Performance Measure Summary – Spokane, WA

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 Spokane WA

Inventory Measures	2007	2006	2005	2004	2003	2002
Urban Area Information						
Population (1000s)	365	360	360	360	355	330
Rank	81	81	81	81	80	81
Urban Area (square miles)	180	180	180	180	180	175
Population Density (persons/sq mile)	2,028	2,000	2,000	2,000	1,972	1,886
Peak Travelers (1000s)	201	198	196	195	191	175
Freeway						
Daily Vehicle-Miles of Travel (1000s)	2,125	2,070	2,030	1,980	1,900	1,800
Lane-Miles	205	205	205	185	170	165
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	4,515	4,405	4,450	4,330	4,180	4,105
Lane-Miles	1,290	1,260	1,260	1,260	1,190	1,140
Public Transportation						
Annual Psgr-Miles of Travel (millions)	49.6	38.8	40.9	40.7	37.2	38.1
Annual Unlinked Psgr Trips (millions)	10.1	9.1	8.3	8.3	8.1	8.0
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 ($/gallon)	3.18	2.80	2.32	2.11	1.63	1.48
System Performance	**2007**	**2006**	**2005**	**2004**	**2003**	**2002**
Congested Travel (% of peak VMT)	17	16	15	16	17	17
Congested System (% of lane-miles)	20	20	19	20	20	20
Congested Time (number of "Rush Hours")	3.0	2.9	2.9	3.0	3.2	3.2
Annual Increase Needed to Maintain Constant Congestion Level:						
Lane-miles	36	35	40	34	30	27
Transit Riders or Carpoolers (millions)	5	5	6	5	5	4
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	1,056	972	930	983	1,010	1,008
Rank	82	82	84	83	82	81
Fuel per Peak Traveler (gallons)	5	5	5	5	5	6
Rank	86	86	86	87	86	78
Annual Delay						
Total Delay (1000s of person-hours)	1,714	1,607	1,544	1,596	1,649	1,652
Rank	83	83	84	83	82	81
Delay per Peak Traveler (person-hours)	9	8	8	8	9	9
Rank	85	86	87	87	85	84
Delay due to Incidents (percent)	55	54	54	55	55	55
Travel Time Index	1.05	1.04	1.04	1.05	1.05	1.05
Rank	87	89	89	87	87	86
Congestion Cost						
Total Cost ($ millions)	36	32	29	29	29	28
Rank	83	82	84	83	81	81
Cost per Peak Traveler ($)	178	163	150	148	150	160
Rank	87	86	87	87	86	84

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 Spokane WA, Continued

Inventory Measures	2001	2000	1999	1998	1997
Urban Area Information					
Population (1000s)	330	330	330	325	325
Rank	80	79	78	78	78
Urban Area (square miles)	175	175	175	170	170
Population Density (persons/sq mile)	1,886	1,886	1,886	1,912	1,912
Peak Travelers (1000s)	173	170	167	163	160
Freeway					
Daily Vehicle-Miles of Travel (1000s)	1,700	1,600	1,500	1,420	1,335
Lane-Miles	155	145	135	130	125
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	4,060	4,070	4,105	4,040	3,985
Lane-Miles	1,120	1,105	1,090	1,075	1,050
Public Transportation					
Annual Psgr-Miles of Travel (millions)	37.5	39.8	37.4	39.8	38.4
Annual Unlinked Psgr Trips (millions)	8.9	9.0	8.6	8.5	8.7
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 ($/gallon)	1.63	1.63	1.40	1.13	1.33
System Performance	**2001**	**2000**	**1999**	**1998**	**1997**
Congested Travel (% of peak VMT)	18	19	19	18	18
Congested System (% of lane-miles)	21	21	21	21	21
Congested Time (number of "Rush Hours")	3.2	3.2	3.4	3.4	3.2
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	27	28	18	20	28
Transit Riders or Carpoolers (millions)	4	4	3	3	4
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	1,014	1,127	1,113	1,038	989
Rank	81	79	79	79	79
Fuel per Peak Traveler (gallons)	6	7	7	6	6
Rank	78	77	76	77	77
Annual Delay					
Total Delay (1000s of person-hours)	1,636	1,788	1,838	1,718	1,659
Rank	81	79	79	79	78
Delay per Peak Traveler (person-hours)	9	11	11	11	10
Rank	83	78	79	76	75
Delay due to Incidents (percent)	55	56	55	55	54
Travel Time Index	1.05	1.06	1.06	1.06	1.05
Rank	86	79	77	76	79
Congestion Cost					
Total Cost ($ millions)	28	30	29	26	25
Rank	81	79	79	79	78
Cost per Peak Traveler ($)	161	176	173	162	158
Rank	83	79	78	77	75

