

Transportation Behavior Changes

INTRODUCTION & CONTEXT

Defining the Issue

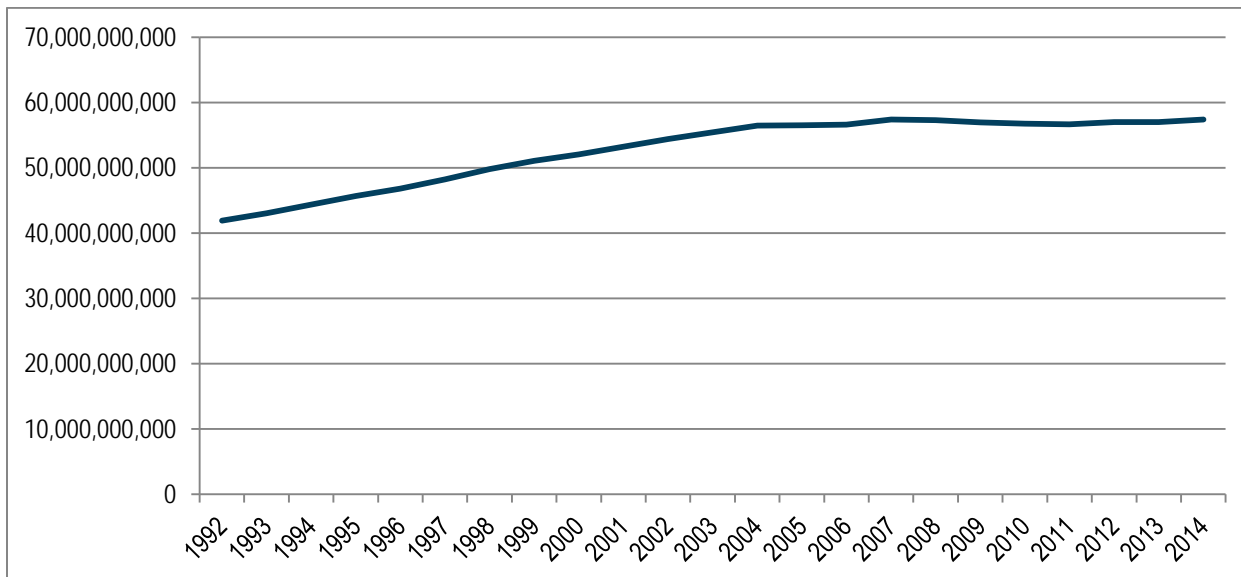
Minnesotans' transportation behaviors are changing in both rural and urban communities. The decisions that individuals and populations as a whole make regarding how they get from point A to point B have impacts on the transportation system and how MnDOT invests in infrastructure throughout the state. This paper explores recent travel behavior changes and how the state's transportation system can adapt to serve these needs. Trends in how rail freight is shipped to, from, and within Minnesota are discussed in separate trend analysis papers about the freight system.

Statewide Information

AUTOMOBILE TRENDS

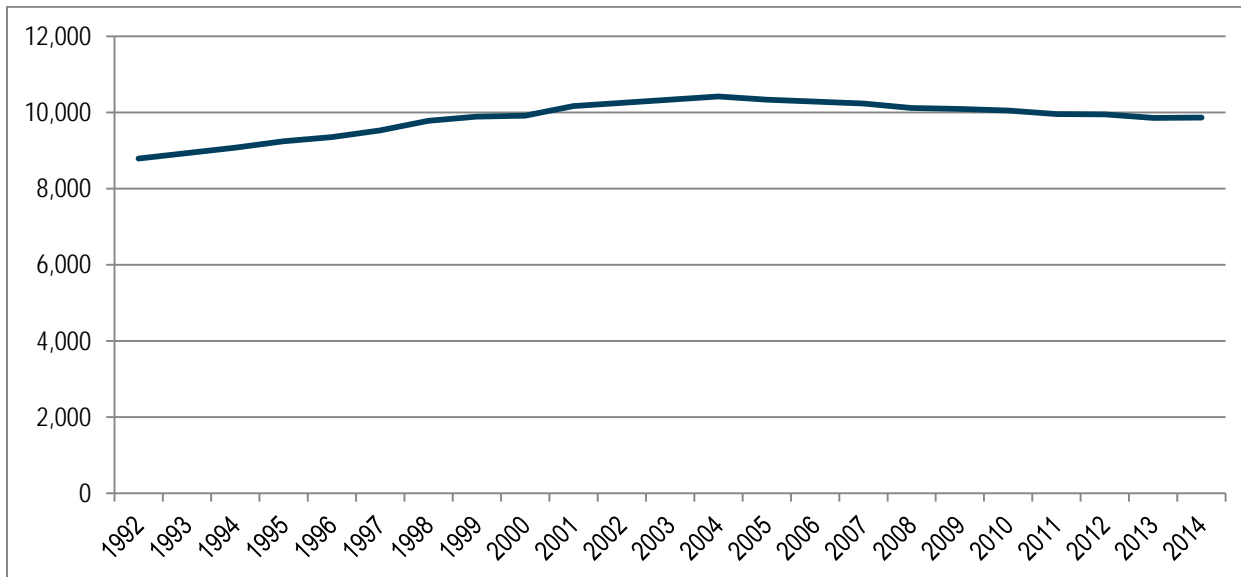
Automobile travel has been the dominant mode of transportation in the United States since the end of World War II. Despite continuous, rapid growth in automobile usage from 1946 through the early 2000s, car usage in the United States has leveled off in recent years. The average US driver travels approximately 1,200 fewer miles each year today than they did in 2005.¹ Driving trends in Minnesota mimic the national trend, with the state's peak vehicle miles traveled (VMT) being achieved in 2007 (57.41 billion miles). Statewide, VMT rose slightly from 56.99 billion in 2013 to 57.39 billion in 2014. Per capita driving rates (Figure 2) show a slightly more substantial decline in the annual distance that Minnesotans drive from the previously set peak. Overall VMT has likely remained close to level since 2007 due to population growth in the state, as is shown in Figure 1.

Figure 1: Total vehicle miles traveled by year in Minnesota



¹ Sivack, Micheal (2013). "Has motorization in the U.S. peaked?"

