

Vehicle Miles of Travel Trends in Minnesota

1992-2014



Minnesota
Department of
Transportation
Office of
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Management
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Vehicle Miles of Travel Trends in Minnesota: 1992 – 2014

MnDOT Office of Transportation System Management

Introduction

The Office of Transportation System Management (OTSM) at the Minnesota Department of Transportation (MnDOT) computes and reports vehicle miles of travel (VMT) for the roadway network in Minnesota. VMT is commonly used to measure the demand on our transportation network. It is defined as the total number of miles traveled by all vehicles during a certain time period, usually daily or annually. Daily VMT is computed by multiplying average annual daily traffic (AADT) by the centerline distance (in miles) of each roadway segment.

Heavy commercial VMT (HCVMT) is calculated by multiplying heavy commercial AADT by the segment length. In Minnesota traffic data are collected on all state highways, county roads, and municipal state-aid streets on a cyclical basis. Until recently, MnDOT only counted heavy commercial traffic on the state trunk highway system; hence HCVMT trends can only be accurately calculated on the state highway system which includes Interstate, US, and MN trunk highways.

In previous decades, Minnesota had seen steady growth in VMT. However, since 2004 VMT growth in Minnesota has been virtually flat, and from 2010 to 2013 it declined by 0.2%¹. In 2014 VMT increased by 1.0% to 57.4 billion to a new high, just slightly higher than 2006. Nationally, VMT increased 1.7%² (50.0 billion miles) as of December 31, 2014 and appears to be increasing for 2015. It has become more difficult for traffic forecasters to project VMT growth into the future due to changes in VMT trends. The purpose of this report is to monitor and report on VMT trends and the most current VMT and HCVMT conditions on Minnesota roads. This report also explores trends in several major factors that impact VMT such as population, employment, and gas prices in Minnesota.

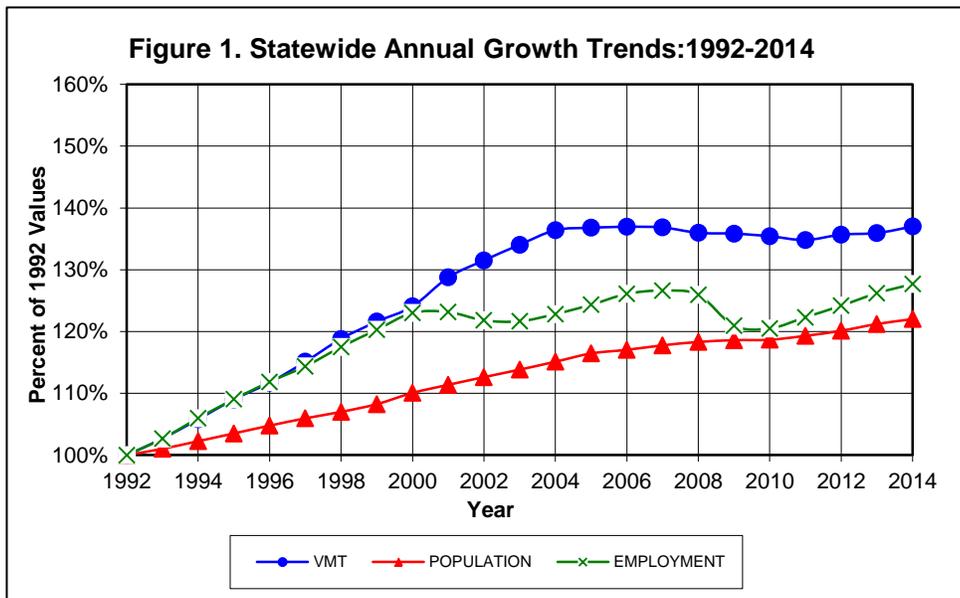
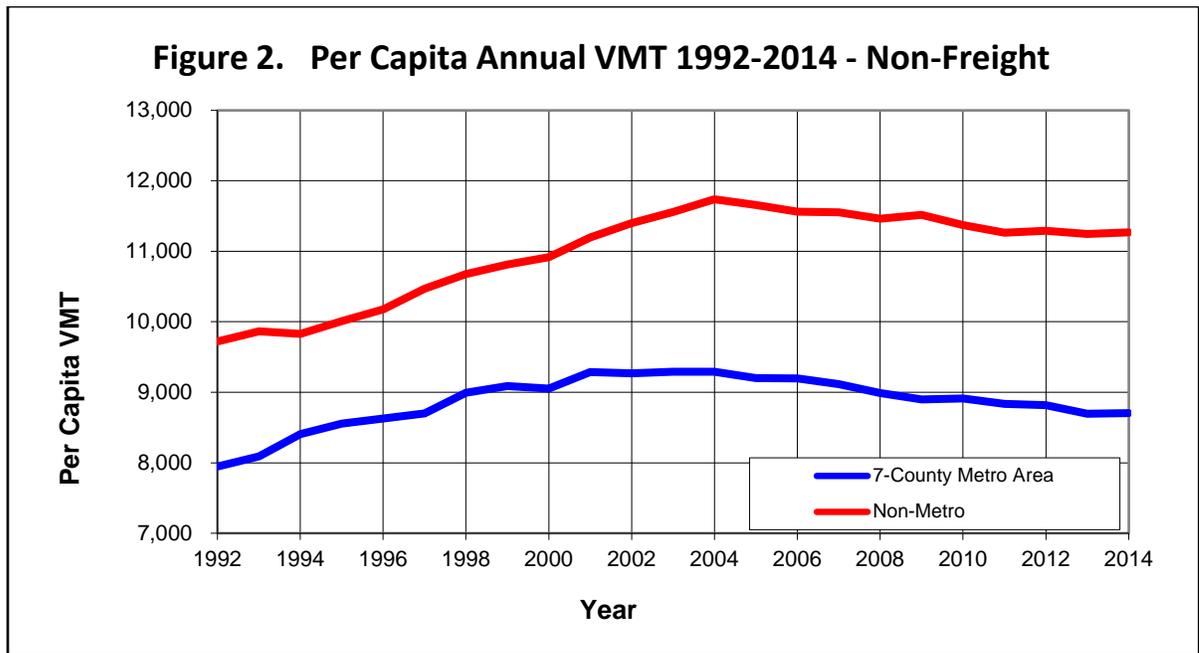


Figure 1 illustrates changes in VMT, population, and employment in Minnesota between 1992 and 2014. During most of the 23-year period, growth in VMT has outpaced population and employment. VMT increased by a total of 37.0%, population increased 22.0%, and employment increased 27.7%. However, VMT growth has been flat in recent years.

