
Trends and Conditions

Special Report – April 2011

Congestion in Florida

Findings from the *2010 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) *2010 Urban Mobility Report*. The following summarizes the results for 2009 and compares them with the 2008 results unless mentioned otherwise:

- **Higher congestion costs nationally** – \$115 billion for 439 urban areas in the U.S. in 2009: 4.8 billion hours in travel delay and 3.9 billion excess gallons of fuel consumed. The 2009 travel delay increased by 4% (200 million more hours) over 2008 and excess fuel consumption went up 3% (100 million more gallons).
- **Higher congestion costs in Florida** – \$6.41 billion for seven selected urban areas in Florida in 2009: 274 million hours in travel delay and 216 million excess gallons of fuel consumed, a 10% increase in travel delay and excess fuel consumption
- **Congestion Levels Stabilized** – Higher fuel prices and a slowing economy have contributed to lower travel demand and a subsequent reduction in congestion compared to 2007. Nationally, the congestion levels for 2009 remained unchanged from 2008. In Florida, overall congestion declined but congestion per peak hour traveler ticked up slightly from 2008 to 2009.
- **Congestion in Florida cities** – Orlando ranked 1st in Florida and 14th nationally with 41 hours of delay per traveler in 2009. Miami and Tampa-St. Petersburg, with a respective delay of 39 hours and 34 hours per peak traveler, were ranked 2nd and 3rd in Florida and 15th and 25th in the nation. In terms of a travel time index (the ratio of congested to free flow travel time), Miami ranked 1st in Florida and 13th nationally with a value of 1.23.
- **Congestion cost savings** – Operational improvements and public transit in Florida reduce congestion costs by \$772 million with \$479 million saved through operational treatments and \$293 million saved by 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.
- **Expected resumption of congestion** – Reduced travel due to the fuel price spike in 2008 and the depressed economy is resulting in lower congestion. However, congestion is anticipated to increase again with a resumption of traffic growth tied to economic growth.



Characteristics of traffic congestion on any road network include slower speeds, longer trip time and increased queuing. This condition generally persists when traffic demand exceeds the capacity of the road or road network. Congestion is often measured in terms of delay per traveler (or peak period traveler). It 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 congestion is a problem in all the major urban areas and had been getting progressively worse until 2007 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 annual delay per traveler, travel time and wasted fuel per traveler were considered, Orlando and Miami ranked the highest in Florida. Three urban areas - Miami, Orlando and Tampa-St. Petersburg - shared 86% of travel delay and 85% of total excess fuel consumed (Table 2). Miami ranked number 1 in Florida in terms of total travel delay, excess fuel consumption and congestion in 2009. Tampa-St. Petersburg and Orlando came in 2nd and 3rd, respectively.

Table 1 Key Mobility Measures for 2009

Urban Area	Population Group	Annual Delay per Peak Traveler			Travel Time Index			Wasted Fuel per Traveler			
		Hours	Rank in Florida	Rank in U.S.	Value	Rank in Florida	Rank in U.S.	Gallons	Rank in Florida	Rank in U.S.	
Florida											
Orlando	Large	41	1	14	1.20	2	20	32	1	14	
Miami	Very Large	39	2	15	1.23	1	13	31	2	18	
Tampa-St. Petersburg	Large	34	3	25	1.16	3	32	27	3	27	
Jacksonville	Large	26	4	41	1.12	4	50	22	4	41	
Cape Coral	Small	23	5	54	1.12	4	50	19	5	56	
Pensacola FL-AL	Small	19	6	66	1.07	7	79	16	6	68	
Sarasota-Bradenton	Medium	17	7	78	1.10	6	61	14	7	78	
Weighted Mean		34.61						28			
Group Means for U.S. (By Population Group)											
Very Large Average (≥3 million)		50			1.26			39			
Large Average (≥1 million and <3 million)		31			1.17			26			
Medium Average (≥500,000 and <1 million)		22			1.11			18			
Small Average (<500,000)		18			1.08			16			

