Southeastern Wisconsin Regional Freeway Reconstruction System Study

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

KENOSHA · MILWAUKEE · OZAUKEE · RACINE · WALWORTH · WASHINGTON · WAUKESHA

March 22, 2001

Agenda Item 4

Overview of the Function of the Regional Freeway System

Overview Outline- Freeway System Function

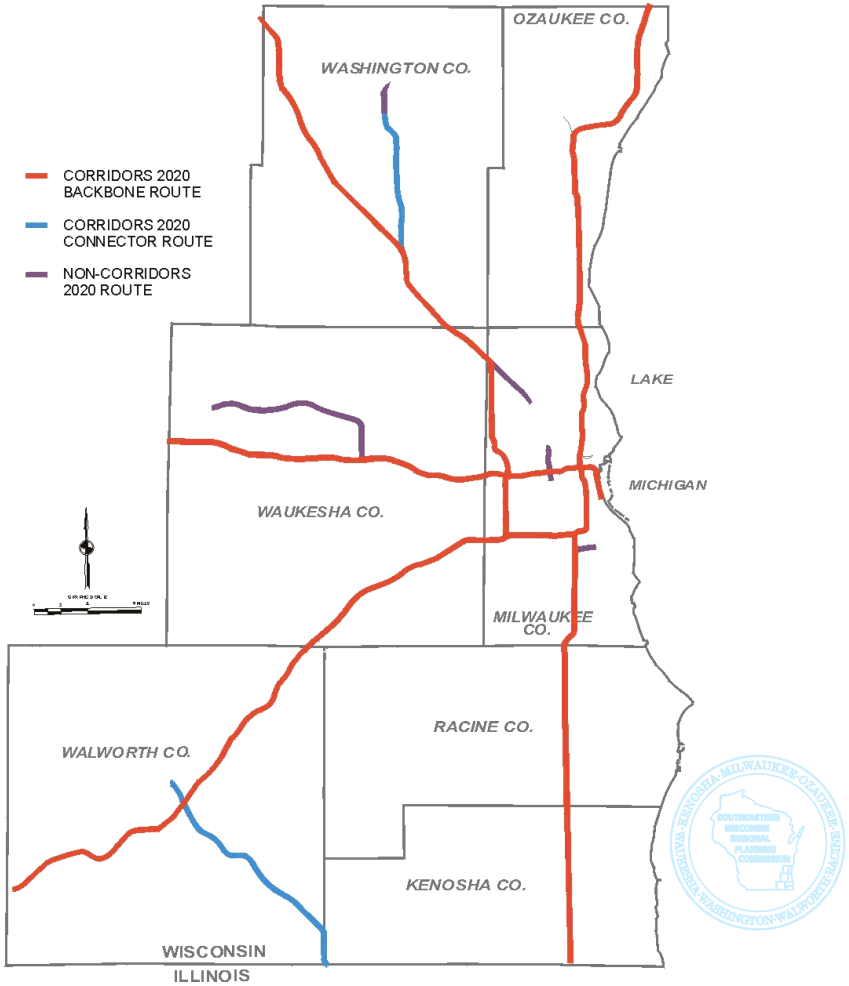
- **Jurisdictional and Federal Classification**
- **Characteristics of Travel**
  - **Origins and Destinations of Trips**
  - **Average Length of Trips**

Jurisdictional and Federal Classification

- **The entire regional freeway system is under the jurisdiction of the State of Wisconsin**
  - **The State is responsible for the design, construction, maintenance, and operation of each segment of the regional freeway system**
  - **Purpose of highways under State jurisdiction-- serve travel through and between the counties of the State and between States**

State Trunk Highway Subsystems -- Freeways

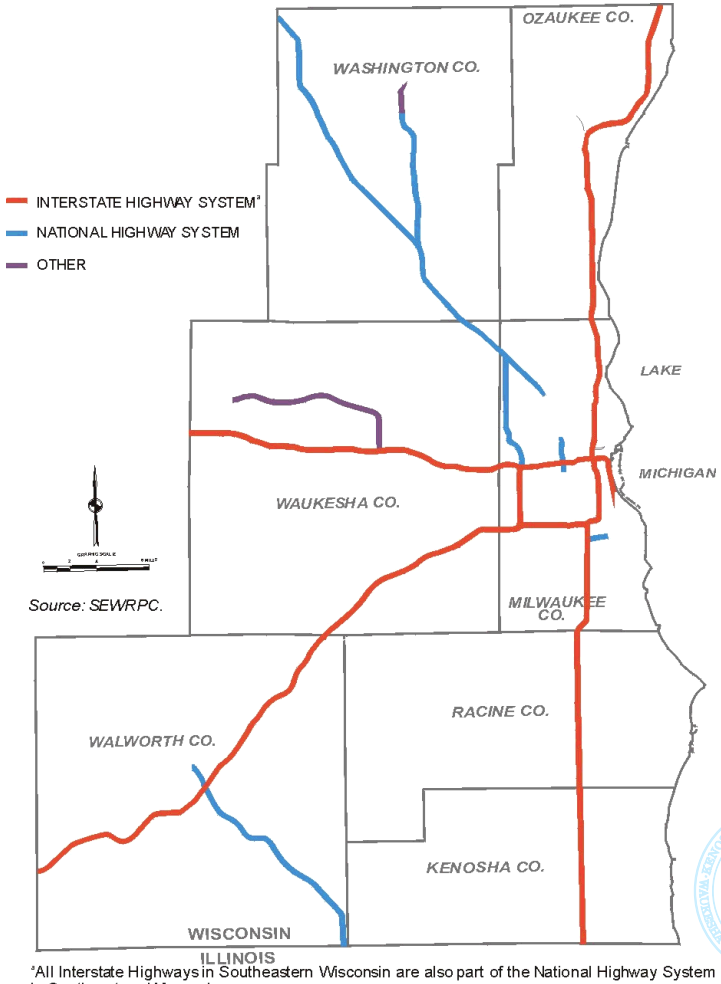
- **State Highways are divided into five subsystems**
  - **Most important subsystem is "Corridors 2020 Backbone" routes -- 214 or 79% of the 272 mile Southeastern Wisconsin Freeway System**
  - **Next most important is "Corridors 2020 Connector" routes -- 31 or 11% of the 272 mile Southeastern Wisconsin Freeway System**



Source: Wisconsin Department of Transportation and SEWRPC.

Highway Route Designation/ Federal Aid Classification

- **Most Important Routes--Interstate Highway System**
  - **173 miles or 64% of Southeastern Wisconsin Freeway System**
- **Next Most Important Routes--National Highway System**
  - **82 miles or 30% of Southeastern Wisconsin Freeway System**



Source: SEWRPC.

