

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 Salem, OR

Inventory Measures	2005	2004	2003	2002	2001	2000
Urban Area Information						
Population (1000s)	225	220	215	215	210	200
Rank	81	82	82	82	82	82
Urban Area (square miles)	80	80	80	80	80	80
Popn Density (persons/sq mile)	2,813	2,750	2,688	2,688	2,625	2,500
Peak Travelers (1000s)	123	119	116	114	110	103
Freeway						
Daily Vehicle-Miles of Travel (1000s)	1,490	1,450	1,350	1,220	1,190	1,190
Lane Miles	125	125	115	100	100	100
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	2,020	2,010	1,960	1,910	1,870	1,810
Lane Miles	420	420	405	390	385	380
Public Transportation						
Annual Psgr-Miles of Travel (millions)	18	17	16	15	14	13
Annual Unlinked Psgr Trips (millions)	6	6	5	5	4	4
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)	2.48	2.11	1.65	1.52	1.67	1.64
System Performance						
Congested Travel (% of peak VMT)	26	25	28	29	29	26
Congested System (% of lane-miles)	29	29	31	31	31	27
Congested Time (number of "Rush Hours")	5.0	4.8	4.8	5.2	5.0	5.0
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	17	18	18	16	18	15
Transit Riders or Carpoolers (millions)	4	4	4	4	4	3
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	1,042	998	1,024	1,143	1,061	860
Rank	79	78	77	77	77	79
Fuel per Peak Traveler (gallons)	8	8	9	10	10	8
Rank	73	73	67	66	68	73
Annual Delay						
Total Delay (1000s of person-hours)	1,773	1,720	1,744	2,042	1,894	1,481
Rank	78	77	77	77	76	79
Delay per Peak Traveler (person-hrs)	14	14	15	18	17	14
Rank	72	72	68	61	65	70
Delay due to Incidents (percent)	54	53	54	54	54	54
Travel Time Index						
Rank	1.09	1.09	1.09	1.11	1.11	1.09
Rank	64	65	64	57	58	65
Congestion Cost						
Total Cost (\$ millions)	31	29	29	33	30	23
Rank	79	77	77	77	76	79
Cost per Peak Traveler (\$)	257	244	246	285	273	221
Rank	73	73	69	63	66	72

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 Salem, OR, Continued

Inventory Measures	1999	1998	1997	1996	1995	1994
Urban Area Information						
Population (1000s)	195	190	185	180	175	175
Rank	82	82	82	82	82	82
Urban Area (square miles)	75	75	75	75	75	75
Popn Density (persons/sq mile)	2,600	2,533	2,467	2,400	2,333	2,333
Peak Travelers (1000s)	99	95	91	87	83	82
Freeway						
Daily Vehicle-Miles of Travel (1000s)	1,170	1,125	1,060	1,025	1,010	970
Lane Miles	100	95	95	95	95	95
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	1,760	1,680	1,610	1,520	1,550	1,570
Lane Miles	370	360	340	325	315	300
Public Transportation						
Annual Psgr-Miles of Travel (millions)	12	12	10	10	10	10
Annual Unlinked Psgr Trips (millions)	4	4	4	3	3	3
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)	1.47	1.19	1.40	1.37	1.28	1.24
System Performance						
Congested Travel (% of peak VMT)	25	23	22	21	22	22
Congested System (% of lane-miles)	27	27	27	27	27	26
Congested Time (number of "Rush Hours")	4.8	4.8	4.4	4.2	4.2	4.4
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	14	11	10	12	14	15
Transit Riders or Carpoolers (millions)	3	3	2	2	3	3
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	801	712	643	583	601	594
Rank	80	80	80	80	80	79
Fuel per Peak Traveler (gallons)	8	7	7	7	7	7
Rank	72	72	70	71	69	69
Annual Delay						
Total Delay (1000s of person-hours)	1,353	1,187	1,087	981	1,001	980
Rank	79	79	80	80	79	79
Delay per Peak Traveler (person-hrs)	14	12	12	11	12	12
Rank	71	71	71	71	69	67
Delay due to Incidents (percent)	54	54	54	54	54	54
Travel Time Index						
Rank	70	71	72	69	68	66
Congestion Cost						
Total Cost (\$ millions)	20	17	16	14	14	13
Rank	79	79	80	80	79	79
Cost per Peak Traveler (\$)	203	180	172	160	165	159
Rank	73	72	71	71	69	66

