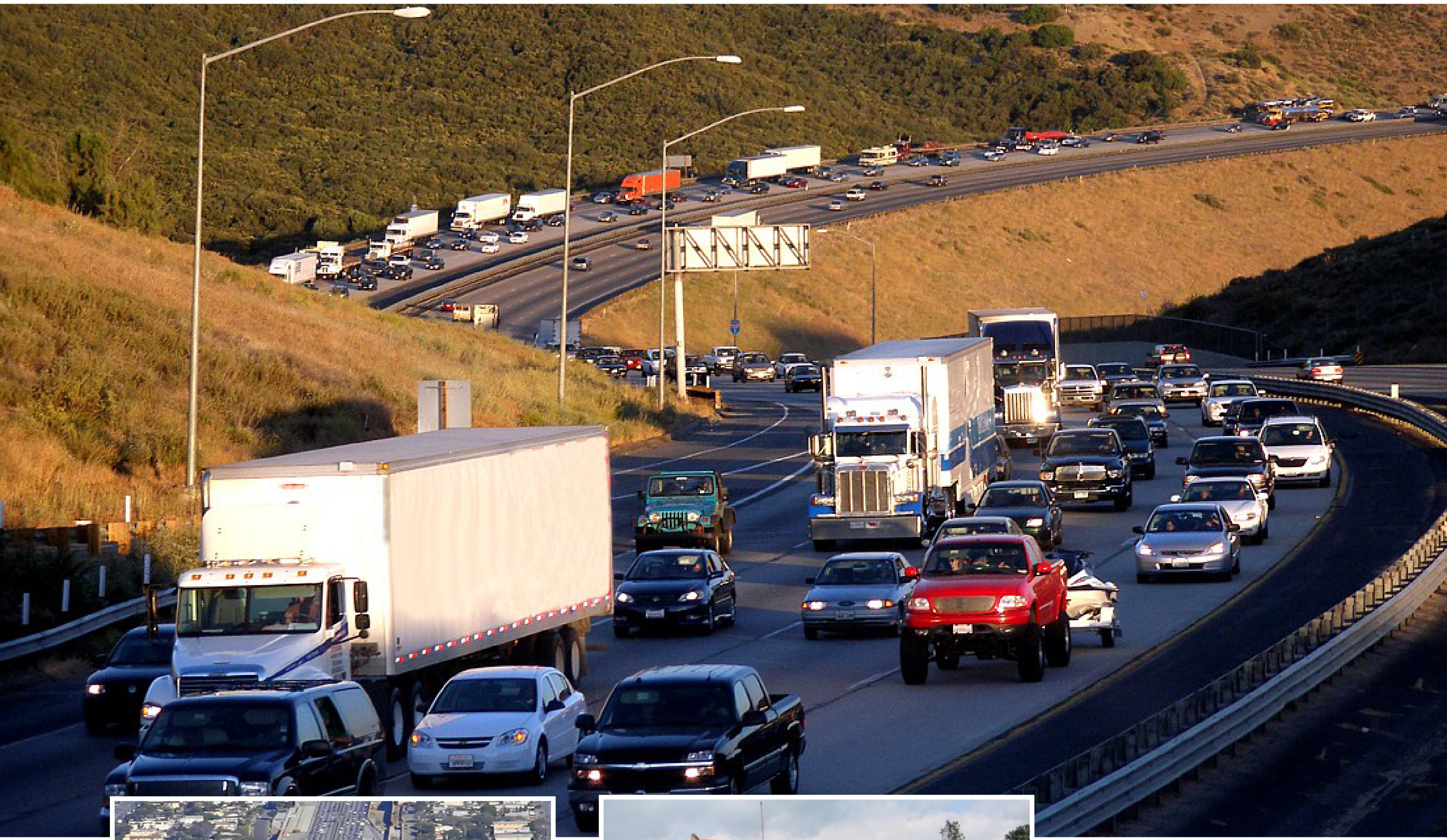
Cost of Congestion to the Trucking Industry

April 2014



Prepared by the American Transportation Research Institute

ATRI American Transportation Research Institute

Cost of Congestion to the Trucking Industry

April 2014

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LIST OF ACRONYMS

AADTT	Average Annual Daily Truck Traffic
ATRI	American Transportation Research Institute
FAF	Freight Analysis Framework
FHWA	Federal Highway Administration
FPM	Freight Performance Measures
GPS	Global Positioning System
IHS	Interstate Highway System
NPMRDS	National Performance Management Research Data Set
VMT	Vehicle Miles Traveled

INTRODUCTION

The United States is heavily reliant on the trucking industry for the safe and efficient movement of goods. In 2012, trucks transported 9.4 billion tons of freight - representing 68.5 percent of total domestic tonnage.[1] This generates significant truck mileage on highways throughout the country, with an estimated 397.8 billion miles traveled by trucks for business purposes in 2010.[2] Given the importance of truck movements in terms of economic growth and competitiveness, not to mention national security, it is critical that system efficiency is continuously monitored. Furthermore, the industry's operational efficiency is a leading driver of cost-effectiveness for supply chains and consumers.

While other national analyses of congestion impacts exist, the American Transportation Research Institute (ATRI) is uniquely qualified to assess the impacts that congestion imposes on trucking operations, due to its direct access to highly sensitive industry data. Leveraging its industry expertise, ATRI utilized a combination of four key data sources to develop this analysis:

1. Truck GPS data from ATRI's Freight Performance Measures (FPM) database;
2. Truck travel times from the Federal Highway Administration (FHWA) National Performance Management Research Data Set (NPMRDS);
3. Truck volumes from the FHWA Freight Analysis Framework (FAF); and
4. Industry financial and operational data obtained by ATRI.

The foundation of ATRI's FPM database and the NPMRDS truck travel time data is truck probe data exclusively obtained by ATRI. Since 2002, ATRI has utilized this data to support freight-related research and analyses throughout North America. ATRI compiles the data anonymously from approximately five hundred thousand trucks that employ embedded GPS systems, generating billions of data points annually. Each truck has a regular position read (generally 30 seconds to 15 minutes) and includes information on vehicle location, unique vehicle identification, time/date, and, in many cases, vehicle spot speed (which is obtained from the vehicle's engine).

ATRI utilizes these truck telematic outputs to perform a variety of spatial queries that relate truck GPS data to a variety of other transportation and economic databases, using both commercial software and customized database management programs. For this congestion assessment, ATRI employed four key steps to spatially link the NPMRDS and FPM data to the FHWA FAF network, thus combining speed data with volume data:

Step 1: As shown in Figure 1, ATRI analyzed average speeds on each mile of the Interstate Highway System (IHS) and identified a congestion level (90% of free-flow speed) for each segment.

Step 2: ATRI calculated the travel time delay due to congested conditions for each segment, as illustrated in Figure 2.

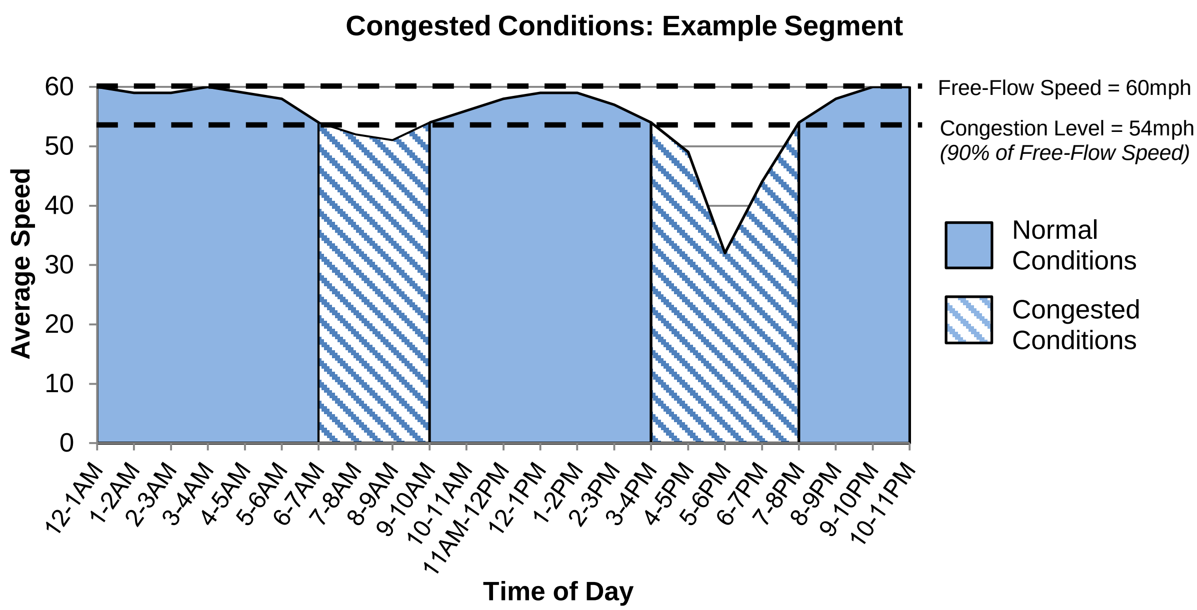
Step 3: The delay for each segment was multiplied by the number of trucks encountering the delay on that particular segment, as estimated from FAF and FPM data. Total delay across all segments was aggregated to calculate national delay due to congestion.

[1] American Trucking Trends 2013. American Trucking Associations.
[2] ibid

Step 4: ATRI utilized an average industry operating cost of $65.29 per hour to monetize the travel time delay and generate the total cost of congestion.[3] The hourly cost figure is derived from an ATRI research program that began in 2008, *An Analysis of the Operational Costs of Trucking*, which tracks operating costs from the trucking industry using motor carrier financial data. This data is collected on a yearly basis and generates an overall industry average operational cost per mile and per hour.

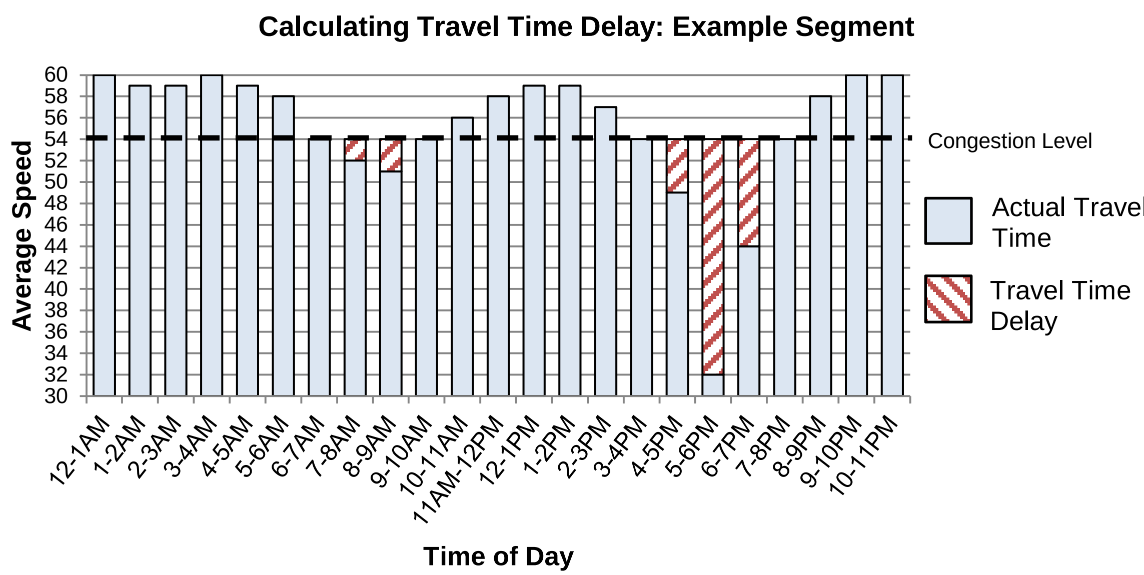
In addition to calculating a national total, the analysis also identified the locations (states, metropolitan areas, and counties) with the highest cost of congestion. It is important to note that the congestion figures presented in this report are for all large trucks with a gross vehicle weight rating exceeding 10,000 pounds.[4] A detailed explanation of the methodology can be found in Appendix A.

Figure 1. Identifying Congested Conditions



[3] An Analysis of the Operational Costs of Trucking: A 2013 Update. American Transportation Research Institute. 2013.
[4] The 10,001+ pound rating was used in order include both medium duty trucks (10,001-26,000 lbs.) and heavy duty trucks (26,001+ lbs) which aligns with the FAF volume data and national VMT data.

Figure 2. Calculating Travel Time Delay



ANALYSIS

This congestion analysis presents the results of the congestion impacts on trucks for four jurisdictional perspectives: national, state, metropolitan area and county. After the jurisdictional analyses, three case studies are offered to highlight additional findings from the study.

Key Findings:

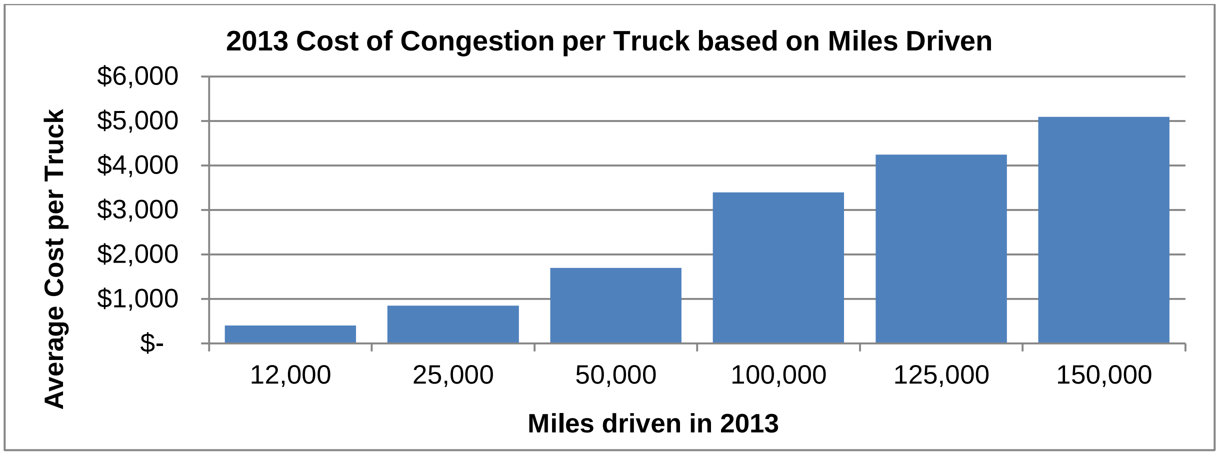
- ***Trucking industry congestion costs totaled $9.209 billion in 2013***
- ***Total delay in 2013 was 141 million hours, equating to over 51,000 drivers sitting idle for a working year***
- ***Congestion was concentrated in urban areas with 89 percent of costs on 12 percent of IHS mileage***

National Analysis

Delay on the IHS during weekdays in 2013 totaled over 141 million hours, which equated to $9.209 billion in increased operational costs for the trucking industry. This loss of productivity and associated costs equates to approximately 51,293 truck drivers sitting idle for an entire driving year.[5] Averaged across the 10.7 million registered large trucks in the U.S.[6], the cost was $864 per truck. In actuality, the impact of congestion on a truck varied by configuration, location, and amount driven. For example, Figure 3 illustrates how the average cost of congestion for a truck that traveled 12,000 miles in 2013 was $408, while a truck that drove 150,000 miles in a year had an average cost of $5,094.

