The TTI Urban Mobility Report: 1986-2012

Compiled by Ken Winter, VDOT Research Library
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BACKGROUND: In 1984 a study was initiated at the Texas Transportation Institute (TTI) to investigate declines in urban mobility in major metropolitan areas around the state. That report eventually led to a series of annual reports that would come to explore and document the nation's long-term congestion trends, make congestion comparisons, and to describe various congestion improvement strategies.

In 1982 researcher Tim Lomax conducted research for TxDOT that formed the early basis for the methodology later used to explore urban mobility across the country. His report was titled "*Estimates of Relative Mobility in Major Texas Cities*" and was based largely on TxDOT data similar to that now included in the Highway Performance Monitoring System (HPMS), which helped inform the research at that time. This early report is generally not counted as part of the national report series although it is listed in this bibliography.

References here, presented in reverse chronological order, show the series on urban mobility written by Lomax and his colleagues from 1986 to 2012. Today that series is referred to as the TTI Urban Mobility Report. Technically, however, the reports were published in more than one series and under a variety of titles. The first 10 reports were performed under a TxDOT research project. Reports since then have been conducted under a variety of contracts and through various sponsors. In 2006 and 2008 the report was not published.

It is vital to note that the methodology and data used in conducting this research have changed significantly in the past 30 years. With that fact in mind, researchers who seek to compare rankings listed in these reports (which have different measures and data approaches), are advised to remember that the authors never attempted to keep measures consistent from one report to the next.

Links to full-text online versions of reports listed here are provided if publicly accessible. Copies of these and other documents are available to VDOT personnel from the VDOT Research Library. If you are a VDOT employee and need assistance contact the library at: Library.Circulation@VDOT.Virginia.gov Employees outside of VDOT can contact their library for delivery options or contact the National Technical Information Service.

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2012 URBAN MOBILITY REPORT.
CITATION: David Schrank, Bill Eisele and Tim Lomax. , 2012. Texas Transportation Institute, the Texas A & M University System. College Station, Tex., Pg. 67.
ABSTRACT: Congestion levels in large and small urban areas were buffeted by several trends in 2011. Some caused congestion increases and others decreased stop-and-go traffic. The 2011 data are consistent with one past trend, congestion will not go away by itself "action is needed!" The problem is very large. In 2011, congestion caused urban Americans to travel 5.5 billion hours more and to purchase an extra 2.9 billion gallons of fuel for a congestion cost of $121 billion. In order to arrive on time for important trips, travelers had to allow for 60 minutes to make a trip that takes 20 minutes in light traffic. While congestion is below its peak in 2005, there is only a short-term cause for celebration. Prior to the economy slowing, just 5 years ago, congestion levels were much higher than a decade ago; these conditions will return as the economy improves. The data show that congestion solutions are not being pursued aggressively enough. The most effective congestion reduction strategy, however, is one where agency actions are complemented by efforts of

businesses, manufacturers, commuters and travelers. There is no rigid prescription for the "best way" each region must identify the projects, programs and policies that achieve goals, solve problems and capitalize on opportunities.
ACCESS: http://mobility.tamu.edu/ums/ or
http://d2dtl5nnlpfr0r.cloudfront.net/tti.tamu.edu/documents/mobility-report-2012.pdf

2011 URBAN MOBILITY REPORT.
CITATION: David Schrank, Tim Lomax and Bill Eisele. , 2011. Texas Transportation Institute, Texas A & M University. College Park, Tex. Pg. 147.
ABSTRACT: Congestion is a significant problem in America's 439 urban areas. And, although readers and policy makers may have been distracted by the economy-based congestion reductions in the last few years, the 2010 data indicate the problem will not go away by itself "action is needed." First, the problem is very large. In 2010, congestion caused urban Americans to travel 4.8 billion hours more and to purchase an extra 1.9 billion gallons of fuel for a congestion cost of $101 billion. Second, 2008 was the best year for congestion in recent times; congestion was worse in 2009 and 2010. Third, there is only a short-term cause for celebration. Prior to the economy slowing, just 4 years ago, congestion levels were much higher than a decade ago; these conditions will return with a strengthening economy. There are many ways to address congestion problems; the data show that these are not being pursued aggressively enough. The most effective strategy is one where agency actions are complemented by efforts of businesses, manufacturers, commuters and travelers. There is no rigid prescription for the "best way" and "each region must identify the projects, programs and policies that achieve goals, solve problems and capitalize on opportunities."
ACCESS: Available from the National Technical Information Service, contact your library for delivery options.

