

Performance Measure Summary

There are several inventory and performance measures listed in the pages of this Urban Area Report for the years from 1982 to 2005. There is no single performance measure that experts agree “says it all.” The best comparison of congestion levels and trends is done between regions of similar size, over several years, and with a few measures of congestion aspects. Examining a few measures over many years reduces the chance that data variations or the estimating procedures may have caused a “spike” in any single year. A few key points should be recognized by users of the Urban Mobility Report data.

Use the Trends – The multi-year performance measures are better indicators, in most cases, than any single year. *(5 years is 5 times better than 1 year).*

Use several measures – Each performance measure illustrates a different element of congestion. *(The view is more interesting from the top of a few measures).*

Compare to similar regions – Congestion analyses that compare areas with similar characteristics (for example population, growth rate, road and public transportation system design) are usually more insightful than comparisons of different regions. *(Los Angeles is not Peoria).*

Compare ranking changes and performance measure values – In some performance measures a small change in the value may cause a significant change in rank from one year to the next. This is the case when there are several regions with nearly the same value. *(15 hours is only 1 hour more than 14 hours).*

Consider the scope of improvement options – Any improvement project in a corridor within most of the regions will only have a modest effect on the regional congestion level. *(To have an effect on areawide congestion, there must be significant change in the system or service).*

Comparison of Several Key Mobility Performance Measures Small Group – less than 500,000 population urban areas

Urban Area	Delay per Traveler	Travel Time Index	Total Delay	1982 to 2005	
				Delay per Traveler	Total Delay
Colorado Springs, CO	H+	H+	H+	F+	F+
Charleston-North Charleston, SC	H+	H+	H+	F	F+
Bakersfield, CA	L	0	0	0	F+
Columbia, SC	0	L	H	0	F+
Cape Coral, FL	H+	H	H+	F	F+
Little Rock, AR	0	L	0	0	F
Spokane, WA	L-	L-	L-	S-	S-
Pensacola, FL-AL	H+	H	H+	F+	F+
Corpus Christi, TX	L-	L	L	S-	S-
Anchorage, AK	L-	L	L-	S-	S-
Eugene, OR	L	0	L	S-	S-
Beaumont, TX	L-	L	L-	S-	S-
Salem, OR	L	0	L	0	S-
Laredo, TX	L-	0	L-	S	S-
Brownsville, TX	L-	L	L-	S-	S-
Boulder, CO	0	0	L-	S	S-

0 – Average congestion levels or average congestion growth

H Higher congestion; H+ Much higher congestion; F Faster congestion growth; F+ Much faster growth

L Lower congestion; L- Much lower congestion; S Slower congestion growth; S- Much slower growth

Performance Measures and Definition of Terms

Travel Time Index – A measure of congestion that focuses on each trip and each mile of travel. The ratio of travel time in the peak period to travel time in free-flow. A value of 1.30 indicates a 20-minute free-flow trip takes 26 minutes in the peak.

Peak Travelers – Number of travelers (using any travel mode) who begin a trip during the morning or evening peak travel periods (6 to 9 a.m. and 4 to 7 p.m.).

Annual Delay per Traveler – A yearly sum of all the per-trip delays. This measure illustrates the effect of the per-mile congestion as well as the length of each trip. The extra time required to travel in the peak period is divided by the number of travelers who begin a trip during the peak period (6 to 9 a.m. and 4 to 7 p.m.).

Total Delay – The overall size of the congestion problem. Measured by the total travel time above that needed to complete a trip at free-flow speeds. The ranking of total delay usually follows the population ranking (larger regions usually have more delay).

Free-Flow Speeds (60 mph on freeways and 35 mph on arterials) – These values are used as the national comparison thresholds. Other speed values may be appropriate for urban areas or sub-regions.

Excess Fuel Consumed – Increased fuel consumption due to travel in congested conditions rather than free-flow conditions.

Public Transportation – Regular route service from all public transportation providers in an urban area.

Operations Treatments – Freeway incident management, freeway ramp metering, arterial street signal coordination and arterial street access management.

Congestion Cost – Value of travel delay for 2005 (estimated at \$14.60 per hour of person travel and \$77.10 per hour of truck time) and excess fuel consumption (estimated using state average cost per gallon).

Annual Increase Needed to Maintain Constant Congestion Level – Number of lane-miles that must be added to the road system each year – or – the number of new transit riders or carpoolers that must be added to keep congestion levels the same as the previous year.

Urban Area – The developed area (population density more than 1,000 persons per square mile) within a metropolitan region. The urban area boundaries change frequently (every year for most growing areas). The annual change in miles traveled, therefore, includes both new travel due to growth and travel that previously occurred in areas designated as rural.

