

# Performance Measure Summary - Washington DC-VA-MD

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 Washington DC-VA-MD

Inventory Measures	2017	2016	2015	2014	2013	2012
<b>Urban Area Information</b>						
Population (1000s)	5,020	4,980	4,950	4,920	4,825	4,740
Rank	8	8	8	8	8	8
Commuters (1000s)	1,888	1,868	1,853	1,838	1,827	1,795
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	46,139	45,230	44,530	38,074	37,786	37,680
Arterial Streets	43,718	42,939	41,800	44,490	44,894	45,105
<b>Cost Components</b>						
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)	2.57	2.37	2.49	3.20	3.79	3.66
Diesel (\$/gallon)	2.66	2.42	2.74	3.52	4.05	4.08
System Performance	2017	2016	2015	2014	2013	2012
<b>Congested Travel (% of peak VMT)</b>	38.4	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	26.4	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	5.0	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	89,885	89,317	88,713	88,129	87,776	87,473
Rank	7	7	7	7	7	7
Fuel per Peak Auto Commuter (gallons)	38	37	36	35	35	35
Rank	2	1	2	2	1	1
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	247,811	242,340	234,531	228,900	223,912	219,081
Rank	6	7	7	7	7	6
Delay per Auto Commuter (pers-hrs)	102	99	96	92	90	90
Rank	3	3	3	3	3	3
<b>Travel Time Index</b>						
Rank	1.35	1.35	1.35	1.34	1.34	1.34
Rank	7	6	7	7	7	8
<b>Commuter Stress Index</b>						
Rank	1.41	--	--	--	--	--
Rank	11	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	2.27	--	--	--	--	--
Rank	9	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	5,010	4,819	4,605	4,541	4,408	4,245
Rank	6	6	7	7	6	6
Cost per Auto Commuter (\$)	2,015	1,984	1,910	1,854	1,831	1,813
Rank	3	3	3	3	3	3
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	10,408	10,178	9,850	9,614	9,404	9,201
Rank	6	7	7	7	7	6
Annual Gallons of Wasted Fuel (000)	19,056	18,935	18,807	18,683	18,609	18,544
Rank	7	7	7	7	7	7
Annual Congestion Cost (\$ million)	527	494	457	444	415	396
Rank	6	6	6	7	6	6

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

# Mobility Data for Washington DC-VA-MD

Inventory Measures	2011	2010	2009	2008	2007	2006
<b>Urban Area Information</b>						
Population (1000s)	4,650	4,560	4,470	4,390	4,330	4,300
Rank	8	8	8	8	8	8
Commuters (1000s)	1,757	1,717	1,679	1,643	1,617	1,603
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	40,082	39,413	38,900	38,175	39,045	38,400
Arterial Streets	49,729	48,899	48,900	47,000	45,500	43,900
<b>Cost Components</b>						
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)	3.58	2.86	2.36	3.50	3.15	2.79
Diesel (\$/gallon)	3.74	3.11	2.86	4.13	3.48	2.93
System Performance	2011	2010	2009	2008	2007	2006
<b>Congested Travel (% of peak VMT)</b>	--	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	--	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	--	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	86,995	86,016	84,255	82,841	80,262	78,051
Rank	5	5	5	6	7	7
Fuel per Peak Auto Commuter (gallons)	35	35	35	34	33	32
Rank	1	1	1	1	1	3
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	215,867	211,442	205,159	192,110	186,130	181,003
Rank	5	4	5	7	7	7
Delay per Auto Commuter (pers-hrs)	90	90	89	86	84	83
Rank	3	2	2	2	3	3
<b>Travel Time Index</b>						
Rank	1.35	1.35	1.35	1.36	1.35	1.34
Rank	6	5	5	5	6	6
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	4,141	3,879	3,671	3,547	3,286	3,084
Rank	4	4	5	6	7	7
Cost per Auto Commuter (\$)	1,845	1,863	1,839	1,708	1,719	1,716
Rank	3	3	3	3	4	4
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	9,066	8,881	8,617	8,069	7,817	7,602
Rank	5	4	5	7	7	7
Annual Gallons of Wasted Fuel (000)	18,443	18,235	17,862	17,562	17,016	16,547
Rank	5	5	5	6	7	7
Annual Congestion Cost (\$ million)	424	388	367	361	329	301
Rank	5	4	4	6	7	7

