencing traffic congestion during hours of the weekday other than the peak traffic hours. The existing levels of traffic congestion experienced in the years 2011 and 2017 are set forth in Table A.6 and shown on Map A.4.

### ***Congestion on Designated Truck Routes and the National Highway System***

The levels of traffic congestion experienced on designated truck routes and the National Highway System (NHS) for the years 2011 and 2017 are presented in Table A.7 and on Map A.5. The State of Wisconsin maintains a truck operations map that identifies streets and highways for the operation of vehicles and combinations of vehicles for which the overall lengths cannot be limited. In addition, the truck operations map identifies restricted truck routes where the overall lengths are limited. The NHS includes highways important to the nation’s economy, defense, and mobility. As part of the Moving Ahead for Progress in the 21st Century Act (MAP-21), the NHS was expanded to include urban and rural principal arterials that were not included in the NHS before October 1, 2012. Though, the miles of designated truck routes and NHS facilities carrying traffic volumes exceeding their design capacity has remained relatively stable since 2011, decreasing only 4.9 percent from 244 miles in 2011 to 232 miles in 2017, decreases in congestion on these roadways improves travel time and freight movement.

## **Roadway Safety**

### ***Number of Crashes***

After a downward trend of total vehicular crashes in the Region since the mid-1990s, the total number of crashes has gradually increased from 2012 to 2018 by about 28 percent (see Figure A.8). The total number of vehicular crashes increased from 42,646 in 2017 to 45,419 in 2018, representing about a 7 percent increase. Crashes involving an injury or a fatality increased slightly to 12,623 crashes in 2018, representing about 28 percent of all crashes. Over the period 1998-2018, crashes involving an injury or a fatality decreased by about 24 percent and property-damage-only crashes increased by about 5 percent, to 32,796 crashes.

### ***Fatal Crashes***

There were 133 fatal vehicular crashes in the Region in 2018 that resulted in 145 fatalities. As shown in Figure A.9, the number of fatalities has oscillated over the 20-year period from 1998-2018, including a peak of 195 fatalities in 2005 and a low of 123 fatalities in 2013. Figure A.10 presents selected characteristics of vehicle crash-related fatalities in the Region during 2017. About 23 percent of fatalities involved bicyclists and pedestrians and 16 percent involved motorcyclists. Alcohol was cited as a contributing factor in about 23 percent of all fatalities.

**Table A.6**  
**Traffic Congestion on the Arterial Street and Highway System**  
**in the Region by County: 2011 and 2017**

County	Under or at Design Capacity <sup>a</sup>		2011						Total Mileage
			Over Design Capacity <sup>a</sup>						
			Moderate Congestion		Severe Congestion		Extreme Congestion		
Mileage	Percent of Total	Mileage	Percent of Total	Mileage	Percent of Total	Mileage	Percent of Total		
Kenosha	303.2	94.8	11.3	3.5	4.9	1.5	0.6	0.2	320.0
Milwaukee	647.5	82.1	64.6	8.2	49.5	6.3	26.8	3.4	788.4
Ozaukee	236.2	94.2	9.6	3.8	4.7	1.9	0.3	0.1	250.8
Racine	345.0	96.3	9.5	2.7	2.5	0.7	1.3	0.4	358.3
Walworth	442.6	99.3	2.4	0.5	0.4	0.1	0.2	0.0	445.6
Washington	397.8	97.9	6.1	1.5	2.3	0.6	0.3	0.1	406.5
Waukesha	676.5	89.8	43.4	5.8	27.9	3.7	5.5	0.7	753.3
Region	3,048.8	91.8	146.9	4.4	92.2	2.8	35.0	1.1	3,322.9

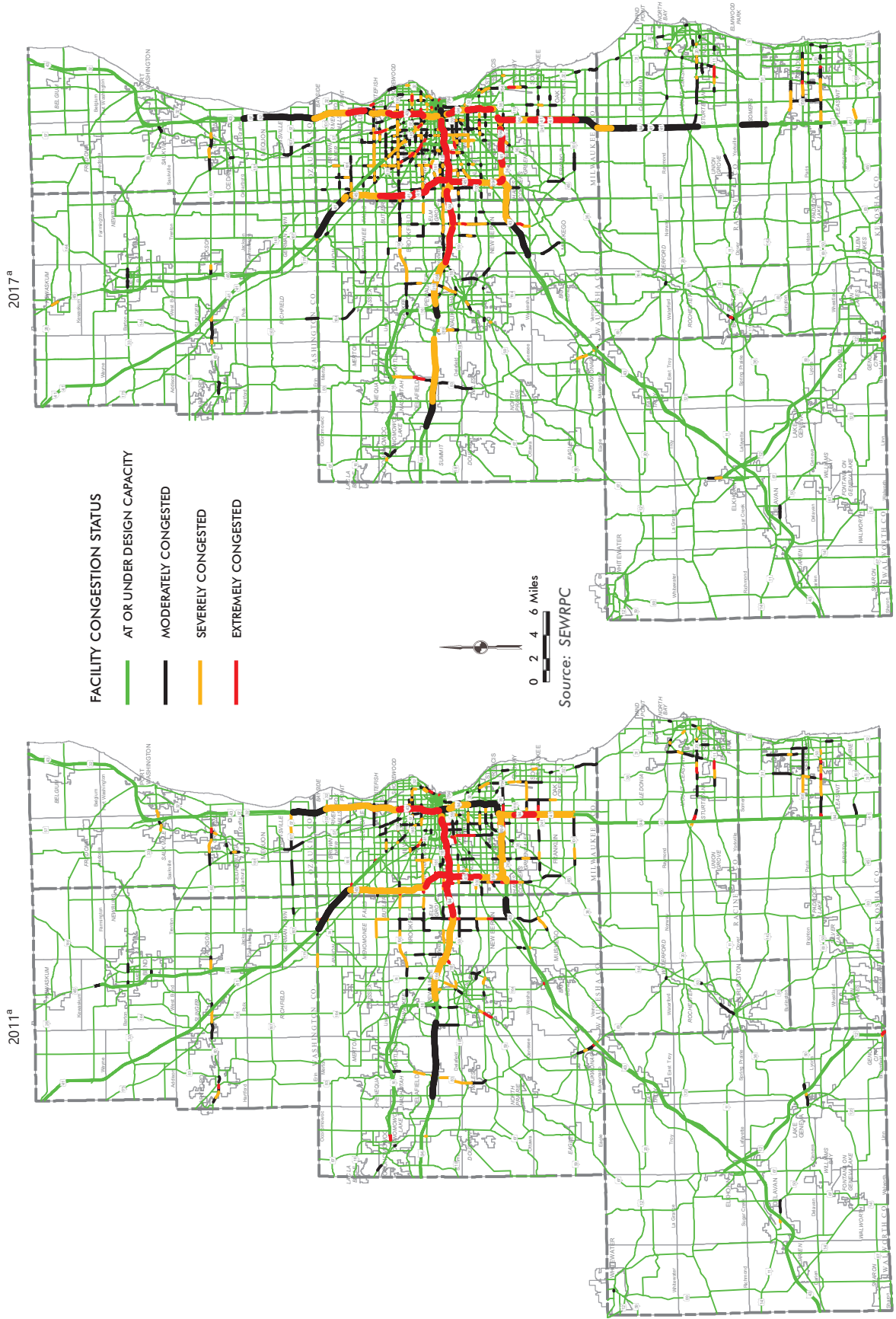
County	Under or at Design Capacity <sup>a</sup>		2017						Total Mileage
			Over Design Capacity <sup>a</sup>						
			Moderate Congestion		Severe Congestion		Extreme Congestion		
Mileage	Percent of Total	Mileage	Percent of Total	Mileage	Percent of Total	Mileage	Percent of Total		
Kenosha	304.6	95.2	8.7	2.7	6.5	2.0	0.2	0.1	320.0
Milwaukee	635.9	80.6	72.4	9.2	51.0	6.5	29.1	3.7	788.4
Ozaukee	239.0	95.3	10.8	4.3	1.0	0.4	-	-	250.8
Racine	342.5	95.0	15.3	4.2	2.4	0.7	0.5	0.1	360.7
Walworth	445.3	99.4	2.0	0.4	0.3	0.1	0.2	0.1	447.8
Washington	399.4	98.3	5.8	1.4	1.3	0.3	-	-	406.5
Waukesha	686.8	91.2	37.9	5.0	24.6	3.3	4.0	0.5	753.3
Region	3,053.5	91.8	152.9	4.6	87.1	2.6	34.0	1.0	3,327.5