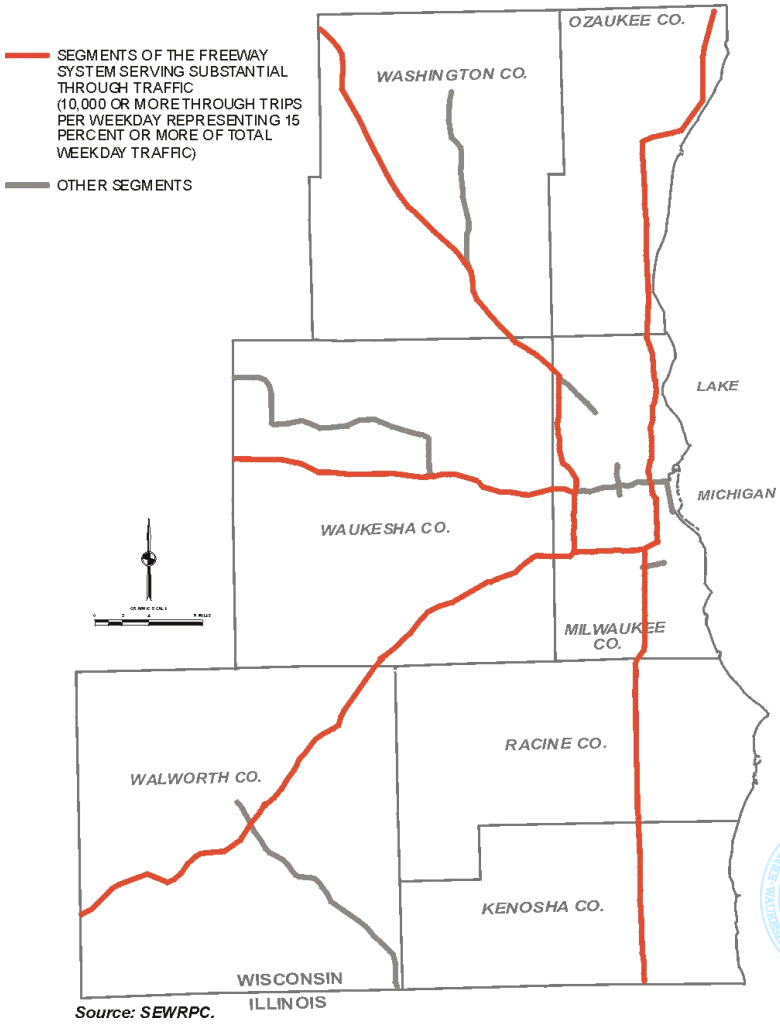
*All Interstate Highways in Southeastern Wisconsin are also part of the National Highway System in Southeastern Wisconsin.

Characteristics of Travel on the Freeway System

- ***Through-*** **Both ends of trip are located outside the county within which the freeway segment is located**
- ***Inter-county-*** **One trip end is located within the county within which freeway segment is located, and other trip end is outside the county**
- ***Local-*** **Both trip ends are located within the county within which freeway segment is located**

Through Travel Forecast for the Year 2020- Both Trip Ends Outside County

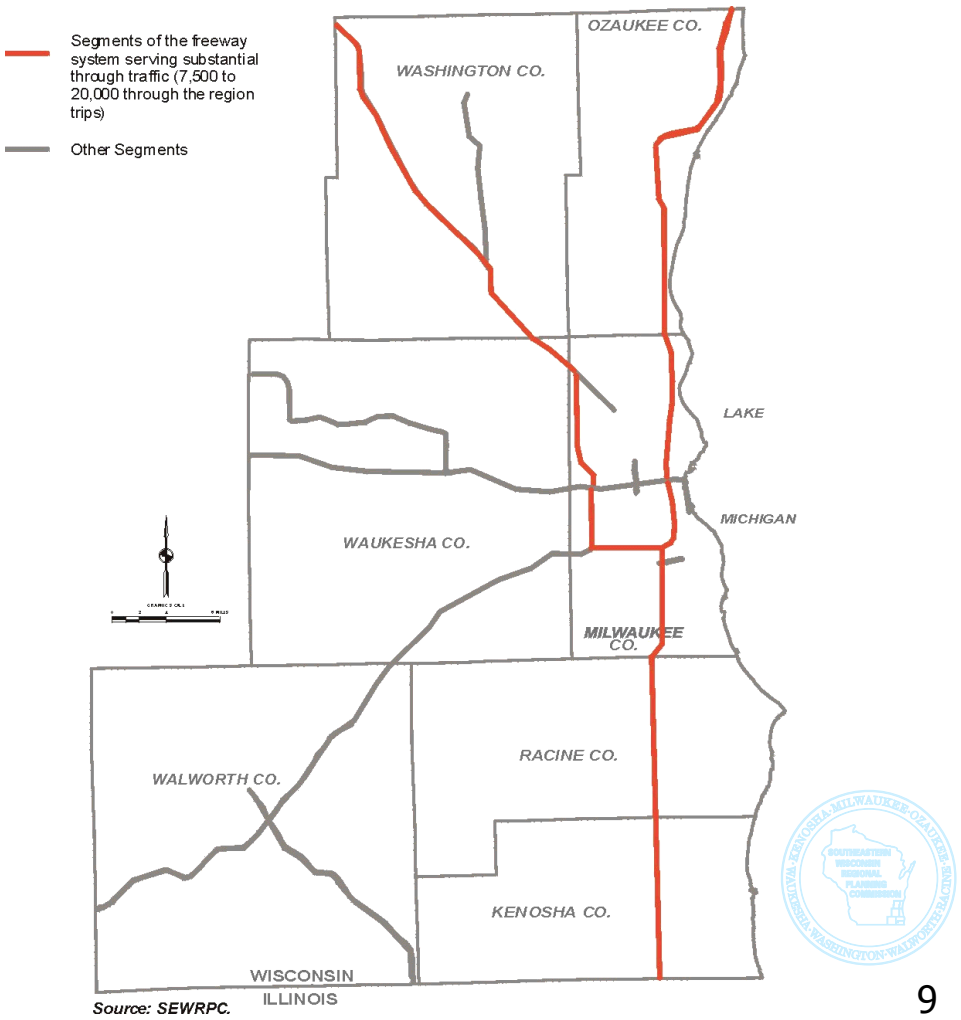
- **Many freeway segments are anticipated to carry significant levels of through traffic (traffic through their county)- 10,000 to over 60,000 vehicles per day representing 15% to over 70% of total anticipated weekday traffic volume**



Source: SEWRPC.

Through Travel Forecast for the Year 2020- Both Trip Ends Outside County and Seven County Southeastern Wisconsin Region

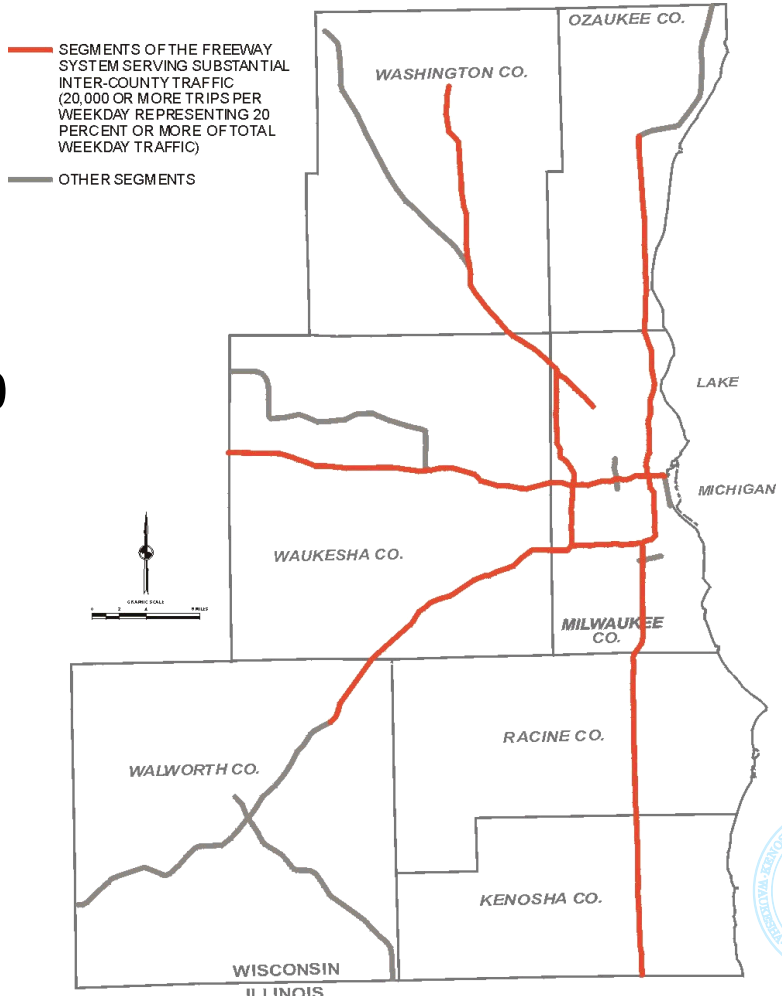
- **Many freeway segments may be expected to carry not only substantial traffic through their county, but also traffic which has both trip ends outside the seven county region--7,500 to 20,000 such trips through the region each weekday**



Source: SEWRPC.