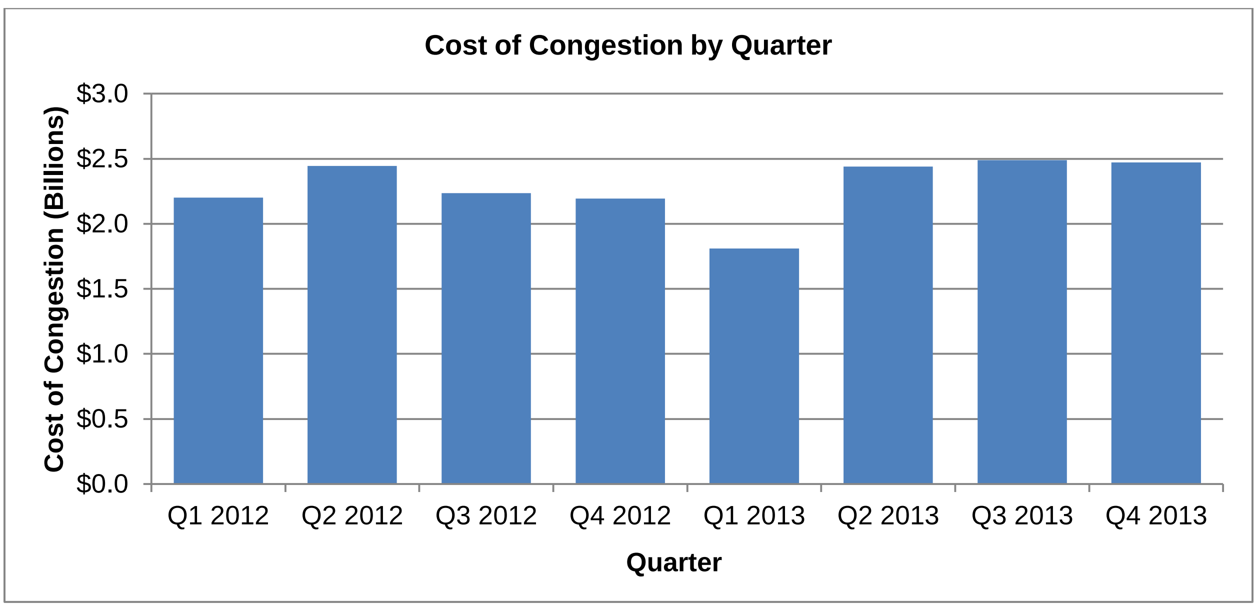
[5] 11 hours per day, 5 days per week, and 50 weeks per year
[6] 2012 Highway Statistics, Table VM-1. Federal Highway Administration. http://www.fhwa.dot.gov/policyinformation/statistics/2012/. Accessed Mar 24, 2014.

Figure 3. Average Cost per Truck by 2013 Miles Driven



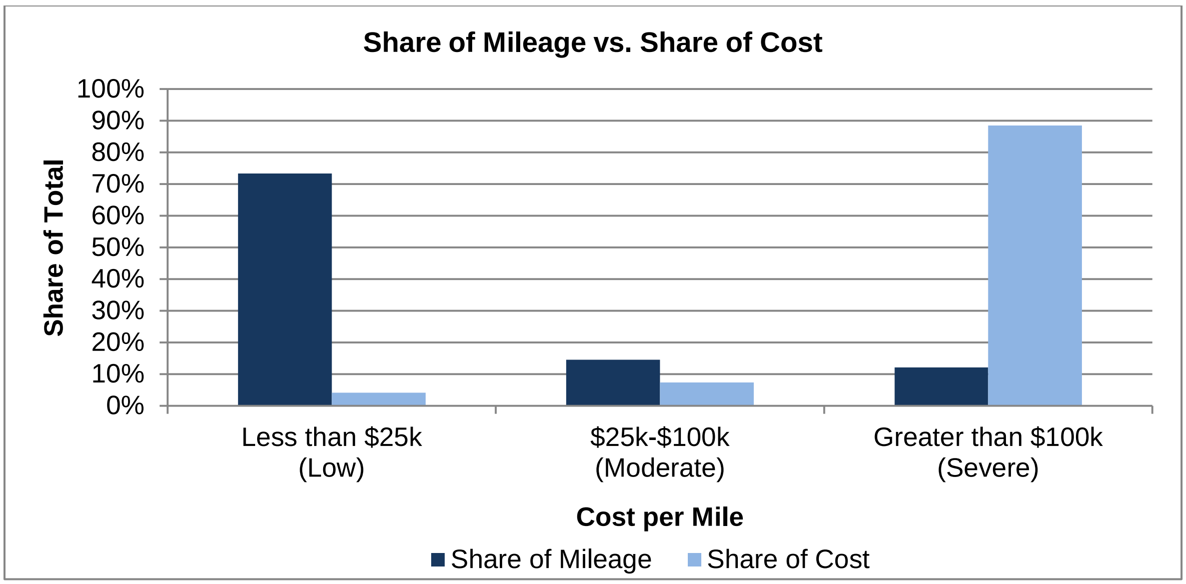
The cost of congestion in 2013 rose slightly from 2012, with the total cost increasing by 1.4 percent ($131.4 million) – likely reflecting a growing economy and increased truck-borne freight movement. While the minor increase in cost is not alarming, total costs for the year were somewhat tempered due to relatively low costs in the first quarter; potentially the result of slower economic growth in the fourth quarter of 2012 and first quarter of 2013. As Figure 4 indicates, the first quarter of 2013 had noticeably less congestion costs compared to the other quarters. Had the first quarter of 2013 been more similar to the same period in 2012, costs would have been even greater.

Figure 4. Cost of Congestion by Quarter, 2012-13



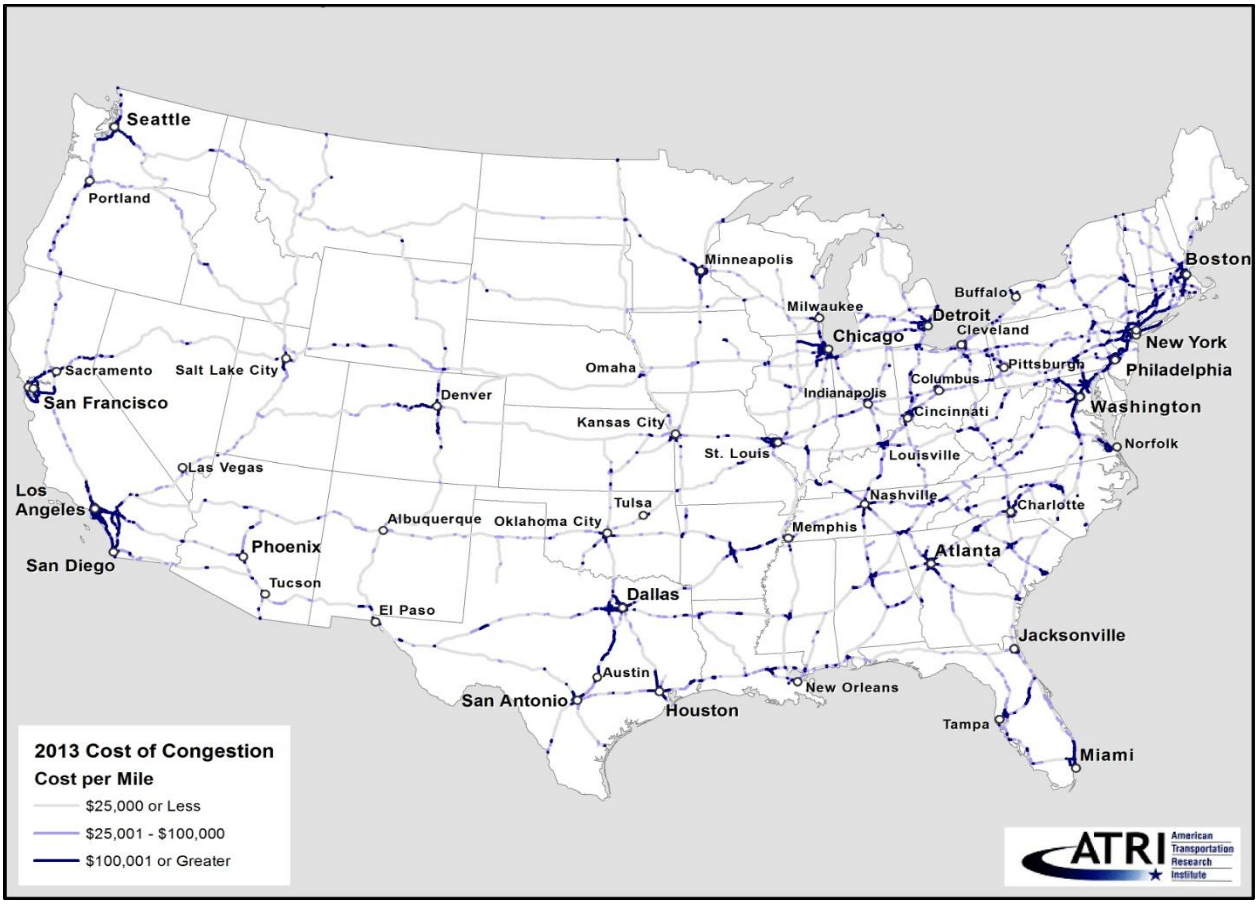
The congestion impacts were not uniformly distributed across the country; as many locations experienced little, if any, delays. While the total congestion costs spread across the IHS averaged $98,148 per mile, relatively few segments actually met or exceeded the national average. This suggests congestion is concentrated on a relatively small portion of the IHS leaving the rest of the nation with little to no congestion. To test this hypothesis, Figure 5 compares the share of Interstate mileage to the share of total costs for three classes of roads based on congestion intensity (low, moderate, and severe). This analysis revealed a strong dichotomy among highway segments: 89 percent of the congestion costs were concentrated on only 12 percent of the Interstate mileage. Conversely, nearly three-quarters (73%) of the Interstate mileage experienced little to no congestion.

Figure 5. Comparison of Cost and Mileage by Segment Congestion Intensity



This concentration of congestion can be visualized by mapping the congestion intensity nationally. Figure 6 displays the cost of congestion per mile for all of the 38,000+ IHS segments analyzed, and reveals how congestion in 2013 was concentrated in major urban areas. In particular, clusters of severe congestion are easily identified in the Boston-Washington, DC corridor, Chicago, Texas, and California.

Figure 6. Cost of Congestion on a Per-Mile Basis



The next three sections present a series of increasingly refined spatial analyses to further investigate the location and severity of congestion. An analysis of congestion costs by state, metropolitan area, and county are presented and within each analysis a set of four metrics are discussed. The four metrics are: total cost in 2013, cost per mile of IHS in 2013, 2012-2013 difference in costs (on a dollar basis), and 2012-2013 difference in costs (on a percentage basis). Each metric quantifies congestion trends in a distinct manner, thus highlighting different types of congestion impacts.

- Total cost: Identifies the largest contributors to congestion at each jurisdictional level.
- Cost per mile: Presents a jurisdiction's congestion level relative to the extent of its IHS mileage. A higher cost per mile indicates a higher intensity of congestion.
- 2012-13 Difference in Costs ($ basis): Highlights locations that have had large changes in congestion costs on an absolute dollar basis. This is particularly useful for identifying trends in locations with a large amount of congestion.
- 2012-13 Difference in Costs (% basis): Identifies locations that have had extreme changes in congestion costs. This is particularly useful for identifying trends in locations that typically have low levels of congestion.

State Analysis

Total cost: Analyzing congestion costs by state[7] reveals that congestion and related costs are typically concentrated in the states with the highest populations. According to Table 1, California led the nation with over $1.7 billion in congestion costs, followed by Texas and New York. To visualize each state's share of congestion costs, Figure 7 presents a cartogram, which is a type of map where each state is sized by cost of congestion rather than its area.

In addition to total costs, ATRI also analyzed:

- the congestion cost per mile of Interstate roadway in each state (Table 2);
- the difference in total cost from 2012 to 2013 (Table 3), and
- the percent change in cost from 2012 to 2013 (Table 4).

Cost per mile: Measuring congestion costs on a per-mile basis illustrates the intensity of congestion relative to the size of the transportation network (i.e. IHS mileage). The District of Columbia ranked first in terms of cost per mile ($1.1 million in 2013 congestion costs per mile of IHS) due mostly to its small size and severe congestion, while Nebraska had the lowest cost per mile ($5,387). California, despite having the highest mileage of any state, had the second-highest cost per mile ($343,450).

2012-13 Difference in Costs ($ basis): Analyzing the difference in congestion costs from 2012 to 2013 is one way of identifying locations that experienced large changes in their congestion patterns. In comparing 2012 congestion *dollars* to 2013, Texas had the largest increase in total cost ($67.0 million) likely a direct result of that state's continued strong population growth, which ranked first nationally.[8] Louisiana saw the largest decrease in cost ($60.9 million), which coincided with major road construction projects ending in 2012 and early 2013 (See Case Study A).

2012-13 Difference in Costs (% basis): One final way of studying congestion patterns is to calculate the cost change from 2012 to 2013 on a percentage basis. This is particularly useful for identifying smaller and less populated locations that had drastic swings in congestion costs. In comparing *percentage change* from 2012 to 2013, North Dakota experienced the greatest increase on a percentage basis (40.2%), potentially due to the recent growth of the oil industry in the state. Nebraska had the greatest percentage decline in costs (-35.9%).

A full table of all 50 states and their associated congestion figures is located in Appendix B.

[7] State analysis excludes Alaska and Hawaii, but includes the District of Columbia.
[8] 2013 State and County Quick Facts, US Census Bureau. http://quickfacts.census.gov. Accessed Mar 24, 2014.

Table 1. Top/Bottom Ten States by Total Cost of Congestion in 2013

Rank	State	2013 Cost
Top Ten		
1	California	$1,706,026,586
2	Texas	$1,053,129,673
3	New York	$845,521,677
4	Illinois	$498,022,538
5	Pennsylvania	$421,508,565
6	Virginia	$330,400,920
7	Maryland	$315,461,693
8	Georgia	$304,113,197
9	Massachusetts	$303,355,238
10	Florida	$256,075,805

Rank	State	2013 Cost
Bottom Ten		
49	Maine	$5,147,186
48	Nebraska	$5,228,002
47	Vermont	$7,372,458
46	New Hampshire	$7,439,687
45	Idaho	$7,684,283
44	North Dakota	$8,701,161
43	Iowa	$11,007,245
42	South Dakota	$12,527,384
41	Montana	$13,371,783
40	Delaware	$17,457,490

Figure 7. Cartogram of Total Cost of Congestion by State

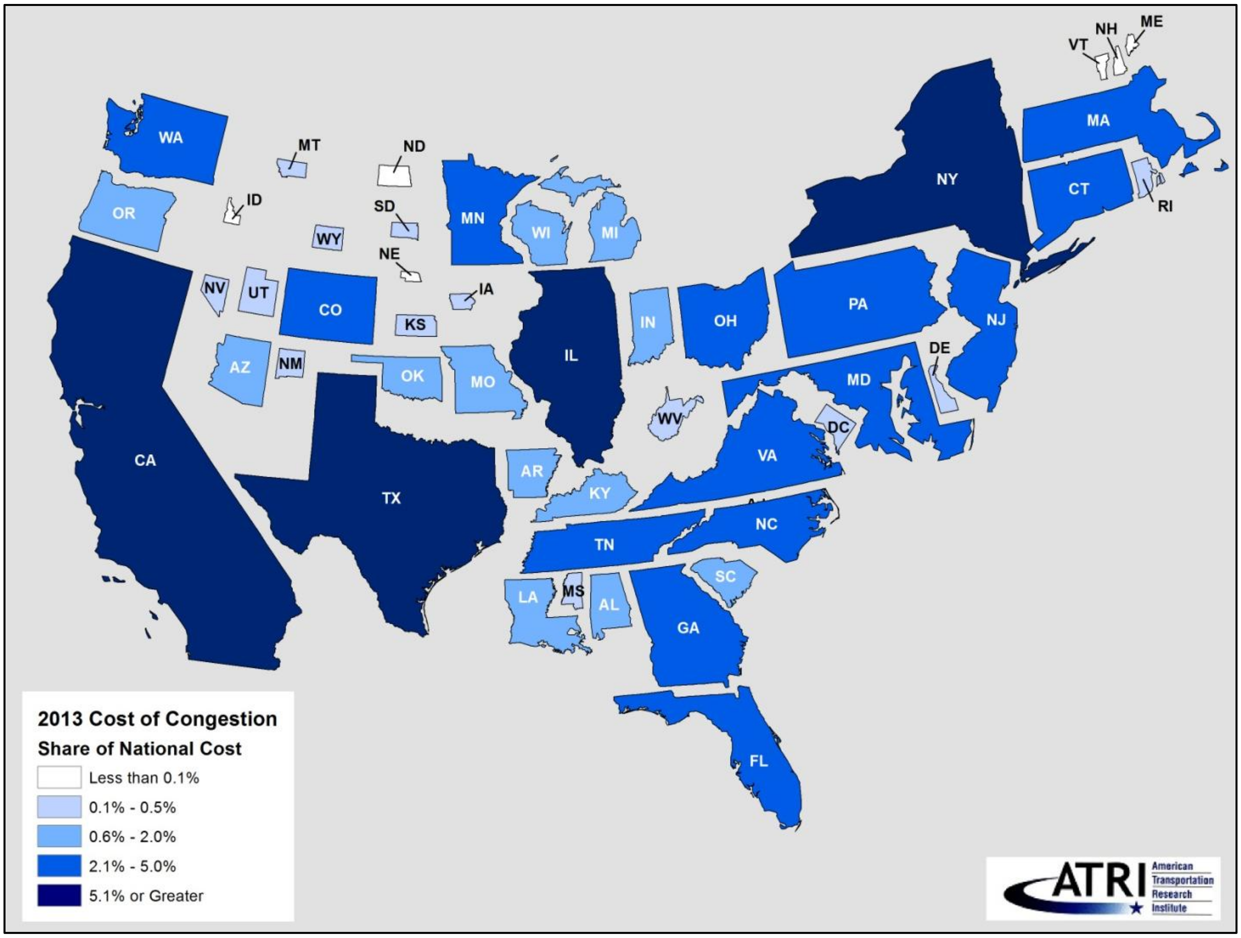


Table 2. Top/Bottom 10 States Based on 2013 Cost per Interstate Mile

Rank	State	2013 Cost per IHS Mile
Top 10		
1	District of Columbia	$1,087,578
2	California	$343,450
3	Maryland	$320,231
4	Connecticut	$272,729
5	New Jersey	$266,214
6	Massachusetts	$264,047
7	New York	$244,839
8	Delaware	$199,388
9	Washington	$163,612
10	Texas	$156,034

