

Performance Measure Summary – Salem, OR

There are several inventory and performance measures listed in the pages of this Urban Area Report for the years from 1982 to 2007. 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. 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*).

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 2007 (estimated at \$15.47 per hour of person travel and \$102.12 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.

The Mobility Data for Salem OR

Inventory Measures	2007	2006	2005	2004	2003	2002
Urban Area Information						
Population (1000s)	230	225	225	220	215	215
Rank	86	86	86	87	87	87
Urban Area (square miles)	80	80	80	80	80	80
Population Density (persons/sq mile)	2,875	2,813	2,813	2,750	2,688	2,688
Peak Travelers (1000s)	127	124	123	119	116	114
Freeway						
Daily Vehicle-Miles of Travel (1000s)	1,505	1,500	1,490	1,450	1,350	1,220
Lane-Miles	125	125	125	125	115	100
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	2,115	2,110	2,020	2,010	1,960	1,910
Lane-Miles	420	420	420	420	405	390
Public Transportation						
Annual Psgr-Miles of Travel (millions)	19.8	18.5	17.6	17.0	16.3	14.7
Annual Unlinked Psgr Trips (millions)	5.6	5.9	5.7	5.6	5.4	4.8
Cost Components						
Value of Time (\$/hour)	15.47	15.06	14.58	14.10	13.73	13.43
Commercial Cost (\$/hour)	102.12	98.77	94.06	86.24	82.38	79.96
Fuel Cost (\$/gallon)	3.14	2.81	2.48	2.11	1.65	1.52
System Performance	2007	2006	2005	2004	2003	2002
Congested Travel (% of peak VMT)	29	29	26	25	28	29
Congested System (% of lane-miles)	33	33	29	29	31	31
Congested Time (number of "Rush Hours")	5.2	5.2	5.0	4.8	4.8	5.2
Annual Increase Needed to Maintain Constant Congestion Level:						
Lane-miles	16	18	17	18	18	16
Transit Riders or Carpoolers (millions)	4	4	4	4	4	4
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	1,224	1,217	1,042	998	1,024	1,143
Rank	81	81	83	82	81	80
Fuel per Peak Traveler (gallons)	10	10	8	8	9	10
Rank	68	70	74	74	70	67
Annual Delay						
Total Delay (1000s of person-hours)	2,069	2,061	1,773	1,720	1,744	2,042
Rank	81	81	82	81	81	80
Delay per Peak Traveler (person-hours)	16	17	14	14	15	18
Rank	69	68	73	73	70	62
Delay due to Incidents (percent)	54	54	54	53	54	54
Travel Time Index	1.10	1.10	1.09	1.09	1.09	1.11
Rank	64	63	66	67	66	58
Congestion Cost						
Total Cost (\$ millions)	41	39	32	30	29	33
Rank	81	81	82	81	81	80
Cost per Peak Traveler (\$)	320	315	263	248	250	289
Rank	69	71	75	74	71	65

Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.

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

The Mobility Data for Salem OR, Continued

Inventory Measures	2001	2000	1999	1998	1997
Urban Area Information					
Population (1000s)	210	200	195	190	185
Rank	87	87	87	87	87
Urban Area (square miles)	80	80	75	75	75
Population Density (persons/sq mile)	2,625	2,500	2,600	2,533	2,467
Peak Travelers (1000s)	110	103	99	95	91
Freeway					
Daily Vehicle-Miles of Travel (1000s)	1,190	1,190	1,170	1,125	1,060
Lane-Miles	100	100	100	95	95
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	1,870	1,810	1,760	1,680	1,610
Lane-Miles	385	380	370	360	340
Public Transportation					
Annual Psgr-Miles of Travel (millions)	13.6	12.8	12.0	11.7	10.2
Annual Unlinked Psgr Trips (millions)	4.5	4.2	4.0	3.9	3.5
Cost Components					
Value of Time (\$/hour)	13.22	12.85	12.43	12.17	11.98
Commercial Cost (\$/hour)	80.88	80.75	74.23	72.61	74.32
Fuel Cost (\$/gallon)	1.67	1.64	1.47	1.19	1.40
System Performance	2001	2000	1999	1998	1997
Congested Travel (% of peak VMT)	29	26	25	23	22
Congested System (% of lane-miles)	31	27	27	27	27
Congested Time (number of "Rush Hours")	5.0	5.0	4.8	4.8	4.4
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	18	15	14	11	10
Transit Riders or Carpoolers (millions)	4	3	3	3	2
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	1,061	860	796	707	640
Rank	80	82	83	84	84
Fuel per Peak Traveler (gallons)	10	8	8	7	7
Rank	69	74	73	74	73
Annual Delay					
Total Delay (1000s of person-hours)	1,894	1,481	1,348	1,183	1,084
Rank	79	82	81	83	84
Delay per Peak Traveler (person-hours)	17	14	14	12	12
Rank	65	71	70	74	73
Delay due to Incidents (percent)	54	54	54	54	54
Travel Time Index	1.11	1.09	1.08	1.08	1.07
Rank	59	67	71	68	72
Congestion Cost					
Total Cost (\$ millions)	30	23	20	17	16
Rank	79	82	82	83	83
Cost per Peak Traveler (\$)	278	226	205	183	175
Rank	66	73	74	75	74

Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.
 Note: Zeroes in the table reflect values less than 0.5.

The Mobility Data for Salem OR, Continued

Inventory Measures	1996	1995	1994	1993	1992
Urban Area Information					
Population (1000s)	180	175	175	175	170
Rank	87	87	87	87	87
Urban Area (square miles)	75	75	75	75	75
Population Density (persons/sq mile)	2,400	2,333	2,333	2,333	2,267
Peak Travelers (1000s)	87	83	82	81	78
Freeway					
Daily Vehicle-Miles of Travel (1000s)	1,025	1,010	970	935	955
Lane-Miles	95	95	95	95	95
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	1,520	1,550	1,570	1,535	1,410
Lane-Miles	325	315	300	280	265
Public Transportation					
Annual Psgr-Miles of Travel (millions)	10.0	10.0	10.1	9.8	9.5
Annual Unlinked Psgr Trips (millions)	3.1	3.0	3.2	3.1	3.0
Cost Components					
Value of Time (\$/hour)	11.71	11.37	11.06	10.78	10.47
Commercial Cost (\$/hour)	74.17	71.54	69.53	67.77	66.19
Fuel Cost (\$/gallon)	1.37	1.28	1.24	1.26	1.26
System Performance	1996	1995	1994	1993	1992
Congested Travel (% of peak VMT)	21	22	22	21	18
Congested System (% of lane-miles)	27	27	26	25	25
Congested Time (number of "Rush Hours")	4.2	4.2	4.4	4.4	4.2
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	12	14	15	15	18
Transit Riders or Carpoolers (millions)	2	3	3	3	4
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	580	598	592	556	455
Rank	84	84	83	84	84
Fuel per Peak Traveler (gallons)	7	7	7	7	6
Rank	72	68	67	67	68
Annual Delay					
Total Delay (1000s of person-hours)	979	1,000	979	940	767
Rank	84	83	83	83	84
Delay per Peak Traveler (person-hours)	11	12	12	12	10
Rank	73	69	64	66	70
Delay due to Incidents (percent)	54	54	54	54	54
Travel Time Index	1.07	1.07	1.07	1.07	1.06
Rank	68	66	65	61	66
Congestion Cost					
Total Cost (\$ millions)	14	14	13	13	10
Rank	84	83	83	83	84
Cost per Peak Traveler (\$)	164	168	163	154	128
Rank	74	72	68	67	71

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The Mobility Data for Salem OR, Continued

