



# Congestion in Florida

## Findings from the 2011 Urban Mobility Report

This special report of the FDOT Trends and Conditions series highlights the costs and challenges of congestion in seven urban areas in Florida and across the nation. It is based on the Texas Transportation Institute's (TTI) *2011 Urban Mobility Report*. The following summarizes the results for 2010 from this report and compares them with the 2009 results, unless mentioned otherwise:

- **Moderation of national congestion costs** – From 2009 to 2010, congestion costs remained steady at about \$101 billion for 439 U.S. urban areas. There were 4.8 billion hours in travel delay and 1.9 billion excess gallons of fuel consumed. The 2010 travel delay and excess fuel consumption also remained constant from 2009.
- **Moderation of congestion costs in Florida** – The congestion costs in 2010 were comparable to that in 2009 at about \$5.6 billion for the seven selected urban areas in Florida. There were approximately 269 million hours in travel delay and 116 million excess gallons of fuel consumed. Travel delay witnessed a modest drop of about 1.5 percent, while excess fuel consumption experienced a drop of about 2.0 percent.
- **Congestion levels stable** – Higher fuel prices and a slow economy temporarily stopped travel demand growth. Nationally, congestion levels remained unchanged. In Florida, both overall congestion and congestion per auto commuter declined.
- **Congestion in Florida cities** – Orlando and Miami each had 38 hours of annual delay per auto commuter in 2010, the highest in Florida. They both ranked 15<sup>th</sup> nationally, Orlando for the large population group and Miami for the very large population group. Tampa–St. Petersburg, with an annual delay of 33 hours per auto commuter, ranked 3<sup>rd</sup> in Florida and 27<sup>th</sup> in the nation. In terms of a travel time index (the ratio of congested to free-flow travel time), Miami ranked 1<sup>st</sup> in Florida and 16<sup>th</sup> nationally, with a value of 1.23.
- **Congestion cost savings** – Operational improvements and public transit in Florida reduce congestion costs by \$678 million, with \$420 million saved through operational treatments and \$258 million saved through use of public transportation.
- **Moderated use of major highways** – The average limited access highway lane in Florida's seven selected urban areas has shown a decline in use since 2007.
- **A pause in the growing burden of congestion** – Reduced travel due to the rise in fuel prices following the spike in 2008 and the depressed economy is resulting in lower congestion. However, congestion is anticipated to increase again, perhaps more slowly, as population and economic growth become more positive.



Characteristics of traffic congestion on any road network include slower speeds, longer trip times, and increased queuing. This condition generally persists when traffic demand exceeds the capacity of the road or road network. Congestion often is measured in terms of delay per traveler (or auto commuter) and is calculated as the time difference between the average speed and the free-flow speed on a roadway segment for vehicle occupants. The TTI report indicates that congestion is a problem in all the major urban areas and had been getting progressively worse until the middle of the last decade, when travel growth slowed.

Table 1 shows the key mobility measures for seven urban areas selected for study in Florida. When key mobility measures such as yearly delay per auto commuter, travel time index, and wasted fuel per auto commuter were considered, Orlando and Miami ranked the highest in Florida. Three urban areas—Miami, Orlando and Tampa–St. Petersburg—shared 86 percent of travel delay and 91 percent of total excess fuel consumed (Table 2). Miami ranked #1 in Florida in terms of total travel delay, excess fuel consumption, and congestion in 2010. Tampa–St. Petersburg and Orlando ranked 2<sup>nd</sup> and 3<sup>rd</sup>, respectively.

**Table 1 Key Mobility Measures for 2010**

Urban Area	Population Group	Yearly Delay per Auto Commuter			Travel Time Index			Wasted Fuel per Auto Commuter		
		Hours	Rank in Florida	Rank in U.S.	Value	Rank in Florida	Rank in U.S.	Gallons	Rank in Florida	Rank in U.S.
<b>Florida</b>										
Orlando	Large	38	1	15	1.18	2	26	12	3	23
Miami	Very Large	38	1	15	1.23	1	16	18	1	16
Tampa–St. Petersburg	Large	33	3	27	1.16	3	37	18	1	16
Jacksonville	Large	25	4	42	1.09	5	68	7	4	41
Cape Coral	Small	23	5	52	1.10	4	56	4	5	66
Pensacola FL–AL	Small	18	6	72	1.08	7	73	3	7	81
Sarasota–Bradenton	Medium	16	7	79	1.09	5	68	4	5	66
<b>Weighted Mean</b>		<b>33</b>						<b>15</b>		
<b>Group Means for U.S. (By Population Group)</b>										
Very Large Average (≥ 3 million)		52			1.27			25		
Large Average (≥1 million and < 3 million)		31			1.17			11		
Medium Average (≥ 500,000 and < 1 million)		21			1.11			5		
Small Average (< 500,000)		18			1.08			4		

Note: The Miami urban area includes the urban areas of Miami–Dade, Broward, and Palm Beach counties.