2010 URBAN MOBILITY REPORT.
CITATION: David Schrank, Tim Lomax and Shawn Turner. , 2010. Texas Transportation Institute, Texas A & M University. College Park, Tex. Pg. 61p.
ABSTRACT: Congestion is still a problem in America's 439 urban areas. The economic recession and slow recovery of the last three years, however, have slowed the seemingly inexorable decline in mobility. Readers and policy makers might be tempted to view this as a change in trend, a new beginning or a sign that congestion has been "solved." However, the data do not support that conclusion. First, the problem is very large. In 2009, congestion caused urban Americans to travel 4.8 billion hours more and to purchase an extra 3.9 billion gallons of fuel for a congestion cost of $115 billion. Second, 2008 appears to be the best year for congestion in recent times; congestion worsened in 2009. Third, there is only a short-term cause for celebration. Prior to the economy slowing, just 3 years ago, congestion levels were much higher than a decade ago; these conditions will return with a strengthening economy. There are many ways to address congestion problems; the data show that these are not being pursued aggressively enough. The most effective strategy is one where agency actions are complemented by efforts of businesses, manufacturers, commuters and travelers. There is no rigid prescription for the "best way" - each region must identify the projects, programs and policies that achieve goals, solve problems and capitalize on opportunities.
ACCESS: http://tti.tamu.edu/documents/mobility_report_2010.pdf

2009 URBAN MOBILITY REPORT.
CITATION: David L. Schrank, Timothy J. Lomax, Texas Transportation Institute, et al. , 2009. Texas Transportation Institute, Texas A & M University. College Park, Tex., Pg. 134.
ABSTRACT: This summary report describes the scope of the problem and some of the improvement strategies. Congestion is a problem in Americas 439 urban areas, and it has gotten worse in regions of all sizes. In 2007, congestion caused urban Americans to travel 4.2 billion hours more and to purchase an extra 2.8 billion gallons of fuel for a congestion cost of $87.2 billion an increase of more than 50% over the previous decade (Exhibit 1). This was a decrease of 40 million hours and a decrease of 40 million gallons, but an increase of over $100 million from 2006 due to an increase in the cost of fuel and truck delay. Small traffic volume declines brought on by increases in fuel prices over the last half of 2007 caused a small reduction in congestion from 2006 to 2007. There are many congestion problems but there are also many solutions. The most effective strategy is one where agency actions are complemented by efforts of businesses, manufacturers, commuters and travelers. The best approach to selecting strategies is to identify projects, programs and policies that solve problems or capitalize on opportunities. The strategies must address the issue that the problems are not the same in every region or on every day the variation in travel time is often as frustrating and costly as the regular daily slog through traffic jams. The 2009 Urban Mobility Report clearly demonstrates that all the solutions are not being implemented fast enough.
ACCESS: http://tti.tamu.edu/documents/mobility_report_2009_wappx.pdf

2008
Note: No report was published this year.

2007 URBAN MOBILITY REPORT.
CITATION: David Schrank L and Timothy Lomax J. , 2007. Texas Transportation Institute, Texas A & M University. College Park, Tex., Pg. 138.
ABSTRACT: Congestion is a problem in America's 437 urban areas and it is getting worse in regions of all sizes. Congestion caused urban Americans to travel 4.2 billion hours more and to purchase an extra 2.9 billion gallons of fuel for a congestion cost of $78 billion. This was an increase of 220 million hours, 140 million gallons and $5 billion from 2004. The solution to this problem is really to consider implementing all the solutions. One lesson from more than 20 years of mobility studies is that congestion relief is not just a matter of highway and transit agencies building big projects. Those are important, but so are actions by businesses, shippers, manufacturers and employers, as well as commuters, shoppers, and travelers for all reasons. This report points out that the supply of solutions is not being implemented at a rate anywhere near the rate of travel demand growth. This report and the website data describe the scope of the problem and some of the improvement strategies.
ACCESS: http://tti.tamu.edu/documents/mobility_report_2007_wappx.pdf

2006
Note: No report was published this year.

2005 URBAN MOBILITY REPORT.
CITATION: David L. Schrank, Timothy J. Lomax and Texas Transportation Institute. , 2005. Texas Transportation Institute, Texas A & M University. College Park, Tex. , Pg. 92.
ABSTRACT: Congestion continues to grow in America's urban areas. Despite a slow growth in jobs and travel in 2003, congestion caused 3.7 billion hours of travel delay and 2.3 billion gallons of wasted fuel, an increase of 79 million hours and 69 million gallons from 2002 to a total cost of more than $63 billion. The solutions to this problem will require commitment by the public and by national, state and local officials to increase investment levels and identify projects, programs and policies that can achieve mobility goals. The 2005 Urban Mobility Report shows that the current pace of transportation improvement, however, is not sufficient to keep pace with even a slow growth in travel demands in most major urban areas.
ACCESS: http://mobility.tamu.edu/ums/congestion%5Fdata/tables/san%5Ffrancisco.pdf and http://mobility.tamu.edu/ums/congestion%5Fdata/tables/san%5Ffrancisco.pdf

