Congestion in Florida

Findings from the *2015 Urban Mobility Scorecard*

The Texas Transportation Institute (TTI) issues *the Urban Mobility Scorecard.* This special report summarizes the information included in the scorecard for seven urban areas in Florida and across the nation. This brief outlines the results for calendar year 2014 and compares them with the prior year results:

- ***Small increase of national congestion cost*** – Congestion cost increased $4 billion for 471 urban areas in the U.S. from $156 billion in 2013 to $160 billion in 2014. There were 6.9 billion hours in travel delay and 3.1 billion excess gallons of fuel consumed. The 2014 travel delay and excess fuel consumption remained relatively constant from 2013.
- ***Moderation of congestion costs in Florida*** – The congestion cost in 2014 for the seven selected urban areas in Florida was $8.75 billion, below the $8.80 billion in 2013. There were approximately 388 million hours in travel delay and 175 million excess gallons of fuel consumed. Travel delay and excess fuel consumption each witnessed a modest increase of 1 percent.
- ***Congestion levels return to growth*** – High fuel prices and a slow economy had temporarily stopped travel demand growth. Both nationally and in Florida, average congestion levels have returned to peak levels of 2008. However, congestion per auto commuter in Florida remains lower than the peak at 44.8 hours.
- ***Congestion in Florida cities*** –Miami ranked 1st in Florida and 12th nationally, with 52 hours of annual delay per auto commuter in 2014. Orlando, with an annual delay of 46 hours per auto commuter, ranked 2nd in Florida and 27th 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 17th nationally, with a value of 1.29.
- ***Congestion during non-peak*** – Delay is the additional time required to make a trip when compared to free flow travel time. Policies are not developed to accommodate free flow speed during peak travel, as free flow peak travel is an unrealistic objective. Though delay is not only a concern for peak travelers, 41% of total delay occurs in the midday and overnight hours which are non-peak times of day for travel.
- ***Truck congestion*** – Trucks account for only 7% of urban travel nationally, but 18% of the national cost of congestion.
- ***The future of congestion*** – By 2020 national congestion costs are projected to grow 20%, totaling $192 billion, and total delay will grow to 8.3 billion hours. This equates to the average commuter spending an additional 47 hours and 21 gallons of gas resulting in a congestion cost of $1,100 in the year 2020.

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 levels moderated and declined.

Table 1 shows the key mobility measures for seven Florida urban areas included in the study. When key mobility measures such as yearly delay per auto commuter, travel time index, and excess fuel per auto commuter were considered, Miami and Orlando ranked the highest in Florida. Three urban areas—Miami, Orlando and Tampa–St. Petersburg—accounted for 83 percent of both travel delay and total excess fuel consumed (Table 2). Miami ranked #1 in Florida in terms of total travel delay, excess fuel consumption, and congestion in 2014. Tampa–St. Petersburg and Orlando ranked 2nd and 3rd, respectively. Table 3 displays the same mobility measures and components of congestion by group size means for the entire U.S. Each of the reported variables increases with group size. The average commuter will experience a delay more than twice as long in a very large area (population more than 3 million) as compared to a small area (population less than 50,000), and will use 93% more gallons of gasoline per year.

Table 1 – Key Mobility Measures for 2014

Urban Area	Population Group	Yearly Delay per Auto Commuter			Travel Time Index			Excess 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.
Florida										
Miami	Very Large	52	1	12	1.29	1	17	24	1	15
Orlando	Large	46	2	27	1.21	2	34	21	2	32
Tampa-St. Petersburg	Large	41	3	45	1.21	2	34	18	3	62
Jacksonville	Large	38	4	55	1.18	4	46	15	5	78
Cape Coral	Medium	30	6	86	1.17	5	54	13	6	86
Sarasota-Bradenton	Medium	26	7	90	1.16	7	65	12	7	91
Pensacola FL-AL	Small	38	4	55	1.17	5	54	18	3	62
Weighted Mean		**44.8**						**20.2**		

