

Performance Measure Summary – Miami, FL

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 Miami FL

Inventory Measures	2007	2006	2005	2004	2003	2002
Urban Area Information						
Population (1000s)	5,420	5,380	5,330	5,270	5,100	5,000
Rank	4	4	4	5	5	5
Urban Area (square miles)	1,685	1,680	1,680	1,680	1,680	1,675
Population Density (persons/sq mile)	3,217	3,202	3,173	3,137	3,036	2,985
Peak Travelers (1000s)	3,095	3,067	3,022	2,972	2,861	2,760
Freeway						
Daily Vehicle-Miles of Travel (1000s)	41,035	40,360	39,470	38,320	37,000	35,695
Lane-Miles	2,105	2,105	2,075	2,050	1,975	1,920
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	52,160	52,585	52,455	52,240	49,045	45,580
Lane-Miles	7,500	7,440	7,400	7,025	6,620	6,400
Public Transportation						
Annual Psgr-Miles of Travel (millions)	973	845	806	757	707	672
Annual Unlinked Psgr Trips (millions)	169	163	159	151	134	126
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)	2.98	2.66	2.34	1.99	1.53	1.41
System Performance	2007	2006	2005	2004	2003	2002
Congested Travel (% of peak VMT)	82	85	84	82	80	77
Congested System (% of lane-miles)	71	75	75	74	73	72
Congested Time (number of "Rush Hours")	8.0	8.0	8.0	8.0	8.0	8.0
Annual Increase Needed to Maintain Constant Congestion Level:						
Lane-miles	266	313	330	403	374	329
Transit Riders or Carpoolers (millions)	90	106	111	140	130	112
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	101,727	102,684	103,996	100,721	95,969	89,590
Rank	4	4	4	4	4	4
Fuel per Peak Traveler (gallons)	33	33	34	34	34	32
Rank	12	12	11	10	10	10
Annual Delay						
Total Delay (1000s of person-hours)	145,608	148,245	150,593	146,227	140,375	132,544
Rank	4	4	4	4	4	4
Delay per Peak Traveler (person-hours)	47	48	50	49	49	48
Rank	11	11	11	11	10	10
Delay due to Incidents (percent)	51	52	52	52	52	52
Travel Time Index	1.37	1.37	1.38	1.38	1.38	1.37
Rank	5	6	6	5	3	3
Congestion Cost						
Total Cost (\$ millions)	2,955	2,891	2,810	2,581	2,355	2,164
Rank	5	4	4	4	4	5
Cost per Peak Traveler (\$)	955	943	930	868	823	784
Rank	14	15	15	12	11	11

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 Miami FL, Continued

Inventory Measures	2001	2000	1999	1998	1997
Urban Area Information					
Population (1000s)	4,965	4,870	4,620	4,525	4,460
Rank	5	5	5	5	5
Urban Area (square miles)	1,670	1,660	1,645	1,625	1,610
Population Density (persons/sq mile)	2,973	2,934	2,809	2,785	2,770
Peak Travelers (1000s)	2,691	2,596	2,416	2,326	2,252
Freeway					
Daily Vehicle-Miles of Travel (1000s)	35,065	34,700	32,815	31,475	30,900
Lane-Miles	1,915	1,910	1,905	1,905	1,895
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	44,055	42,735	40,040	38,065	36,050
Lane-Miles	6,250	6,105	6,090	6,030	6,015
Public Transportation					
Annual Psgr-Miles of Travel (millions)	675	628	634	613	581
Annual Unlinked Psgr Trips (millions)	127	122	118	114	110
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)	1.51	1.54	1.14	1.07	1.17
System Performance	2001	2000	1999	1998	1997
Congested Travel (% of peak VMT)	77	74	69	63	63
Congested System (% of lane-miles)	68	63	59	54	54
Congested Time (number of "Rush Hours")	7.8	7.8	7.6	7.4	7.4
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	359	352	337	329	318
Transit Riders or Carpoolers (millions)	121	118	107	100	93
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	84,165	77,860	65,827	56,455	53,358
Rank	4	6	8	8	8
Fuel per Peak Traveler (gallons)	31	30	27	24	24
Rank	10	13	15	18	17
Annual Delay					
Total Delay (1000s of person-hours)	124,430	115,734	96,273	82,822	78,384
Rank	4	4	7	8	8
Delay per Peak Traveler (person-hours)	46	45	40	36	35
Rank	10	11	14	18	20
Delay due to Incidents (percent)	52	52	52	52	52
Travel Time Index	1.36	1.34	1.30	1.26	1.26
Rank	2	3	6	11	9
Congestion Cost					
Total Cost (\$ millions)	2,026	1,838	1,451	1,223	1,153
Rank	5	5	8	8	8
Cost per Peak Traveler (\$)	753	708	600	526	512
Rank	14	13	18	23	28

