SEAT BELT USE ON NORTH DAKOTA RURAL ROADS: 2014

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1. INTRODUCTION

North Dakota's rural roads provide vital social and commercial links for a widely dispersed population. The safety of these roadways is paramount in managing traffic assets to enhance the state's livability. Approximately two-thirds of the state's travel, in vehicle-miles, takes place on rural roads that interconnect small communities and join the rural geography to interstates, principal state corridors, and urban centers (NDDOT). This level of rural driving is relatively high, considering only about a third of the nation's travel occurs on rural roads (U.S. DOT). From a safety perspective, this poses an inherent challenge because the risk for serious injury and death on rural roads is relatively high compared to the risk on urban roads (U.S. DOT 2005, U.S. DOT 2009a). In North Dakota, crash reports from 2009 to 2013 show that nearly 83% of fatal crashes and 85% of serious injury crashes – which include fatal and disabling injuries – occurred on non-interstate rural roads (NDDOT 2013).

With the understanding that seat belts are a relatively low-cost safety device and are an easy primary protection for occupants in passenger vehicles, North Dakota has chosen to continue to measure seat belt use on non-interstate rural roads. Understanding tendencies and trends in seat belt use on these rural roads is essential to making wise decisions with regard to efforts to encourage seat belt use in the state. The U.S. Department of Transportation does work with states to measure seat belt use through the long-standing annual National Occupant Protection Use Survey (NOPUS).

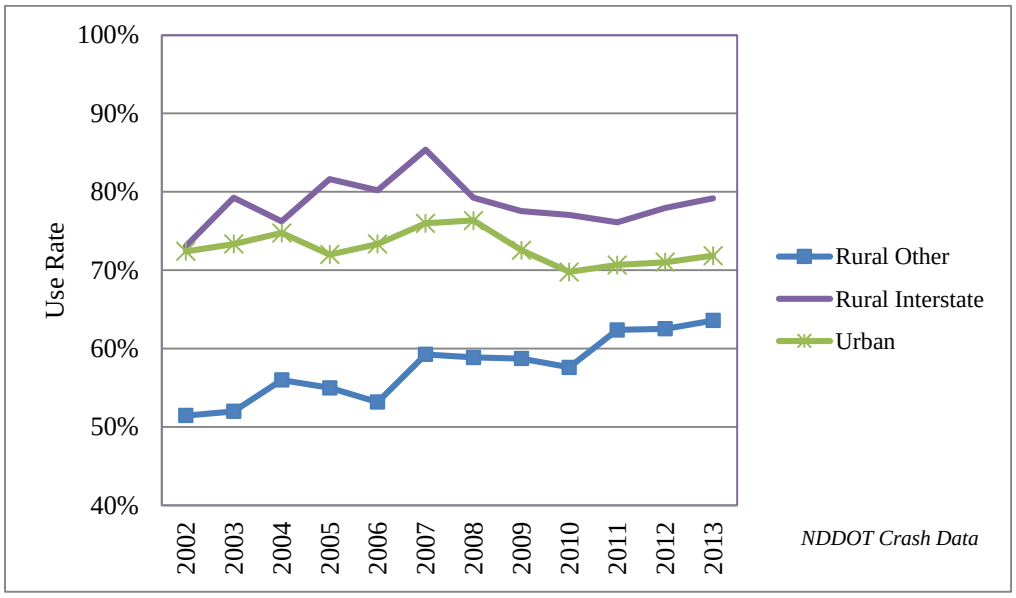

Figure 1.1 Seat Belt Use in Injury Crashes (includes Fatal Injuries), by Road

Results from this survey supplement to NOPUS statewide estimate which also includes urban and interstate travel which are heavily weighted in the final seat belt use estimate. Figure 1.1 provides some insight into seat belt use based on occupant reports for crashes by road type. Although not a perfect reflection of use on the road types, trends do offer some insight for the larger occupant population. Other perspectives on the traffic crashes are offered in the seat belt use rates by occupant injury outcome and crash incidence trends. The crash incidence is categorized by the most serious injury outcome resulting from a crash event in order to provide additional context regarding traffic activity. The observation study described in this report of the larger occupant population is a continuation of efforts to measure seat belt usage for all occupants on rural roads North Dakota.