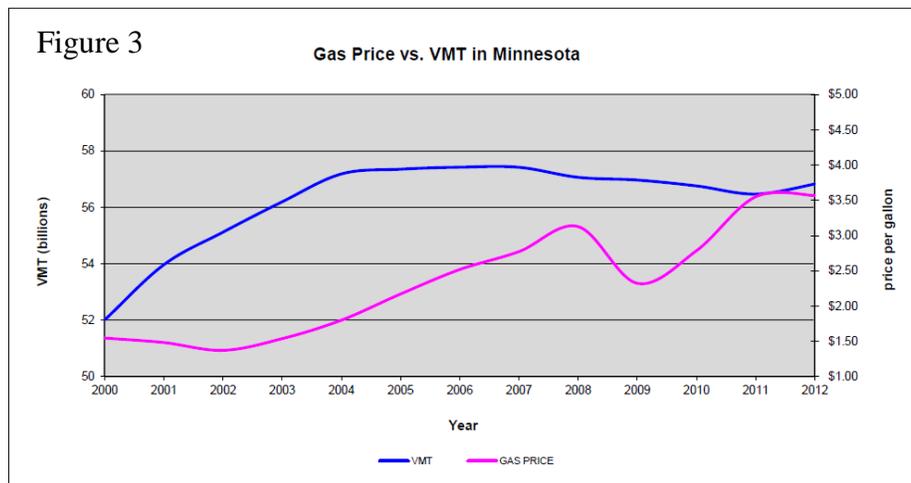
Source: Minnesota State Demographic Center;
 Minnesota Department of Employment and Economic Development;
 MnDOT, Office of Transportation System Management

1. VMT on state highways decreased 0.32% and county roads declined 0.25%. For more information on how to calculate VMT, see appendix A.
 2. Estimated on FHWA’s Traffic Volume Trends Report, which is based on a sample of automatic traffic recorders from each state.



Source: Minnesota State Demographic Center;
MnDOT, Office of Transportation System Management

Another way to look at VMT trends is to calculate per capita VMT; that is VMT divided by the population. This measure is the average vehicle miles people travel. Although population has been increasing, per capita VMT has decreased since 2004 in both the metro and non-metro areas as illustrated in Figure 2. The decrease means that individuals are driving less. The 2014 per capita travel in the Metro Area has fallen below 1998 levels.



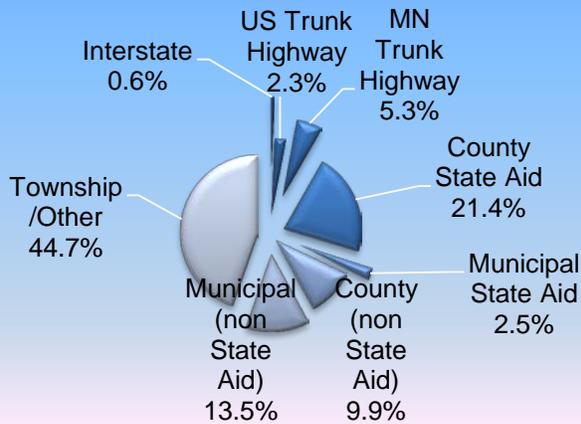
Source: Mn/DOT, Budget Section, Office of Finance;
Mn/DOT, Office of Transportation System Management

It appears that as gas prices increased motorists began taking fewer trips, carpooling, and using more public transportation. In the Twin Cities metro area transit ridership has been increasing since 2004, although 2008 to 2009 it decreased by 6.1%³ due to the recent decline in gas price from 2008 to 2009. The gas price vs VMT graph in Figure 3 shows that as gas prices rose, VMT growth flattened beginning in 2004. Decreasing variability in gas prices and changes in driver behavior create a major challenge for traffic forecasters, transportation planners, and transportation engineers with respect to projecting future VMT.

