



Highway/Bridge

The Michigan Department of Transportation (MDOT) 2005-2030 *MI Transportation Plan Highway & Bridge Technical Report* presented an overview of Michigan's trunkline roadway system. It presented information on the inventory of system assets, condition and performance, as well as issues and considerations that may impact MDOT's ability to meet customer needs and to meet and sustain its current system condition goals. This white paper will update inventory statistics, system condition forecasts and system performance data.

Trunkline System Inventory:

- a. MDOT has jurisdictional responsibility for 9,653 route miles of state trunkline highways, which consist of all the "I," "M," and "US" numbered highways, and 4,414 bridges.
- b. Michigan's system of state trunkline highways, county roads, and city streets totals 121,151 miles. The state trunkline system, managed by MDOT, comprises eight percent (9,653 miles) of Michigan's roadway network and carries 51 percent of total statewide traffic. County roads and city streets (together) consist of 92 percent (111,498 miles) of Michigan's roadway system, but carry only half of the statewide traffic.
- c. MDOT has jurisdictional responsibility for approximately 4,414 trunkline bridges that have over 49 million square feet of bridge deck area. Approximately 1,700 (about 40 percent) of MDOT's bridges are on major freeways (I-75, I-94, I-96 or I-69). MDOT bridges are much larger and carry more traffic than local jurisdiction bridges. Although MDOT is responsible for 41 percent of the state bridges, this accounts for 74 percent of the bridge deck area of all Michigan highway bridges.
- d. Highway non-pavement infrastructure includes signs, pavement marking, guardrails, signals, safety, drainage structures, weigh stations, non-motorized facilities, lighting, pump houses, carpool parking lots, rest areas, and noise abatement barriers.
 - There are more than 240 carpool parking lots (CPLs) spread across the state. In 2011, the official CPLs accommodated 4,256 users; almost double the use since the last Long Range Plan.
 - Eighty-one rest areas in the state serve approximately 40 million visitors annually, with 40 percent serving 500,000 or more visitors annually.
 - MDOT provides 14 weigh station and 27 virtual sites that are operated by the Michigan State Police, Motor Carrier Division (MSP/MCD). While efficiency may be gained by further utilizing Weigh in Motion (WIM) technology and "virtual weigh stations," MSP/MCD continue to maintain traditional weigh station operations. Because of the high volume of trucks weighed and the increase in virtual weigh station cost, MDOT is trying to maximize all current weigh station installations.



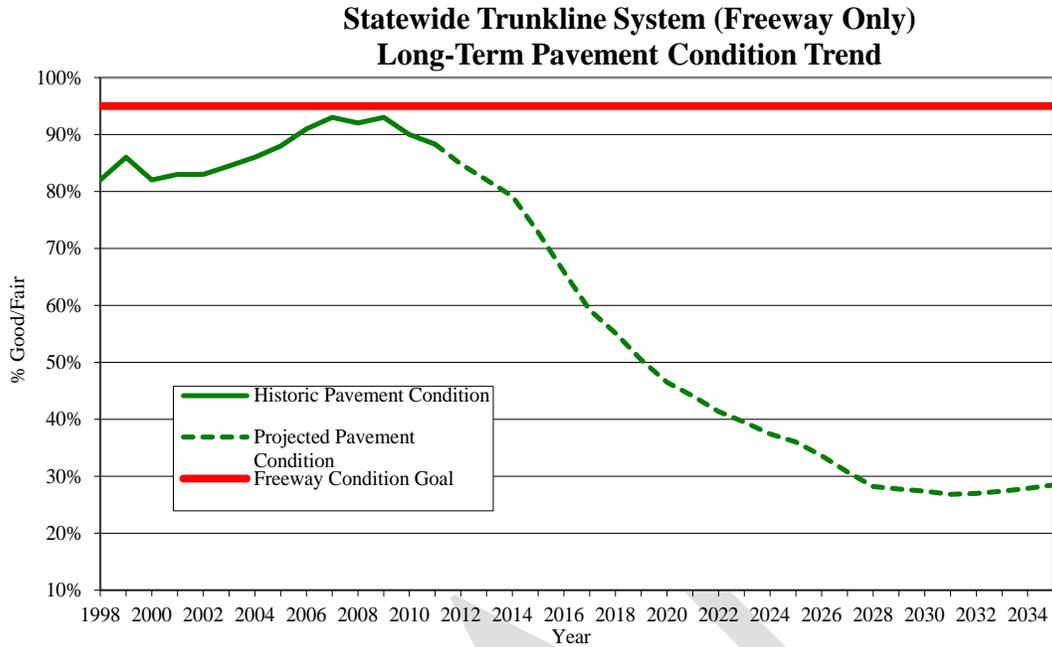
- Paved shoulders 4 feet or greater are suitable bicycle facilities in most rural areas. The network of shoulders in both curbed and uncurbed sections of trunkline increased by almost 20 percent from 2,560 miles to 3,054 miles in 2011. While much of the additional mileage has occurred on rural roads, the department has reconfigured the lane markings on more than 50 road segments (over 48 miles of trunkline) in communities across the state, by reducing travel lanes from 4-lanes to 2-lane with a center turn lane. Often referred to as “road diets,” these lane reconfigurations are done for safety reasons and to reduce severe crashes; but, the reallocation of lane lines in a 3-lane cross section often means the left over pavement can serve as a defacto bike lane or be used for on-street parking.
- Currently, there are 284 individual noise barriers located along MDOT’s trunkline system. They are in the southern half of the lower peninsula, primarily in five counties (Wayne, Washtenaw, Macomb, Oakland, and Kalamazoo). Noise barriers are also located in the cities of Grand Rapids, Flint, and Lansing.

