

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 Very Large Group – over 3 million population urban areas

Urban Area	Delay per Traveler	Travel Time Index	Total Delay	1982 to 2005	
				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	0	F+
Miami, FL	L	0	L	0	0
Philadelphia, PA-NJ-DE-MD	L-	L-	L-	S-	S-
Dallas-Fort Worth-Arlington, TX	H	L	L	F+	F
Washington, DC-VA-MD	H	0	L	F+	S-
Atlanta, GA	H	L	L	0	S-
San Francisco-Oakland, CA	H	H	L	F	S-
Boston, MA-NH-RI	L	L-	L-	0	S-
Detroit, MI	0	L-	L-	S	S-
Houston, TX	H	0	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

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 New York-Newark, NY-NJ-CT

Inventory Measures	2005	2004	2003	2002	2001	2000
Urban Area Information						
Population (1000s)	17,775	17,750	17,700	17,400	17,200	17,090
Rank	1	1	1	1	1	1
Urban Area (square miles)	4,780	4,780	4,775	4,600	4,500	4,400
Popn Density (persons/sq mile)	3,719	3,713	3,707	3,783	3,822	3,884
Peak Travelers (1000s)	8,319	8,254	8,177	7,969	7,757	7,588
Freeway						
Daily Vehicle-Miles of Travel (1000s)	117,500	115,500	112,555	105,195	103,675	101,295
Lane Miles	7,200	7,000	6,850	6,765	6,760	6,600
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	95,000	94,000	90,450	85,850	84,365	83,835
Lane Miles	19,010	18,800	18,430	17,900	17,700	17,510
Public Transportation						
Annual Psgr-Miles of Travel (millions)	18,720	18,973	18,444	18,594	18,990	18,648
Annual Unlinked Psgr Trips (millions)	3,478	3,387	3,344	3,392	3,417	3,224
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)	2.40	2.14	1.62	1.49	1.72	1.64
System Performance						
Congested Travel (% of peak VMT)	68	68	64	61	60	61
Congested System (% of lane-miles)	48	48	44	44	44	44
Congested Time (number of "Rush Hours")	7.2	7.2	7.2	6.8	6.8	6.8
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	733	712	660	437	511	588
Transit Riders or Carpoolers (millions)	206	201	184	117	136	157
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	241,976	224,458	194,264	173,452	163,428	163,316
Rank	2	2	2	2	2	2
Fuel per Peak Traveler (gallons)	29	27	24	22	21	22
Rank	23	26	30	34	33	31
Annual Delay						
Total Delay (1000s of person-hours)	384,046	350,148	305,283	270,520	255,564	256,244
Rank	2	2	2	2	2	2
Delay per Peak Traveler (person-hrs)	46	42	37	34	33	34
Rank	16	23	28	33	31	27
Delay due to Incidents (percent)	64	63	63	63	62	62
Travel Time Index						
Rank	1.39	1.36	1.32	1.30	1.28	1.29
Rank	5	7	8	10	12	11
Congestion Cost						
Total Cost (\$ millions)	7,383	6,470	5,397	4,691	4,398	4,269
Rank	2	2	2	2	2	2
Cost per Peak Traveler (\$)	888	784	660	589	567	563
Rank	18	22	27	28	30	27

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 New York-Newark, NY-NJ-CT, Continued

Inventory Measures	1999	1998	1997	1996	1995	1994
Urban Area Information						
Population (1000s)	16,650	16,500	16,335	16,320	16,270	16,185
Rank	1	1	1	1	1	1
Urban Area (square miles)	4,300	4,200	4,100	4,020	3,980	3,960
Popn Density (persons/sq mile)	3,872	3,929	3,984	4,060	4,088	4,087
Peak Travelers (1000s)	7,293	7,112	6,942	6,822	6,703	6,571
Freeway						
Daily Vehicle-Miles of Travel (1000s)	100,260	96,808	94,755	91,270	88,500	86,600
Lane Miles	6,590	6,590	6,550	6,545	6,495	6,440
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	82,575	81,665	80,255	78,300	75,605	71,555
Lane Miles	17,460	17,425	17,400	17,380	17,360	17,355
Public Transportation						
Annual Psgr-Miles of Travel (millions)	17,640	16,931	16,318	16,306	15,362	14,964
Annual Unlinked Psgr Trips (millions)	3,130	2,907	2,885	2,660	2,531	2,580
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)	1.19	1.15	1.31	1.37	1.27	1.15
System Performance						
Congested Travel (% of peak VMT)	62	57	56	52	50	47
Congested System (% of lane-miles)	48	46	46	46	46	45
Congested Time (number of "Rush Hours")	6.6	6.4	6.2	5.8	5.6	5.4
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	708	780	860	854	811	821
Transit Riders or Carpoolers (millions)	187	201	218	210	194	190
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	173,454	153,113	147,154	130,529	122,364	109,650
Rank	2	2	2	2	2	2
Fuel per Peak Traveler (gallons)	24	22	21	19	18	17
Rank	26	32	31	34	33	35
Annual Delay						
Total Delay (1000s of person-hours)	279,744	249,046	241,894	215,565	204,168	183,933
Rank	2	2	2	2	2	2
Delay per Peak Traveler (person-hrs)	38	35	35	32	30	28
Rank	22	25	27	29	29	30
Delay due to Incidents (percent)	62	61	61	62	62	62
Travel Time Index						
Rank	6	9	9	13	14	14
Congestion Cost						
Total Cost (\$ millions)	4,424	3,847	3,713	3,241	2,990	2,592
Rank	2	2	2	2	2	2
Cost per Peak Traveler (\$)	607	541	535	475	446	394
Rank	20	24	23	28	26	29

