

Performance Measure Summary - Providence RI-MA

There are several inventory and performance measures listed in the pages of this Urban Area Report for the years from 1982 to 2017. There is no single performance measure that experts agree "says it all". A few key points should be recognized by users of the Urban Mobility Scorecard data.

Use the trends - The multi-year performance measures are better indicators, in most cases, than any single year. 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. (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 atop several 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. It is calculated as the ratio of travel time in the peak period to travel time in free-flow. A value of 1.30 indicates that a 20-minute free-flow trip takes 26 minutes in the peak.

Planning Time Index - A travel time reliability measure that represents the total travel time that should be planned for a trip. Computed with the 95th percentile travel time it represents the amount of time that should be planned for a commute trip to be late for only 1 day a month. If it is computed with the 80th percentile travel time it represents the amount of time that should be planned for a trip to be late for only 1 day a week. A PTI of 2.00 means that for a 20-minute trip in light traffic, 40 minutes should be planned.

Peak Commuters - Number of travelers who begin a trip during the morning or evening peak travel periods (6 to 10 a.m. and 3 to 7 p.m.). "Commuters" are private vehicle users unless specifically noted.

Annual Delay per Commuter - A yearly sum of all the per-trip delays for those persons who travel in the peak period (6 to 10 a.m. and 3 to 7 p.m.). This measure illustrates the effect of traffic slowdowns as well as the length of each trip.

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 - These values are derived from time periods with lighter traffic volumes in the INRIX speed database. They are used as the national comparison thresholds. Other speed thresholds may be appropriate for urban project evaluations or sub-region studies.

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

Congestion Cost - Value of travel delay for 2017 (estimated at \$18.29 per hour of person travel and \$59.94 per hour of truck time) and excess fuel consumption estimated using state average cost per gallon.

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), so increases include both new growth and development that was previously in areas designated as rural.

Number of Rush Hours - Time when the road system might have congestion.

Mobility Data for Providence RI-MA

Inventory Measures	2017	2016	2015	2014	2013	2012
Urban Area Information						
Population (1000s)	1,195	1,190	1,185	1,185	1,185	1,180
Rank	40	40	40	40	38	38
Commuters (1000s)	611	608	605	605	600	598
Daily Vehicle-Miles of Travel (1000s)						
Freeway	12,201	11,932	11,315	11,023	11,135	11,150
Arterial Streets	10,588	10,238	10,105	10,028	10,045	9,980
Cost Components						
Value of Time (\$/hour)	18.12	17.91	17.69	17.67	17.39	17.14
Commercial Cost (\$/hour)	52.14	50.20	46.87	44.82	41.23	39.66
Gasoline (\$/gallon)	2.38	2.20	2.32	3.44	3.64	3.60
Diesel (\$/gallon)	2.56	2.32	2.63	3.65	3.97	3.96
System Performance	2017	2016	2015	2014	2013	2012
Congested Travel (% of peak VMT)	18.5	--	--	--	--	--
Congested System (% of lane-miles)	12.1	--	--	--	--	--
Congested Time (number of "Rush Hours")	2.1	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	15,214	15,059	14,896	14,620	14,461	14,366
Rank	43	43	42	42	42	42
Fuel per Peak Auto Commuter (gallons)	19	19	19	19	20	20
Rank	55	53	50	47	37	33
Annual Delay						
Total Delay (1000s of person-hours)	36,273	35,335	34,355	33,134	32,483	31,694
Rank	44	43	43	43	43	43
Delay per Auto Commuter (pers-hrs)	48	47	46	44	44	43
Rank	42	43	43	44	43	43
Travel Time Index						
Rank	1.17	1.17	1.17	1.17	1.17	1.18
Rank	49	49	49	52	51	40
Commuter Stress Index						
Rank	1.18	--	--	--	--	--
Rank	56	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)						
Rank	1.37	--	--	--	--	--
Rank	59	--	--	--	--	--
Congestion Cost						
Total Cost (\$ millions)	736	705	677	667	644	620
Rank	44	43	43	43	43	43
Cost per Auto Commuter (\$)	828	811	784	752	745	736
Rank	53	54	53	54	52	52
Truck Congestion						
Annual Person-Hours of Delay (000)	1,523	1,484	1,443	1,392	1,364	1,331
Rank	44	43	43	43	43	43
Annual Gallons of Wasted Fuel (000)	3,225	3,192	3,158	3,100	3,066	3,046
Rank	43	43	42	42	42	42
Annual Congestion Cost (\$ million)	78	73	68	66	62	58
Rank	44	44	44	44	43	43