Trunkline System Condition:

The overall condition of the system can be displayed in terms of pavement, bridge, and non-pavement infrastructure condition. It is generally projected that conditions will deteriorate over the next 10 years if today’s funding levels continue.

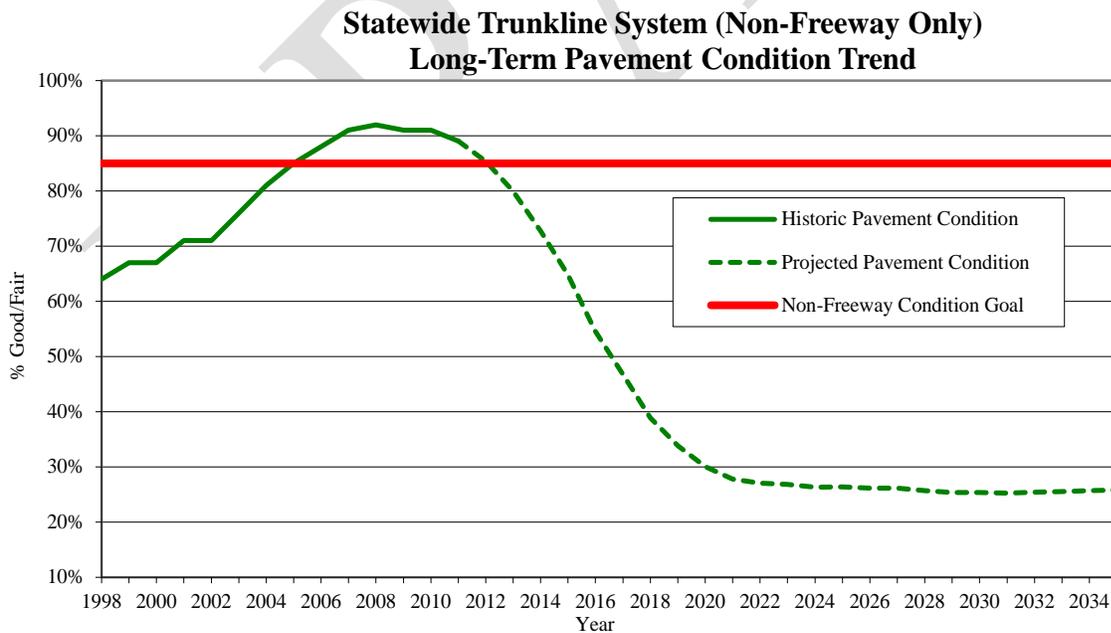
- a. **Pavement Condition Goal:** MDOT’s pavement condition goals are to maintain 95 percent of pavement in “good or fair” condition on the freeway system and 85 percent on the non-freeway system. Federal and state funding initiatives such as Jobs Today, Preserve First, and the American Recovery and Reinvestment Act of 2009 have led to significant improvements from the late 1990s through the late 2000s. However, rising costs and anticipated stagnant revenues are putting those pavement condition gains at risk in the very near future.
 - Over the long term, MDOT projects that freeway pavement conditions will continue to decline until they reach approximately 30 percent good/fair in 2030, and remain near that level through 2040 (Figure 1).
 - Similarly, the non-freeway pavement condition will rapidly decline until reaching approximately 25 percent good/fair in 2030 where it will remain through 2040 (Figure 2).
 - Overall pavement conditions on the statewide trunkline system steadily improved in the last 10 years, from 64 percent good/fair in 1996 to a peak of 92 percent good in 2008. MDOT achieved the non-freeway goal of 85 percent good/fair in 2005 and has maintained that goal to the present. However, the non-freeway condition has declined to 89 percent good/fair as of 2011. On the freeway network, the system improved to reach a condition of 93 percent good/fair in 2007. However, freeway pavement condition has declined to 88 percent good/fair in 2011.

