

# Performance Measure Summary - Winston-Salem NC

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 Winston-Salem NC

Inventory Measures	2017	2016	2015	2014	2013	2012
<b>Urban Area Information</b>						
Population (1000s)	420	415	415	415	410	405
Rank	84	84	84	84	84	84
Commuters (1000s)	217	214	214	214	215	213
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	6,390	6,306	5,871	5,931	4,792	4,685
Arterial Streets	2,527	2,440	2,440	2,359	1,766	1,765
<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)	2.20	2.10	2.15	3.20	3.44	3.49
Diesel (\$/gallon)	2.45	2.23	2.47	3.58	3.89	3.89
System Performance	2017	2016	2015	2014	2013	2012
<b>Congested Travel (% of peak VMT)</b>	12.2	--	--	--	--	--
<b>Congested System (% of lane-miles)</b>	9.2	--	--	--	--	--
<b>Congested Time (number of "Rush Hours")</b>	0.9	--	--	--	--	--
<b>Annual Excess Fuel Consumed</b>						
Total Fuel (1000 gallons)	2,618	2,559	2,501	2,434	2,374	2,363
Rank	97	97	97	96	96	96
Fuel per Peak Auto Commuter (gallons)	10	9	9	8	7	7
Rank	98	98	98	99	98	98
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	7,930	7,642	7,278	6,956	6,664	6,513
Rank	93	94	94	94	94	94
Delay per Auto Commuter (pers-hrs)	27	26	24	22	21	21
Rank	97	97	97	97	98	98
<b>Travel Time Index</b>						
Rank	1.11	1.11	1.11	1.11	1.11	1.11
Rank	96	96	96	97	96	94
<b>Commuter Stress Index</b>						
Rank	1.12	--	--	--	--	--
Rank	96	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	1.24	--	--	--	--	--
Rank	87	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	159	151	141	137	130	125
Rank	93	94	94	94	94	94
Cost per Auto Commuter (\$)	487	472	449	426	414	410
Rank	98	98	98	98	97	97
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	333	321	306	292	280	274
Rank	93	94	94	94	94	94
Annual Gallons of Wasted Fuel (000)	555	543	530	516	503	501
Rank	97	97	97	96	96	96
Annual Congestion Cost (\$ million)	17	15	14	13	12	11
Rank	93	94	93	95	95	95

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

# Mobility Data for Winston-Salem NC

Inventory Measures	2011	2010	2009	2008	2007	2006
<b>Urban Area Information</b>						
Population (1000s)	400	395	380	375	370	360
Rank	84	84	84	84	85	85
Commuters (1000s)	210	206	198	194	191	185
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	4,777	4,740	4,600	4,440	4,685	4,545
Arterial Streets	1,665	1,700	1,860	1,945	1,845	1,855
<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)	3.32	2.70	2.24	3.42	2.95	2.62
Diesel (\$/gallon)	3.64	2.93	2.53	4.11	3.33	2.80
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)	2,356	2,371	2,308	2,402	2,445	2,412
Rank	96	95	95	95	96	95
Fuel per Peak Auto Commuter (gallons)	7	7	7	7	8	8
Rank	98	99	97	98	97	98
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	6,435	6,414	6,186	6,131	6,241	6,156
Rank	93	92	90	91	90	90
Delay per Auto Commuter (pers-hrs)	20	20	21	21	22	22
Rank	98	98	96	96	94	94
<b>Travel Time Index</b>						
Rank	1.11	1.12	1.11	1.11	1.11	1.12
Rank	93	89	92	96	95	88
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	122	117	110	112	109	104
Rank	94	92	91	93	92	90
Cost per Auto Commuter (\$)	418	426	420	412	436	443
Rank	96	95	95	95	95	95
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	270	269	260	258	262	259
Rank	93	92	90	90	90	89
Annual Gallons of Wasted Fuel (000)	500	503	489	509	518	511
Rank	96	95	95	95	96	95
Annual Congestion Cost (\$ million)	12	12	11	11	11	10
Rank	95	90	89	93	90	89

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

# Mobility Data for Winston-Salem NC

Inventory Measures	2005	2004	2003	2002	2001	2000
<b>Urban Area Information</b>						
Population (1000s)	350	340	335	325	320	310
Rank	86	87	87	87	87	88
Commuters (1000s)	178	172	169	161	156	149
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	4,565	4,335	4,280	4,130	4,100	4,005
Arterial Streets	1,835	1,815	1,750	1,660	1,570	1,545
<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)	2.27	1.89	1.46	1.33	1.43	1.46
Diesel (\$/gallon)	2.44	1.90	1.47	1.32	1.47	1.44
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)	2,238	2,026	1,860	1,734	1,662	1,580
Rank	95	95	95	95	95	95
Fuel per Peak Auto Commuter (gallons)	8	7	6	5	5	6
Rank	97	96	97	97	96	94
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	5,711	5,171	4,748	4,426	4,241	4,032
Rank	91	94	94	95	95	91
Delay per Auto Commuter (pers-hrs)	21	20	18	18	17	17
Rank	95	95	95	95	95	95
<b>Travel Time Index</b>						
Rank	1.12	1.11	1.10	1.10	1.10	1.10
Rank	86	91	91	91	88	86
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	93	80	71	65	61	56
Rank	93	94	95	95	95	93
Cost per Auto Commuter (\$)	424	395	374	358	347	338
Rank	94	95	95	94	94	94
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	240	217	199	186	178	169
Rank	91	94	94	95	95	91
Annual Gallons of Wasted Fuel (000)	474	430	394	368	352	335
Rank	95	95	95	95	95	95
Annual Congestion Cost (\$ million)	9	8	7	6	5	5
Rank	91	89	92	92	95	89

