

Angeles/Long Beach, Chicago, or New York/New Jersey should be expected to have more truck value traveling than urban areas where ports play less of a role. In addition, FAF 2.2 does not include truck trips that are less than 50 miles. As such, substantial value of trips that occur in these “port-influenced” urban areas may not be adequately reflected in the Part 1 methodology (“Line Method”).

Part 2 Methodology (“Node Method”)

While the datasets for the Part 2 methodology are the same, the focus is on the origins and destinations to provide more consideration and increased value for port cities. Because of the focus on the endpoints of the trip, this methodology is sometimes termed the “Node Method.” The steps that follow describe the methodology in more detail. Figure 2 shows a flowchart of the steps used in this method. The numbered steps and elements in Figure 2 are described in the following steps.

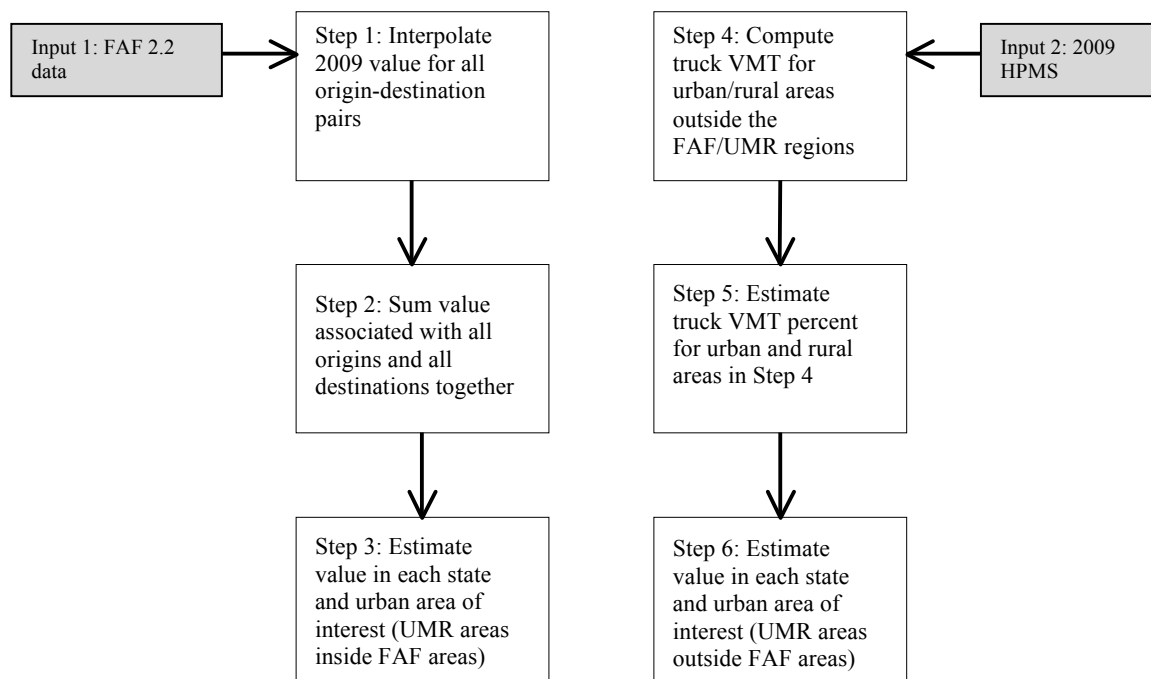


Figure 2 Methodology for Part 2 Methodology (“Node Method”) of UMR Truck Value Methodology

- Input 1. *FAF 2.2 data input:* Computing the truck values begins by using the FAF 2.2 data as input.
- Step 1. *Interpolate 2009 value for all origin-destination pairs:* Researchers interpolated the 2009 truck freight values between each origin and destination pair for the 2009 year of interest.
- Step 2. *Sum value associated with all origins and all destinations together:* Researchers summed the total truck value of all origin and destinations together to provide the “node influence” of this methodology.
- Step 3. *Estimate value in each state and urban area of interest (UMR areas inside FAF areas):* For a given FAF area, researchers allocated the proportion of truck value occurring in either the origin or the destination as a percent of the total truck value (sum of all

origins and destinations together). These FAF areas typically covered the urban areas of the metropolitan areas of the *UMR*.

- Input 2. *2009 HPMS Input*: The Part 2 methodology uses the 2009 HPMS data for the metropolitan areas of interest.
- Step 4. *Compute truck VMT for urban/rural areas outside the FAF/UMR regions covered in Step 3*: Researchers computed truck VMT for the relatively urban areas not covered in the FAF regions in Step 3 as well as the rural areas in each state.
- Step 5. *Estimate truck VMT percent for urban and rural areas in Step 4*: Researchers computed the percentage of truck VMT for the remaining urban/rural areas.
- Step 6. *Estimate value in each state and urban area of interest (UMR areas outside FAF areas)*. For urban/rural areas outside FAF 2.2 areas, researchers allocated truck value based on the relative percentage of truck VMT in each urban/rural area.