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

Mobility Data for Providence RI-MA

Inventory Measures	2011	2010	2009	2008	2007	2006
Urban Area Information						
Population (1000s)	1,180	1,180	1,180	1,180	1,180	1,190
Rank	38	38	38	38	38	37
Commuters (1000s)	594	589	585	583	582	586
Daily Vehicle-Miles of Travel (1000s)						
Freeway	11,861	11,871	11,500	11,025	11,700	11,480
Arterial Streets	10,431	10,439	10,747	11,000	11,200	11,090
Cost Components						
Value of Time (\$/hour)	16.79	16.28	16.01	16.07	15.47	15.06
Commercial Cost (\$/hour)	44.62	42.50	41.83	40.77	39.30	37.88
Gasoline (\$/gallon)	3.53	2.82	2.34	3.36	2.98	2.72
Diesel (\$/gallon)	3.76	3.08	2.73	4.37	3.56	2.92
System Performance	2011	2010	2009	2008	2007	2006
Congested Travel (% of peak VMT)	--	--	--	--	--	--
Congested System (% of lane-miles)	--	--	--	--	--	--
Congested Time (number of "Rush Hours")	--	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	14,272	13,900	13,645	13,988	13,837	13,620
Rank	40	41	41	41	40	40
Fuel per Peak Auto Commuter (gallons)	21	20	20	20	20	20
Rank	25	29	18	31	28	28
Annual Delay						
Total Delay (1000s of person-hours)	30,913	29,828	28,733	28,053	27,750	27,316
Rank	43	44	44	44	44	44
Delay per Auto Commuter (pers-hrs)	42	41	40	39	39	39
Rank	42	42	43	43	44	43
Travel Time Index						
Rank	40	43	45	53	40	39
Commuter Stress Index						
Rank	--	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)						
Rank	--	--	--	--	--	--
Congestion Cost						
Total Cost (\$ millions)	599	552	518	524	494	470
Rank	43	43	43	44	44	44
Cost per Auto Commuter (\$)	741	738	722	699	719	727
Rank	49	49	50	52	51	50
Truck Congestion						
Annual Person-Hours of Delay (000)	1,298	1,253	1,207	1,178	1,166	1,147
Rank	43	44	44	44	44	44
Annual Gallons of Wasted Fuel (000)	3,026	2,947	2,893	2,965	2,933	2,887
Rank	40	41	41	41	40	40
Annual Congestion Cost (\$ million)	62	56	52	55	51	47
Rank	43	43	43	43	43	43

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

Mobility Data for Providence RI-MA

Inventory Measures	2005	2004	2003	2002	2001	2000
Urban Area Information						
Population (1000s)	1,190	1,190	1,180	1,175	1,170	1,170
Rank	36	36	36	35	35	35
Commuters (1000s)	583	580	573	564	554	548
Daily Vehicle-Miles of Travel (1000s)						
Freeway	11,505	11,415	11,095	10,585	10,430	10,125
Arterial Streets	11,100	11,110	11,030	10,515	10,110	9,500
Cost Components						
Value of Time (\$/hour)	14.58	14.10	13.73	13.43	13.22	12.85
Commercial Cost (\$/hour)	36.51	35.19	33.92	32.69	31.51	30.38
Gasoline (\$/gallon)	2.32	2.05	1.57	1.44	1.72	1.57
Diesel (\$/gallon)	2.60	2.09	1.68	1.46	1.65	1.57
System Performance	2005	2004	2003	2002	2001	2000
Congested Travel (% of peak VMT)	--	--	--	--	--	--
Congested System (% of lane-miles)	--	--	--	--	--	--
Congested Time (number of "Rush Hours")	--	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	13,508	13,372	13,134	12,857	12,145	11,386
Rank	39	39	39	37	38	39
Fuel per Peak Auto Commuter (gallons)	20	20	19	20	19	18
Rank	25	21	23	15	13	16
Annual Delay						
Total Delay (1000s of person-hours)	27,090	26,818	26,341	25,786	24,357	22,834
Rank	43	43	41	40	39	39
Delay per Auto Commuter (pers-hrs)	39	38	38	38	37	36
Rank	43	42	42	40	40	40
Travel Time Index						
Rank	1.19	1.18	1.18	1.18	1.17	1.16
Rank	38	38	38	37	38	45
Commuter Stress Index						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
Congestion Cost						
Total Cost (\$ millions)	447	425	400	381	357	325
Rank	43	42	41	40	39	39
Cost per Auto Commuter (\$)	745	762	770	770	738	711
Rank	46	43	43	41	44	44
Truck Congestion						
Annual Person-Hours of Delay (000)	1,138	1,126	1,106	1,083	1,023	959
Rank	43	43	41	40	39	39
Annual Gallons of Wasted Fuel (000)	2,864	2,835	2,784	2,726	2,575	2,414
Rank	39	39	39	37	38	39
Annual Congestion Cost (\$ million)	44	41	38	35	33	29
Rank	42	40	40	39	39	39