Rank	State	2013 Cost per IHS Mile
Bottom 10		
49	Nebraska	$5,387
48	Montana	$5,596
47	Idaho	$6,264
46	Iowa	$6,878
45	Maine	$7,022
44	North Dakota	$7,328
43	South Dakota	$7,806
42	Wyoming	$11,102
41	New Mexico	$11,221
40	Vermont	$11,469

Table 3. Top/Bottom 5 States Based on 2012-13 Difference in Cost

Rank	State	2013-12 Difference
Top 5		
1	Texas	$66,972,488
2	Illinois	$49,554,804
3	Colorado	$33,781,371
4	Massachusetts	$33,464,468
5	Georgia	$20,894,598

Rank	State	2013-12 Difference
Bottom 5		
49	Louisiana	-$60,876,105
48	New York	-$41,446,554
47	Ohio	-$18,989,068
46	Utah	-$18,024,186
45	Tennessee	-$16,963,028

Table 4. Top/Bottom 5 States Based on 2012-13 Percent Change in Cost

Rank	State	2013-12 Pct. Change
Top 5		
1	North Dakota	40.2%
2	Vermont	28.9%
3	Arkansas	22.8%
4	Colorado	20.6%
5	Wyoming	20.3%

Rank	State	2013-12 Pct. Change
Bottom 5		
49	Nebraska	-35.9%
48	Louisiana	-34.2%
47	Utah	-28.5%
46	New Mexico	-25.6%
45	Delaware	-17.8%

Metropolitan Analysis

Total cost: With 96 percent of the nation's congestion costs occurring in metropolitan areas, ATRI also documented congestion costs by metropolitan region.[9] As Table 5 shows, the Los Angeles, CA metropolitan area had the largest cost ($1.082 billion), followed by New York, NY ($984 million), with Chicago, IL ($467 million) a distant third. Generally, the total cost of congestion was a reasonable proxy for metropolitan population, as further evidenced by the small metro areas in the bottom ten ranking.

Cost per mile: Figure 8 illustrates how the congestion costs per mile of Interstate roadway varied across metro areas. Many of the areas with the highest total cost, such as Los Angeles and New York, also have some of the highest intensities. However, smaller metro areas such as Austin, Portland, and Seattle climbed in rank when comparing data on a per-mile basis – indicating high levels of congestion in those areas, despite their relatively smaller populations. Table 6 provides the ten metro areas with the largest and smallest cost per mile figures.

2012-13 Difference in Costs ($ basis): As shown in Table 7, the Chicago area had the largest increase in costs compared to 2012 ($50.0 million). The New York metro area saw a large decline in costs in 2013, with $39.3 million less cost compared to 2012. The greatest declines in costs in the New York area were in the boroughs of Brooklyn and the Bronx, which together shed $44.5 million in costs.

2012-13 Difference in Costs (% basis): Analyzing the percent change in congestion, as shown in Table 8, highlights smaller metropolitan areas that have seen relatively large changes in congestion between 2012 and 2013, often due to isolated severe events. The Mount Vernon, WA area saw the largest increase in costs (676%), due to the collapse of the I-5 Skagit River Bridge in May 2013 which severely impacted travel times (See Case Study C). Conversely, Lake Charles, LA had the greatest percent decrease in costs (83.4%), due partly to severe delays when emergency repairs were made in early 2012 to the I-10 Calcasieu River Bridge.[10]

It should be noted that the *combined* cost of congestion across all of the non-metro areas in the U.S. (i.e. rural areas) totaled $376 million, which was only 4 percent of the total national cost. Interestingly, if treated as a metro area, all rural areas combined would have had the overall largest decline in costs ($62.9 million). This could partially be explained by the milder winter weather in 2013 as weather is a key source of delay in rural areas that lack high traffic volumes. Additionally, the continued urbanization of the U.S. is moving traffic away from rural areas and into urban areas.

A full table of all 308 metro areas and their associated congestion figures is located in Appendix C.

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[9] ATRI utilized the Metropolitan Statistical Area definitions and data from the U.S. Census Bureau.
[10] LSP: Significant traffic congestion on I-10 near Lake Charles. KPLC Television. http://www.kplctv.com/story/16963051/lsp-significant-traffic-congestion-on-i-10-near-lake-charles. Accessed Apr 10, 2014.

Table 5. Top/Bottom Ten Metro Areas by Total Cost of Congestion in 2013

Rank	Metropolitan Area	2013 Cost
Top Ten		
1	Los Angeles-Long Beach-Santa Ana, CA	$1,081,748,940
2	New York-Northern New Jersey-Long Island, NY-NJ-PA	$984,287,793
3	Chicago-Joliet-Naperville, IL-IN-WI	$466,939,275
4	Dallas-Fort Worth-Arlington, TX	$406,130,727
5	Washington-Arlington-Alexandria, DC-VA-MD-WV	$379,356,852
6	Houston-Sugar Land-Baytown, TX	$373,603,620
7	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	$292,141,937
8	San Francisco-Oakland-Fremont, CA	$288,629,957
9	Boston-Cambridge-Quincy, MA-NH	$278,238,672
10	Atlanta-Sandy Springs-Marietta, GA	$275,126,523

Rank	Metropolitan Area	2013 Cost
Bottom Ten		
308	Lewiston-Auburn, ME	$24,453
307	Elkhart-Goshen, IN	$33,949
306	Hinesville-Fort Stewart, GA	$53,383
305	Rochester, MN	$54,053
304	Utica-Rome, NY	$65,937
303	Lawrence, KS	$67,378
302	Jefferson City, MO	$69,195
301	Ames, IA	$80,978
300	Muskegon-Norton Shores, MI	$86,278
299	Sumter, SC	$92,340

Figure 8. 2013 Cost of Congestion per Mile of Interstate by Metro Area

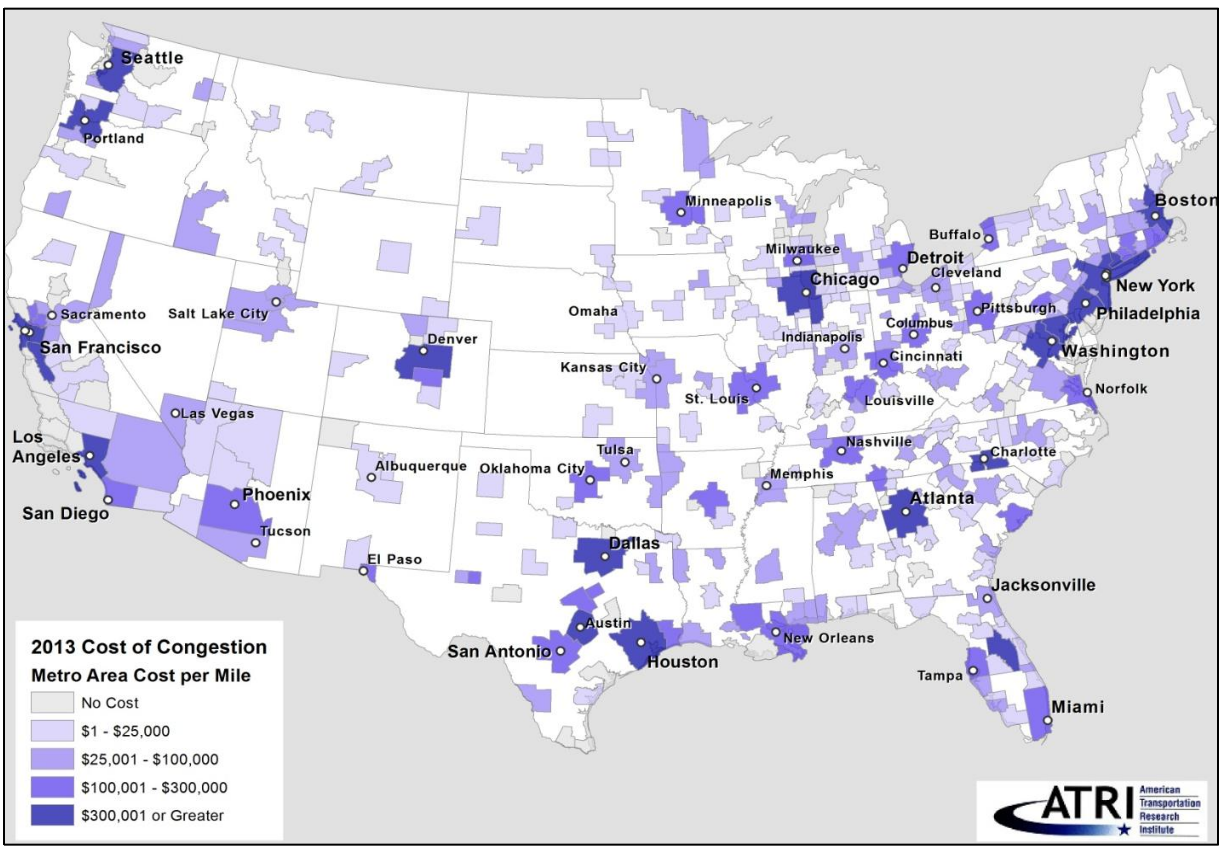


Table 6. Top/Bottom 10 Metro Areas Based on 2013 Cost per Interstate Mile

Rank	Metropolitan Area	2013 Cost per IHS Mile
Top 10		
1	Los Angeles-Long Beach-Santa Ana, CA	$1,386,112
2	New York-Northern New Jersey-Long Island, NY-NJ-PA	$801,121
3	Bridgeport-Stamford-Norwalk, CT	$717,041
4	San Francisco-Oakland-Fremont, CA	$679,614
5	Washington-Arlington-Alexandria, DC-VA-MD-WV	$627,246
6	Seattle-Tacoma-Bellevue, WA	$600,812
7	Orlando-Kissimmee-Sanford, FL	$572,318
8	Austin-Round Rock-San Marcos, TX	$523,183
9	Portland-Vancouver-Hillsboro, OR-WA	$523,153
10	San Jose-Sunnyvale-Santa Clara, CA	$518,695

Rank	Metropolitan Area	2013 Cost per IHS Mile
Bottom 10		
308	Utica-Rome, NY	$771
307	Rochester, MN	$993
306	Elkhart-Goshen, IN	$1,007
305	Lewiston-Auburn, ME	$1,142
304	Jefferson City, MO	$1,305
303	Manhattan, KS	$1,709
302	Ames, IA	$1,723
301	Lawrence, KS	$1,907
300	Casper, WY	$2,190
299	Idaho Falls, ID	$2,328

Table 7. Top/Bottom 5 Metro Areas Based on 2012-13 Difference in Cost

Rank	Metropolitan Area	2013-12 Difference
Top 5		
1	Chicago-Joliet-Naperville, IL-IN-WI	$49,971,569
2	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	$36,037,270
3	Houston-Sugar Land-Baytown, TX	$34,506,805
4	Boston-Cambridge-Quincy, MA-NH	$33,571,505
5	Dallas-Fort Worth-Arlington, TX	$29,524,932

Rank	Metropolitan Area	2013-12 Difference
Bottom 5		
308	New York-Northern New Jersey-Long Island, NY-NJ-PA	-$39,256,910
307	Baton Rouge, LA	-$28,055,800
306	Lake Charles, LA	-$19,165,192
305	Louisville/Jefferson County, KY-IN	-$19,098,530
304	Provo-Orem, UT	-$15,403,133

Table 8. Top/Bottom 5 Metro Areas Based on 2012-13 Percent Change in Cost

Rank	Metropolitan Area	2013-12 Pct. Change
Top 5		
1	Mount Vernon-Anacortes, WA	676.0%
2	Midland, TX	499.8%
3	Kankakee-Bradley, IL	353.2%
4	Fort Smith, AR-OK	348.0%
5	Clarksville, TN-KY	340.6%

Rank	Metropolitan Area	2013-12 Pct. Change
Bottom 5		
308	Lake Charles, LA	-83.4%
307	Redding, CA	-82.5%
306	Lincoln, NE	-80.0%
305	St. Joseph, MO-KS	-77.2%
304	Jefferson City, MO	-76.4%

County Analysis

Total cost: The county level is the smallest jurisdictional area analyzed in this study. As expected, the core counties of major metro areas experienced the greatest congestion costs. As Table 9 indicates, Los Angeles County (CA) accumulated over $944 million in congestion costs in 2013, significantly exceeding the number two county, Cook County (IL), which had over $385 million in 2013 costs.

Cost per mile: Figure 9 illustrates the costs nationally on a per-mile basis, again highlighting the concentration of costs in major cities. While Los Angeles County saw the highest total costs, Kings County (NY) had the greatest cost per mile at over $5.0 million for each mile of IHS in the county (Table 10). In fact, the five primary counties that comprise New York City took five of the top six places. All of the top ten counties on a cost per mile basis were in the Boston to Washington corridor, highlighting the intensity of congestion in this urbanized area. Carroll County (MS) had the lowest cost per mile at only $98.

2012-13 Difference in Costs ($ basis): Table 11 ranks the county congestion costs by the total change in costs between 2012 and 2013. Harris County (TX) had the largest increase of any county at nearly $38.6 million. This increase in congestion was likely due to continued population growth in the Houston region, as Harris County experienced the largest population increase between 2012 and 2013 of any county in the U.S. (an increase of 82,890 residents).[11] Kings County (NY) had the single-largest drop in costs of any county ($27.4 million decline). The primary driver of this decline was a sharp drop in congestion costs on I-278 west of the Brooklyn Bridge beginning in late 2012. This drop appears to coincide with the completion of a major construction project in the summer of 2012.

2012-13 Difference in Costs (% basis): As shown in Table 12, St. Francis County (AR) had the highest increase at over 2,281 percent (See Case Study B for explanation). DeKalb County (IL) saw the largest percentage decline in costs (-96.3%) with costs in that county virtually disappearing in 2013. In the summer of 2012, I-88 was resurfaced, causing travel time delays for several months.[12]

[11] 2013 State and County QuickFacts. US Census Bureau. http://quickfacts.census.gov.
[12] Reagan Memorial Tollway (I-88) Resurfacing Project to Begin April 1. Illinois Tollway. http://www.illinoistollway.com/documents/10157/19978b8c-8aa5-4220-a4f2-fd635bfa1e60. Accessed Apr 10, 2014.