2004 URBAN MOBILITY REPORT.
CITATION: D. Schrank and T. Lomax. , 2004. Texas Transportation Institute, Texas A & M University. College Park, Tex. , Pg. 27.
ABSTRACT: Congestion continues to grow in America's urban areas. The 2004 Annual Urban Mobility Report presents details on the trends, findings and what can be done to address the growing transportation problems. Trend data from 1982 to 2002 for 85 urban areas provides both a local view and a national perspective on the growth and extent of traffic congestion. The 2004 Report provides clear evidence that the time for improvements has arrived. Communicating the congestion levels and the need for improvements is a goal of this report. The decisions about which, and how much, improvement to fund will be made at the local level according to a variety of goals, but there are some broad conclusions that can be drawn from this database.
ACCESS: Available from the National Technical Information Service, contact your library for delivery options.

2003 URBAN MOBILITY REPORT: VOLUME 2 - FIVE CONGESTION REDUCTION STRATEGIES AND THEIR EFFECTS ON MOBILITY.
CITATION: D. Schrank and T. Lomax. , 2003. Pg. 31.
ABSTRACT: The Urban Mobility Report procedures provide estimates of mobility at the areawide level. The approach that is used describes congestion in consistent ways using generally available data allowing for comparisons across urban areas or groups of urban areas. Past procedures only looked at projects that added lanes or reduced demand and overlooked many other types of projects that affected the demand characteristics. This report extends the procedures to several other treatments. The goal is to include all improvements, but good data are necessary to accomplish this. This report describes a framework for incorporating additional treatments and shows effects of those treatments. The five treatments are ramp metering, traffic signal coordination, incident management programs, high occupancy vehicle (HOV) lanes, and

public transportation service.
ACCESS: http://ntl.bts.gov/lib/24000/24000/24011/mobility_report_2003_vol2.pdf

2003 URBAN MOBILITY REPORT.
CITATION: D. Schrank L and T. Lomax J. , 2003. Pg. 93.
ABSTRACT: The Annual Urban Mobility Report provides an easy-to-understand view of urban transportation congestion issues. The 20 years of data in this Urban Mobility Report identify several significant trends and provide information to the discussion of problems and solutions at the local, state and national levels. Previous reports have been used to inform the debates about transportation priorities, funding needs and broad strategic directions. The measures are only a tool, however, and they should not be interpreted as indicating specific projects or technologies as solutions. The data may guide the amount of improvements required, and they can be a useful measure of progress toward mobility goals, but the data in this report do not replace more detailed information or project evaluations. Major transportation system improvements require time for planning, design and implementation, and often a significant amount of funding as well. Communicating the congestion levels and the need for improvements is a goal of this report.
ACCESS: http://ntl.bts.gov/lib/24000/24000/24010/mobility_report_2003.pdf

2002 URBAN MOBILITY REPORT.
CITATION: David L. Schrank, Timothy J. Lomax, Texas Transportation Institute, et al. , 2002. Texas Transportation Institute. College Station, Tex. Pg. 72.
ABSTRACT: The Annual Report of the Urban Mobility Study provides some information about congestion and mobility issues in ways that everyone can understand. This report focuses on the trends from 1982 to 2000 and analyzes issues that the motoring public, transportation officials, and policy makers often raise regarding traffic congestion and urban mobility in a way that is useful to these different information markets.
ACCESS: http://ntl.bts.gov/lib/11000/11200/11296/mobility_report_2002.pdf