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 Spokane WA, Continued

Inventory Measures	1996	1995	1994	1993	1992
Urban Area Information					
Population (1000s)	320	320	315	305	300
Rank	78	78	77	78	78
Urban Area (square miles)	165	165	165	160	160
Population Density (persons/sq mile)	1,939	1,939	1,909	1,906	1,875
Peak Travelers (1000s)	155	153	148	141	137
Freeway					
Daily Vehicle-Miles of Travel (1000s)	1,295	1,280	1,230	1,185	1,110
Lane-Miles	125	125	125	125	125
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	3,875	3,795	3,980	3,850	3,625
Lane-Miles	1,030	1,000	995	955	930
Public Transportation					
Annual Psgr-Miles of Travel (millions)	39.0	38.6	36.6	37.8	31.9
Annual Unlinked Psgr Trips (millions)	8.4	8.0	8.0	8.0	7.4
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 ($/gallon)	1.35	1.25	1.16	1.19	1.22
System Performance	**1996**	**1995**	**1994**	**1993**	**1992**
Congested Travel (% of peak VMT)	17	16	18	18	16
Congested System (% of lane-miles)	20	19	24	24	19
Congested Time (number of "Rush Hours")	3.0	3.0	3.2	3.0	2.9
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	37	47	64	63	54
Transit Riders or Carpoolers (millions)	6	7	10	10	8
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	880	843	1,068	1,021	755
Rank	79	79	76	73	77
Fuel per Peak Traveler (gallons)	6	6	7	7	6
Rank	76	74	67	67	68
Annual Delay					
Total Delay (1000s of person-hours)	1,489	1,436	1,870	1,805	1,272
Rank	79	78	75	73	77
Delay per Peak Traveler (person-hours)	10	9	13	13	9
Rank	75	77	62	62	74
Delay due to Incidents (percent)	54	54	54	53	54
Travel Time Index	1.05	1.05	1.06	1.06	1.05
Rank	78	78	70	68	73
Congestion Cost					
Total Cost ($ millions)	22	21	26	25	17
Rank	79	78	73	71	76
Cost per Peak Traveler ($)	144	136	177	175	125
Rank	76	77	62	62	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 Spokane WA, Continued

Inventory Measures	1991	1990	1989	1988	1987
Urban Area Information					
Population (1000s)	295	290	290	290	290
Rank	78	78	78	77	77
Urban Area (square miles)	160	160	155	155	155
Population Density (persons/sq mile)	1,844	1,813	1,871	1,871	1,871
Peak Travelers (1000s)	132	128	127	126	125
Freeway					
Daily Vehicle-Miles of Travel (1000s)	995	925	885	835	870
Lane-Miles	125	125	125	125	125
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	3,425	3,210	3,050	2,960	2,820
Lane-Miles	905	880	860	845	815
Public Transportation					
Annual Psgr-Miles of Travel (millions)	36.7	44.3	34.6	33.9	33.3
Annual Unlinked Psgr Trips (millions)	7.6	9.4	6.7	6.5	6.5
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 ($/gallon)	1.14	1.09	1.10	1.02	1.02
System Performance	**1991**	**1990**	**1989**	**1988**	**1987**
Congested Travel (% of peak VMT)	14	10	10	10	11
Congested System (% of lane-miles)	19	18	18	18	17
Congested Time (number of "Rush Hours")	2.8	2.7	2.6	2.6	2.6
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	39	35	38	38	40
Transit Riders or Carpoolers (millions)	6	5	5	5	5
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	638	470	443	428	493
Rank	76	82	80	79	75
Fuel per Peak Traveler (gallons)	5	4	3	3	4
Rank	71	74	80	75	69
Annual Delay					
Total Delay (1000s of person-hours)	1,106	831	793	784	937
Rank	77	82	79	78	75
Delay per Peak Traveler (person-hours)	8	6	6	6	7
Rank	74	78	76	73	68
Delay due to Incidents (percent)	53	53	53	53	52
Travel Time Index	1.04	1.03	1.03	1.03	1.04
Rank	73	80	79	75	65
Congestion Cost					
Total Cost ($ millions)	14	10	9	9	10
Rank	76	79	79	77	75
Cost per Peak Traveler ($)	109	81	74	70	81
Rank	71	77	75	73	69