Part 3: Methodology

Part 3 is the final part of the methodology. Part 1 and Part 2 both provide an estimate of the truck value for each state and urban area in the *UMR*. For Part 3 of the methodology, researchers obtained the final estimate of truck value by averaging the truck value of the Part 1 and Part 2 results for each metropolitan area in the *UMR*.

RESULTS AND DISCUSSION

Table 1 presents the results of the methodology in terms of truck commodity value aggregated by city size. Delay statistics are also included in Table 1 as computed in the *2011 Urban Mobility Report (I)*. Table 2 shows the state truck commodity values. Table 1 and Table 2 are the results as presented in the *2011 Urban Mobility Report*.

Table 1 demonstrates a correlation between commodity value and truck delay—higher commodity values are associated with more people; more people are associated with more traffic congestion (*I*). Bigger cities consume more goods, which means a higher value of freight movement. While there are many cities with large differences in commodity and delay ranks, only 15 urban areas are ranked with commodity values much higher than their delay ranking.

Table 1 also illustrates the role of long corridors with important roles in freight movement. Some of the smaller urban areas along major interstate highways along the east and west coast and through the central and Midwestern U.S., for example, have commodity value ranks much higher than their delay ranking. This occurs in both Madison and Milwaukee. High commodity values and lower delay might sound advantageous—lower congestion levels with higher commodity values means there is less chance of congestion getting in the way of freight movement. At the areawide level, this reading of the data is correct, but in the real world the problem often exists at the road or even intersection level.

Table 1. Truck Commodity Value and Truck Delay, 2010

Urban Area	Total Delay		Truck Delay			Truck Commodity Value	
	(1000 Hours)	Rank	(1000 Hours)	Rank	Congestion Cost	(\$ million)	Rank
Very Large Average (15 areas)	187,872		12,120		895	206,375	
Chicago IL-IN	367,122	3	31,378	1	2,317	357,816	3
Los Angeles-Long Beach-Santa Ana CA	521,449	1	30,347	2	2,254	406,939	2
New York-Newark NY-NJ-CT	465,564	2	30,185	3	2,218	475,730	1
Houston TX	153,391	6	9,299	4	688	230,769	4
Washington DC-VA-MD	188,650	4	9,204	5	683	95,965	17
Dallas-Fort Worth-Arlington TX	163,585	5	9,037	6	666	227,514	5
Philadelphia PA-NJ-DE-MD	134,899	8	8,970	7	659	172,905	7
Atlanta GA	115,958	11	8,459	8	623	189,488	6
Miami FL	139,764	7	8,207	9	604	153,596	9
Phoenix AZ	81,829	15	8,139	10	603	129,894	12
San Francisco-Oakland CA	120,149	9	6,558	11	484	130,852	11
Seattle WA	87,919	12	6,296	12	467	150,998	10
Boston MA-NH-RI	117,234	10	6,227	13	459	128,143	13
Detroit MI	87,572	13	5,186	15	382	159,328	8
San Diego CA	72,995	18	4,316	17	321	85,686	20

Very Large Urban Areas—over 3 million population.

Medium Urban Areas—over 500,000 and less than 1 million population.

Large Urban Areas—over 1 million and less than 3 million population.

Small Urban Areas—less than 500,000 population.

Travel Delay—Travel time above that needed to complete a trip at free-flow speeds for all vehicles.

Truck Delay—Travel time above that needed to complete a trip at free-flow speeds for large trucks.

Truck Commodity Value—Value of all commodities moved by truck estimated to be traveling in the urban area.

Note: Please do not place too much emphasis on small differences in the rankings. There may be little difference in congestion between areas ranked (for example) 6th and 12th. The actual measure values should also be examined.

Also note: The best congestion comparisons use multi-year trends and are made between similar urban areas