2001 URBAN MOBILITY REPORT.
CITATION: D. Schrank and T. Lomax. , Texas Transportation Institute. , 2001. Texas Transportation Institute, Texas A & M University. College Park, Tex. Pg. 67 p.
ABSTRACT: The 18 years of data presented in this report document the growth of congestion levels on the major roads systems of 68 U.S. urban areas. Major transportation system improvements require time for planning, design and implementation, and often a significant amount of funding as well. Communicating the condition and the need for improvements is a goal of this report. Some of the broad conclusions drawn from this research include the following. 1. Congestion is growing in areas of every size. The 68 urban areas in this report range from New York City down to those with 100,000 population. 2. Congestion costs can be expressed in a log of different factors, but they are all increasing. The total congestion "bill" for the 68 areas in 1999 came to $78 billion, which was the value of 4.5 billion hours of delay and 6.8 billion gallons of excess fuel consumed. 3. Road expansions slow the growth in congestion. In areas where the rate of roadway additions were approximately equal to travel growth, travel time grew at about one-fourth to one-third as fast as areas where traffic volume grew much faster than roads were added. 4. By themselves, however, additional roadways do not seem to be the answer. The need for new roads exceeds the funding capacity and the ability to gain environmental and public approval. 5. The "solution" is really a diverse set of options that require funding commitments, as well as a variety of changes in the ways that transportation systems are used. These options and changes include more roads and more transit, more efficient operations, and modifications to the way in which travelers use the transportation network to accommodate more demand. 6. Improving the reliability of the transportation system is an important aspect of the programs in most large cities.
ACCESS: http://ntl.bts.gov/lib/18000/18100/18128/PB2001106835.pdf

1999 ANNUAL MOBILITY REPORT: INFORMATION FOR URBAN AMERICA.
CITATION: D. Schrank and T. Lomax. , 1999. Pg. 123 p.
ABSTRACT: The mobility provided by the nation's transportation system is the subject of discussion and debate every day. This report provides data on the performance of some elements of that transport system in 68 urban areas. The travel, demographic, facility and operational performance statistics in the study from 1982 to 1997 are oriented to the broad public interest. The report is designed to present technical information to non-technical audiences. The primary performance measures are the travel rate index and travel delay. Both measures relate to the concerns of transport users - the amount of time required to travel. The travel rate index compares the time needed to travel during peak travel periods of the average day and the time needed to travel during free-flow conditions. The index is designed to be easy to understand and useful for a

range of analyses and presentations. Travel delay is presented as an annual estimate of the amount of additional travel time caused by traffic congestion. Various federal, state, and local agencies provided the information used to update and verify the primary database - the Federal Highway Administration's Highway Performance Monitoring Systems (HPMS).
ACCESS: http://ntl.bts.gov/lib/7000/7400/7475/mobility_report_1999.pdf

1998 URBAN ROADWAY CONGESTION ANNUAL REPORT.
CITATION: David Schrank and Tim Lomax. 1998 / College Station, Texas : Texas A&M University. Texas Transportation Institute (TTI), Pg. 190.
ABSTRACT: This report documents roadway congestion and mobility measures in 70 major urban areas in the United States. This study contains vehicle travel, facility length and operation estimates, and urban area characteristics from 1982 to 1996 for each of these urban areas. Various federal, state, and local agencies provided the information used to update and verify the primary database -- the Federal highway Administration's Highway Performance Monitoring System (HPMS).
ACCESS: Available from the National Technical Information Service, contact your library for delivery options.

URBAN ROADWAY CONGESTION - 1982 TO 1994. VOLUME 2: METHODOLOGY AND URBANIZED AREA DATA.
CITATION: D. Schrank L and T. Lomax J. , 1997. Pg. 256.
ABSTRACT: This research report represents the final year of a 10-year research effort focused on quantifying urban mobility. This study contains the facility information for 50 urban areas throughout the country. The database used for this research contains information on vehicle travel, system length, and urban area characteristics from 1982 to 1994. Various federal, state, and local agencies provided the information used to update and verify the primary database. The primary database and original source of most of the information is the Federal Highway Administration's Highway Performance Monitoring System (HPMS). Researchers combined vehicle travel and system length data to develop Roadway Congestion Index (RCI) values for 50 urban areas including the seven largest in Texas. The RCI values provide an indicator of the relative mobility level within an urban area. This report includes an analysis of the cost of congestion using travel delay and increased fuel consumption as estimated quantities. The impact of congestion was also estimated by the amount of additional facility capacity required to provide urban mobility. Congestion costs were estimated on an areawide, per eligible driver, and per capita basis.
ACCESS: http://tti.tamu.edu/documents/1131-9-V2.pdf

