FHWA-HOP-21-010

2020 URBAN CONGESTION TRENDS

U.S. Department of Transportation
Federal Highway Administration

CONGESTED HOURS
DAILY CONGESTION

-89 MINUTES FROM LAST YEAR

2019..... 3:47
2020..... 2:18

TRAVEL TIME INDEX
AVERAGE CONGESTION

-18 POINTS FROM LAST YEAR

2019..... 1.31
2020..... 1.13

PLANNING TIME INDEX
WORST-DAY CONGESTION

-49 POINTS FROM LAST YEAR

2019..... 2.06
2020..... 1.57

For more 2020 trend information, see page 6.

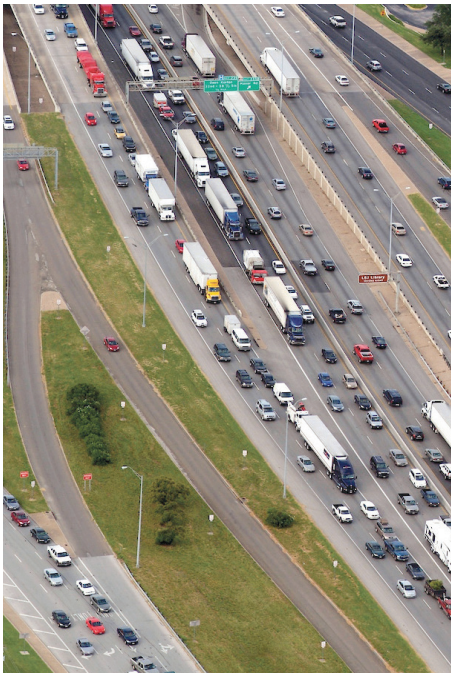
Photo credit: Texas A&M Transportation Institute Communications

Congestion Measure Definitions

Congested Hours—average amount of time in hours when freeways operate in *congested conditions* during a day (congested conditions means at less than 90 percent of free-flow speed between 6 a.m. and 10 p.m.).

Travel Time Index (TTI)—time penalty for a trip on an average day. A TTI of 1.30 indicates a 20-minute free-flow trip takes 26 minutes (20 × 1.30) in the rush hours (Weekdays 6 a.m. to 9 a.m. and 4 p.m. to 7 p.m.).

Planning Time Index (PTI)—time penalty for a trip to be on time for 95 percent of trips (e.g., late for work on one day per month). A PTI of 1.60 indicates a 20-minute free-flow trip takes more than 32 minutes (20 × 1.60) one day per month.