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

# Mobility Data for Winston-Salem NC

Inventory Measures	1999	1998	1997	1996	1995	1994
<b>Urban Area Information</b>						
Population (1000s)	305	295	290	280	270	260
Rank	88	88	87	88	89	89
Commuters (1000s)	144	138	133	127	120	114
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	3,900	3,800	3,765	3,600	3,500	3,330
Arterial Streets	1,480	1,400	1,335	1,270	1,265	1,240
<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)	1.05	1.02	1.14	1.21	1.13	1.02
Diesel (\$/gallon)	1.06	1.12	1.20	1.28	1.19	1.08
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)	1,418	1,302	1,144	986	844	744
Rank	95	95	95	95	96	96
Fuel per Peak Auto Commuter (gallons)	4	5	5	4	3	2
Rank	97	93	92	92	94	96
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	3,619	3,324	2,919	2,516	2,154	1,898
Rank	94	94	95	95	95	95
Delay per Auto Commuter (pers-hrs)	16	15	14	12	11	10
Rank	95	95	95	96	96	96
<b>Travel Time Index</b>						
Rank	1.09	1.09	1.08	1.07	1.06	1.06
Rank	87	84	88	91	93	91
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	48	44	38	32	27	23
Rank	94	93	95	95	95	95
Cost per Auto Commuter (\$)	311	296	261	235	209	185
Rank	94	94	95	95	96	97
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	152	140	123	106	90	80
Rank	94	93	95	95	95	95
Annual Gallons of Wasted Fuel (000)	301	276	242	209	179	158
Rank	95	95	95	95	96	96
Annual Congestion Cost (\$ million)	4	4	3	3	2	2
Rank	93	88	94	93	95	95

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

# Mobility Data for Winston-Salem NC

Inventory Measures	1993	1992	1991	1990	1989	1988
<b>Urban Area Information</b>						
Population (1000s)	250	240	230	220	210	200
Rank	89	90	90	90	90	93
Commuters (1000s)	108	102	96	91	86	81
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	3,100	2,950	2,800	2,700	2,585	2,505
Arterial Streets	1,250	1,460	1,440	1,410	1,400	1,380
<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)	1.07	1.08	1.12	1.08	1.08	1.00
Diesel (\$/gallon)	1.13	1.15	1.21	1.07	0.98	0.91
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)	630	586	556	518	479	444
Rank	96	96	96	96	95	95
Fuel per Peak Auto Commuter (gallons)	2	2	2	2	1	1
Rank	96	95	94	93	97	94
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	1,609	1,496	1,419	1,321	1,222	1,133
Rank	95	96	95	93	94	94
Delay per Auto Commuter (pers-hrs)	9	9	9	9	9	8
Rank	97	97	96	94	92	92
<b>Travel Time Index</b>						
Rank	93	92	92	90	87	84
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	19	17	16	14	12	11
Rank	95	96	94	93	94	94
Cost per Auto Commuter (\$)	165	151	156	146	149	141
Rank	97	97	97	97	96	96
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	68	63	60	55	51	48
Rank	95	96	95	93	94	94
Annual Gallons of Wasted Fuel (000)	134	124	118	110	102	94
Rank	96	96	96	96	95	95
Annual Congestion Cost (\$ million)	2	2	2	1	1	1
Rank	92	90	85	93	91	90

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

# Mobility Data for Winston-Salem NC

Inventory Measures	1987	1986	1985	1984	1983	1982
<b>Urban Area Information</b>						
Population (1000s)	190	185	180	175	170	170
Rank	94	94	95	95	95	93
Commuters (1000s)	77	74	71	69	67	66
<b>Daily Vehicle-Miles of Travel (1000s)</b>						
Freeway	2,400	2,335	2,290	2,125	2,000	1,970
Arterial Streets	1,360	1,345	1,320	1,300	1,280	1,250
<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)	1.00	0.98	1.28	1.29	1.32	1.38
Diesel (\$/gallon)	0.91	0.89	1.16	1.17	1.20	1.26
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)	419	398	375	337	308	268
Rank	94	93	93	93	93	92
Fuel per Peak Auto Commuter (gallons)	1	1	1	1	1	1
Rank	93	91	90	87	86	82
<b>Annual Delay</b>						
Total Delay (1000s of person-hours)	1,070	1,016	956	860	787	684
Rank	93	92	92	93	92	92
Delay per Auto Commuter (pers-hrs)	8	8	8	7	7	6
Rank	92	90	90	90	85	90
<b>Travel Time Index</b>						
Rank	79	74	64	75	68	76
<b>Commuter Stress Index</b>						
Rank	--	--	--	--	--	--
<b>Freeway Planning Time Index (95th Pctile)</b>						
Rank	--	--	--	--	--	--
<b>Congestion Cost</b>						
Total Cost (\$ millions)	10	9	9	8	7	6
Rank	93	91	91	89	91	91
Cost per Auto Commuter (\$)	140	143	128	119	117	107
Rank	95	95	95	93	92	91
<b>Truck Congestion</b>						
Annual Person-Hours of Delay (000)	45	43	40	36	33	29
Rank	93	91	92	93	92	92
Annual Gallons of Wasted Fuel (000)	89	84	79	71	65	57
Rank	94	93	93	93	93	92
Annual Congestion Cost (\$ million)	1	1	1	1	1	1
Rank	87	84	83	81	78	75

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