Table 1. Truck Commodity Value and Truck Delay, 2010, Continued

Urban Area	Total Delay		Truck Delay			Truck Commodity Value	
	(1000 Hours)	Rank	(1000 Hours)	Rank	Congestion Cost (\$million)	(\$ million)	Rank
Large Average (32 areas)	33,407		2,024		148	62,310	
Baltimore MD	87,199	14	6,103	14	449	94,943	19
Denver-Aurora CO	80,837	16	4,324	16	319	76,023	22
Minneapolis-St. Paul MN	78,483	17	4,073	18	300	95,819	18
St. Louis MO-IL	47,042	21	3,841	19	283	107,010	15
Riverside-San Bernardino CA	40,875	25	3,080	20	229	108,218	14
Orlando FL	38,260	26	2,856	21	207	63,106	32
Tampa-St. Petersburg FL	53,047	19	2,842	22	210	61,906	33
Pittsburgh PA	41,081	24	2,755	23	200	69,290	25
Portland OR-WA	41,743	23	2,546	24	185	64,964	30
San Juan PR	50,229	20	2,417	25	174	23,130	60
Nashville-Davidson TN	26,475	33	1,961	26	142	65,449	29
New Orleans LA	20,565	39	1,859	27	135	34,270	50
San Jose CA	42,846	22	1,815	28	133	52,079	36
Milwaukee WI	26,699	32	1,746	29	127	66,629	28
Sacramento CA	29,602	30	1,688	30	123	51,883	37
Cincinnati OH-KY-IN	23,297	35	1,660	31	120	64,323	31
Indianapolis IN	20,800	38	1,657	32	119	83,984	21
Kansas City MO-KS	24,185	34	1,641	33	119	72,545	23
Austin TX	31,038	28	1,636	34	119	32,824	52
Raleigh-Durham NC	19,247	40	1,569	35	115	49,468	40
San Antonio TX	30,207	29	1,428	37	105	50,600	39
Charlotte NC-SC	17,730	43	1,383	38	101	68,196	26
Virginia Beach VA	36,538	27	1,344	40	98	43,056	42
Memphis TN-MS-AR	17,197	44	1,195	42	87	98,356	16
Louisville KY-IN	17,033	45	1,170	43	85	55,226	35
Jacksonville FL	18,005	42	1,158	44	84	41,508	44
Las Vegas NV	27,386	31	1,141	45	83	35,458	49
Cleveland OH	21,380	36	1,016	46	75	67,808	27
Salt Lake City UT	18,366	41	823	50	61	56,160	34
Columbus OH	14,651	51	727	51	53	69,664	24
Buffalo NY	11,450	56	698	55	51	48,387	41
Providence RI-MA	15,539	48	610	59	45	21,633	61

Very Large Urban Areas—over 3 million population.

Large Urban Areas—over 1 million and less than 3 million population.

Travel Delay—Travel time above that needed to complete a trip at free-flow speeds for all vehicles.

Truck Delay—Travel time above that needed to complete a trip at free-flow speeds for large trucks.

Truck Commodity Value—Value of all commodities moved by truck estimated to be traveling in the urban area.

Medium Urban Areas—over 500,000 and less than 1 million population.

Small Urban Areas—less than 500,000 population.

Note: Please do not place too much emphasis on small differences in the rankings. There may be little difference in congestion between areas ranked (for example) 6th and 12th. The actual measure values should also be examined. Also note: The best congestion comparisons use multi-year trends and are made between similar urban areas

Table 1. Truck Commodity Value and Truck Delay, 2010, Continued

Urban Area	Total Delay		Truck Delay			Truck Commodity Value	
	(1000 Hours)	Rank	(1000 Hours)	Rank	Congestion Cost (\$ million)	(\$ million)	Rank
Medium Average (33 areas)	9,513		578		42	18,478	
Baton Rouge LA	14,577	52	1,519	36	110	32,636	54
Bridgeport-Stamford CT-NY	21,233	37	1,380	39	102	11,205	73
Tucson AZ	11,412	57	1,287	41	92	28,654	58
Birmingham AL	15,832	47	971	47	71	38,401	45
Albuquerque NM	10,477	58	963	48	69	14,035	67
Oklahoma City OK	16,848	46	912	49	66	37,779	46
Hartford CT	15,072	49	716	52	52	42,403	43
El Paso TX-NM	10,452	59	714	53	52	31,703	55
Charleston-North Charleston SC	9,160	62	701	54	51	10,552	76
New Haven CT	11,643	55	676	56	49	8,276	86
Allentown-Bethlehem PA-NJ	9,777	60	597	60	43	15,827	65
Honolulu HI	15,035	50	595	61	42	10,125	78
Tulsa OK	9,086	63	562	63	42	28,827	57
Richmond VA	13,800	53	530	64	39	37,643	47
Oxnard-Ventura CA	9,009	64	529	65	39	9,187	83
Colorado Springs CO	11,897	54	509	66	37	6,546	91
Albany-Schenectady NY	7,467	71	484	67	35	32,655	53
Grand Rapids MI	7,861	68	446	69	32	37,551	48
Sarasota-Bradenton FL	8,015	67	446	69	32	7,591	89
Knoxville TN	7,518	70	439	71	32	11,989	72
Bakersfield CA	4,005	90	425	72	31	10,838	75
Fresno CA	5,999	78	396	73	29	9,474	81
Indio-Cathedral City-Palm Springs CA	5,633	80	389	74	28	5,455	94
Dayton OH	7,096	73	382	75	28	33,645	51
Springfield MA-CT	8,305	66	378	76	27	9,238	82
Omaha NE-IA	9,299	61	314	79	23	8,668	85
Lancaster-Palmdale CA	6,906	74	303	80	22	2,728	99
Rochester NY	6,377	76	295	81	21	26,077	59
Akron OH	6,198	77	290	82	21	9,828	80
Wichita KS	6,858	75	280	84	21	7,901	87
Poughkeepsie-Newburgh NY	4,271	85	272	85	20	13,714	68
Toledo OH-MI	4,223	86	247	90	18	10,950	74
McAllen TX	2,598	96	125	99	9	7,678	88

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Table 1. Truck Commodity Value and Truck Delay, 2010, Continued