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

Mobility Data for Providence RI-MA

Inventory Measures	1999	1998	1997	1996	1995	1994
Urban Area Information						
Population (1000s)	1,170	1,165	1,165	1,150	1,145	1,135
Rank	34	34	34	34	33	33
Commuters (1000s)	540	532	524	511	503	492
Daily Vehicle-Miles of Travel (1000s)						
Freeway	9,855	9,505	8,840	8,800	8,525	8,325
Arterial Streets	9,000	8,405	7,525	7,215	6,855	6,720
Cost Components						
Value of Time (\$/hour)	12.43	12.17	11.98	11.71	11.37	11.06
Commercial Cost (\$/hour)	29.28	28.89	28.50	28.12	27.75	27.38
Gasoline (\$/gallon)	1.16	1.11	1.29	1.33	1.25	1.09
Diesel (\$/gallon)	1.22	1.24	1.35	1.38	1.29	1.12
System Performance	1999	1998	1997	1996	1995	1994
Congested Travel (% of peak VMT)	--	--	--	--	--	--
Congested System (% of lane-miles)	--	--	--	--	--	--
Congested Time (number of "Rush Hours")	--	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	10,916	10,029	9,055	8,338	7,595	7,100
Rank	39	39	39	39	39	39
Fuel per Peak Auto Commuter (gallons)	17	17	14	13	12	10
Rank	17	13	26	29	35	45
Annual Delay						
Total Delay (1000s of person-hours)	21,893	20,114	18,161	16,721	15,233	14,240
Rank	39	39	40	41	40	40
Delay per Auto Commuter (pers-hrs)	35	32	29	27	25	24
Rank	41	52	60	63	65	65
Travel Time Index						
Rank	41	44	62	50	59	63
Commuter Stress Index						
Rank	--	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)						
Rank	--	--	--	--	--	--
Congestion Cost						
Total Cost (\$ millions)	297	267	239	216	191	173
Rank	39	39	40	41	40	40
Cost per Auto Commuter (\$)	703	662	607	571	538	516
Rank	44	47	49	51	51	52
Truck Congestion						
Annual Person-Hours of Delay (000)	919	845	763	702	640	598
Rank	39	39	40	41	40	40
Annual Gallons of Wasted Fuel (000)	2,314	2,126	1,920	1,768	1,610	1,505
Rank	39	39	39	39	39	39
Annual Congestion Cost (\$ million)	26	24	22	20	18	16
Rank	39	39	38	38	39	39