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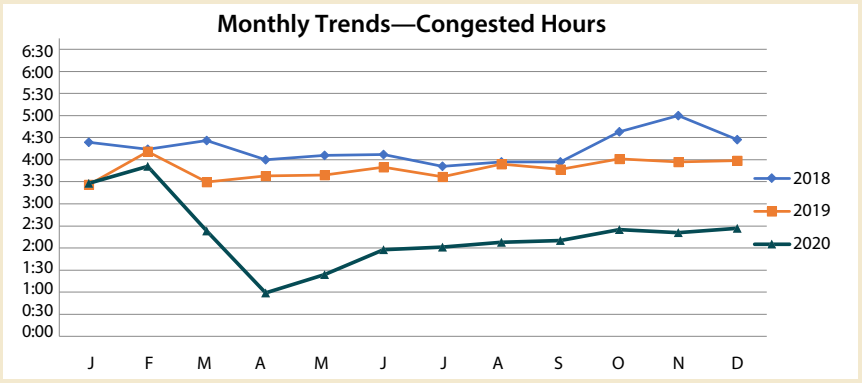
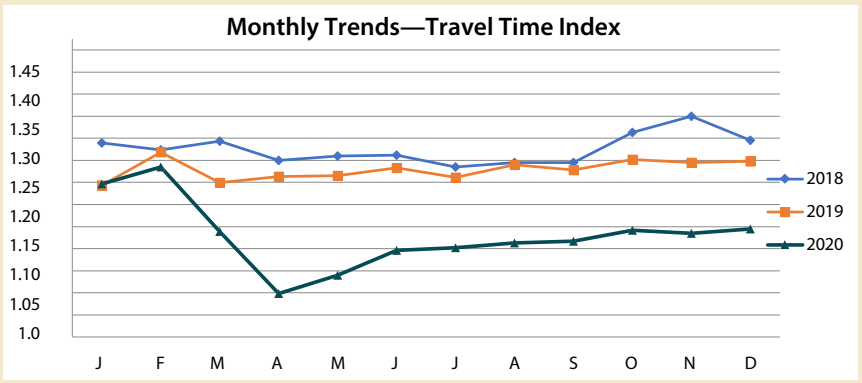
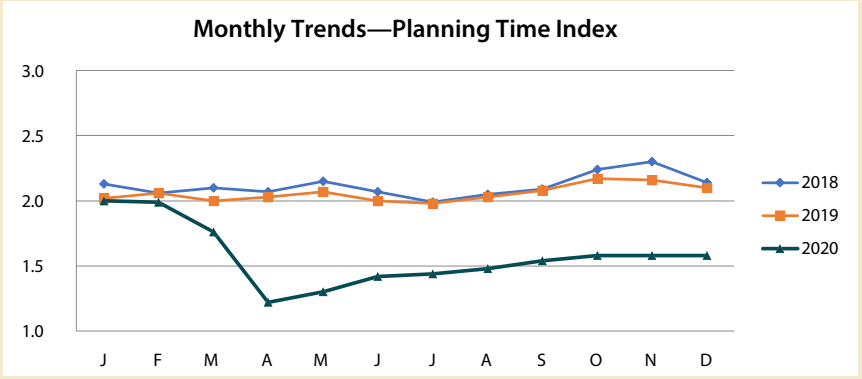
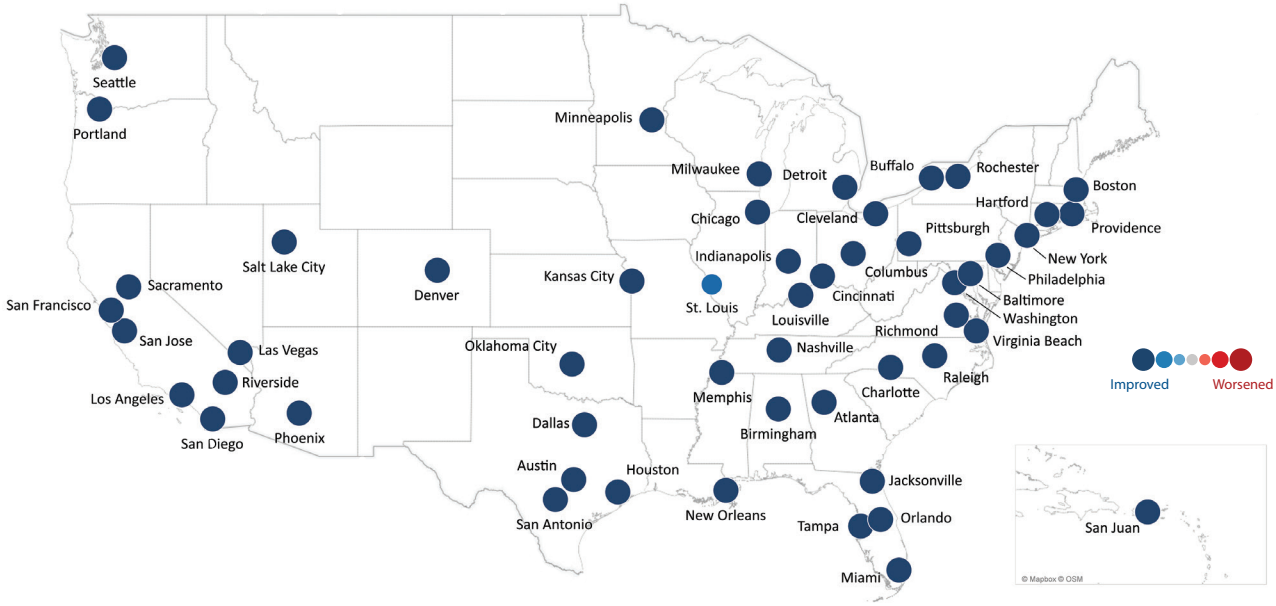






Urban Congestion Trends

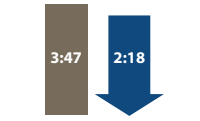
Year-to-Year Congestion Trends in the United States (2019 to 2020)



98% All three measures improved

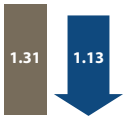
2% Measures had no change or mixed results

CONGESTED HOURS



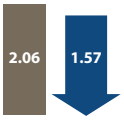
-89 minutes
Average duration of daily congestion

TRAVEL TIME INDEX



-18 points
Peak-period vs. off-peak travel times

PLANNING TIME INDEX



-49 points
Unreliability (variability) of travel

NOTES
The results in this map are annual congestion trends. Quarterly ***Urban Congestion Report*** data are available at http://www.ops.fhwa.dot.gov/perf_measurement/ucr/.
Each symbol ( ) represents 1 metropolitan statistical area.