Figure 2: Per capita vehicle miles traveled by year in Minnesota



In 2009 the average number of cars owned by each household in the United States dropped below two cars for the first time in ten years, though the overall decline in household size makes this an imperfect measure.² Household car ownership is an indicator of the extent to which people in the United States rely on automobiles as their main mode of transportation. A decline in car ownership could indicate that households are using other modes of transportation at greater levels. The declines in driving rates and vehicle ownership coincide with the economic downturn in 2008; however, the downward trend began prior to the recession and has not reverted to previous patterns of growth as the US economy recovered. As such, it is possible that these trends could be caused by other social pressures and may continue past economic recovery.

Changing household compositions may also be influencing the number of cars per household, especially in instances of single-parent families. One possible reason why transportation behaviors may be changing is that the cost of driving has increased significantly since the mid-2000s. The rising cost of auto-insurance rates is one factor – rates grew by 10 percent from 2008 to 2010 even though overall rates of driving decreased.³ When combined with volatile gasoline prices, owning a car is not within many low-income people's means.

Additionally, generation cohorts are changing the current patterns of driving as a main mode of transportation, particularly those who are younger and college-educated.⁴ In 1990, 87 percent of teens in the 16-18 age group had a valid license in Minnesota; in 2011 the percentage had fallen to 69 percent.⁵ Fewer licensed drivers may mean fewer cars on the road and more exposure to alternative modes including transit, walking, and bicycling. Data from the National Household Travel Survey supports this idea. A comparison of per capita vehicle miles traveled by age cohort is shown in Figure 3, and while the data is outdated, recent per-capita VMT trends in Minnesota suggest that this trend is continuing.

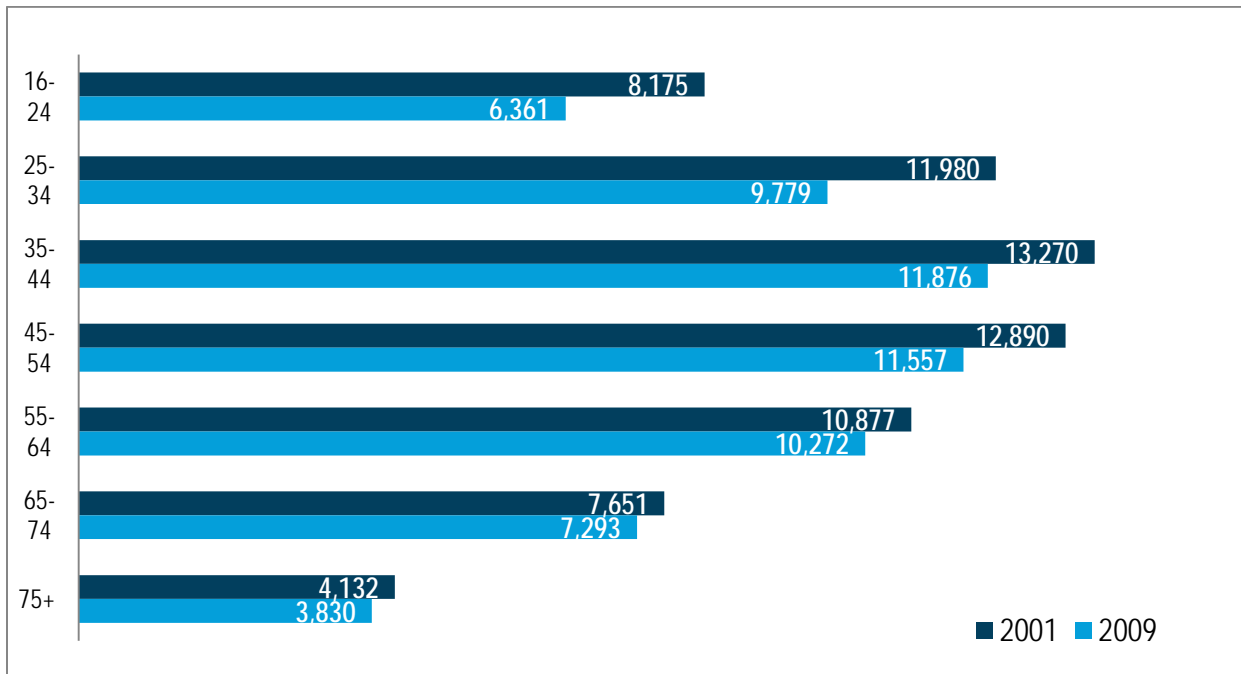
² Sivack, Micheal (2013). "Has motorization in the U.S. peaked?"

³ Collazo, Jason (2011) "Auto Insurance Rates on the Rise"

⁴ Levinson, David; Greg Lindsey; Yingling Fan, Jason Cao, Michael Iacono, Martin Brosnana, Andrew Guthrie and Jessica Schoner (2015) "Chapter 6: Cohort Analysis of Travel Behavior" Travel Behavior Over Time. University of Minnesota Center for Transportation Studies, Sponsored by: Minnesota Department of Transportation and the Metropolitan Council.

⁵ Levinson, David; Greg Lindsey; Yingling Fan, Jason Cao, Michael Iacono, Martin Brosnana, Andrew Guthrie and Jessica Schoner (2015) "Chapter 6: Cohort Analysis of Travel Behavior" Travel Behavior Over Time. University of Minnesota Center for Transportation Studies, Sponsored by: Minnesota Department of Transportation and the Metropolitan Council.

Figure 3: Per capita VMT by age⁶



Changes in work arrangements are also having an effect on how much people drive. A survey conducted in 2010 estimated that 16 million employees worked from home at least once a month – an increase of 62 percent over levels observed in 2005.⁷ Given the rate at which teleworking increased during that timeframe, it is likely that more people are teleworking on occasion today, or are teleworking more frequently.

Car Sharing

Car sharing in North American cities spreads the use of a fleet of vehicles across a broad group of members, using various methods for reservations and payment. Car sharing in its various forms has expanded across the United States, and may be a solution to some of the transportation problems that are commonly encountered by individuals who choose to not own a car. Car sharing saves money for infrequent users when compared to outright purchase of a vehicle by including gas, insurance, maintenance and the sometimes expensive hassle of finding parking within the fee for using the car. The pricing strategies of car sharing force the user to be more mindful of the variable costs of each trip, including environmental costs, therefore reducing the number of vehicle miles traveled through the use of car sharing.⁸ Being aware of the variable costs of car usage motivates the individual to rely on other cheaper alternatives when possible, including public transit, walking or cycling. Car sharing is available in two Greater Minnesota communities and the Twin Cities metropolitan area.