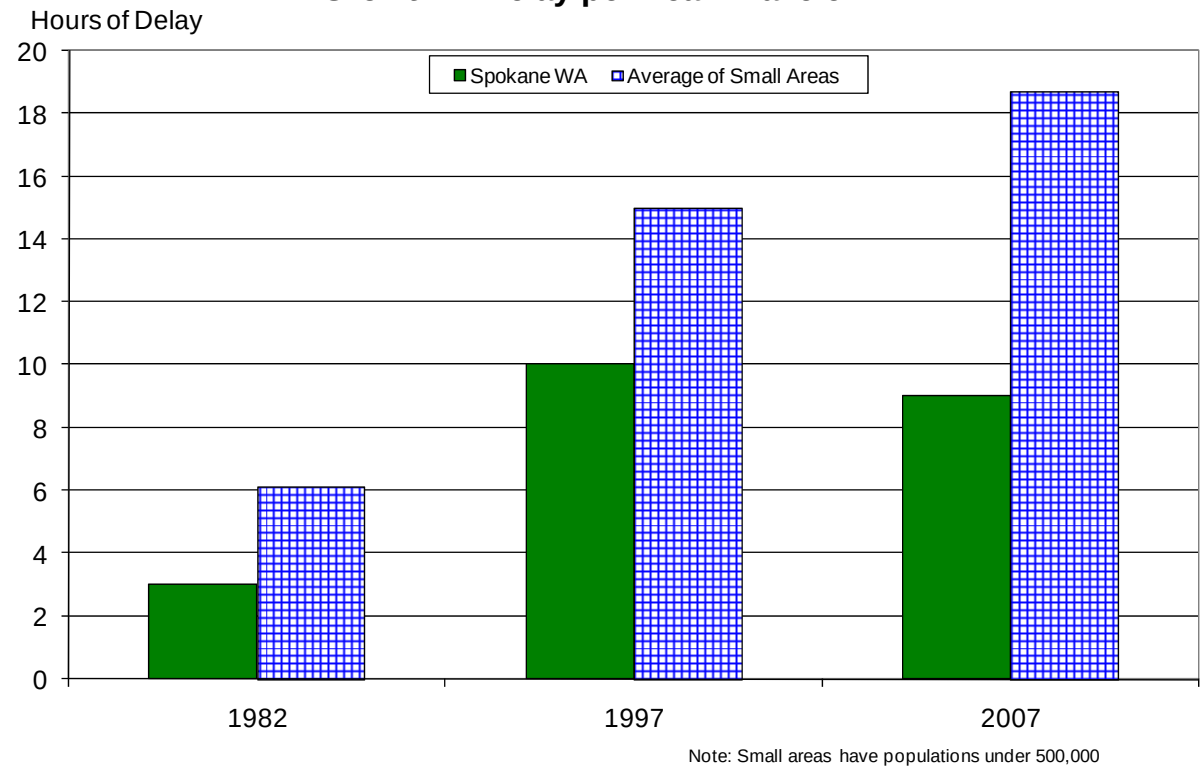
Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.
Note: Zeroes in the table reflect values less than 0.5.