Congestion Facts

- From 2019 to 2020, the national congestion measures improved.
- Across the country, 98 percent (51) of the 52 reported-on metropolitan statistical areas (MSAs) improved in all three measures.
- None of the MSAs deteriorated in any of the three congestion measures compared to the 2019 values.
- The hours of congestion on an average day decreased in 100 percent (52) of the MSAs.
- Travel time on the worst day of a month decreased (got better) in 100 percent (52) of the MSAs.

Photo credit:
Texas A&M Transportation Institute Communications

National Performance Management Research Data Set Applications

Graphic above and map below source: Project Performance Assessment, Sacramento Area Council of Governments (sacog.org)

A unique use of the National Performance Management Research Data Set (NPMRDS) is the application by the Sacramento Area Council of Governments (SACOG) for on-the-fly project assessment. SACOG is the metropolitan planning organization for the Sacramento, CA, area and is made up of 6 counties and 22 cities. SACOG conducts funding rounds to allocate funds to transportation projects based on available apportionments of regional Congestion Mitigation and Air Quality, Regional Surface Transportation Program, State Transportation Improvement Program, Active Transportation Program, and SACOG managed funds.

Map from the PPA Tool.

Frequently, one component of analysis in the funding round is congestion and reliability. In an effort to evaluate the congestion metrics and reliability of the submitted road project, NPMRDS speed and travel time data are used to get an idea of how reliable and congested a road is by, in part, using the Project Performance Assessment (PPA) Tool (https://www.sacog.org/project-performance-assessment). The tool allows users to select average speeds or reliability metrics by time of day and present them visually on a color-coded map, as shown above.

For more information, contact
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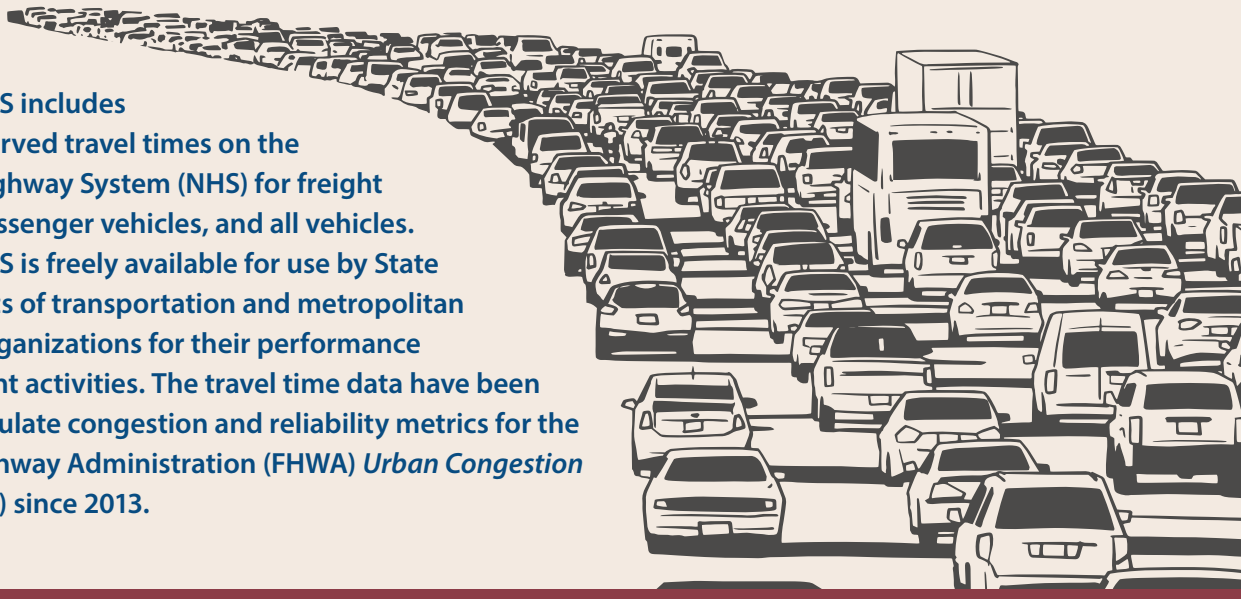

The NPMRDS includes actual, observed travel times on the National Highway System (NHS) for freight vehicles, passenger vehicles, and all vehicles. The NPMRDS is freely available for use by State departments of transportation and metropolitan planning organizations for their performance management activities. The travel time data have been used to calculate congestion and reliability metrics for the Federal Highway Administration (FHWA) *Urban Congestion Report* (UCR) since 2013.