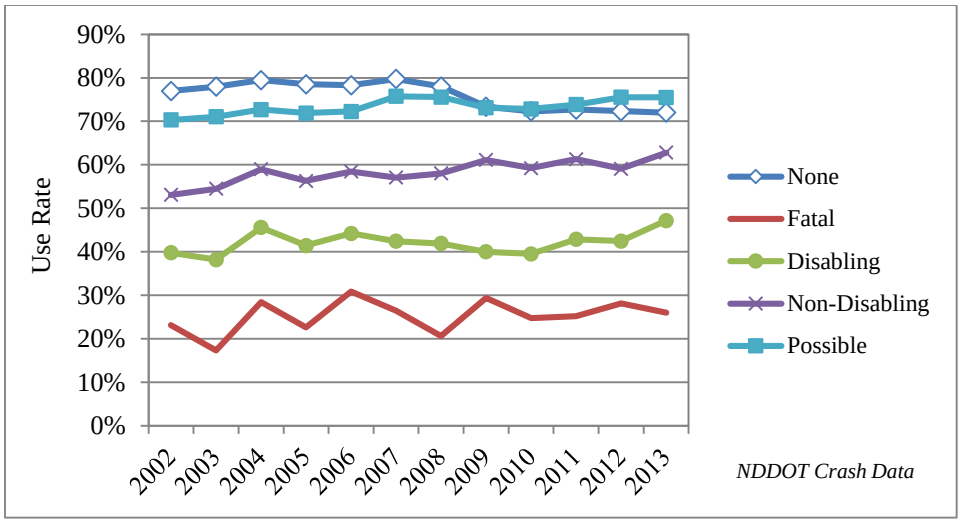

Figure 1.2 Seat Belt Use Rate in All Crashes, by Type of Injury

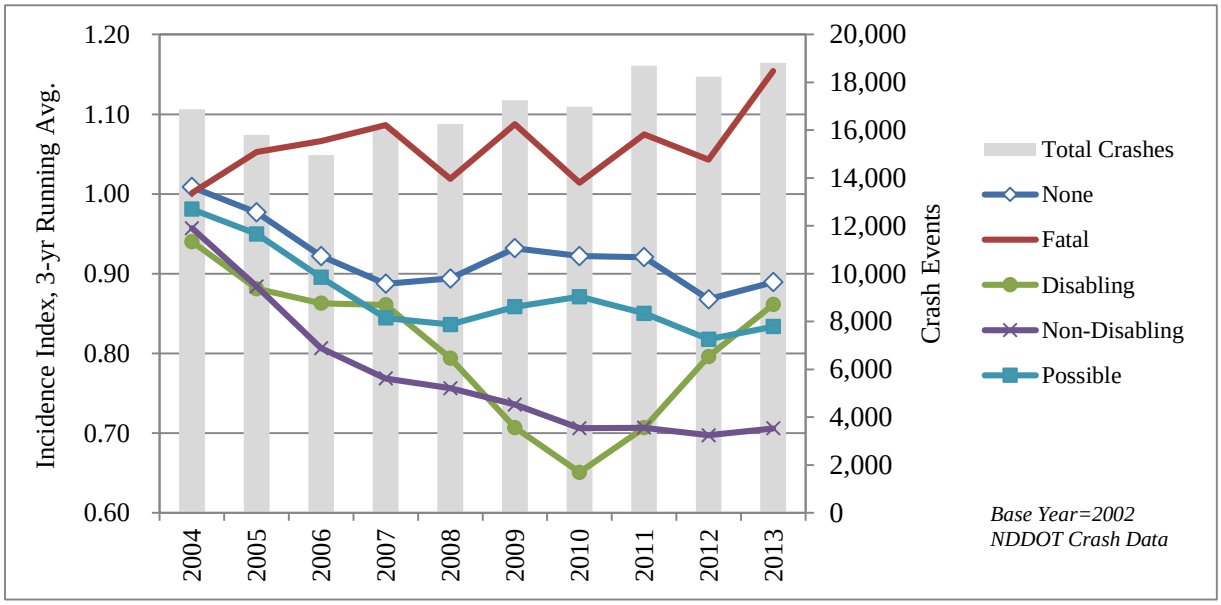

Figure 1.3 Crash Type, VMT Incidence Rate Index

2. METHODOLOGY

The method used in the 2014 survey is a continuation of a survey initiated in 2009. As with previous surveys, a direct observation method was used. A first step in administering the survey was to define a representative and realistic survey sample. Sampling was based on rural county populations and geographic representation of counties across four quadrants of the state. Counties were used as the boundaries for the initial selection stratum in the sample because population and other demographic information for counties are readily available. The quadrants were defined based on the North Dakota Health Department administration regions (Figure 2.1). Initially, stratified random sampling was conducted with rural counties that are not part of the NOPUS survey. Due to changes that occurred with the NOPUS method for the 2012 survey, the counties in the rural survey were selected to avoid duplication of counties between the surveys.

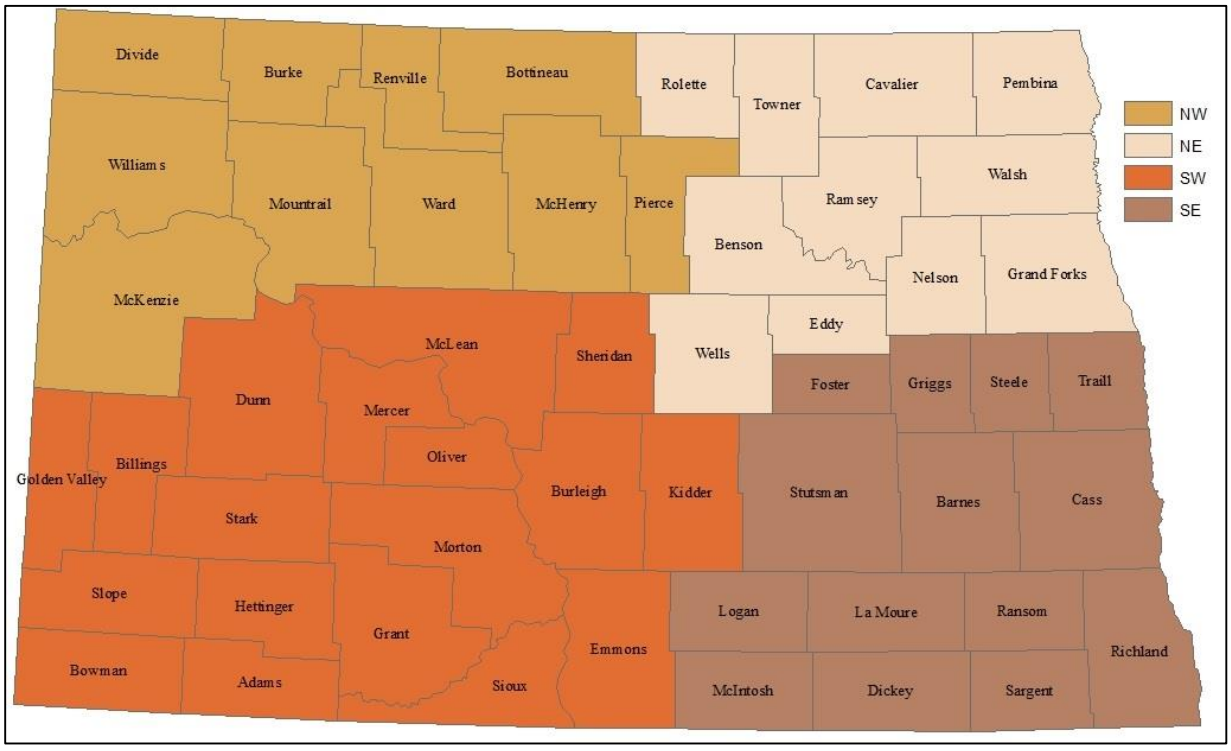

Figure 2.1 Rural Seat Belt Regions

The counties excluded from the annual statewide seat belt survey normally comprise the state's rural-county geography for this project. The three highest population counties in the statewide seat belt survey have approximately 62 people per square mile, compared to only 10 people per square mile for the three highest in the rural county sample. Although some counties with lower population densities are included in the statewide seat belt survey sample, the counties selected for that survey include the most populated – thus most urban – counties in the state. Twenty-four of the 37 counties not surveyed in the NOPUS survey were surveyed in this project (Figure 2.2).