Inventory Measures	1991	1990	1989	1988	1987
Urban Area Information					
Population (1000s)	170	170	165	165	165
Rank	87	87	87	87	86
Urban Area (square miles)	75	75	75	75	70
Population Density (persons/sq mile)	2,267	2,267	2,200	2,200	2,357
Peak Travelers (1000s)	76	75	72	72	71
Freeway					
Daily Vehicle-Miles of Travel (1000s)	930	920	905	880	755
Lane-Miles	90	90	90	90	90
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	1,300	1,220	1,205	1,145	1,100
Lane-Miles	250	245	235	235	225
Public Transportation					
Annual Psgr-Miles of Travel (millions)	8.8	8.3	8.0	7.5	7.8
Annual Unlinked Psgr Trips (millions)	2.7	2.6	2.5	2.4	2.4
Cost Components					
Value of Time (\$/hour)	10.17	9.75	9.25	8.83	8.48
Commercial Cost (\$/hour)	64.55	62.47	59.16	56.03	54.62
Fuel Cost (\$/gallon)	1.48	1.16	1.32	1.22	1.22
System Performance	1991	1990	1989	1988	1987
Congested Travel (% of peak VMT)	16	14	10	9	9
Congested System (% of lane-miles)	21	20	18	14	14
Congested Time (number of "Rush Hours")	4.2	4.0	4.0	3.6	3.0
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	18	15	18	22	19
Transit Riders or Carpoolers (millions)	4	3	4	5	4
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	388	331	263	229	185
Rank	84	85	85	86	87
Fuel per Peak Traveler (gallons)	5	4	4	3	3
Rank	71	74	73	75	75
Annual Delay					
Total Delay (1000s of person-hours)	654	571	491	424	336
Rank	85	85	85	86	87
Delay per Peak Traveler (person-hours)	9	8	7	6	5
Rank	67	71	73	73	75
Delay due to Incidents (percent)	54	54	52	52	52
Travel Time Index	1.05	1.05	1.04	1.03	1.03
Rank	71	65	71	75	72
Congestion Cost					
Total Cost (\$ millions)	8	7	6	5	4
Rank	85	85	85	85	85
Cost per Peak Traveler (\$)	109	91	77	64	49
Rank	71	75	74	76	78

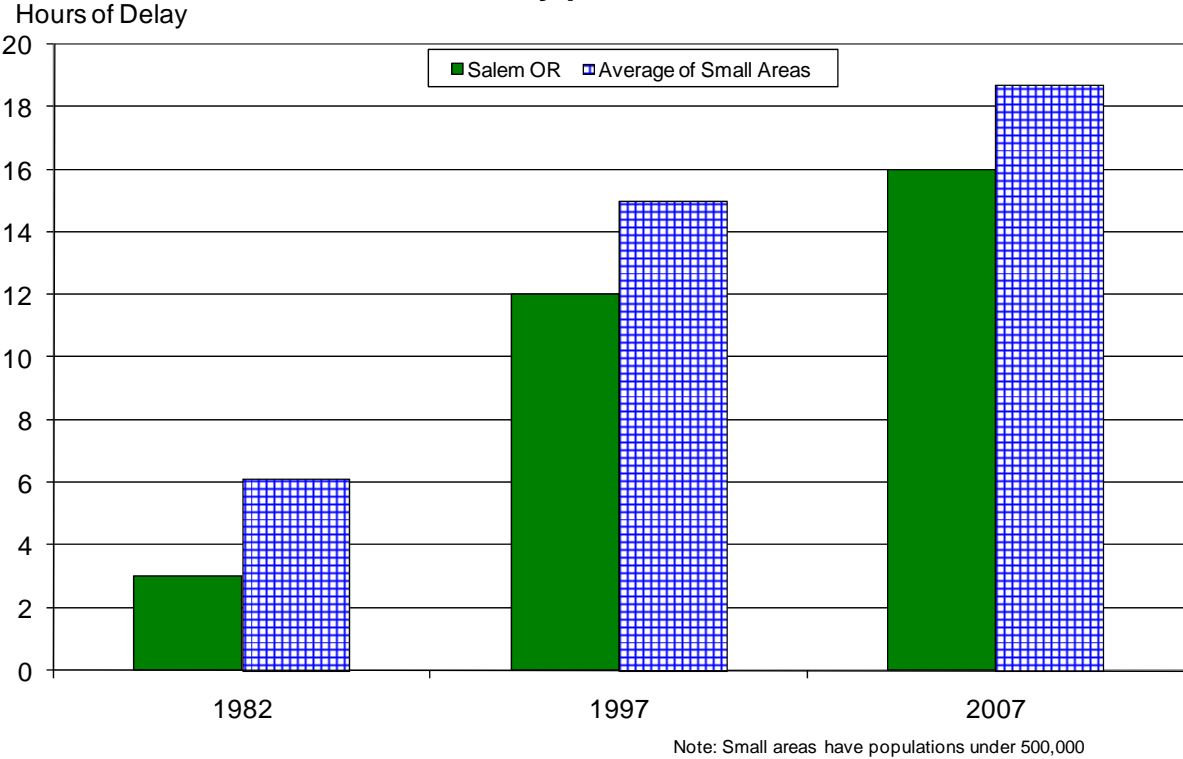
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The Mobility Data for Salem OR, Continued