Inter-county Travel Forecast for the Year 2020 - One Trip End Inside and Other Trip End Outside County

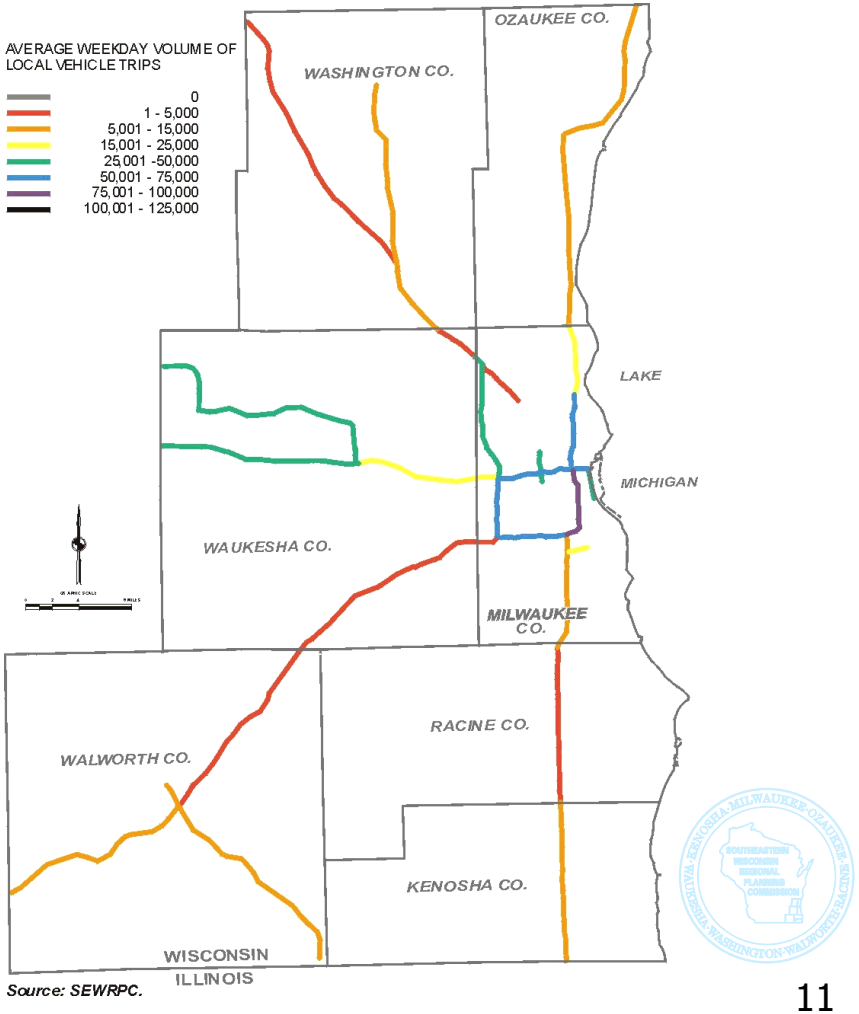
- **Most freeway segments are anticipated to carry significant levels of inter-county travel- 20,000 to over 100,000 vehicles per day representing 20% to 60% of total anticipated weekday traffic volume**



Source: SEWRPC.

Local Travel Forecast for the Year 2020 - Both Trip Ends Inside County

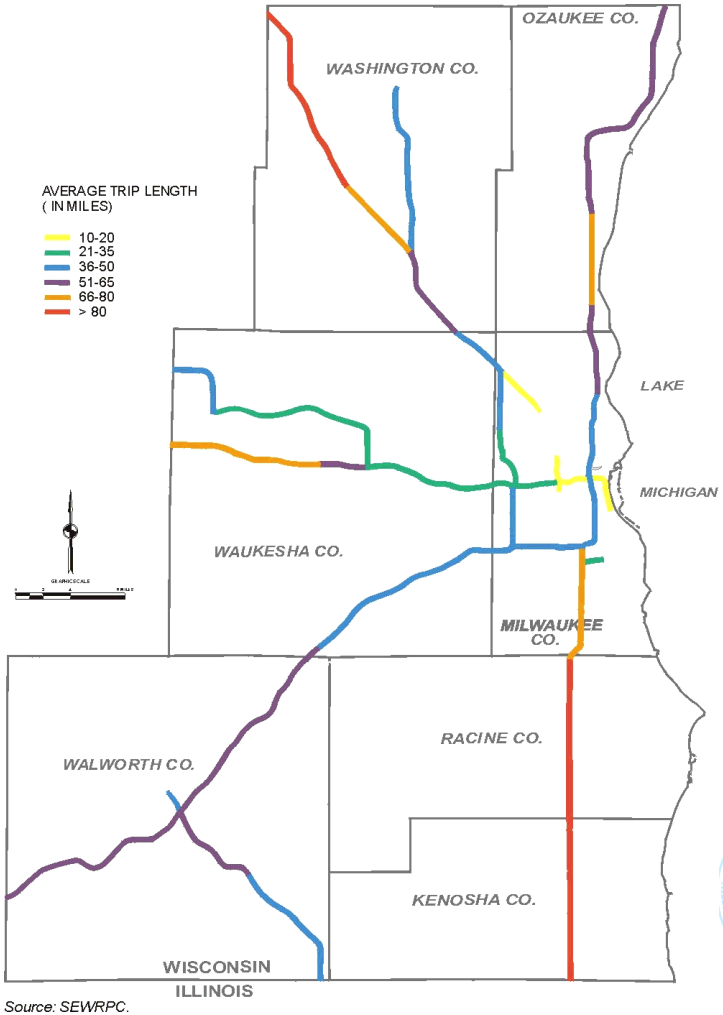
- **All segments of the freeway system may be anticipated to carry significant volumes of local travel**
- **Local travel represents the overwhelming majority of all traffic for some freeway segments**



Source: SEWRPC.

Average Length of Trips Forecast for the Year 2020

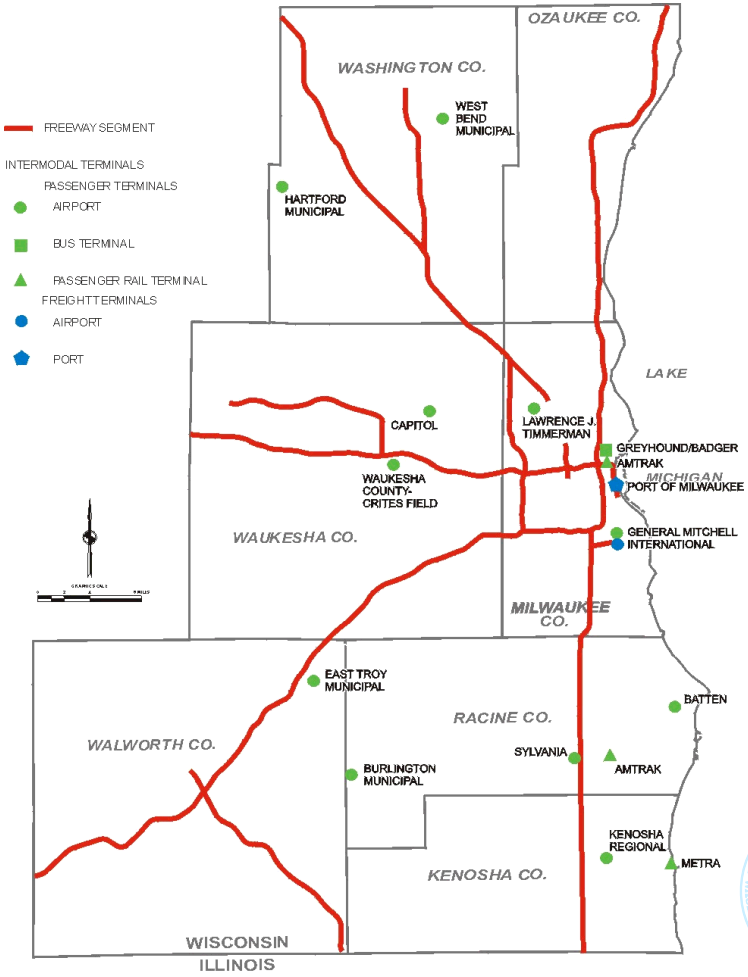
- **Forecast average trip length for major freeway segments- 20 to over 80 miles**
- **Trip length reflects use of freeway system for trips through the Region, inter-Regional trips, and longer trips internal to the Region**



Source: SEWRPC.

