

## 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 Large Group – 1 million to 3 million population urban areas

Urban Area	Delay per Traveler	Travel Time Index	Total Delay	1982 to 2005	
				Delay per Traveler	Total Delay
San Diego, CA	H+	H+	H+	F+	F+
Minneapolis-St. Paul, MN	H	0	H+	F+	F+
Baltimore, MD	H	H	H+	F	F+
<b>Tampa-St. Petersburg, FL</b>	<b>H+</b>	<b>H</b>	<b>H+</b>	<b>S</b>	<b>F+</b>
St. Louis, MO-IL	L	L-	0	S	0
Denver-Aurora, CO	H+	H+	H+	F+	F+
Pittsburgh, PA	L-	L-	L-	S-	S-
Riverside-San Bernardino, CA	H+	H+	H+	F+	F+
Cleveland, OH	L-	L-	L-	S-	S-
Sacramento, CA	H	H+	H	0	F+
Portland, OR-WA	0	H	0	0	0
San Jose, CA	H+	H+	H+	F	F+
Cincinnati, OH-KY-IN	L-	L	L	S	S-
Virginia Beach, VA	L	L	L	S-	S-
Kansas City, MO-KS	L-	L-	L-	S-	S-
Milwaukee, WI	L-	L-	L-	S-	S-
Las Vegas, NV	0	H	L	F	0
Orlando, FL	H+	H	H	F+	F+
San Antonio, TX	0	0	L	F	S
Providence, RI-MA	L-	L-	L-	0	S-
Columbus, OH	L	L	L	F	S-
Buffalo, NY	L-	L-	L-	S-	S-
New Orleans, LA	L-	L-	L-	S-	S-
Indianapolis, IN	H	0	L	0	S-
Memphis, TN-MS-AR	L	L-	L-	0	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
<b>2005 Values</b> 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
<b>1982 to 2005 Trends</b> Delay per Traveler - Total Delay -	5 Hours 5 Hours x Average Population	3 Hours 3 Hours x Average Population

**The Mobility Data for Tampa-St. Petersburg, FL**

<b>Inventory Measures</b>	<b>2005</b>	<b>2004</b>	<b>2003</b>	<b>2002</b>	<b>2001</b>	<b>2000</b>
<b>Urban Area Information</b>						
Population (1000s)	2,250	2,215	2,050	2,025	2,000	1,945
Rank	18	18	19	20	20	19
Urban Area (square miles)	1,350	1,350	1,345	1,340	1,340	1,335
Popn Density (persons/sq mile)	1,667	1,641	1,524	1,511	1,493	1,457
Peak Travelers (1000s)	1,242	1,216	1,119	1,089	1,058	1,013
<b>Freeway</b>						
Daily Vehicle-Miles of Travel (1000s)	13,050	12,980	12,000	11,100	10,400	9,700
Lane Miles	850	840	810	785	750	725
<b>Arterial Streets</b>						
Daily Vehicle-Miles of Travel (1000s)	28,000	27,340	24,675	24,200	22,605	21,000
Lane Miles	3,750	3,700	3,480	3,355	3,225	3,100
<b>Public Transportation</b>						
Annual Psgr-Miles of Travel (millions)	112	106	100	94	86	87
Annual Unlinked Psgr Trips (millions)	23	21	20	20	20	19
<b>Cost Components</b>						
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)	2.34	1.99	1.53	1.41	1.51	1.54
<b>System Performance</b>						
<b>Congested Travel</b> (% of peak VMT)	69	67	64	63	57	57
<b>Congested System</b> (% of lane-miles)	66	65	64	63	58	58
<b>Congested Time</b> (number of "Rush Hours")	7.6	7.6	7.4	7.4	7.4	7.2
<b>Annual Increase Needed To Maintain Constant Congestion Level:</b>						
Lane-Miles	275	321	264	267	238	199
Transit Riders or Carpoolers (millions)	85	99	78	79	69	56
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	35,281	35,556	31,146	29,157	26,524	23,449
Rank	20	20	20	20	21	22
Fuel per Peak Traveler (gallons)	28	29	28	27	25	23
Rank	25	24	21	22	22	27
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	56,203	55,783	51,331	48,238	44,040	38,644
Rank	19	17	19	20	19	21
Delay per Peak Traveler (person-hrs)	45	46	46	44	42	38
Rank	20	14	11	13	17	22
Delay due to Incidents (percent)	54	54	54	54	54	54
<b>Travel Time Index</b>						
Rank	1.28	1.29	1.28	1.27	1.26	1.25
Rank	23	18	19	17	20	18
<b>Congestion Cost</b>						
Total Cost (\$ millions)	1,005	959	839	765	692	591
Rank	19	19	19	20	20	22
Cost per Peak Traveler (\$)	809	789	749	702	654	584
Rank	24	21	17	19	19	25