<sup>a</sup> Design capacity is the maximum level of traffic volume a facility can carry before beginning to experience morning and afternoon peak traffic hour traffic congestion, and is expressed in terms of number of vehicles per average weekday.

Source: SEWRPC



**Map A.4  
Congestion on the Arterial Street and Highway System in the Southeastern Wisconsin Region: Years 2011 and 2017**



<sup>a</sup> During 2011, the traffic volume on the freeway system was impacted by lane closures attendant to the resurfacing of IH 94 between STH 16 and the Stadium Interchange, and the reconstruction of the Mitchell Interchange. In 2017, the traffic volume on the freeway system was primarily attendant to the reconstruction of the Zoo and Lake Interchanges.

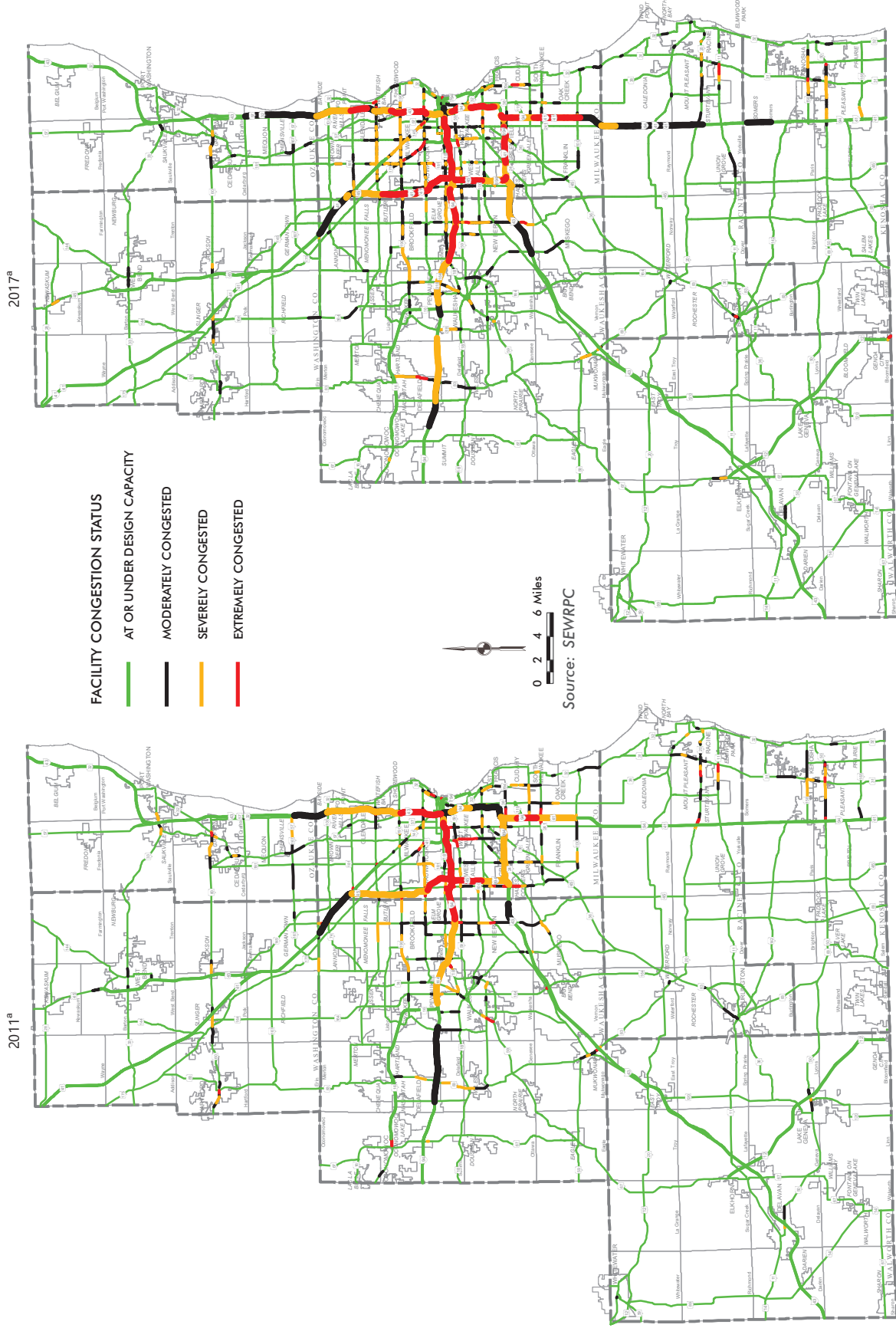


**Table A.7**  
**Traffic Congestion on Designated Truck Routes and the National**  
**Highway System in the Region: 2011 and 2017**

Year	Under or At Design Capacity	Over Design Capacity			Total Mileage
		Moderate Congestion	Severe Congestion	Extreme Congestion	
2011	1,403	124	86	34	1,647
2017	1,419	123	77	32	1,651