Access to Intermodal Terminals

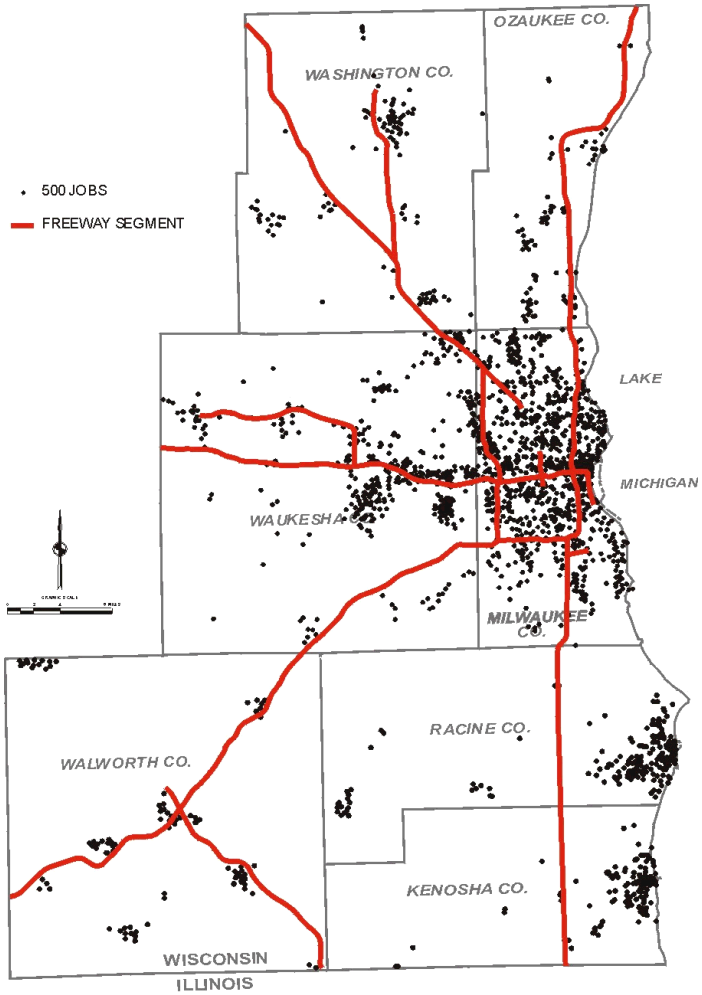
- **Freeway system provides important access to freight and passenger facilities**
  - **Airports**
  - **Bus terminals**
  - **Passenger rail terminals**
  - **Port of Milwaukee**
  - **Rail-truck transfer facilities outside the Region**



Source: SEWRPC.

Access to Jobs

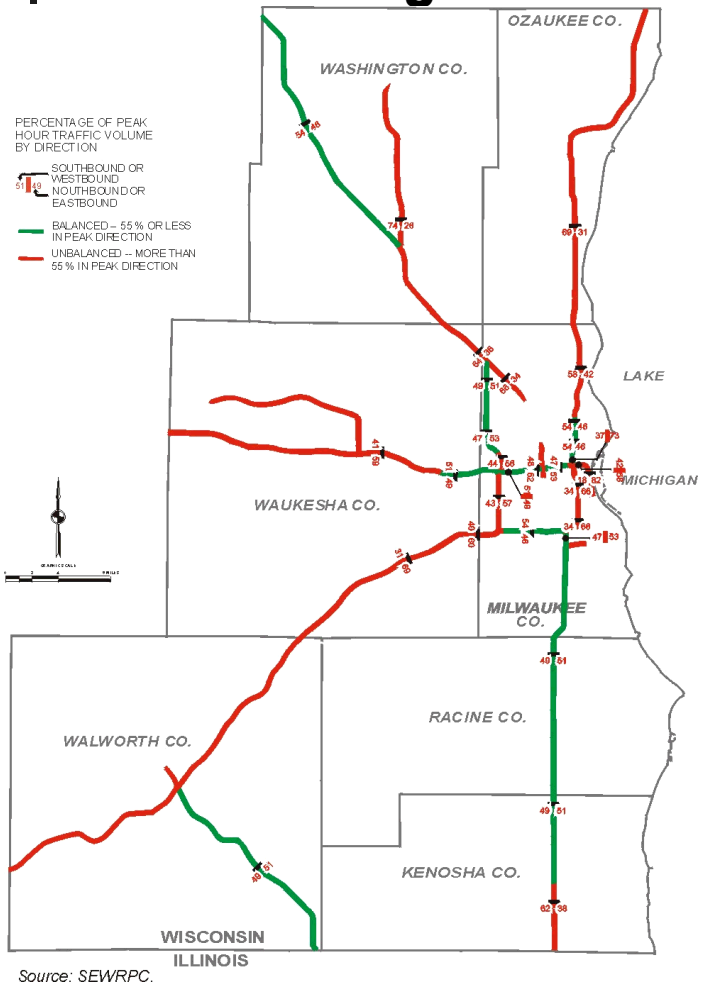
- **Freeway system provides important access to employers and jobs**
- **Directional split of traffic- predominantly traditional flow on many freeway segments, but many are balanced or nearly balanced**



Source: SEWRPC.

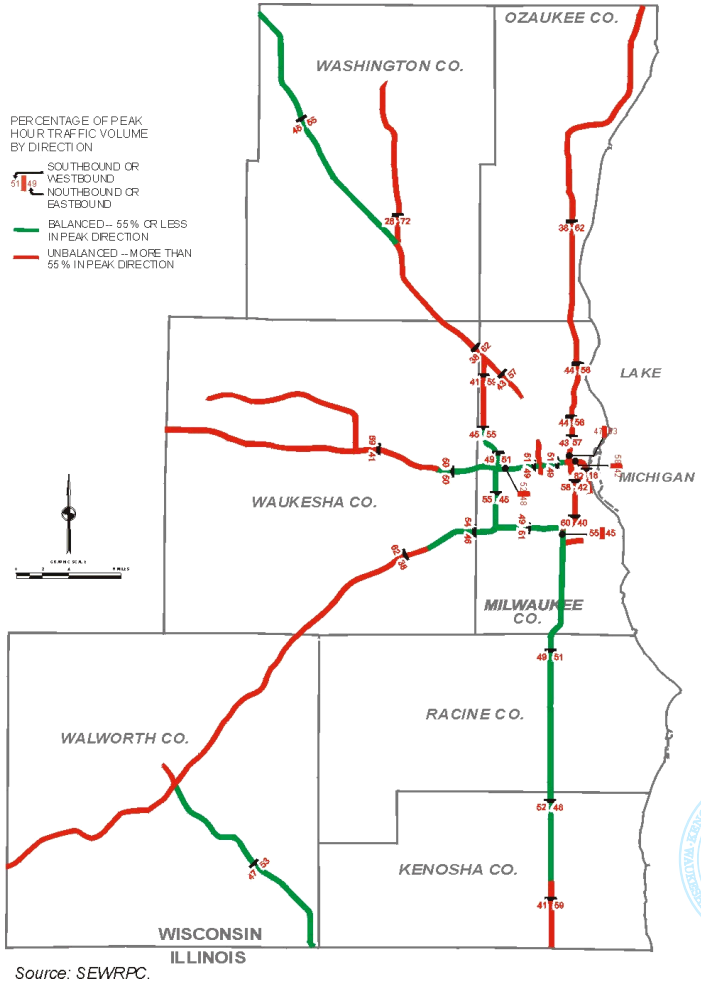
Access to Jobs- Directionality of Traffic

Morning Peak Hour



Source: SEWRPC.