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 Miami FL, Continued

Inventory Measures	1996	1995	1994	1993	1992
Urban Area Information					
Population (1000s)	4,395	4,280	4,120	4,080	4,030
Rank	5	5	5	5	5
Urban Area (square miles)	1,585	1,525	1,475	1,440	1,405
Population Density (persons/sq mile)	2,773	2,807	2,793	2,833	2,868
Peak Travelers (1000s)	2,184	2,089	1,973	1,922	1,866
Freeway					
Daily Vehicle-Miles of Travel (1000s)	29,800	29,460	27,660	25,815	24,875
Lane-Miles	1,880	1,850	1,815	1,755	1,720
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	34,000	32,995	31,600	30,925	30,110
Lane-Miles	5,955	5,910	5,850	5,715	5,625
Public Transportation					
Annual Psgr-Miles of Travel (millions)	572	600	614	641	553
Annual Unlinked Psgr Trips (millions)	110	112	113	121	100
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)	1.30	1.20	1.08	1.13	1.12
System Performance	1996	1995	1994	1993	1992
Congested Travel (% of peak VMT)	64	64	62	60	61
Congested System (% of lane-miles)	59	59	59	59	59
Congested Time (number of "Rush Hours")	7.2	7.2	7.0	6.8	6.6
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	321	324	267	261	293
Transit Riders or Carpoolers (millions)	91	91	72	69	76
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	50,043	48,004	43,712	40,896	41,066
Rank	8	8	8	7	7
Fuel per Peak Traveler (gallons)	23	23	22	21	22
Rank	18	16	15	16	14
Annual Delay					
Total Delay (1000s of person-hours)	72,813	69,303	64,736	61,702	61,841
Rank	8	8	8	7	7
Delay per Peak Traveler (person-hours)	33	33	33	32	33
Rank	23	19	16	15	15
Delay due to Incidents (percent)	52	52	52	52	52
Travel Time Index	1.25	1.25	1.24	1.23	1.24
Rank	9	9	9	9	9
Congestion Cost					
Total Cost (\$ millions)	1,056	974	879	821	801
Rank	8	8	8	8	7
Cost per Peak Traveler (\$)	483	466	446	427	429
Rank	25	23	20	18	16

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

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The Mobility Data for Miami FL, Continued

Inventory Measures	1991	1990	1989	1988	1987
Urban Area Information					
Population (1000s)	3,965	3,910	3,860	3,755	3,670
Rank	6	6	6	6	6
Urban Area (square miles)	1,375	1,355	1,335	1,305	1,275
Population Density (persons/sq mile)	2,884	2,886	2,891	2,877	2,878
Peak Travelers (1000s)	1,804	1,748	1,710	1,648	1,596
Freeway					
Daily Vehicle-Miles of Travel (1000s)	22,675	21,670	21,020	19,360	17,425
Lane-Miles	1,680	1,635	1,590	1,550	1,520
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	29,500	29,210	28,895	28,415	27,790
Lane-Miles	5,550	5,470	5,430	5,415	5,375
Public Transportation					
Annual Psgr-Miles of Travel (millions)	519	470	415	381	390
Annual Unlinked Psgr Trips (millions)	99	98	93	84	88
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)	1.10	1.05	1.08	1.00	1.00
System Performance	1991	1990	1989	1988	1987
Congested Travel (% of peak VMT)	58	60	58	57	50
Congested System (% of lane-miles)	62	65	62	66	64
Congested Time (number of "Rush Hours")	6.0	6.0	6.0	5.6	5.0
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	292	327	367	353	303
Transit Riders or Carpoolers (millions)	73	81	91	84	69
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	35,584	35,931	33,718	32,882	25,842
Rank	7	7	8	8	9
Fuel per Peak Traveler (gallons)	20	21	20	20	16
Rank	14	12	12	13	15
Annual Delay					
Total Delay (1000s of person-hours)	54,349	55,076	52,030	50,857	40,627
Rank	7	7	8	7	9
Delay per Peak Traveler (person-hours)	30	32	30	31	25
Rank	16	14	15	12	15
Delay due to Incidents (percent)	52	52	52	52	52
Travel Time Index	1.22	1.23	1.21	1.22	1.18
Rank	10	9	10	6	8
Congestion Cost					
Total Cost (\$ millions)	685	668	601	559	432
Rank	7	7	7	7	9
Cost per Peak Traveler (\$)	380	382	352	339	270
Rank	17	16	16	14	16