The Benefits and Costs of Implementing Automated Traffic Signal Performance Measures

Automated traffic signal performance measures (ATSPMs) is a suite of performance measures, as well as data collection and analysis tools to support objectives and performance-based approaches to traffic signal operations, maintenance, management, and design to improve the safety, mobility, and efficiency of signalized intersections for all users. The measures have been shown to greatly enhance an agency's situational awareness regarding operation and maintenance of its signal system.

The Maricopa County Department of Transportation (MCDOT) and several cities and towns within Maricopa County recognized the need for the ability to make data-driven decisions that involve signal operations, so they decided to cooperatively implement ATSPMs. These agencies had previously used conventional retiming signal practices, undertaking about three coordination projects per year and developing new base timing plans every five years. Now that ATSPMs have been implemented, engineers will replace arbitrarily scheduled activities with data-driven retiming decisions using metrics derived from ATSPMs. The table shows anticipated benefits to the citizens and employees of Maricopa County.

One of MCDOT's immediate uses of ATSPMs was to proactively identify detector failures using the email alert system in the Utah Department of Transportation open-source ATSPM software. MCDOT is now able to quickly validate problems reported by the public without sending staff into the field. Previously, when a citizen complained about signal operations, MCDOT would observe operations using closed-circuit television (CCTV) or send a technician to the field to examine the problem. However, once the technician arrived at the intersection, it was possible the problem would not recur during the site visit. Remote observation and site visits were limited to the time when agency staff could attend to identified problems.

Graphic illustration credit: Shutterstock.com

Cost/Benefit Table *(Source: FHWA-HOP-20-003)*

	Description	Cost
COST	Detection system development	($765,000)
	Detection system reconfiguration	($22,100)
	New server	($1,000)
	Software license	($2,800)
	Integration cost	($50,000)
	Usage cost	($441,584)
	Total Cost	**($1,282,484)**

	Description	Benefit
BENEFIT	Manual data collection avoided	$176,016
	Scheduled maintenance avoided	$866,184
	Complaint response time reduction	$441,584
	Total Benefit	**$1,483,784**
	Overall Benefit	**$201,300**

In the near future, MCDOT plans to use ATSPMs for a performance baseline to assess the impacts of new technologies, such as adaptive signal control and connected vehicle (CV) applications. The ability to monitor such change is a core function of traffic signal systems that has not been available in the past with most systems. Currently, MCDOT is monitoring traffic conditions with pilot tests of CV applications in the Anthem, AZ, SMARTDrive test bed.

For more information, contact
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Summary of Performance Measure Trends for Calendar Year 2020

Traffic performance measures calculated for the UCR all improved in 2020. Traffic volumes were lower for much of the year, and as shown in this report, speeds were up, indicating improvement for the three measures across the 52 MSAs. Hours of congestion across the MSAs decreased an average of 89 minutes compared to 2019 and were down nearly two hours when compared to the 2018 hours-of-congestion measure.

Based on the TTI and a 20-minute trip at free flow for comparison purposes across years, travel time was down by about 4 minutes in 2020 compared to 2019. Similarly, based on the PTI and a 20-minute free-flow trip, in 2020, the longest trip out of 20 would have taken longer than 31 minutes. In 2019, the same longest trip out of 20 would have taken longer than 41 minutes.

Photo credit: Nicole Glass Photography/Shutterstock.com

The long, consistent collection of data and measures from the UCR program allows for trend analysis of the three measures. Future trend analyses may show 2020 to be an outlier.

Photos by Texas Department of Transportation and Texas A&M Transportation Institute Communications

The FHWA *2020 Urban Congestion Trends* report details trends and the current state of congestion and reliability on the NHS in 52 of the largest metropolitan areas in the United States. This report also includes examples of how agencies are using the NPMRDS for performance reporting and analysis, as well as for operational strategy evaluation and benefit calculation.

FHWA-HOP-21-010

Contact Information

Visit the Operations Performance Measurement Program Urban Congestion Reports web page for quarterly congestion trend updates: ops.fhwa.dot.gov/perf_measurement/ucr/index.htm.

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