URBAN ROADWAY CONGESTION - 1982 TO 1994. VOLUME 1: ANNUAL REPORT.
CITATION: D. Schrank L and T. Lomax J. , 1997. Pg. 92 p.
ABSTRACT: This research report represents the final year of a 10-year research effort focused on quantifying urban mobility. This study contains the facility information for 50 urban areas throughout the country. The database used for this research contains information on vehicle travel, system length, and urban area characteristics from 1982 to 1994. Various federal, state, and local agencies provided the information used to update and verify the primary database. The primary database and original source of most of the information is the Federal Highway Administration's Highway Performance Monitoring System (HPMS). Researchers combined vehicle travel and system length data to develop Roadway Congestion Index (RCI) values for 50 urban areas, including the seven largest in Texas. The RCI values provide an indicator of the relative mobility level within an urban area. This report includes an analysis of the cost of congestion using travel delay and increased fuel consumption as estimated quantities. The impact of congestion was also estimated by the amount of additional facility capacity required to provide urban mobility. Congestion costs were estimated on an areawide, per eligible driver, and per capita basis.
ACCESS: http://tti.tamu.edu/documents/1131-9-V1.pdf

URBAN ROADWAY CONGESTION - 1982 TO 1993. VOLUME 2: METHODOLOGY AND URBANIZED AREA DATA.
CITATION: D. Schrank L and T. Lomax J. , 1996. Pg. 252.
ABSTRACT: This research report represents the ninth year of a ten-year research effort focused on quantifying urban mobility. This study contains the facility information for 50 urban areas throughout the country. The database used for this research contains information on vehicle travel, system length, and urban area characteristics from 1982 to 1993. Various federal, state, and local agencies provided the information used to update and verify the primary database. The primary database and original source of most of the information is the Federal Highway Administration's Highway Performance Monitoring System (HPMS). Researchers

combined vehicle travel and system length data to develop Roadway Congestion Index (RCI) values for 50 urban areas including the seven largest in Texas. The RCI values provide an indicator of the relative mobility level within an urban area. This report includes an analysis of the cost of congestion using travel delay and increased fuel consumption as estimated quantities. The impact of congestion was also estimated by the amount of additional facility capacity required to provide urban mobility. Congestion costs were estimated on an areawide, per eligible driver, and per capita basis.
ACCESS: Available from the National Technical Information Service, contact your library for delivery options.

URBAN ROADWAY CONGESTION - 1982 TO 1993. VOLUME 1: ANNUAL REPORT.
CITATION: D. Schrank L and T. Lomax J. , 1996. Pg. 86 p.
ABSTRACT: This research report represents the ninth year of a ten-year research effort focused on quantifying urban mobility. This study contains the facility information for 50 urban areas throughout the country. The database used for this research contains information on vehicle travel, system length, and urban area characteristics from 1982 to 1993. Various federal, state, and local agencies provided the information used to update and verify the primary database. The primary database and original source of most of the information is the Federal Highway Administration's Highway Performance Monitoring System (HPMS). Researchers combined vehicle travel and system length data to develop Roadway Congestion Index (RCI) values for 50 urban areas including the seven largest in Texas. The RCI values provide an indicator of the relative mobility level within an urban area. This report includes an analysis of the cost of congestion using travel delay and increased fuel consumption as estimated quantities. The impact of congestion was also estimated by the amount of additional facility capacity required to provide urban mobility. Congestion costs were estimated on an areawide, per eligible driver, and per capita basis.
ACCESS: http://tti.tamu.edu/documents/1131-8-V1.pdf

URBAN ROADWAY CONGESTION - 1982 TO 1992. VOLUME 2: METHODOLOGY AND URBANIZED AREA DATA. INTERIM REPORT.
CITATION: D. Schrank L, S. Turner M and T. Lomax J. , 1995. Pg. 188 p.
ABSTRACT: This research report represents the seventh year of a ten-year research effort focused on quantifying urban mobility. This study contains the facility information for 50 urban areas throughout the country. The database used for this research contains information on vehicle travel, system length, and urban area characteristics from 1982 to 1992. Various federal, state, and local agencies provided the information used to update and verify the primary database. The primary database and original source of most of the information is the Federal Highway Administration's Highway Performance Monitoring System (HPMS). Vehicle travel and system length data were combined to develop Roadway Congestion Index (RCI) values for 50 urban areas including the seven largest in Texas. The RCI values provide an indicator of the relative mobility level within an urban area. An analysis of the cost of congestion was also performed using travel delay and increased fuel consumption as estimated quantities. The impact of congestion was also estimated by the amount of additional facility capacity required to provide urban mobility. Congestion costs were estimated on an areawide, per registered vehicle, and per capita basis.
ACCESS: http://tti.tamu.edu/documents/1131-8-V2.pdf