**Table 2 Components of Congestion Problems, 2010 Urban Area Totals**

Urban Area	Population Group	Travel Delay			Excess Fuel Consumed			Congestion Costs		
		Hours (1000s)	Rank in FL	Rank in U.S.	Gallons (1000s)	Rank in FL	Rank in U.S.	\$ Million	Rank in FL	Rank in U.S.
<b>Florida</b>										
Miami	Very Large	139,764	1	7	66,104	1	7	2,906	1	7
Tampa–St. Petersburg	Large	53,047	2	19	28,488	2	19	1,097	2	19
Orlando	Large	38,260	3	26	11,883	3	24	811	3	26
Jacksonville	Large	18,005	4	42	5,461	4	41	371	4	42
Sarasota–Bradenton	Medium	8,015	5	67	2,240	5	62	161	5	66
Cape Coral	Small	7,600	6	69	1,366	6	75	158	6	68
Pensacola FL–AL	Small	4,699	7	83	888	7	86	93	7	83
<b>Weighted Mean</b>		<b>77,658*</b>			<b>36,641*</b>			<b>1,614*</b>		
<b>Group Means for U.S. (By Population Group)</b>										
Very Large Average		187,872			90,718			3,981		
Large Average		33,407			11,968			688		
Medium Average		9,513			2,216			193		
Small Average		4,166			881			86		

\*Mean is weighted based on peak period travelers

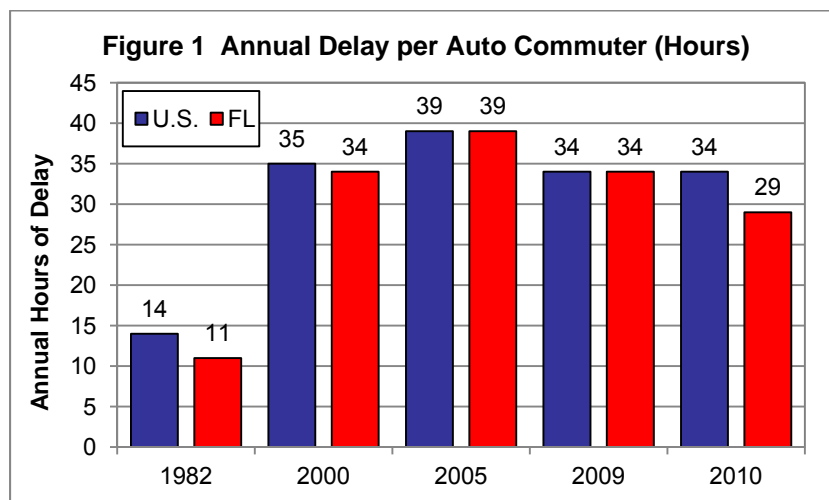
**Table 3 Congestion Impacts for 439 U.S. Urban Areas**

	1982	2000	2005	2009	2010
<b>Individual Traveler Congestion</b>					
Yearly Delay per Auto Commuter (hours)	14	35	39	34	34
Travel Time Index	1.09	1.21	1.25	1.20	1.20
Commuter Stress Index	--	--	--	1.29	1.30
Wasted Fuel per auto commuter (gallons)*	6	14	17	14	14
Congestion Costs per auto commuter (constant 2010 dollars)	\$301	\$701	\$814	\$723	\$713
<b>Total Congestion</b>					
Travel Delay (billion hours)	1.0	4.0	5.2	4.8	4.8
Wasted Fuel (billion gallons)	0.4	1.6	2.2	1.9	1.9
Truck Congestion Costs (billions of 2010 dollars)	--	--	--	\$24	\$23
Congestion Costs (billions of 2010 dollars)	\$21	\$79	\$108	\$101	\$101
<b>Effect of Some Solutions</b>					
Yearly Travel Delay saved by					
Operational Treatments(million hours)	8	190	312	321	327
Public Transportation (million hours)	381	720	802	783	796
Yearly Congestion Costs saved by					
Operational Treatments (billions of 2010 dollars)	\$0.2	\$3.1	\$6.5	\$6.7	\$6.9
Public Transportation (billions of 2010 dollars)	\$6.9	\$12.0	\$16.9	\$16.5	\$16.8