Afternoon Peak Hour



Source: SEWRPC.

Freeway System Function Overview--Summary and Conclusions

- **Jurisdictional and Federal Classification**
  - **All 272 miles of existing freeways within southeastern Wisconsin are under the jurisdiction of the State of Wisconsin**
  - **About 214 miles, about 80% of the freeway system of southeastern Wisconsin, are on the state "Corridor 2020 Backbone" system which is considered to include the most important highways in the State**
  - **About 173 miles, or almost two-thirds of the southeastern Wisconsin freeway system are interstate highway routes, designated by the U. S. Department of Transportation, Federal Highway Administration as the routes of highest importance to the Nation**

Freeway System Function Overview--Summary and Conclusions-continued

- **Characteristics of Travel on the Freeway System**
  - **Nearly all segments of the freeway system are anticipated to carry a significant volume of through traffic through their county-10,000 or more vehicles per weekday-representing a significant percentage of the total weekday traffic volume on each freeway segment-15 percent or more. The exceptions on the freeway system are those segments of freeways which are stubs or spurs, some of which may be expected to carry no through traffic.**
  - **Many major segments of the freeway system are anticipated to carry a significant volume-7,500 or 20,000 vehicle trips per weekday-of through traffic where both trip ends of the travel are located not only outside the county within which the freeway segment is located, but also outside the entire seven county southeastern Wisconsin region.**

Freeway System Function Overview-- Summary and Conclusions-continued

- **Characteristics of Travel on the Freeway System- continued**
  - **Nearly every freeway segment within southeastern Wisconsin may be anticipated to carry a significant volume of inter-county traffic-between 20,000 and over 100,000 vehicles per weekday-and have a significant percent of total average weekday traffic which is such inter-county traffic-between 20 and 60 percent.**
  - **All segments of the freeway system, may be expected to carry significant volumes of traffic and proportions of traffic which may be considered as local traffic, or traffic which has both ends of the trip within the county within which the freeway segment is located.**

Freeway System Function Overview-- Summary and Conclusions-continued

- **Characteristics of Travel on the Freeway System- continued**
  - **The average trip length for trips using major segments of the freeway system may be expected to range from 20 to 80 miles. The average trip length for all persons trips made internal to the Region by residents of the Region on an average weekday within southeastern Wisconsin is 6.5 miles.**

Agenda Item 5

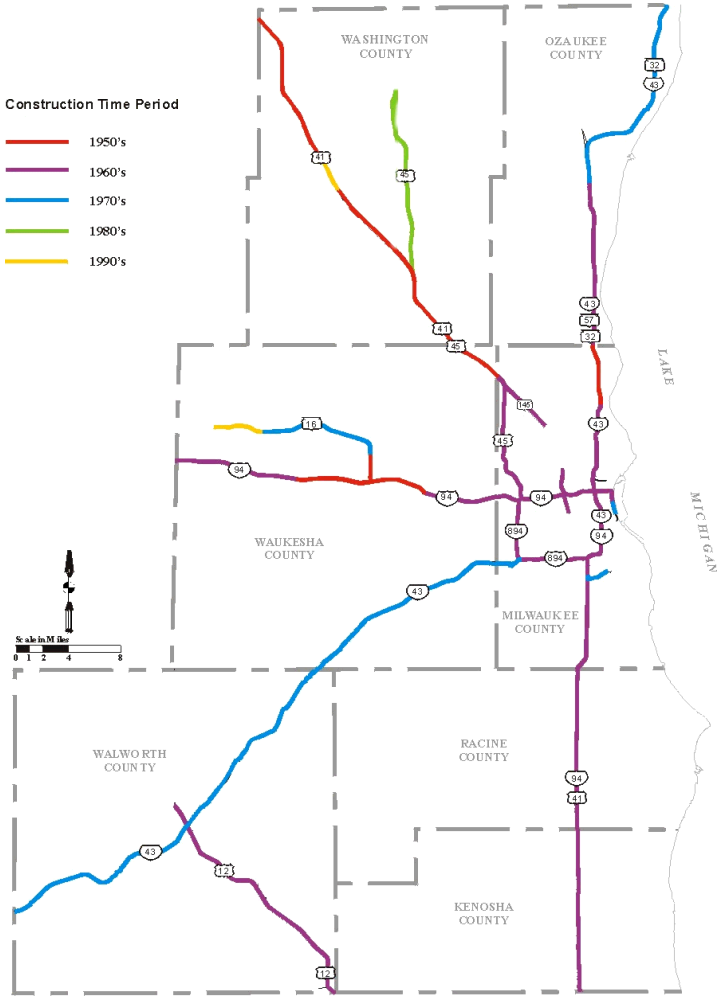
Overview of the Need for Reconstruction of the Regional Freeway System

Objective of This Analysis

To identify the life expectancy of the freeway system of Southeastern Wisconsin.

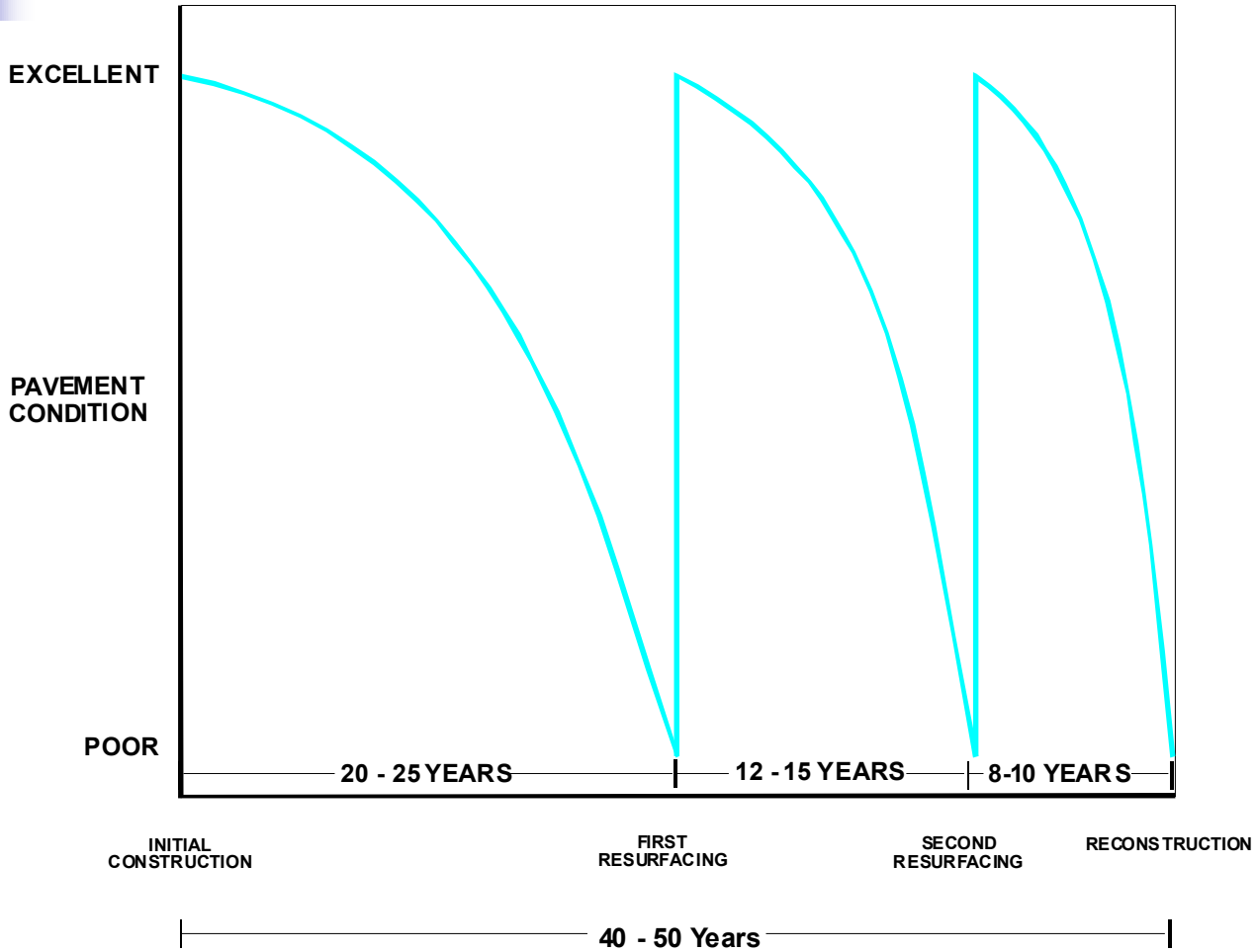
- **Time period when reconstruction of freeway pavements and bridges will be required**
- **Life expectancy methodologies for freeway pavement and the freeway bridges**