URBAN ROADWAY CONGESTION - 1982 TO 1992. VOLUME 1: ANNUAL REPORT. INTERIM REPORT. (9)
CITATION: D. Schrank L, S. Turner M and T. Lomax J. , 1995. Pg. 92 p.
ABSTRACT: This research report represents the seventh year of a ten-year research effort focused on quantifying urban mobility. This study contains the facility information for 50 urban areas throughout the country. The database used for this research contains information on vehicle travel, system length, and urban area characteristics from 1982 to 1992. Various federal, state, and local agencies provided the information used to update and verify the primary database. The primary database and original source of most of the information is the Federal Highway Administration's Highway Performance Monitoring System (HPMS). Vehicle travel and system length data were combined to develop Roadway Congestion Index (RCI) values for 50 urban areas including the seven largest in Texas. The RCI values provide an indicator of the relative mobility level within an urban area. An analysis of the cost of congestion was also performed using travel delay and increased fuel consumption as estimated quantities. The impact of congestion was also estimated by the amount of additional facility capacity required to provide urban mobility. Congestion costs were estimated on an areawide, per registered vehicle, and per capita basis.
ACCESS: http://tti.tamu.edu/documents/1131-7-V1.pdf

TRENDS IN URBAN ROADWAY CONGESTION - 1982-1991. VOLUME 2: METHODOLOGY AND URBANIZED AREA DATA. INTERIM REPORT.
CITATION: D. Schrank L, S. Turner M and T. Lomax J. , 1994. Pg. 184.
ABSTRACT: This research report represents the sixth year of a ten-year research effort focused on quantifying urban mobility. This study contains the facility information for 50 urban areas throughout the country. The database used for this research contains information on vehicle travel, system length, and urban area characteristics from 1982 to 1991. Various federal, state, and local agencies provided the information used to update and verify the primary database. The primary database and original source of most of the information is the Federal Highway Administration's Highway Performance Monitoring System (HPMS). Vehicle travel and system length data were combined to develop Roadway Congestion Index (RCI) values for 50 urban areas including the seven largest in Texas. The RCI values provide an indicator of the relative mobility level within an urban area. An analysis of the cost of congestion was also performed using travel delay and increased fuel consumption as estimated quantities. The impact of congestion was also estimated by the amount of additional facility capacity required to provide urban mobility. Congestion costs were estimated on an areawide, per registered vehicle, and per capita basis.
ACCESS: http://tti.tamu.edu/documents/1131-7-V2.pdf

TRENDS IN URBAN ROADWAY CONGESTION - 1982 TO 1991, VOLUME 1: ANNUAL REPORT.
CITATION: D. Schrank L, S. Turner M and T. Lomax J. , Interim Research Report, 1994. Pg. 68.
ABSTRACT: This research report represents the sixth year of a ten-year research effort focused on quantifying urban mobility. This study contains the facility information for 50 urban areas throughout the country. The database used for this research contains information on vehicle travel, system length, and urban area characteristics from 1982 to 1991. Various federal, state, and local agencies provided the information used to update and verify the primary database. The primary database and original source of most of the information is the Federal Highway Administration's Highway Performance Monitoring System (HPMS). Vehicle travel and system length data were combined to develop Roadway Congestion Index (RCI) values for 50 urban areas including the seven largest in Texas. The RCI values provide an indicator of the relative mobility level within an urban area. An analysis of the cost of congestion was also performed using travel delay and increased fuel consumption as estimated quantities. The impact of congestion was also estimated by the amount of additional facility capacity required to provide urban mobility. Congestion costs were estimated on an areawide, per registered vehicle, and per capita basis.
ACCESS: http://tti.tamu.edu/documents/1131-6-V1.pdf

ESTIMATES OF URBAN ROADWAY CONGESTION, 1990.
CITATION: . Schrank L, S. Turner M and T. Lomax J. 1993, College Station, Texas : Texas A&M University. Texas Transportation Institute (TTI), Pg. 69.
ABSTRACT: This research report is the fifth year continuation of a six year research effort focused on quantifying urban mobility. This study contain the facility information for 50 urban areas throughout the country. The database used for this research contains vehicle-miles of travel, urban area information, and facility mileage data from 1982 to 1990. Various federal, state, and local agencies provided the information used to update and verify the primary database. The primary database and source of information is the Federal Highway Administration's Highway Performance Monitoring System (HPMS). Vehicle-miles of travel and lane-mile data were combined to develop Roadway Congestion Index (RCI) values for 50 urban areas including the seven largest in Texas. These RCI values provide an indicator of the relative mobility level within an urban area. An analysis of the impacts and cost of congestion were also performed using travel delay, increased fuel consumption, and additional facility lane-miles as measures of urban mobility. Congestion costs were estimated on an areawide, per registered vehicle, and per capita basis.
ACCESS: http://tti.tamu.edu/documents/1131-5.pdf