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



Table 2 Components of Congestion Problems, 2009 Florida Urban Area Totals

Urban Area	Population Group	Travel Delay			Excess Fuel Consumed			Congestion Cost		
		Hours (1000s)	Rank	Rank in U.S.	Gallons (1000s)	Rank	Rank in U.S.	\$ Million	Rank	Rank in U.S.
Florida										
Miami	Very Large	140,972	1	7	109,281	1	7	3,272	1	8
Tampa-St. Petersburg	Large	54,130	2	19	42,644	2	20	1,239	2	19
Orlando	Large	39,185	3	25	31,189	3	26	962	3	24
Jacksonville	Large	18,481	4	42	16,029	4	39	445	4	41
Sarasota-Bradenton	Medium	8,563	5	65	6,953	5	68	198	5	65
Cape Coral	Small	7,465	6	71	5,932	6	75	183	6	69
Pensacola FL-AL	Small	4,715	7	82	3,910	7	85	108	7	83
Weighted Mean		83,399			65,071			1,940		
Group Means for U.S. (By Population Group)										
Very Large Average		185,503			145,959			4,414		
Large Average		32,953			27,926			780		
Medium Average		9,841			8,379			233		
Small Average		4,262			3,754			104		

* Mean is weighted based on peak period travelers.

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

	1982	1999	2007	2008	2009
Individual Traveler Congestion					
Annual Delay per peak traveler (Hours)	14	35	38	34	34
Travel Time Index*	1.09	1.21	1.24	1.20	1.2
Commuter Stress Index	-	-	1.36	1.29	1.29
Wasted Fuel per peak traveler (gallons)*	12	28	31	27	28
Congestion Cost per peak traveler (constant 2009 dollars)	\$351	\$784	\$919	\$817	\$808
Total Congestion					
Travel Delay (billion hours)	1	3.8	5.2	4.6	4.8
Wasted Fuel (billion gallons)	0.7	3	4.1	3.8	3.9
Truck Congestion Cost (billions of 2009 Dollars)			\$36	\$32	\$33
Congestion Cost (billions of 2009 dollars)	\$24	\$85	\$126	\$113	\$115
Effect of Some Solutions					
Travel Delay saved by					
Operational Treatments (million hours)	-	-	363	312	321
Public Transportation (million hours)	-	-	889	802	783
Congestion Costs saved by					
Operational Treatments (billions of 2009 dollars)	-	-	\$8.70	\$7.60	\$7.60
Public Transportation (billions of 2009 dollars)	-	-	\$22	\$20	\$19

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 1.35 indicates a 20-minute free-flow trip takes 27 minutes in the peak.

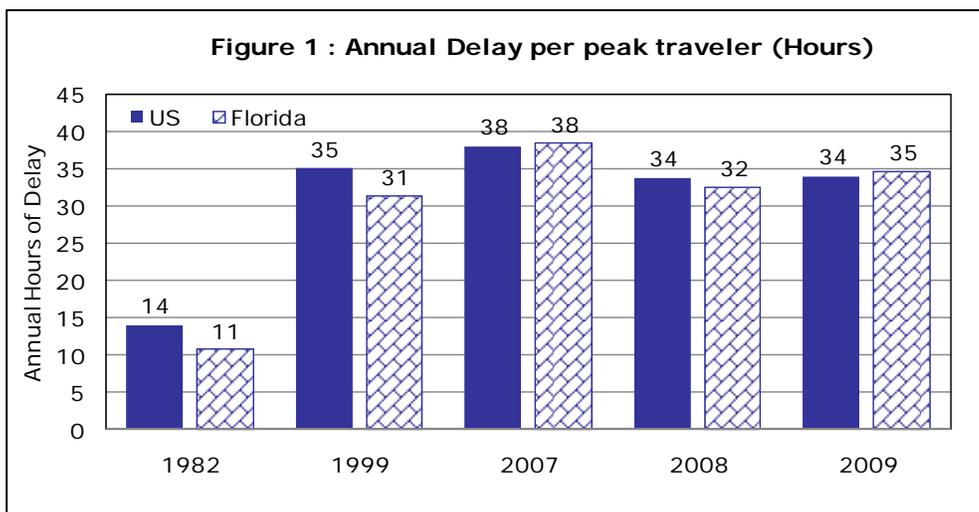
Delay per Peak Traveler – The extra time spent traveling at congested speeds rather than free-flow speeds divided by the number of persons making a trip during the peak period

Wasted Fuel – Extra fuel consumed during congested travel.