3. The ridership information is from Metropolitan Council.

4. This includes all types of gas: E85, M85, diesel combined, and etc.

**Figure 4.
Percent of Total Centerline Miles
by Route System
(Based on 2014 Mileage)**

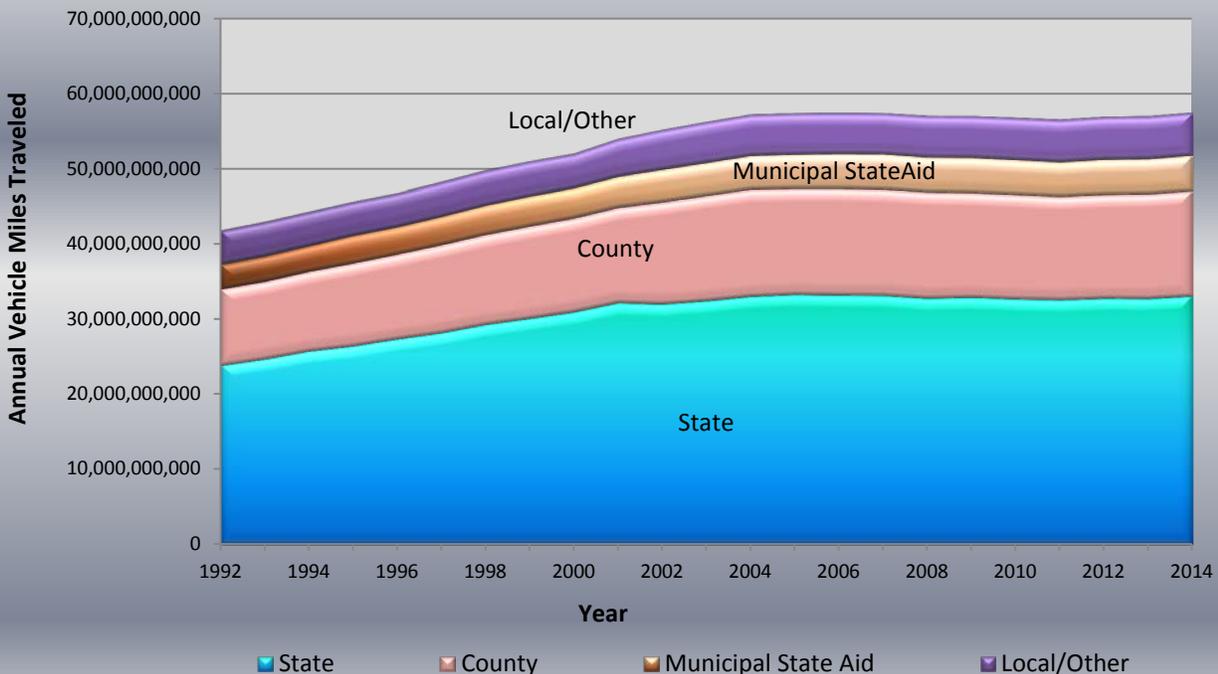


Trends in Vehicle Miles of Travel

In 2014, total VMT on all 143,000 miles of roads in Minnesota was 57.4 billion⁵. The state trunk highway system, made up 57.7% of total VMT, but only 8.2% of total centerline miles. Figure 4 shows the proportions of mileage in Minnesota by route system. Figure 5 shows the statewide annual trends in VMT from 1992-2014 by jurisdiction for all public roads in Minnesota. For those years VMT has increased a total of 37.0%.

Source

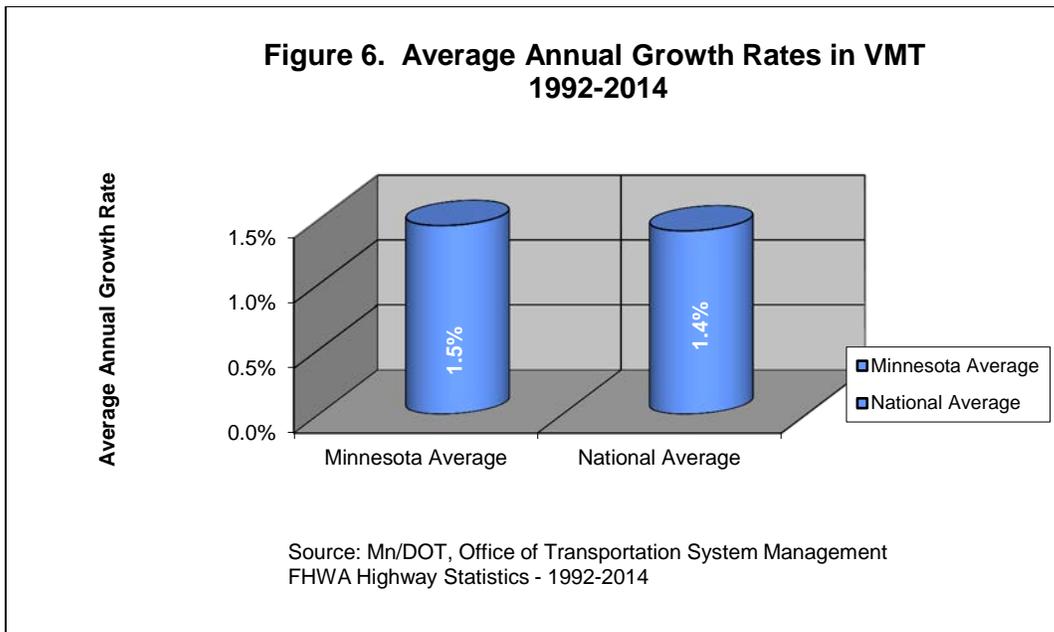
Figure 5. Statewide VMT Growth Trends in Minnesota by Jurisdiction: 1992 - 2014



Source: Mn/DOT, Office of Transportation System Management

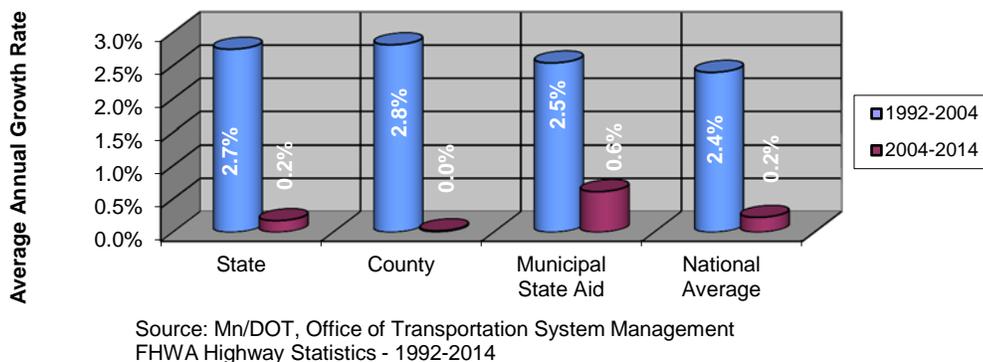
5. It is the actual number and it did not adjust for leap year.