The Mobility Data for Spokane WA, Continued

Inventory Measures	1986	1985	1984	1983	1982
Urban Area Information					
Population (1000s)	285	285	285	280	275
Rank	77	76	75	75	75
Urban Area (square miles)	155	150	150	150	150
Population Density (persons/sq mile)	1,839	1,900	1,900	1,867	1,833
Peak Travelers (1000s)	122	121	120	117	114
Freeway					
Daily Vehicle-Miles of Travel (1000s)	950	905	850	835	815
Lane-Miles	125	125	125	125	125
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	2,725	2,575	2,415	2,290	2,180
Lane-Miles	800	780	770	755	740
Public Transportation					
Annual Psgr-Miles of Travel (millions)	39.3	45.3	39.4	39.4	39.4
Annual Unlinked Psgr Trips (millions)	6.8	7.6	7.0	7.0	7.0
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 ($/gallon)	0.99	1.30	1.31	1.34	1.41
System Performance	**1986**	**1985**	**1984**	**1983**	**1982**
Congested Travel (% of peak VMT)	9	9	7	7	6
Congested System (% of lane-miles)	17	17	13	13	13
Congested Time (number of "Rush Hours")	2.6	2.5	2.4	2.4	2.3
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	- -	- -	- -	- -	- -
Transit Riders or Carpoolers (millions)	- -	- -	- -	- -	- -
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	377	326	243	223	214
Rank	80	80	83	83	83
Fuel per Peak Traveler (gallons)	3	3	2	2	2
Rank	72	71	73	73	72
Annual Delay					
Total Delay (1000s of person-hours)	680	574	432	396	390
Rank	79	80	81	82	82
Delay per Peak Traveler (person-hours)	6	5	4	3	3
Rank	69	72	72	78	76
Delay due to Incidents (percent)	52	52	52	52	52
Travel Time Index	1.03	1.03	1.02	1.02	1.02
Rank	71	69	76	74	74
Congestion Cost					
Total Cost ($ millions)	7	6	5	4	4
Rank	77	77	79	80	79
Cost per Peak Traveler ($)	59	51	37	34	34
Rank	73	74	77	77	77

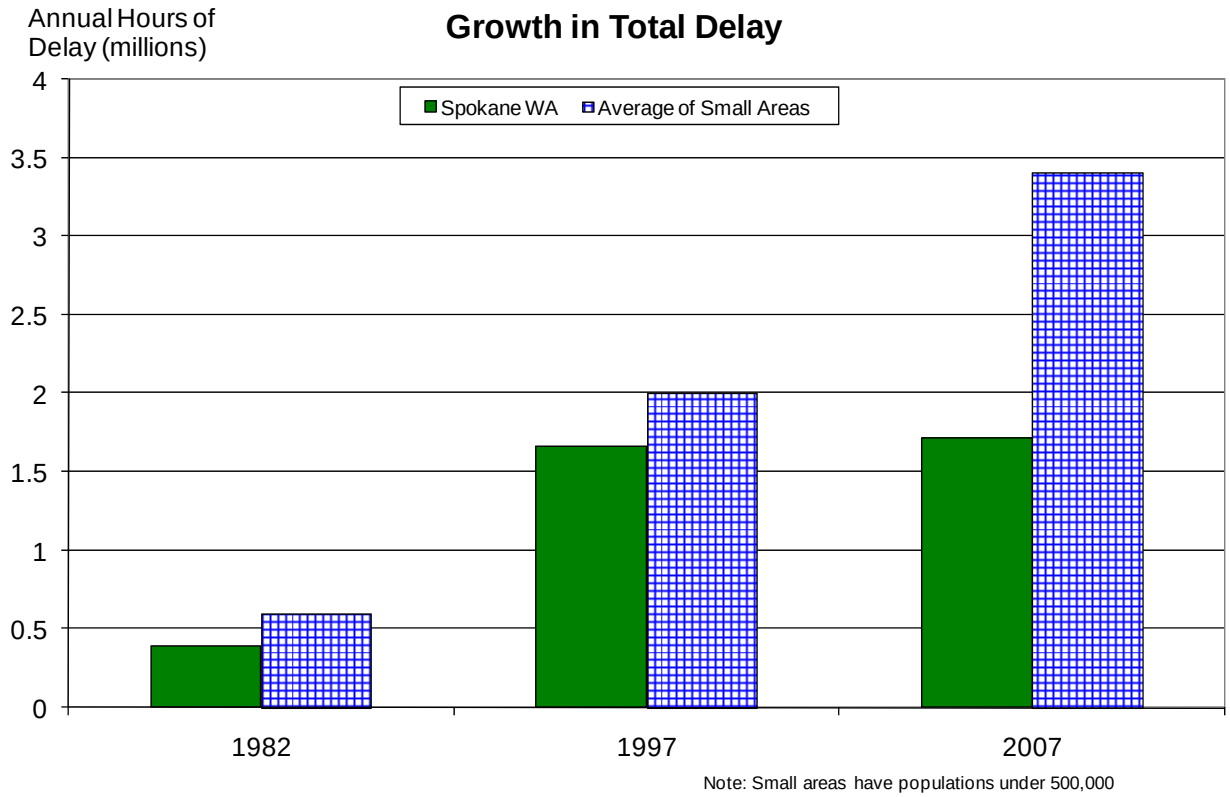
Note: System Performance statistics for 2000 through 2007 data reflect the effects of operational treatments.
Note: Zeroes in the table reflect values less than 0.5.