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 Salem, OR, Continued

Inventory Measures	1993	1992	1991	1990	1989	1988
Urban Area Information						
Population (1000s)	175	170	170	170	165	165
Rank	82	82	82	82	82	82
Urban Area (square miles)	75	75	75	75	75	75
Popn Density (persons/sq mile)	2,333	2,267	2,267	2,267	2,200	2,200
Peak Travelers (1000s)	81	78	76	75	72	72
Freeway						
Daily Vehicle-Miles of Travel (1000s)	935	955	930	920	905	880
Lane Miles	95	95	90	90	90	90
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	1,535	1,410	1,300	1,220	1,205	1,145
Lane Miles	280	265	250	245	235	235
Public Transportation						
Annual Psgr-Miles of Travel (millions)	10	10	9	8	8	7
Annual Unlinked Psgr Trips (millions)	3	3	3	3	3	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)	1.26	1.26	1.48	1.16	1.32	1.22
System Performance						
Congested Travel (% of peak VMT)	21	18	16	14	10	9
Congested System (% of lane-miles)	25	25	21	20	18	14
Congested Time (number of "Rush Hours")	4.4	4.2	4.2	4.0	4.0	3.6
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	15	18	18	15	18	22
Transit Riders or Carpoolers (millions)	3	4	4	3	4	5
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	559	455	388	331	263	229
Rank	80	80	80	81	81	81
Fuel per Peak Traveler (gallons)	7	6	5	4	4	3
Rank	68	70	70	71	73	75
Annual Delay						
Total Delay (1000s of person-hours)	940	767	654	571	491	424
Rank	79	80	81	81	81	81
Delay per Peak Traveler (person-hrs)	12	10	9	8	7	6
Rank	65	69	69	71	70	72
Delay due to Incidents (percent)	54	54	54	54	52	52
Travel Time Index						
Rank	1.07	1.06	1.05	1.05	1.04	1.03
Rank	65	67	67	67	73	72
Congestion Cost						
Total Cost (\$ millions)	12	10	8	7	5	4
Rank	79	80	81	81	81	81
Cost per Peak Traveler (\$)	150	125	107	91	75	62
Rank	65	68	68	71	70	72

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 Salem, OR, Continued

Inventory Measures	1987	1986	1985	1984	1983	1982
Urban Area Information						
Population (1000s)	165	165	165	160	160	160
Rank	82	82	82	82	82	82
Urban Area (square miles)	70	70	70	70	70	70
Popn Density (persons/sq mile)	2,357	2,357	2,357	2,286	2,286	2,286
Peak Travelers (1000s)	71	71	70	68	67	66
Freeway						
Daily Vehicle-Miles of Travel (1000s)	755	660	680	615	530	520
Lane Miles	90	90	90	90	85	80
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	1,100	1,075	1,030	1,005	915	860
Lane Miles	225	220	230	220	225	225
Public Transportation						
Annual Psgr-Miles of Travel (millions)	8	7	7	9	9	9
Annual Unlinked Psgr Trips (millions)	2	2	2	3	3	3
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)	1.22	1.19	1.56	1.58	1.61	1.69
System Performance						
Congested Travel (% of peak VMT)	9	7	7	7	6	6
Congested System (% of lane-miles)	14	14	14	14	15	15
Congested Time (number of "Rush Hours")	3.0	2.9	2.8	2.7	2.5	2.5
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	19	--	--	--	--	--
Transit Riders or Carpoolers (millions)	4	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	185	143	127	119	97	96
Rank	82	83	83	84	83	83
Fuel per Peak Traveler (gallons)	3	2	2	2	1	1
Rank	75	80	80	78	80	80
Annual Delay						
Total Delay (1000s of person-hours)	336	262	227	212	172	178
Rank	82	83	83	84	83	83
Delay per Peak Traveler (person-hrs)	5	4	3	3	3	3
Rank	73	78	79	79	80	79
Delay due to Incidents (percent)	52	52	52	52	52	52
Travel Time Index						
Rank	74	80	80	80	81	77
Congestion Cost						
Total Cost (\$ millions)	3	3	2	2	2	2
Rank	82	83	83	84	83	83
Cost per Peak Traveler (\$)	48	37	32	30	24	24
Rank	74	78	79	78	79	79