From 1992 to 2014, VMT growth on all roads in Minnesota averaged about 1.5% per year. Figure 6 shows the Minnesota statewide average annual VMT growth rate compared to the national average for all roads. As can be seen, Minnesota's average VMT growth rate has been slightly lower than the national average.



Since the year 2004, Minnesota has seen a change in VMT growth trends. The chart in Figure 7 shows VMT growth from 1992-2004 and from 2004-2014 by jurisdiction. While the growth on state trunk highways from 1992-2004 was higher at 2.7% per year, it has since slowed down to 0.2% for years 2004-2014. Growth on the county and municipal system has also slowed for 2004-2014.

**Figure 7. Average Annual Growth Rates in VMT by Jurisdiction
1992-2004 & 2004-2014**



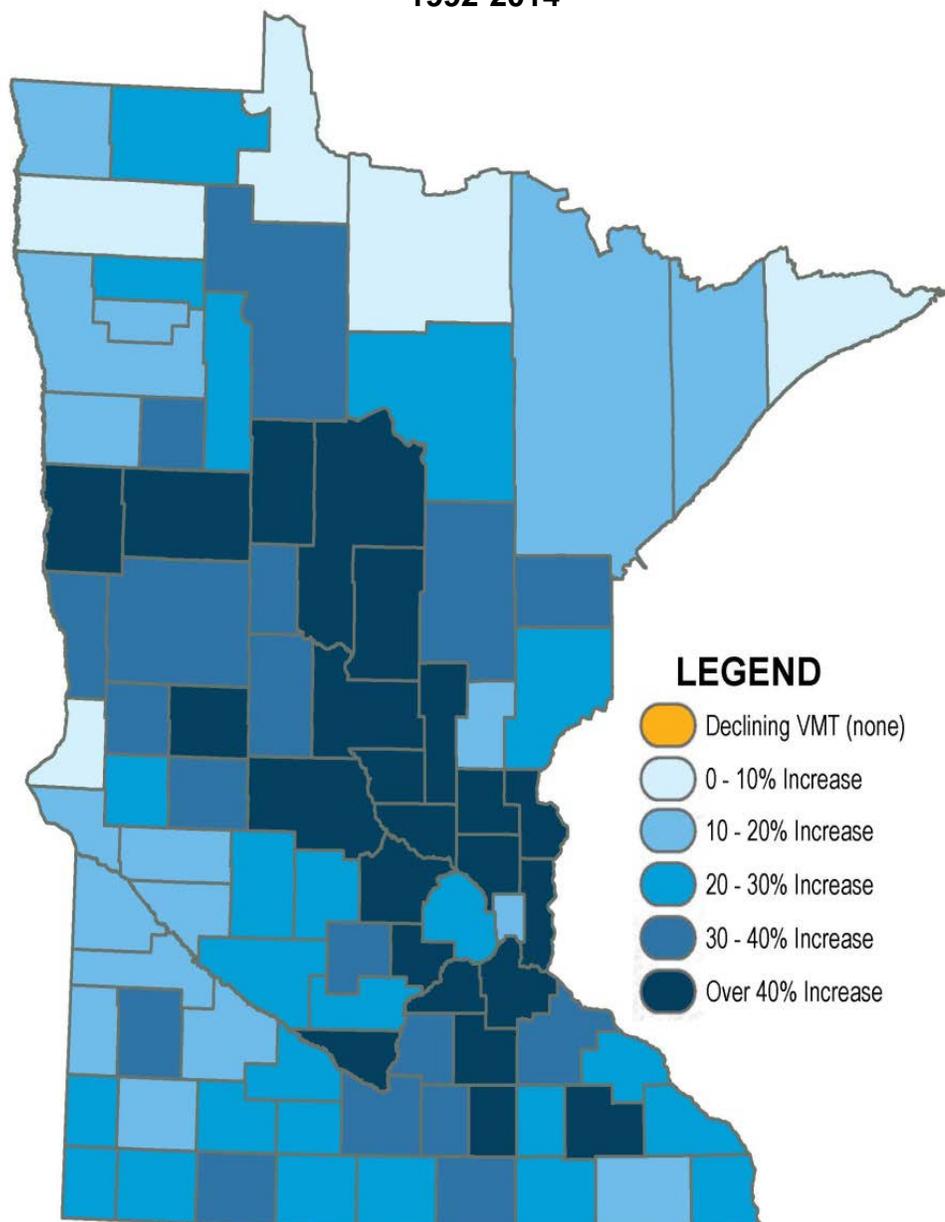
The data so far suggests that the growth rate may continue to remain relatively flat with a slight increase for 2015. The economic downturn appears to have had some impact on the total number of miles driven. As the economy improves we are seeing an increase, but not near the growth that we had seen prior to 2004.

Trends in Vehicle Miles of Travel by County

As shown in Figure 8 the highest percent growth in VMT in Minnesota has been in the counties surrounding the Twin Cities. When looking at the absolute growth by county for 1992-2014 Carver was the fastest growing at 92.3%. Other seven counties with the highest VMT growth are: Scott (74.5%), Wright (69.9%), Dakota (67.7%), Sherburne (65.6%), Washington (63.0%), and Chisago (55.7%). Each of these counties had a total growth of more than 55%. See Appendix A for a complete list of counties.

The slowest percent growth in VMT occurred in the more rural counties in the state including Koochiching, Cook, Lake of the Woods, Marshall, and Traverse counties with total growth less than 10% for the same time period from 1992 - 2014.

Figure 8
Total Percent VMT Growth on all Roads in Minnesota
1992-2014



Source: Mn/DOT, Office of Transportation System Management

Figure 9 and Figure 10 show the total percent changes in population and employment from 1992 to 2014. In general, the biggest increases in VMT correspond to area with higher increases in population and employment.