Number of Rush Hours – Time when system might have congestion

Key Mobility Performance Measure Labels

Note: Designation of an urban area congestion problem as “Much higher”, “Much faster growth”, etc. is determined using a general indicator of the accuracy of the congestion estimates. For regions with the same indicator label, there may be no difference in congestion levels. Different values are used for the indicators in regions over 1 million population and below 1 million population.

Measures	Differences Within These Values May Not Indicate a Difference in Congestion Level	
	Above 1M Population	Below 1M Population
2005 Values Delay per Traveler - Travel Time Index - Total Delay -	5 Hours 5 Index Points 5 Hours x Average Population	3 Hours 3 Index Points 3 Hours x Average Population
1982 to 2005 Trends Delay per Traveler - Total Delay -	5 Hours 5 Hours x Average Population	3 Hours 3 Hours x Average Population

The Mobility Data for Brownsville, TX

Inventory Measures	2005	2004	2003	2002	2001	2000
Urban Area Information						
Population (1000s)	165	165	160	160	160	155
Rank	84	84	84	84	84	84
Urban Area (square miles)	60	60	55	55	55	50
Popn Density (persons/sq mile)	2,750	2,750	2,909	2,909	2,909	3,100
Peak Travelers (1000s)	90	89	86	85	84	80
Freeway						
Daily Vehicle-Miles of Travel (1000s)	590	580	505	450	375	325
Lane Miles	60	50	45	40	35	30
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	1,185	1,160	1,140	1,125	1,075	1,040
Lane Miles	270	270	270	260	250	245
Public Transportation						
Annual Psgr-Miles of Travel (millions)	14	14	14	15	14	14
Annual Unlinked Psgr Trips (millions)	2	2	2	2	2	2
Cost Components						
Value of Time (\$/hour)	14.60	14.10	13.75	13.45	13.25	12.85
Commercial Cost (\$/hour)	77.10	74.60	72.65	71.05	69.95	68.00
Fuel Cost (\$/gallon)	2.23	1.83	1.45	1.32	1.46	1.47
System Performance						
Congested Travel (% of peak VMT)	19	20	19	20	20	19
Congested System (% of lane-miles)	25	30	31	31	31	27
Congested Time (number of "Rush Hours")	3.4	4.4	4.0	4.2	4.0	4.0
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	18	19	19	19	15	13
Transit Riders or Carpoolers (millions)	3	4	3	3	3	2
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	383	387	361	351	334	288
Rank	85	85	85	85	85	85
Fuel per Peak Traveler (gallons)	4	4	4	4	4	4
Rank	85	85	85	85	85	85
Annual Delay						
Total Delay (1000s of person-hours)	680	679	639	606	589	510
Rank	85	85	85	85	85	85
Delay per Peak Traveler (person-hrs)	8	8	7	7	7	6
Rank	84	84	85	85	85	85
Delay due to Incidents (percent)	53	53	53	53	53	53
Travel Time Index						
Rank	1.06	1.07	1.06	1.07	1.07	1.06
Rank	81	77	80	74	74	75
Congestion Cost						
Total Cost (\$ millions)	12	12	11	10	10	8
Rank	85	85	85	85	85	85
Cost per Peak Traveler (\$)	138	134	127	118	115	101
Rank	85	85	85	85	85	85

Note: System Performance statistics for 2000 through 2005 data reflect the effects of operational treatments.

Note: Zeroes in the table reflect values less than 0.5.