Table 9. Top/Bottom Ten Counties by Total Cost of Congestion in 2013

Rank	County	State	2013 Cost
Top Ten			
1	Los Angeles	California	$944,340,296
2	Cook	Illinois	$385,506,901
3	Harris	Texas	$360,789,145
4	Alameda	California	$235,416,472
5	Dallas	Texas	$226,298,618
6	Bronx	New York	$215,964,608
7	Queens	New York	$201,510,032
8	King	Washington	$177,444,644
9	Tarrant	Texas	$155,518,718
10	Philadelphia	Pennsylvania	$146,739,036

Rank	County	State	2013 Cost
Bottom Ten			
1357	Storey	Nevada	$247
1356	Todd	Minnesota	$541
1355	Wright	Iowa	$1,250
1354	Logan	Kansas	$1,252
1353	Alexander	Illinois	$1,748
1352	Carroll	Mississippi	$1,908
1351	Franklin	Indiana	$2,380
1350	Deaf Smith	Texas	$2,759
1349	Carter	Tennessee	$4,746
1348	Carroll	Maryland	$5,557

Figure 9. 2013 Cost of Congestion per Mile of Interstate by County

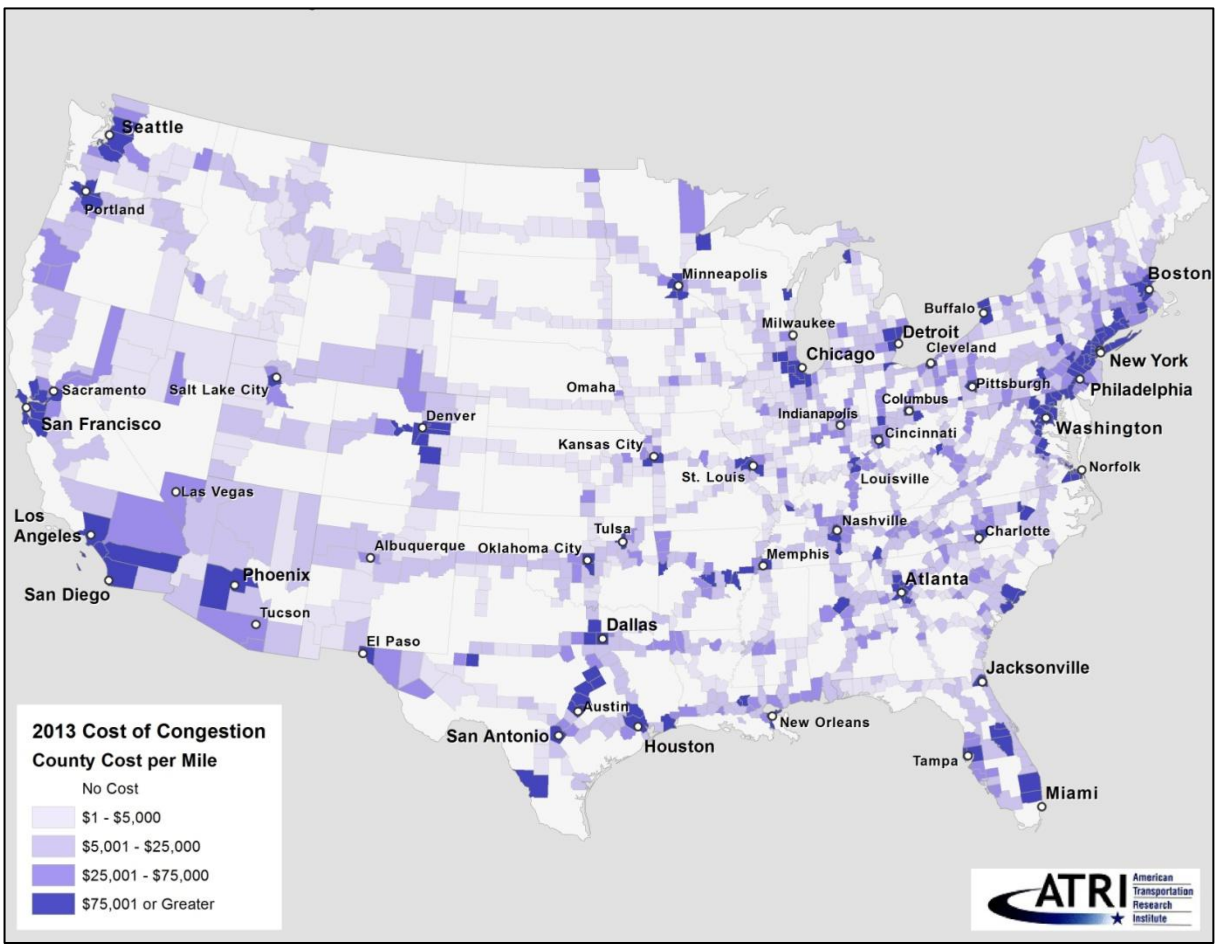


Table 10. Top/Bottom 10 Counties Based on 2013 Cost per Interstate Mile

Rank	County	State	2013 Cost per IHS Mile
Top Ten			
1	Kings	New York	$5,029,930
2	Bronx	New York	$3,293,166
3	New York	New York	$2,789,469
4	Suffolk	Massachusetts	$2,557,312
5	Queens	New York	$2,488,410
6	Richmond	New York	$2,098,736
7	Philadelphia	Pennsylvania	$2,013,598
8	Alexandria City	Virginia	$1,911,490
9	Nassau	New York	$1,877,794
10	Arlington	Virginia	$1,855,407

Rank	County	State	2013 Cost per IHS Mile
Bottom Ten			
1357	Carroll	Mississippi	$98
1356	Todd	Minnesota	$112
1355	Wright	Iowa	$149
1354	New Madrid	Missouri	$163
1353	Franklin	Indiana	$199
1352	Logan	Kansas	$217
1351	Harrison	Missouri	$241
1350	Faribault	Minnesota	$330
1349	Herkimer	New York	$345
1348	Caldwell	Kentucky	$368

Table 11. Top/Bottom 5 Counties Based on 2012-13 Difference in Cost

Rank	County	State	2013-12 Difference
Top Five			
1	Harris	Texas	$38,596,880
2	Philadelphia	Pennsylvania	$25,894,017
3	Cook	Illinois	$24,080,024
4	Tarrant	Texas	$21,805,483
5	Alameda	California	$17,833,894

Rank	County	State	2013-12 Difference
Bottom Five			
1357	Kings	New York	-$27,376,126
1356	Fairfax	Virginia	-$24,051,152
1355	East Baton Rouge	Louisiana	-$20,611,192
1354	Calcasieu	Louisiana	-$19,217,719
1353	Bronx	New York	-$17,120,274

Table 12. Top/Bottom 5 Counties Based on 2012-13 Percent Change in Cost

Rank	County	State	2013-12 Pct. Change
Top Five			
1	St. Francis	Arkansas	2281.8%
2	McCracken	Kentucky	2095.6%
3	Christian	Kentucky	1738.8%
4	McHenry	Illinois	1390.9%
5	Boone	Illinois	1341.6%

Rank	County	State	2013-12 Pct. Change
Bottom Five			
1357	DeKalb	Illinois	-96.3%
1356	Wright	Iowa	-94.2%
1355	Walton	Georgia	-94.0%
1354	Scott	Mississippi	-93.5%
1353	Clinton	Illinois	-92.0%

CASE STUDIES

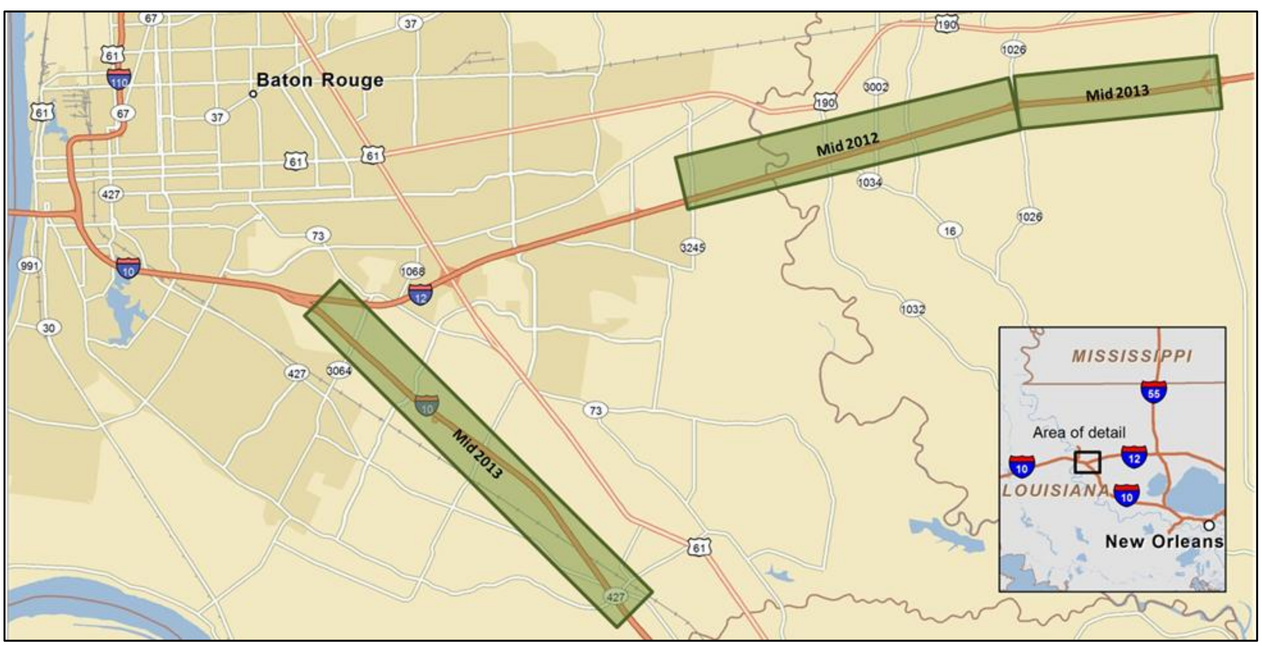
To better understand the root causes of congestion beyond simple capacity constraints, ATRI conducted a series of case studies that examined factors such as road construction and traffic incidents. ATRI developed and applied its methodology of assessing congestion costs associated with road construction and traffic incidents on the following three case studies:

Case Study A: Benefits of Infrastructure Improvements, Baton Rouge, LA
Case Study B: Pre-Planning Construction, St. Francis County, AR
Case Study C: Impact of Sudden Infrastructure Disruptions, Mt. Vernon, WA

Case Study A: Benefits of Infrastructure Improvements, Baton Rouge, LA

While road improvements are a necessary element of a robust transportation system, these improvements may generate temporary delays and add to congestion in the short-term (albeit the long-term benefits of the investment often become immediately apparent when the construction is completed). ATRI documented a particular example of the benefits of infrastructure improvements in Baton Rouge, LA. As part of the Louisiana Department of Transportation and Development (LA DOTD) Geaux Wider program, multiple sections of I-10 and I-12 in the Baton Rouge area were widened in order to accommodate increased traffic volumes.[13] As Figure 10 shows, three key sections of roadway were improved, each of which opened at various times in 2012 and 2013.

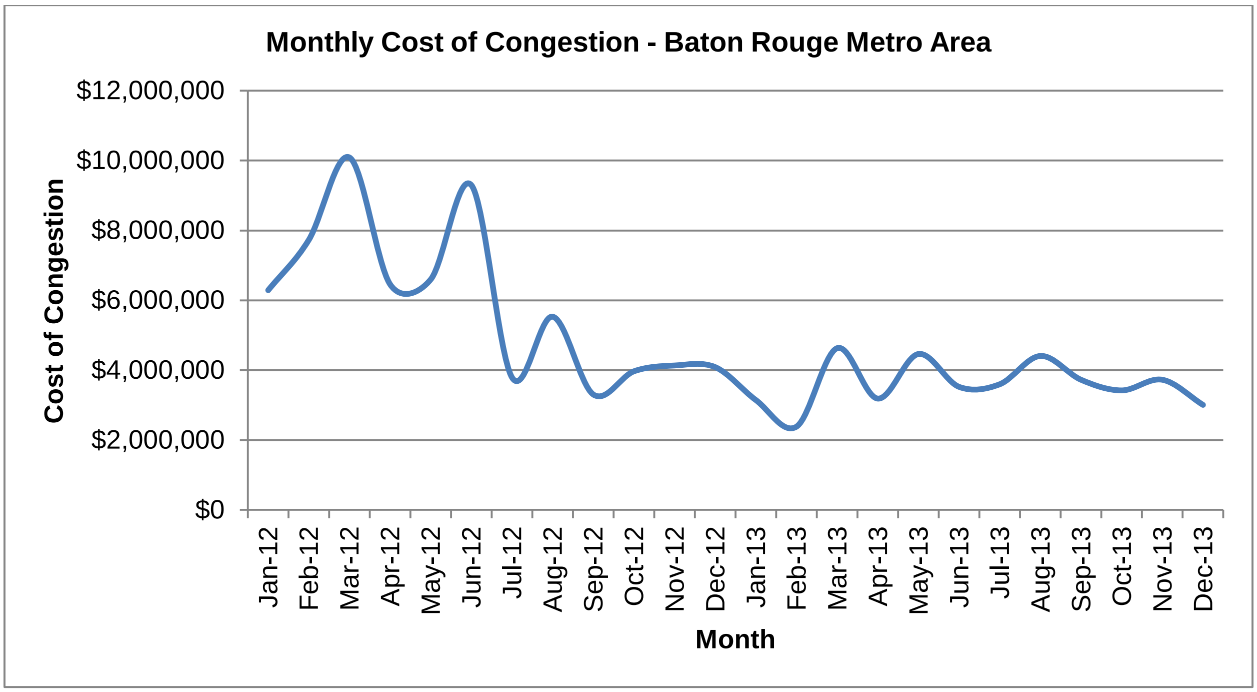
Figure 10. Affected Areas in Baton Rouge



[13] Geaux Wider Project Information. Louisiana Department of Transportation and Development. http://www.geauxwider.com/construction_info/. Accessed Apr 10, 2014.

Due to inadequate roadway capacity and ongoing construction delays, the Baton Rouge metro area had a particularly high cost of congestion in 2012 of $71.3 million. On a per-mile basis, Baton Rouge was the 16th worst metro in 2012, indicating intense levels of congestion that outranked other notoriously congested metros such as Chicago and Atlanta. However, the Baton Rouge metro experienced the second-largest drop in congestion costs between 2012 and 2013, shedding over $28 million. A monthly analysis of congestion costs shown in Figure 11 illustrates how the completion of various portions of the Geaux Wider likely had a positive impact on congestion costs. Costs in the first half of 2012 were the highest in the two-year study period and were also the most variable, often changing by $2 million or more from month-to-month. This variability was likely due to lane closures that had an immediate effect on capacity and thus impacted congestion levels. The first section of roadway opened in mid-2012 at which time costs appeared to drop markedly, as did the monthly variability in costs. By the middle of 2013, the remaining two sections were opened and cost variability was further reduced for the remainder of 2013. Not only did the congestion levels drop once the project was completed, the reliability of the network also appears to have improved.

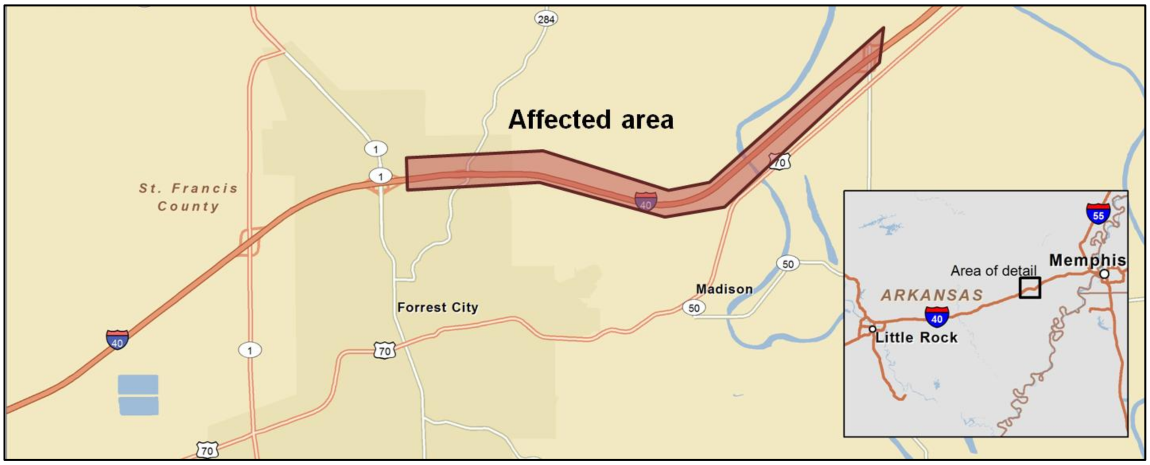
Figure 11. Monthly Cost of Congestion in Baton Rouge, 2012-2013



Case Study B: Pre-Planning Construction, St. Francis County, AR

Road maintenance is a critical component of a safe, efficient and reliable transportation system. However, with that maintenance come secondary impacts such as incidents and delays that can have a short-term negative impact on system performance. Nevertheless, advance planning and outreach of construction activity by state and local officials can mitigate some of the negative impacts of road construction. One example of the benefits of advance planning is a road replacement project on I-40 in Forrest City, AR. Forrest City is located in St. Francis County, which is approximately 45 miles west of Memphis and 90 miles east of Little Rock. Beginning in the summer of 2013, eight miles of I-40 were impacted by construction, as shown in Figure 12. While St. Francis County is relatively small in population (27,260[14]), it contains a segment of I-40 that is a critical corridor for truck movement. Press releases indicate a concerted effort to notify the public of the upcoming work.[15] This allowed car and truck drivers to avoid the area when schedules and routing permitted.