Time Period of Original Freeway Construction



Source: Wisconsin Department of Transportation and HNTB

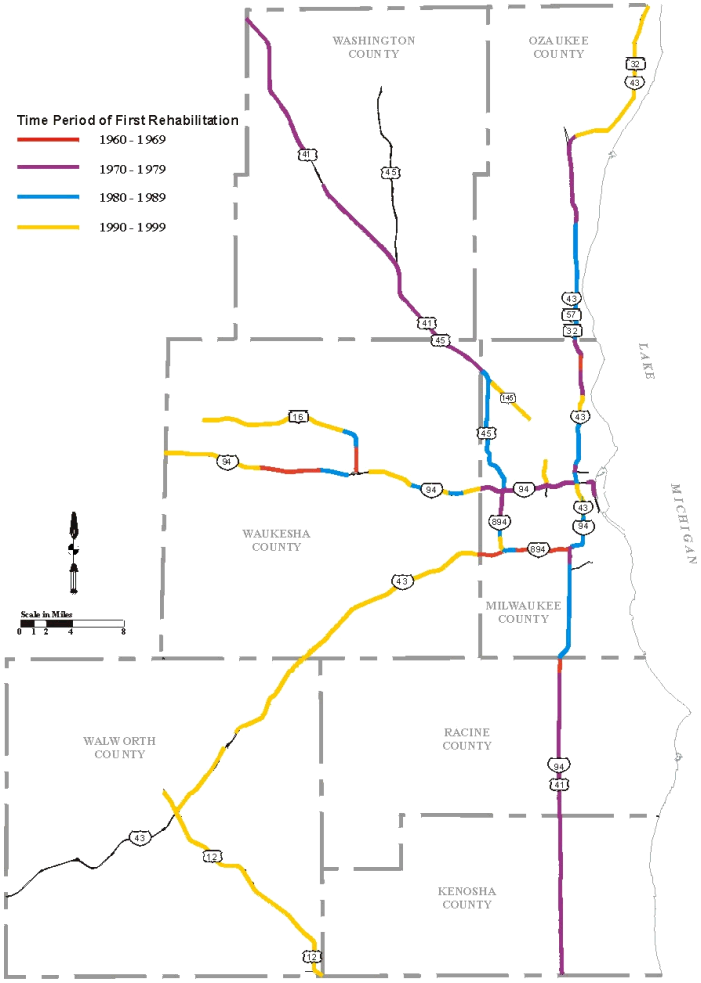
Typical Freeway Pavement Life Cycle



Pavement Life Expectancy Methodology

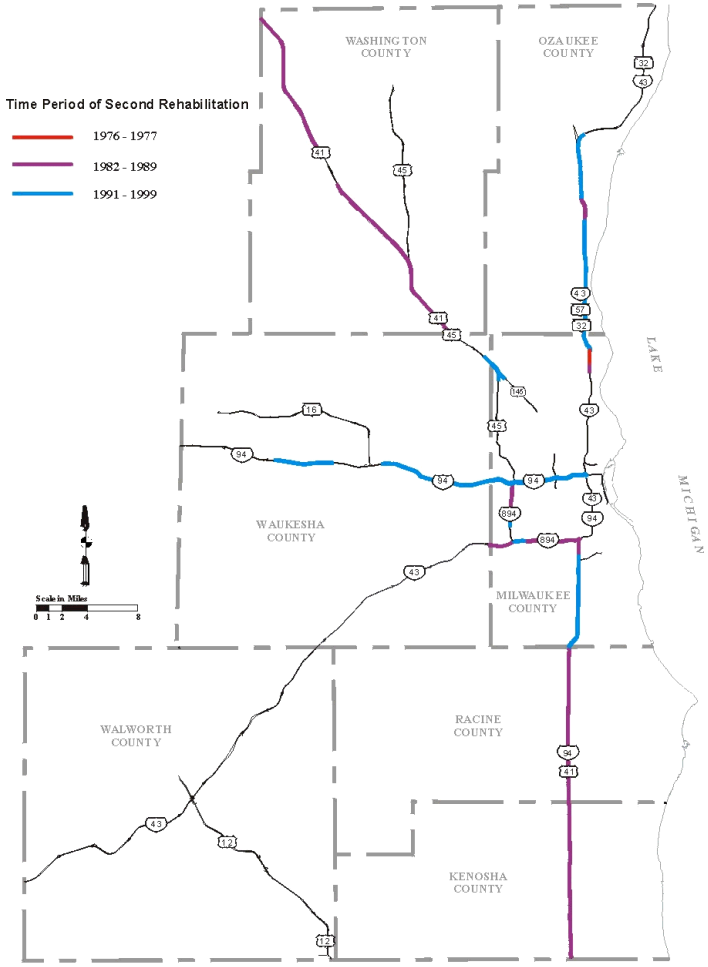
- **Original construction date**
- **Rehabilitation history**
- **WisDOT biennial inspections**
  - **Pavement Serviceability Index (PSI)**
  - **Pavement Distress Index (PDI)**
- **Projects life expectancy/need for reconstruction**
- **Programmed improvements**

Freeway Maintenance: First Rehabilitation (Through 1999)



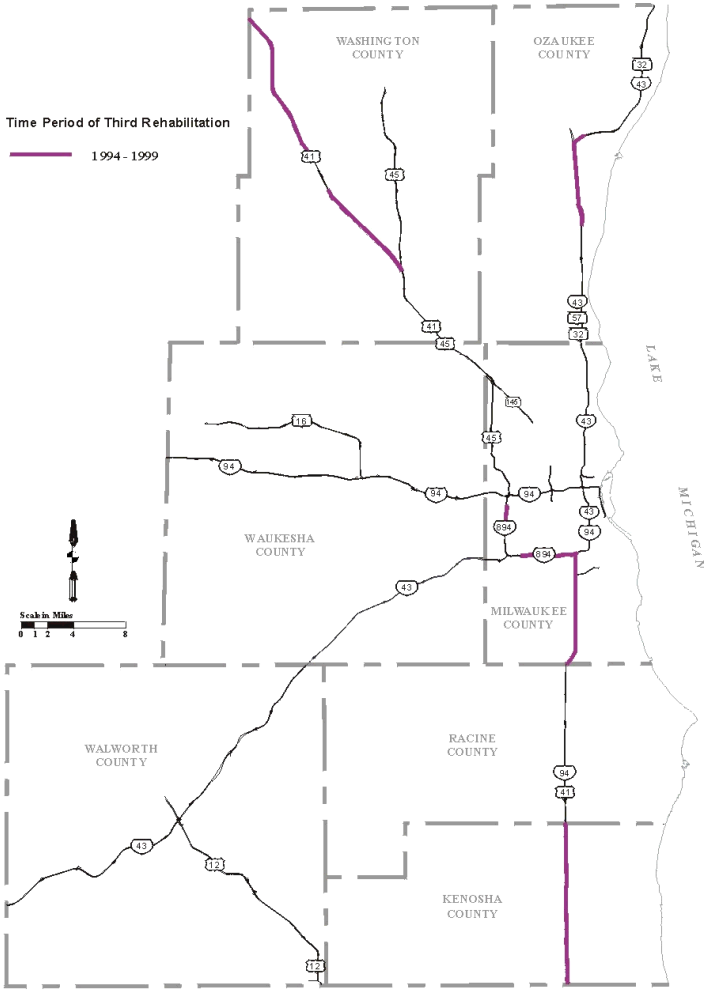
Source: Wisconsin Department of Transportation and HNTB