Figure 9
Total Percent Population Growth
1992 – 2014

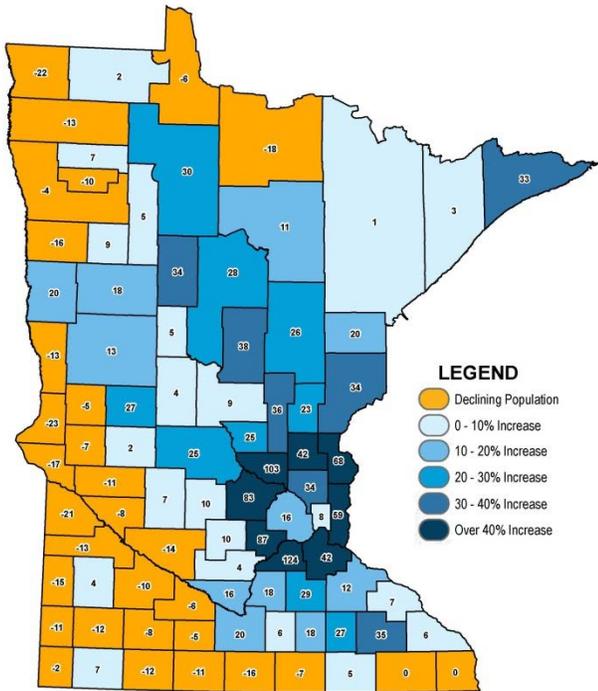
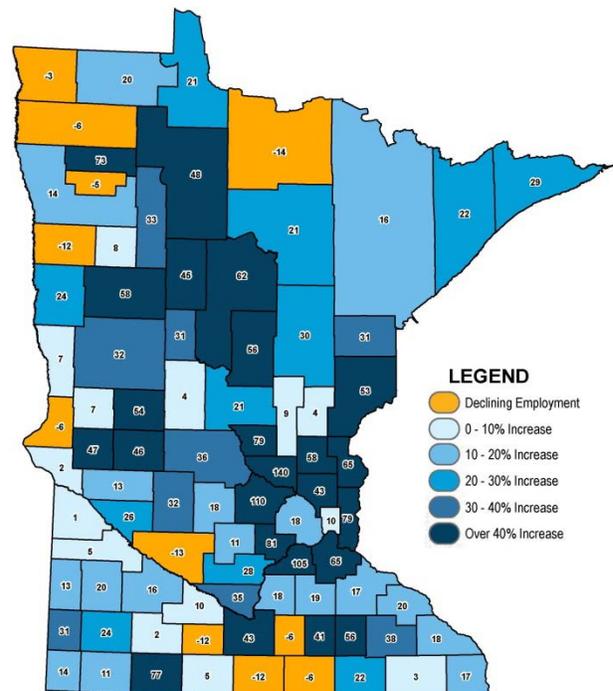


Figure 10
Total Percent Employment Growth
1992 – 2014



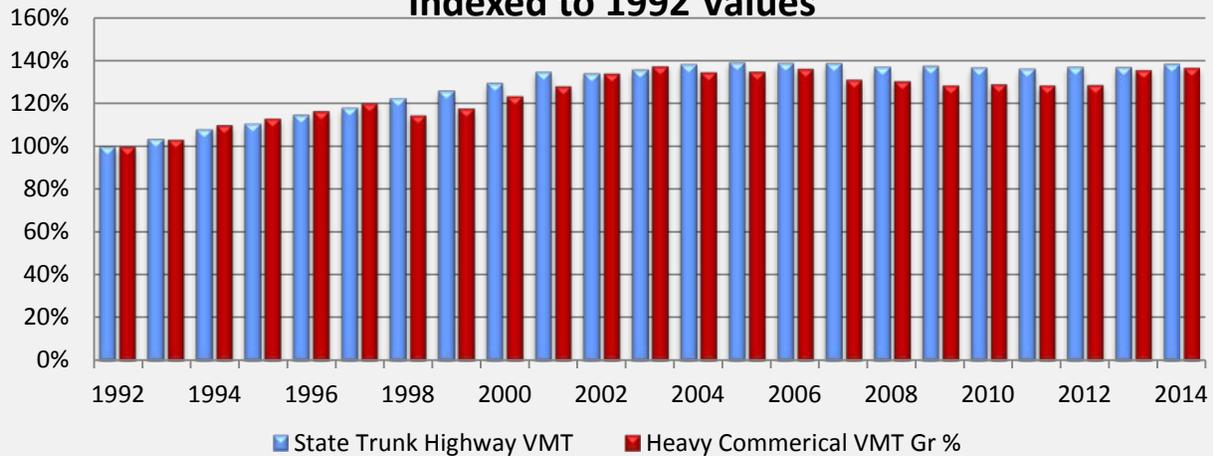
Source: Minnesota State Demographic Center,
 Minnesota Department of Employment and Economic Development

Heavy Commercial VMT

HCVMT trends can only be accurately calculated on the state roads because until recently MnDOT only collected heavy commercial traffic data on the state trunk highway system. In 2014 HCVMT made up about 8.3% of total VMT on state roads. During the time period from 1992-2014, the total VMT on state trunk highways has increased 38.4% (average annual rate of 1.5%), while the HCVMT has increased 37.1% (average annual rate of 1.5%).