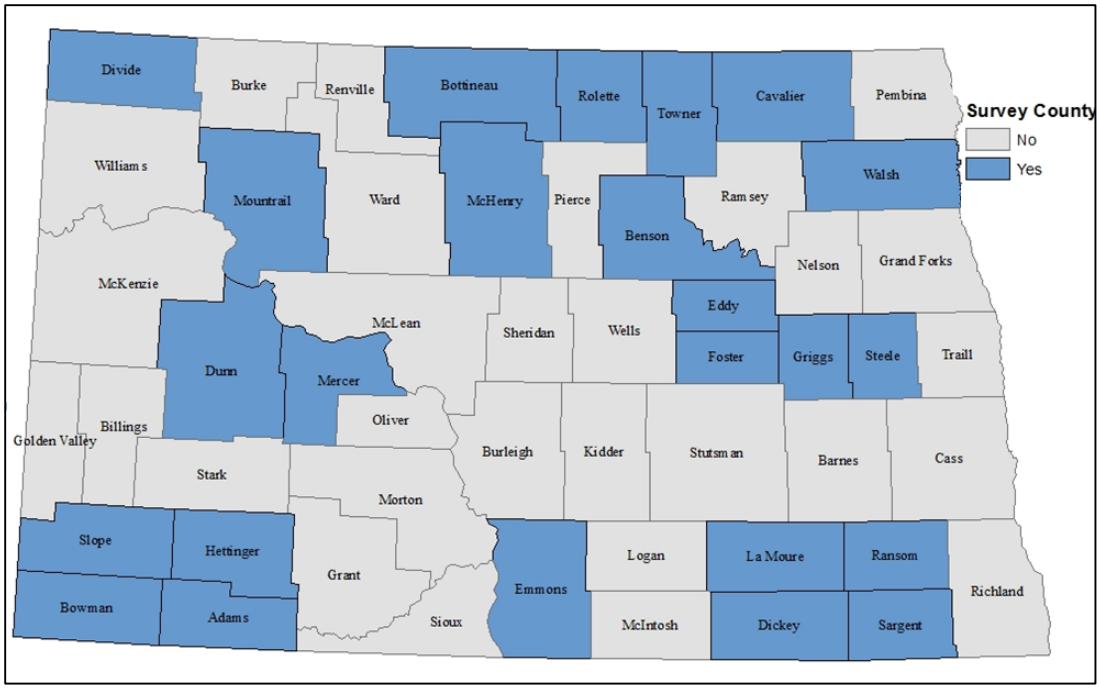

Figure 2.2 Rural Seat Belt Counties

Within the sample counties, sites selected for observation were based on local traffic knowledge, due to the fact that annual vehicle miles traveled, or traffic density, is not available for local roads.

Observations were conducted in July 2014. The seat belt observations were performed by experienced seat belt survey observers. Prior to conducting county observations, observers were asked to become familiar with the "Rural Seat Belt Observation Training Guide" which outlines specific procedures recommended for conducting rural seat belt observations in North Dakota, including the data collection tool (Appendix A).

The following outlines general site selection and timeline guidance provided to observers:

1. One site per town, up to two towns per county,
2. Three to four "non-town" sites to cover higher-traffic intersections on non-interstate/non-urban roads in the county,
3. Sites chosen had to be a minimum of 20 miles away from the interstate (to avoid bias associated with urban commuter traffic),
4. Each site had to be observed for a minimum of 30 minutes, up to one hour if extra time was needed to meet the 30 observation minimum for a site. After the additional 30 minutes, the site was considered "complete" regardless if the 30 observation minimum was met or not,
5. Hours for collection were from 7 a.m. to 7 p.m.

3. RESULTS

A total of 5,687 observations of driver seat belt use were collected during surveys conducted at 142 sites across the state (Figure 1.2). This includes 119 instances where driver seat belt use could not be determined. These observations are not included when calculating driver seat belt use in this report. Passenger seat belt use was also collected when possible. The limited information on passenger use, which includes 1,275 observations, was used primarily to assess correlation with driver use. This includes 32 instances where passenger seat belt use could not be determined. These observations are not included when calculating passenger seat belt use in this report. The non-response rates – defined by the number of cases where use could not be determined – were low for both driver and occupant at 2.1% and 2.5% respectively. In addition to the observation distribution by county, the following table also includes the county populations used for weighted results highlighted in the following sections.

Table 3.1 Observation Counts and Observation Site Counts by County: 2014

	Observations			Population (2013)	
County	**Count**	**% of TOTAL**	**Observation Sites Per County**	**Population**	**% of TOTAL**
Adams	250	4.4%	6	2,360	2.0%
Benson	190	3.3%	6	6,877	5.9%
Bottineau	297	5.2%	6	6,736	5.7%
Bowman	251	4.4%	6	3,214	2.7%
Cavalier	136	2.4%	6	3,896	3.3%
Dickey	181	3.2%	6	5,248	4.5%
Divide	272	4.8%	6	2,314	2.0%
Dunn	372	6.5%	6	4,162	3.6%
Eddy	178	3.1%	6	2,404	2.1%
Emmons	277	4.9%	6	3,486	3.0%
Foster	264	4.6%	6	3,366	2.9%
Griggs	129	2.3%	6	2,296	2.0%
Hettinger	186	3.3%	6	2,660	2.3%
LaMoure	161	2.8%	6	4,166	3.6%
McHenry	341	6.0%	6	5,922	5.1%
Mercer	394	6.9%	6	8,592	7.3%
Mountrail	574	10.1%	6	9,376	8.0%
Ransom	180	3.2%	4	5,516	4.7%
Rolette	219	3.9%	6	14,582	12.4%
Sargent	179	3.1%	6	3,890	3.3%
Slope	268	4.7%	6	761	0.6%
Steele	134	2.4%	6	1,960	1.7%
Towner	112	2.0%	6	2,317	2.0%
Walsh	142	2.5%	6	11,104	9.5%
TOTAL	**5,687**	**100.0%**	**142**	**117,205**	**100.0%**