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

Source: http://mobility.tamu.edu/ums/report/

Table 2 – Components of Congestion Problems, 2014 Urban Area Totals

Urban Area	Population Group	Travel Delay			Excess Fuel Consumed			Congestion Cost		
		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.
Florida										
Miami	Very Large	195,946	1	6	90,320	1	5	4,444	1	6
Tampa-St. Petersburg	Large	71,628	2	22	31,654	2	22	1,589	2	24
Orlando	Large	52,723	3	28	23,938	3	31	1,207	3	28
Jacksonville	Large	29,680	4	48	12,063	4	53	659	4	49
Sarasota-Bradenton	Medium	14,053	5	75	6,574	5	76	312	5	75
Cape Coral	Medium	12,959	6	78	5,637	6	83	288	6	79
Pensacola FL-AL	Small	11,017	7	85	5,120	7	85	247	7	86
Weighted Mean		113,820	*		51,991	*		2,573	*	

*Mean is weighted based on peak period travelers

Source: http://mobility.tamu.edu/ums/report/

Table 3 – Mobility Measures and Components of Congestion by Group Means, 2014

Group Means for U.S. (By Population Group)	Annual Delay per Traveler (Hours)	Travel Time Index	Excess Fuel per Traveler (Gallons)	Travel Delay in Hours (1000s)	Gallons of Excess Fuel Consumed (1000s)	Congestion Cost (Millions)
Very Large Average	63	1.32	27	231,970	99,490	$ 5,260
Large Average	45	1.23	21	55,390	25,690	$ 1,280
Medium Average	37	1.18	18	20,000	9,815	$ 475
Small Average	30	1.14	14	8,170	3,850	$ 190

Source: http://mobility.tamu.edu/ums/report/

Table 4 shows the change in congestion impacts from 1982 to 2014 for all 471 U.S. urban areas included in the study. All cost associated variables are given in constant 2014 dollars to allow for comparisons without requiring additional inflation terms. Yearly delay per auto commuter has increased 133% from 1982 to 2014. During that same time period, the total amount of excess fuel consumed increased 520%.

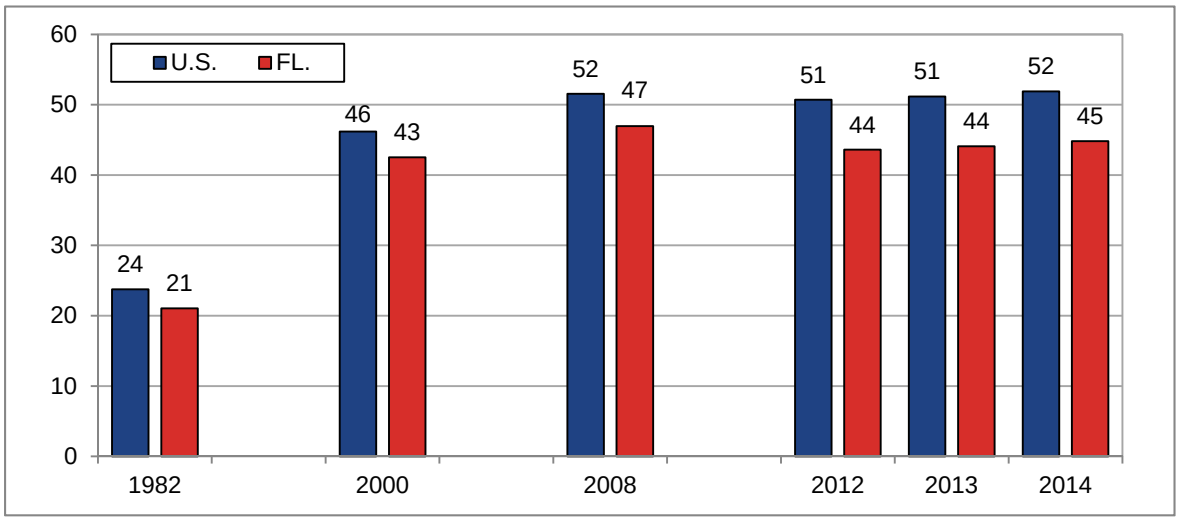
Table 4 – Congestion Impacts for 471 U.S. Urban Areas