Urban Area	Total Delay		Truck Delay			Truck Commodity Value	
	(1000 Hours)	Rank	(1000 Hours)	Rank	Congestion Cost (\$ million)	(\$ million)	Rank
Small Average (21 areas)	4,166		288		21	12,275	
Columbia SC	8,515	65	651	57	47	12,404	70
Jackson MS	5,488	81	648	58	47	16,984	64
Cape Coral FL	7,600	69	567	62	41	5,962	93
Little Rock AR	7,345	72	457	68	33	15,221	66
Greensboro NC	4,104	87	362	77	26	50,964	38
Spokane WA	4,306	84	323	78	23	7,230	90
Winston-Salem NC	4,054	89	287	83	21	8,679	84
Pensacola FL-AL	4,699	83	261	86	19	6,339	92
Worcester MA	5,639	79	259	87	19	10,115	79
Salem OR	3,912	91	256	88	18	3,864	97
Madison WI	3,375	93	252	89	18	17,361	63
Provo UT	5,056	82	240	91	18	12,681	69
Beaumont TX	3,814	92	236	92	17	20,504	62
Laredo TX	2,041	99	212	93	15	30,799	56
Brownsville TX	2,323	98	206	94	15	2,380	100
Stockton CA	2,648	95	203	95	15	10,264	77
Anchorage AK	3,013	94	183	96	13	4,454	96
Corpus Christi TX	2,432	97	172	97	13	12,327	71
Boise ID	4,063	88	137	98	10	4,772	95
Eugene OR	1,456	101	98	100	7	3,658	98
Boulder CO	1,612	100	47	101	3	820	101
101 Area Average	42,461		2,690		198	58,981	
Remaining Area Average	1,582		119		9	3,183	
All 439 Area Average	10,987		710		52	16,021	

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Also note: The best congestion comparisons use multi-year trends and are made between similar urban areas.

Table 2. State Truck Commodity Value, 2010

State	Total Truck Commodity Value (\$ million)	Rural Truck Commodity Value (\$ million)	Urban Truck Commodity Value (\$ million)
Alabama	225,316	140,281	85,035
Alaska	17,161	12,082	5,079
Arizona	266,930	102,058	164,872
Arkansas	160,049	130,440	29,609
California	1,235,308	295,145	940,164
Colorado	153,998	62,081	91,917
Connecticut	110,515	7,578	102,937
Delaware	35,030	12,397	22,633
Florida	552,621	138,470	414,151
Georgia	417,906	182,728	235,178
Hawaii	16,307	5,592	10,715
Idaho	57,974	47,004	10,970
Illinois	548,431	174,621	373,810
Indiana	368,446	199,151	169,296
Iowa	157,013	130,758	26,255
Kansas	142,534	100,076	42,458
Kentucky	222,880	146,951	75,929
Louisiana	217,425	101,396	116,029
Maine	44,693	36,143	8,550
Maryland	205,976	51,098	154,878
Massachusetts	164,871	10,433	154,438
Michigan	348,470	101,493	246,977
Minnesota	189,643	86,720	102,923
Mississippi	155,821	121,572	34,249
Missouri	297,147	150,722	146,425
Montana	41,673	39,489	2,184
Nebraska	96,020	84,448	11,572
Nevada	78,514	37,075	41,440
New Hampshire	38,649	23,312	15,338
New Jersey	295,927	12,901	283,026
New Mexico	111,128	91,403	19,725
New York	482,018	111,566	370,451
North Carolina	373,822	146,171	227,652
North Dakota	47,109	42,718	4,391

Total Truck Commodity Value—Value of all commodities moved by truck estimated to be traveling in the state.

Rural Truck Commodity Value—Value of all commodities moved by truck estimated to be traveling in the rural areas of the state.

Urban Truck Commodity Value—Value of all commodities moved by truck estimated to be traveling in the urban areas of the state.

Table 2. State Truck Commodity Value, 2010, Continued

State	Total Truck Commodity Value (\$ million)	Rural Truck Commodity Value (\$ million)	Urban Truck Commodity Value (\$ million)
Ohio	447,564	177,760	269,805
Oklahoma	205,346	137,892	67,453
Oregon	153,382	82,144	71,239
Pennsylvania	443,946	195,660	248,286
Rhode Island	21,139	3,786	17,353
South Carolina	192,648	97,765	94,883
South Dakota	44,693	39,879	4,813
Tennessee	349,114	156,776	192,337
Texas	1,150,012	441,184	708,828
Utah	143,138	60,146	82,992
Vermont	24,158	21,648	2,510
Virginia	253,058	110,587	142,471
Washington	273,611	91,855	181,756
West Virginia	85,762	62,040	23,722
Wisconsin	326,741	190,205	136,536
Wyoming	48,921	46,372	2,549
District of Columbia	9,059	-	9,059
Puerto Rico	38,653	3,494	35,159

Total Truck Commodity Value—Value of all commodities moved by truck estimated to be traveling in the state.

Rural Truck Commodity Value—Value of all commodities moved by truck estimated to be traveling in the rural areas of the state.

Urban Truck Commodity Value—Value of all commodities moved by truck estimated to be traveling in the urban areas of the state.