⁶ National Household Travel Survey

⁷ [Lister and Harnish, 2011](#)

⁸ [R Katzev \(2003\) "Car Sharing: A new approach to urban transportation problems"](#)

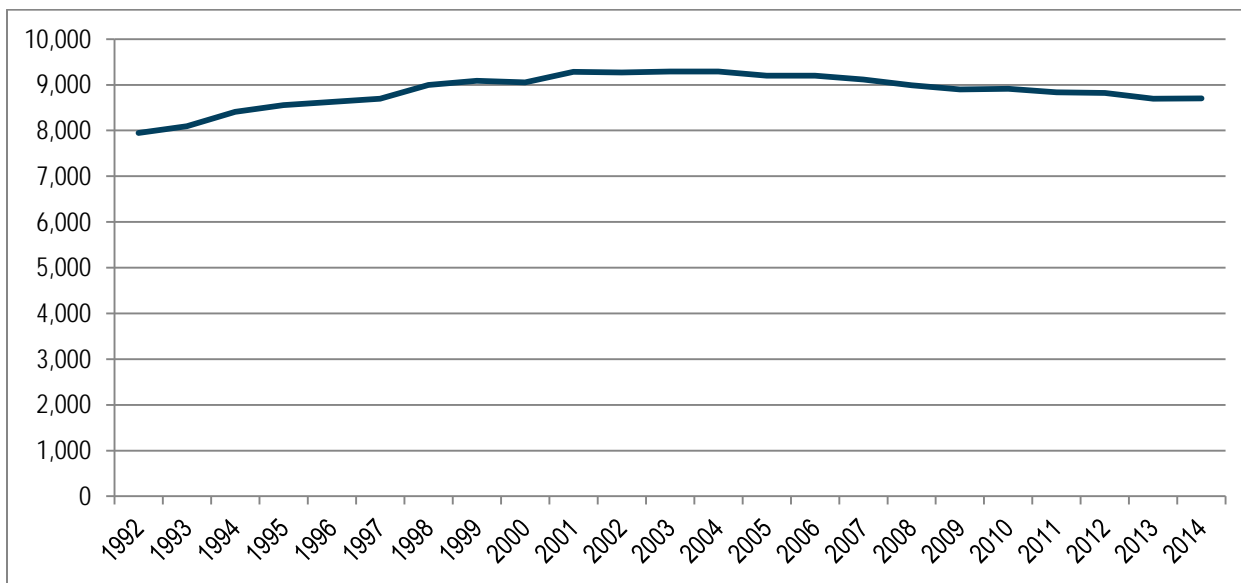
Twin Cities Metro

Data on transportation behavior in the Twin Cities is quite robust, thanks to efforts by the Metropolitan Council and other service providers who make data available to the public. Understanding the implications of this data is an important step to maintaining a strong transportation system in the Twin Cities.

AUTOMOBILE

Driving rates in the Twin Cities Metro mirror those for Minnesota as a whole, though per capita miles driven per year are significantly less than in Greater Minnesota. The general decline in per-capita auto usage in the Twin Cities metro has continued since 2004, though a slight uptick in 2014 per-capita VMT may suggest that we have reached the end of year-over-year declines, as is shown in Figure 4. Carpooling rates to work have remained consistent at about 8.4 percent.⁹

Figure 4: Per capita vehicle miles traveled in the Twin Cities Metro



Car Sharing

Car2Go maintains a fleet of over 300 cars in Minneapolis and Saint Paul, and had more than 20,000 members as of 2015; remarkable progress given that the company launched in Minneapolis during 2013.¹⁰ In the Twin Cities, Car2Go trips can only be ended in the Minneapolis and Saint Paul city limits¹¹ – significantly reducing the viability of this alternative in terms of suburban trips. While Car2Go is limited in its service area, it does offer advantages as a point-to-point system that does not require users to return cars to specific parking spots. ZipCar and HOURCAR both also offer car sharing services in the Twin Cities using hourly rental fees in addition to variable costs per mile. HOURCAR recently integrated their vehicle technology to be compatible with MetroTransit's Go-To cards, allowing users to seamlessly use both transit and car-sharing services.¹²

⁹ [American Community Survey, Table B08101, 2014](#)

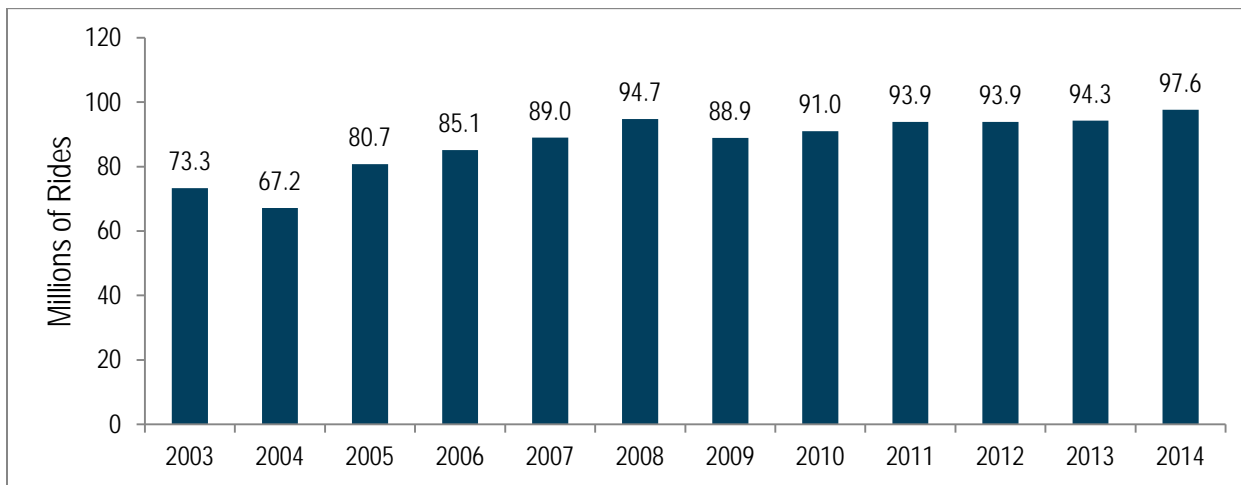
¹⁰ Car2Go

¹¹ Car2Go is in discussions with Saint Paul to reduce its service area due to low usage outside of downtown and narrow corridor expanding north and south from Interstate 94.