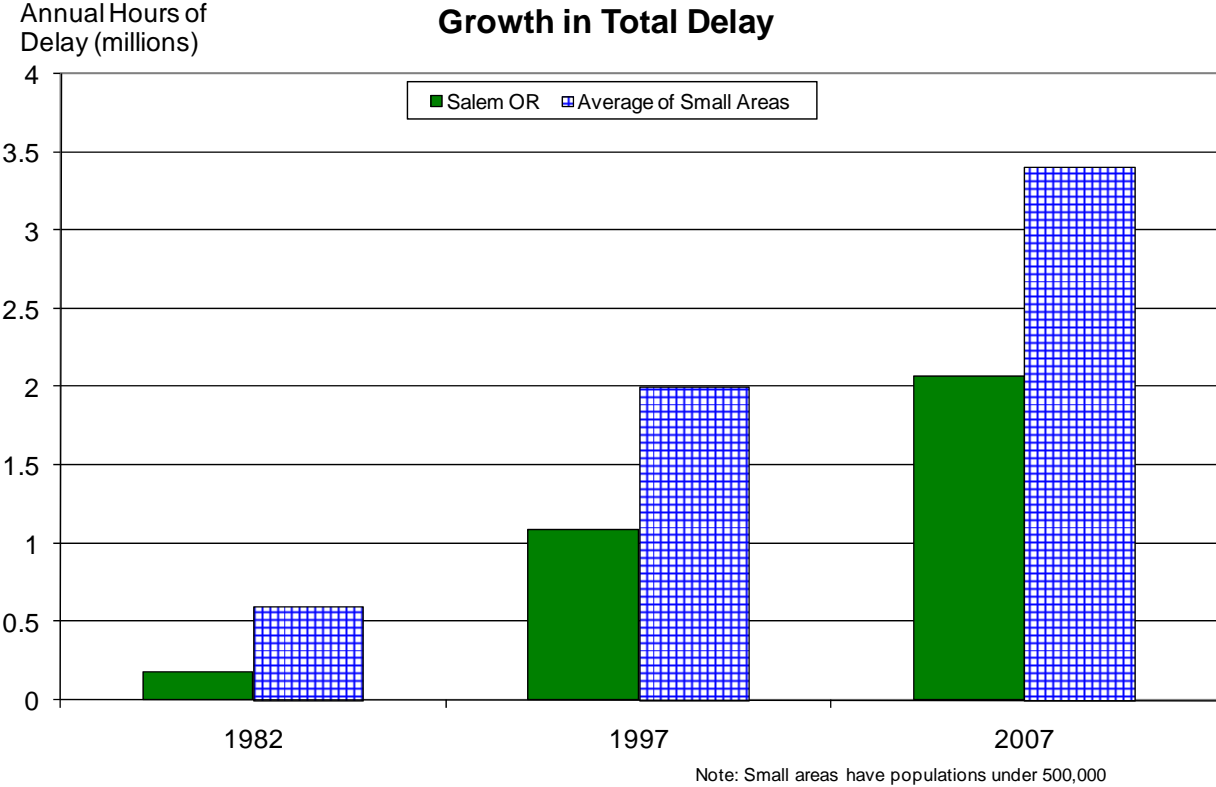
Inventory Measures	1986	1985	1984	1983	1982
Urban Area Information					
Population (1000s)	165	165	160	160	160
Rank	86	86	86	86	86
Urban Area (square miles)	70	70	70	70	70
Population Density (persons/sq mile)	2,357	2,357	2,286	2,286	2,286
Peak Travelers (1000s)	71	70	68	67	66
Freeway					
Daily Vehicle-Miles of Travel (1000s)	660	680	615	530	520
Lane-Miles	90	90	90	85	80
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	1,075	1,030	1,005	915	860
Lane-Miles	220	230	220	225	225
Public Transportation					
Annual Psgr-Miles of Travel (millions)	7.3	6.9	8.8	8.8	8.8
Annual Unlinked Psgr Trips (millions)	2.3	2.2	2.7	2.7	2.7
Cost Components					
Value of Time (\$/hour)	8.18	8.03	7.75	7.43	7.20
Commercial Cost (\$/hour)	52.63	55.80	54.65	52.70	52.13
Fuel Cost (\$/gallon)	1.19	1.56	1.58	1.61	1.69
System Performance	1986	1985	1984	1983	1982
Congested Travel (% of peak VMT)	7	7	7	6	6
Congested System (% of lane-miles)	14	14	14	15	15
Congested Time (number of "Rush Hours")	2.9	2.8	2.7	2.5	2.5
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	--	--	--	--	--
Transit Riders or Carpoolers (millions)	--	--	--	--	--
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	143	127	119	97	96
Rank	88	88	88	88	88
Fuel per Peak Traveler (gallons)	2	2	2	1	1
Rank	80	78	73	84	84
Annual Delay					
Total Delay (1000s of person-hours)	262	227	212	172	178
Rank	88	88	88	88	88
Delay per Peak Traveler (person-hours)	4	3	3	3	3
Rank	78	82	79	78	76
Delay due to Incidents (percent)	52	52	52	52	52
Travel Time Index	1.02	1.02	1.02	1.02	1.02
Rank	80	80	76	74	74
Congestion Cost					
Total Cost (\$ millions)	3	2	2	2	2
Rank	86	88	86	86	85
Cost per Peak Traveler (\$)	37	33	31	25	25
Rank	82	83	81	83	83

Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.
 Note: Zeroes in the table reflect values less than 0.5.

Growth in Delay per Peak Traveler



Growth in Total Delay



**Benefits from Public Transportation Service and Operations Strategies in
Salem OR**

Operations Strategies	2007	2006	2005	2004
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	67	65	52	43
Annual Delay Reduction (1000 hours)	37	34	18	10
Arterial Access Management				
Percent of Roadway Miles	5	5	5	5
Annual Delay Reduction (1000 hours)	17	22	11	17
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	54	56	29	27
Annual Delay Saved per Peak Traveler (hours)	0	0	0	0
Annual Congestion Cost Savings (\$million)	1.0	1.0	0.5	0.5
Travel Time Index with Strategies	1.103	1.103	1.090	1.087
Travel Time Index (Base)	1.105	1.105	1.091	1.088
Public Transportation Service	2007	2006	2005	2004
Existing Service				
Annual Passenger-miles of travel (million)	19.8	18.5	17.6	17.0
Unlinked Passenger Trips (million)	5.6	5.9	5.7	5.6
Travel Time Index (combined road and transit)	1.104	1.104	1.090	1.087
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.109	1.109	1.094	1.091
Annual Increase				
Delay (1000 hours)	111	116	84	86
Delay per Peak Traveler (hours)	1	1	1	1
Congestion Cost (\$million)	2.3	2.3	1.5	1.5

**Benefits from Public Transportation Service and Operations Strategies in
Salem OR, Continued**

Operations Strategies	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	44	31	31	32
Annual Delay Reduction (1000 hours)	10	9	9	6
Arterial Access Management				
Percent of Roadway Miles	5	5	5	4
Annual Delay Reduction (1000 hours)	8	0	0	1
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	18	9	10	7
Annual Delay Saved per Peak Traveler (hours)	0	0	0	0
Annual Congestion Cost Savings (\$million)	0.3	0.2	0.2	0.1
Travel Time Index with Strategies	1.094	1.111	1.105	1.086
Travel Time Index (Base)	1.095	1.112	1.106	1.087
Public Transportation Service	2003	2002	2001	2000
Existing Service				
Annual Passenger-miles of travel (million)	16.3	14.7	13.6	12.8
Unlinked Passenger Trips (million)	5.4	4.8	4.5	4.2
Travel Time Index (combined road and transit)	1.093	1.111	1.105	1.086
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.098	1.114	1.108	1.090
Annual Increase				
Delay (1000 hours)	87	75	64	79
Delay per Peak Traveler (hours)	1	1	1	1
Congestion Cost (\$million)	1.5	1.2	1.0	1.3

**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 2007	
				Delay per Traveler	Total Delay
Knoxville, TN	H+	H	H+	F	F+
Charleston-North Charleston, SC	H+	H+	H+	F+	F+
Cape Coral, FL	H+	H+	H+	F+	F+
Columbia, SC	H	0	H+	F+	F+
Wichita, KS	L-	L-	L-	S-	S-
Little Rock, AR	H	0	H	F+	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-	L	L-	S-	S-
Salem, OR	L	0	L	0	S-
Beaumont, TX	L-	L-	L-	S-	S-
Laredo, TX	L	H	L-	0	S-
Brownsville, TX	L-	L	L-	S-	S-
Boulder, CO	L-	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

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
2007 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 2007 Trends Delay per Traveler - Total Delay -	5 Hours 5 Hours x Average Population	3 Hours 3 Hours x Average Population