	1982	2000	2010	2013	2014
Individual Traveler Congestion					
Yearly Delay per Auto Commuter (hours)	18	37	40	42	42
Travel Time Index	1.09	1.19	1.20	1.21	1.22
Additional Fuel per Auto Commuter (gallons)*	4	15	15	19	19
Congestion Cost per auto commuter (constant 2014 dollars)	$400	$810	$930	$950	$960
Total Congestion					
Travel Delay (billion hours)	1.8	5.2	6.4	6.8	6.9
Excess Fuel (billion gallons)	0.5	2.1	2.5	3.1	3.1
Truck Congestion Cost (billions of 2014 Dollars)	--	--	--	--	$28
Congestion Cost (billions of 2014 dollars)	$42	$114	$149	$156	$160

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.
Excess fuel – Extra fuel consumed during congested travel.
Congestion cost – The yearly value of delay time and excess fuel.
Source: http://mobility.tamu.edu/ums/report/

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 2008, with peak delays approximately double the delay experienced in 1982 for the U.S. and Florida, respectively. Florida has had relatively low delay, about 11% less compared to the nation in 1982, and 14% less than the national average in 2014. While the national delay per traveler has returned to peak levels of 52 hours per year, delay per person in Florida has not yet gotten as bad as the prior peak levels.

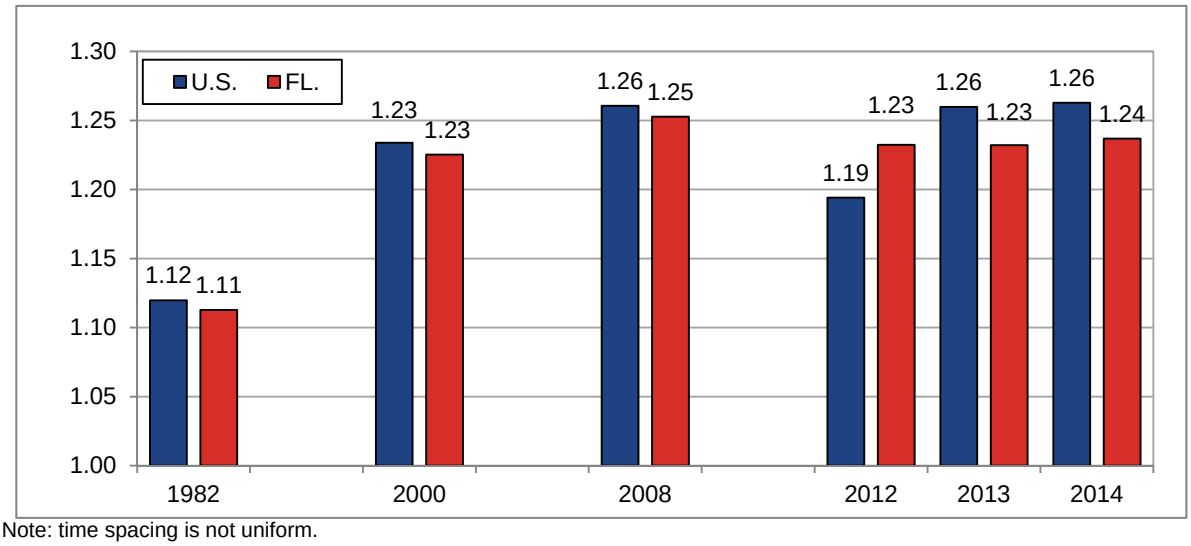
Figure 1: Annual Hours of Delay per Traveler, 1982-2014



Note: time spacing is not uniform.
Source: http://mobility.tamu.edu/ums/report/

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 the peak period to travel time in free flow conditions. The travel time index reached its peak of 1.26 and 1.25 for the U.S. and Florida, respectively, in 2008, up from the 1982 levels of 1.12 and 1.11. This means that a 20-minute free-flow trip took 22.4 minutes in 1982 in the U.S. and 22.2 minutes in Florida, but 25.2 minutes for the U.S. and 25.0 minutes for Florida in 2008. It then dropped in 2012 for both the U.S. and Florida and returned to 2008 levels in 2014.