¹² [HOURCAR, 2015](#)

TRANSIT

Figure 5: Transit ridership in the Twin Cities Metro (in millions), 2003 – 2014¹³



Transit ridership has increased by roughly 24 million rides per year in the Twin Cities since 2003. The increase in demand for public transportation systems has been driven by multiple demographic groups. Transit is needed to support aging baby boomers, many of whom will reduce their driving as they continue to age. Nationally, one of every five adults over 65 doesn't drive, and each year more than 600,000 people 70 and older across the US stop driving and must depend on others to meet their transportation needs.¹⁴ More information on this topic can be found in the paper on Minnesota's Aging Population.

Some literature suggests that younger generations may be pursuing car free lifestyles in urban settings, and are reducing their overall dependence on the automobile. It is uncertain whether this trend may be due in part to a recent weak job market for college graduates and larger student loan debt burdens, affecting young adults' ability to afford cars and homes. Nonetheless, this trend may result in an increase in transit ridership among young, college-educated adults. The influx of people moving into urban areas also creates a larger demand for transit accessibility with population density in urban areas. An increase in investment and expansion of transit systems will likely be needed in the future to keep up with demand.

Light Rail

Transit ridership in the Minneapolis-St. Paul region rose dramatically in 2014, up 3.5 percent over 2013, which may be partially explained by the opening of Metro Transit's Green Line between Downtown Minneapolis and Downtown Saint Paul.¹⁵ Light rail transit provides a high quality alternative to automobile travel and decreases personal transportation costs in areas close to stations for those who use transit service when compared to automobile usage.¹⁶ The Green Line carried 6.5 million riders during the 7 months that it was operating in 2014. Metro Transit's other light rail line, the Metro Blue Line, carried 9.5 million riders in 2014 – 11.2 percent of Metro Transit's total 2014 ridership.¹⁷ Recent estimates show that light rail accounts for about 20 percent of all transit trips taken in the Twin Cities.¹⁸

¹³ Metropolitan Council

¹⁴ [Beal, Dave \(2014\) "Transportation for the aging poses mounting challenge in Twin Cities"](#)

¹⁵ [Thoman, Barb \(2015\) "Twin Cities Region Sees Dramatic Increase in Transit Ridership"](#)

¹⁶ Hurst, Needham B., Sarah E. West (2014). "Public Transit and Urban redevelopment: the effect of light rail transit on land use in Minneapolis, Minnesota." Regional Science and Urban Economics, May 2014.

¹⁷ [Metropolitan Council, 2015](#)

¹⁸ MetroTransit, 2014

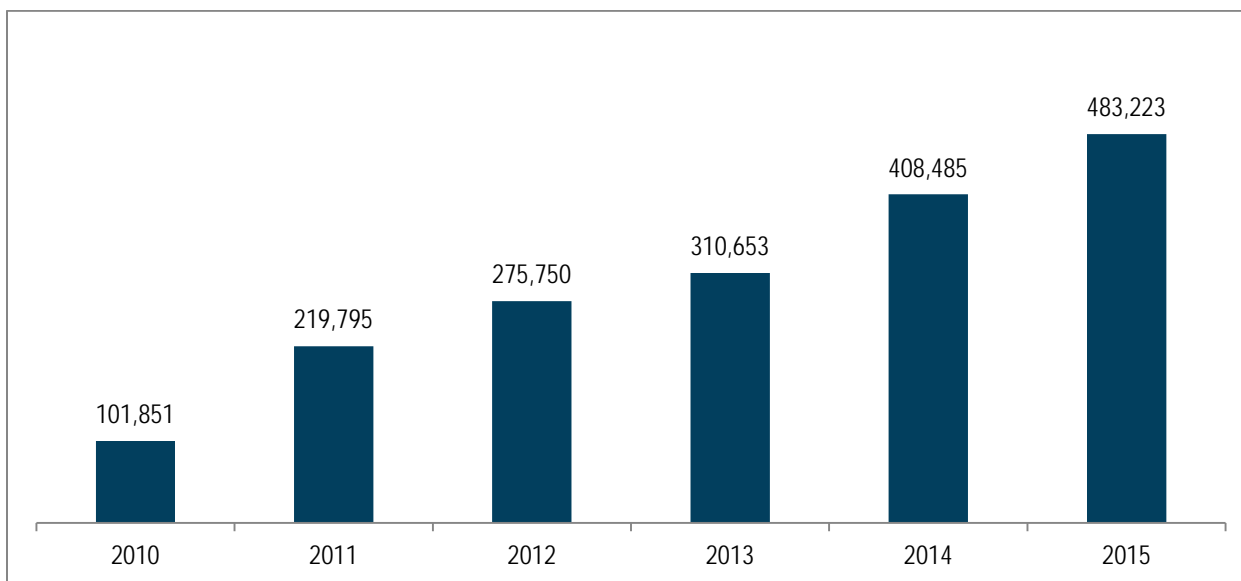
BICYCLE & PEDESTRIAN TRENDS

Rates of walking and bicycling both increased in the Twin Cities from 2001 to 2010.¹⁹ Overall, two percent of trips in the Twin Cities are completed by bike, while 6 percent are completed on foot.²⁰ In Minneapolis, the number of regular bicycle commuters more than doubled in less than two decades, from around 3,000 in 1993 to 7,000 in 2010.²¹ Despite gains in rates of bicycling overall, a gender gap persists. Most of the observed growth in cycling from 2011 to 2010 came from increases in the number of men who commute to work by bike.²² The gap appears to be in bicycling participation rates of men and women; there was no observed gap in how often people make bike trips based on gender. Widespread facility improvements mean that access to bike lanes is no longer a significant factor associated with likelihood of bicycling in Minneapolis and many other cities and towns.²³

Bike Sharing

Bike sharing has continued to grow since it was introduced in the Twin Cities. Nice Ride Minnesota has seen increased ridership every year since its launch in 2010, as is shown in Figure 6. Bike sharing provides an alternative active transportation option for short point-to-point trips and provides access to bikes for populations who are unable purchase one outright.

