

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 Medium Group – 500,000 to 1 million population urban areas

Urban Area	Delay per Traveler	Travel Time Index	Total Delay	1982 to 2005	
				Delay per Traveler	Total Delay
Jacksonville, FL	H+	H+	H+	F	F+
Nashville-Davidson, TN	H+	0	H+	0	F+
Salt Lake City, UT	0	H	H	0	F+
Raleigh-Durham, NC	H+	H	H+	F+	F+
Richmond, VA	L-	L-	0	S-	S
Louisville, KY-IN	H+	H+	H+	F+	F+
Hartford, CT	L-	L-	L	S	S-
Bridgeport-Stamford, CT-NY	H	H+	H+	F	F+
Charlotte, NC-SC	H+	H+	H+	F+	F+
Austin, TX	H+	H+	H+	F+	F+
Oklahoma City, OK	L-	L-	L	S	S-
Tulsa, OK	L-	L-	L	S-	S-
Tucson, AZ	H+	H+	H+	0	F+
Dayton, OH	L-	L-	L-	S-	S-
Honolulu, HI	L	H+	L	S-	S-
Birmingham, AL	H+	0	H	F+	F+
El Paso, TX-NM	L	0	L	F	S-
Rochester, NY	L-	L-	L-	S-	S-
Springfield, MA-CT	L-	L-	L-	S-	S-
Omaha, NE-IA	L	0	L	0	S-
Sarasota-Bradenton, FL	L	H	L	S-	S-
Allentown-Bethlehem, PA-NJ	L-	L	L-	S-	S-
Akron, OH	L-	L-	L-	S-	S-
Fresno, CA	L-	L	L-	S-	S-
Grand Rapids, MI	L	L-	L-	0	S-
Oxnard-Ventura, CA	H+	H+	0	F+	F+
Albuquerque, NM	H+	0	0	F	S
New Haven, CT	L-	L-	L-	S-	S-
Albany-Schenectady, NY	L-	L-	L-	S-	S-
Toledo, OH-MI	L-	L-	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 Albuquerque, NM

Inventory Measures	2005	2004	2003	2002	2001	2000
Urban Area Information						
Population (1000s)	575	575	575	570	570	565
Rank	66	66	65	63	61	61
Urban Area (square miles)	280	280	280	280	280	275
Popn Density (persons/sq mile)	2,054	2,054	2,054	2,036	2,036	2,055
Peak Travelers (1000s)	312	311	309	303	299	292
Freeway						
Daily Vehicle-Miles of Travel (1000s)	4,665	4,515	4,285	4,100	3,980	3,875
Lane Miles	330	330	330	300	280	265
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	7,335	7,240	7,050	6,785	6,670	6,600
Lane Miles	1,540	1,500	1,440	1,400	1,380	1,360
Public Transportation						
Annual Psgr-Miles of Travel (millions)	21	21	21	22	22	22
Annual Unlinked Psgr Trips (millions)	8	8	8	8	7	6
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)	2.36	1.92	1.52	1.37	1.55	1.52
System Performance						
Congested Travel (% of peak VMT)	45	43	41	43	44	45
Congested System (% of lane-miles)	41	41	41	41	41	42
Congested Time (number of "Rush Hours")	6.0	5.8	5.6	5.8	6.0	6.2
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	51	48	37	21	22	26
Transit Riders or Carpoolers (millions)	11	11	8	5	5	6
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	6,644	5,929	5,314	5,083	5,505	5,674
Rank	50	53	56	54	52	50
Fuel per Peak Traveler (gallons)	21	19	17	17	18	19
Rank	39	42	44	44	43	36
Annual Delay						
Total Delay (1000s of person-hours)	10,407	9,392	8,387	7,926	8,547	8,791
Rank	50	52	54	55	51	49
Delay per Peak Traveler (person-hrs)	33	30	27	26	29	30
Rank	36	40	45	44	41	36
Delay due to Incidents (percent)	52	52	52	52	52	52
Travel Time Index						
Rank	42	45	48	50	42	38
Congestion Cost						
Total Cost (\$ millions)	200	171	147	135	145	145
Rank	50	51	53	53	51	49
Cost per Peak Traveler (\$)	640	551	476	446	484	495
Rank	36	40	44	44	41	35