CHAPTER 4: MILWAUKEE CASE STUDY APPLICATION AND RESULTS

Based on a methodology documented in previous research (18), researchers developed estimates of truck freight values for individual roadway corridors in the Milwaukee region. This chapter describes the Milwaukee case study data, methodology, and results.

Data Sources

The methodology for the Milwaukee case study uses data from two primary data sources, 1) the Federal Highway Administration's (FHWA) Highway Performance Monitoring System (HPMS), and 2) FHWA's Freight Analysis Framework (FAF).

Highway Performance Monitoring System

HPMS includes national-level data on the condition and performance of the highway system (16). The states provide HPMS data elements to FHWA on a yearly basis for use in federal aid allocation and for producing FHWA's "Conditions and Performance" reports.

Researchers have historically used HPMS data in the development of the statistics in the *Urban Mobility Report*. The following are the specific HPMS-link data elements used in the methodology to incorporate truck freight values into the UMR.

- Average Daily Traffic (ADT)
- Truck percent (percent of ADT that are trucks)
- Link length

Freight Analysis Framework

For the Milwaukee case study, researchers used FAF version 3 (FAF³). FAF³ is an improvement on FAF 2.2. The updated FAF³ is updated using the 2007 Commodity Flow Survey as input. FAF provides estimates of tonnage and value, by commodity type, mode, origin, and destination for 2007, the most recent year. Forecasts are provided through 2040 in FAF³.

Researchers used the truck mode value forecasts for the metropolitan areas of interest for the methodology that follows. FAF³ provides data for 123 domestic analysis regions.

Methodology

Figure 3 illustrates a flowchart for the methodology used for the Milwaukee application. The steps shown in Figure 3 are described here.

Input 1. *Wisconsin 2009 HPMS shapefile input*: The methodology begins by using the shapefile supplied by Wisconsin Department of Transportation (WisDOT) staff.

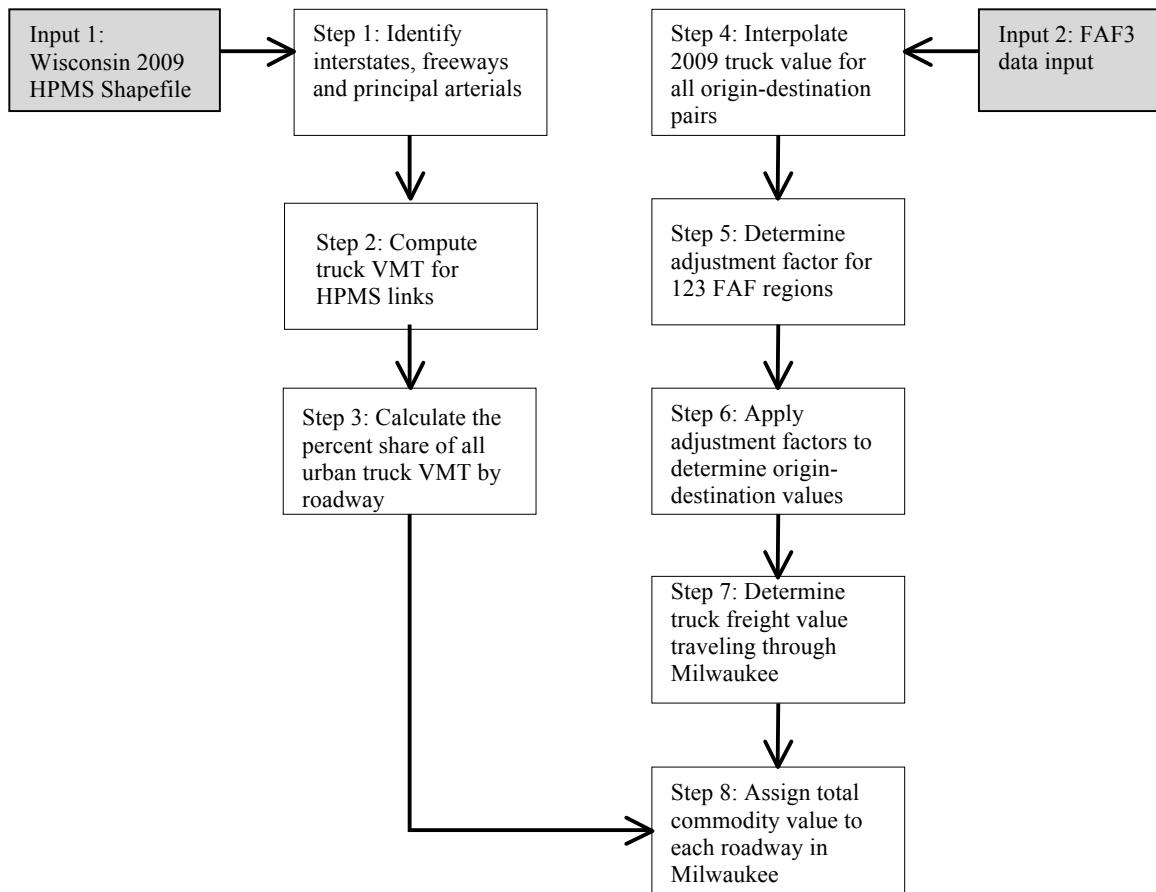


Figure 3 Methodology for Determining Truck Freight Value along Milwaukee Roadways