The Mobility Data for Brownsville, TX, Continued

Inventory Measures	1999	1998	1997	1996	1995	1994
Urban Area Information						
Population (1000s)	150	145	145	135	130	125
Rank	84	84	84	84	84	84
Urban Area (square miles)	50	45	45	45	45	40
Popn Density (persons/sq mile)	3,000	3,222	3,222	3,000	2,889	3,125
Peak Travelers (1000s)	76	73	71	65	62	59
Freeway						
Daily Vehicle-Miles of Travel (1000s)	300	280	260	250	245	240
Lane Miles	30	30	30	30	30	30
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	1,000	950	900	875	840	775
Lane Miles	240	235	230	220	215	210
Public Transportation						
Annual Psgr-Miles of Travel (millions)	14	13	17	19	18	19
Annual Unlinked Psgr Trips (millions)	2	1	2	2	2	2
Cost Components						
Value of Time (\$/hour)	12.40	12.15	12.00	11.70	11.40	11.05
Commercial Cost (\$/hour)	65.80	64.35	63.40	61.95	60.20	58.50
Fuel Cost (\$/gallon)	1.07	1.01	1.12	1.21	1.14	1.03
System Performance						
Congested Travel (% of peak VMT)	17	16	15	13	13	12
Congested System (% of lane-miles)	27	27	27	23	23	23
Congested Time (number of "Rush Hours")	3.4	3.0	2.9	2.9	2.9	2.8
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	14	12	12	12	10	9
Transit Riders or Carpoolers (millions)	2	2	2	2	2	1
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	250	215	192	165	154	133
Rank	85	85	85	85	85	85
Fuel per Peak Traveler (gallons)	3	3	3	3	2	2
Rank	85	85	85	85	85	85
Annual Delay						
Total Delay (1000s of person-hours)	436	373	334	290	267	231
Rank	85	85	85	85	85	85
Delay per Peak Traveler (person-hrs)	6	5	5	4	4	4
Rank	85	85	85	85	85	85
Delay due to Incidents (percent)	53	53	53	53	53	53
Travel Time Index						
Rank	81	80	79	82	80	81
Congestion Cost						
Total Cost (\$ millions)	7	5	5	4	4	3
Rank	85	85	85	85	85	85
Cost per Peak Traveler (\$)	86	75	68	64	60	53
Rank	85	85	85	85	85	85

Note: System Performance statistics for 2000 through 2005 data reflect the effects of operational treatments.

Note: Zeroes in the table reflect values less than 0.5.

The Mobility Data for Brownsville, TX, Continued

Inventory Measures	1993	1992	1991	1990	1989	1988
Urban Area Information						
Population (1000s)	120	115	110	105	105	100
Rank	84	84	84	84	84	84
Urban Area (square miles)	40	40	40	40	35	35
Popn Density (persons/sq mile)	3,000	2,875	2,750	2,625	3,000	2,857
Peak Travelers (1000s)	56	52	49	46	46	44
Freeway						
Daily Vehicle-Miles of Travel (1000s)	270	245	230	235	225	210
Lane Miles	30	30	30	30	30	30
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	705	680	660	640	620	590
Lane Miles	200	195	190	185	175	170
Public Transportation						
Annual Psgr-Miles of Travel (millions)	15	15	13	12	11	10
Annual Unlinked Psgr Trips (millions)	2	2	2	2	2	2
Cost Components						
Value of Time (\$/hour)	10.75	10.50	10.25	10.00	9.25	8.80
Commercial Cost (\$/hour)	57.05	55.40	53.80	51.60	48.95	46.70
Fuel Cost (\$/gallon)	1.10	1.09	1.12	1.04	1.07	0.99
System Performance						
Congested Travel (% of peak VMT)	10	10	10	10	10	9
Congested System (% of lane-miles)	18	18	18	18	18	18
Congested Time (number of "Rush Hours")	2.8	2.7	2.6	2.6	2.6	2.5
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	9	9	9	10	9	8
Transit Riders or Carpoolers (millions)	1	1	1	1	1	1
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	108	99	94	93	91	81
Rank	85	85	85	84	84	84
Fuel per Peak Traveler (gallons)	2	2	2	2	2	2
Rank	85	85	84	84	84	83
Annual Delay						
Total Delay (1000s of person-hours)	188	172	163	164	162	144
Rank	85	85	85	84	84	84
Delay per Peak Traveler (person-hrs)	3	3	3	4	4	3
Rank	85	85	85	84	83	83
Delay due to Incidents (percent)	53	53	53	53	53	53
Travel Time Index						
Rank	1.03	1.03	1.03	1.03	1.03	1.03
Rank	84	83	81	81	77	79
Congestion Cost						
Total Cost (\$ millions)	2	2	2	2	2	2
Rank	85	85	85	84	84	84
Cost per Peak Traveler (\$)	45	43	42	44	41	36
Rank	85	85	85	84	83	83

Note: System Performance statistics for 2000 through 2005 data reflect the effects of operational treatments.

Note: Zeroes in the table reflect values less than 0.5.