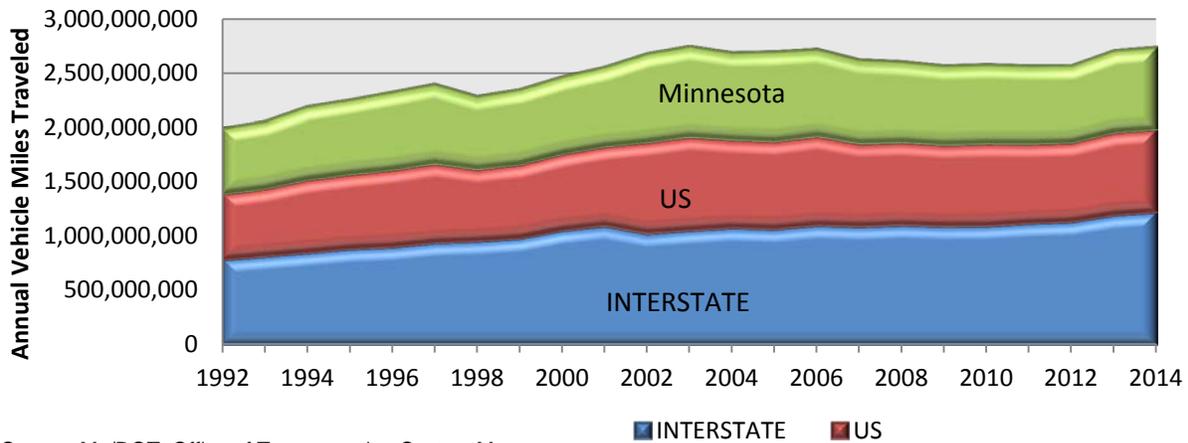
Figure 11 shows the annual changes in VMT compared to HCVMT on state trunk highways from 1992 – 2014, indexed to 1992 values. While the HCVMT was decreasing at a faster rate than total VMT with the economic downturn, it has recovered and increased since 2012 to a rate that matches the rate for total traffic.

Figure 11
Statewide Annual VMT Growth Trends:1992-2014
Indexed to 1992 Values



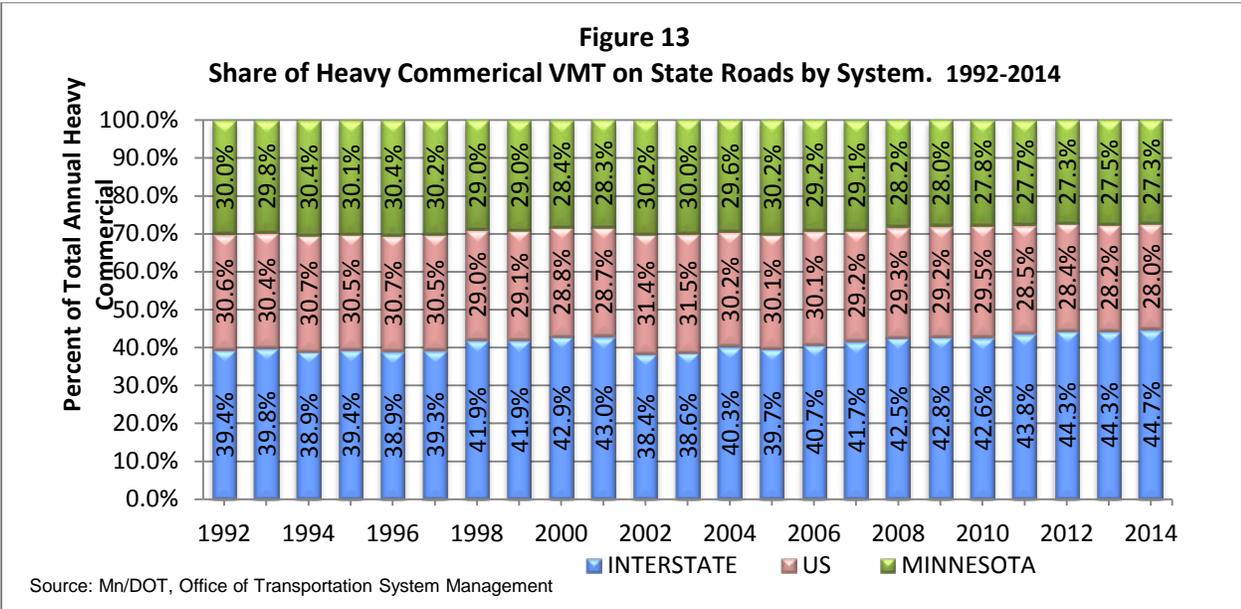
Source: Mn/DOT, Office of Transportation System Management

Figure 12
Statewide Heavy Commercial VMT Growth Trends on State
Roads by System: 1992-2014