- Step 1. *Identify interstates, freeways and principal arterials*: Researchers selected only the interstates, freeways, and principal arterials for the analysis of the Milwaukee urban area. Figure 4 shows the greater Milwaukee highway network.
- Step 2. *Compute truck VMT for HPMS links*: For the roadways of interest in the Milwaukee area, researchers computed the truck VMT for the HPMS links.
- Step 3. *Calculate the percent share of all urban truck VMT by roadway*: Researchers determined the percentage of truck VMT of each roadway in the Milwaukee area relative to the total amount of truck VMT on all roadways of interest in the region.
- Input 2. *FAF³ data input*: Computing the truck values begins by using the FAF³ data as input.

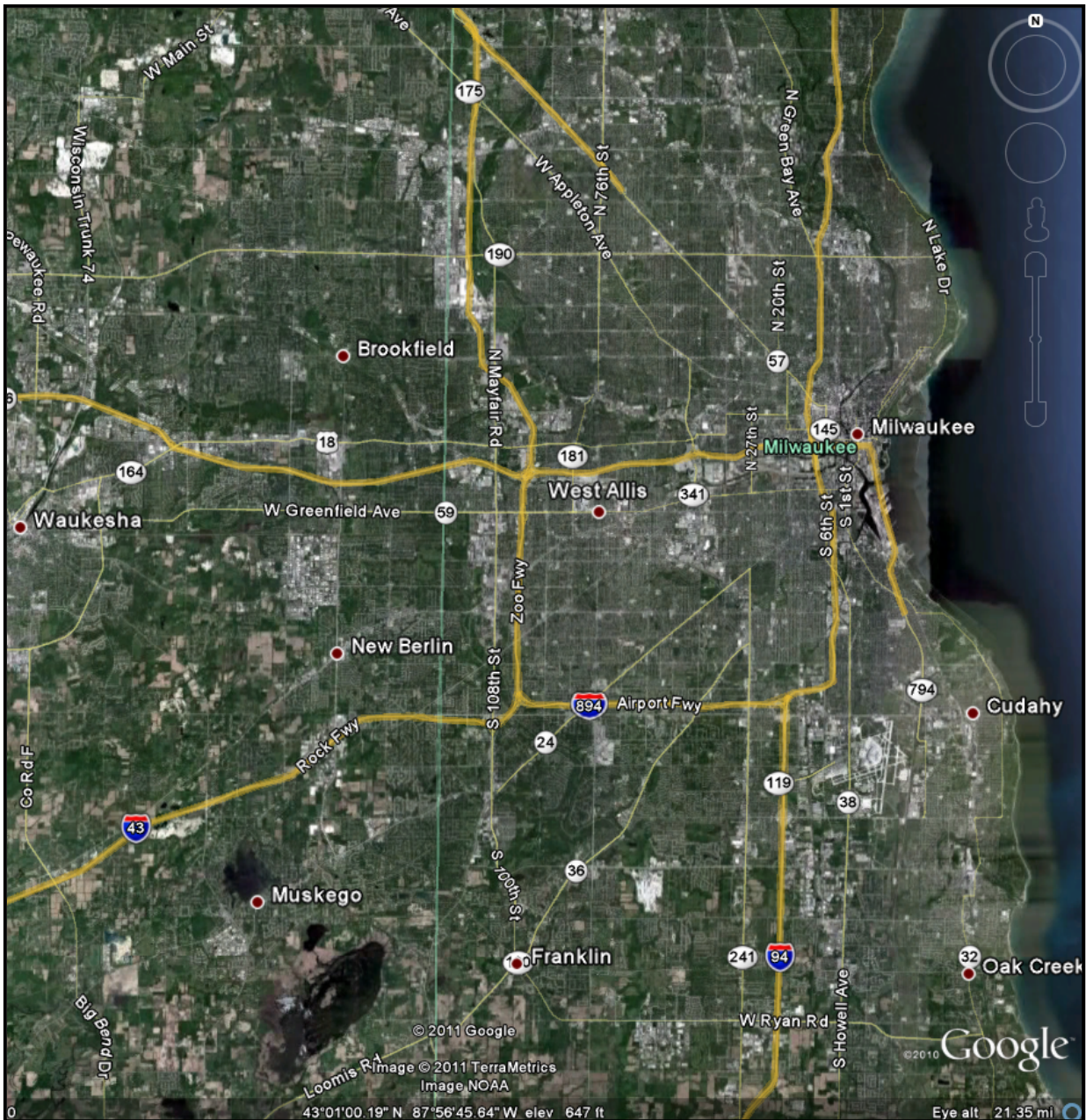


Figure 4 Greater Milwaukee Area Showing Highway Network (Source: Google Earth)

- Step 4. *Interpolate 2009 truck value for all origin-destination pairs*: Researchers interpolated the 2009 truck freight values between each origin-destination pair for the 2009 year of interest.
- Step 5. *Determine adjustment factor for 123 FAF regions*: Researchers used a two-step process as implemented in previous research (18). The two-step process estimates the value of commodities moved. First, a proximity matrix was created for each origin-destination pair with percentage factors representing the expectation that a given trip from the origin to the destination would go through Milwaukee. The proximity matrix provides a way to rationally expedite an

approximation of through trips. The proximity matrix used for the Milwaukee analysis is shown in Figure 5.