Figure 6: Nice Ride Minnesota total trips taken, 2010 – 2015²⁴



Walking

Increases in walking can be seen in certain demographic groups, including aging residents who may choose to move to areas that are walkable to reduce the amount that they need to drive. There is a debate as to whether people are actively seeking to live in communities that facilitate car free living. Existing information shows that property values are higher in areas with stronger Walk Scores (a proprietary system that analyzes routes from one address to local amenities and provides a score based on how many are within a walkable distance), perhaps indicating that there is, in fact, higher demand for homes within short distance of walkable amenities.²⁵

¹⁹ Levinson, David; Greg Lindsey; Yingling Fan, Jason Cao, Michael Iacono, Martin Brosnana, Andrew Guthrie and Jessica Schoner (2015) "Chapter 5: Biking and Walking over Time" Travel Behavior Over Time. University of Minnesota Center for Transportation Studies, Sponsored by: Minnesota Department of Transportation and the Metropolitan Council.

²⁰ [Metropolitan Council Travel Behavior Inventory, 2010](#)

²¹ Bicycle and Pedestrian Section Public Works Department City of Minneapolis (2013) "Understanding Bicyclist-Motorist Crashes in Minneapolis, Minnesota"

²² Levinson, David; Greg Lindsey; Yingling Fan, Jason Cao, Michael Iacono, Martin Brosnana, Andrew Guthrie and Jessica Schoner (2015) "Chapter 5: Biking and Walking over Time" Travel Behavior Over Time. University of Minnesota Center for Transportation Studies, Sponsored by: Minnesota Department of Transportation and the Metropolitan Council.

²³ Ibid

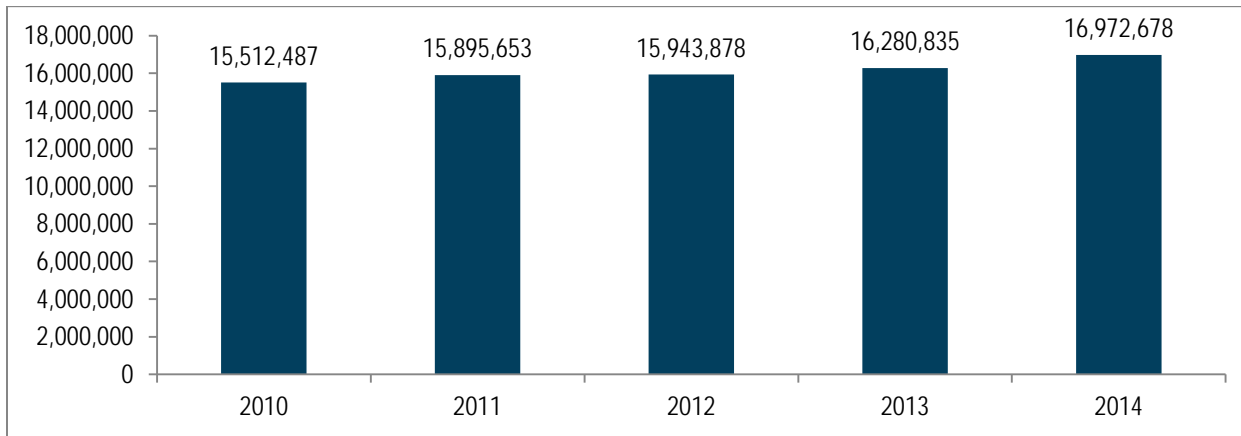
²⁴ [Nice Ride Minnesota](#)

²⁵ [Darlin, 2010](#)

AIR TRAVEL TRENDS

As of 2014, MSP International Airport facilitated almost 17 million total airplane boardings.²⁶ In total, boardings have increased over 9 percent from 2010, as is shown in Figure 7.²⁷ Despite this growth, MSP remained the 16th busiest airport in the United States as of 2014, unchanged from its position nationally according to 2010 data.²⁸

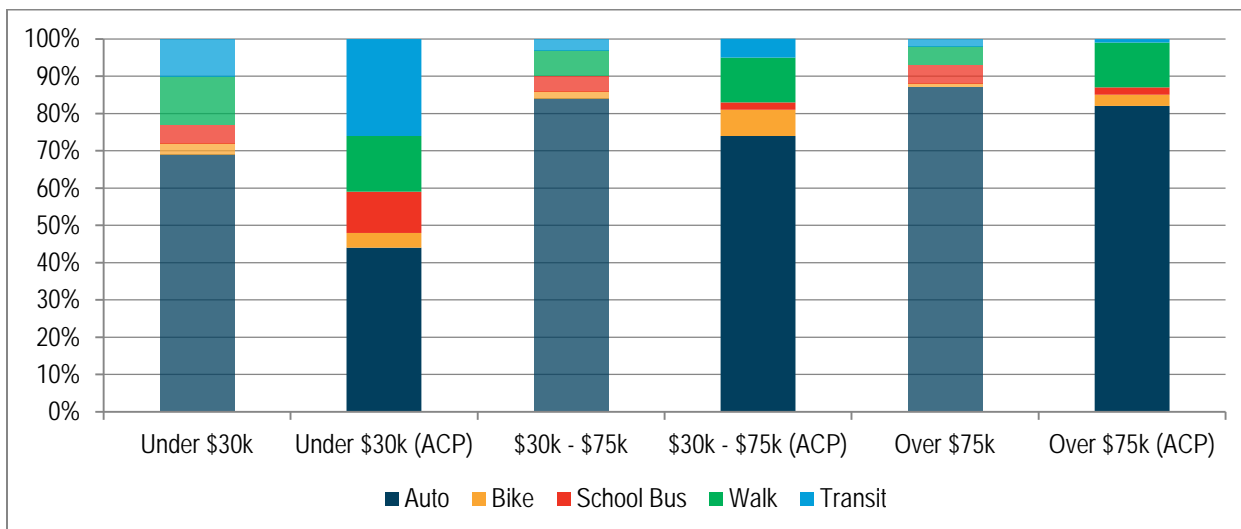
Figure 7: Total boardings at MSP International Airport from 2010 to 2014²⁹