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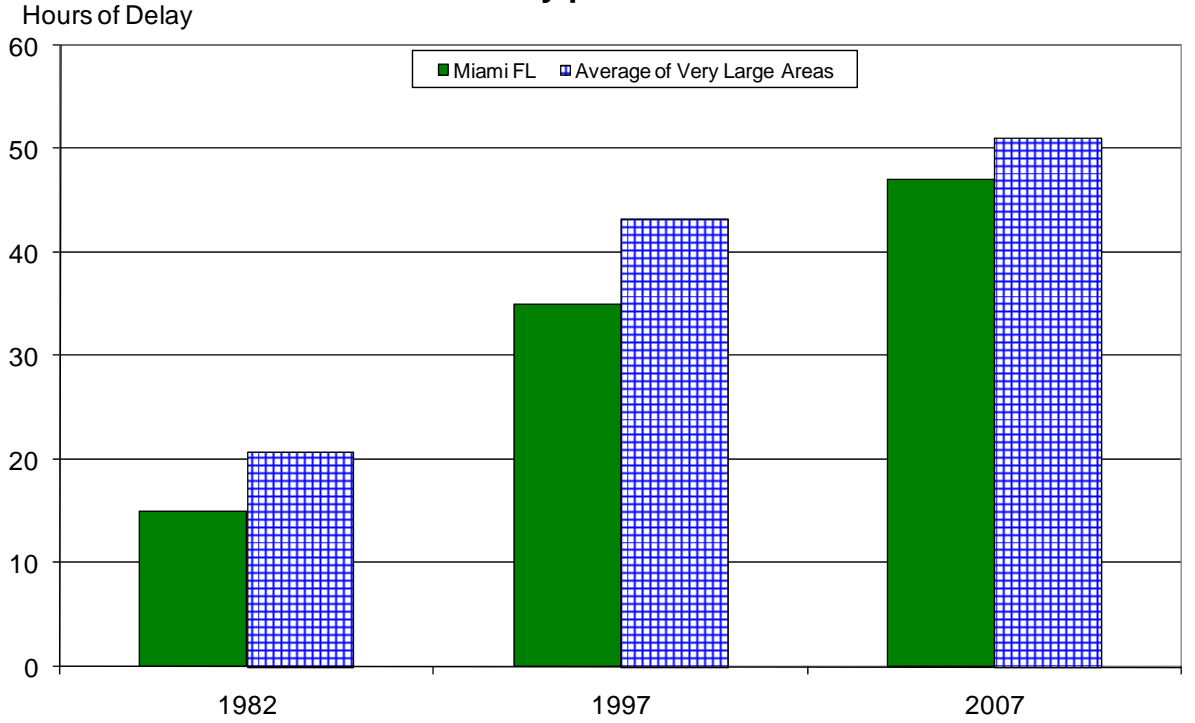
The Mobility Data for Miami FL, Continued