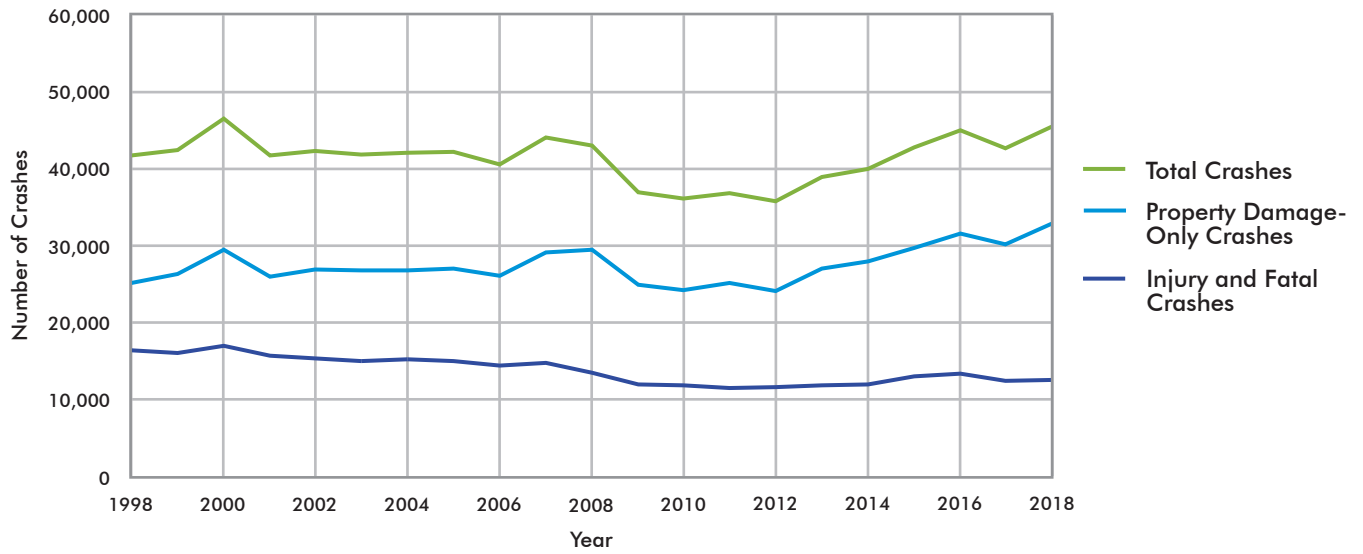
Source: SEWRPC

**Map A.5  
Congestion on the Regional Freight Network in the Southeastern Wisconsin Region: Years 2011 and 2017**



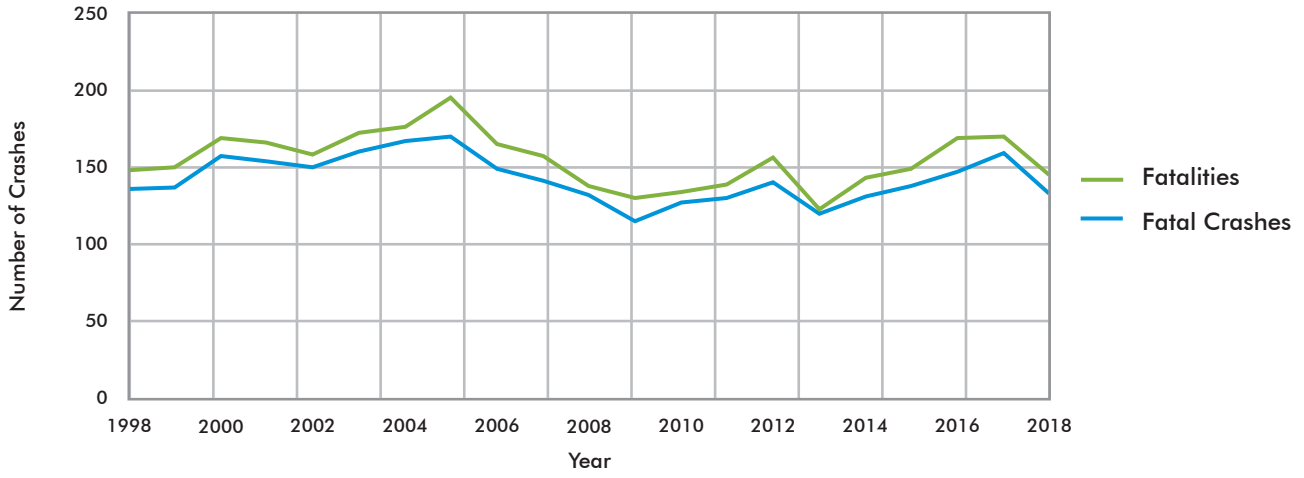
<sup>a</sup> During 2011, the traffic volume on the freeway system was impacted by lane closures attendant to the resurfacing of IH 94 between STH 16 and the Stadium Interchange, and the reconstruction of the Mitchell Interchange. In 2017, the traffic volume on the freeway system was impacted by lane and ramp closures primarily attendant to the reconstruction of the Zoo and Lake Interchanges.

**Figure A.8**  
**Total, Property Damage-Only, and Injury and Fatal**  
**Vehicular Crashes Reported in the Region: 1998-2018**



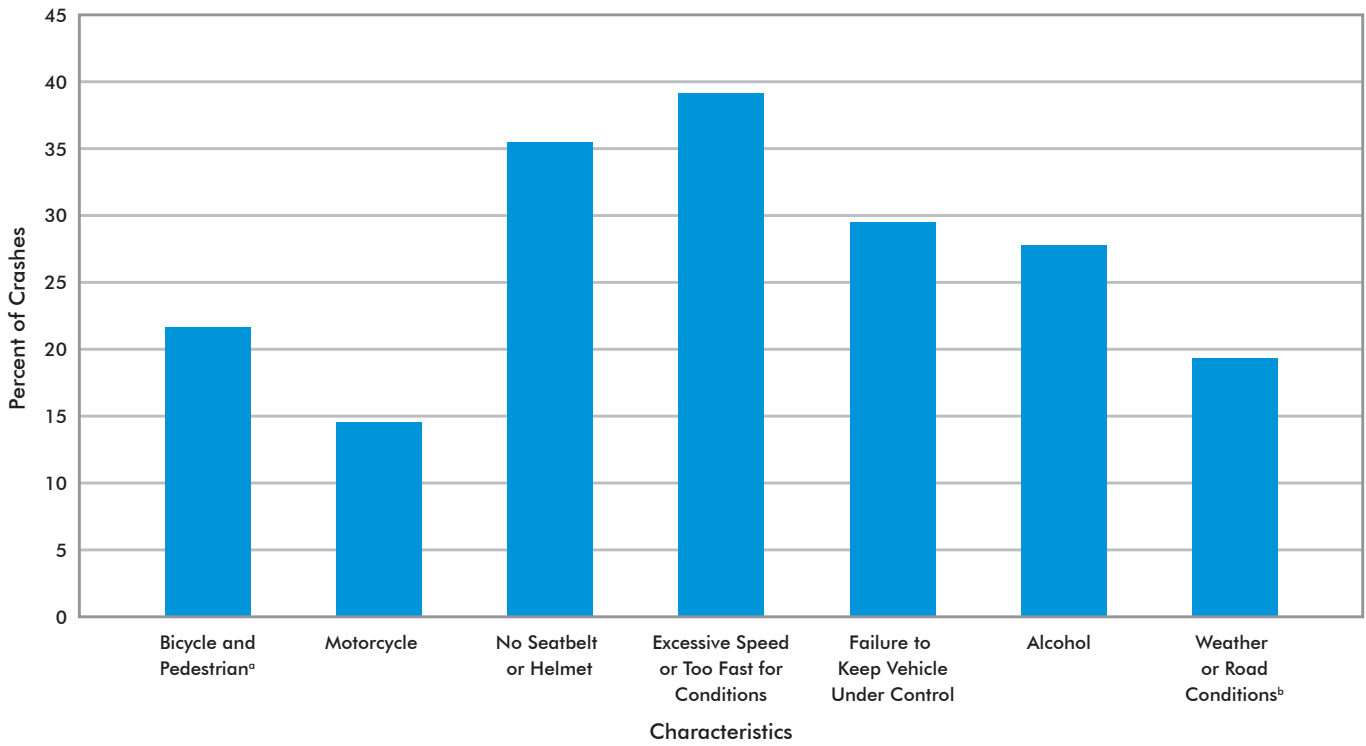
Source: WisDOT and SEWRPC

**Figure A.9**  
**Fatal Vehicular Crashes and Fatalities Reported in the Region: 1998-2018**



Source: WisDOT and SEWRPC

**Figure A.10**  
**Selected Characteristics of Vehicular Crash Fatalities in Southeastern Wisconsin: 2018**



Note: Fatalities attributable to multiple categories are counted more than once.