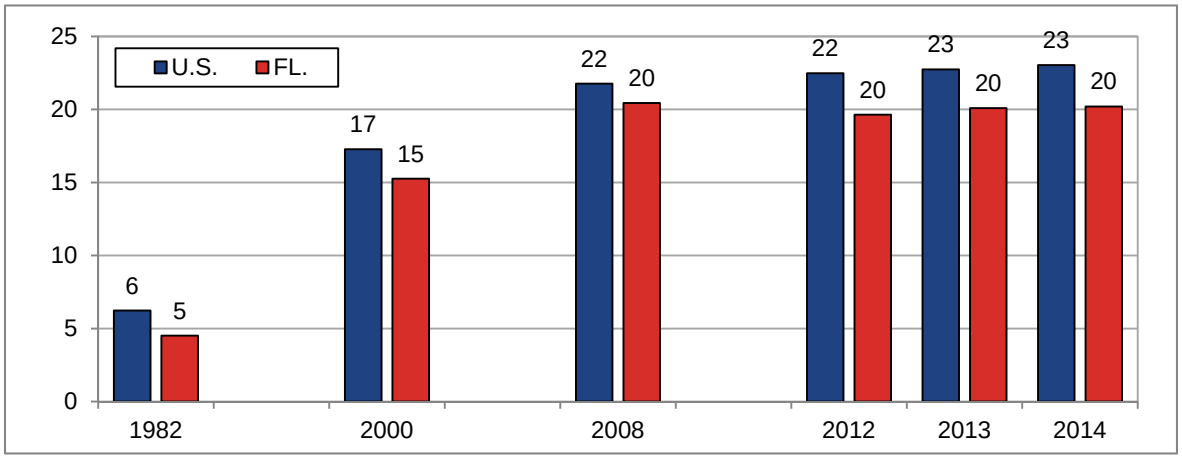
Figure 2: Travel Time Index, 1982-2014



Note: time spacing is not uniform.
Source: http://mobility.tamu.edu/ums/report/

The excess fuel per auto commuter in Florida is consistently 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 over the last three decades, peaking in 2008. The excess fuel per auto commuter remained stable for both the U.S. and Florida post 2008.

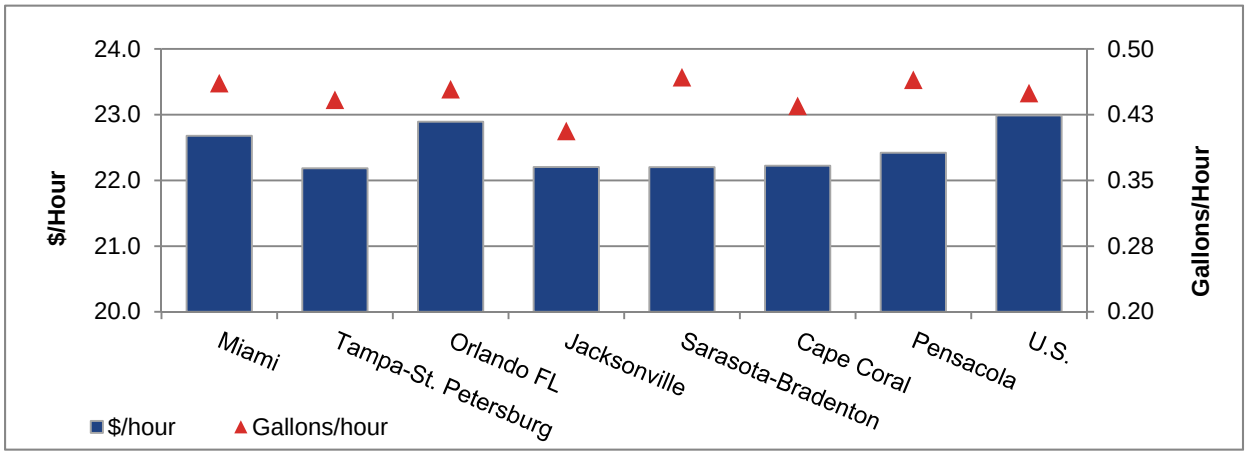
Figure 3: Excess Gallons of Fuel per Auto Commuter, 1982-2014