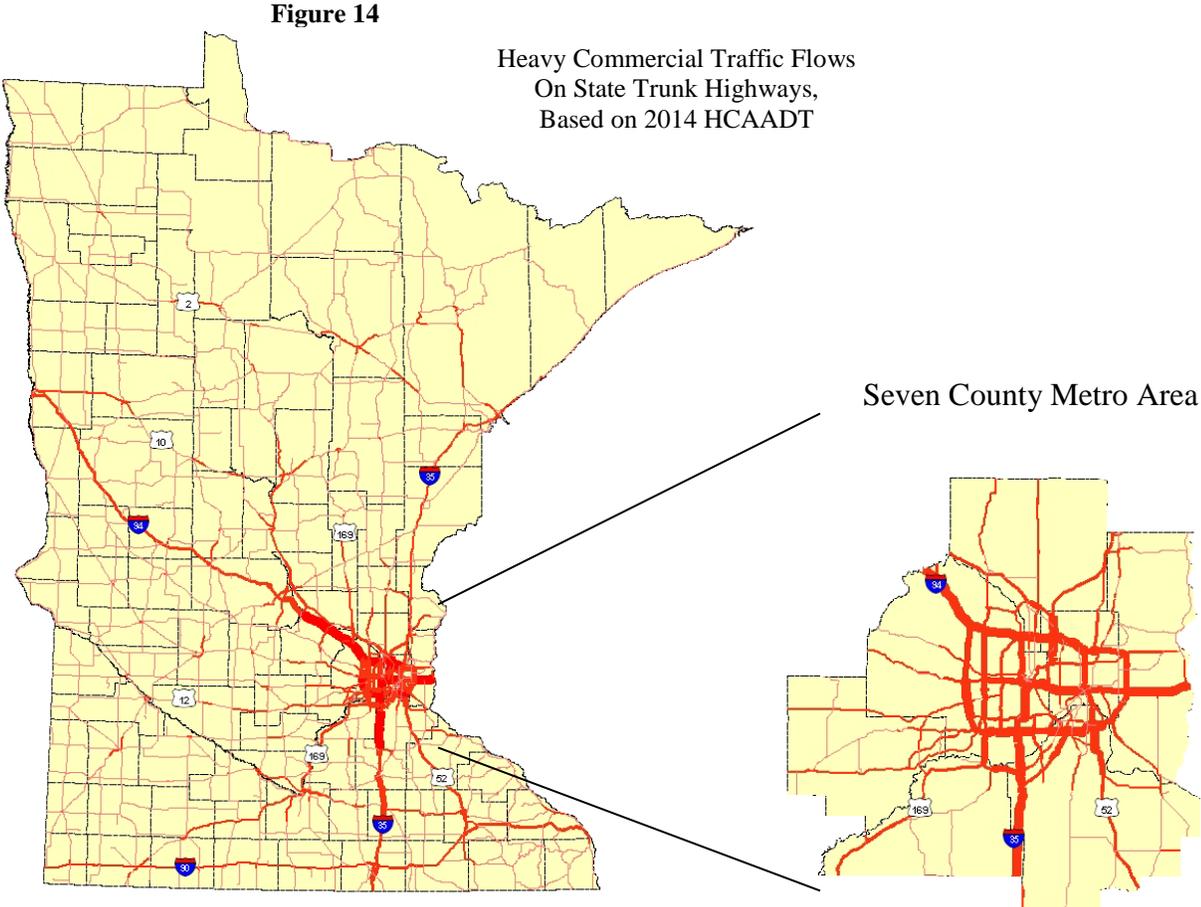


Source: Mn/DOT, Office of Transportation System Management

The following two figures show the trends in HCVMT by system types on Minnesota trunk, U.S. trunk, and interstate highways for 1992-2014. Figure 12 shows the trends along with the proportions of each roadway system type, and Figure 13 shows the percentage of total HCVMT for each of these systems. Although there have been some variations, the proportions have remained fairly constant with Minnesota at about 27.3%, U.S. trunks 28.0% and interstates with about 44.7% of the total share on state trunk highways.



In Minnesota, the majority of the heavy commercial traffic occurs on the interstate system and in the Twin Cities metro area. Figure 14 shows the relative volume flows of heavy commercial traffic on state highways throughout the state. In greater Minnesota, trunk highways 10, 52, and 169 carry a large share of the heavy commercial traffic on the non-interstate system.



Summary

The vehicle-miles of travel had been increasing for decades in Minnesota, but since the year 2004 traffic has remained at about the same level. VMT slightly decreased from 2010 to 2013, but in 2014 VMT increased by 1.0% to 57.4 billion to a new high, just slightly higher than 2006. Preliminary data suggests that nationally VMT will be slightly up again in 2015. In recent years the highest growth in VMT in Minnesota has been in the counties surrounding the Twin Cities while the growth has slowed or declined on many of the rural counties. Due to factors such as the economic environment we anticipate, at least in the near-term, that VMT will continue to remain flat or slightly increase, but at a more moderate rate than Minnesota has seen over the past decades.

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Appendix A

Qualifications for 2014 VMT Data

There are many conditions to be considered when using VMT data from TIS, especially when performing VMT trend analysis.

1. The official VMT reports available at:
<http://www.dot.state.mn.us/roadway/data/html/roadwaydata.html> are based on mileage from the year they were created. Comparing the VMT totals from these reports for consecutive years is invalid. For the purpose of comparison, the historic VMT information should be reported using the current year's mileage. For more information please contact Mark Flinner 651-366-3849.
2. Consecutive year VMT comparisons (using the current mileage) should only be used as an estimate of Statewide VMT changes. Cross year comparisons of VMT at the county level are valid only when "actual" data is used (from counted year to counted year) and the data is reported using the current mileage. Traffic counting schedules are available online at:
<http://www.dot.state.mn.us/traffic/data/html/aadt.html>
3. VMT for Leap Years is reported as 366 days worth of traffic. This must be normalized to 365 days when comparing with non-leap years.
4. Addition of new roadways can create artificial "increases" in VMT that are not due to growth on pre-existing routes.
5. For more information and analysis regarding VMT trends please visit:
<http://www.dot.state.mn.us/traffic/data/html/reports.html>
6. HCADT counts are on a different schedule than AADT counts. For more information on this data contact Shannon Foss at 651-366-3878. The conditions above should also be considered for HCVMT analysis.

The following notes consist of information specific to the 2008 VMT data:

1. The addition of the "New" 212 in Carver County increased VMT on U.S. Highway Routes in that county by 34% over 2007.
2. The update of AADT on MSAS roadways in New Prague increased VMT on MSAS Routes in that county by 300% over 2007.

The following notes consist of information specific to the 2009 VMT data:

1. Due to the opening of the "New" 212 in Carver County in 2008, VMT on local roadways in the surrounding area has decreased while VMT on U.S. Highway Routes has increased.
2. The update of AADT on MSAS roadways in Kasson increased VMT on MSAS Routes in Dodge County by 115% over 2008.
3. The update of AADT on MSAS roadways in Wyoming increased VMT on MSAS Routes in Chisago County by 20% over 2008.

The following notes consist of information specific to the 2010 VMT data:

1. In Carver County traffic patterns have changed significantly as a result of the "New" 212. Trunk Highway 912C ("Old" 212) saw a major decrease in AADT due to these changes. Therefore Minnesota Trunk Routes (system 3) saw a major decrease in VMT.
2. Many miles were added to tribal and state forest routes in 2010.