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 New York-Newark, NY-NJ-CT, Continued

Inventory Measures	1993	1992	1991	1990	1989	1988
Urban Area Information						
Population (1000s)	16,115	16,015	15,975	15,925	15,840	15,750
Rank	1	1	1	1	1	1
Urban Area (square miles)	3,900	3,800	3,700	3,600	3,500	3,400
Popn Density (persons/sq mile)	4,132	4,214	4,318	4,424	4,526	4,632
Peak Travelers (1000s)	6,446	6,310	6,198	6,083	6,003	5,906
Freeway						
Daily Vehicle-Miles of Travel (1000s)	84,210	82,900	81,600	81,475	78,675	74,580
Lane Miles	6,310	6,285	6,100	6,020	5,900	5,810
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	67,905	63,810	60,695	57,385	54,800	54,490
Lane Miles	17,305	17,240	17,095	16,965	16,900	16,875
Public Transportation						
Annual Psgr-Miles of Travel (millions)	13,839	14,909	14,786	15,481	16,572	16,157
Annual Unlinked Psgr Trips (millions)	2,419	2,622	2,591	2,808	3,067	2,815
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)	1.21	1.24	1.21	1.07	1.13	1.04
System Performance						
Congested Travel (% of peak VMT)	46	45	45	45	44	40
Congested System (% of lane-miles)	45	45	45	45	45	44
Congested Time (number of "Rush Hours")	5.2	5.0	5.2	5.2	5.0	4.6
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	789	707	665	694	631	613
Transit Riders or Carpoolers (millions)	176	153	142	145	128	121
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	99,183	92,626	92,144	94,913	87,834	74,384
Rank	2	2	2	2	2	2
Fuel per Peak Traveler (gallons)	15	15	15	16	15	13
Rank	35	36	31	27	24	28
Annual Delay						
Total Delay (1000s of person-hours)	161,967	153,119	152,337	163,132	151,778	131,512
Rank	2	2	2	2	2	2
Delay per Peak Traveler (person-hrs)	25	24	25	27	25	22
Rank	33	33	28	20	20	24
Delay due to Incidents (percent)	61	62	62	63	63	63
Travel Time Index						
Rank	15	13	12	12	11	13
Congestion Cost						
Total Cost (\$ millions)	2,231	2,065	2,000	2,074	1,808	1,487
Rank	2	2	2	2	2	2
Cost per Peak Traveler (\$)	346	327	323	341	301	252
Rank	30	30	27	21	20	24

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 New York-Newark, NY-NJ-CT, Continued