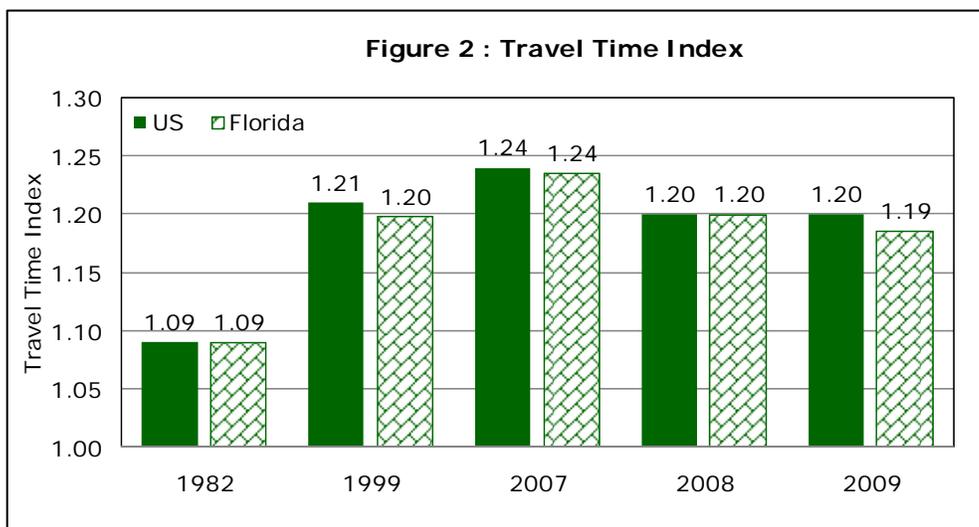
Vehicle-miles – Total of all vehicle travel (10 vehicles traveling 9 miles is 90 vehicle-miles).



Figure 1 presents a comparison of the annual delay per peak traveler experienced nationwide as well as in Florida. The increasing delay associated with a growing economy and demand for travel was observed from 1982 through 2007, with peak delays reaching three times the delay observed in 1982. Florida which had relatively lower delay, about 20% less as compared to the nation in 1999, caught up to the national level of delay in 2007. 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 was marginally higher for Florida as compared to that for the U.S. From 2007 to 2008, the delay per peak traveler reduced by 6 and 4 hours for Florida and the U.S., respectively. From 2008 to 2009, it remained steady for the U.S., but increased for Florida by 3 hours.

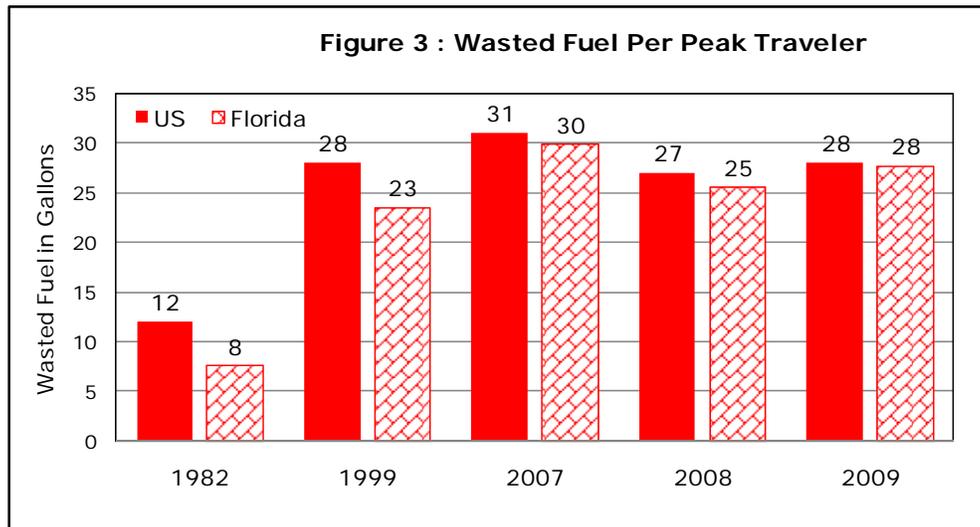


A similar trend is shown for the travel time index for Florida and the U.S. in Figure 2. This measure represents the ratio of the travel time in peak period to travel time at free flow conditions.