The following notes consist of information specific to the 2013VMT data:

1. The I 35 construction project in St. Louis County significantly impacted VMT. This is a temporary shift and should recover after project completion.

Appendix B

Total growth of VMT from 1992-2014 in Minnesota shown by county

County Name	All System	State System	Local System	Total Centerline Miles
AITKIN	31.6%	28.2%	42.7%	1805
ANOKA	44.2%	41.9%	46.3%	2367
BECKER	41.1%	43.0%	38.6%	2202
BELTRAMI	39.3%	41.7%	36.9%	2593
BENTON	42.4%	45.8%	36.8%	973
BIG STONE	15.6%	20.6%	8.4%	972
BLUE EARTH	32.0%	36.2%	27.8%	1724
BROWN	28.3%	25.1%	30.8%	1213
CARLTON	39.3%	44.4%	30.2%	1208
CARVER	92.3%	76.8%	111.6%	1082
CASS	42.0%	41.6%	42.7%	3080
CHIPPEWA	15.2%	14.2%	16.7%	1209
CHISAGO	55.7%	47.8%	73.7%	1140
CLAY	46.3%	44.4%	49.5%	2155
CLEARWATER	26.8%	24.3%	29.7%	1246
COOK	8.0%	-5.5%	48.7%	936
COTTONWOOD	22.5%	35.8%	10.7%	1266
CROW WING	50.3%	47.8%	53.1%	2033
DAKOTA	67.7%	71.6%	63.5%	2577
DODGE	29.3%	12.4%	63.3%	916
DOUGLAS	62.3%	47.2%	88.7%	1545
FARIBAULT	21.4%	32.3%	5.6%	1450
FILLMORE	19.6%	18.0%	21.6%	1617
FREEBORN	30.6%	39.5%	15.3%	1553
GOODHUE	39.4%	32.9%	56.0%	1636
GRANT	34.0%	47.3%	5.5%	1073
HENNEPIN	28.1%	34.7%	19.4%	5333
HOUSTON	25.2%	28.0%	20.4%	920
HUBBARD	41.7%	38.4%	47.8%	1762
ISANTI	53.5%	38.9%	76.7%	1073
ITASCA	20.2%	21.1%	19.1%	3666
JACKSON	39.7%	55.1%	15.5%	1413
KANABEC	12.6%	-0.9%	47.3%	844
KANDIYOHI	26.4%	33.3%	19.8%	1705
KITTSOON	18.0%	22.2%	14.0%	1668
KOOCHICHING	1.8%	-1.6%	9.7%	1393
LAC QUI PARLE	12.6%	14.6%	10.7%	1482
LAKE	16.5%	3.6%	40.8%	1085
LAKE OF THE WOODS	8.1%	8.8%	7.1%	868
LE SUEUR	32.5%	29.2%	37.3%	1054
LINCOLN	18.9%	24.2%	14.7%	1066
LYON	30.8%	29.2%	33.3%	1471
MCLEOD	35.7%	33.4%	38.4%	1111
MAHNOHEN	34.1%	31.3%	39.6%	744
MARSHALL	9.7%	24.0%	1.2%	2886
MARTIN	25.4%	26.6%	24.2%	1504
MEEKER	28.5%	24.6%	35.6%	1297
MILLE LACS	45.5%	45.5%	45.5%	1033
MORRISON	46.1%	54.7%	33.4%	1931
MOWER	25.5%	28.1%	22.0%	1572
MURRAY	14.1%	15.3%	13.0%	1385
NICOLLET	42.7%	37.0%	56.3%	902

County Name	All System	State System	Local System	Total Centerline Miles
NOBLES	29.5%	44.9%	12.0%	1518
NORMAN	11.8%	10.3%	13.7%	1583
OLMSTED	51.7%	34.7%	76.0%	1825
OTTER TAIL	39.3%	50.1%	27.7%	4023
PENNINGTON	29.5%	35.4%	24.8%	1143
PINE	24.4%	25.8%	21.2%	1955
PIPESTONE	22.4%	30.8%	12.5%	968
POLK	17.2%	10.3%	25.2%	3691
POPE	32.8%	45.5%	14.9%	1246
RAMSEY	17.5%	24.4%	8.4%	1978
RED LAKE	17.1%	19.2%	15.1%	789
REDWOOD	12.8%	11.0%	14.7%	1715
RENVILLE	23.2%	22.7%	23.9%	1896
RICE	48.4%	51.2%	42.8%	1280
ROCK	27.7%	36.1%	14.7%	1008
ROSEAU	27.1%	23.9%	31.4%	2312
ST LOUIS	17.4%	20.9%	14.0%	5839
SCOTT	74.5%	72.3%	76.7%	1277
SHERBURNE	65.6%	48.0%	97.3%	1320
SIBLEY	20.4%	16.1%	26.5%	1134
STEARNS	53.3%	64.4%	41.6%	3212
STEELE	44.6%	42.5%	48.1%	989
STEVENS	28.5%	41.2%	15.5%	1081
SWIFT	20.0%	30.5%	7.3%	1430
TODD	32.9%	38.1%	26.0%	1887
TRAVERSE	10.0%	25.7%	-3.5%	1111
WABASHA	20.1%	10.6%	36.8%	995
WADENA	37.0%	43.2%	29.2%	966
WASECA	34.7%	23.0%	48.8%	876
WASHINGTON	63.0%	56.4%	73.7%	1929
WATONWAN	25.0%	29.0%	19.7%	890
WILKIN	34.4%	40.4%	21.3%	1494
WINONA	24.0%	28.5%	14.6%	1237
WRIGHT	69.9%	60.4%	86.7%	2073
YELLOW MEDICINE	16.3%	19.9%	12.2%	1505