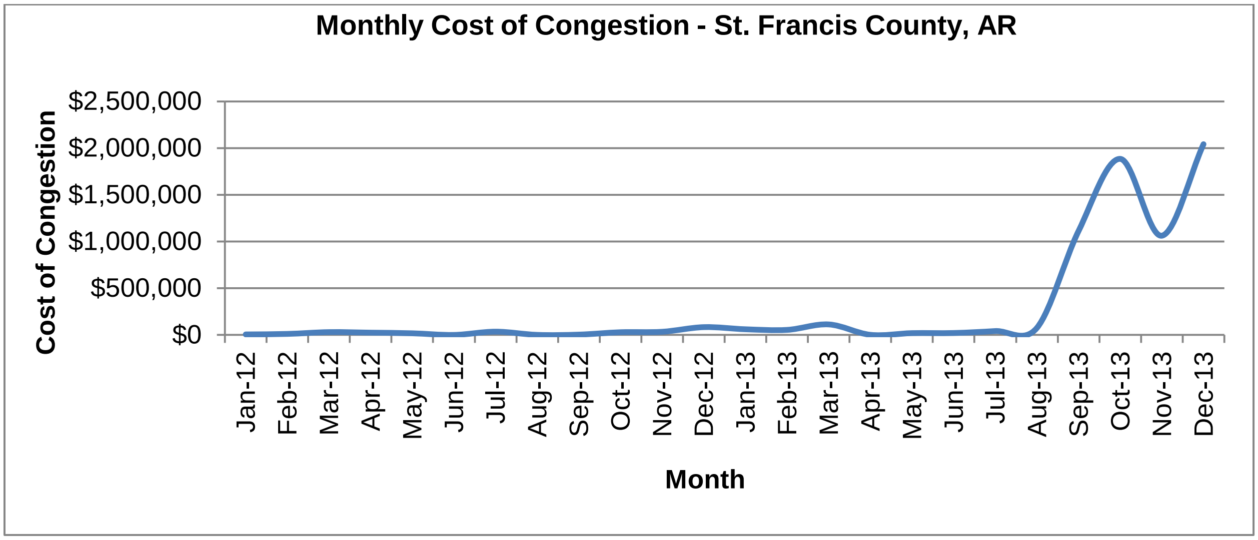
Figure 12. Affected Area in St. Francis County



As a result of this important construction project, St. Francis County experienced an increase in congestion costs in 2013, relative to 2012. While costs for the county only amounted to $272,230 in 2012, that figure increased more than 22-fold to $6,483,926 in 2013. A monthly analysis of the congestion costs (Figure 13) reveals that all of those increased costs began in September 2013, which corresponds to the first significant lane closures for the project.[16] While this is a large increase in costs, had this been an unplanned closure with no advance warning, it is likely these costs would have been considerably higher, particularly given the high trucking volumes on this corridor and during a strengthening economy.

[14] State and County 2013 QuickFacts. U.S. Census Bureau. http://quickfacts.census.gov/qfd/states/05/05123.html. Accessed Mar 24, 2014.
[15] Improvements to Interstate 40 Require Lane Closures in St. Francis County. Arkansas State Highway and Transportation Department. http://www.arkansashighways.com/news/2013/NR%2013-290.pdf. Accessed Apr 10, 2014.
[16] Ibid.

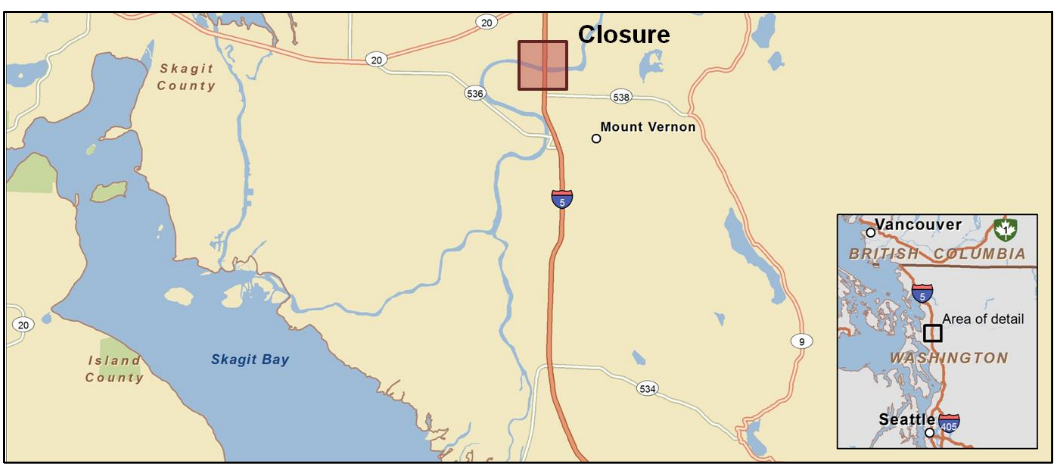
Figure 13. Monthly Cost of Congestion in St. Francis County, 2012-2013



Case Study C: Impact of Sudden Infrastructure Disruptions, Mt. Vernon, WA

The Skagit River Bridge, located on I-5 approximately 60 miles north of Seattle, is a critical infrastructure component for trucks traveling between the Seattle and Vancouver metro areas. On May 23, 2013, the bridge was struck by a truck, resulting in a partial collapse and a complete closing of I-5 just north of Mt. Vernon (Figure 14). A temporary bridge was opened on June 19, 2013 with the permanent replacement bridge opening to traffic on September 15, 2013.[17]

Figure 14. Affected Area in Mt. Vernon



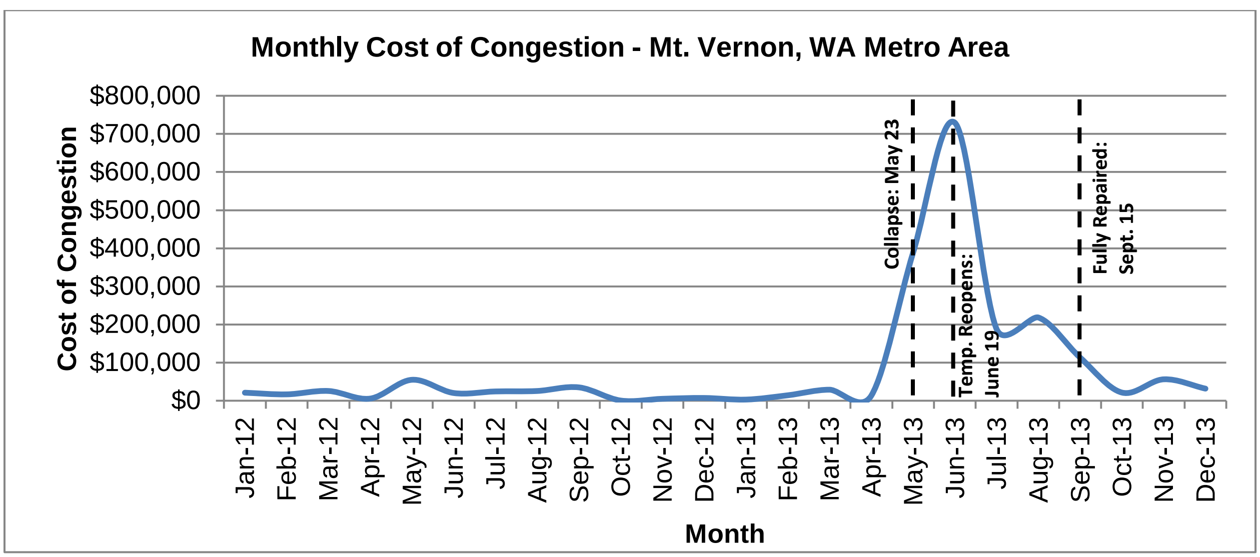
[17] In with the new: Permanent I-5 Skagit River Bridge replacement opens to traffic. Washington State Department of Transportation. http://www.wsdot.wa.gov/News/2013/09/15_PermanentI5SkagitRiverBridgeOpens.htm. Accessed Apr 10, 2014.

ATRI's analysis of truck flows during this time period documented a large increase in congestion in the Mt. Vernon metropolitan area in 2013. Comparing the congestion costs in 2013 with 2012 costs, the Mt. Vernon area had the largest percentage increase of any metro area in the U.S. (676% increase). In 2012, prior to the bridge collapse, the metro area experienced approximately $240,906 in congestion costs. However, that figure increased dramatically to $1,869,362 in 2013. Fortunately, this portion of I-5 is not as heavily utilized as other parts of the IHS network. Had this event occurred in a location with volumes similar to I-40 in St. Francis County (Case Study B), the projected 2013 congestion costs would have been between $5.1 million and $12.3 million.[18] An analysis of the incurred costs by month, shown in Figure 15, reveals a sharp increase in costs during the bridge closure period. Costs were most severe in May and June 2013 when the bridge was completely closed. The temporary bridge relieved congestion somewhat for the remainder of the summer until the permanent replacement opened in September 2013. Congestion costs returned to a normal level beginning in October 2013.

This case study highlights the high cost of unplanned construction due to structural failures or disasters. It also shows the continuum of impact and benefit as the project proceeds from total closure to temporary bridge to completed permanent bridge.

While the primary cause of this particular collapse was a vehicle striking the bridge, state officials had previously classified the bridge as "functionally obsolete," specifically citing the "facture critical" nature of the bridge, meaning the bridge lacked structural redundancy should one portion of the bridge fail.[19] While functionally obsolete bridges are still considered safe to drive on and are commonly still in service in the U.S., this nevertheless underscores the importance of investing in infrastructure on a national scale to ensure the system is up-to-date with the latest engineering standards.

Figure 15. Monthly Cost of Congestion in Mt. Vernon, 2012-2013



[18] Based on differences in FHWA FAF volumes between I-40 in St. Francis County, AR and I-5 in Mt. Vernon, WA. A description of how FAF volumes were derived can be found in the methodology description in Appendix A.
[19] Experts: Skagit River Bridge considered 'fracture critical'. KIRO Television. http://www.kirotv.com/news/news/experts-skagit-river-bridge-considered-fracture-cr/nX3Sz/. Accessed Apr 10, 2014.

SUMMARY

Congestion takes a variety of forms and can be triggered by economic growth, inadequate roadway capacity, severe weather, construction and infrastructure disruptions. Using a variety of trucking-specific data sources, ATRI quantified the costs of all forms of congestion on the Interstate system to the trucking industry. For 2013, ATRI calculated a $9.209 billion impact on trucking industry operational costs that was a direct result of congested conditions. Overall, 89 percent of the congestion costs were concentrated on only 12 percent of the Interstate mileage. This concentration of congestion has been well documented in previous work by ATRI which identified the worst truck bottlenecks in the U.S. and ranked them according to a congestion severity index.[20] Of the top 100 bottlenecks in ATRI's previous bottleneck analysis, 98 were identified as having "severe" congestion in this cost of congestion analysis (the only two locations not identified were located on non-IHS roads and outside the scope of this study).

Congestion had a significant impact on industry operations and productivity in 2013. On average, each registered truck experienced $864 in added operational costs in 2013 due to congestion on the Interstates; however the impact was greater on trucks that traveled more miles in 2013. On average, a truck that drove 150,000 miles in 2013 was burdened with an additional $5,094 in operational costs due to congestion on the Interstates. In terms of productivity, the industry lost 141 million hours of driving time, which was the equivalent of 51,293 truck drivers sitting idle for an entire working year.

This analysis not only identifies the locations with the highest levels of congestion, it also underscores the importance of properly investing in highway infrastructure. As highlighted by the highway widening project in Baton Rouge, the short term delays caused by construction are quickly erased when improved infrastructure opens. Maintenance and improvements are necessary for a properly functioning transportation system, and communicating those improvements in advance is critical for minimizing the inevitable delays associated with road construction. While planned construction is rarely without delays, the I-5 Skagit River Bridge collapse highlights the cost of unplanned events. Sudden closures due to failing infrastructure or disasters are costly and can severely disrupt supply chain movements. Adequate funding of highway repairs and improvements that address system deficiencies and plan for future growth would not only help reduce congestion costs, but would also improve productivity throughout the economy. The concentration of congestion highlighted by this research, and other ATRI studies, suggests that while the magnitude of the congestion issue is quite large, the geographic scope of congestion is relatively limited. Analyses such as these provide valuable information as to the strategic locations where limited infrastructure investment funds could be used to generate the greatest return on investment.

[20] FPM Congestion Monitoring at 100 Freight Significant Highway Locations. American Transportation Research Institute. 2013. http://atri-online.org/2013/07/08/atri-100-freight-locations/. Accessed April 28, 2014.

APPENDIX A. METHODOLOGY

ATRI utilized a combination of four key data sources to produce this analysis:

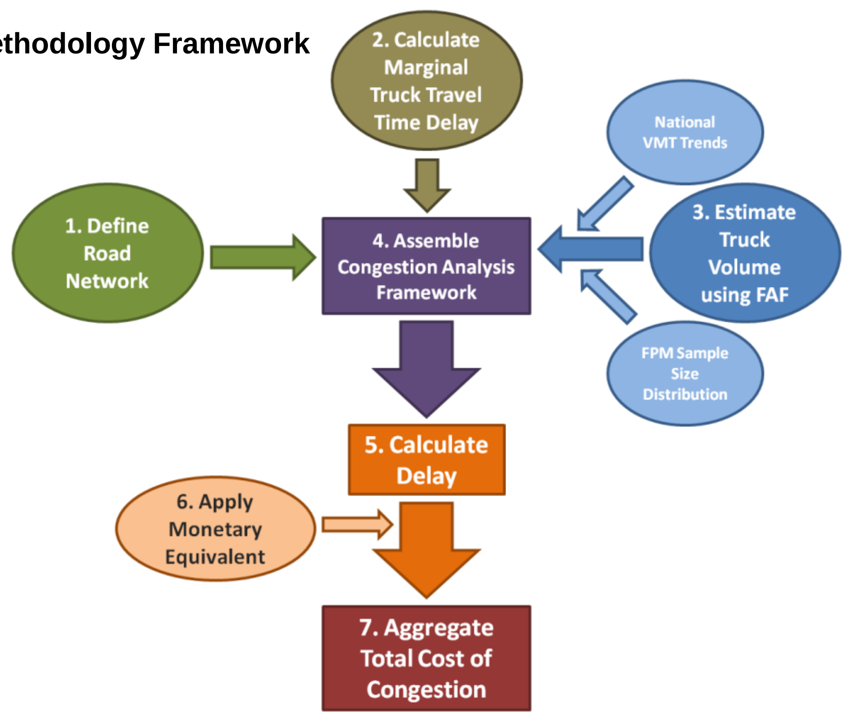
1. Truck GPS data from ATRI's Freight Performance Measures (FPM) database;
2. Truck travel times from the National Performance Management Research Data Set (NPMRDS);
3. Truck volumes from FHWA Freight Analysis Framework (FAF); and
4. Motor carrier financial and operating data obtained by ATRI.

The foundation of ATRI's FPM database and the NPMRDS truck travel times is truck probe data obtained by ATRI. Since 2002, ATRI has utilized this data to support studies throughout North America that seek to more fully understand the nature of trucking operations and the impact that externalities have on those operations. ATRI compiles the data anonymously from nearly 500,000 trucks using GPS data from onboard trucking systems, generating billions of data points annually. Each truck has a regular position read (generally every 30 seconds to 15 minutes) and includes information on vehicle location, unique vehicle identification, time/date, and, in many cases, vehicle spot speed (which is obtained from the vehicle's engine).

Using these data points, ATRI performs spatial queries and relates the truck GPS data to a variety of transportation datasets using customized software and proprietary database management workflows. For this research, ATRI spatially linked the NPMRDS and FPM data to FHWA's FAF network in order to combine speed data with volume data. This allowed ATRI to calculate the level of congestion on each mile of the IHS and aggregate that data nationally.

Figure A-1 illustrates the seven steps ATRI utilized in this analysis. The subsequent sections present a detailed explanation of the calculations performed in each step.

Figure A-1: Methodology Framework



Step One: Define the Road Network

The first step was to establish the spatial framework for the analysis. The NPMRDS shapefile was utilized as the base network file given its availability to freight planning professionals. ATRI limited the study network to the IHS in an effort to constrain the analysis to a single road type (i.e. freeways with access control). The network was segmented into varying lengths (median length 1.5 miles), ranging from 37 miles to less than a quarter-mile (with the shorter segments often located in more urbanized areas). Each segment of the network contained a unique identification code (note that each direction of travel had its own segmentation). After refining the NPMRDS network, the remaining 38,233 segments (totaling 93,833 miles)[21] provided the foundation for which all analyses were conducted.

Additionally, each segment was spatially linked to a number of geographic characteristics, including state, metropolitan area and county. This gave ATRI the ability to aggregate the analysis across a variety of geographic areas.