<sup>a</sup>In 2018 there was one bicycle fatality (0.7 percent of total fatal crashes) and 31 pedestrian fatalities (21.4 percent of total fatal crashes).

<sup>b</sup>This category includes snowy, rainy, and foggy conditions and snow-covered, icy or wet roads.

Source: SEWRPC

### ***Serious Injury Crashes***

In 2018, there were 873 vehicle crashes in the Region that resulted in at least one serious injury, representing a 3 percent decrease from 2017 as shown in Figure A.11. Between 1998 and 2018, the number of crashes resulting in serious injury declined significantly, by about 54 percent.

### ***Bicycle and Pedestrian Crashes***

In 2018, there were 317 vehicular crashes involving bicycles and 696 vehicular crashes involving pedestrians. Over the past 20 years, the number of bicycle and pedestrian crashes has significantly decreased by nearly 44 percent and 30 percent, respectively (see Figure A.12). In 2018, there were 28 bicycle crashes and 151 pedestrian crashes resulting in a fatality or serious injury. Historically, the number of bicycle and pedestrian crashes resulting in a fatality or serious injury have generally decreased, as seen in Figure A.13. However, over the last 10 years, there has been only a slight decline in the number of bicycle crashes resulting in a fatality or serious injury and a slight increase in the number of such pedestrian crashes.

### ***State Trunk Highway Vehicular Crash Rates***

A summary of the five-year average annual crash rates on those freeways and surface arterials on the State Trunk Highway network in the Region is presented in Table A.8 for two time periods—2008-2012 and 2012-2016. Crash rates, expressed on the basis of the number of crashes per 100 million vehicle miles driven, slightly increased for both freeways and standard arterials on the Region's State Trunk Highway system.

### ***Arterial Highway Travel Times***

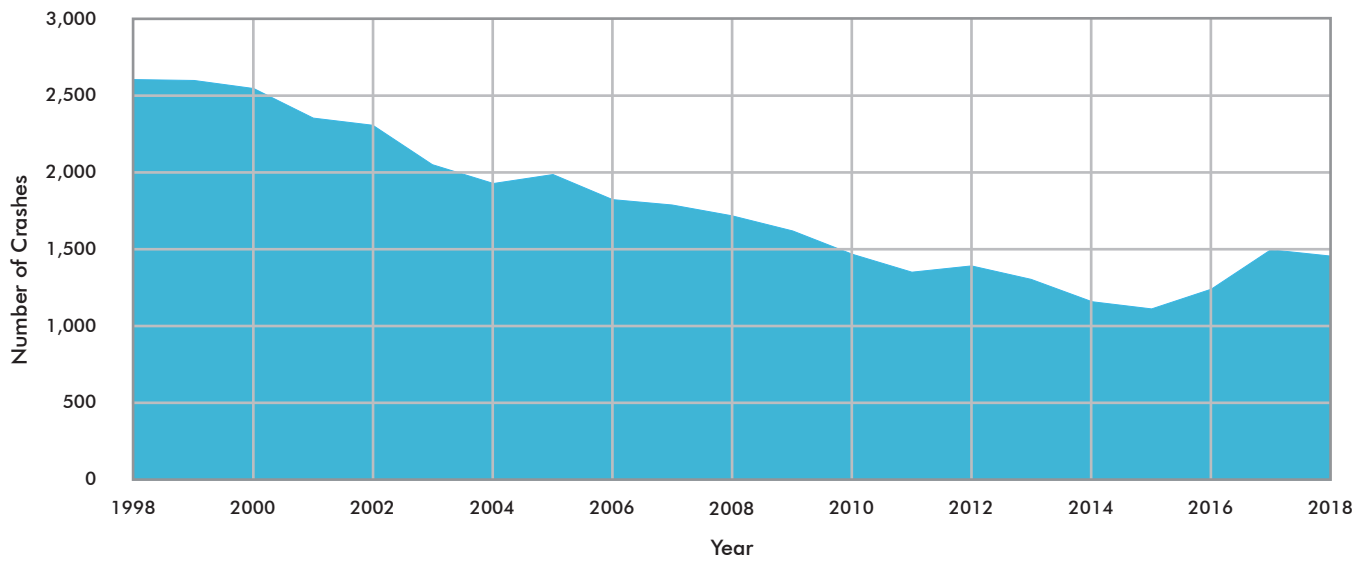
The estimated peak-hour travel speeds for selected freeway and surface arterial street segments for 2001 and 2011 are shown on Map A.6. Estimated peak-hour arterial street and highway travel time contours for 2001 and 2011 are shown on Map A.7 for two locations: the Milwaukee central business district and the Milwaukee regional medical center. Year 2001 and 2011 arterial street and highway travel times are very similar.

## **PARK-RIDE FACILITY AND TRANSIT STATION UTILIZATION**

### ***Park-Ride Lots Served by Transit***

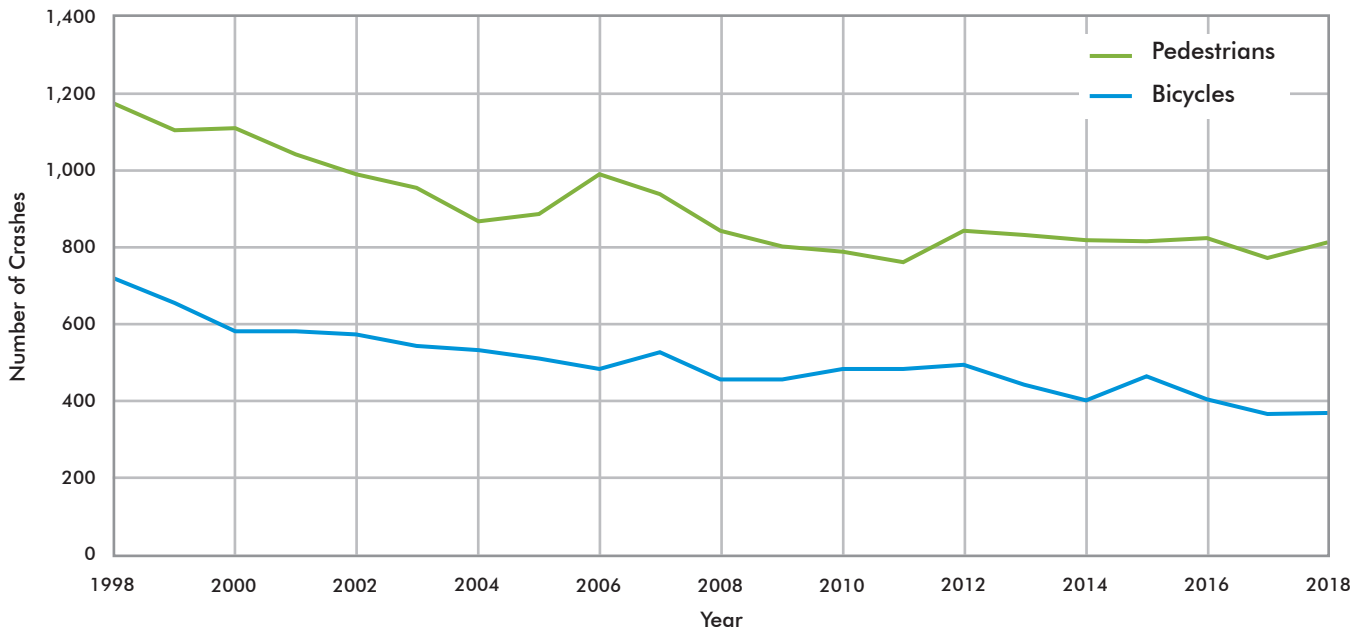
In 2018, there were 51 park-ride lots in the Region, with 37 lots served by commuter or express bus transit service, as shown on Map A.8 and in Table A.9. These intermodal parking facilities provided 6,325 parking spaces. The utilization of parking spaces at all park-ride lots served by transit in 2018 ranged from a high of 117 percent at the lot located at IH 43 and CTH C in the Town of Grafton (with