Note: time spacing is not uniform.
Source: http://mobility.tamu.edu/ums/report/

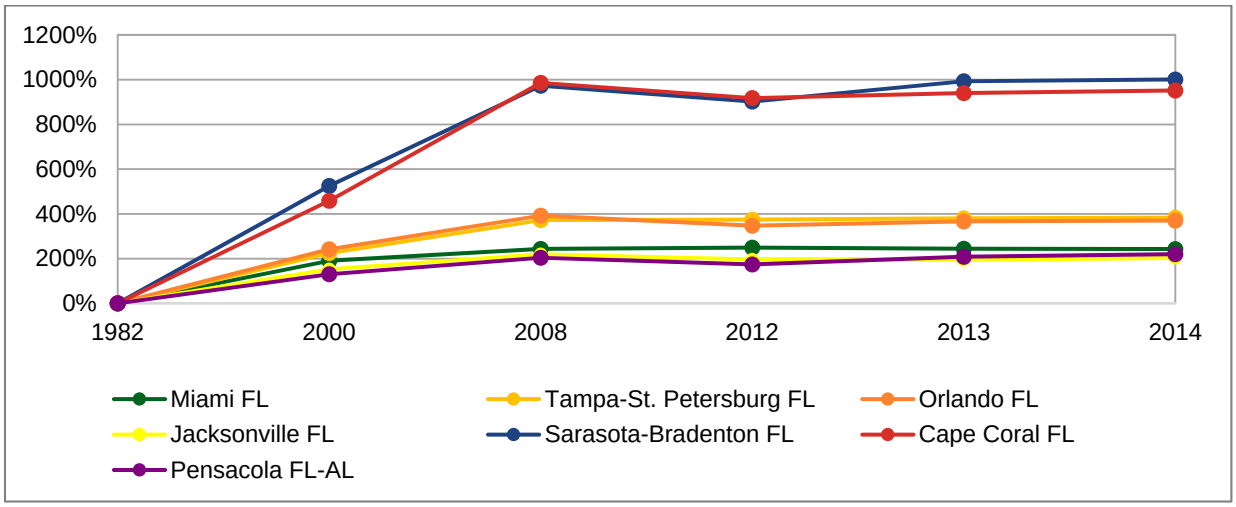
Figure 4 compares the cost of delay and fuel consumed per hour among cities in Florida and the U.S. in general. The highest hourly cost of congestion in Florida was Orlando at $22.9/hour. The hourly costs for the metro areas of Florida were all lower than the national average of $23.0/hour, ranging from $22.2 to $22.9/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 $17.67/hour.

Figure 4: Hourly Cost of Delay and Excess Fuel (2014)