1989 ROADWAY CONGESTION ESTIMATES AND TRENDS.
CITATION: James W. Hanks and Timothy J. Lomax. , Appearing in: Draft research report ;; 1131-4; Variation: Research report (Austin, Tex.) ;; 1131-4. 1992. Texas Transportation Institute, Texas A&M University System. College Station, Tex. Pg. 57.
ABSTRACT: The report is the fourth year continuation of a six year research effort focused on quantifying urban mobility. This study contains the facility information for 50 urban areas throughout the country. The data base used for this research contains vehicle-miles of travel, urban area information, facility mileage, and facility lane-mile data from 1982 to 1989. Various federal, state, and local agencies provided the information used to update and verify the primary data base. The primary data base and source of information is the Federal Highway Administration's Highway Performance Monitoring System (HPMS). Vehicle-miles of travel and

lane-mile data were combined to develop Roadway Congestion Index (RCI) values for 50 urban areas including the seven largest in Texas. These RCI values provide an indicator of the relative mobility level within an urban

area. An analysis of the impacts and cost of congestion were also performed using travel delay, increased fuel consumption, and additional facility lane-miles as measures of urban mobility. Congestion costs were estimated on an areawide, per registered vehicle, and per capita basis.
ACCESS: http://tti.tamu.edu/documents/1131-4.pdf

ROADWAY CONGESTION IN MAJOR URBANIZED AREAS 1982-1988.
CITATION: James W. Hanks, Jr. and Timothy J. Lomax. 1990 / College Station, Texas : Texas A&M University. Texas Transportation Institute (TTI)
ABSTRACT: The research report represents the results of the third year analysis of a six year research effort focused on quantifying urban mobility. The study contains roadway information for 39 urban areas representing a geographic cross-section throughout the country. The data base used for the research contains vehicle travel, urban area information, facility mileage, and vehicle travel per lane-mile information from 1982 to 1988. Various federal, state, and local information sources were used to develop and update the data base with the primary source being the Federal Highway Administration's Highway Performance Monitoring System. Vehicle-miles of travel and lane-mile data were used to develop roadway congestion index values for the seven largest Texas and 32 other U.S. urban areas. These index values serve as indicators of the relative mobility level within an urban area. An analysis of the cost of congestion was performed using travel delay, increased fuel consumption and increased auto insurance premiums as the economic analysis factors. Congestion costs were estimated on an urban areawide, per registered vehicle, and per capita basis.
ACCESS: http://tti.tamu.edu/documents/1131-3.pdf

ROADWAY CONGESTION IN MAJOR URBAN AREAS 1982 TO 1987.
CITATION: James W. Hanks and Timothy J. Lomax. 1989 / College Station, Texas : Texas A&M University. Texas Transportation Institute (TTI)
ABSTRACT: The research report studied 39 urban areas. An assessment of the freeway and major street operating conditions was performed in seven Texas and 32 other urban areas in the continental United States. In addition, the analyses from 1982 to 1986 were updated to include 1987 urban area data. Vehicle-miles of travel and lane-miles of roadway data were collected from a variety of sources to estimate congestion on the freeway/expressway and principal arterial street systems. The values for each system were combined into a roadway congestion index used to rank mobility in each urban area on a relative scale. An analysis of the cost of this congestion was performed using travel delay, increased fuel consumption and increased auto insurance premiums as the economic analysis factors. The economic cost to the urban area, and to the individual resident, was estimated.
ACCESS: http://tti.tamu.edu/documents/1131-2.pdf or

THE IMPACT OF DECLINING MOBILITY IN MAJOR TEXAS AND OTHER U.S. CITIES.
CITATION: Timothy J. Lomax, Diane L. Bullard, and James W. Hanks, Jr. 1988 / College Station, Texas : Texas A&M University. Texas Transportation Institute (TTI), Pg. 117.
ABSTRACT: An assessment of the freeway and major street operating conditions was performed in seven Texas cities and 22 other urban areas in the U.S. for the period 1982 to 1986. Vehicle-miles of travel and lane-miles of roadway data were collected from a variety of sources to estimate congestion on the freeway/expressway and principal arterial street systems. The values for each system were combined into a congestion index used to rank the urban areas on a relative scale. An analysis of the cost of this congestion was performed using travel delay, increased fuel consumption and increased auto insurance premiums as the economic analysis factors. The economic cost to the urban area, and to the individual resident, was estimated. An investigation of business attitudes toward urban area traffic congestion was performed in 13 of the study cities. The construction and widening of freeways and major streets in the urban areas were the most frequently mentioned improvements that would enhance business activity.
ACCESS: http://tti.tamu.edu/documents/431-1F.pdf