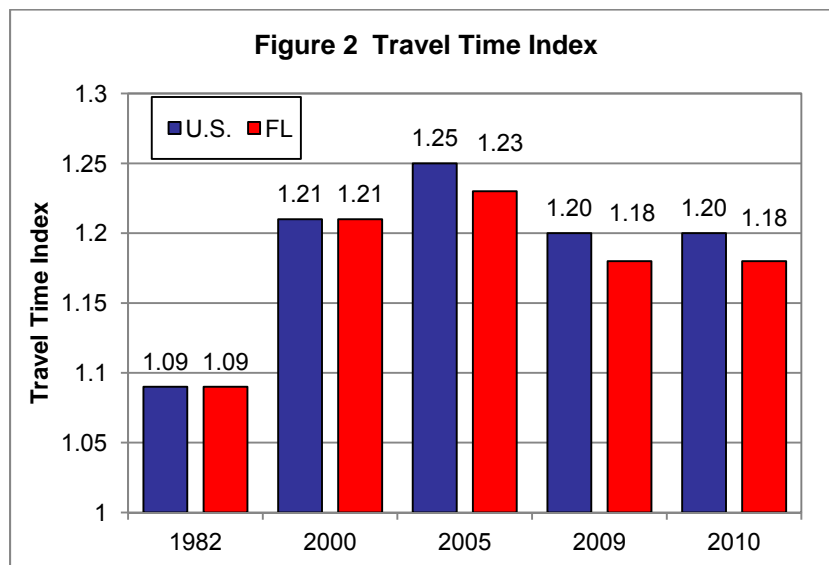
- Yearly delay per auto commuter – The extra time spent traveling at congested speeds rather than free-flow speeds by private vehicle drivers and passengers who typically travel in the peak periods.
- Travel Time Index (TTI) – The ratio of travel time in the peak period to travel time at free-flow conditions. A Travel Time Index of 1.30 indicates a 20-minute free-flow trip takes 26 minutes in the peak period.
- Commuter Stress Index – The ratio of travel time for the peak direction to travel time at free-flow conditions. A TTI calculation for only the most congested direction in both peak periods.
- Wasted fuel – Extra fuel consumed during congested travel.
- Congestion cost – The yearly value of delay time and wasted fuel.



Figure 1 presents a comparison of the annual delay per auto commuter experienced nationwide as well as in Florida. The increasing delay associated with a growing economy and demand for travel was observed from 1982 through 2005, with peak delays exceeding twice the delay experienced in 1982 for the U.S. and Florida, respectively. Florida, which had relatively low delay — about 21 percent less compared to the nation in 1982 — caught up to the national level of delay in 2005. This was followed by declines in delay as the downturn in the economy and consequent reduced demand for travel employment and activity participation reduced travel. The drop in delay for Florida was identical to that for the U.S. from 2005 to 2009, but the delay per auto commuter was reduced by 5 hours for Florida while remaining the same for the U.S. in 2010.



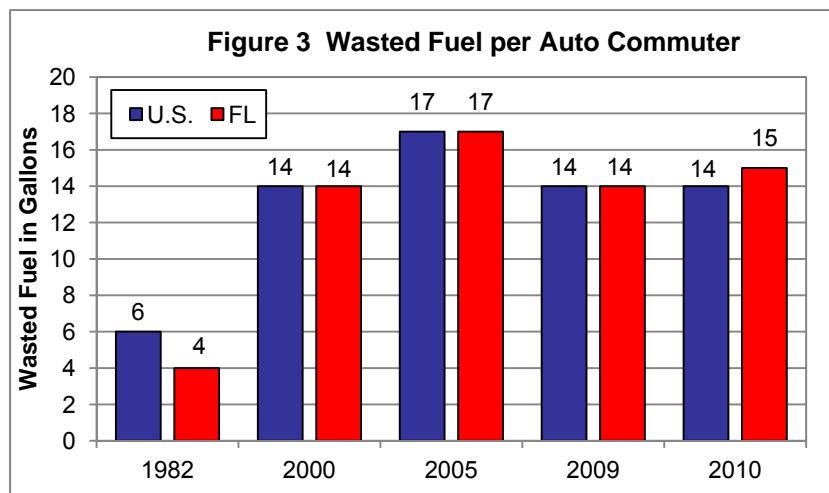
A similar trend is shown for the travel time index for Florida and the U.S. in Figure 2. This measure represents the ratio of the travel time in peak period to travel time at free-flow conditions.