The Mobility Data for Brownsville, TX, Continued

Inventory Measures	1987	1986	1985	1984	1983	1982
Urban Area Information						
Population (1000s)	100	95	95	95	90	90
Rank	84	84	84	83	84	84
Urban Area (square miles)	35	35	35	30	30	30
Popn Density (persons/sq mile)	2,857	2,714	2,714	3,167	3,000	3,000
Peak Travelers (1000s)	43	41	40	40	38	37
Freeway						
Daily Vehicle-Miles of Travel (1000s)	195	175	140	135	125	110
Lane Miles	30	30	30	25	20	20
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	570	550	550	540	525	480
Lane Miles	170	165	165	160	160	155
Public Transportation						
Annual Psgr-Miles of Travel (millions)	9	8	6	6	6	6
Annual Unlinked Psgr Trips (millions)	2	2	2	2	2	2
Cost Components						
Value of Time (\$/hour)	8.50	8.20	8.00	7.75	7.45	7.20
Commercial Cost (\$/hour)	44.85	43.30	42.50	41.05	39.35	38.10
Fuel Cost (\$/gallon)	0.99	0.97	1.27	1.28	1.31	1.37
System Performance						
Congested Travel (% of peak VMT)	8	7	6	6	7	6
Congested System (% of lane-miles)	14	13	9	9	9	9
Congested Time (number of "Rush Hours")	2.4	2.4	2.3	2.4	2.5	2.3
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	11	--	--	--	--	--
Transit Riders or Carpoolers (millions)	1	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	64	59	45	43	45	37
Rank	84	84	85	86	84	85
Fuel per Peak Traveler (gallons)	1	1	1	1	1	1
Rank	84	83	85	85	82	84
Annual Delay						
Total Delay (1000s of person-hours)	115	106	81	73	79	64
Rank	84	84	85	86	84	85
Delay per Peak Traveler (person-hrs)	3	3	2	2	2	2
Rank	84	83	85	86	82	83
Delay due to Incidents (percent)	53	53	53	53	53	53
Travel Time Index						
Rank	80	81	83	84	79	81
Congestion Cost						
Total Cost (\$ millions)	1	1	1	1	1	1
Rank	84	84	85	86	84	85
Cost per Peak Traveler (\$)	28	27	20	18	20	16
Rank	83	83	85	86	82	83

Note: System Performance statistics for 2000 through 2005 data reflect the effects of operational treatments.

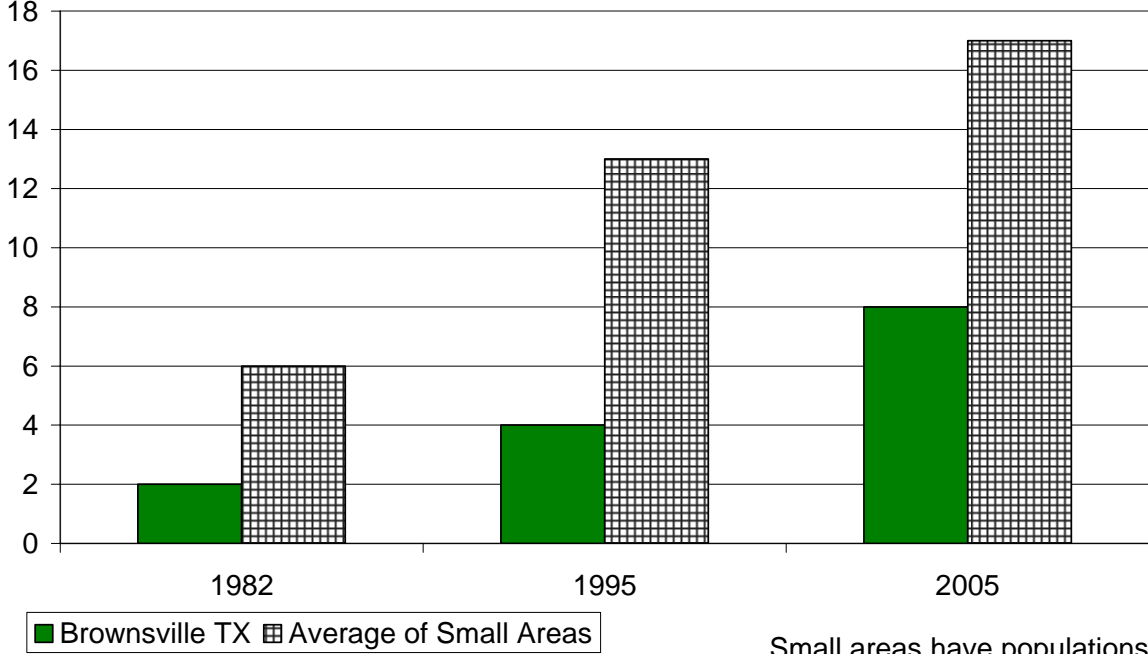
Note: Zeroes in the table reflect values less than 0.5.