RELATIVE MOBILITY IN TEXAS CITIES, 1975 TO 1984.
CITATION: Timothy J. Lomax, 1986, College Station, Texas : Texas A&M University. Texas Transportation Institute (TTI), Pg. 56.
ABSTRACT: The major urban areas in Texas have experienced a period of unprecedented growth. Along with that growth came significant increases in traffic congestion with corresponding declines in urban mobility. This

study uses available traffic data to assess the relative mobility levels in Austin, Corpus Christi, Dallas, El Paso, Forth Worth, Houston and San Antonio between 1975 and 1984. An estimate of the number of years before congestion reaches an undesirable level was generated for each major urban area.
ACCESS: http://tti.tamu.edu/documents/339-8.pdf

ESTIMATES OF RELATIVE MOBILITY IN MAJOR TEXAS CITIES.
CITATION: T.J. Lomax, D.L. Christiansen, A.V. Fitzgerald. 1982 / College Station, Texas : Texas A&M University. Texas Transportation Institute (TTI),
ABSTRACT: The major urban areas in Texas have recently experienced a period of unprecedented growth. Along with that growth came significant increases in traffic congestion with corresponding declines in urban mobility. Maintaining mobility is essential if continued economic growth is to be realized. This study uses available data to assess the seriousness of congestion in the major urban areas and to estimate the relative levels of mobility that exist in major Texas cities.
ACCESS: http://tti.tamu.edu/documents/323-1F.pdf

ADDITIONAL READING: The following citations, listed alphabetically by title, may also be of interest to researchers. Note that some of the citations listed here are for interim reports for the series above.

ANALYZING AND COMMUNICATING OPERATIONAL IMPROVEMENTS IN AN URBAN AREA.
CITATION: D. Schrank, T. Lomax. , ITE J., 1998. Institute of Transportation Engineers. Vol. 68, No. 2, Pg. 2
ACCESS: Contact your library for delivery options.

ANNUAL STUDY SHOWS TRAFFIC JAMS AS A GROWING TRIPLE THREAT.
CITATION: Tim Lomax and D. Schrank. , Texas Transportation Researcher, 2002. Texas Transportation Institute. Vol. 38, No. 2, Pg. p. 3.
ACCESS: http://tti.tamu.edu/publications/researcher/v38n2/38_2.pdf

COMPARING PERCEPTIONS AND MEASURES OF CONGESTION.
CITATION: Minh Le, Shawn Turner, Tim Lomax, et al. , 2012. Pg. 22p.
ACCESS: http://utcm.tamu.edu/publications/final_reports/Le_11-00-72.pdf or http://ntl.bts.gov/lib/46000/46300/46378/Le_11-00-72.pdf

CONGESTED CORRIDORS REPORT - 2011.
CITATION: Bill Eisele, David Schrank and Tim Lomax. , 2011. Pg. 94p.
ACCESS: http://tti.tamu.edu/documents/corridors-report-2011.pdf

ESTIMATES OF URBAN ROADWAY CONGESTION, 1990 : INTERIM REPORT.
CITATION: David L. Schrank, Shawn Turner, Timothy J. Lomax, et al. , 1993. Office of Traffic Management and
ACCESS: http://ntl.bts.gov/lib/7000/7000/7001/925.pdf

EVALUATING MOBILITY AND ENERGY EFFICIENCY. FINAL REPORT.
CITATION: T. Lomax, V. Stover, G. Carlin, et al. , 1994. Pg. 162 p.
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CITATION: T. Lomax and D. Schrank. , Texas Transportation Researcher, 2003. Texas Transportation Institute. Vol. 39, No. 4, Pg. p. 2-3.
ACCESS: http://tti.tamu.edu/publications/researcher/v39n4/39_4.pdf

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CITATION: Tim Lomax, Bruce Wang, David Schrank, et al. , 2010. Pg. 90p.
ACCESS: http://utcm.tamu.edu/publications/final_reports/Lomax_09-17-09.pdf or http://ntl.bts.gov/lib/33000/33700/33760/Lomax_09-17-09.pdf

REAL-TIMING THE 2010 URBAN MOBILITY REPORT.
CITATION: Tim Lomax, David Schrank, Shawn Turner, et al. , 2011. Pg. 102p.
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REFINING THE REAL-TIMED URBAN MOBILITY REPORT.
CITATION: Tim Lomax, Shawn Turner, Bill Eisele, et al. , 2012. Pg. 204p.
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