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

# Mobility Data for Washington DC-VA-MD

Inventory Measures	2005	2004	2003	2002	2001	2000
<b>Urban Area Information</b>						
Population (1000s)	4,280	4,275	4,250	4,185	4,030	3,900
Rank	8	7	7	7	7	8
Commuters (1000s)	1,586	1,578	1,562	1,541	1,487	1,442
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	38,580	38,200	37,815	36,200	35,770	34,535
Arterial Streets	42,000	40,960	40,395	38,385	36,000	35,395
<b>Cost Components</b>						
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)	2.40	2.04	1.62	1.53	1.75	1.61
Diesel (\$/gallon)	2.59	2.09	1.73	1.54	1.73	1.67
System Performance	2005	2004	2003	2002	2001	2000
<b>Congested Travel (% of peak VMT)</b>	--	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	--	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	--	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	75,965	73,049	70,611	67,882	63,633	59,357
Rank	7	7	7	8	9	9
Fuel per Peak Auto Commuter (gallons)	31	30	29	29	27	24
Rank	3	3	3	3	2	6
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	176,166	169,403	163,749	157,422	147,566	137,652
Rank	7	7	7	7	7	8
Delay per Auto Commuter (pers-hrs)	81	78	76	75	72	70
Rank	3	3	3	3	3	3
<b>Travel Time Index</b>						
Rank	1.34	1.33	1.32	1.31	1.30	1.29
Rank	6	6	6	6	7	7
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	2,883	2,658	2,475	2,319	2,151	1,945
Rank	7	7	7	7	7	8
Cost per Auto Commuter (\$)	1,727	1,718	1,706	1,674	1,591	1,526
Rank	4	4	4	4	3	4
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	7,399	7,115	6,877	6,612	6,198	5,781
Rank	7	7	7	7	7	8
Annual Gallons of Wasted Fuel (000)	16,105	15,486	14,970	14,391	13,490	12,584
Rank	7	7	7	8	9	9
Annual Congestion Cost (\$ million)	279	252	231	212	195	175
Rank	7	7	7	7	7	8

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

# Mobility Data for Washington DC-VA-MD

Inventory Measures	1999	1998	1997	1996	1995	1994
<b>Urban Area Information</b>						
Population (1000s)	3,885	3,800	3,660	3,570	3,510	3,480
Rank	8	9	9	9	8	8
Commuters (1000s)	1,439	1,408	1,359	1,328	1,308	1,297
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	33,975	33,930	33,340	33,045	32,460	31,565
Arterial Streets	35,165	34,965	34,370	34,575	33,880	34,080
<b>Cost Components</b>						
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)	1.10	1.11	1.21	1.32	1.24	1.10
Diesel (\$/gallon)	1.27	1.18	1.34	1.47	1.37	1.22
System Performance	1999	1998	1997	1996	1995	1994
<b>Congested Travel (% of peak VMT)</b>	--	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	--	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	--	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	58,186	56,119	53,204	51,535	50,059	49,027
Rank	8	7	7	7	6	6
Fuel per Peak Auto Commuter (gallons)	24	23	22	22	20	21
Rank	4	5	4	2	4	3
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	134,936	130,142	123,381	119,511	116,087	113,695
Rank	8	8	8	7	7	6
Delay per Auto Commuter (pers-hrs)	68	68	66	66	65	64
Rank	3	3	3	3	3	3
<b>Travel Time Index</b>						
Rank	1.28	1.28	1.28	1.27	1.27	1.27
Rank	7	6	6	5	5	4
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	1,818	1,719	1,611	1,534	1,447	1,375
Rank	8	8	8	7	6	6
Cost per Auto Commuter (\$)	1,548	1,525	1,469	1,457	1,459	1,472
Rank	3	3	3	3	3	3
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	5,667	5,466	5,182	5,019	4,876	4,775
Rank	8	8	8	7	7	6
Annual Gallons of Wasted Fuel (000)	12,336	11,897	11,279	10,925	10,612	10,394
Rank	8	7	7	7	6	6
Annual Congestion Cost (\$ million)	161	153	145	140	133	127
Rank	8	8	8	6	6	6