3.1 Driver Rural Seat Belt Use

3.1.1 Road Type

Because overall rural seat belt use rate may be skewed by the mix of rural highway and rural town seat belt observations – which may not truly reflect crash exposure risk – it may be more appropriate to consider the different driving environments separately. The more relevant numbers are seat belt use by road type, used here as the driving environment, due to relative injury risk between the rural town and rural highway roads. The greater risk associated with travel beyond town is evident in state crash data, which shows only about 2% of fatal crashes on rural roads occur in town (NDDOT 2013). Therefore, rural highways are given special attention.

The observed seat belt use rate for drivers on rural highways was 71.7%. This use rate is significantly different than the use rate in rural towns at 44.6%.[1] Both use rates fall well below the NOPUS estimate of about 81%. Rural highway seat belt use rates by drivers have increased in each of the past six years, while town use has ranged from 35.6% to 46.0% (Figure 3.1). From 2009 to 2014, highway use increased from 55.2% to 71.7% and town use increased from 35.6% to 39.7%. The percentage point increase of 16.5 for highway use is a 30% increase and the 4.1 percentage point increase translates to a 12% increase in town use. The increase in driver use on rural highways from 2013 to 2014 is significant at the 90th percentile (χ^2=3.2209, ρ=0.07, n=6,299). The decrease from 2013 to 2014 for seat belt use in towns is statistically significant at the 90th percentile (χ^2=13.0908, ρ<0.01, n=5,115).

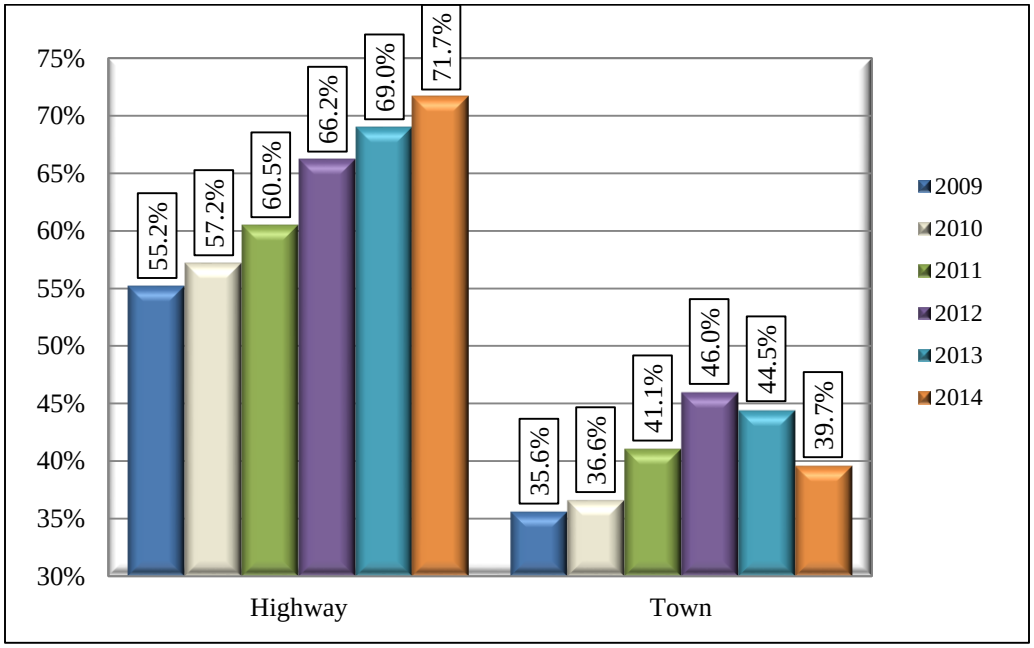

Figure 3.1 Driver Seat Belt Use by Road Type

The range of highway seat belt use rates by county was large, with a high of 81.7% in Griggs County and a low of 57.2 % in Emmons County (Figure 3.2). The range in seat belt use suggests potential to investigate the environment and practices in the more successful counties to determine if best practices can be transferred to other areas or if there are unique cultural or travel situations that lead to the higher

[1] Figures reported for the seat belt use rates are observed rates weighted by county population. For regional and statewide figures, only weighted seat belt use rates are reported unless otherwise specified.

rates. Seat belt use in rural towns ranges from a high of 68.4% in Slope County to a low of 13.9% in Hettinger County.