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 Tampa-St. Petersburg, FL, Continued**

<b>Inventory Measures</b>	<b>1999</b>	<b>1998</b>	<b>1997</b>	<b>1996</b>	<b>1995</b>	<b>1994</b>
<b>Urban Area Information</b>						
Population (1000s)	1,895	1,865	1,845	1,840	1,830	1,780
Rank	19	19	19	19	19	19
Urban Area (square miles)	1,325	1,315	1,305	1,300	1,290	1,270
Popn Density (persons/sq mile)	1,430	1,418	1,414	1,415	1,419	1,402
Peak Travelers (1000s)	970	940	915	898	878	842
<b>Freeway</b>						
Daily Vehicle-Miles of Travel (1000s)	9,100	8,500	8,110	7,845	7,615	7,165
Lane Miles	690	650	615	585	545	510
<b>Arterial Streets</b>						
Daily Vehicle-Miles of Travel (1000s)	19,550	18,700	17,730	16,840	16,205	15,405
Lane Miles	2,875	2,700	2,545	2,465	2,345	2,200
<b>Public Transportation</b>						
Annual Psgr-Miles of Travel (millions)	85	87	79	82	92	92
Annual Unlinked Psgr Trips (millions)	19	19	17	17	19	19
<b>Cost Components</b>						
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)	1.14	1.07	1.17	1.30	1.20	1.08
<b>System Performance</b>						
<b>Congested Travel</b> (% of peak VMT)	58	58	58	61	62	62
<b>Congested System</b> (% of lane-miles)	59	59	59	63	63	63
<b>Congested Time</b> (number of "Rush Hours")	7.2	7.2	7.2	7.2	7.4	7.4
<b>Annual Increase Needed To Maintain Constant Congestion Level:</b>						
Lane-Miles	174	158	149	137	157	145
Transit Riders or Carpoolers (millions)	49	44	42	39	45	42
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	23,545	22,281	21,321	21,751	21,628	20,357
Rank	21	22	21	21	20	19
Fuel per Peak Traveler (gallons)	24	24	23	24	25	24
Rank	25	24	25	22	13	12
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	39,097	36,970	35,592	36,220	35,880	34,025
Rank	20	20	21	20	17	16
Delay per Peak Traveler (person-hrs)	40	39	39	40	41	40
Rank	19	15	17	10	10	10
Delay due to Incidents (percent)	54	54	54	54	54	54
<b>Travel Time Index</b>						
Rank	16	13	12	6	6	4
<b>Congestion Cost</b>						
Total Cost (\$ millions)	567	524	501	500	481	441
Rank	21	21	21	21	20	19
Cost per Peak Traveler (\$)	585	557	547	557	548	524
Rank	22	18	20	15	11	11

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 Tampa-St. Petersburg, FL, Continued**

<b>Inventory Measures</b>	<b>1993</b>	<b>1992</b>	<b>1991</b>	<b>1990</b>	<b>1989</b>	<b>1988</b>
<b>Urban Area Information</b>						
Population (1000s)	1,755	1,730	1,725	1,720	1,670	1,635
Rank	21	21	21	21	21	21
Urban Area (square miles)	1,230	1,200	1,160	1,130	1,090	1,055
Popn Density (persons/sq mile)	1,427	1,442	1,487	1,522	1,532	1,550
Peak Travelers (1000s)	816	792	776	762	735	713
<b>Freeway</b>						
Daily Vehicle-Miles of Travel (1000s)	6,825	6,300	5,850	5,315	5,000	4,885
Lane Miles	485	460	425	400	365	340
<b>Arterial Streets</b>						
Daily Vehicle-Miles of Travel (1000s)	14,785	14,225	13,960	12,980	12,390	12,010
Lane Miles	2,110	2,035	1,990	1,945	1,900	1,870
<b>Public Transportation</b>						
Annual Psgr-Miles of Travel (millions)	91	89	98	46	46	45
Annual Unlinked Psgr Trips (millions)	19	18	19	9	9	8
<b>Cost Components</b>						
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)	1.13	1.12	1.10	1.05	1.08	1.00
<b>System Performance</b>						
<b>Congested Travel</b> (% of peak VMT)	64	63	64	62	62	61
<b>Congested System</b> (% of lane-miles)	64	64	61	60	60	60
<b>Congested Time</b> (number of "Rush Hours")	7.4	7.4	7.4	7.2	7.2	7.2
<b>Annual Increase Needed To Maintain Constant Congestion Level:</b>						
Lane-Miles	130	119	125	101	87	93
Transit Riders or Carpoolers (millions)	38	34	35	27	23	25
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	19,664	18,479	18,071	15,452	14,017	13,693
Rank	18	18	18	18	18	17
Fuel per Peak Traveler (gallons)	24	23	23	20	19	19
Rank	12	12	12	16	18	15
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	32,243	30,358	29,700	25,682	23,300	22,760
Rank	16	17	17	18	18	17
Delay per Peak Traveler (person-hrs)	40	38	38	34	32	32
Rank	10	10	10	14	14	14
Delay due to Incidents (percent)	54	54	54	53	53	53
<b>Travel Time Index</b>						
Rank	4	4	3	4	5	4
<b>Congestion Cost</b>						
Total Cost (\$ millions)	409	376	359	302	255	237
Rank	17	18	18	18	18	17
Cost per Peak Traveler (\$)	501	474	462	396	347	332
Rank	11	12	12	14	17	15