Inventory Measures	1987	1986	1985	1984	1983	1982
Urban Area Information						
Population (1000s)	15,580	15,500	15,400	15,340	15,375	15,500
Rank	1	1	1	1	1	1
Urban Area (square miles)	3,350	3,300	3,220	3,160	3,150	3,180
Popn Density (persons/sq mile)	4,651	4,697	4,783	4,854	4,881	4,874
Peak Travelers (1000s)	5,796	5,704	5,621	5,553	5,520	5,503
Freeway						
Daily Vehicle-Miles of Travel (1000s)	72,000	69,100	65,860	63,900	60,600	57,560
Lane Miles	5,790	5,650	5,555	5,605	5,485	5,425
Arterial Streets						
Daily Vehicle-Miles of Travel (1000s)	54,510	54,440	53,830	52,540	52,365	51,105
Lane Miles	16,720	16,660	16,550	16,475	16,325	16,285
Public Transportation						
Annual Psgr-Miles of Travel (millions)	15,000	14,924	16,435	16,325	16,325	16,325
Annual Unlinked Psgr Trips (millions)	2,953	2,961	3,195	3,504	3,504	3,504
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)	1.05	1.02	1.34	1.35	1.38	1.44
System Performance						
Congested Travel (% of peak VMT)	33	31	29	27	26	25
Congested System (% of lane-miles)	42	41	41	41	41	41
Congested Time (number of "Rush Hours")	4.2	4.2	3.8	3.4	3.2	3.0
Annual Increase Needed To Maintain Constant Congestion Level:						
Lane-Miles	695	--	--	--	--	--
Transit Riders or Carpoolers (millions)	136	--	--	--	--	--
Annual Excess Fuel Consumed						
Total Fuel (1000 gallons)	54,033	49,026	47,207	41,922	40,583	37,248
Rank	3	3	2	2	2	2
Fuel per Peak Traveler (gallons)	9	9	8	8	7	7
Rank	37	40	36	36	34	34
Annual Delay						
Total Delay (1000s of person-hours)	93,776	85,775	83,326	73,042	73,266	68,045
Rank	2	2	2	2	2	2
Delay per Peak Traveler (person-hrs)	16	15	15	13	13	12
Rank	36	36	33	35	29	28
Delay due to Incidents (percent)	60	60	60	60	60	60
Travel Time Index						
Rank	1.13	1.12	1.12	1.11	1.11	1.10
Rank	20	19	18	19	16	15
Congestion Cost						
Total Cost (\$ millions)	1,020	899	872	743	719	649
Rank	2	2	2	2	2	2
Cost per Peak Traveler (\$)	176	158	155	134	130	118
Rank	35	34	33	35	29	28

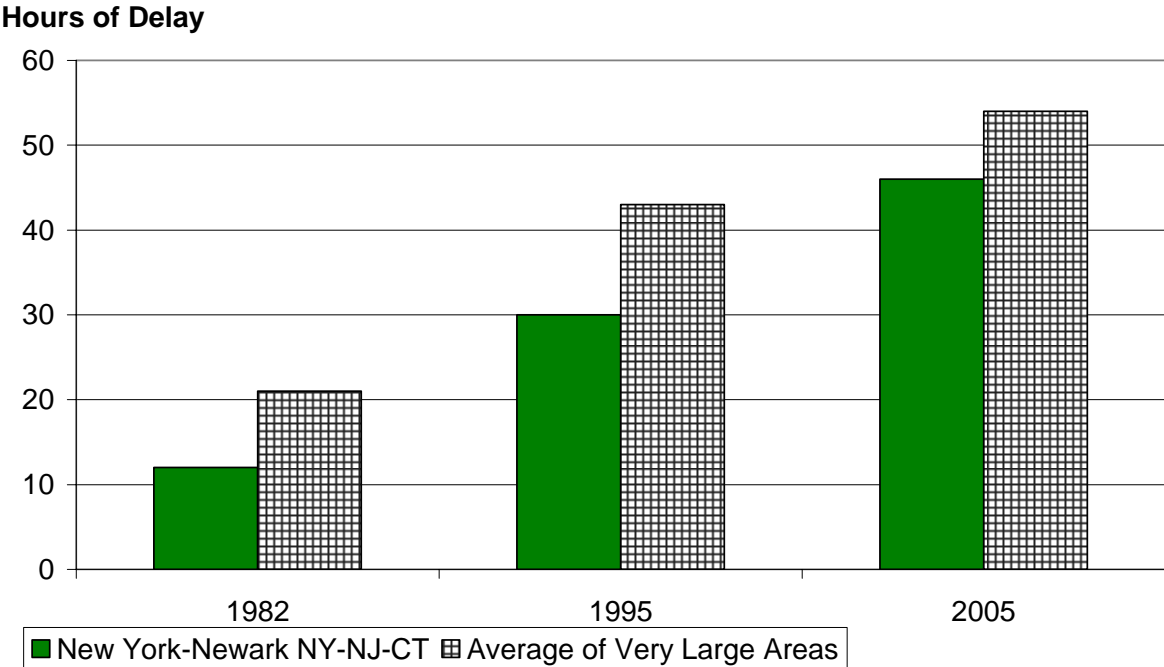
Note: System Performance statistics for 2000 through 2005 data reflect the effects of operational treatments.