**Figure A.11**  
**Total Number of Crashes Resulting in a Serious Injury Reported in the Region: 1998-2018**



Source: WisDOT and SEWRPC

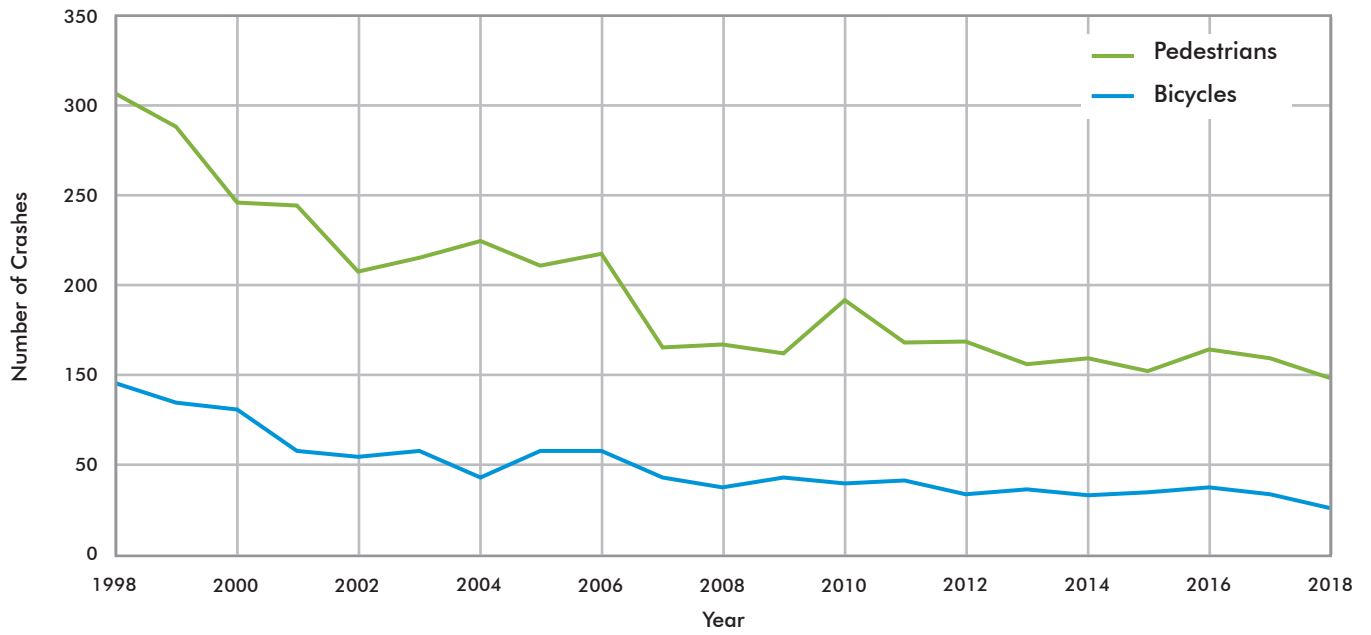
**Figure A.12**  
**Total Number of Vehicular Crashes Involving Bicycles or Pedestrians as Reported in the Region: 1998-2018**



Source: Wisconsin Traffic Operations and Safety Laboratory and SEWRPC



**Figure A.13**  
**Total Number of Vehicular Crashes Involving Bicycles or Pedestrians Resulting in a Fatality or a Serious Injury as Reported in the Region: 1998-2018**



Source: Wisconsin Traffic Operations and Safety Laboratory and SEWRPC

**Table A.8**  
**Average Vehicular Crash Rate of State Trunk Highways by Arterial Type**  
**by County in the Region: 2008-2012 and 2012-2016**

County	Crash Rate per 100 Million Vehicle Miles			
	Freeways		Standard Arterials	
	2008-2012	2012-2016	2008-2012	2012-2016
Kenosha	45.7	46.8	255.6	249.7
Milwaukee	120.2	129.8	372.8	414.6
Ozaukee	41.0	45.9	119.0	154.0
Racine	33.7	46.3	234.9	250.4
Walworth	38.3	33.2	139.2	135.3
Washington	43.3	52.6	215.0	210.7
Waukesha	53.7	54.3	222.4	201.9
<b>Region</b>	<b>72.5</b>	<b>81.2</b>	<b>265.0</b>	<b>271.0</b>

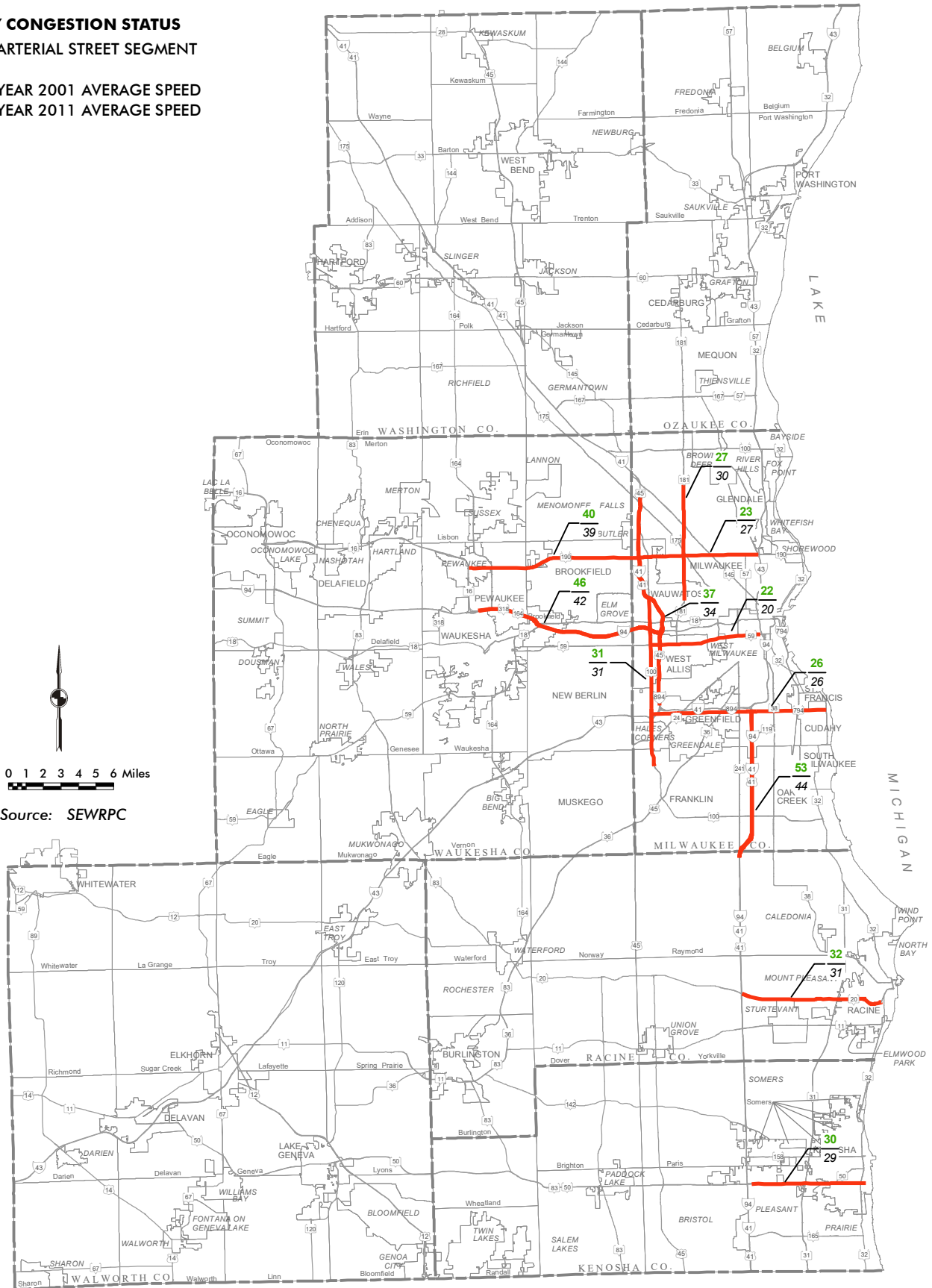
Note: Crashes that occurred on segments of roadway that no longer exist due to a recent roadway reconfiguration are not included.