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

# Mobility Data for Washington DC-VA-MD

Inventory Measures	1993	1992	1991	1990	1989	1988
<b>Urban Area Information</b>						
Population (1000s)	3,420	3,300	3,250	3,100	3,080	3,040
Rank	8	9	9	10	10	10
Commuters (1000s)	1,277	1,235	1,219	1,165	1,146	1,120
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	29,320	27,985	26,000	25,080	24,590	23,455
Arterial Streets	33,035	30,420	27,525	25,305	24,530	24,045
<b>Cost Components</b>						
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)	1.12	1.18	1.12	1.08	1.10	1.02
Diesel (\$/gallon)	1.25	1.31	1.39	1.26	1.20	1.11
System Performance	1993	1992	1991	1990	1989	1988
<b>Congested Travel (% of peak VMT)</b>	--	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	--	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	--	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	46,234	43,127	39,525	36,276	34,441	33,135
Rank	6	6	6	7	7	8
Fuel per Peak Auto Commuter (gallons)	19	19	17	15	15	14
Rank	3	3	3	4	5	5
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	107,218	100,013	91,660	84,125	79,870	76,842
Rank	6	6	6	6	6	6
Delay per Auto Commuter (pers-hrs)	61	59	55	53	51	50
Rank	3	3	3	3	3	3
<b>Travel Time Index</b>						
Rank	4	4	4	5	5	5
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	1,267	1,153	1,028	907	822	756
Rank	6	6	6	6	6	6
Cost per Auto Commuter (\$)	1,425	1,370	1,294	1,243	1,247	1,260
Rank	3	3	3	5	5	5
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	4,503	4,201	3,850	3,533	3,355	3,227
Rank	6	6	6	6	6	6
Annual Gallons of Wasted Fuel (000)	9,802	9,143	8,379	7,690	7,301	7,025
Rank	6	6	6	7	7	8
Annual Congestion Cost (\$ million)	119	110	100	90	84	79
Rank	6	6	6	6	6	6

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

# Mobility Data for Washington DC-VA-MD

Inventory Measures	1987	1986	1985	1984	1983	1982
<b>Urban Area Information</b>						
Population (1000s)	2,980	2,920	2,860	2,810	2,780	2,700
Rank	10	9	9	9	9	9
Commuters (1000s)	1,089	1,058	1,026	999	980	942
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	22,365	21,345	19,460	18,015	16,255	15,200
Arterial Streets	23,930	22,885	21,165	19,230	18,105	17,375
<b>Cost Components</b>						
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)	1.02	0.99	1.30	1.31	1.34	1.41
Diesel (\$/gallon)	1.11	1.08	1.42	1.43	1.46	1.53
System Performance	1987	1986	1985	1984	1983	1982
<b>Congested Travel (% of peak VMT)</b>	--	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	--	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	--	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	31,524	30,214	27,210	24,871	21,892	20,103
Rank	9	8	9	10	10	11
Fuel per Peak Auto Commuter (gallons)	14	13	12	11	10	8
Rank	5	4	5	5	4	9
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	73,105	70,068	63,101	57,677	50,768	46,620
Rank	6	7	8	10	10	10
Delay per Auto Commuter (pers-hrs)	49	48	45	42	37	36
Rank	3	3	4	4	5	4
<b>Travel Time Index</b>						
Rank	1.20	1.20	1.19	1.17	1.16	1.15
Rank	5	5	6	7	7	8
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	694	643	578	512	435	390
Rank	6	7	8	10	10	10
Cost per Auto Commuter (\$)	1,251	1,246	1,141	1,085	998	947
Rank	5	4	5	6	7	8
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	3,070	2,943	2,650	2,422	2,132	1,958
Rank	6	7	8	10	10	10
Annual Gallons of Wasted Fuel (000)	6,683	6,405	5,769	5,273	4,641	4,262
Rank	9	8	9	10	10	11
Annual Congestion Cost (\$ million)	75	70	65	58	51	47
Rank	6	6	7	10	10	10

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