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**Benefits From Public Transportation Service and Operations Strategies for
New York-Newark, NY-NJ-CT**

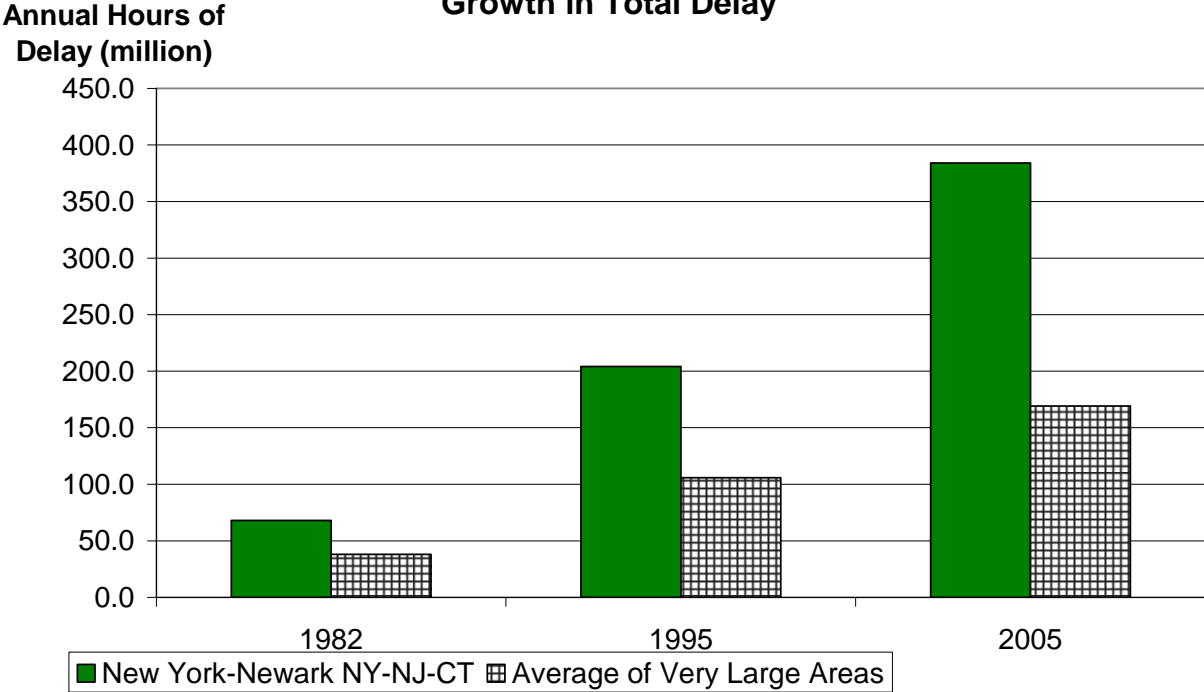
Operations Strategies	2005	2004	2003	2002	2001	2000
Freeway Ramp Metering						
Percent of Roadway Miles	3	3	3	3	3	3
Annual Delay Reduction (1000 hours)	1,424	1,252	1,203	928	875	851
Freeway Incident Management						
Cameras						
Percent of Roadway Miles	40	40	33	34	31	29
Service Patrols						
Percent of Roadway Miles	68	70	68	72	66	62
Annual Delay Reduction (1000 hours)	31,302	27,402	23,268	20,827	17,875	16,640
Arterial Signal Coordination						
Percent of Roadway Miles	50	51	50	52	53	53
Annual Delay Reduction (1000 hours)	1,384	1,403	1,049	1,073	1,015	1,090
Arterial Access Management						
Percent of Roadway Miles	25	25	25	24	22	20
Annual Delay Reduction (1000 hours)	5,351	5,459	5,843	5,670	5,117	5,041
HOV Lanes						
Daily Passenger-miles of Travel (1000s)	950	836	735	646	568	500
HOV User Delay Savings	1,754	1,372	1,055	895	753	699
Total Effect of Operations Treatments						
Annual Delay Reduction (1000 hours)	41,215	36,889	32,418	29,392	25,635	24,321
Annual Delay Saved per Peak Traveler (hours)	5	4	4	4	3	3
Annual Congestion Cost Savings (\$million)	781.9	675.5	569.1	507.7	437.8	402.2
Travel Time Index with Strategies	1.387	1.361	1.317	1.299	1.285	1.290
Travel Time Index (Base)	1.419	1.391	1.344	1.325	1.307	1.312
Public Transportation Service						
Existing Service						
Annual Passenger-miles of Travel (million)	18,720	18,973	18,444	18,594	18,990	18,648
Unlinked Passenger Trips (million)	3,478	3,387	3,344	3,392	3,417	3,224
Travel Time Index (combined road and transit)	1.276	1.257	1.228	1.212	1.201	1.204
Condition if Public Transportation Service were Discontinued						
Travel Time Index	1.532	1.509	1.445	1.444	1.433	1.440
Annual Delay Increase (1000 hours)	216,43	220,49	193,48	204,36	206,72	207,01
	1	9	9	5	6	1
Annual Delay Increase per Peak Traveler (hours)	26	27	24	26	27	27
Annual Congestion Cost Increase (\$million)	4,177.6	4,089.1	3,430.8	3,562.0	3,571.0	3,465.0

Growth in Delay per Peak Traveler



Very Large areas have populations over 3 million

Growth in Total Delay



Very Large areas have populations over 3 million