Source: http://mobility.tamu.edu/ums/report/

Figure 5 – Daily Freeway VMT, 1982 to 2014



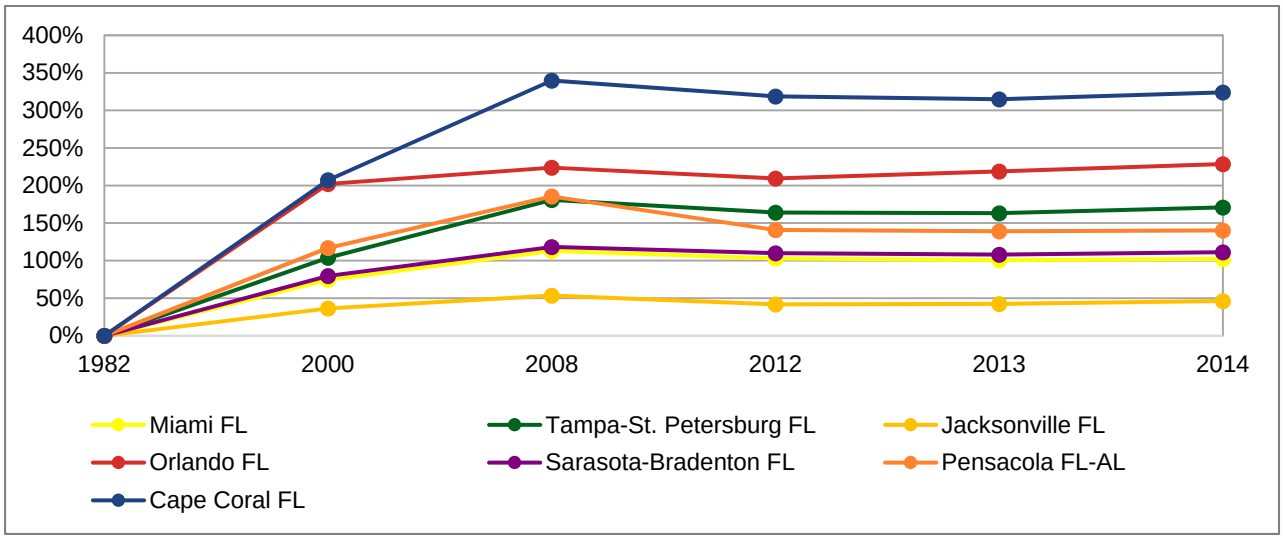
Note: time spacing is not uniform.
Source: http://mobility.tamu.edu/ums/report/

Figure 5 exhibits the intensive use of the limited access lanes in Florida urban areas. From 1982 to 2008, daily vehicle miles traveled (DVMT) increased by over 247% on average for Florida urban areas. Pensacola witnessed the smallest cumulative increase of 204% whereas Cape Coral experienced the largest growth of 985%. During that same time period from 1982 to 2008, the number of auto commuters in those Florida regions increased an average of 132% and again, Pensacola witnessed the smallest increase of 111% while Cape Coral saw the largest

increase in commuters at 216%. The DVMT dropped across most urban areas in Florida by an average of approximately 3.2% from 2008 to 2014, during which time the number of commuters increased by 4.5%.

Figure 6 exhibits the intensive use of the arterials in Florida urban areas. From 1982 to 2008, daily vehicle miles traveled (DVMT) increased by over 116% on average. However, the arterial DVMT dropped across all urban places in Florida, with the exception of Orlando, by an average of 6.5% from 2008-2014.

Figure 6 – Daily Arterial VMT, 1982 to 2014



Note: time spacing is not uniform.
Source: http://mobility.tamu.edu/ums/report/

Travel Time Reliability

The *Urban Mobility Scorecard* includes a measure of "extra" travel time – the amount of time drivers have to allow above the regular travel time. The INRIX data is collected form a variety of sources including commercial vehicles, smart phones, and connected vehicles with location devices which feed time and location points into the INRIX database. The INRIX dataset catalogs many trips taken on each road section which have been analyzed to identify the longest trip times and present them in a measure similar to the Travel Time Index. The Planning Time Index (PTI) identifies the extra time factor that should be used to estimate the departure time to arrive on-time for a trip 19 times out of 20. Statistically, this is the 95th percentile and it speaks to the effects of a variety of events that make travel time unpredictable. For example, if the PTI for your trip is 2.00, that indicates that you should plan for your trip time to take twice as long during congestion as compared to an uncongested time, to ensure you are on-time for a trip 19 out of 20 times. Table 5 displays the planning time index for Florida Metropolitan freeways. In general, Florida has lower ranked planning time indices which indicate less variability in travel time and/or faster incident clearing times relative to other urban areas with similar overall congestion levels.