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

Mobility Data for Providence RI-MA

Inventory Measures	1993	1992	1991	1990	1989	1988
Urban Area Information						
Population (1000s)	1,120	1,110	1,100	1,095	1,090	1,085
Rank	33	33	33	33	32	32
Commuters (1000s)	480	470	459	451	445	439
Daily Vehicle-Miles of Travel (1000s)						
Freeway	8,055	7,470	7,290	7,200	7,000	6,500
Arterial Streets	6,675	6,610	6,615	6,525	6,425	6,280
Cost Components						
Value of Time (\$/hour)	10.78	10.47	10.17	9.75	9.25	8.83
Commercial Cost (\$/hour)	27.02	26.66	26.30	25.95	25.60	25.26
Gasoline (\$/gallon)	1.08	1.17	1.20	1.10	1.09	1.01
Diesel (\$/gallon)	1.12	1.20	1.29	1.16	1.13	1.04
System Performance	1993	1992	1991	1990	1989	1988
Congested Travel (% of peak VMT)	--	--	--	--	--	--
Congested System (% of lane-miles)	--	--	--	--	--	--
Congested Time (number of "Rush Hours")	--	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	6,805	5,877	5,249	4,556	4,175	3,592
Rank	39	39	40	44	44	46
Fuel per Peak Auto Commuter (gallons)	12	10	9	8	7	7
Rank	16	24	27	35	39	27
Annual Delay						
Total Delay (1000s of person-hours)	13,648	11,786	10,527	9,137	8,374	7,203
Rank	39	41	42	45	45	47
Delay per Auto Commuter (pers-hrs)	24	21	19	17	15	13
Rank	58	65	68	70	77	80
Travel Time Index						
Rank	54	59	62	63	66	74
Commuter Stress Index						
Rank	--	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)						
Rank	--	--	--	--	--	--
Congestion Cost						
Total Cost (\$ millions)	162	137	119	99	87	71
Rank	39	41	41	44	45	47
Cost per Auto Commuter (\$)	510	454	417	380	365	329
Rank	46	55	58	63	62	66
Truck Congestion						
Annual Person-Hours of Delay (000)	573	495	442	384	352	303
Rank	39	41	42	45	45	47
Annual Gallons of Wasted Fuel (000)	1,443	1,246	1,113	966	885	761
Rank	39	39	40	44	44	46
Annual Congestion Cost (\$ million)	15	13	12	10	9	8
Rank	39	40	41	42	43	42

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

Mobility Data for Providence RI-MA

Inventory Measures	1987	1986	1985	1984	1983	1982
Urban Area Information						
Population (1000s)	1,080	1,075	1,070	1,060	1,060	1,050
Rank	30	30	30	30	30	31
Commuters (1000s)	434	428	422	414	410	403
Daily Vehicle-Miles of Travel (1000s)						
Freeway	5,515	4,345	4,250	4,190	4,050	4,000
Arterial Streets	6,115	5,935	5,720	5,510	5,395	5,390
Cost Components						
Value of Time (\$/hour)	8.48	8.18	8.03	7.75	7.43	7.20
Commercial Cost (\$/hour)	24.93	24.60	24.27	23.94	23.63	23.31
Gasoline (\$/gallon)	1.01	0.98	1.29	1.30	1.33	1.39
Diesel (\$/gallon)	1.05	1.02	1.34	1.35	1.38	1.45
System Performance	1987	1986	1985	1984	1983	1982
Congested Travel (% of peak VMT)	--	--	--	--	--	--
Congested System (% of lane-miles)	--	--	--	--	--	--
Congested Time (number of "Rush Hours")	--	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	2,750	2,524	2,300	2,093	1,957	1,804
Rank	53	52	52	52	50	51
Fuel per Peak Auto Commuter (gallons)	4	4	3	3	3	2
Rank	61	54	66	61	46	55
Annual Delay						
Total Delay (1000s of person-hours)	5,516	5,063	4,613	4,197	3,925	3,618
Rank	54	55	53	52	50	51
Delay per Auto Commuter (pers-hrs)	10	10	9	8	8	7
Rank	85	83	83	83	76	82
Travel Time Index						
Rank	79	85	81	75	68	76
Commuter Stress Index						
Rank	--	--	--	--	--	--
Freeway Planning Time Index (95th Pctile)						
Rank	--	--	--	--	--	--
Congestion Cost						
Total Cost (\$ millions)	53	47	43	38	34	31
Rank	53	54	52	51	50	49
Cost per Auto Commuter (\$)	263	254	238	220	214	210
Rank	75	71	69	72	70	69
Truck Congestion						
Annual Person-Hours of Delay (000)	232	213	194	176	165	152
Rank	54	55	53	51	50	51
Annual Gallons of Wasted Fuel (000)	583	535	488	444	415	382
Rank	53	52	52	52	50	51
Annual Congestion Cost (\$ million)	6	5	5	4	4	4
Rank	47	50	46	49	47	44

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