Figure 1



Source: Michigan Department of Transportation, Road Quality Forecasting System

Figure 2



Source: Michigan Department of Transportation, Road Quality Forecasting System

b. **Bridge Condition Goal:** MDOT’s goal of having 95 percent of bridges in good or fair condition on the freeway system and 85 percent on the non-freeway system has led to steady improvements in recent years. Overall conditions on the statewide trunkline bridges have progressively improved from 78 percent good or fair in 1998 to 93 percent good or fair in 2012.

- At existing funding levels, the outlook for the state’s freeway bridge condition may near the goal to have 95 percent of freeway bridges in good or fair condition, but is not expected to sustain this condition. Freeway bridge condition will peak at approximately 94 percent good or fair in 2012, after which the condition will start to decline. (Figure 3)
- MDOT has achieved the non-freeway bridge goal of 85 percent in good or fair condition. However, current funding levels are expected to lead to a declining non-freeway network condition until the 85 percent good or fair goal is no longer met following the year 2025. (Figure 4)

Figure 3

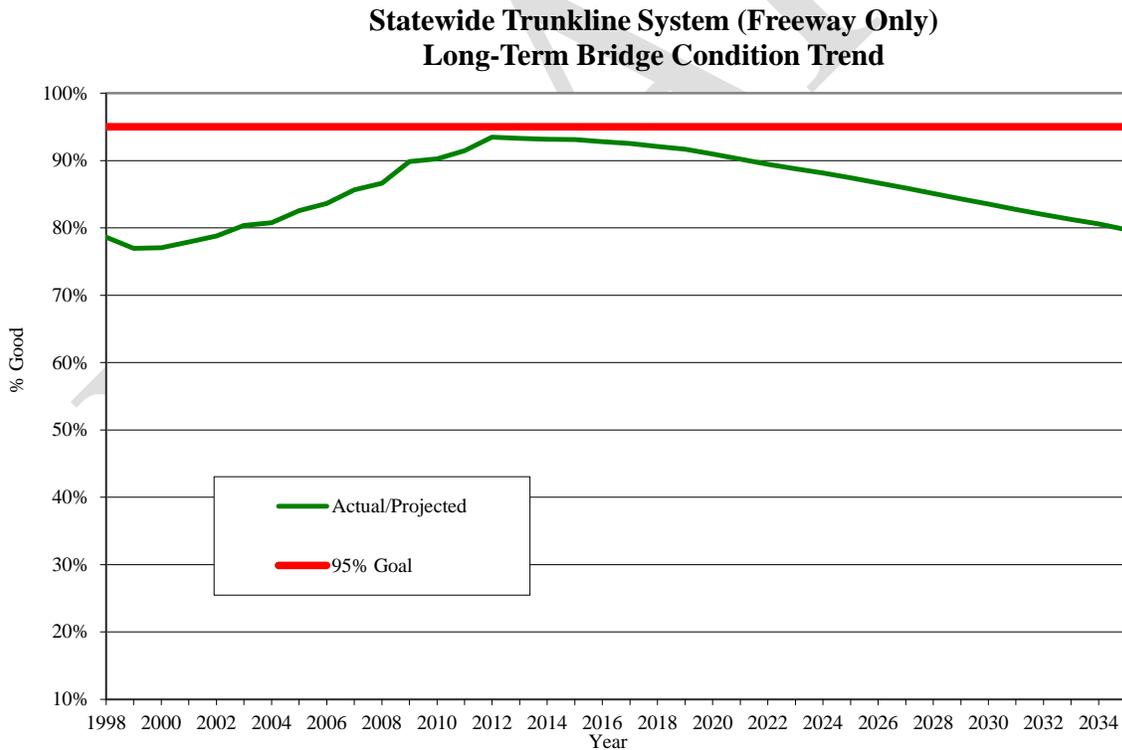
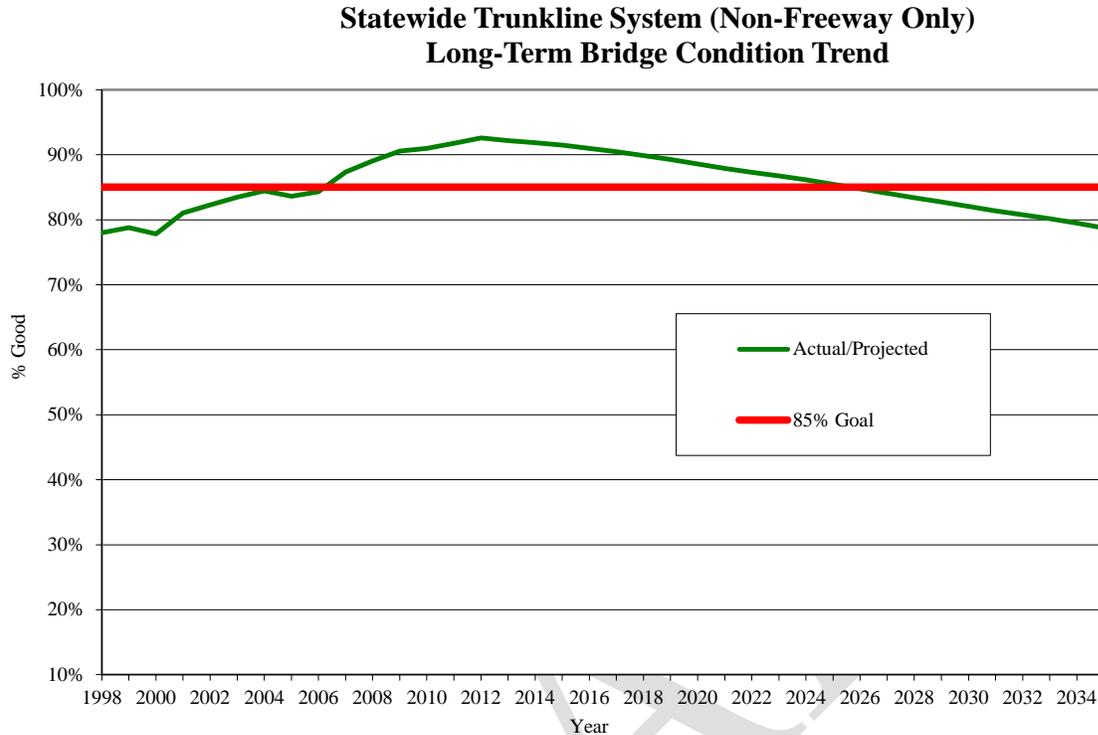