Freeway Maintenance: Second Rehabilitation (Through 1999)



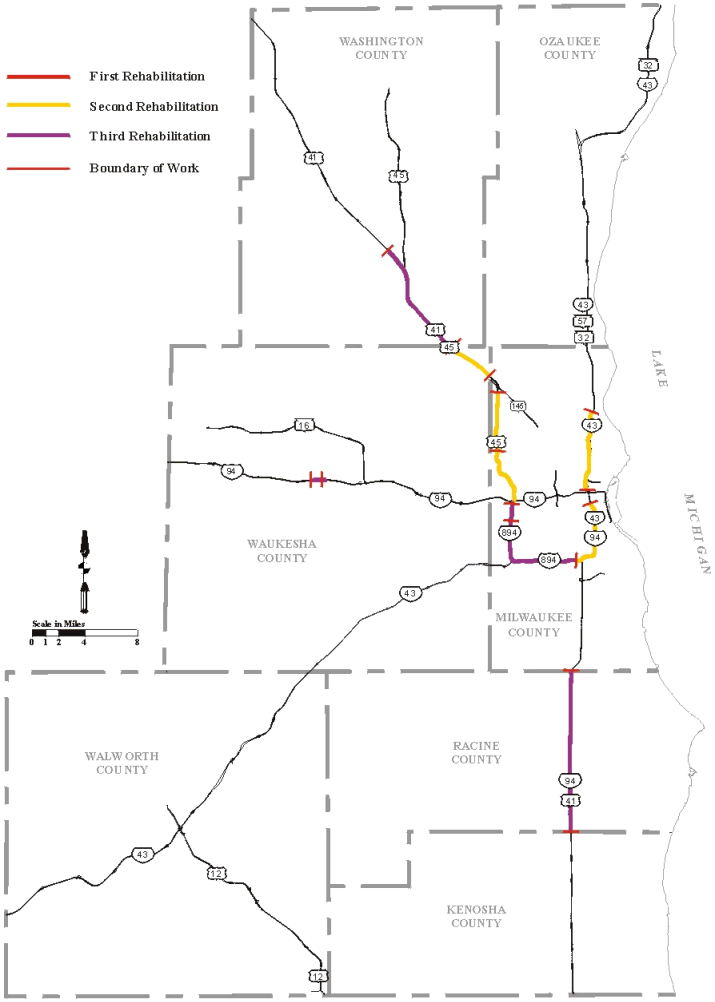
Source: Wisconsin Department of Transportation and HNTB

Freeway Maintenance: Third Rehabilitation (Through 1999)



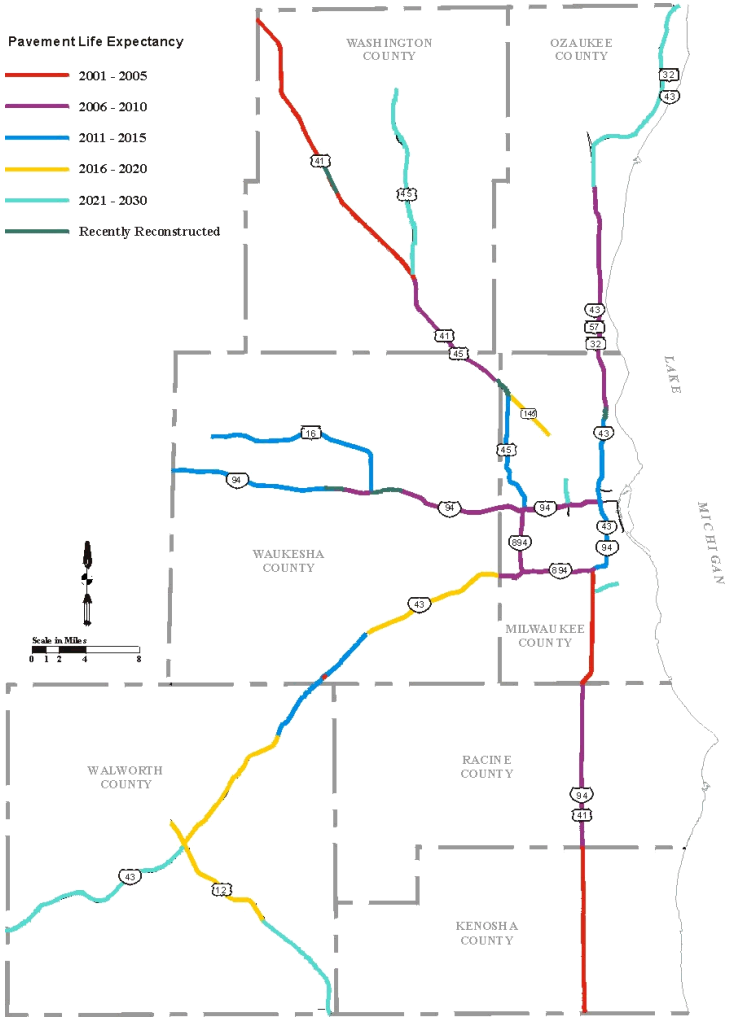
Source: Wisconsin Department of Transportation and HNTB