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 Albuquerque, NM, Continued

Inventory Measures	1999	1998	1997	1996	1995	1994
Urban Area Information						
Population (1000s)	565	565	565	560	550	540
Rank	62	61	61	60	59	59
Urban Area (square miles)	275	275	275	275	270	265
Popn Density (persons/sq mile)	2,055	2,055	2,055	2,036	2,037	2,038
Peak Travelers (1000s)	289	285	281	276	267	259
Freeway						
Daily Vehicle-Miles of Travel (1000s)	3,825	3,720	3,585	3,505	3,255	3,100
Lane Miles	250	235	235	235	235	235
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	6,500	6,500	6,650	6,490	6,425	6,335
Lane Miles	1,315	1,310	1,305	1,300	1,295	1,290
Public Transportation						
Annual Psgr-Miles of Travel (millions)	21	22	23	23	22	22
Annual Unlinked Psgr Trips (millions)	7	7	7	7	7	7
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)	1.20	1.12	1.25	1.31	1.23	1.18
System Performance						
Congested Travel (% of peak VMT)	47	45	45	43	41	39
Congested System (% of lane-miles)	42	37	37	37	37	37
Congested Time (number of "Rush Hours")	6.6	6.8	6.8	6.4	6.0	5.6
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	29	32	42	46	39	38
Transit Riders or Carpoolers (millions)	7	7	10	10	9	8
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	6,452	6,203	6,008	5,641	5,048	4,436
Rank	48	47	46	45	45	45
Fuel per Peak Traveler (gallons)	22	22	21	20	19	17
Rank	33	30	30	29	31	33
Annual Delay						
Total Delay (1000s of person-hours)	10,432	9,961	9,733	9,100	7,989	7,090
Rank	48	47	45	43	45	46
Delay per Peak Traveler (person-hrs)	36	35	35	33	30	27
Rank	26	26	28	28	30	32
Delay due to Incidents (percent)	53	53	54	54	54	54
Travel Time Index						
Rank	33	34	34	34	33	38
Congestion Cost						
Total Cost (\$ millions)	164	153	148	135	115	98
Rank	48	47	45	43	45	45
Cost per Peak Traveler (\$)	567	536	525	490	429	379
Rank	27	26	26	26	30	31

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 Albuquerque, NM, Continued

Inventory Measures	1993	1992	1991	1990	1989	1988
Urban Area Information						
Population (1000s)	530	525	520	505	500	490
Rank	59	59	58	59	59	59
Urban Area (square miles)	260	260	260	255	250	250
Popn Density (persons/sq mile)	2,038	2,019	2,000	1,980	2,000	1,960
Peak Travelers (1000s)	251	246	240	230	226	220
Freeway						
Daily Vehicle-Miles of Travel (1000s)	2,940	2,670	2,480	2,430	2,310	2,225
Lane Miles	235	235	230	230	230	235
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	6,300	6,275	6,150	6,100	6,050	5,900
Lane Miles	1,285	1,280	1,275	1,270	1,265	1,250
Public Transportation						
Annual Psgr-Miles of Travel (millions)	22	21	21	21	17	17
Annual Unlinked Psgr Trips (millions)	7	6	6	6	4	4
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)	1.21	1.20	1.10	1.11	1.15	1.06
System Performance						
Congested Travel (% of peak VMT)	39	37	34	32	30	26
Congested System (% of lane-miles)	40	39	38	38	38	33
Congested Time (number of "Rush Hours")	5.4	5.0	4.6	4.4	4.2	3.8
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	39	40	38	45	43	42
Transit Riders or Carpoolers (millions)	8	8	7	9	8	8
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	4,109	3,800	3,193	3,047	2,770	2,283
Rank	45	47	47	48	46	49
Fuel per Peak Traveler (gallons)	16	15	13	13	12	10
Rank	30	31	34	36	35	37
Annual Delay						
Total Delay (1000s of person-hours)	6,532	6,065	5,151	4,971	4,557	3,756
Rank	45	46	48	48	46	49
Delay per Peak Traveler (person-hrs)	26	25	21	22	20	17
Rank	29	32	35	33	32	38
Delay due to Incidents (percent)	54	54	53	53	53	53
Travel Time Index						
Rank	36	37	39	39	39	42
Congestion Cost						
Total Cost (\$ millions)	87	79	65	61	52	41
Rank	44	46	48	48	46	49
Cost per Peak Traveler (\$)	348	323	269	264	231	185
Rank	29	32	36	33	33	37