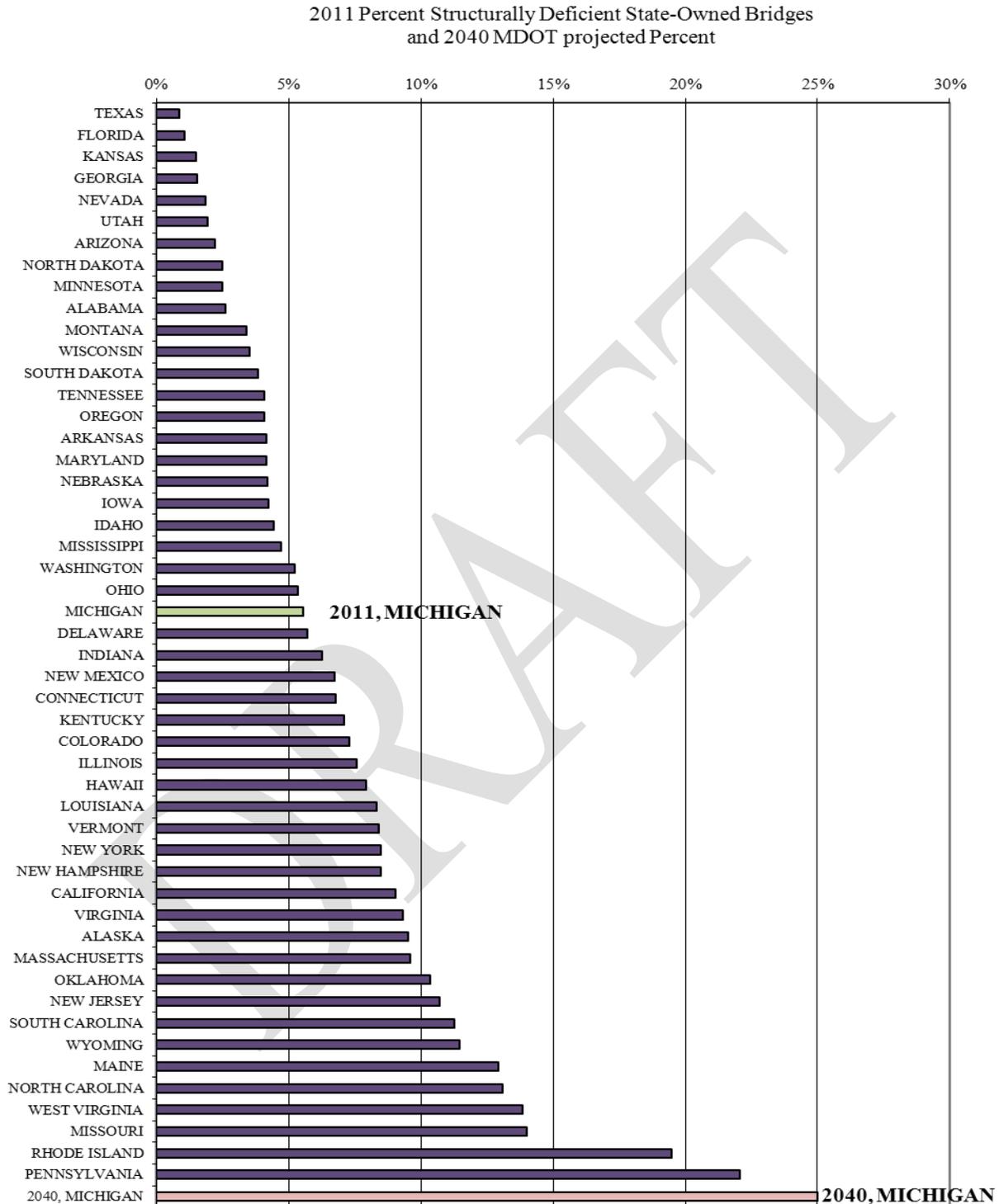
Figure 4



- MDOT has maintained its non-freeway bridge condition goal since 2006; non-freeway bridge condition is currently at a level of 93 percent good or fair. MDOT continues to work toward maintaining its non-freeway bridge goals.
- In addition to the 95/85 condition goals, MDOT also is working toward reducing the total number of structurally deficient bridges on the system as part of its “Scorecard Performance Measures,” as well as a performance measure on the Governor’s “Infrastructure Dashboard.” In 2007, MDOT ranked 39th in the number of structurally deficient bridges owned by state agencies and 6th out of the six Great Lakes states. These rankings were improved to 24th in the nation and 4th out of the Great Lakes states. Based on anticipated funding and compared to current national conditions, MDOT’s projected percentage of structurally deficient bridges would rank 50th in the nation. (Figure 5, Figure 6)