Inventory Measures	1986	1985	1984	1983	1982
Urban Area Information					
Population (1000s)	3,635	3,580	3,495	3,415	3,370
Rank	6	6	6	7	7
Urban Area (square miles)	1,245	1,220	1,210	1,160	1,100
Population Density (persons/sq mile)	2,920	2,934	2,888	2,944	3,064
Peak Travelers (1000s)	1,567	1,529	1,478	1,434	1,402
Freeway					
Daily Vehicle-Miles of Travel (1000s)	15,770	14,605	13,375	12,405	11,960
Lane-Miles	1,480	1,445	1,415	1,385	1,375
Arterial Streets					
Daily Vehicle-Miles of Travel (1000s)	27,025	26,010	25,320	24,910	24,500
Lane-Miles	5,355	5,305	5,275	5,220	5,150
Public Transportation					
Annual Psgr-Miles of Travel (millions)	396	400	367	367	367
Annual Unlinked Psgr Trips (millions)	89	87	80	80	80
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)	0.98	1.28	1.29	1.32	1.38
System Performance	1986	1985	1984	1983	1982
Congested Travel (% of peak VMT)	44	39	34	34	33
Congested System (% of lane-miles)	61	65	61	57	56
Congested Time (number of "Rush Hours")	4.6	4.0	3.6	3.4	3.2
Annual Increase Needed to Maintain Constant Congestion Level:					
Lane-miles	--	--	--	--	--
Transit Riders or Carpoolers (millions)	--	--	--	--	--
Annual Excess Fuel Consumed					
Total Fuel (1000 gallons)	21,195	16,891	13,752	13,395	12,891
Rank	9	9	9	9	8
Fuel per Peak Traveler (gallons)	14	11	9	9	9
Rank	13	22	27	23	20
Annual Delay					
Total Delay (1000s of person-hours)	33,331	27,279	22,335	22,064	21,440
Rank	9	9	9	9	8
Delay per Peak Traveler (person-hours)	21	18	15	15	15
Rank	19	24	28	23	20
Delay due to Incidents (percent)	52	52	52	52	52
Travel Time Index	1.15	1.13	1.11	1.11	1.11
Rank	10	13	16	15	9
Congestion Cost					
Total Cost (\$ millions)	342	284	226	216	205
Rank	9	9	11	10	9
Cost per Peak Traveler (\$)	218	186	153	150	146
Rank	21	28	30	26	21

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.

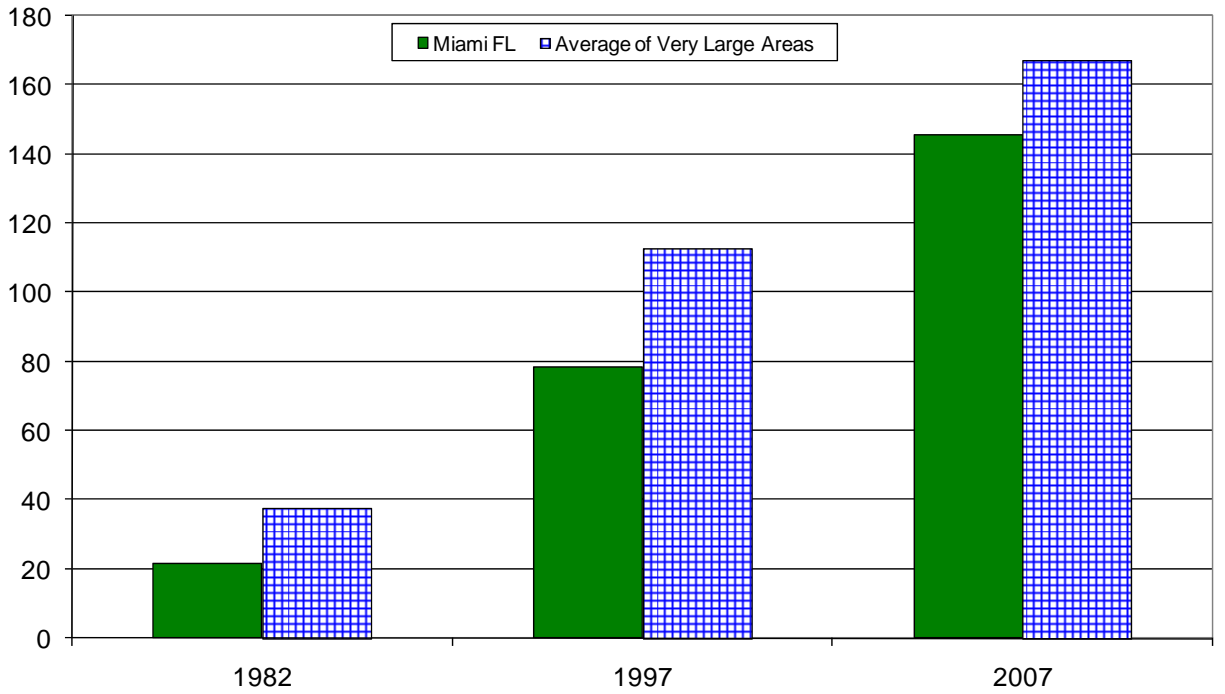
Growth in Delay per Peak Traveler



Note: Very Large areas have populations over 3 million

Annual Hours of Delay (millions)