Benefits From Public Transportation Service and Operations Strategies for Brownsville, TX

Operations Strategies	2005	2004	2003	2002	2001	2000
Freeway Ramp Metering						
Percent of Roadway Miles	--	--	--	--	--	--
Annual Delay Reduction (1000 hours)	--	--	--	--	--	--
Freeway Incident Management						
Cameras						
Percent of Roadway Miles	--	--	--	--	--	--
Service Patrols						
Percent of Roadway Miles	--	--	--	--	--	--
Annual Delay Reduction (1000 hours)	--	--	--	--	--	--
Arterial Signal Coordination						
Percent of Roadway Miles	81	81	70	65	56	55
Annual Delay Reduction (1000 hours)	7	10	11	12	12	4
Arterial Access Management						
Percent of Roadway Miles	13	12	12	12	12	12
Annual Delay Reduction (1000 hours)	--	--	--	--	--	--
HOV Lanes						
Daily Passenger-miles of Travel (1000s)	--	--	--	--	--	--
HOV User Delay Savings	--	--	--	--	--	--
Total Effect of Operations Treatments						
Annual Delay Reduction (1000 hours)	7	10	11	12	12	4
Annual Delay Saved per Peak Traveler (hours)	0	0	0	0	0	0
Annual Congestion Cost Savings (\$million)	0.1	0.2	0.2	0.2	0.2	0.1
Travel Time Index with Strategies	1.064	1.066	1.065	1.066	1.068	1.062
Travel Time Index (Base)	1.065	1.067	1.066	1.067	1.069	1.063
Public Transportation Service						
Existing Service						
Annual Passenger-miles of Travel (million)	14	14	14	15	14	14
Unlinked Passenger Trips (million)	2	2	2	2	2	2
Travel Time Index (combined road and transit)	1.062	1.064	1.063	1.064	1.066	1.060
Condition if Public Transportation Service were Discontinued						
Travel Time Index	1.068	1.071	1.070	1.071	1.075	1.067
Annual Delay Increase (1000 hours)	52	57	54	52	66	56
Annual Delay Increase per Peak Traveler (hours)	1	1	1	1	1	1
Annual Congestion Cost Increase (\$million)	0.9	1.0	0.9	0.9	1.1	0.9

Growth in Delay per Peak Traveler

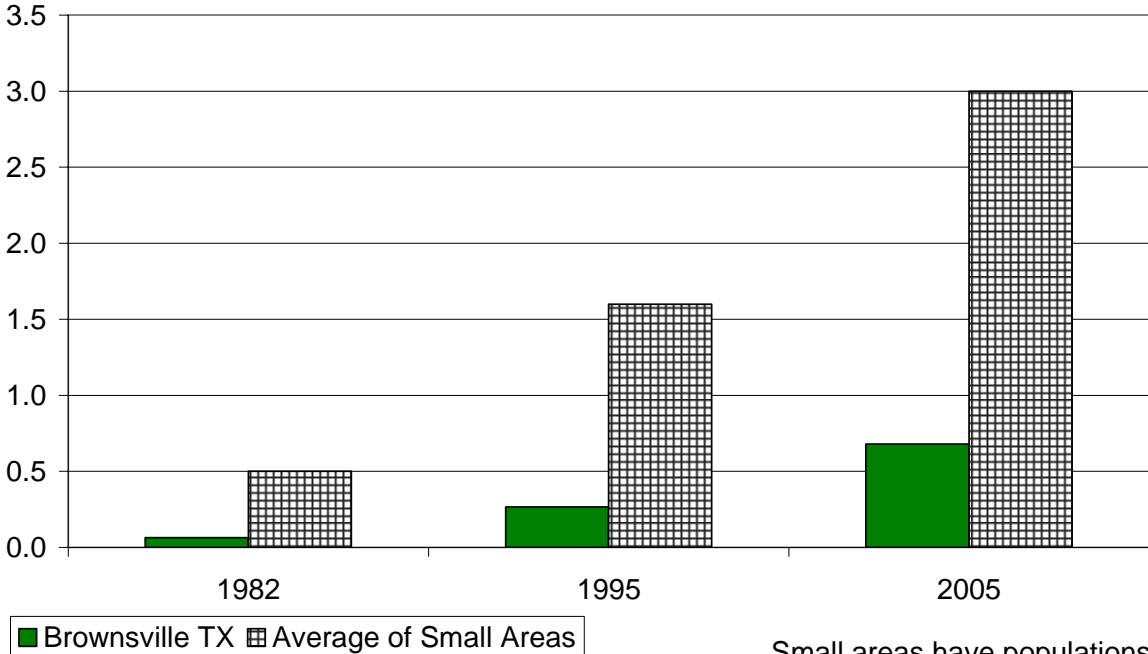
Hours of Delay



Small areas have populations under 0.5 million

Growth in Total Delay

Annual Hours of Delay (million)



Small areas have populations under 0.5 million