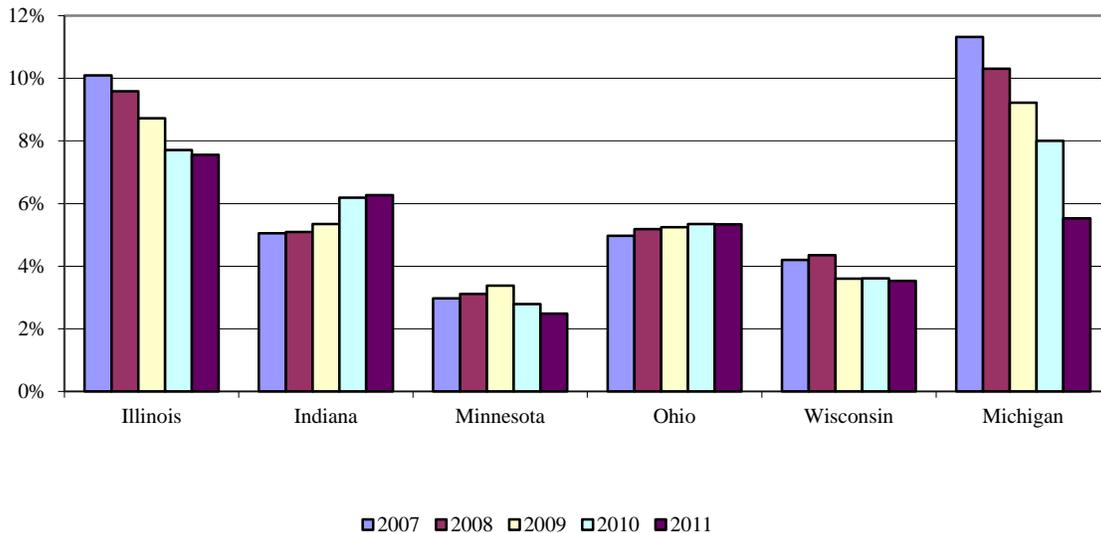
Figure 5



Source Federal Highway Administration National Bridge Inventory data

Figure 6

**Percent Structurally Deficient State Owned Bridges
Great Lakes States**



Source Federal Highway Administration National Bridge Inventory data

Trunkline System Performance

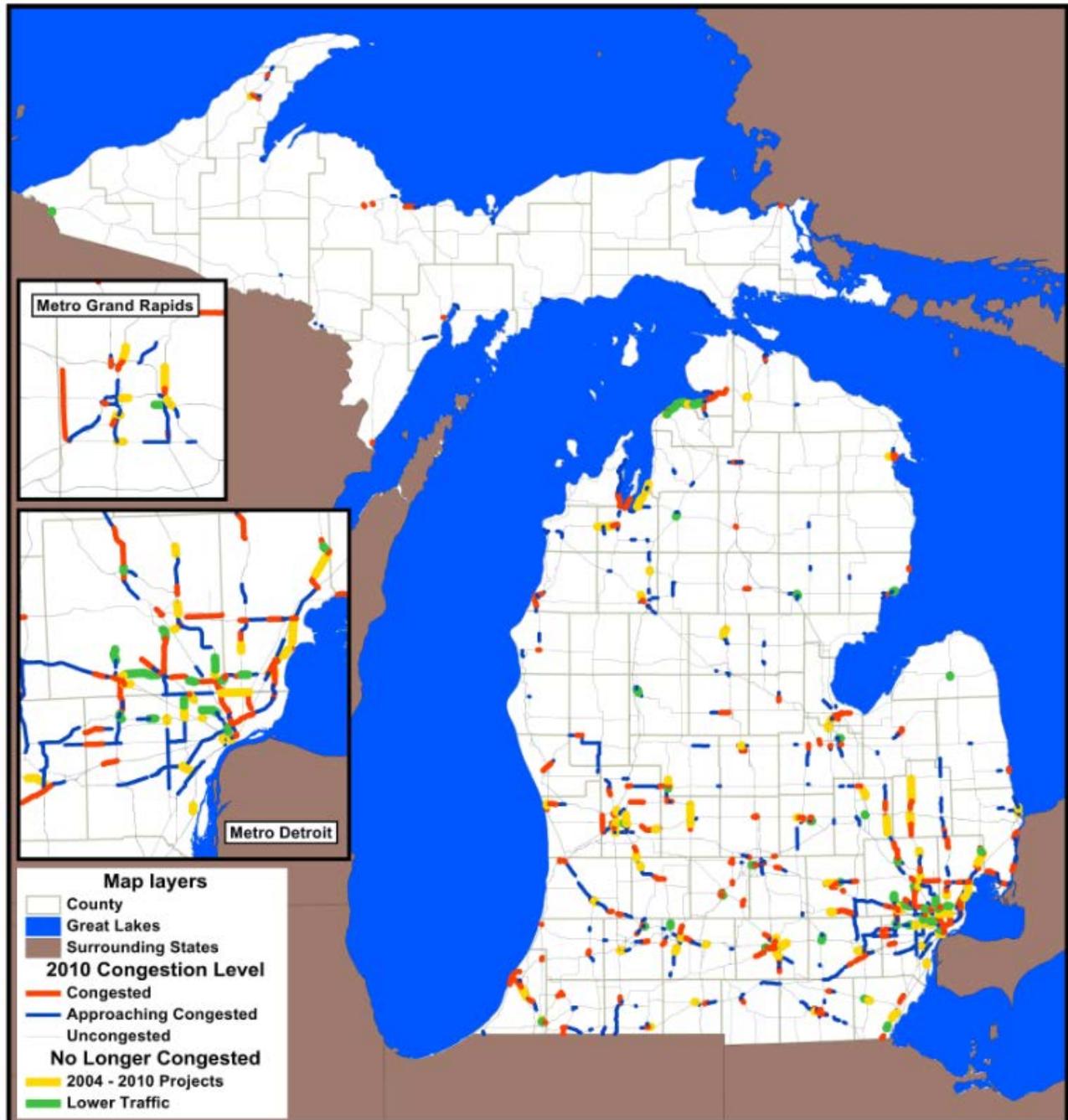
For the 2005-2030 MITP, there was a 28 percent reduction in congested miles from 1995 with less than one percent growth in congested vehicle miles traveled (VMT). With the continued economic downturn in Michigan, traffic and congestion have been and will continue to be reduced. In 2010, total trunkline VMT declined by 7.2 percent from the peak high in 2004 (53.7 billion versus 49.8 billion). Michigan also experienced a 27 percent reduction in VMT and a 25 percent reduction in commercial VMT operating under congested conditions in 2010. Figure 7 illustrated the locations of the 2004 congested locations compared to 2010 congested locations.

New traffic estimates project 2035 vehicle miles traveled (VMT) on the trunkline system to be slightly lower than traffic levels forecasted in the 2005-2030 MITP. This includes 2035 commercial vehicle miles traveled (CVMT). CVMT is projected to remain significantly lower than previous projections based on current assumptions. Congestion levels (both congested and approaching congested) for 2035 also are significantly reduced. Overall, traffic volumes on the trunkline system from 2010 to 2035 do increase, but at a slower rate than previously estimated. This is not enough to make up for the losses over the last decade.

Figure 7 illustrates that congestion still remains primarily in urban and areas surrounding urban areas.

Figure 7

Comparison of Congested Trunkline Segments



Source: Michigan Department of Transportation, Statewide and Urban Travel Analysis Section
 2010 Sufficiency File



In 2035, only 5 percent of urban freeway VMT will be considered congested and 30 percent will be approaching congested, while previously 2030 estimates showed 43 percent and 29 percent respectively. This also is consistent with what can be seen in the urban non-freeway, for 2035 it is estimated that 18 percent of the VMT will be congested and 14 percent will be approaching congested, while previous estimates showed 39 percent and 23 percent respectively in 2030.