Table 5 – Freeway Planning Time Index (2014)

Urban Area	Population Group	US Rank	Florida Rank	Planning Time Index
Miami FL	Very Large	15	1	2.85
Tampa-St. Petersburg FL	Large	34	2	2.39
Orlando FL	Large	37	3	2.34
Jacksonville FL	Large	39	4	2.27
Sarasota-Bradenton FL	Medium	72	5	1.83
Cape Coral FL	Medium	87	6	1.70
Pensacola FL-AL	Small	95	7	1.47

Source: http://mobility.tamu.edu/ums/report/

Table 6 – Most Congested Corridors in Florida (2014)

Rank	City	Roads	Distance (miles)	Free flow Travel Time (min)	Peak Travel Time (min)	Worst Peak Period	Peak Delay (min)
47	Miami-Fort Lauderdale-Miami Beach FL	FL-826 NB	10.2	10	21	pm	11
62	Miami-Fort Lauderdale-Miami Beach FL	FL-836 WB	5.31	6	12	pm	7
70	Orlando-Kissimmee FL	I-4 EB	10.55	11	18	pm	8
127	Tampa-St. Petersburg-Clearwater FL	I-275 SB	4.24	5	8	pm	4
155	Orlando-Kissimmee FL	I-4 WB	6.31	6	9	pm	3
190	Miami-Fort Lauderdale-Miami Beach FL	FL-826 SB	2.89	3	6	pm	3
196	Tampa-St. Petersburg-Clearwater FL	I-275 NB	3.68	4	7	pm	3
205	Miami-Fort Lauderdale-Miami Beach FL	FL-826 SB	4.6	4	8	am	3
224	Miami-Fort Lauderdale-Miami Beach FL	FL-821 NB	8.25	8	13	am	5
265	Miami-Fort Lauderdale-Miami Beach FL	FL-836 EB	5.24	5	9	am	3

Source: http://inrix.com/worst-corridors/

In addition to area size and urban area, the INRIX data is also used to determine the most congested corridors for select countries in Europe and the U.S. These corridors are then ranked

by country in terms of delay. The Florida corridors that are most congested are listed in Table 6 below in order of most congested corridors within the U.S.

The availability of GPS based navigation services has resulted in increasing amounts of data on roadway travel flows. In addition to the Urban Mobility Scorecard produced by TTI, INRIX produces a variety of congestion metrics for domestic and international locations. More about these available congestion measures can be found at: http://inrix.com/scorecard/

TomTom is another company that produces a Traffic Index, which ranks cities by congestion levels across the world. All data used for the TomTom congestion calculations is based on actual GPS measurements, and compares peak travel times to free flow travel times to determine the level of congestion. The 2014 TomTom Traffic Index Report included data from 218 cities on 6 continents across the globe. Table 8 shows the 4 Florida cities which were in the top 133 cities in the world, and top 41 cities in the U.S. in terms of most congested.

Table 7 – TomTom Defined Top Congested Cities in Florida (2014)

City	World Rank	US Rank	Congestion Level	Morning Peak	Evening Peak	Highways	Non-Highways
Miami	66	7	27%	46%	56%	14%	36%
Tampa	84	11	25%	34%	53%	15%	29%
Orlando	96	18	23%	28%	47%	10%	33%
Jacksonville	133	41	15%	27%	38%	6%	27%

Source: https://www.tomtom.com/en_gb/trafficindex/#/list

This special report was prepared by CUTR. For more information, contact Steve Polzin at 813-974-9849. Visit http://mobility.tamu.edu/ums/report/ to access TTI's report, 2015 *Urban Mobility Report*.

Notes:

- The 2015 Urban Mobility Scorecard uses what FHWA defines as "Urbanized Areas." All Urbanized Areas (population 50,000 or more) are also Urban Areas. There are 27 urbanized areas in Florida. Its six largest urbanized areas, plus Pensacola (which is #8), are reported. Palm Coast-Daytona Beach-Port Orange, ranked 7, had 82,000 more residents than Pensacola.
- The seven urbanized areas in the report had a population of 12,717,000, or 76% of the 16,736,000 total urbanized area population in Florida (as of April 1, 2014).
- The reader is urged to exercise caution in using averages as the outliers can have significant policy implications.