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 Tampa-St. Petersburg, FL, Continued**

<b>Inventory Measures</b>	<b>1987</b>	<b>1986</b>	<b>1985</b>	<b>1984</b>	<b>1983</b>	<b>1982</b>
<b>Urban Area Information</b>						
Population (1000s)	1,610	1,565	1,520	1,485	1,455	1,420
Rank	21	21	21	21	21	21
Urban Area (square miles)	1,020	990	970	950	920	890
Popn Density (persons/sq mile)	1,578	1,581	1,567	1,563	1,582	1,596
Peak Travelers (1000s)	697	671	648	628	611	589
<b>Freeway</b>						
Daily Vehicle-Miles of Travel (1000s)	4,590	3,985	3,700	3,545	3,230	2,985
Lane Miles	310	290	280	270	260	250
<b>Arterial Streets</b>						
Daily Vehicle-Miles of Travel (1000s)	11,655	11,420	11,115	10,855	10,500	10,300
Lane Miles	1,855	1,835	1,800	1,780	1,755	1,725
<b>Public Transportation</b>						
Annual Psgr-Miles of Travel (millions)	42	47	46	41	41	41
Annual Unlinked Psgr Trips (millions)	9	10	9	10	10	10
<b>Cost Components</b>						
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)	1.00	0.98	1.28	1.29	1.32	1.38
<b>System Performance</b>						
<b>Congested Travel</b> (% of peak VMT)	60	60	56	54	53	52
<b>Congested System</b> (% of lane-miles)	55	55	51	50	50	51
<b>Congested Time</b> (number of "Rush Hours")	7.2	7.2	7.0	7.0	6.6	6.6
<b>Annual Increase Needed To Maintain Constant Congestion Level:</b>						
Lane-Miles	89	--	--	--	--	--
Transit Riders or Carpoolers (millions)	23	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	13,128	11,895	10,501	10,032	9,114	8,638
Rank	17	17	17	16	14	14
Fuel per Peak Traveler (gallons)	19	18	16	16	15	15
Rank	12	9	10	8	8	8
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	21,926	19,591	17,411	16,872	15,197	14,273
Rank	17	16	16	15	14	13
Delay per Peak Traveler (person-hrs)	31	29	27	27	25	24
Rank	11	9	10	8	8	6
Delay due to Incidents (percent)	53	53	53	53	53	53
<b>Travel Time Index</b>						
Rank	3	4	4	3	3	2
<b>Congestion Cost</b>						
Total Cost (\$ millions)	221	190	168	158	138	126
Rank	17	16	16	15	14	13
Cost per Peak Traveler (\$)	317	283	260	252	226	214
Rank	11	9	11	9	9	8