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

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The Mobility Data for Albuquerque, NM, Continued

Inventory Measures	1987	1986	1985	1984	1983	1982
Urban Area Information						
Population (1000s)	485	475	465	455	450	440
Rank	59	60	59	58	58	60
Urban Area (square miles)	245	240	230	220	210	210
Popn Density (persons/sq mile)	1,980	1,979	2,022	2,068	2,143	2,095
Peak Travelers (1000s)	216	210	204	198	194	188
Freeway						
Daily Vehicle-Miles of Travel (1000s)	2,100	1,980	1,865	1,870	1,885	1,735
Lane Miles	240	250	260	270	270	270
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	5,750	5,650	5,500	5,400	5,200	5,000
Lane Miles	1,240	1,230	1,225	1,220	1,210	1,200
Public Transportation						
Annual Psgr-Miles of Travel (millions)	16	16	16	19	19	19
Annual Unlinked Psgr Trips (millions)	4	5	5	6	6	6
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)	1.06	1.04	1.36	1.37	1.41	1.47
System Performance						
Congested Travel (% of peak VMT)	23	21	19	17	16	16
Congested System (% of lane-miles)	32	31	31	25	21	21
Congested Time (number of "Rush Hours")	3.4	3.0	2.9	2.9	2.8	2.7
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	46	--	--	--	--	--
Transit Riders or Carpoolers (millions)	8	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	1,960	1,831	1,671	1,379	1,287	1,163
Rank	47	45	47	49	45	44
Fuel per Peak Traveler (gallons)	9	9	8	7	7	6
Rank	39	39	37	38	37	39
Annual Delay						
Total Delay (1000s of person-hours)	3,378	3,231	2,978	2,464	2,303	2,066
Rank	47	43	45	47	43	43
Delay per Peak Traveler (person-hrs)	16	15	15	12	12	11
Rank	39	34	34	38	36	37
Delay due to Incidents (percent)	53	53	53	53	53	53
Travel Time Index						
Rank	43	43	43	46	44	45
Congestion Cost						
Total Cost (\$ millions)	35	32	30	24	21	19
Rank	47	43	47	48	43	43
Cost per Peak Traveler (\$)	162	154	145	120	110	99
Rank	39	35	35	39	36	36