Source: SEWRPC

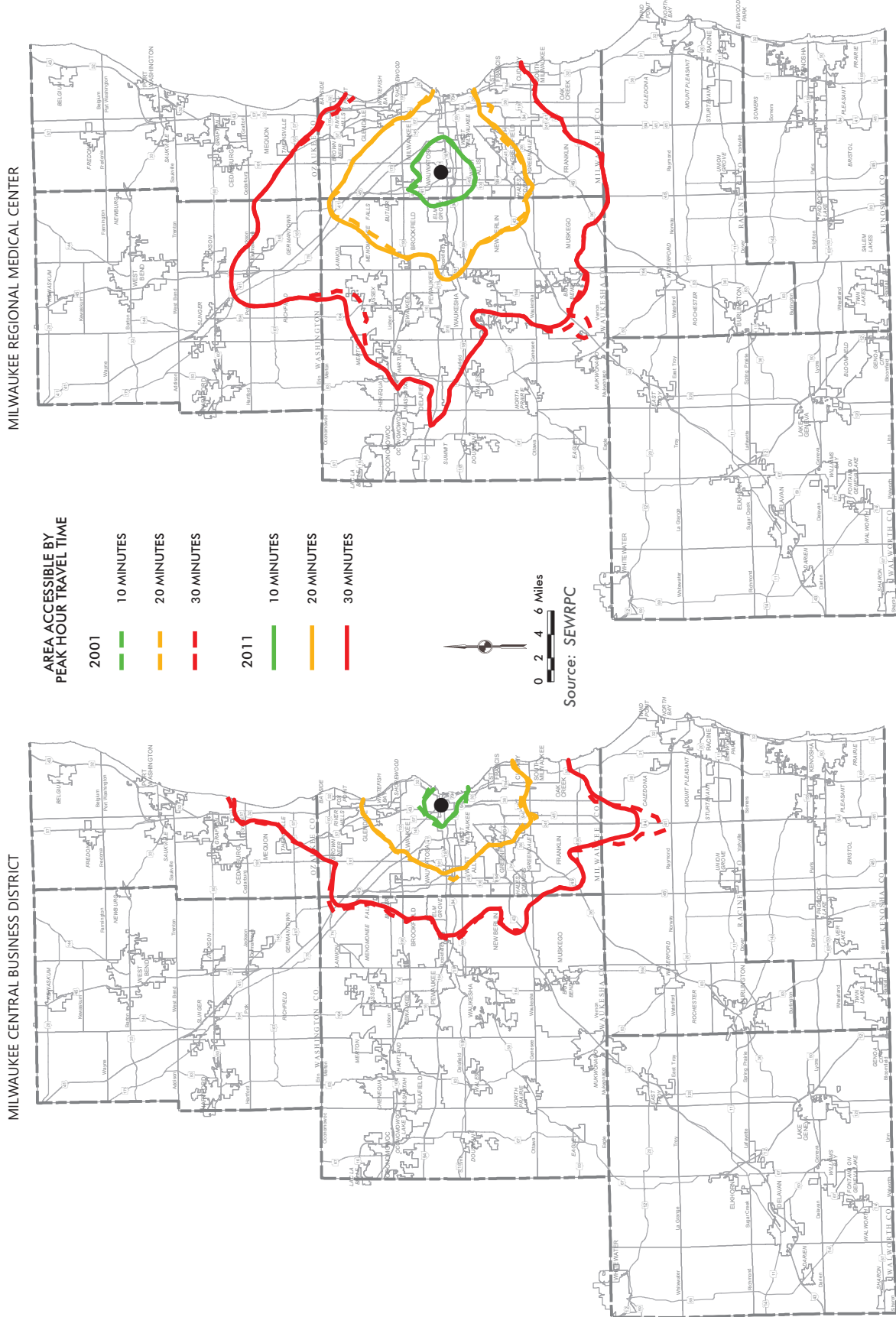
# Map A.6 Comparison of Estimated Year 2001 and 2011 Peak Hour Travel Speeds for Selected Freeway and Surface Arterial Streets in the Region