Programmed Projects Through 2003

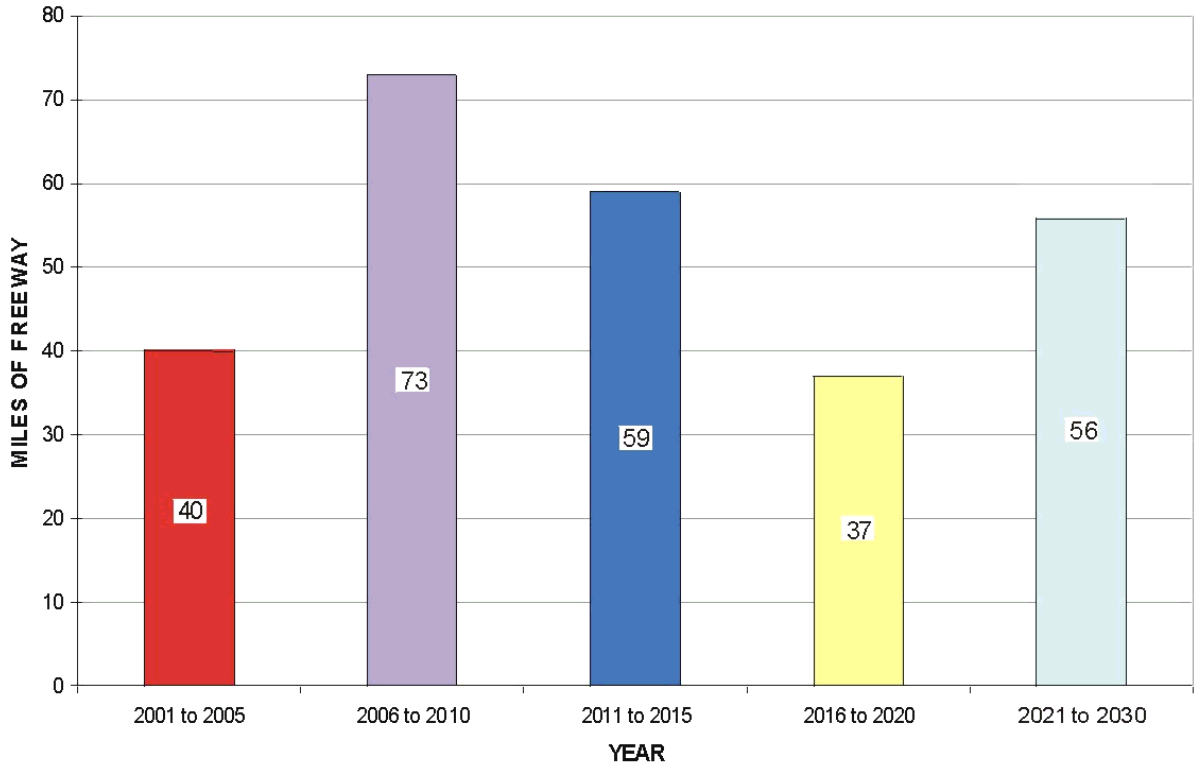


Source: Wisconsin Department of Transportation and HNTB

Pavement Life Expectancy/ Need for Reconstruction

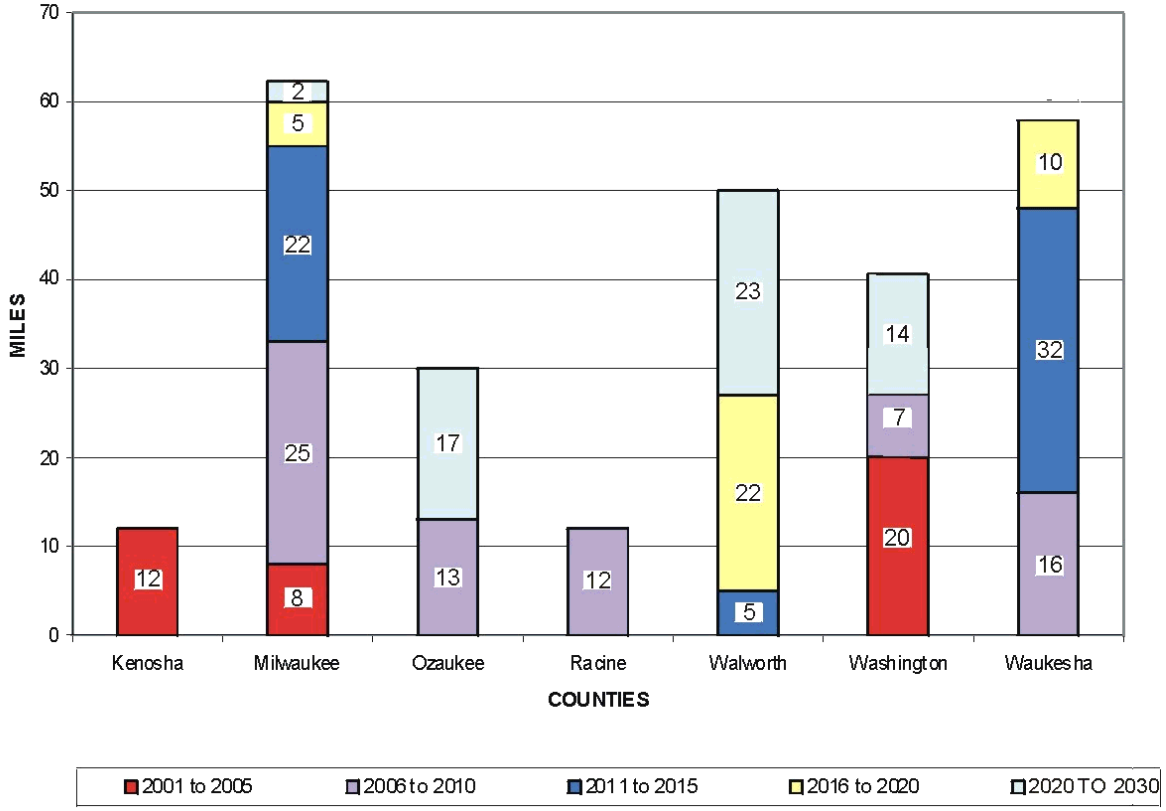


Pavement Life Expectancy- Miles of Freeway in Five Year Increments



DOES NOT INCLUDE SEVEN MILES OF RECENTLY RECONSTRUCTED FREEWAY SEGMENTS.

Pavement Life Expectancy- Miles of Freeway by County



DOES NOT INCLUDE SEVEN MILES OF RECENTLY RECONSTRUCTED FREEWAY SEGMENTS.

Pavement Life Expectancy Summary

- **30 to 50 year old base pavement**
- **Routine and regular rehabilitations**
- **Nearing the end of 50 year design life**
- **Reconstruction required over next 10 to 20 years**

Bridge Life Expectancy

Bridge Life Expectancy Projection

- **WisDOT and HNTB developed methodology for estimating life expectancy**

Bridge Life Expectancy Projection

- **Unique Structures**
  - **IH-794, east of Marquette Interchange**
  - **IH-794, Hoan Bridge**
  - **IH-94, High Rise or Menomonee Valley Bridge**

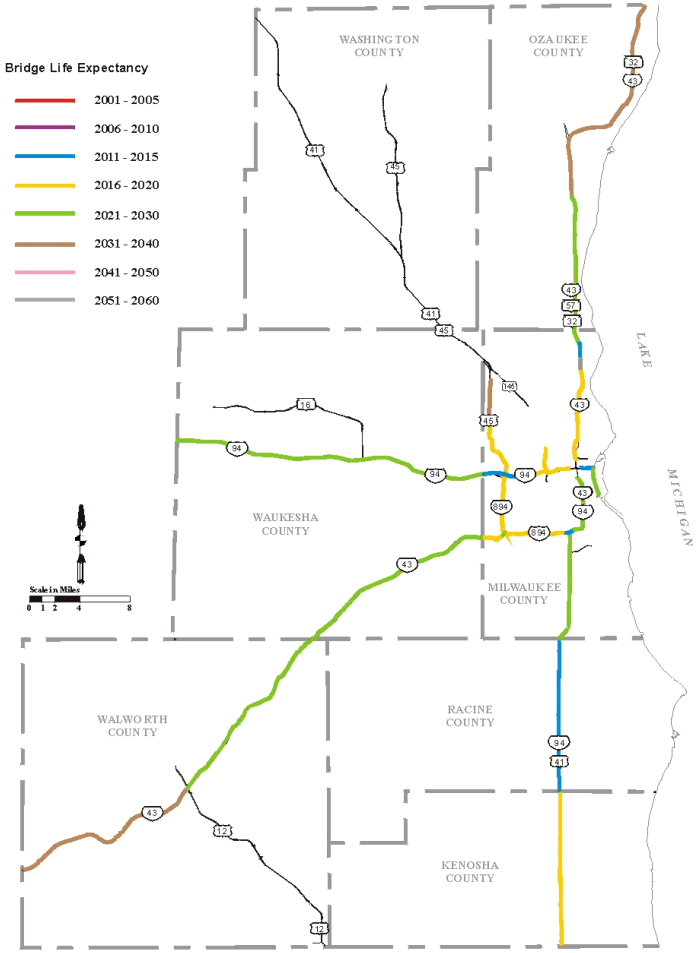
Bridge Life Expectancy Factors

- **Bridge design life**
- **Bridge age**
- **Substructure condition rating**
- **Superstructure condition rating**
- **Load rating**

Bridge Design Life

- **Modern Structures: 75 year design life**
  - **Constructed within the past 30 years**
- **Older Structures: 60 year design life**
  - **Constructed 30 to 50 years ago**
  - **Constructed prior to modern design standards**
  - **Majority of structures**

Bridge Life Expectancy



Source: Wisconsin Department of Transportation and SEWRPC.

This map represents the average bridge life over a segment.
Bridge data was not available for USH 12 in Walworth County, STH 16 in Waukesha County, and USH 41/USH 45 in Washington County.

Bridge Life Expectancy Summary

- **Majority of structures**
  - **60 year design life**
  - **20 to 30 years life remaining**

Freeway Life Expectancy Summary

- **Pavement life expectancy**
  - **Nearing end of 50-year design life**
  - **Majority of system, less than 20 years life expectancy**
- **Bridge life expectancy**
  - **Majority of structures, 20 to 30 years life expectancy**

Life Expectancy Summary

- **Bridges will only last approximately 10 years beyond the pavement**
- **Bridge should be expected to be replaced during reconstruction of pavement**