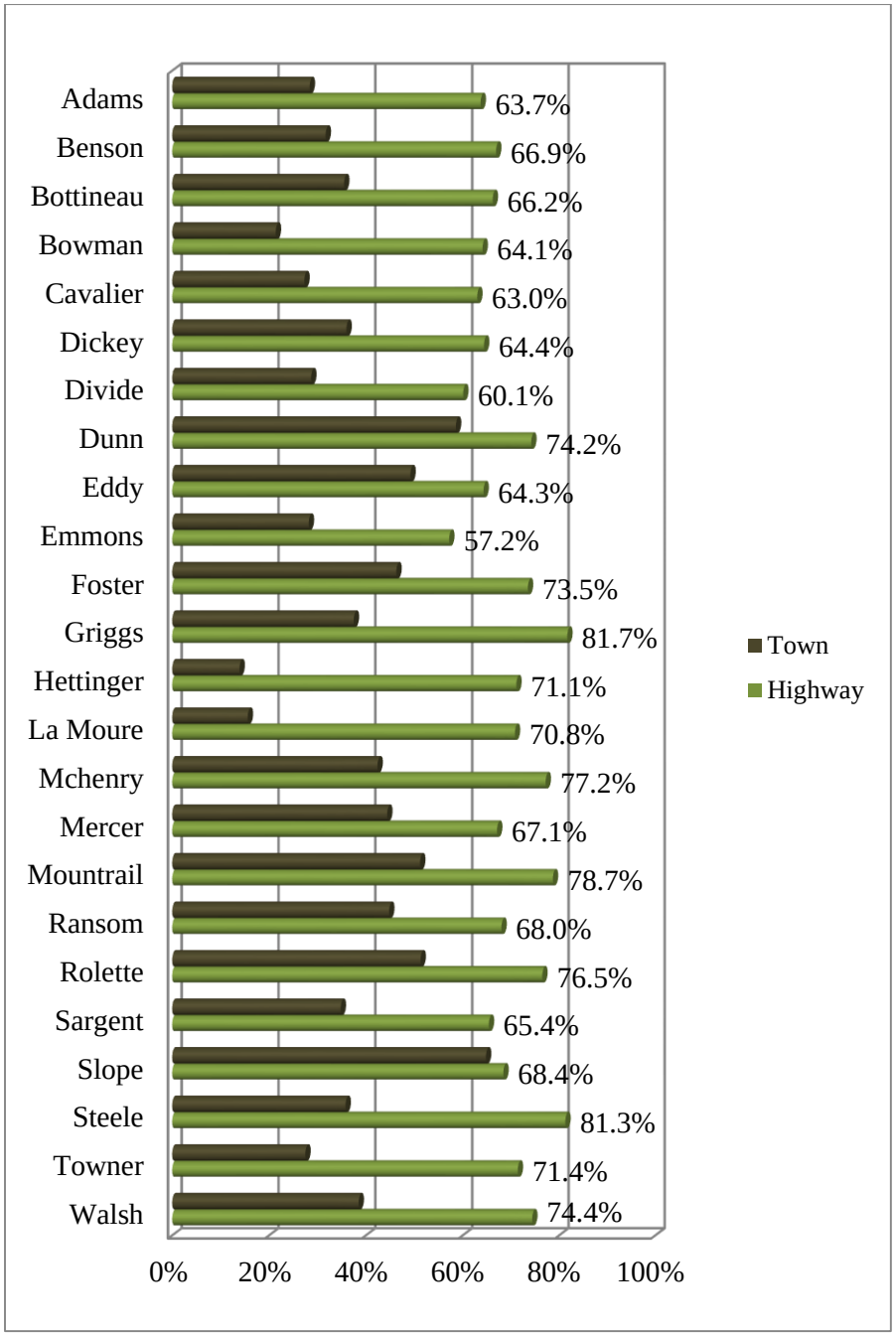

Figure 3.2 Driver Seat Belt Use by Road Type and County, 2014

Clusters and corridors of counties can be identified in the map of seat belt use by looking at the distribution of counties by use rates (Figure 3.3). In the northwest region, McHenry and Mountrail were in the upper quartile. Walsh, Griggs, and Steele counties are in close proximity as a cluster in the northeast. With these counties, commuter traffic and close proximity to an interstate highway may be an influence. Although attempts are made to minimize interstate traffic influences, it is likely that some counties still have affects from commuter traffic where use rates tend to be higher. Counties with the

lowest highway seat belt use rates are grouped in two areas: along the northern tier of counties including Eddy, Benson, Cavalier and Bottineau counties and in the southern part of the state, including Dickey, Ransom, and Sargent counties. In the central and western regions of the state, Emmons, Bowman, and Adams had less than 64.4% of observed vehicle occupants using seat belts.

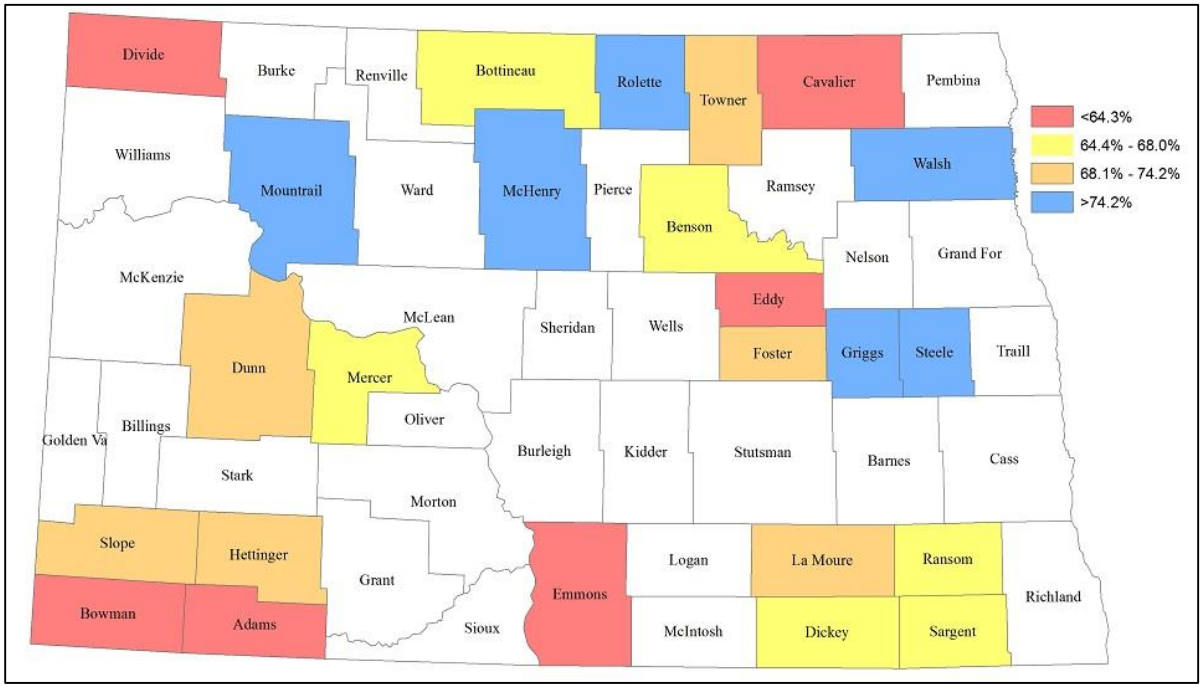

Figure 3.3 Highway Seat Belt Use by County, 2014

Of counties that have been observed for multiple years, Towner, Griggs, Dickey, LaMoure and Hettinger had the largest increases in highway seat belt use compared to an average for the previous years' observation rates (Table 3.2). Counties with the largest declines in highway seat belt use were Slope, Walsh and Mercer. Once again, it is possible that the fluctuations in seat belt use identified here are attributable to driver behavior, but changes in driver characteristics or environmental factors also may be influential.