Step Two: Calculate Marginal Truck Travel Time Delay

Each month, the NPMRDS is updated with a new set of average truck travel times across 288 five-minute epochs (e.g. Epoch 1 provides the monthly average truck travel time on that particular segment for the 12:00 – 12:05 AM period). To reduce the impact of outliers and missing data points, ATRI aggregated the five-minute data into one-hour time periods, yielding 24 monthly average travel times for each segment. ATRI aggregated the travel time data for each month in 2012 and 2013.

In order to calculate the level of congestion, a free-flow travel time must be established for each segment. While the speed limit can be used as free-flow, issues often arise with varying degrees of speed limit enforcement and truck speed governor usage. A more accurate predictor of actual congestion can be derived using the empirical travel time observations for each segment. This was established by calculating each segment's fastest hourly average travel time for each month in 2012 and 2013. ATRI then calculated the median of those 24 fastest hourly values and set that value as the free-flow travel time.

Next, a congestion level was identified to flag instances of congestion. Previous research has set the level of moderate congestion at 90 percent of the free-flow speed.[22] ATRI replicated this assumption and calculated a congestion threshold travel time for each segment. ATRI decided against setting the congestion level at 100 percent of free-flow because the trucking industry is generally flexible enough to adjust to minor congestion in daily operations. By using a more conservative threshold to calculate marginal delay, ATRI's analysis provides a more accurate assessment of congestion that is having a noticeable impact on industry operations.

Actual monthly travel times were then compared to the congestion threshold to identify situations where congestion was present, as illustrated in Figure A-2. In instances where congestion was present, the actual travel time was subtracted from the congestion threshold travel time to establish a marginal delay value (Figure A-3). This yielded over 11 million marginal delay values annually (38,233 segments X 24 hours X 12 months).

[21] This includes mileage for each direction of travel.
[22] 2012 Urban Mobility Report. Texas Transportation Institute. http://mobility.tamu.edu/ums/report/. Accessed Apr 10, 2014.

Figure A-2. Identifying Congested Conditions

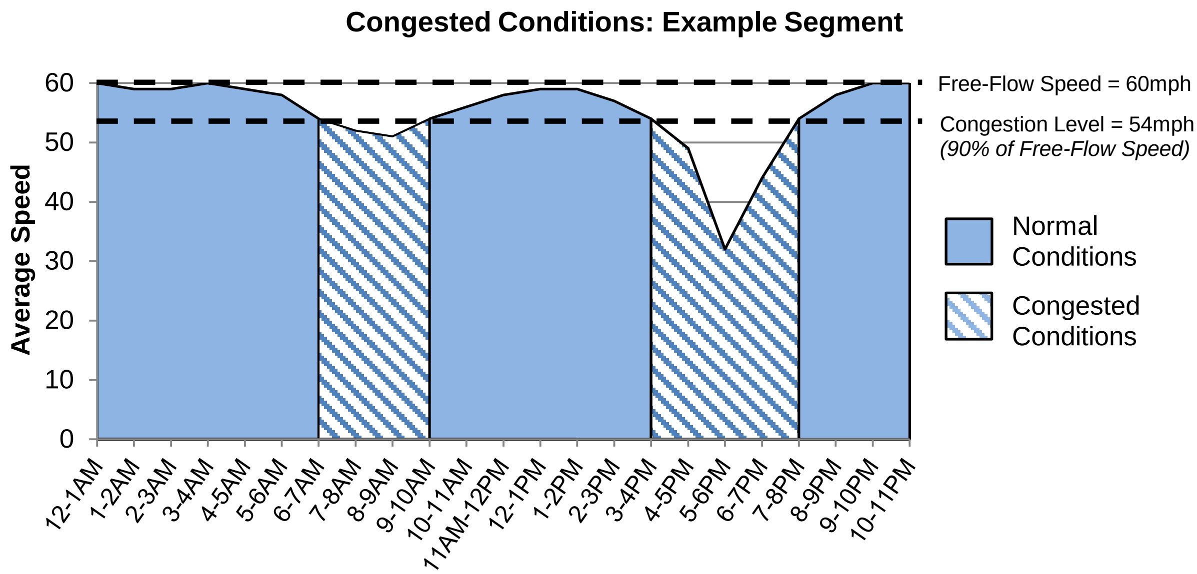
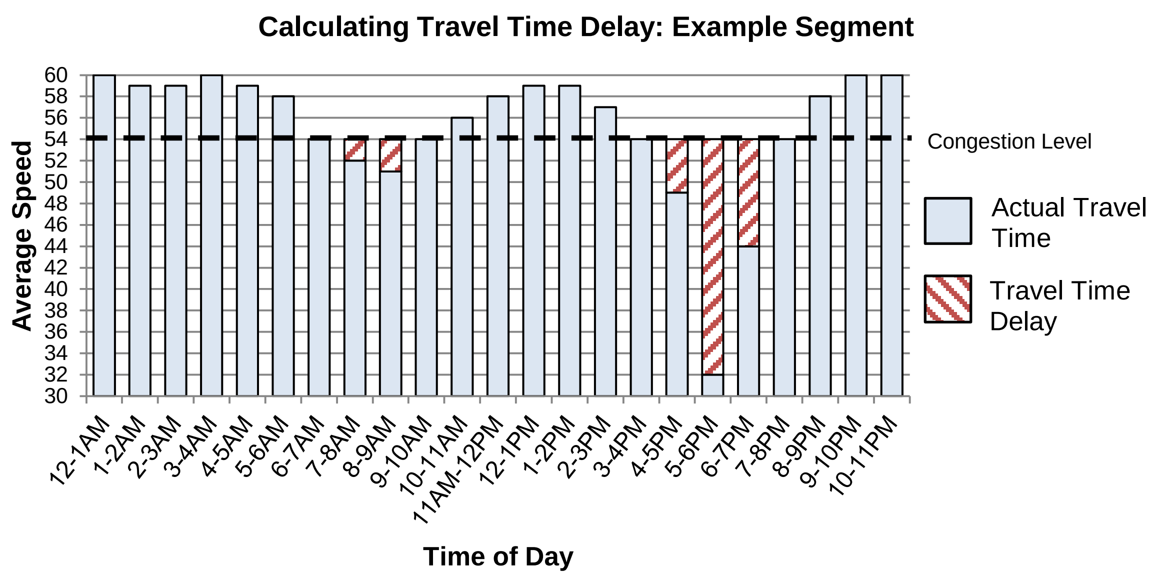


Figure A-3. Calculating Travel Time Delay



Step Three: Estimate Truck Volume using FAF

While the marginal delay calculations are necessary for understanding the severity of congestion at a particular time and place, truck volume data is needed to calculate the total impact on the trucking industry. For example, the impact of congestion is greater on a segment with higher truck volumes compared to a segment with lower volumes even if the marginal delays are the same.

One of the most commonly used government sources of truck volume estimates is the FAF, produced by FHWA. The FAF provides volume data for all large trucks with a gross vehicle weight rating exceeding 10,000 pounds. Unfortunately, the FAF network does not precisely align with the customized network developed in Step 1, so it was necessary for ATRI to spatially link the FAF volumes to ATRI's network using ESRI ArcGIS software. This allowed ATRI to assign FAF volumes from the closest FAF segment to each ATRI segment. Once the FAF volume data was associated with the ATRI network it was necessary to adjust the volume figures, which were presented by the FAF as the Average Annual Daily Truck Traffic (AADTT) in 2007 for both directions of travel. Table A-1 gives a fictitious example of the various steps in the volume analysis, and is explained by the following narrative.

Step 3-A: The 2007 AADTT was adjusted to 2012 and 2013 AADTT. Using truck Vehicle Miles Traveled (VMT) figures generated by FHWA for urban interstates and rural interstates, ATRI calculated the change in VMT from 2007 to 2012, which was the most recent figure available. ATRI adjusted all the FAF volumes by the overall VMT change to estimate 2012 VMT (using the urban VMT data for urban segments, and the rural data for rural segments). Because 2013 national VMT figures have not been released by FHWA, ATRI applied the 2013 year-end estimates from the FHWA Traffic Volume Report[23] for all vehicle types to the 2012 data. In the Table A-1 example, the 10,000 AADTT figure is adjusted by 95 percent to reflect a national decline in truck VMT from 2007 to 2012, yielding a 2012 estimate of 9,500.

Step 3-B: Next, the 2012 volume estimates were adjusted to reflect only one direction of travel. The 2012 figures were equally divided between each direction of travel. While more nuanced methodologies could have been developed, ATRI was constrained by the national scope of this analysis and the lack of non-proprietary national VMT data by direction. In the example, the 9,500 estimate for both directions becomes 4,750 for one direction.

Step 3-C: The volume estimates were adjusted to account for seasonality. ATRI utilized FHWA national volume statistics[24] to estimate how total volume fluctuates seasonally. The volume estimates were adjusted by a monthly utilization factor to account for seasonal trends in volume. In the Table A-1 example, a January 2012 utilization factor of 90 percent was applied to reflect lower activity in January, giving a January 2012 estimate of 4,275 trucks per day.

Step 3-D: The volume estimates were modified to account for hourly changes in road usage. When ATRI aggregated the truck probe data for the IHS, it recorded the number of trucks in each hour time period for each segment. It was assumed that the ATRI FPM distribution of trucks was a reasonable approximation of how truck volume varies by time of day on a particular segment. That distribution was calculated for each segment and applied to the volume estimates to generate an hourly figure. The Table A-1 example for the 12-1PM hour shows a distribution factor of 6 percent, yielding an average of 256.5 trucks in that hour per day in January 2012.

Step 3-E: Total monthly volumes were calculated. The preceding steps generated a monthly estimate of average hourly truck volume on each segment of roadway. To calculate the total monthly truck volume by hour, it was necessary to multiple this figure by the number of days in a particular month. Given that the ATRI analysis was focused only on weekdays, each hourly estimate was multiplied by the number of weekdays in that month. In the Table A-1 example,

[23] Traffic Volume Trends: December 2013. Federal Highway Administration. http://www.fhwa.dot.gov/policyinformation/travel_monitoring/13dectvt/index.cfm. Accessed Apr 10, 2014.
[24] Ibid.

the hourly estimate is multiplied by 22 days to generate an estimate of 5,643 trucks in the 12-1PM period for January 2012.

Table A-1. Example deriving total truck volume estimates from 2007 FAF truck volume estimates.

Value	Description
10,000	Average Daily Truck Traffic in 2007 (both directions)
x 95%	*Adjustment for 2007-2012 national change in volume*
9,500	Average Daily Truck Traffic in 2012 (both directions)
x 50%	*Adjustment for direction of travel*
4,750	Average Daily Truck Traffic in 2012 (one direction)
x 90%	*Adjustment for January's monthly utilization factor*
4,275	Average Daily Truck Traffic in January 2012 (one direction)
x 6%	*Share of truck data in 12-1PM hour*
256.5	Average Daily Truck Traffic for 12-1PM hour in January 2012 (one direction)
x 22	*Number of weekdays in January 2012*
5,643	**Total Truck Traffic for 12-1PM hour in January 2012 (one direction)**

Step Four: Assemble Congestion Analysis Framework

In this step, the network characteristics, travel time calculations, and volume estimates were combined so that the delay calculations could be calculated (Step Five). Each of the analyses in steps one, two, and three utilized a common identifier for each unique road segment, which allowed for the three steps to be easily combined. The resulting framework contained geographic information on each segment, its marginal monthly delay, and monthly volume estimates.

Step Five: Calculate Delay

With the analysis framework established, calculating delay was straightforward. The marginal delay factor (average hours of delay per truck) for each hour in each month was multiplied by the corresponding volume estimate for that particular hour and month. This generated a total hours of delay for each hour period in each month.

Step Six: Apply Monetary Equivalent

The final analytical step was to apply monetary equivalents to the total delay figures calculated in Step Five to determine the total cost of the delay. Each year since 2008, ATRI has financial and operational data from a sample of motor carriers to produce a national average cost to operate a truck.[25] ATRI's *Analysis of the Operational Costs of Trucking* report calculated the

[25] An Analysis of the Operational Costs of Trucking: A 2013 Update. American Transportation Research Institute. September 2013.

average operational cost was $65.29 per hour in 2012 (the most recent year available). The total delay figures were multiplied by the average cost to generate the total cost of congestion.

Step Seven: Aggregate Total Cost of Congestion

The total cost figures for each segment of IHS were then aggregated to generate a national cost of congestion to the trucking industry for both 2012 and 2013. Additionally, the geographic data associated with each segment allowed the costs to be aggregated by state, metropolitan area, and county. Please note that the congestion figures represent the cost for all trucks with a gross vehicle weight rating exceeding 10,000 pounds.

APPENDIX B. STATE CONGESTION TABLE

State	2013 Cost	2012 Cost	2013-12 Difference	2013-12 Pct. Change	2013 Cost per Interstate Mile
Alabama	$64,949,765	$72,744,674	-$7,794,909	-10.7%	$34,967
Arizona	$101,257,427	$100,177,800	$1,079,627	1.1%	$43,084
Arkansas	$67,526,619	$55,005,369	$12,521,249	22.8%	$51,276
California	$1,706,026,586	$1,686,431,954	$19,594,632	1.2%	$343,450
Colorado	$197,605,771	$163,824,400	$33,781,371	20.6%	$102,129
Connecticut	$197,082,319	$192,805,627	$4,276,692	2.2%	$272,729
Delaware	$17,457,490	$21,236,565	-$3,779,074	-17.8%	$199,388
District of Columbia	$26,770,469	$22,269,663	$4,500,806	20.2%	$1,087,578
Florida	$256,075,805	$239,276,120	$16,799,685	7.0%	$85,369
Georgia	$304,113,197	$283,218,599	$20,894,598	7.4%	$120,755
Idaho	$7,684,283	$6,974,196	$710,087	10.2%	$6,264
Illinois	$498,022,538	$448,467,735	$49,554,804	11.0%	$112,735
Indiana	$86,792,919	$100,422,744	-$13,629,826	-13.6%	$36,474
Iowa	$11,007,245	$13,061,508	-$2,054,263	-15.7%	$6,878
Kansas	$26,375,148	$29,402,051	-$3,026,903	-10.3%	$14,885
Kentucky	$87,802,688	$91,325,616	-$3,522,928	-3.9%	$57,406
Louisiana	$117,348,386	$178,224,491	-$60,876,105	-34.2%	$65,299
Maine	$5,147,186	$6,039,414	-$892,229	-14.8%	$7,022
Maryland	$315,461,693	$305,118,545	$10,343,148	3.4%	$320,231
Massachusetts	$303,355,238	$269,890,770	$33,464,468	12.4%	$264,047
Michigan	$114,260,621	$107,406,125	$6,854,496	6.4%	$45,754
Minnesota	$204,485,605	$190,999,946	$13,485,660	7.1%	$108,905
Mississippi	$19,154,150	$20,732,237	-$1,578,086	-7.6%	$13,370
Missouri	$126,392,127	$143,221,967	-$16,829,840	-11.8%	$45,121

State	2013 Cost	2012 Cost	2013-12 Difference	2013-12 Pct. Change	2013 Cost per Interstate Mile
Montana	$13,371,783	$12,262,161	$1,109,623	9.0%	$5,596
Nebraska	$5,228,002	$8,160,228	-$2,932,226	-35.9%	$5,387
Nevada	$22,742,623	$25,337,240	-$2,594,617	-10.2%	$20,384
New Hampshire	$7,439,687	$7,794,805	-$355,118	-4.6%	$14,665
New Jersey	$241,566,200	$235,379,390	$6,186,811	2.6%	$266,214
New Mexico	$22,421,944	$30,122,555	-$7,700,611	-25.6%	$11,221
New York	$845,521,677	$886,968,231	-$41,446,554	-4.7%	$244,839
North Carolina	$192,527,451	$186,566,370	$5,961,080	3.2%	$77,321
North Dakota	$8,701,161	$6,205,481	$2,495,680	40.2%	$7,328
Ohio	$209,842,936	$228,832,004	-$18,989,068	-8.3%	$65,920
Oklahoma	$82,273,917	$78,440,999	$3,832,918	4.9%	$43,192
Oregon	$149,227,189	$154,461,766	-$5,234,577	-3.4%	$101,862
Pennsylvania	$421,508,565	$403,328,019	$18,180,546	4.5%	$110,288
Rhode Island	$20,061,479	$18,029,946	$2,031,533	11.3%	$142,169
South Carolina	$57,617,109	$50,290,738	$7,326,372	14.6%	$32,572
South Dakota	$12,527,384	$11,889,229	$638,155	5.4%	$7,806
Tennessee	$208,126,970	$225,089,998	-$16,963,028	-7.5%	$88,486
Texas	$1,053,129,673	$986,157,185	$66,972,488	6.8%	$156,034
Utah	$45,178,342	$63,202,528	-$18,024,186	-28.5%	$23,837
Vermont	$7,372,458	$5,719,679	$1,652,778	28.9%	$11,469
Virginia	$330,400,920	$340,921,632	-$10,520,712	-3.1%	$145,206
Washington	$250,106,949	$236,967,998	$13,138,951	5.5%	$163,612
West Virginia	$38,830,727	$39,845,388	-$1,014,661	-2.5%	$34,054
Wisconsin	$81,123,002	$70,765,052	$10,357,951	14.6%	$53,441
Wyoming	$20,465,404	$17,007,184	$3,458,220	20.3%	$11,102