Secondly, researchers created a likelihood matrix for each origin-destination pair with factors based on the likelihood that a trip would pass through the Milwaukee area, considering the existing roadway network connecting the origin to the destination relative to Milwaukee. With the likelihood matrix, the roadway network in the area of interest is considered, along with the possibility that a trip from a given origin or destination would pass through the area. The likelihood matrix is shown in Figure 6.

As an example, consider the origin-destination pair Los Angeles, California to Detroit, Michigan. According to the proximity matrix in Figure 5, there would be a proximity value of 5 percent based on the origin in Los Angeles, and a proximity value of 50 percent for the destination in Detroit. Similarly, there would be a 1 percent value for the likelihood for the origin of Los Angeles (Figure 6), and a likelihood value of 50 percent for a destination in Detroit (Figure 6). Therefore, the adjustment factor for the L.A. to Detroit origin-destination pair is the product of the two proximity matrix values and the two likelihood matrix values (0.0125 percent = 0.05 x 0.50 x 0.01 x 0.50).

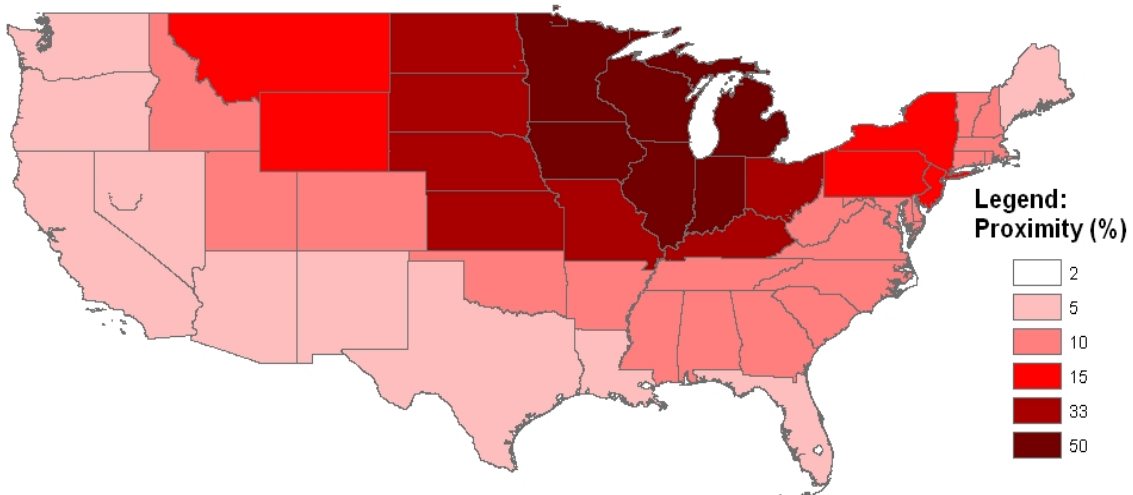


Figure 5 Proximity Matrix Implemented for Milwaukee Case Study

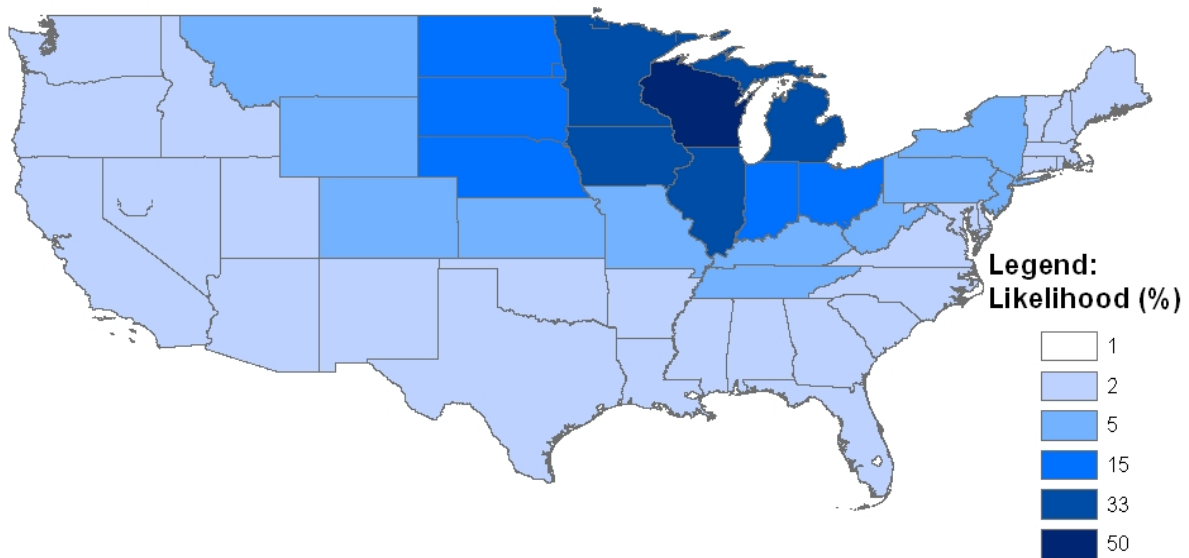


Figure 6 Likelihood Matrix Implemented for Milwaukee Case Study

Step 6. *Apply adjustment factors to determine origin-destination values:* Researchers applied the adjustment factors estimated in Step 5 to the values of truck freight between each origin-destination pair. The result is the value of truck freight traveling between any origin and destination that is estimated to travel through Milwaukee.

Continuing the example started in the previous step, consider there is \$100,000 worth of commodity goods traveling from Los Angeles to Detroit. The value of goods traveling from L.A. to Detroit that would travel through Milwaukee in this simplified example is \$12.50 ($\$100,000 \times 0.000125$).

Step 7. *Determine truck freight value traveling through Milwaukee:* Researchers summed the adjusted values from each origin-destination pair determined in Step 6 to determine the total value of truck freight traveling in the Milwaukee region. This total truck commodity value was approximately \$74 billion.

Researchers calibrated the proximity and likelihood percentages shown in Figure 5 and Figure 6 using professional judgment such that the total truck commodity value resulting in this step (approximately \$74 billion) was within 10 percent of the estimate for Milwaukee shown in Table 1.

Step 8. *Assign total commodity value to each roadway in Milwaukee:* Using the percent share of all urban truck VMT by roadway from Step 3, researchers allocated the total commodity value (approximately \$74 billion) to each roadway in Milwaukee.

MILWAUKEE CASE STUDY RESULTS AND DISCUSSION