Table 3.2 Annual Observation of Highway Seat Belt Use by County

County	2010	2011	2012	2013	2014	Percentage Point Change from Avg. Previous Observations
Adams	67.8%	n.a.	66.0%	61.4%	63.7%	0%
Benson	61.1%	46.0%	73.0%	60.4%	66.9%	7%
Bottineau	n.a.	n.a.	n.a.	67.7%	66.2%	-1%
Bowman	54.8%	n.a.	66.9%	59.1%	64.1%	1%
Cavalier	53.5%	49.2%	70.2%	76.0%	63.0%	-2%
Dickey	68.6%	41.9%	65.7%	53.2%	64.4%	11%
Divide	70.7%	51.6%	53.6%	71.4%	60.1%	1%
Dunn	53.7%	n.a.	61.0%	77.0%	74.2%	5%
Eddy	44.8%	n.a.	65.6%	57.6%	64.3%	3%
Emmons	n.a.	57.8%	n.a.	53.2%	57.2%	2%
Foster	n.a.	65.8%	67.9%	69.7%	73.5%	6%
Griggs	57.8%	58.7%	71.2%	74.8%	81.7%	13%
Hettinger	55.4%	62.8%	67.9%	51.3%	71.1%	10%
LaMoure	63.7%	n.a.	66.9%	54.9%	70.8%	10%
McHenry	68.9%	n.a.	63.4%	81.6%	77.2%	5%
Mercer	n.a.	n.a.	n.a.	70.6%	67.1%	-4%
Mountrail	n.a.	n.a.	n.a.	74.1%	78.7%	5%
Ransom	62.9%	59.5%	67.4%	65.1%	68.0%	4%
Rolette	40.6%		62.2%	73.6%	76.5%	9%
Sargent	67.8%	64.9%	61.9%	60.7%	65.4%	3%
Slope	56.4%		78.2%	72.1%	68.4%	-7%
Steele	61.1%	72.9%	63.5%	84.5%	81.3%	8%
Towner	67.9%	45.7%	52.7%	58.9%	71.4%	19%
Walsh	68.5%	77.0%	81.8%	82.7%	74.4%	-6%

n.a. not available

3.1.2 Region

Based on the regions defined in the methodology section, seat belt use among drivers is presented as trend lines in Figure 3.4. Drivers in the northern regions of the state saw little change in seat belt use, remaining ahead of the southern areas with about 73% use rates reported for 2014. The northwest region at 73.2% remained slightly above the northeast in seat belt use on rural highways. The northeast rate of 72.1% seems to have leveled off considering previous years. The lowest use among regions was reported for the southwest at 66.7%, followed by the southeast at 70.2%. Both the southern regions did see increases in highway seatbelt use from 2013 to 2014. None of the use rate changes are statistically significant compared to last year.

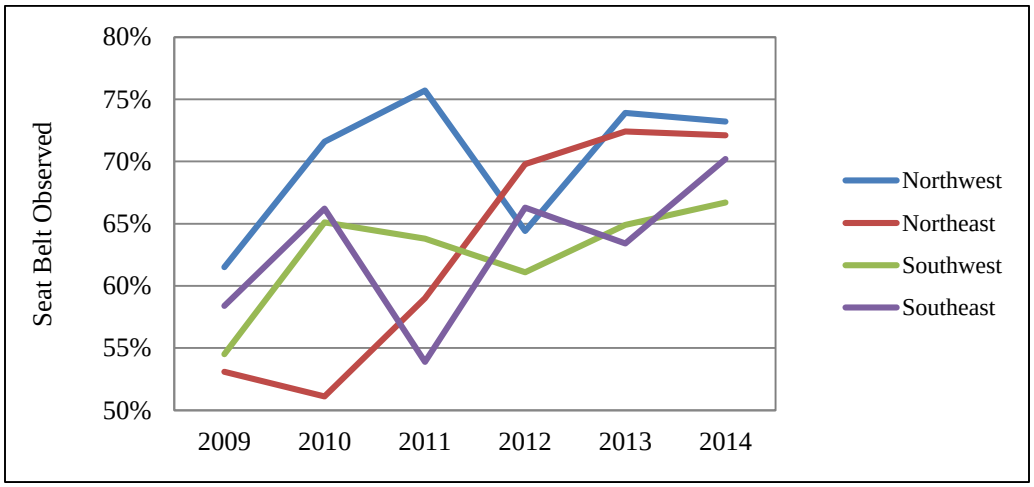

Figure 3.4 Highway Driver Seat Belt Use by Region: 2009-2014

3.1.3 Driver Gender

Males were present at a ratio of about 2.3 to 1 in the driver population for the rural road seat belt observations. Of the 5,678 drivers observed where gender could be determined, 3,978 were male. Females made up a smaller share of the driver population both on highways and in towns, with the share higher in town at 35.8% compared to 32.7% on the highways. Female share in both road types increased compared to 2013. Gender is a common topic in seat belt use research because of the relatively low-cost and ease with which the information can be collected. The lower propensity for males to use seat belts found in this study, is consistent with other research (Strinea et. al, 2010, U.S. DOT 2008, Gross et al. 2007, Vivida et al 2007, McCartt and Northrup 2004). The driver seat belt use does vary significantly between the genders (χ^2=71.6857, p=<0.01, n=5,565).