The travel time index reached its peak of 1.25 and 1.23 for the U.S. and Florida, respectively, in 2005, up from the 1982 levels of 1.09. This means that a 20-minute free-flow trip took 21.8 minutes in 1982 in the U.S. and Florida, but 25 minutes for the U.S. and 24.6 minutes for Florida in 2005. It then dropped by a minute in 2009 for both the U.S. and Florida and remained unchanged in 2010.

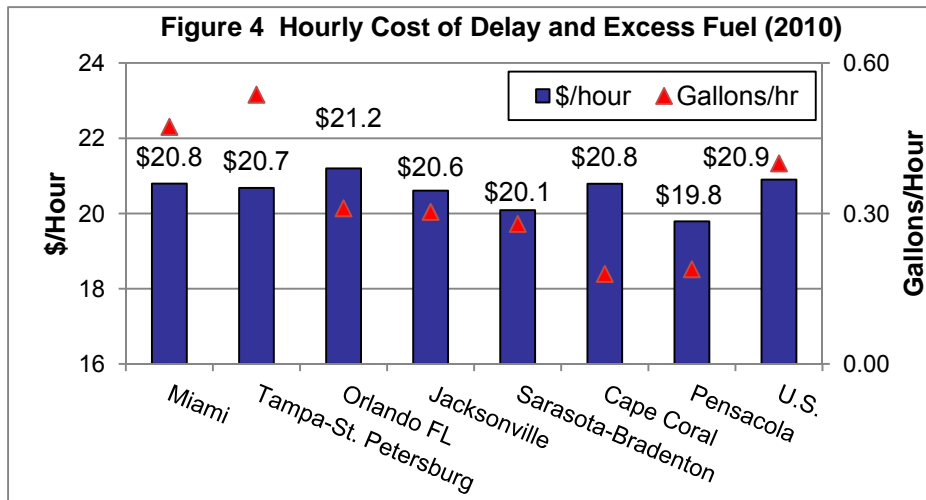
The fuel wasted per auto commuter in Florida had been at or below the national level across the study years (Figure 3), except for 2010. Over the last two decades, Florida has observed significant growth across all three measures, peaking in 2005. The same is true for the nation. Nevertheless, the fuel wasted per auto commuter and the above two measures declined for both the U.S. and Florida in the latter half of the last decade, probably due to the adverse economic conditions and resulting lower demand for activity participation and travel, thus lessening congestion. The increase in share of fuel-efficient cars and slight increases in transit, walk, and work at home may have contributed to the decline in wasted fuel per traveler.



Note: Use caution in interpreting trends as the unequal time between data points distorts the shape of the trends.

Figure 4 compares the costs of delay and fuel consumed per hour among cities in Florida and the U.S. in general. The highest hourly cost of congestion in Florida was Orlando at \$21.20/hr. The hourly costs for the rest of these metro areas of Florida were all lower than the national average of \$20.90 per hour, ranging from \$19.80 to \$20.80 per hour. These cost differences result from varying fuel costs and differences in the share of truck and passenger traffic across regions from which the congestion costs are calculated. The value of time used in these calculations was \$16.30/hour for individuals and \$88.12/hour for trucks. Appendix A of the 2011 *Urban Mobility report* provides more details on the methodology.<sup>1</sup>

<sup>1</sup> <http://mobility.tamu.edu/ums/report/>



The delay and congestion discussed up to this point focused primarily on travelers. The following analyzes the effect of congestion on freight. According to the *2011 Urban Mobility Report*, Florida’s trucking industry moves \$552.6 billion worth of commodities, with 75 percent of these commodities moving through urban areas. Table 4 summarizes the truck delay associated with moving these commodities through seven urban areas in Florida. The truck delay estimated here is the travel time needed above the free flow travel time to complete a trip by truck.

Table 4 – Truck Delay in Florida

Urban Area (Florida)	Population Group	U.S. Rank	Florida Rank	Truck Delay (1000 Hrs)	% of Total Delay
Miami	Very Large	9	1	8,207	5.9%
Tampa–St. Petersburg	Large	22	3	2,842	5.4%
Orlando	Large	21	2	2,856	7.5%
Jacksonville	Large	44	4	1,158	6.4%
Sarasota–Bradenton	Medium	69	6	446	5.6%
Cape Coral	Small	62	5	567	7.5%
Pensacola FL–AL	Small	86	7	261	5.6%
<b>Group Means for U.S. (By Population Group)</b>					
Very Large Average				12,120	6.5%
Large Average				2,024	6.1%
Medium Average				578	6.1%
Small Average				288	6.9%

Miami’s truck delay was approximately 32 percent less than the national average delay for very large urban areas. Truck delay in Tampa and Orlando (large urban area category) was approximately 40 percent above the average delay, but Jacksonville experienced a below-average truck delay in this category. Truck delays in Sarasota as a medium urban area and



Pensacola as a small urban area were also below the average for their respective urban categories. The City of Cape Coral, in the small category, had the third highest delay among its peers, trailing only Jackson (MS) and Columbia (SC) and exceeding the national average of small urban areas by more than 97 percent.