## FACILITY CONGESTION STATUS

- ARTERIAL STREET SEGMENT
- 23 YEAR 2001 AVERAGE SPEED
- 23 YEAR 2011 AVERAGE SPEED




**Map A.7  
Estimated Peak Hour Arterial Street and Highway Travel Time Contours: Years 2001 and 2011**

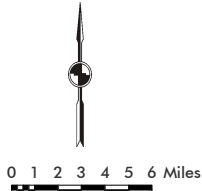
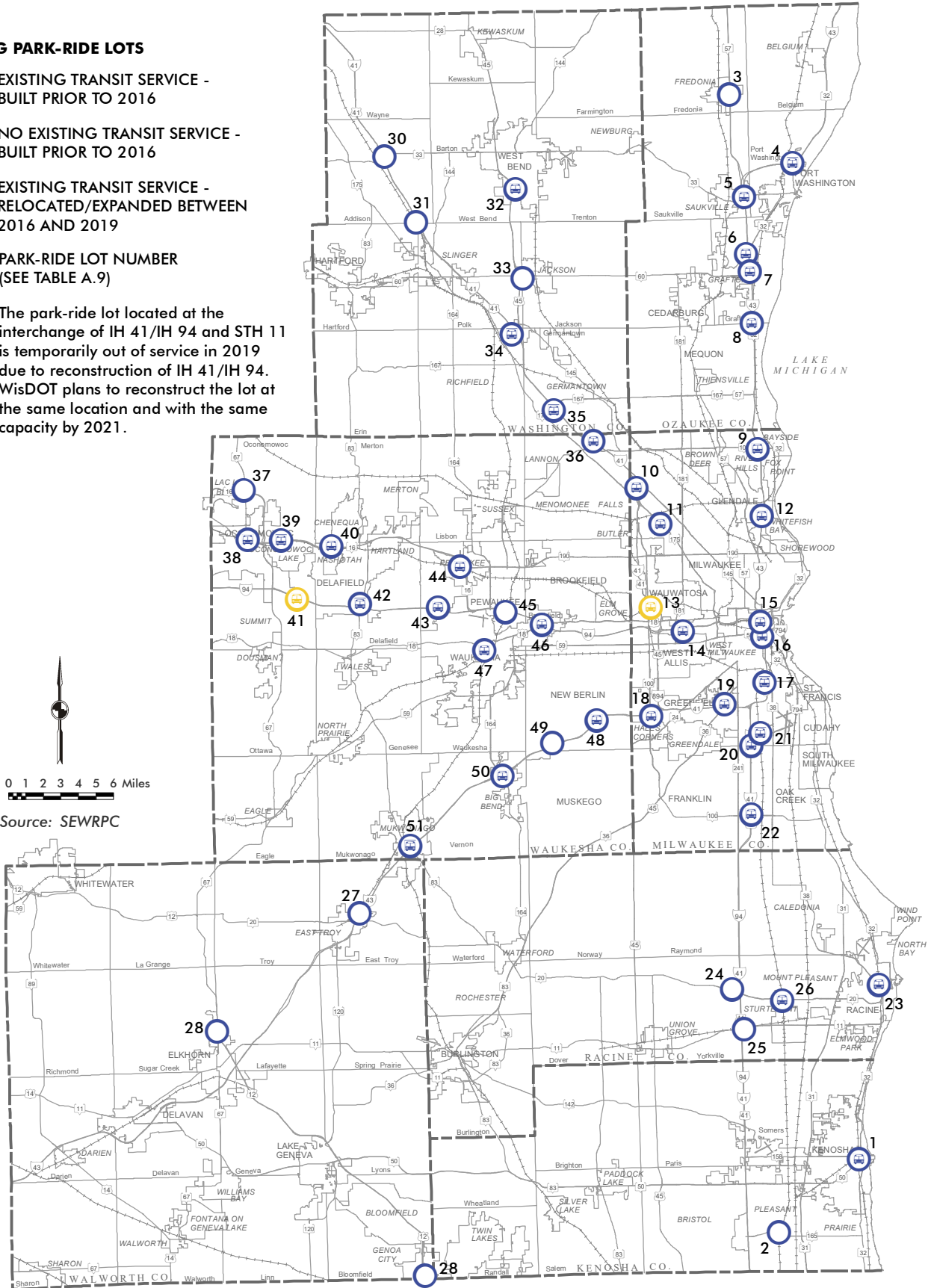


**Map A.8**  
**Existing Park-Ride Lots and Transit Stations Located in the Region: 2019**

**EXISTING PARK-RIDE LOTS**

-  EXISTING TRANSIT SERVICE - BUILT PRIOR TO 2016
-  NO EXISTING TRANSIT SERVICE - BUILT PRIOR TO 2016
-  EXISTING TRANSIT SERVICE - RELOCATED/EXPANDED BETWEEN 2016 AND 2019
- 31** PARK-RIDE LOT NUMBER (SEE TABLE A.9)

**Note:** The park-ride lot located at the interchange of IH 41/IH 94 and STH 11 is temporarily out of service in 2019 due to reconstruction of IH 41/IH 94. WisDOT plans to reconstruct the lot at the same location and with the same capacity by 2021.



Source: SEWRPC

**Table A.9**  
**Average Weekday Use of Park-Ride Lots and Transit Stations: 2018**

No. On Map A.10	Location	Served by Transit	Not Served by Transit	Shared Use	Available Parking Spaces	Autos Parked on an Average Weekday: 2018	Percent of Spaces Used
<b>Kenosha County</b>							
1	Metra Station (Kenosha)	X		X	143	-- <sup>a</sup>	-- <sup>a</sup>
2	STH 165 and Terwall Terrace (Pleasant Prairie)		X	X	387	-- <sup>a</sup>	-- <sup>a</sup>
<b>Ozaukee County</b>							
3	STH 57 and CTH H (Fredonia)		X		46	11	24
4	IH 43 and STH 32-CTH H (Port Washington)	X			89	29	33
5	Walmart (Saukville)	X		X	50	-- <sup>a</sup>	-- <sup>a</sup>
6	IH 43 and CTH V (Grafton)	X			79	16	20
7	IH 43 and STH 60 (Grafton)	X		X	-- <sup>b</sup>	-- <sup>a</sup>	-- <sup>a</sup>
8	IH 43 and CTH C (Grafton)	X			64	75	117
<b>Milwaukee County</b>							
9	W. Brown Deer Road (River Hills)	X			335	106	32
10	W. Good Hope Road (Milwaukee)	X			131	31	24
11	Timmerman Field (Milwaukee)		X		140	4	3
12	North Shore (Glendale)	X			130	86	66
13	W. Watertown Plank Road (Wauwatosa)	X			236	104	44
14	State Fair Park (Milwaukee)	X			415	130	31
15	Downtown Milwaukee Intermodal Amtrak Station	X			282	-- <sup>a</sup>	-- <sup>a</sup>
16	National Avenue and IH 43/94 (Milwaukee)	X		X	55	-- <sup>a</sup>	-- <sup>a</sup>
17	W. Holt Avenue (Milwaukee)	X			234	104	44
18	Whitnall (Hales Corners)	X			355	172	48
19	W. Loomis Road (Greenfield)	X			358	62	17
20	W. College Avenue (Milwaukee)	X			702	324	46
21	Mitchell Airport Amtrak Station (Milwaukee)	X			280	-- <sup>a</sup>	-- <sup>a</sup>
22	W. Ryan Road (Oak Creek)	X			-- <sup>c</sup>	-- <sup>a</sup>	-- <sup>a</sup>
<b>Racine County</b>							
23	Racine Metro Transit Center (Racine)	X			125	-- <sup>a</sup>	-- <sup>a</sup>
24	IH 94 and STH 20 (Ives Grove)		X		78	79	101
25	IH 94 and STH 11 (Mount Pleasant)		X		-- <sup>c</sup>	-- <sup>a</sup>	-- <sup>a</sup>
26	Sturtevant Amtrak Station (Sturtevant)	X			181	-- <sup>a</sup>	-- <sup>a</sup>
<b>Walworth County</b>							
27	East Troy Municipal Airport (East Troy)		X		54	3	6
28	USH 12 and STH 67 (Elkhorn)		X		47	7	15
29	USH 12 and CTH P (Genoa City)		X		77	7	9
<b>Washington County</b>							
30	IH 41 and STH 33 (Allenton)		X		113	44	39
31	IH 41 and CTH K (Addison)		X		53	11	21
32	USH 45 and Paradise Drive (West Bend)	X			103	75	73
33	STH 60 and CTH P (Jackson)		X		132	11	8
34	IH 41 and Pioneer Road (Richfield)	X			282	-- <sup>a</sup>	-- <sup>a</sup>
35	IH 41 and Lannon Road (Germantown)	X			158	92	58

Table continued on next page.

