

# Performance Measure Summary - Madison WI

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 Madison WI

Inventory Measures	2017	2016	2015	2014	2013	2012
<b>Urban Area Information</b>						
Population (1000s)	445	440	440	435	430	425
Rank	82	82	82	83	83	83
Commuters (1000s)	201	198	197	194	192	189
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	3,850	3,754	3,630	3,498	3,501	3,085
Arterial Streets	3,575	3,509	3,670	3,800	3,693	2,780
<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)	2.33	2.18	2.33	3.32	3.63	3.60
Diesel (\$/gallon)	2.51	2.32	2.31	3.65	3.91	3.91
System Performance	2017	2016	2015	2014	2013	2012
<b>Congested Travel (% of peak VMT)</b>	16.4	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	8.9	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	1.7	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	4,238	4,178	4,138	4,097	4,046	3,914
Rank	84	84	84	84	84	84
Fuel per Peak Auto Commuter (gallons)	17	17	17	16	17	16
Rank	68	68	65	70	64	69
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	9,664	9,451	9,282	9,030	8,762	8,400
Rank	86	85	85	85	85	85
Delay per Auto Commuter (pers-hrs)	38	37	37	35	35	34
Rank	80	81	79	80	79	79
<b>Travel Time Index</b>						
Rank	1.15	1.15	1.15	1.15	1.15	1.15
Rank	71	71	69	71	70	71
<b>Commuter Stress Index</b>						
Rank	1.16	--	--	--	--	--
Rank	72	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	1.39	--	--	--	--	--
Rank	55	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	196	189	183	182	174	165
Rank	86	85	85	84	85	85
Cost per Auto Commuter (\$)	633	624	608	587	577	561
Rank	90	90	88	88	87	90
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	406	397	390	379	368	353
Rank	86	85	85	85	85	85
Annual Gallons of Wasted Fuel (000)	898	886	877	868	858	830
Rank	84	84	84	84	84	84
Annual Congestion Cost (\$ million)	21	20	18	18	17	16
Rank	85	84	84	84	84	84

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

# Mobility Data for Madison WI

Inventory Measures	2011	2010	2009	2008	2007	2006
<b>Urban Area Information</b>						
Population (1000s)	415	400	390	385	385	385
Rank	83	83	83	83	83	83
Commuters (1000s)	185	177	172	169	169	168
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	3,499	3,356	3,200	3,065	3,125	3,025
Arterial Streets	2,935	2,899	2,880	2,870	2,905	2,895
<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)	3.42	2.71	2.29	3.48	3.08	2.73
Diesel (\$/gallon)	3.71	2.99	2.54	4.15	3.41	2.90
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)	3,801	3,713	3,548	3,596	3,418	3,203
Rank	84	84	84	85	86	88
Fuel per Peak Auto Commuter (gallons)	16	17	15	16	16	16
Rank	67	61	62	68	70	64
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	8,011	7,683	7,203	6,952	6,608	6,193
Rank	86	86	86	87	88	88
Delay per Auto Commuter (pers-hrs)	34	33	33	31	32	31
Rank	78	77	77	78	77	80
<b>Travel Time Index</b>						
Rank	1.15	1.14	1.14	1.15	1.15	1.15
Rank	70	73	74	72	72	72
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	155	142	130	130	118	107
Rank	85	86	86	86	88	88
Cost per Auto Commuter (\$)	551	546	519	497	489	473
Rank	91	91	91	92	93	92
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	336	323	303	292	278	260
Rank	86	86	86	87	88	88
Annual Gallons of Wasted Fuel (000)	806	787	752	762	725	679
Rank	84	84	84	85	86	88
Annual Congestion Cost (\$ million)	16	14	13	14	12	11
Rank	85	86	86	86	87	88

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

# Mobility Data for Madison WI

Inventory Measures	2005	2004	2003	2002	2001	2000
<b>Urban Area Information</b>						
Population (1000s)	380	380	370	365	360	355
Rank	83	82	81	81	80	80
Commuters (1000s)	164	163	158	154	149	145
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	2,900	2,890	2,830	2,775	2,720	2,650
Arterial Streets	3,045	3,145	2,960	2,920	2,860	2,725
<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)	2.37	1.98	1.58	1.46	1.51	1.64
Diesel (\$/gallon)	2.53	1.98	1.53	1.40	1.58	1.57
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)	2,932	2,735	2,542	2,381	2,247	2,059
Rank	90	90	90	90	89	90
Fuel per Peak Auto Commuter (gallons)	14	13	13	12	11	10
Rank	75	80	74	78	78	80
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	5,669	5,287	4,916	4,604	4,345	3,980
Rank	93	92	93	93	92	93
Delay per Auto Commuter (pers-hrs)	30	29	28	26	25	23
Rank	82	83	84	86	87	89
<b>Travel Time Index</b>						
Rank	1.14	1.14	1.13	1.13	1.12	1.11
Rank	76	74	76	75	78	80
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	94	84	75	68	63	57
Rank	92	93	93	93	93	92
Cost per Auto Commuter (\$)	449	430	410	392	380	357
Rank	92	92	92	92	91	93
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	238	222	206	193	182	167
Rank	92	92	93	93	92	93
Annual Gallons of Wasted Fuel (000)	622	580	539	505	476	436
Rank	89	90	90	90	89	90
Annual Congestion Cost (\$ million)	9	8	7	6	6	5
Rank	91	89	92	92	87	89