**Effects of Mobility Improvement/Solutions to Congestion Problems in Florida**

Mobility improvements or solutions include operational treatments and use of public transportation. Operational treatments refer to freeway incident management, freeway ramp metering, arterial street signal coordination, arterial street access management, and high-occupancy vehicle lanes. Florida saved a total of more than 20 million hours of travel time in 2010 through operational treatments, which equaled nearly \$420 million savings in cost. Public transportation systems in Florida saved more than 12 million hours of travel time, which equated to approximately \$258 million in cost savings (Table 5).

**Table 5 – Effect of Mobility Improvements in Florida**

Urban Area	Population Group	Operational Treatment Savings				Public Transportation Savings			
		Delay Reduction (1000 Hours)	Rank in Florida	Rank in U.S.	Cost Savings (\$ Million)	Delay Reduction (1000 Hours)	Rank in Florida	Rank in U.S.	Cost Savings (\$ Million)
<b>Florida</b>									
Miami	Very Large	12,065	1	7	250.9	9,276	1	10	192.9
Tampa–St. Petersburg	Large	3,873	2	18	80.1	1,021	3	36	21.1
Orlando	Large	2,254	3	25	47.8	1,399	2	29	29.7
Jacksonville	Large	1,055	4	35	21.8	398	4	51	8.2
Sarasota–Bradenton	Medium	509	5	53	10.2	116	6	85	2.3
Cape Coral	Small	382	6	61	8.0	132	5	83	2.7
Pensacola FL–AL	Small	74	7	90	1.5	45	7	95	0.9
<b>Group means for U.S. (By Population Group)</b>									
Very Large Average		15,636			330.0	45,381			960.0
Large Average		1,934			40.0	2,304			47.0
Medium Average		363			7.0	263			5.0
Small Average		142			3.0	132			3.0

Table 6 shows the intensive use of the limited access lanes in Florida urban areas. From 1982 to 2007, daily vehicle miles traveled (DVMT) per lane increased by more than 100 percent on average. Cape Coral experienced the largest growth (196 percent) whereas Tampa–St. Petersburg witnessed the smallest increase of 33 percent. However, the DVMT per lane-mile dropped across all places in Florida by an average of 8.5 percent from 2007-2010.



**Table 6 – Trend in Daily VMT per Lane Mile, 1982 to 2010**

Urban Area	VMT PER LANE MILE (1,000)						2010 Rank In Florida
	1982	1999	2007	2008	2009	2010	
Miami	8.7	17.23	19.18	18.09	18.00	18.00	1
Orlando	9.17	12.38	15.56	14.58	14.5	14.43	5
Jacksonville	10.00	13.36	15.97	14.89	14.81	14.81	4
Sarasota–Bradenton	5.33	12.36	16.03	15.61	14.08	14.15	6
Tampa- St. Petersburg	11.94	13.19	15.93	15.37	15.29	15.30	2
Pensacola FL–AL	6.67	9.74	10.86	8.73	8.69	8.68	7
Cape Coral	5.67	12.14	16.77	14.95	14.88	14.95	3
<b>Weighted Mean</b>	8.59	14.74	17.23	16.17	15.98	15.77	

This special report was prepared by Center for Urban Transportation Research. For more information, contact [Steve Polzin](mailto:Steve.Polzin@tti.tamu.edu) at (813) 974-9849. Visit <http://mobility.tamu.edu/ums/report/> to access TTI’s 2011 Urban Mobility Report.

Notes:

- The 2011 Urban Mobility Report uses what FHWA defines as “Urbanized Areas.” All Urbanized Areas (population 50,000 or more) are also Urban Areas. There are 28 urbanized areas in Florida. Its six largest urbanized areas, plus Pensacola (which is #8), are reported. Palm Bay–Melbourne, ranked #7, had 90,000 more residents than Pensacola.
- The seven urbanized areas in the report had a population of 11,740,123, or 75 percent of the 15,723,680 total urbanized area population in Florida (as of April 1, 2010).
- The reader is urged to exercise caution in using averages, as the outliers can have significant policy implications.