Growth in Delay per Peak Traveler



Note: Small areas have populations under 500,000

Growth in Total Delay



Note: Small areas have populations under 500,000

Benefits from Public Transportation Service and Operations Strategies in Spokane Wa

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	58	58	57	38
Service Patrols				
Percent of Roadway Miles	63	63	63	70
Annual Delay Reduction (1000 hours)	23	16	10	16
Arterial Signal Coordination				
Percent of Roadway Miles	61	53	51	52
Annual Delay Reduction (1000 hours)	25	11	20	21
Arterial Access Management				
Percent of Roadway Miles	6	6	5	6
Annual Delay Reduction (1000 hours)	27	14	21	23
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	75	41	52	60
Annual Delay Saved per Peak Traveler (hours)	0	0	0	0
Annual Congestion Cost Savings ($million)	1.6	0.9	1.0	1.1
Travel Time Index with Strategies	1.047	1.044	1.042	1.046
Travel Time Index (Base)	1.049	1.045	1.043	1.047
Public Transportation Service	**2007**	**2006**	**2005**	**2004**
Existing Service				
Annual Passenger-miles of travel (million)	49.6	38.8	40.9	40.7
Unlinked Passenger Trips (million)	10.1	9.1	8.3	8.3
Travel Time Index (combined road and transit)	1.048	1.045	1.043	1.047
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.052	1.047	1.046	1.049
Annual Increase				
Delay (1000 hours)	169	84	117	92
Delay per Peak Traveler (hours)	1	0	1	0
Congestion Cost ($million)	3.6	1.7	2.3	1.7

Benefits from Public Transportation Service and Operations Strategies in Spokane Wa, 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	30	30	30	--
Service Patrols				
Percent of Roadway Miles	76	79	--	--
Annual Delay Reduction (1000 hours)	18	20	1	--
Arterial Signal Coordination				
Percent of Roadway Miles	48	50	50	51
Annual Delay Reduction (1000 hours)	20	20	18	15
Arterial Access Management				
Percent of Roadway Miles	6	6	6	6
Annual Delay Reduction (1000 hours)	25	28	28	28
HOV Lanes				
Daily Passenger-miles of travel (1000s)	--	--	--	--
HOV User Delay Savings	--	--	--	--
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	62	68	46	43
Annual Delay Saved per Peak Traveler (hours)	0	0	0	0
Annual Congestion Cost Savings ($million)	1.1	1.2	0.8	0.7
Travel Time Index with Strategies	1.049	1.050	1.052	1.059
Travel Time Index (Base)	1.051	1.052	1.053	1.060
Public Transportation Service	**2003**	**2002**	**2001**	**2000**
Existing Service				
Annual Passenger-miles of travel (million)	37.2	38.1	37.5	39.8
Unlinked Passenger Trips (million)	8.1	8.0	8.9	9.0
Travel Time Index (combined road and transit)	1.050	1.051	1.052	1.059
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.054	1.057	1.057	1.063
Annual Increase				
Delay (1000 hours)	141	186	166	159
Delay per Peak Traveler (hours)	1	1	1	1
Congestion Cost ($million)	2.5	3.3	2.9	2.7

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	
2007 Values	**Above 1M Population**	**Below 1M Population**
Delay per Traveler -	5 Hours	3 Hours
Travel Time Index -	5 Index Points	3 Index Points
Total Delay -	5 Hours x Average Population	3 Hours x Average Population
1982 to 2007 Trends		
Delay per Traveler -	5 Hours	3 Hours
Total Delay -	5 Hours x Average Population	3 Hours x Average Population