TRANSPORTATION BEHAVIOR IN AREAS OF CONCENTRATED POVERTY

The Metropolitan Council has analyzed differences in mode use and travel behavior between people living in areas of concentrated poverty (ACP) and those living outside of ACPs. The results of this analysis have found that people in ACPs rely more heavily on transit, bicycling, and walking to get around. Over one-quarter of all trips made by people living in ACPs with incomes under \$30,000 are taken via transit.³⁰ Increased rates of travel via transit, walking, and biking are not limited to only people with low incomes – even people making more than \$75,000 who live in ACPs rely more heavily on biking and walking to get around than those making similar amounts outside of ACPs, as can be seen in Figure 8.³¹

Figure 8: Mode split in the Twin Cities Metro based on residential location



²⁶ [Federal Aviation Administration](#)

²⁷ Ibid.

²⁸ Ibid.

²⁹ Ibid.

³⁰ Metropolitan Council, 2015

³¹ Ibid.

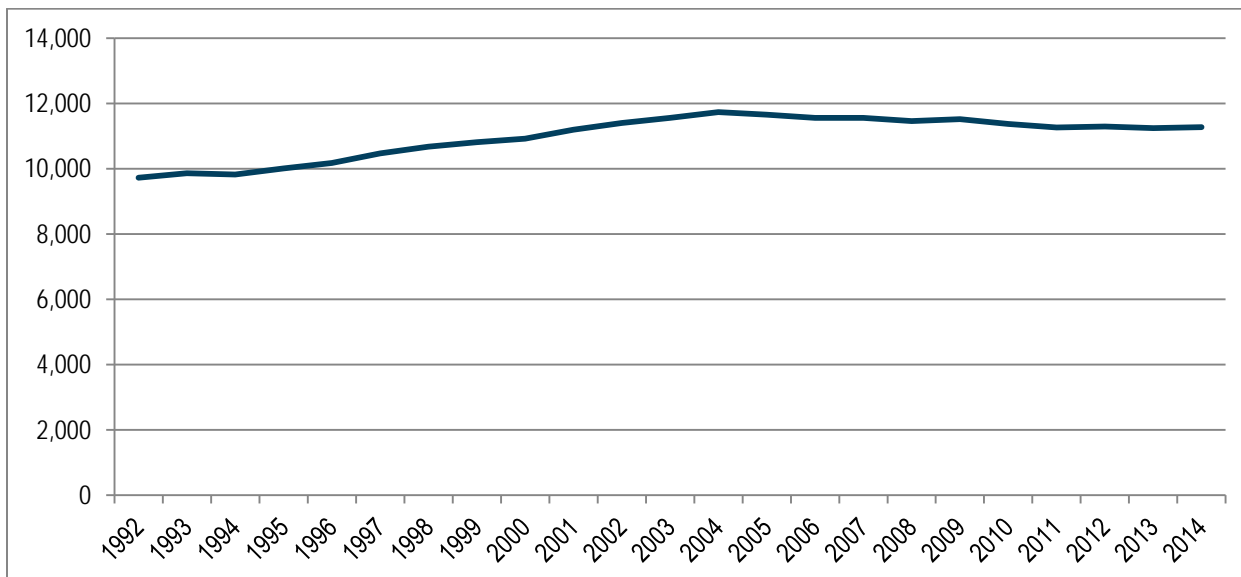
Greater Minnesota

It is difficult to find consistent data about transportation behavior trends in rural Minnesota due to complications in defining the difference between urban and rural areas. Population trends, including the movement of youth away from rural areas, affect the raw numbers and create a lack of consistency in year-to-year statistics. A lack of institutionalized data collection like there is in the Twin Cities through the Metropolitan Council's Travel Behavior Inventory adds further complication.

AUTOMOBILE TRENDS

Rural areas in Minnesota have similar driving trends to those observed in statewide statistics above, including a decline in overall vehicle miles traveled (VMT). Understanding exactly why per capita VMT has declined in Greater Minnesota is challenging, though the economic downturn in the late 2000s may partially be the cause. 2014 saw a slight uptick in per-capita VMT for Greater Minnesota (shown in Figure 9), suggesting that persistent declines since 2008 may be reversing.

Figure 9: Per capita VMT in Greater Minnesota, 1992 – 2013



Another concerning trend related to automobiles in rural areas is the disproportion of severe crashes that rural areas experience. In Minnesota 72 percent of all roadway fatalities happen in rural areas.³² The disparity of crashes and crash severity in rural areas poses an important question for safety and road conditions in rural Minnesota.

Car Sharing

While not as prominent as car sharing in the Twin Cities, two Greater Minnesota communities are home to car sharing networks. Zipcar operates on two college campuses – Winona State (2 vehicles) and Minnesota State University – Mankato (2 vehicles).³³ Zimride, an online service that connects drivers to those looking for rides, has networks established for the University of Minnesota at Morris and the College of Saint Benedict/Saint John's University.³⁴

³² [MN Department of Public Safety](#)