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

# Mobility Data for Madison WI

Inventory Measures	1999	1998	1997	1996	1995	1994
<b>Urban Area Information</b>						
Population (1000s)	350	345	340	335	330	325
Rank	80	80	80	81	81	80
Commuters (1000s)	141	137	133	129	125	121
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	2,580	2,500	2,450	2,410	2,380	2,350
Arterial Streets	2,665	2,575	2,485	2,445	2,415	2,390
<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)	1.17	1.14	1.19	1.33	1.18	1.09
Diesel (\$/gallon)	1.16	1.16	1.26	1.42	1.26	1.16
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)	1,940	1,774	1,718	1,551	1,472	1,409
Rank	88	87	87	87	87	87
Fuel per Peak Auto Commuter (gallons)	10	8	9	7	7	7
Rank	77	83	75	82	77	73
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	3,752	3,431	3,322	2,999	2,846	2,725
Rank	92	92	91	92	91	89
Delay per Auto Commuter (pers-hrs)	23	21	21	20	19	19
Rank	87	89	86	85	85	85
<b>Travel Time Index</b>						
Rank	1.11	1.10	1.10	1.09	1.09	1.09
Rank	78	80	80	79	77	75
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	51	46	44	39	36	33
Rank	92	92	90	91	89	88
Cost per Auto Commuter (\$)	346	324	320	292	287	287
Rank	93	93	90	90	90	89
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	158	144	140	126	120	114
Rank	92	92	91	92	90	89
Annual Gallons of Wasted Fuel (000)	411	376	364	329	312	299
Rank	88	87	87	87	87	87
Annual Congestion Cost (\$ million)	5	4	4	4	3	3
Rank	84	88	86	82	88	85

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

# Mobility Data for Madison WI

Inventory Measures	1993	1992	1991	1990	1989	1988
<b>Urban Area Information</b>						
Population (1000s)	320	315	310	305	300	295
Rank	80	81	81	81	81	81
Commuters (1000s)	117	114	110	107	104	102
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	2,300	2,240	2,200	2,170	2,140	2,100
Arterial Streets	2,370	2,280	2,215	2,175	2,035	1,985
<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	1.11	1.15	1.11	1.13	1.04
Diesel (\$/gallon)	1.20	1.19	1.25	1.21	1.23	1.13
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)	1,271	1,185	1,157	1,126	1,086	1,060
Rank	87	87	85	84	83	82
Fuel per Peak Auto Commuter (gallons)	6	5	5	5	5	5
Rank	76	82	79	72	63	58
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	2,458	2,292	2,237	2,178	2,100	2,050
Rank	90	90	87	83	83	82
Delay per Auto Commuter (pers-hrs)	17	17	17	17	16	16
Rank	85	83	78	70	68	61
<b>Travel Time Index</b>						
Rank	1.08	1.08	1.08	1.08	1.08	1.08
Rank	77	76	71	63	56	48
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	29	27	25	24	22	20
Rank	90	87	86	83	82	82
Cost per Auto Commuter (\$)	261	256	255	254	262	277
Rank	90	87	86	86	80	76
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	103	96	94	91	88	86
Rank	90	90	87	83	83	82
Annual Gallons of Wasted Fuel (000)	270	251	245	239	230	225
Rank	87	87	85	84	83	82
Annual Congestion Cost (\$ million)	3	3	2	2	2	2
Rank	82	80	85	83	82	80

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

# Mobility Data for Madison WI

Inventory Measures	1987	1986	1985	1984	1983	1982
<b>Urban Area Information</b>						
Population (1000s)	290	285	280	275	270	265
Rank	81	81	81	81	80	80
Commuters (1000s)	99	97	94	92	90	87
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	2,050	2,000	1,960	1,940	1,920	1,900
Arterial Streets	1,915	1,900	1,880	1,870	1,860	1,845
<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)	1.05	1.02	1.34	1.35	1.38	1.44
Diesel (\$/gallon)	1.14	1.11	1.45	1.47	1.50	1.57
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)	1,042	1,038	1,022	1,005	953	834
Rank	80	78	76	73	71	72
Fuel per Peak Auto Commuter (gallons)	5	5	5	5	5	3
Rank	48	40	32	27	22	34
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	2,014	2,006	1,975	1,943	1,842	1,612
Rank	81	79	78	74	72	72
Delay per Auto Commuter (pers-hrs)	16	17	17	17	16	15
Rank	55	47	38	35	33	33
<b>Travel Time Index</b>						
Rank	44	42	39	38	33	35
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	19	19	18	18	16	14
Rank	81	78	78	73	72	72
Cost per Auto Commuter (\$)	285	284	281	290	300	270
Rank	71	66	64	56	48	52
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	85	84	83	82	77	68
Rank	81	79	78	73	72	72
Annual Gallons of Wasted Fuel (000)	221	220	217	213	202	177
Rank	80	78	76	73	71	72
Annual Congestion Cost (\$ million)	2	2	2	2	2	2
Rank	79	75	73	70	66	65

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