The travel time index reached its peak at 1.24 in 2007 for Florida as well as for the U.S., up from the 1982 levels of 1.09. This means that a 30-minute free-flow trip took 32.7 minutes in 1982 but 37.5 minutes in 2007. It then dropped by 1.5 minutes in 2008 and remained unchanged in 2009 for the U.S. Florida observed a slight dip in 2009, which translated to an improvement of under one minute in a 30-minute commute.



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

The fuel wasted per peak traveler in Florida is at or below the level for the U.S. across the study years (Figure 3). The general trend across the above discussed measures shows that Florida observed significant growth from 1982, peaking in 2007 to match the national level, followed by a drop in 2008. The drop could be due to the adverse economic conditions and resulting lower demand for activity participation and travel. However, an increase in congestion in 2009 resulted in more wasted fuel both nationally and in Florida.

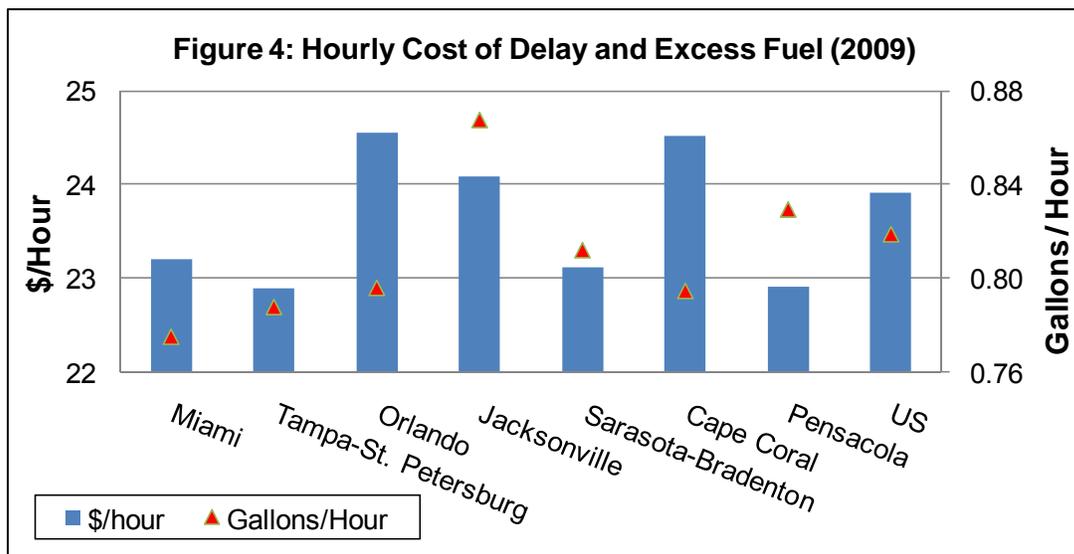




Figure 4 compares the cost of delay and fuel consumed per hour among cities in Florida and the U.S. in general. The highest hourly cost of congestion in Florida was for Orlando and Cape Coral at \$25/hr. The hourly costs for these two metro areas and Jacksonville were higher than the national average of approximately \$24 per hour. The costs for Tampa-St. Petersburg, Miami, Sarasota-Bradenton and Pensacola were below the U.S. average at around \$23 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/hour for individuals and \$106/hour for trucks. Appendix A of the 2010 Urban Mobility report provides more details on the methodology¹. The delay and congestion discussed up to this point primarily focused on travelers. The following analyzes the effect of congestion on freight. According to the 2010 Urban Mobility Report, Florida moves \$494.5 billion dollars worth of commodities with 57% 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	US Rank	Florida Rank	Truck Delay (1000 Hrs)	% of Total Delay
Miami	Very Large	8	1	8,351	5.9%
Tampa-St. Petersburg	Large	21	2	2,985	5.5%
Orlando	Large	22	3	2,895	7.4%
Jacksonville	Large	44	4	1,228	6.6%
Sarasota-Bradenton	Medium	68	6	489	5.7%
Cape Coral	Small	64	5	545	7.3%
Pensacola FL-AL	Small	90	7	250	5.3%
Very Large Average				12,046	6.5%
Large Average				2,046	6.2%
Medium Average				606	6.2%
Small Average				296	6.9%