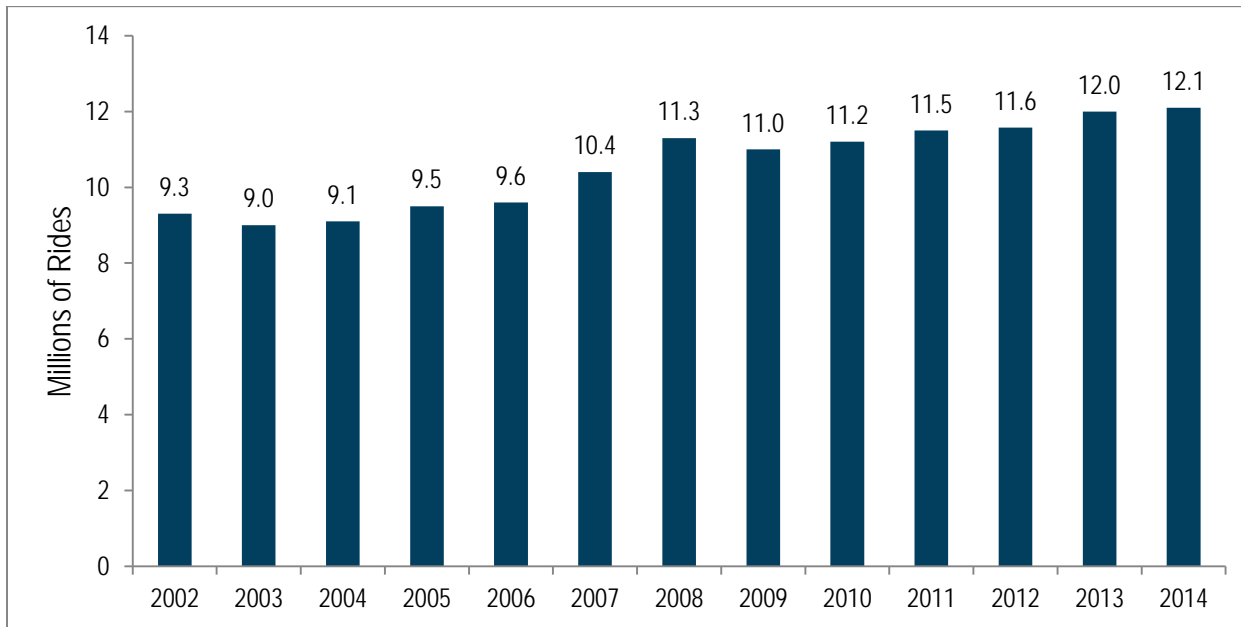
³³ [Zipcar](#)

³⁴ [Zimride](#)

TRANSIT TRENDS

In 2014 there were 12.1 million transit rides taken in greater Minnesota.³⁵ Many of the factors behind increased transit demand in Greater Minnesota (shown in Figure 10) are similar to those being experienced in metro areas. 51 percent of transit riders in Greater Minnesota do not have a driver's license.³⁶ This indicates that half of those using transit in Greater Minnesota may be either too young to have a driver's license, no longer able to drive, or have disabilities that limit their use of other modes.

Figure 10: Transit ridership in Greater Minnesota, 2002 – 2014



Sixty-two percent of transit riders in Greater Minnesota have household incomes of \$20,000 or less, meaning that over half of the transit using population in Greater Minnesota is considered low-income and rely on public transportation as their primary means of getting around.³⁷ It should be noted that a significant proportion of those using transit with household incomes below \$20,000 per year may be college students, as many colleges and universities in Greater Minnesota have college transit pass programs. Fifty percent of Greater Minnesota transit users ride at least five times a week while 86 percent of Greater Minnesota transit users ride at least twice a week, illustrating the levels of dependence that riders have on transit service in Greater Minnesota.

INTERCITY TRAVEL

Intercity Bus Service

Intercity bus services connect many cities and towns across Minnesota to other regional centers and the Twin Cities. Jefferson Lines provides the majority of subsidized and un-subsidized service in Minnesota along with Land to Air express, Northfield Lines, and Rainbow Rider, while Greyhound Lines and Megabus offer express-style service between Minneapolis and Chicago.³⁸ It is difficult to ascertain trends in intercity bus service as routes are frequently rerouted, lengthened, and occasionally, shortened. Ridership of curbside bus services like Megabus have seen high levels of expansion, though this does not directly benefit riders in Greater Minnesota.³⁹

³⁵ [Burrell, Matt \(2010\) "Transit systems in Minnesota"](#)

³⁶ [Cook, M. \(2012\) Minnesota Transit Index](#)

³⁷ Ibid

³⁸ [Minnesota Intercity Bus Study, 2014](#)

³⁹ Ibid.

Passenger Rail

Amtrak services 6 stations along the Empire Builder train route in Minnesota and carried about 70,000 riders in Minnesota during 2014.⁴⁰ Minnesota's total ridership has fallen by 26 percent since 2009.⁴¹ Key causes of ridership decline include inconsistent on-time performance due to sharing rails with freight companies and having lower priority when schedule conflicts occur. Amtrak recently completed a study on a proposed second round trip train between St. Paul and Chicago. The second train is projected to exceed 150,000 passengers a year; however, Minnesota and Wisconsin would have to subsidize about \$6.6 million annually plus infrastructure improvements which start at \$142 million to make it a reality.⁴²

BICYCLE & PEDESTRIAN TRENDS

The majority of rural areas in Minnesota support funding bicycle and pedestrian infrastructure improvements.⁴³ In Central Minnesota the support rate for bicycle and pedestrian infrastructure is around 64 percent while Southern Minnesota's is 57 percent and Northern Minnesota's is 56 percent.⁴⁴ MnDOT's yearly omnibus survey asks Minnesotans how frequently they ride their bikes. Two percent of Greater Minnesota residents ride their bike every day, while 14 percent ride at least once a week. When combined, these two categories are only 5 percent less than the same categorical responses in the Twin Cities.⁴⁵ Little additional data on bicycle ridership or rates of walking exists for Greater Minnesota. However, this is likely to change as an ongoing collaborative research project between MnDOT and the University of Minnesota recently deployed counters for bicycle and pedestrian counting.

Bike Sharing

Greater Minnesota is home to a variety of different types of bike-sharing systems that range in complexity. Willmar and some other communities in Minnesota have started informal bike-sharing programs that use unclaimed bikes from the city's impound lot or donors as part of the system.⁴⁶ Nice Ride Minnesota operates a satellite system in Bemidji that functions more like a traditional bike-rental business than the Nice Ride system in Minneapolis and Saint Paul.⁴⁷

AIR TRAVEL TRENDS

By and large, air travel in Greater Minnesota has increased since 2010. Some trends that affect commercial service to greater Minnesota include pilot shortages, up-gauging of aircraft (using larger planes for most commercial flights), and changes to airline business models. Up-gauging of aircraft is of particular concern for small airports, as larger jets require significantly different facilities than smaller regional aircraft. Some programs that support commercial service in Greater Minnesota include the federal essential air service program and the state air service marketing program.⁴⁸ Figure 11 shows the percentage change in airport boardings at airports in Minnesota with Minneapolis included for reference. Figure 12 shows boarding totals for Greater Minnesota airports.