With regard to driver use rates by gender for road type, female use on rural highways was 81.4% compared to 66.4% for males (Figure 3.5). In rural towns, the use rates are 49.2% for female drivers and 33.5% for males. While seat belt use did increase for male drivers on rural highways, drivers' seat belt use in other categories decreased. The decrease in seat belt use by males in towns is significant compared to the previous year (χ^2=7.22, p=<0.0001, n=3,332). Changes in the other road type and driver categories were not statistically significant at the 99th percentile.

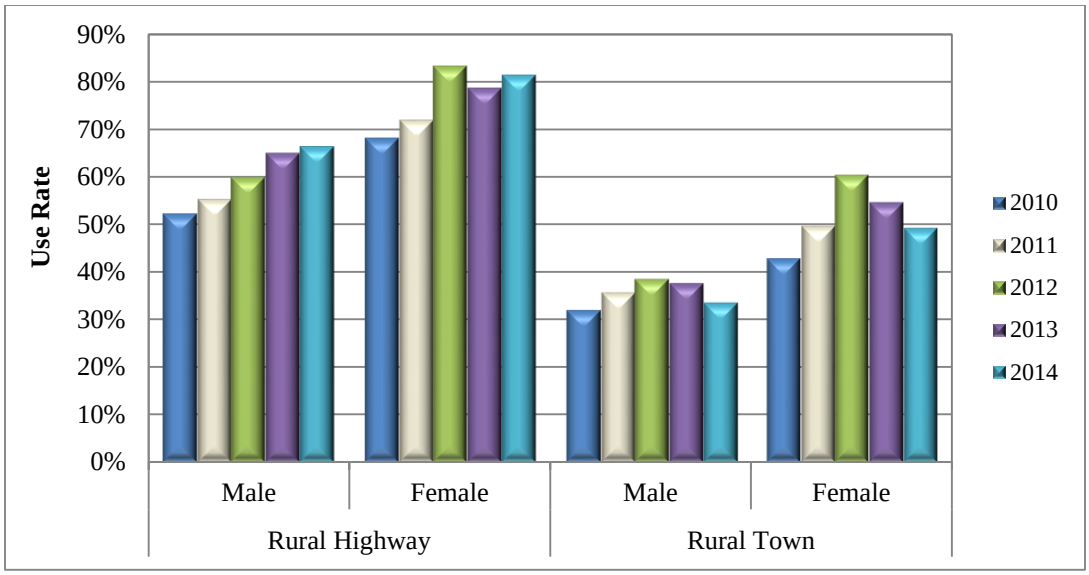

Figure 3.5 Driver Seat Belt Use by Gender and Road Type: 2010-2014

Table 3.3 shows county-level seat belt use rates on rural highways and in rural towns by gender. The county information shows the highest female use rates for 2014, above 90%, on rural highways are in Foster, Griggs and Mountrail counties. The lowest rates among female drivers, with rates under 75%, were Sargent, Cavalier and Dickey counties. Steel, Mountrail and McHenry counties had the highest use rates among male drivers on rural highways, with rates of 76% to 78%. The lowest seat belt use rates among male drivers, with rates under 58%, were in Hettinger, Emmons and Adams counties.

Male driver seat belt use in towns was highest in Slope County at 65%. The use within this driver group was lowest, under 20%, in Hettinger, Bowman, Adams, and Emmons counties. Among female drivers, use was under 30% in Emmons County. The highest rate for females, 68%, was reported in Dunn County. LaMoure County had the lowest rate of female seat belt use in town with only 5%.

County-level seat belt use figures should be used with caution due to factors which may affect the figures relative to other counties and year-to-year changes. These factors may include commuter traffic, observation site proximity to highways, community events, and observation counts. The information is offered as additional insight, but should be used sparingly as the sole factor in resource decisions. Used in conjunction with expanded information from this survey or other seat belt use studies, the additional information may be useful in targeting education and enforcement activities.

Table 3.3 County Driver Seat Belt Use, by Road Type and Gender

County	Average 2011-2013				2014			
	Rural Highway		Rural Town		Rural Highway		Rural Town	
	Male	Female	Male	Female	Male	Female	Male	Female
Adams	59%	76%	36%	52%	55%	86%	18%	45%
Benson	55%	76%	34%	40%	60%	84%	27%	42%
Bottineau	n.a.	n.a.	n.a.	n.a.	61%	80%	30%	48%
Bowman	57%	83%	39%	69%	61%	77%	13%	35%
Cavalier	60%	83%	24%	34%	59%	72%	26%	31%
Dickey	49%	64%	42%	45%	60%	73%	22%	57%
Divide	55%	91%	35%	26%	58%	76%	28%	30%
Dunn	69%	69%	54%	64%	73%	82%	58%	68%
Eddy	58%	71%	43%	54%	59%	76%	51%	44%
Emmons	48%	76%	19%	33%	51%	79%	19%	41%
Foster	65%	75%	31%	45%	65%	94%	33%	66%
Griggs	68%	71%	29%	52%	73%	93%	26%	48%
Hettinger	54%	77%	21%	32%	35%	84%	11%	22%
LaMoure	56%	75%	32%	57%	68%	76%	21%	5%
McHenry	69%	84%	37%	69%	76%	82%	39%	50%
Mercer	n.a.	n.a.	n.a.	n.a.	61%	84%	39%	55%
Mountrail	n.a.	n.a.	n.a.	n.a.	76%	93%	48%	59%
Ransom	59%	80%	34%	57%	62%	78%	37%	57%
Rolette	59%	84%	36%	59%	73%	82%	41%	67%
Sargent	58%	84%	34%	56%	65%	67%	23%	54%
Slope	73%	83%	65%	62%	64%	83%	65%	63%
Steele	73%	86%	32%	54%	78%	88%	36%	35%
Towner	50%	65%	39%	48%	67%	82%	24%	33%
Walsh	75%	92%	38%	65%	71%	79%	33%	44%

n.a. not available

3.1.4 Vehicle Type

As with gender, vehicle type is also commonly considered in seat belt surveys. Both offer potentially useful information for greater efficacy in directing enforcement and education efforts toward a driver group (U.S. DOT 2009b). For example, a nationwide study of fatal crashes showed that pickup truck occupants had the highest percent of unrestrained fatalities among all passenger vehicle types (U.S. DOT 2008). Similar use patterns for this vehicle type were found here, with male pickup truck drivers having the lowest use rates among the gender-fleet mix.