Miami’s truck delay was approximately 30% less than the national average delay for very large urban areas. In large urban areas, truck delay in Tampa and Orlando was 40% 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. On the other hand, truck delay in the City of Cape Coral exceeded the national average of small urban areas by over 84% and ranked the third highest among its peers, only trailing Jackson, MS and Columbia, SC.

¹ http://mobility.tamu.edu/ums/report/appendix_a.pdf



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. Through operational treatments, a total of over 20 million hours of travel time was saved in 2009, which translated to nearly \$479 million in congestion cost savings. Public transportation systems saved nearly 13 million hours of travel time, which equated to approximately \$293 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)
Florida									
Miami	Very Large	12,169	1	7	282.0	9,356	1	10	217.2
Tampa-St. Petersburg	Large	3,952	2	18	90.5	1,041	3	36	23.8
Orlando	Large	2,308	3	25	56.7	1,432	2	30	35.2
Jacksonville	Large	1,083	4	33	26.1	409	4	48	9.8
Sarasota-Bradenton	Medium	544	5	52	12.6	124	6	84	2.9
Cape Coral	Small	375	6	61	9.2	129	5	83	3.2
Pensacola FL-AL	Small	74	7	91	1.7	45	7	94	1.0
Group means for U.S. (By Population Group)									
Very Large Average		15,397			364.0	44,732			1,071.0
Large Average		1,896			45.0	2,200			52.0
Medium Average		375			9.0	361			8.4
Small Average		148			3.6	126			3.1

Table 6 exhibits the intensiveness of the use of limited access lanes in Florida urban areas. From 1982 to 2007, daily vehicle miles traveled (DVMT) per lane mile increased by 91% on average. Tampa-St. Petersburg witnessed the smallest increase of 33% whereas Cape Coral experienced the fastest growth of 196%. However, the DVMT per lane mile dropped across all places in Florida by an average of 6% from 2007 to 2009.

Table 6 – Trend in Daily VMT per Lane Mile, 1982 to 2009

Urban Area	VMT PER LANE MILE (1,000)					2009 Rank In Florida
	1982	1999	2007	2008	2009	
Miami	8.70	17.23	19.18	18.09	18.00	1
Orlando	9.17	12.38	15.56	14.58	14.50	5
Jacksonville	10.00	13.36	15.97	14.89	14.81	4
Sarasota-Bradenton	5.33	12.36	16.03	15.61	14.08	6
Tampa-St. Petersburg	11.94	13.19	15.93	15.37	15.29	2
Pensacola FL-AL	6.67	9.74	10.86	8.73	8.69	7
Cape Coral	5.67	12.14	16.77	14.95	14.88	3
Weighted Mean	9.22	14.89	17.30	16.29	16.12	



This special report was prepared by CUTR. For more information, contact [Steve Polzin](mailto:Steve.Polzin@cutr.com) at 813-974-9849. Visit <http://mobility.tamu.edu/ums/report/> to access TTI's report, *2010 Urban Mobility Report*.

Notes:

- The 2010 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 largest six urbanized areas, plus Pensacola (which is #8), are reported. Palm Bay-Melbourne, ranked 7, had over 100,000 more residents than Pensacola and was not tracked in the report.
- The seven urbanized areas in the report had a population of 11,660,450, or 74% of the 15,665,302 total urbanized area population in Florida (as of April 1, 2009).
- The reader is urged to exercise caution in using averages as the outliers can have significant policy implications.