APPENDIX C. METRO AREA CONGESTION TABLE

Metropolitan Area	2013 Cost	2012 Cost	2013-12 Difference	2013-12 Pct. Change	2013 Cost per Mile
Abilene, TX	$652,811	$438,392	$214,418	48.9%	$5,151
Akron, OH	$9,523,098	$12,920,716	-$3,397,617	-26.3%	$34,886
Albany-Schenectady-Troy, NY	$11,233,123	$13,236,576	-$2,003,452	-15.1%	$36,137
Albuquerque, NM	$9,088,167	$10,860,525	-$1,772,358	-16.3%	$25,368
Alexandria, LA	$495,154	$681,463	-$186,309	-27.3%	$4,568
Allentown-Bethlehem-Easton, PA-NJ	$10,389,401	$9,969,207	$420,194	4.2%	$40,534
Altoona, PA	$209,200	$503,789	-$294,589	-58.5%	$2,549
Amarillo, TX	$1,719,191	$1,681,742	$37,449	2.2%	$8,999
Ames, IA	$80,978	$290,210	-$209,233	-72.1%	$1,723
Anderson, IN	$1,158,234	$2,037,111	-$878,877	-43.1%	$26,506
Anderson, SC	$389,730	$327,165	$62,566	19.1%	$5,336
Ann Arbor, MI	$5,092,094	$4,889,898	$202,196	4.1%	$68,678
Anniston-Oxford, AL	$690,115	$1,581,249	-$891,134	-56.4%	$37,031
Asheville, NC	$8,911,306	$9,941,528	-$1,030,221	-10.4%	$38,960
Atlanta-Sandy Springs-Marietta, GA	$275,126,523	$253,387,701	$21,738,823	8.6%	$332,012
Auburn-Opelika, AL	$967,511	$3,791,865	-$2,824,354	-74.5%	$15,119
Augusta-Richmond County, GA-SC	$3,257,536	$4,249,855	-$992,319	-23.3%	$16,791
Austin-Round Rock-San Marcos, TX	$87,562,069	$92,639,589	-$5,077,520	-5.5%	$523,183
Bakersfield-Delano, CA	$3,245,658	$8,662,259	-$5,416,601	-62.5%	$19,722
Baltimore-Towson, MD	$177,385,021	$162,889,314	$14,495,708	8.9%	$408,510
Bangor, ME	$751,877	$773,042	-$21,164	-2.7%	$3,256
Baton Rouge, LA	$43,230,609	$71,286,409	-$28,055,800	-39.4%	$211,432
Battle Creek, MI	$1,179,366	$673,488	$505,877	75.1%	$9,893
Bay City, MI	$388,001	$437,192	-$49,190	-11.3%	$5,826
Beaumont-Port Arthur, TX	$10,911,483	$9,472,212	$1,439,271	15.2%	$112,066
Bellingham, WA	$778,037	$1,585,015	-$806,978	-50.9%	$11,454
Billings, MT	$770,283	$496,741	$273,542	55.1%	$4,014
Binghamton, NY	$3,548,776	$2,707,883	$840,893	31.1%	$29,168
Birmingham-Hoover, AL	$38,000,822	$38,292,361	-$291,539	-0.8%	$81,443
Bismarck, ND	$645,413	$414,223	$231,190	55.8%	$2,965
Blacksburg-Christiansburg-Radford, VA	$1,892,917	$3,353,688	-$1,460,770	-43.6%	$21,449
Bloomington-Normal, IL	$1,112,000	$598,673	$513,327	85.7%	$6,571
Boise City-Nampa, ID	$3,143,801	$1,878,969	$1,264,833	67.3%	$26,198
Boston-Cambridge-Quincy, MA-NH	$278,238,672	$244,667,167	$33,571,505	13.7%	$482,815
Bowling Green, KY	$722,548	$864,024	-$141,476	-16.4%	$13,440
Bridgeport-Stamford-Norwalk, CT	$89,965,759	$84,013,355	$5,952,403	7.1%	$717,041
Brunswick, GA	$652,417	$391,337	$261,080	66.7%	$8,294
Buffalo-Niagara Falls, NY	$21,910,388	$20,378,969	$1,531,419	7.5%	$113,454
Burlington, NC	$447,604	$452,833	-$5,229	-1.2%	$13,974
Burlington-South Burlington, VT	$3,085,955	$1,920,834	$1,165,120	60.7%	$22,570
Canton-Massillon, OH	$1,229,190	$1,040,168	$189,021	18.2%	$32,167
Cape Coral-Fort Myers, FL	$4,837,786	$2,278,523	$2,559,263	112.3%	$88,448

Metropolitan Area	2013 Cost	2012 Cost	2013-12 Difference	2013-12 Pct. Change	2013 Cost per Mile
Cape Girardeau-Jackson, MO-IL	$330,959	$475,034	-$144,075	-30.3%	$5,816
Casper, WY	$233,406	$219,227	$14,179	6.5%	$2,190
Cedar Rapids, IA	$428,903	$541,654	-$112,751	-20.8%	$5,487
Champaign-Urbana, IL	$965,840	$889,106	$76,734	8.6%	$4,509
Charleston, WV	$13,909,762	$16,262,417	-$2,352,655	-14.5%	$65,069
Charleston-N. Charleston-Summerville, SC	$22,637,339	$17,727,279	$4,910,060	27.7%	$126,595
Charlotte-Gastonia-Rock Hill, NC-SC	$119,159,102	$108,334,010	$10,825,092	10.0%	$344,839
Charlottesville, VA	$991,216	$552,202	$439,014	79.5%	$16,429
Chattanooga, TN-GA	$31,783,890	$36,538,892	-$4,755,002	-13.0%	$106,412
Cheyenne, WY	$2,423,763	$1,133,929	$1,289,834	113.7%	$10,147
Chicago-Joliet-Naperville, IL-IN-WI	$466,939,275	$416,967,706	$49,971,569	12.0%	$374,006
Cincinnati-Middletown, OH-KY-IN	$86,020,633	$90,470,117	-$4,449,484	-4.9%	$153,428
Clarksville, TN-KY	$5,421,203	$1,230,406	$4,190,797	340.6%	$47,635
Cleveland, TN	$854,278	$1,850,290	-$996,012	-53.8%	$14,874
Cleveland-Elyria-Mentor, OH	$44,835,743	$42,177,833	$2,657,910	6.3%	$92,449
Coeur d'Alene, ID	$1,137,452	$1,642,998	-$505,546	-30.8%	$14,204
Colorado Springs, CO	$11,910,898	$7,017,018	$4,893,880	69.7%	$120,339
Columbia, MO	$1,654,306	$969,626	$684,680	70.6%	$37,254
Columbia, SC	$15,405,622	$13,458,483	$1,947,139	14.5%	$44,613
Columbus, GA-AL	$1,738,219	$1,879,246	-$141,027	-7.5%	$23,865
Columbus, IN	$548,332	$1,333,428	-$785,096	-58.9%	$11,623
Columbus, OH	$52,227,899	$62,330,753	-$10,102,854	-16.2%	$116,897
Corpus Christi, TX	$943,716	$961,707	-$17,991	-1.9%	$9,663
Crestview-Fort Walton Beach-Destin, FL	$235,442	$126,898	$108,544	85.5%	$4,821
Cumberland, MD-WV	$3,229,772	$1,908,282	$1,321,490	69.3%	$38,176
Dallas-Fort Worth-Arlington, TX	$406,130,727	$376,605,795	$29,524,932	7.8%	$386,149
Dalton, GA	$525,508	$295,832	$229,675	77.6%	$14,607
Danville, IL	$170,189	$419,590	-$249,401	-59.4%	$3,653
Davenport-Moline-Rock Island, IA-IL	$3,080,090	$3,435,895	-$355,805	-10.4%	$11,160
Dayton, OH	$11,140,403	$12,500,595	-$1,360,191	-10.9%	$49,182
Decatur, AL	$737,743	$2,320,762	-$1,583,019	-68.2%	$20,022
Decatur, IL	$231,888	$107,455	$124,433	115.8%	$3,461
Deltona-Daytona Bea.-Ormond Bea., FL	$3,005,701	$2,795,109	$210,593	7.5%	$19,903
Denver-Aurora-Broomfield, CO	$167,338,690	$141,315,233	$26,023,457	18.4%	$323,035
Des Moines-West Des Moines, IA	$3,795,971	$4,120,079	-$324,108	-7.9%	$17,047
Detroit-Warren-Livonia, MI	$87,853,738	$85,959,327	$1,894,412	2.2%	$127,986
Duluth, MN-WI	$4,473,955	$2,408,100	$2,065,854	85.8%	$42,282
Durham-Chapel Hill, NC	$8,037,524	$7,982,406	$55,118	0.7%	$72,307
Eau Claire, WI	$631,047	$193,664	$437,383	225.8%	$10,824
El Centro, CA	$2,224,835	$7,873,487	-$5,648,652	-71.7%	$11,742
El Paso, TX	$19,780,699	$17,711,029	$2,069,670	11.7%	$160,147
Elizabethtown, KY	$2,217,800	$1,646,388	$571,412	34.7%	$41,552
Elkhart-Goshen, IN	$33,949	$102,596	-$68,647	-66.9%	$1,007
Elmira, NY	$409,017	$876,525	-$467,509	-53.3%	$8,196
Erie, PA	$2,656,625	$3,476,517	-$819,892	-23.6%	$17,982

Metropolitan Area	2013 Cost	2012 Cost	2013-12 Difference	2013-12 Pct. Change	2013 Cost per Mile
Eugene-Springfield, OR	$1,659,033	$2,371,652	-$712,620	-30.0%	$18,872
Evansville, IN-KY	$618,564	$409,049	$209,515	51.2%	$4,146
Fargo, ND-MN	$1,563,844	$709,175	$854,669	120.5%	$6,756
Fayetteville, NC	$730,215	$615,914	$114,301	18.6%	$12,269
Fayetteville-Springdale-Rogers, AR-MO	$3,415,691	$2,606,094	$809,597	31.1%	$28,161
Flagstaff, AZ	$2,906,539	$3,741,922	-$835,382	-22.3%	$11,314
Flint, MI	$1,982,681	$1,328,027	$654,655	49.3%	$14,149
Florence, SC	$374,980	$317,902	$57,079	18.0%	$4,299
Fort Collins-Loveland, CO	$2,972,371	$2,322,045	$650,326	28.0%	$37,680
Fort Smith, AR-OK	$9,294,295	$2,074,541	$7,219,754	348.0%	$38,223
Fort Wayne, IN	$2,300,455	$3,027,023	-$726,568	-24.0%	$15,025
Fresno, CA	$1,419,411	$1,503,215	-$83,804	-5.6%	$9,116
Gadsden, AL	$310,630	$1,272,525	-$961,895	-75.6%	$4,272
Gainesville, FL	$938,058	$805,482	$132,575	16.5%	$13,732
Gainesville, GA	$2,181,579	$2,293,012	-$111,433	-4.9%	$68,263
Glens Falls, NY	$459,005	$242,770	$216,236	89.1%	$5,875
Goldsboro, NC	$207,934	$198,538	$9,396	4.7%	$7,293
Grand Forks, ND-MN	$393,702	$173,425	$220,277	127.0%	$5,170
Grand Junction, CO	$948,739	$1,361,865	-$413,127	-30.3%	$7,671
Grand Rapids-Wyoming, MI	$4,247,199	$3,261,544	$985,656	30.2%	$30,382
Great Falls, MT	$1,482,353	$1,108,028	$374,324	33.8%	$11,488
Greeley, CO	$1,023,687	$830,261	$193,426	23.3%	$8,124
Green Bay, WI	$3,786,283	$1,351,816	$2,434,468	180.1%	$84,695
Greensboro-High Point, NC	$4,299,994	$4,243,465	$56,530	1.3%	$18,504
Greenville-Mauldin-Easley, SC	$7,148,714	$6,730,757	$417,957	6.2%	$39,291
Gulfport-Biloxi, MS	$2,788,893	$2,640,815	$148,078	5.6%	$27,673
Hagerstown-Martinsburg, MD-WV	$9,456,446	$8,470,831	$985,616	11.6%	$55,509
Hanford-Corcoran, CA	$225,411	$406,139	-$180,728	-44.5%	$3,562
Harrisburg-Carlisle, PA	$26,931,862	$23,834,111	$3,097,751	13.0%	$109,498
Harrisonburg, VA	$888,555	$1,399,230	-$510,675	-36.5%	$14,928
Hartford-West Hartford-East Hartford, CT	$52,281,904	$48,819,581	$3,462,322	7.1%	$209,588
Hattiesburg, MS	$595,733	$1,278,993	-$683,260	-53.4%	$8,264
Hickory-Lenoir-Morganton, NC	$591,306	$1,269,144	-$677,839	-53.4%	$6,536
Hinesville-Fort Stewart, GA	$53,383	$104,153	-$50,770	-48.7%	$3,083
Holland-Grand Haven, MI	$948,119	$577,754	$370,364	64.1%	$13,494
Houston-Sugar Land-Baytown, TX	$373,603,620	$339,096,816	$34,506,805	10.2%	$508,287
Huntington-Ashland, WV-KY-OH	$3,502,910	$1,931,193	$1,571,716	81.4%	$35,439
Huntsville, AL	$1,278,918	$2,390,827	-$1,111,909	-46.5%	$12,321
Idaho Falls, ID	$250,586	$351,363	-$100,777	-28.7%	$2,328
Indianapolis-Carmel, IN	$44,857,440	$50,460,091	-$5,602,652	-11.1%	$78,168
Iowa City, IA	$427,829	$709,212	-$281,383	-39.7%	$6,102
Jackson, MI	$1,533,505	$1,243,232	$290,273	23.3%	$25,459
Jackson, MS	$9,585,160	$9,473,647	$111,513	1.2%	$32,903
Jackson, TN	$675,996	$803,856	-$127,860	-15.9%	$11,097
Jacksonville, FL	$32,786,537	$29,217,464	$3,569,074	12.2%	$89,791