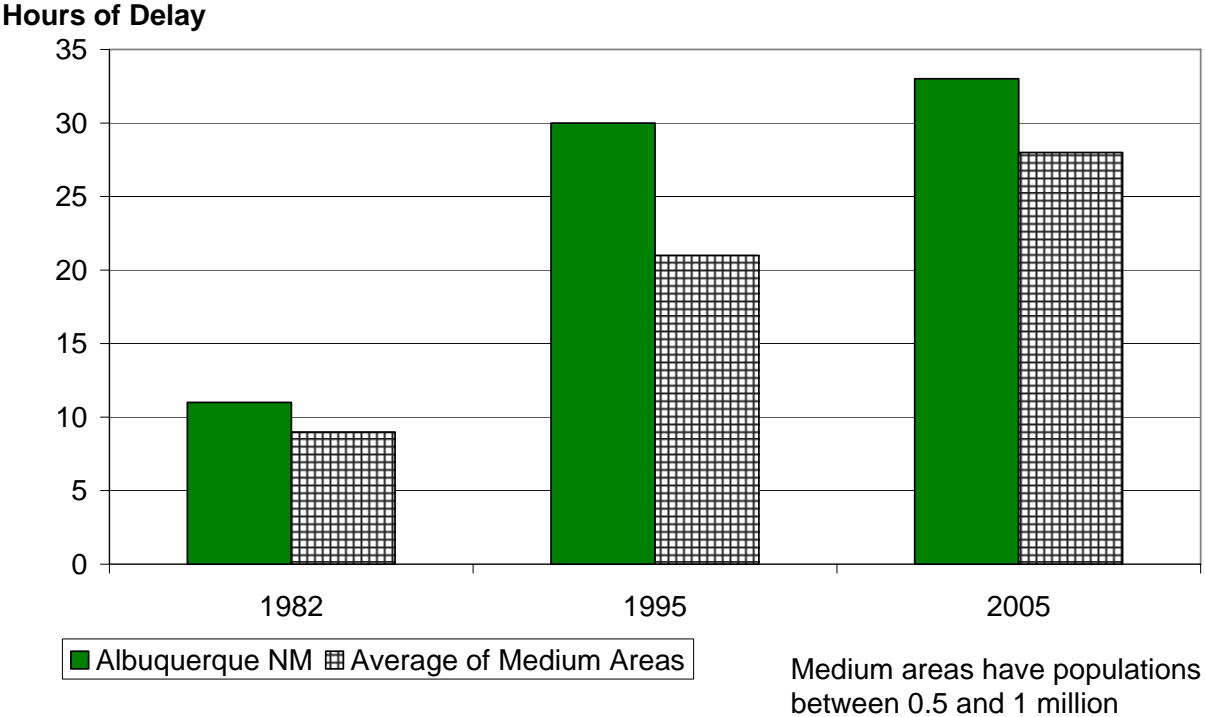
Note: System Performance statistics for 2000 through 2005 data reflect the effects of operational treatments.

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

Benefits From Public Transportation Service and Operations Strategies for Albuquerque, NM

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	24	24	24	20	--	--
Service Patrols						
Percent of Roadway Miles	45	45	45	42	--	--
Annual Delay Reduction (1000 hours)	171	140	114	77	--	--
Arterial Signal Coordination						
Percent of Roadway Miles	49	50	52	54	54	55
Annual Delay Reduction (1000 hours)	35	30	30	50	59	74
Arterial Access Management						
Percent of Roadway Miles	67	67	70	75	75	75
Annual Delay Reduction (1000 hours)	444	400	380	386	409	424
HOV Lanes						
Daily Passenger-miles of Travel (1000s)	--	--	--	--	--	--
HOV User Delay Savings	--	--	--	--	--	--
Total Effect of Operations Treatments						
Annual Delay Reduction (1000 hours)	651	570	523	513	468	499
Annual Delay Saved per Peak Traveler (hours)	2	2	2	2	2	2
Annual Congestion Cost Savings (\$million)	12.2	10.2	9.0	8.6	7.6	7.9
Travel Time Index with Strategies	1.174	1.157	1.145	1.144	1.161	1.169
Travel Time Index (Base)	1.182	1.164	1.152	1.152	1.167	1.176
Public Transportation Service						
Existing Service						
Annual Passenger-miles of Travel (million)	21	21	21	22	22	22
Unlinked Passenger Trips (million)	8	8	8	8	7	6
Travel Time Index (combined road and transit)	1.172	1.155	1.144	1.142	1.159	1.167
Condition if Public Transportation Service were Discontinued						
Travel Time Index	1.183	1.167	1.153	1.154	1.169	1.178
Annual Delay Increase (1000 hours)	122	206	157	186	168	184
Annual Delay Increase per Peak Traveler (hours)	0	1	1	1	1	1
Annual Congestion Cost Increase (\$million)	2.3	3.8	2.8	3.2	2.8	3.0

Growth in Delay per Peak Traveler



Growth in Total Delay