No. On Map A.10	Location	Served by Transit	Not Served by Transit	Shared Use	Available Parking Spaces	Autos Parked on an Average Weekday: 2018	Percent of Spaces Used
<b>Waukesha County</b>							
36	Pilgrim Road (Menomonee Falls)	X			68	27	40
37	STH 67 and Lang Road (Oconomowoc)		X		39	6	15
38	Collins Street Parking Lot (Oconomowoc)	X		X	-- <sup>b</sup>	-- <sup>a</sup>	-- <sup>a</sup>
39	STH 16 and CTH P (Oconomowoc)	X			45	6	13
40	STH 16 and CTH C (Nashotah)	X			59	7	12
41	IH 94 and CTH P (Summit)	X			145	40	28
42	IH 94 and STH 83 (Delafield)	X			199	90	45
43	IH 94 and CTH G/CTH SS (Pewaukee)	X			247	60	24
44	Kiwanis Village Park (Pewaukee)	X		X	-- <sup>b</sup>	-- <sup>a</sup>	-- <sup>a</sup>
45	IH 94 and CTH F (Pewaukee)		X		83	15	18
46	Goerke's Corners (Brookfield)	X			322	281	87
47	Waukesha Metro Transit Downtown Transit Center (Waukesha)	X		X	-- <sup>b</sup>	-- <sup>a</sup>	-- <sup>a</sup>
48	IH 43 and Moorland Road (New Berlin)	X			140	35	25
49	IH 43 and CTH Y (New Berlin)		X		49	14	29
50	IH 43 and STH 164 (Big Bend)	X			147	41	28
51	IH 43 and STH 83 (Mukwonago)	X			166	59	36

<sup>a</sup> Data not available.

<sup>b</sup> Parking available within larger public lot or structure.

<sup>c</sup> Park-ride lot closed due to construction.

Source: SEWRPC

vehicles parked outside of designated parking stalls) to a low of 12 percent at the lot located at STH 16 and CHT C in the Town of Oconomowoc. In addition to the IH 43 and CTH C site, other park-ride lots served by transit with utilization rates greater than 60 percent include: IH 43 and Silver Spring Drive (Bayshore) in the City of Glendale; USH 45 and Paradise Drive in the City of West Bend; and IH 94 and CTH Y (Goerke's Corners) in the Town of Brookfield. On an average weekday during 2018, 42 percent of parking spaces at park-ride lots served by transit were in use.<sup>1</sup>

### **Park-Ride Lots Not Served by Transit**

In 2018, there were 14 park-ride lots not served by transit located within the Region, providing 1,298 parking spaces, also shown on Map A.8 and in Table A.9. The utilization of parking spaces at the individual park-ride lots not served by transit ranged from a high of 101 percent at the lot located at IH 94 and STH 20 in Ives Grove to 3 percent at the lot located at Timmerman Airport in the City of Milwaukee. No other park-ride lots not served by transit had utilization rates greater than 60 percent in 2018. On an average weekday during 2018, 23 percent of parking spaces at park-ride lots not served by transit were in use.<sup>2</sup>

### **Total Park-Ride Lot Utilization**

Table A.10 shows that utilization of all park-ride lots has decreased by about 7 percent between 2014 and 2018, despite a slight increase in available spaces.

## **TRANSPORTATION AIR POLLUTANT AND AIR TOXIC EMISSIONS**

The estimated transportation system air pollutant emissions and motor fuel consumption within Southeastern Wisconsin for the years 2001 and 2010 are shown in Table A.11. Estimated air pollutant emissions have declined for all pollutants—particularly volatile organic compounds and nitrogen oxides—owing to cleaner, more efficient vehicles, with the exception being carbon dioxide emissions and ammonia (which are estimated to have increased from 2001 to 2010 as fuel consumption has increased during these years).

## **SUMMARY AND CONCLUSION**

A review of the performance of public transit shows that there have been relatively minor changes in levels of service with varying levels of ridership. While level of service on intracounty transit service and intercounty bus service has remained relatively stable, ridership continues to steadily decline. However, an increase in demand for and ridership on public shared-ride taxi services has likely resulted in an

<sup>1</sup> The utilization rate is based on park-ride lots served by transit where data on available parking spaces and autos parked on an average weekday are known.

<sup>2</sup> The utilization rate is based on park-ride lots not served by transit where data on available parking spaces and autos parked on an average weekday are known.



**Table A.10**  
**Park-Ride Lot Utilization in Southeastern Wisconsin: 2014 and 2018**

<b>Year</b>	<b>Available Parking Spaces<sup>a</sup></b>	<b>Autos Parked on Average Weekday</b>	<b>Percent of Spaces Used</b>
2014	5,645	2,603	46.1
2018	5,838	2,264	38.7
<b>Percent Change</b>			<b>-7.4</b>

<sup>a</sup> Capacity only included for park-ride lots with utilization data available.

Source: SEWRPC

**Table A.11**  
**Estimated Southeastern Wisconsin Region Transportation System**  
**Air Pollutant Emissions and Fuel Consumption: 2001 and 2010**

Year	Estimated Air Pollutant Emissions (Tons per Hot Summer Weekday)						
	Volatile Organic Compounds <sup>a</sup>	Nitrogen Oxides <sup>a</sup>	Carbon Monoxide	Carbon Dioxide	Fine Particulate Matter	Sulfur Dioxide	Ammonia
2001	50.03	114.23	592.48	18,050	1.77	2.77	4.84
2010	27.30	60.92	358.29	18,500	1.18	0.51	5.62
Year	Butadiene	Acetaldehyde	Acrolein	Benzene	Formaldehyde	Estimated Fuel Consumption (Gallons per Average Weekday)	
2001	0.20	0.43	0.03	1.40	0.63	1,805,000	
2010	0.09	0.20	0.01	0.66	0.30	1,865,000	

<sup>a</sup> Estimated 1990 emissions were 154.6 tons of volatile organic compounds and 136.3 tons of nitrogen oxides. Estimated 1999 emissions were 61.3 tons of volatile organic compounds and 118.0 tons of nitrogen oxides.

Source: SEWRPC

increase in service on taxi services. Ridership on the Amtrak Hiawatha service continues to grow, and while there have been some improvements in service, growth in ridership is likely due to myriad external factors, including the current strength of the economy, which increases both business and personal travel between the Milwaukee and Chicago areas.

Since VISION 2050 was completed, there have been some changes to the condition of pavement and bridges in the Region, with improvements in some cases and declines in others. The percentage of pavement that is considered good and poor have both declined slightly, and the percentage of bridges considered in good condition has slightly increased, while the percentage of bridges considered in poor condition has nearly doubled.

Over the five years since VISION 2050 was completed, total vehicular crash rates have increased. While there was a slight decrease in crashes between 2016 and 2017, crashes again increased from 2017 to 2018. The severity of crashes in terms of serious injury and fatality has slightly decreased from 2017 to 2018, but remains slightly higher than in 2014. Vehicular crashes involving bicycles decreased since 2014 and vehicular crashes involving pedestrians decreased overall between 2014 and 2018.

A review of congestion on the freeway and arterial street and highway system shows an overall increase in congestion, with some areas experiencing an increase in congestion and some experiencing a decrease in congestion since VISION 2050 was completed.

Although new capacity for park-ride lots has been added since VISION 2050 was adopted, there has been a 15 percent reduction in utilization.