Metropolitan Area	2013 Cost	2012 Cost	2013-12 Difference	2013-12 Pct. Change	2013 Cost per Mile
Janesville, WI	$467,980	$317,717	$150,263	47.3%	$5,648
Jefferson City, MO	$69,195	$292,853	-$223,659	-76.4%	$1,305
Johnson City, TN	$862,234	$891,509	-$29,274	-3.3%	$9,011
Joplin, MO	$1,226,304	$1,726,009	-$499,705	-29.0%	$8,112
Kalamazoo-Portage, MI	$1,947,920	$1,438,050	$509,870	35.5%	$14,806
Kankakee-Bradley, IL	$631,286	$139,290	$491,996	353.2%	$12,429
Kansas City, MO-KS	$45,658,112	$45,087,109	$571,003	1.3%	$52,053
Kennewick-Pasco-Richland, WA	$551,912	$920,815	-$368,903	-40.1%	$3,791
Killeen-Temple-Fort Hood, TX	$7,967,281	$6,670,014	$1,297,266	19.4%	$108,021
Kingsport-Bristol-Bristol, TN-VA	$2,039,229	$2,920,088	-$880,859	-30.2%	$14,851
Kingston, NY	$1,123,040	$1,027,048	$95,992	9.3%	$16,148
Knoxville, TN	$7,473,597	$5,994,292	$1,479,305	24.7%	$35,498
La Crosse, WI-MN	$702,494	$227,749	$474,745	208.5%	$17,329
Lafayette, IN	$968,225	$665,399	$302,826	45.5%	$16,076
Lafayette, LA	$2,250,282	$2,773,413	-$523,131	-18.9%	$26,296
Lake Charles, LA	$3,802,871	$22,968,063	-$19,165,192	-83.4%	$32,689
Lake Havasu City-Kingman, AZ	$2,159,554	$2,183,589	-$24,035	-1.1%	$8,808
Lakeland-Winter Haven, FL	$1,440,741	$2,949,519	-$1,508,777	-51.2%	$22,338
Lancaster, PA	$559,480	$1,028,141	-$468,661	-45.6%	$8,751
Lansing-East Lansing, MI	$1,770,120	$1,189,566	$580,554	48.8%	$8,710
Laredo, TX	$7,073,822	$7,816,909	-$743,088	-9.5%	$93,088
Las Cruces, NM	$4,934,346	$7,924,372	-$2,990,027	-37.7%	$24,594
Las Vegas-Paradise, NV	$15,353,753	$15,741,191	-$387,438	-2.5%	$53,259
Lawrence, KS	$67,378	$84,516	-$17,138	-20.3%	$1,907
Lawton, OK	$382,527	$377,746	$4,781	1.3%	$6,081
Lebanon, PA	$1,978,512	$712,951	$1,265,561	177.5%	$28,559
Lewiston-Auburn, ME	$24,453	$44,444	-$19,991	-45.0%	$1,142
Lexington-Fayette, KY	$2,227,330	$1,632,309	$595,021	36.5%	$13,064
Lima, OH	$2,063,830	$537,564	$1,526,266	283.9%	$44,437
Lincoln, NE	$519,170	$2,595,801	-$2,076,631	-80.0%	$4,469
Little Rock-North Little Rock-Conway, AR	$32,449,460	$30,243,399	$2,206,061	7.3%	$106,921
Longview, TX	$3,275,394	$3,679,754	-$404,360	-11.0%	$71,850
Longview, WA	$823,781	$850,771	-$26,990	-3.2%	$11,150
Los Angeles-Long Beach-Santa Ana, CA	$1,081,748,940	$1,060,039,874	$21,709,066	2.0%	$1,386,112
Louisville/Jefferson County, KY-IN	$49,045,197	$68,143,727	-$19,098,530	-28.0%	$104,222
Lubbock, TX	$109,990	$137,842	-$27,852	-20.2%	$2,696
Macon, GA	$2,619,999	$2,867,038	-$247,039	-8.6%	$13,542
Madison, WI	$1,882,548	$1,867,629	$14,919	0.8%	$10,629
Manchester-Nashua, NH	$1,572,954	$1,193,708	$379,246	31.8%	$27,994
Manhattan, KS	$109,222	$150,938	-$41,716	-27.6%	$1,709
Mansfield, OH	$152,582	$206,150	-$53,568	-26.0%	$4,012
Medford, OR	$3,088,106	$5,885,812	-$2,797,707	-47.5%	$29,521
Memphis, TN-MS-AR	$24,031,762	$23,840,469	$191,294	0.8%	$73,190
Merced, CA	$926,193	$432,924	$493,270	113.9%	$14,297
Miami-Ft. Lauderdale-Pompano Beach, FL	$81,243,853	$76,516,172	$4,727,681	6.2%	$256,285

Metropolitan Area	2013 Cost	2012 Cost	2013-12 Difference	2013-12 Pct. Change	2013 Cost per Mile
Michigan City-La Porte, IN	$142,047	$186,569	-$44,521	-23.9%	$2,502
Midland, TX	$9,475,592	$1,579,689	$7,895,903	499.8%	$137,298
Milwaukee-Waukesha-West Allis, WI	$65,337,334	$60,639,658	$4,697,676	7.7%	$278,811
Minneapolis-St. Paul-Bloomington, MN-WI	$198,665,672	$187,847,076	$10,818,596	5.8%	$306,074
Missoula, MT	$667,929	$287,750	$380,179	132.1%	$6,275
Mobile, AL	$6,953,428	$6,960,540	-$7,112	-0.1%	$59,496
Modesto, CA	$136,255	$222,173	-$85,918	-38.7%	$2,449
Monroe, LA	$2,610,209	$1,353,728	$1,256,481	92.8%	$58,426
Monroe, MI	$1,294,634	$1,991,810	-$697,176	-35.0%	$18,482
Montgomery, AL	$2,384,530	$3,467,370	-$1,082,840	-31.2%	$15,845
Morgantown, WV	$1,364,543	$1,694,327	-$329,784	-19.5%	$13,481
Morristown, TN	$3,341,667	$1,719,129	$1,622,538	94.4%	$44,948
Mount Vernon-Anacortes, WA	$1,869,362	$240,906	$1,628,455	676.0%	$38,844
Muncie, IN	$111,317	$207,920	-$96,603	-46.5%	$2,578
Muskegon-Norton Shores, MI	$86,278	$98,438	-$12,160	-12.4%	$7,840
Napa, CA	$239,505	$170,900	$68,606	40.1%	$110,137
Naples-Marco Island, FL	$2,243,435	$3,040,880	-$797,445	-26.2%	$17,337
Nashville-Davidson-Murfreesboro, TN	$131,778,037	$133,201,125	-$1,423,088	-1.1%	$243,669
New Haven-Milford, CT	$46,677,937	$50,930,519	-$4,252,582	-8.3%	$276,344
New Orleans-Metairie-Kenner, LA	$49,612,746	$55,574,000	-$5,961,253	-10.7%	$158,595
New York-Northern NJ-Long Is., NY-NJ-PA	$984,287,793	$1,023,544,703	-$39,256,910	-3.8%	$801,121
Niles-Benton Harbor, MI	$2,002,940	$525,787	$1,477,153	280.9%	$20,892
Non-Metropolitan Area (Rural)	$375,672,349	$438,575,159	-$62,902,810	-14.3%	$10,115
North Port-Bradenton-Sarasota, FL	$4,575,582	$7,084,405	-$2,508,824	-35.4%	$33,346
Norwich-New London, CT	$5,983,287	$7,897,253	-$1,913,966	-24.2%	$49,384
Ocala, FL	$1,155,839	$1,190,130	-$34,291	-2.9%	$14,712
Odessa, TX	$2,141,209	$1,693,081	$448,128	26.5%	$38,059
Ogden-Clearfield, UT	$4,942,030	$4,902,379	$39,651	0.8%	$33,951
Oklahoma City, OK	$61,468,122	$53,148,806	$8,319,316	15.7%	$102,637
Olympia, WA	$2,346,722	$3,784,301	-$1,437,579	-38.0%	$40,945
Omaha-Council Bluffs, NE-IA	$4,203,158	$3,862,804	$340,354	8.8%	$10,242
Orlando-Kissimmee-Sanford, FL	$52,844,694	$46,039,223	$6,805,470	14.8%	$572,318
Palm Bay-Melbourne-Titusville, FL	$2,951,794	$2,755,475	$196,320	7.1%	$19,607
Palm Coast, FL	$395,586	$216,187	$179,400	83.0%	$10,077
Parkersburg-Marietta-Vienna, WV-OH	$854,071	$951,905	-$97,834	-10.3%	$8,701
Pascagoula, MS	$1,702,105	$1,106,645	$595,460	53.8%	$27,918
Pensacola-Ferry Pass-Brent, FL	$1,215,915	$2,889,541	-$1,673,625	-57.9%	$11,727
Peoria, IL	$3,542,736	$2,711,534	$831,203	30.7%	$14,605
Phila.-Camden-Wilmington, PA-NJ-DE-MD	$292,141,937	$256,104,667	$36,037,270	14.1%	$465,040
Phoenix-Mesa-Glendale, AZ	$77,031,723	$70,892,072	$6,139,651	8.7%	$124,848
Pine Bluff, AR	$1,050,495	$661,393	$389,101	58.8%	$18,002
Pittsburgh, PA	$80,398,099	$80,088,687	$309,412	0.4%	$125,064
Pittsfield, MA	$224,088	$302,635	-$78,547	-26.0%	$10,431
Pocatello, ID	$556,609	$528,946	$27,663	5.2%	$2,691
Port St. Lucie, FL	$1,677,195	$1,828,486	-$151,290	-8.3%	$15,545

Metropolitan Area	2013 Cost	2012 Cost	2013-12 Difference	2013-12 Pct. Change	2013 Cost per Mile
Portland-South Portland-Biddeford, ME	$3,012,044	$3,802,084	-$790,040	-20.8%	$11,916
Portland-Vancouver-Hillsboro, OR-WA	$133,849,069	$126,378,663	$7,470,406	5.9%	$523,153
Poughkeepsie-Newburgh-Middletown, NY	$5,813,649	$6,152,693	-$339,044	-5.5%	$30,951
Prescott, AZ	$3,878,404	$4,453,498	-$575,093	-12.9%	$15,166
Providence-New Bedford-Fall River, RI-MA	$27,406,405	$26,140,281	$1,266,124	4.8%	$103,580
Provo-Orem, UT	$5,473,364	$20,876,498	-$15,403,133	-73.8%	$27,995
Pueblo, CO	$986,430	$882,744	$103,685	11.7%	$10,119
Punta Gorda, FL	$588,146	$943,134	-$354,989	-37.6%	$10,453
Racine, WI	$479,933	$491,010	-$11,077	-2.3%	$20,422
Raleigh-Cary, NC	$26,781,177	$25,990,054	$791,123	3.0%	$101,300
Rapid City, SD	$1,384,288	$1,418,290	-$34,002	-2.4%	$7,347
Reading, PA	$4,108,188	$3,688,060	$420,128	11.4%	$40,428
Redding, CA	$1,477,660	$8,441,819	-$6,964,159	-82.5%	$11,415
Reno-Sparks, NV	$3,574,093	$5,985,457	-$2,411,364	-40.3%	$37,087
Richmond, VA	$29,727,972	$31,394,703	-$1,666,731	-5.3%	$52,514
Riverside-San Bernardino-Ontario, CA	$130,663,029	$131,184,299	-$521,270	-0.4%	$101,205
Roanoke, VA	$4,145,270	$7,216,843	-$3,071,573	-42.6%	$39,081
Rochester, MN	$54,053	$79,237	-$25,184	-31.8%	$993
Rochester, NY	$6,482,572	$3,970,343	$2,512,229	63.3%	$22,521
Rockford, IL	$4,610,889	$1,176,741	$3,434,148	291.8%	$53,930
Rocky Mount, NC	$709,831	$485,133	$224,698	46.3%	$15,546
Sacramento--Arden-Arcade--Roseville, CA	$23,057,575	$32,913,290	-$9,855,715	-29.9%	$61,008
Saginaw-Saginaw Township North, MI	$501,774	$414,298	$87,475	21.1%	$8,236
Salem, OR	$3,384,206	$4,195,222	-$811,016	-19.3%	$40,702
Salt Lake City, UT	$29,864,985	$29,991,045	-$126,060	-0.4%	$58,492
San Antonio-New Braunfels, TX	$78,506,144	$82,636,229	-$4,130,085	-5.0%	$134,341
San Diego-Carlsbad-San Marcos, CA	$94,572,601	$90,022,212	$4,550,389	5.1%	$210,268
San Francisco-Oakland-Fremont, CA	$288,629,957	$266,487,848	$22,142,109	8.3%	$679,614
San Jose-Sunnyvale-Santa Clara, CA	$44,276,617	$37,586,616	$6,690,001	17.8%	$518,695
Sandusky, OH	$379,558	$876,654	-$497,096	-56.7%	$7,197
Santa Fe, NM	$798,297	$995,115	-$196,818	-19.8%	$9,261
Savannah, GA	$8,248,566	$7,565,676	$682,890	9.0%	$51,476
Scranton--Wilkes-Barre, PA	$16,424,140	$21,436,819	-$5,012,678	-23.4%	$50,986
Seattle-Tacoma-Bellevue, WA	$224,596,215	$208,964,810	$15,631,404	7.5%	$600,812
Sebastian-Vero Beach, FL	$1,082,649	$313,873	$768,776	244.9%	$35,560
Sheboygan, WI	$218,330	$189,486	$28,844	15.2%	$4,081
Shreveport-Bossier City, LA	$10,275,850	$15,610,361	-$5,334,511	-34.2%	$50,078
Sioux City, IA-NE-SD	$812,479	$1,382,685	-$570,207	-41.2%	$5,028
Sioux Falls, SD	$1,257,655	$1,098,001	$159,655	14.5%	$5,128
South Bend-Mishawaka, IN-MI	$394,338	$299,899	$94,439	31.5%	$5,777
Spartanburg, SC	$2,374,213	$1,644,626	$729,587	44.4%	$15,597
Spokane, WA	$2,626,770	$2,280,869	$345,902	15.2%	$28,699
Springfield, IL	$727,637	$1,324,859	-$597,222	-45.1%	$5,036
Springfield, MA	$7,230,271	$7,257,570	-$27,298	-0.4%	$27,688
Springfield, MO	$1,032,001	$1,048,010	-$16,009	-1.5%	$10,096

Metropolitan Area	2013 Cost	2012 Cost	2013-12 Difference	2013-12 Pct. Change	2013 Cost per Mile
Springfield, OH	$1,250,859	$1,243,486	$7,373	0.6%	$20,086
St. Cloud, MN	$790,745	$523,143	$267,601	51.2%	$6,608
St. George, UT	$507,714	$1,255,998	-$748,284	-59.6%	$6,001
St. Joseph, MO-KS	$2,765,399	$12,129,013	-$9,363,614	-77.2%	$25,397
St. Louis, MO-IL	$102,612,901	$113,704,640	-$11,091,739	-9.8%	$117,693
State College, PA	$2,803,782	$4,043,994	-$1,240,213	-30.7%	$18,177
Stockton, CA	$10,432,108	$10,913,410	-$481,302	-4.4%	$65,515
Sumter, SC	$92,340	$96,456	-$4,116	-4.3%	$3,864
Syracuse, NY	$6,658,503	$10,031,616	-$3,373,113	-33.6%	$23,456
Tallahassee, FL	$796,814	$1,198,632	-$401,818	-33.5%	$5,324
Tampa-St. Petersburg-Clearwater, FL	$59,570,818	$53,514,082	$6,056,735	11.3%	$191,122
Terre Haute, IN	$2,832,218	$1,024,654	$1,807,563	176.4%	$46,334
Texarkana, TX-Texarkana, AR	$1,720,063	$1,596,766	$123,298	7.7%	$13,676
Toledo, OH	$10,391,755	$11,103,493	-$711,739	-6.4%	$38,834
Topeka, KS	$3,406,905	$3,250,683	$156,221	4.8%	$14,536
Trenton-Ewing, NJ	$4,589,245	$4,217,457	$371,788	8.8%	$79,691
Tucson, AZ	$5,644,932	$7,318,235	-$1,673,304	-22.9%	$28,674
Tulsa, OK	$12,954,191	$14,258,548	-$1,304,357	-9.1%	$54,768
Tuscaloosa, AL	$4,375,719	$3,986,241	$389,478	9.8%	$27,643
Tyler, TX	$1,141,251	$1,279,176	-$137,924	-10.8%	$16,074
Utica-Rome, NY	$65,937	$80,042	-$14,104	-17.6%	$771
Valdosta, GA	$308,210	$138,398	$169,812	122.7%	$4,313
Vallejo-Fairfield, CA	$16,817,524	$13,520,784	$3,296,741	24.4%	$112,050
VA Beach-Norfolk-Newport News, VA-NC	$51,064,407	$48,930,068	$2,134,338	4.4%	$187,315
Waco, TX	$11,021,538	$8,168,055	$2,853,482	34.9%	$138,134
Warner Robins, GA	$368,106	$638,163	-$270,057	-42.3%	$9,180
Washington-Arlington, DC-VA-MD-WV	$379,356,852	$383,848,221	-$4,491,370	-1.2%	$627,246
Waterloo-Cedar Falls, IA	$1,452,732	$1,055,790	$396,942	37.6%	$42,172
Wausau, WI	$289,284	$300,549	-$11,265	-3.7%	$8,884
Wheeling, WV-OH	$4,406,433	$7,391,120	-$2,984,687	-40.4%	$42,010
Wichita Falls, TX	$115,274	$210,523	-$95,248	-45.2%	$4,385
Wichita, KS	$4,814,594	$4,792,537	$22,058	0.5%	$15,497
Williamsport, PA	$754,685	$529,245	$225,440	42.6%	$20,556
Wilmington, NC	$1,673,966	$1,222,955	$451,011	36.9%	$21,222
Winchester, VA-WV	$691,561	$1,067,080	-$375,519	-35.2%	$14,629
Winston-Salem, NC	$1,776,618	$1,839,691	-$63,073	-3.4%	$14,763
Worcester, MA	$12,811,800	$11,978,650	$833,150	7.0%	$54,992
Yakima, WA	$377,003	$494,743	-$117,740	-23.8%	$3,733
York-Hanover, PA	$5,123,390	$6,940,821	-$1,817,431	-26.2%	$57,177
Youngstown-Warren-Boardman, OH-PA	$6,421,772	$7,138,499	-$716,727	-10.0%	$23,306
Yuma, AZ	$1,210,323	$2,244,975	-$1,034,653	-46.1%	$7,578

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