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

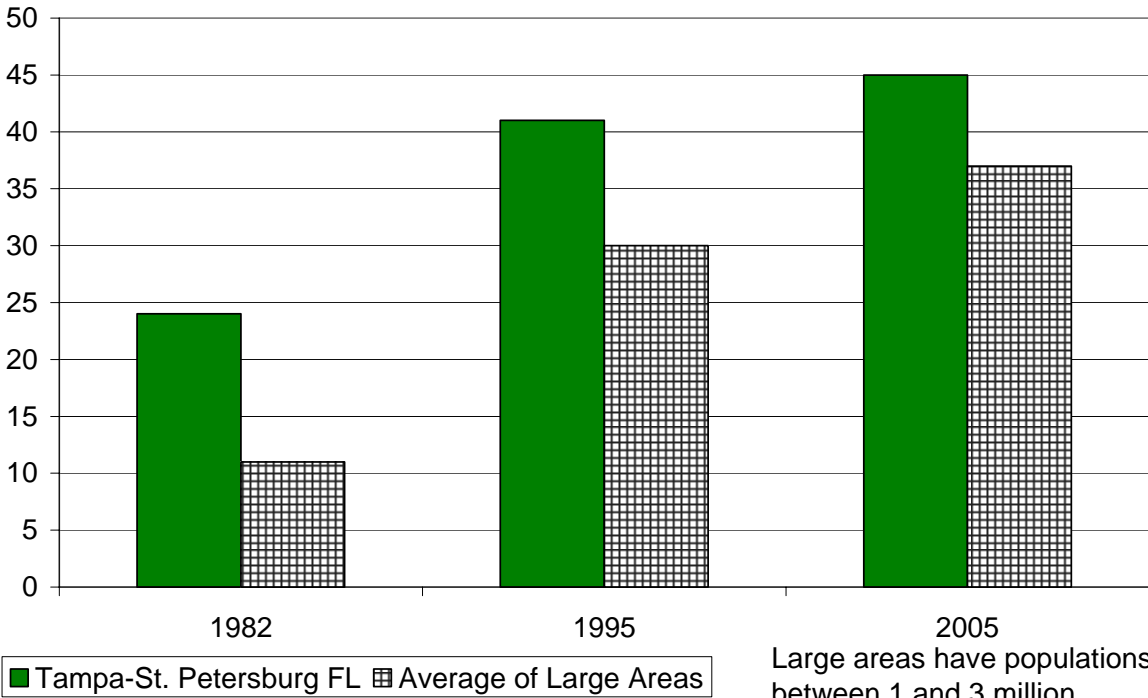
Note: Zeroes in the table reflect values less than 0.5.

## Benefits From Public Transportation Service and Operations Strategies for Tampa-St. Petersburg, FL

<b>Operations Strategies</b>	<b>2005</b>	<b>2004</b>	<b>2003</b>	<b>2002</b>	<b>2001</b>	<b>2000</b>
<b>Freeway Ramp Metering</b>						
Percent of Roadway Miles	--	--	--	--	--	--
Annual Delay Reduction (1000 hours)	--	--	--	--	--	--
<b>Freeway Incident Management</b>						
<b>Cameras</b>						
Percent of Roadway Miles	23	23	18	8	8	8
<b>Service Patrols</b>						
Percent of Roadway Miles	62	40	39	38	24	9
Annual Delay Reduction (1000 hours)	789	600	529	382	309	129
<b>Arterial Signal Coordination</b>						
Percent of Roadway Miles	62	61	47	42	39	40
Annual Delay Reduction (1000 hours)	299	213	192	177	170	161
<b>Arterial Access Management</b>						
Percent of Roadway Miles	52	52	55	58	60	62
Annual Delay Reduction (1000 hours)	2,434	2,547	2,364	2,075	2,079	1,940
<b>HOV Lanes</b>						
Daily Passenger-miles of Travel (1000s)	--	--	--	--	--	--
HOV User Delay Savings	--	--	--	--	--	--
<b>Total Effect of Operations Treatments</b>						
Annual Delay Reduction (1000 hours)	3,522	3,360	3,086	2,634	2,559	2,230
Annual Delay Saved per Peak Traveler (hours)	3	3	3	2	2	2
Annual Congestion Cost Savings (\$million)	62.5	57.1	49.9	41.5	39.6	33.5
Travel Time Index with Strategies	1.282	1.290	1.278	1.270	1.260	1.246
Travel Time Index (Base)	1.297	1.305	1.292	1.283	1.273	1.258
<b>Public Transportation Service</b>						
<b>Existing Service</b>						
Annual Passenger-miles of Travel (million)	112	106	100	94	86	87
Unlinked Passenger Trips (million)	23	21	20	20	20	19
Travel Time Index (combined road and transit)	1.275	1.284	1.272	1.264	1.254	1.241
<b>Condition if Public Transportation Service were Discontinued</b>						
Travel Time Index	1.301	1.307	1.295	1.285	1.275	1.261
Annual Delay Increase (1000 hours)	1,282	1,032	954	898	879	884
Annual Delay Increase per Peak Traveler (hours)	1	1	1	1	1	1
Annual Congestion Cost Increase (\$million)	22.8	17.7	15.6	14.3	13.8	13.5

### Growth in Delay per Peak Traveler

Hours of Delay



Annual Hours of Delay (million)

### Growth in Total Delay