Table 3 presents the results of the Milwaukee case study analysis. For each of the highways and interstates of interest in the Milwaukee region, Table 3 presents the truck VMT percent and the commodity value in millions of dollars.

Intuitively, the results in Table 3 show that the four interstates in the Milwaukee region account for the largest commodity value of any roadway type. The interstates combine for 48 percent of the commodity value traveling in the region in 2009.

Researchers estimated the total truck commodity value traveling through Milwaukee as \$70.3 billion as shown in Table 1 using the areawide *UMR* method. The total value of the goods shown in Table 1 is \$74 billion. This value is approximately 6 percent more than the \$70.3 billion of truck commodity value estimated in Table 1 for the areawide *UMR* method. This appears to be reasonable for an urban area analysis such as this.

Table 3 Truck VMT Percentage and Commodity Value for Roadways in the Milwaukee Region

	Truck VMT Percent	Commodity Value (\$millions)
Interstate Highways		
IH43	22	16,368
IH94	23.1	17,186
IH794	1.6	1,190
IH894	1.2	893
<i>Interstate Highway Subtotals=</i>	<i>48</i>	<i>35,638</i>
US Highways		
US 18	3.7	2,753
US 41	6.3	4,687
US 45	9.8	7,291
<i>US Highway Subtotals=</i>	<i>20</i>	<i>14,731</i>
State Highways		
SH 16	5.2	3,869
SH 24	0.045	33
SH 32	1.0	744
SH 33	0.2	149
SH 36	1.3	967
SH 38	1.7	1,265
SH 57	1.2	893
SH 59	3.4	2,530
SH 60	0.5	372
SH 67	1.0	744
SH 74	0.9	670
SH 83	1.1	818
SH 100	3.2	2,381
SH 119	0.2	149
SH 145	0.9	670
SH 164	2.8	2,083
SH 167	0.8	595
SH 175	0.8	595
SH 181	0.9	670
SH 190	3.7	2,753
SH 241	1.2	893
SH 341	0.2	149
<i>State Highway Subtotals=</i>	<i>32</i>	<i>23,990</i>

Note: when roadways are signed with two highway numbers, preference is given to the through road (higher classification).

CHAPTER 5: CONCLUSIONS AND FUTURE WORK

This research was successful in developing a methodology for incorporating areawide truck freight estimates into the *UMR* by urban area. Researchers estimated truck commodity value traveling in each urban area. Researchers implemented the methodology into the *2010 Urban Mobility Report*, which was released in January 2011. The *2011 Urban Mobility Report*, released in September 2011, used the same methodology to present the truck freight values. Researchers used the FAF³ data in the methodology for the *2011 Urban Mobility Report*.

The methodology for performing the Milwaukee analysis is transferable to other metropolitan areas. For such analyses, there is a need to develop new proximity and likelihood matrices to perform such analyses in other areas. Building from prior work (18), this research further demonstrates the rational and efficiency of using the proximity and likelihood matrix to estimate through travel between origin-destination pairs in the FAF data set for areawide analysis.

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