Growth in Total Delay



Note: Very Large areas have populations over 3 million

**Benefits from Public Transportation Service and Operations Strategies in
Miami FL**

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	52	21	22	22
Service Patrols				
Percent of Roadway Miles	100	100	100	100
Annual Delay Reduction (1000 hours)	5,397	4,685	3,849	3,538
Arterial Signal Coordination				
Percent of Roadway Miles	78	74	74	79
Annual Delay Reduction (1000 hours)	938	943	1,076	1,154
Arterial Access Management				
Percent of Roadway Miles	78	78	78	83
Annual Delay Reduction (1000 hours)	5,504	5,234	5,827	5,874
HOV Lanes				
Daily Passenger-miles of travel (1000s)	1,200	1,000	872	565
HOV User Delay Savings	1,604	1,174	1,102	560
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	13,443	12,037	11,853	11,127
Annual Delay Saved per Peak Traveler (hours)	4	4	4	4
Annual Congestion Cost Savings (\$million)	269.2	232.7	218.4	194.1
Travel Time Index with Strategies	1.369	1.374	1.384	1.376
Travel Time Index (Base)	1.402	1.404	1.413	1.403
Public Transportation Service	2007	2006	2005	2004
Existing Service				
Annual Passenger-miles of travel (million)	973	845	806	757
Unlinked Passenger Trips (million)	169	163	159	151
Travel Time Index (combined road and transit)	1.389	1.392	1.402	1.392
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.414	1.418	1.428	1.417
Annual Increase				
Delay (1000 hours)	10,027	10,723	10,183	10,217
Delay per Peak Traveler (hours)	3	3	3	3
Congestion Cost (\$million)	191.1	199.2	182.2	173.0

**Benefits from Public Transportation Service and Operations Strategies in
Miami FL, 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	9	9	9	6
Service Patrols				
Percent of Roadway Miles	100	98	90	84
Annual Delay Reduction (1000 hours)	3,571	3,384	2,828	2,463
Arterial Signal Coordination				
Percent of Roadway Miles	83	78	80	82
Annual Delay Reduction (1000 hours)	1,143	901	1,080	1,867
Arterial Access Management				
Percent of Roadway Miles	80	81	82	82
Annual Delay Reduction (1000 hours)	5,645	5,047	4,998	3,857
HOV Lanes				
Daily Passenger-miles of travel (1000s)	367	238	154	100
HOV User Delay Savings	307	146	56	17
Total Effect of Operations Treatments				
Annual Delay Reduction (1000 hours)	10,666	9,478	8,962	8,205
Annual Delay Saved per Peak Traveler (hours)	4	3	3	3
Annual Congestion Cost Savings (\$million)	177.1	153.2	144.2	128.4
Travel Time Index with Strategies	1.378	1.373	1.358	1.336
Travel Time Index (Base)	1.404	1.397	1.381	1.356
Public Transportation Service	2003	2002	2001	2000
Existing Service				
Annual Passenger-miles of travel (million)	707	672	675	628
Unlinked Passenger Trips (million)	134	126	127	122
Travel Time Index (combined road and transit)	1.393	1.386	1.370	1.347
Condition if Public Transportation Service were Discontinued				
Travel Time Index	1.415	1.409	1.393	1.367
Annual Increase				
Delay (1000 hours)	8,428	8,078	7,907	7,210
Delay per Peak Traveler (hours)	3	3	3	3
Congestion Cost (\$million)	136.2	128.1	126.0	112.7

**Comparison of Several Key Mobility Performance Measures
Very Large Group – over 3 million population urban areas**

Urban Area	Delay per Traveler	Travel Time Index	Total Delay	1982 to 2007	
				Delay per Traveler	Total Delay
New York-Newark, NY-NJ-CT	L	0	H+	0	F+
Los Angeles-Long Beach-Santa Ana, CA	H+	H+	H+	S	F+
Chicago, IL-IN	L-	H	H	S	F+
Miami, FL	L	0	L	0	S
Philadelphia, PA-NJ-DE-MD	L-	L-	L-	S-	S-
San Francisco-Oakland, CA	H	H	L	0	S-
Dallas-Fort Worth-Arlington, TX	0	L	L	F+	0
Atlanta, GA	H	0	L	F+	S
Washington, DC-VA-MD	H+	0	L	F+	S-
Boston, MA-NH-RI	L-	L-	L-	0	S-
Detroit, MI	0	L-	L-	0	S-
Houston, TX	H	L	L	S	S-
Phoenix, AZ	L	L	L-	S-	S-
Seattle, WA	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

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 -	Above 1M Population 5 Hours 5 Index Points 5 Hours x Average Population	Below 1M 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