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

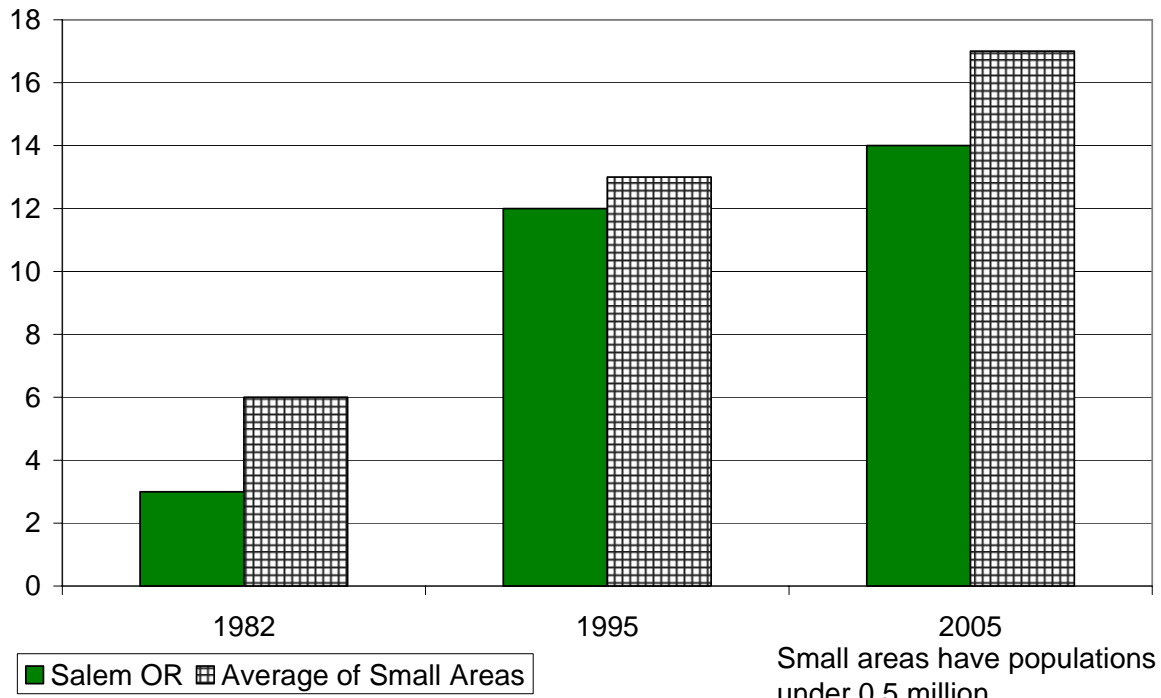
Note: Zeroes in the table reflect values less than 0.5.

Benefits From Public Transportation Service and Operations Strategies for Salem, OR

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	52	43	44	31	31	32
Annual Delay Reduction (1000 hours)	18	10	10	9	9	6
Arterial Access Management						
Percent of Roadway Miles	5	5	5	5	5	4
Annual Delay Reduction (1000 hours)	11	17	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)	29	27	18	9	10	7
Annual Delay Saved per Peak Traveler (hours)	0	0	0	0	0	0
Annual Congestion Cost Savings (\$million)	0.5	0.5	0.3	0.2	0.2	0.1
Travel Time Index with Strategies	1.090	1.087	1.094	1.111	1.105	1.086
Travel Time Index (Base)	1.091	1.088	1.095	1.112	1.106	1.087
Public Transportation Service						
Existing Service						
Annual Passenger-miles of Travel (million)	18	17	16	15	14	13
Unlinked Passenger Trips (million)	6	6	5	5	4	4
Travel Time Index (combined road and transit)	1.088	1.085	1.092	1.109	1.104	1.085
Condition if Public Transportation Service were Discontinued						
Travel Time Index	1.094	1.091	1.097	1.114	1.108	1.090
Annual Delay Increase (1000 hours)	85	75	71	70	60	71
Annual Delay Increase per Peak Traveler (hours)	1	1	1	1	1	1
Annual Congestion Cost Increase (\$million)	1.5	1.3	1.2	1.1	1.0	1.1

Growth in Delay per Peak Traveler

Hours of Delay



Annual Hours of Delay (million)

Growth in Total Delay