Since MITP was originally issued, several resources have been made available to examine congestion and include methods to address these problems:

- As stated in the [Goals, Objectives, and Performance Measures](#) white paper, the [Transportation System Condition Report](#) has been developed to provide data on the condition and performance of Michigan's publicly-owned transportation system.
- [A Michigan Toolbox for Mitigating Traffic Congestion](#) is intended to be both a useful desk reference for practitioners and an educational tool for elected officials acting through public policy boards. The congestion mitigation strategies documented and presented within the guide will ultimately provide physical benefits to the users of Michigan's roadway network. Through the use of this Toolbox, and good judgment by the practitioner through the review and approval of the appropriate policy board members, the traveling public will benefit.
- [Where Are We Going? Current and Future Pavement and Bridge Conditions, Safety and Congestion Levels of Michigan's Roadways and the Impact on Michigan Households, Based on Investment Levels over the Next Decade](#) produced by TRIP, a Washington, D.C., transportation group, identifies the cost related to Pavement, Bridge, Safety, and Congestion.

Issues and Challenges:

Special issues and considerations for highway and bridge planning in *MITP* include:

- a. Projections based on current funding levels show the state trunkline pavement system condition is forecasted to decline at an alarming rate. Once pavements deteriorate into the "poor" category, it is more costly to bring them back into "good" condition. Unfortunately, unless long-term transportation revenues are addressed, the significant progress made over the last 10 years in improving the pavement service life will be lost as depicted in the graphs on the previous pages.
- b. Pavement deterioration, congestion, crashes, and a lack of connectivity to activities and other modes are all potential performance barriers for the highway and bridge system. These barriers threaten the performance of not only highways and bridges, but also other components of the system that depend on safe, sustainable, and reliable roadway connections.



- c. The Federal Highway Administration's current bridge sufficiency ratings place less emphasis on the condition of bridge decks and scour critical bridges, overlooking important safety and preservation issues on Michigan's bridges.
- d. The bridge sufficiency formula affects the funding available for Michigan's bridges and creates a challenge for improving bridges with decks in need of improvement.
- e. Scour critical bridges are bridges that may be compromised by rapidly flowing water during flood events. MDOT has nearly 400 structures identified as scour critical bridges. Retrofitting or replacing these bridges for potential flood and high-water events contributes significantly to the cost of Michigan's overall highway needs. MDOT may be restricted from using federal highway bridge funds on a project unless the bridge is also structurally deficient or functionally obsolete.
- f. Because bridge under-clearance standards have changed since many of Michigan's bridges were constructed, the expense of bridge rehabilitation and replacement projects must take into account today's standards. Similarly, a number of good or fair condition bridges must be replaced to bring a road corridor up to standard. This contributes to the increased financial need for bridge improvements.
- g. To address the lack of funding for large CPL projects, the department partnered with local businesses with excess parking to provide carpool facilities. Legal limitation to allowing MDOT to operate lighting of the lots is still a challenge.
- h. The Roadside Development program supports Michigan's rest areas. The program coordinates facility spacing, property acquisition, site development, motorist safety, commercial vehicle accommodation, partnering with Michigan State Police Commercial Vehicle Enforcement, and ensuring the aesthetic and environmental quality of these facilities. When rest areas are added or improved, the Roadside Maintenance Program and the Office of Administrative Services also have responsibilities associated with maintaining these facilities to protect new investments and to optimize their service life.
- i. MDOT has the potential to leverage roadway improvements by incorporating non-motorized facilities into the design and construction of new facilities or in major reconstruction projects. Better tracking of the development and maintenance needs of non-motorized facilities may also help to preserve these assets. Bicycle and pedestrian counts are ways to assess the use and need for bicycle and pedestrian facilities. Public Act 82 provides MDOT greater potential to leverage roadway improvement projects to improve non-motorized safety and access by including sidewalks.
- j. Commercial vehicle enforcement is changing. Technology offers some significant practical alternatives to traditional methods. Some elements of the current enforcement system may be de-emphasized. For example, weigh stations located at state or



international borders inspecting inbound traffic will continue to be a high priority. Interior weigh stations, particularly where there are multiple weigh stations in each direction, will be evaluated for effectiveness.

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