⁴⁰ [Amtrak Minnesota Fact Sheet, 2015](#)

⁴¹ Ibid

⁴² [Amtrak, 2015](#)

⁴³ [Callanan, Rachel \(2014\) "MN Support Ped & Bike Funding"](#)

⁴⁴ Ibid

⁴⁵ MnDOT, 2015

⁴⁶ [Miller, 2015](#)

⁴⁷ [Nice Ride Minnesota](#)

⁴⁸ Juran, Ryan Aviation Office, Minnesota Department of Transportation

Figure 11: Percent change in airport boardings, 2010 - 2014⁴⁹

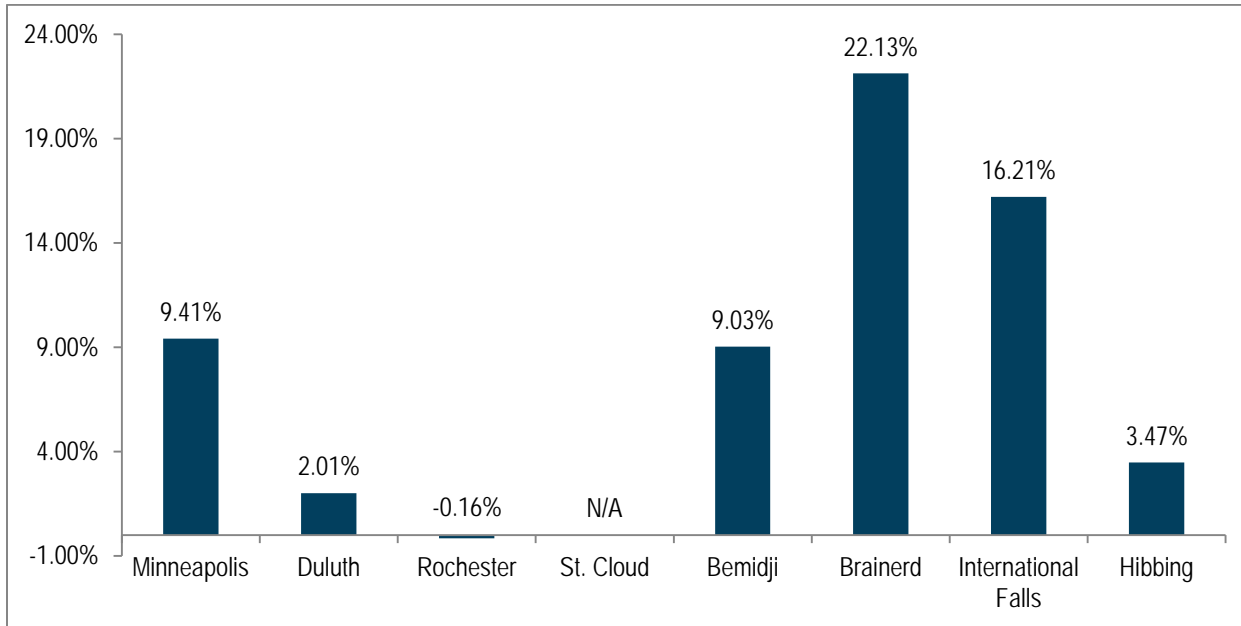
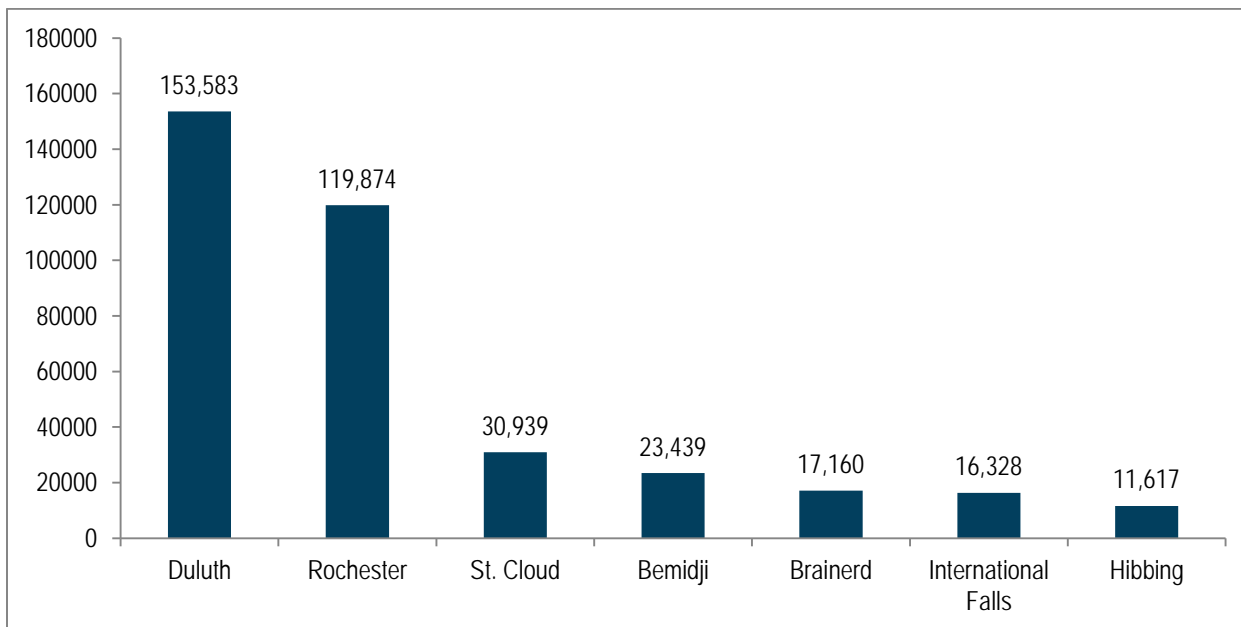


Figure 12: Total boardings at airports in Greater Minnesota, 2014⁵⁰



⁴⁹ [Federal Aviation Administration](#)

⁵⁰ [Federal Aviation Administration](#)