The rural seat belt observations included more pickup trucks than cars (2,716 and 1,411, respectively), along with 1,148 sport utility vehicles (SUVs), and 355 vans (Figure 3.6). The fleet composition for the seat belt observation, by vehicle type, is similar to 2013.

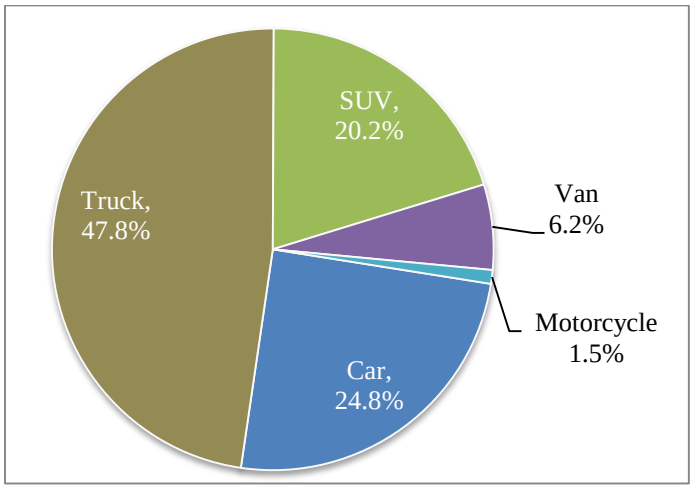

Figure 3.6 Observed Rural Road Passenger Vehicle Fleet, by Vehicle Type

A significant variation in seat belt use is found across passenger vehicle types on rural roads (χ^2=135.0455, p<0.0001, n=5,568). In 2014, driver seat belt use in cars on rural highways was 77.0% compared to 63.9% for pickup truck drivers (Figure 3.7). Use by pickup truck drivers did increase 4.5 percentage points compared to 2013 while use by car drivers increased by 6.5 percentage points. SUV drivers also had a higher observed use rate in 2014 at 82.9%. Seat belt use by van drivers decreased by 3.8 percentage points in 2014 compared to 2013. The changes between 2013 and 2014 by vehicle type, for rural roads, were not statistically significant.

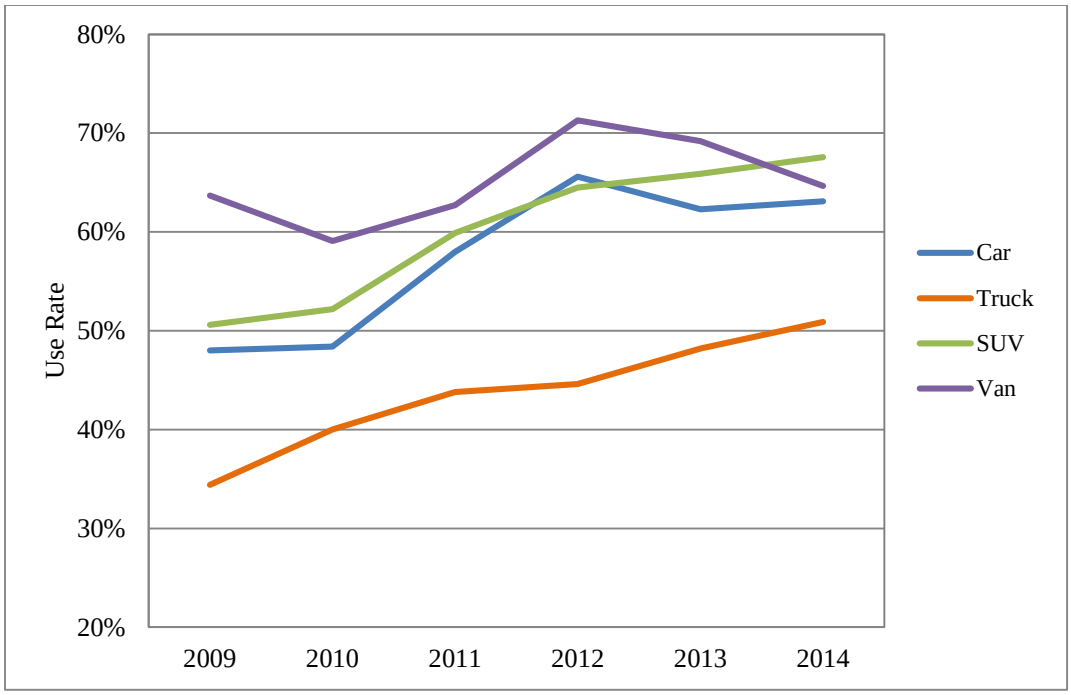

Figure 3.7 Driver Seat Belt Use by Vehicle Type

Further stratification for gender shows that female drivers have higher seat belt use rates among all vehicle classes, ranging from 53.7% for pickups to 74.0% for vans (Table 3.4). Males, in comparison, used seat belts only 45.6% of the time in pickup trucks and 63.8% of the time in vans. A significant difference was found in seat belt use between female and male drivers for cars and SUVs at the 95th percentile (χ^2=4.97, ρ=0.0257, n=1,384; χ^2=4.61, ρ=0.0317, n=1,124). The variance is significant at the 90th percentile for pickup truck drivers (χ^2=3.67, ρ=0.0553, n=2,649).

Table 3.4 Driver Seat Belt Use by Vehicle Type and Gender

	2011		2012		2013		2014	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
Car	52.6%	63.5%	59.6%	72.4%	60.8%	65.0%	60.2%	65.2%
SUV	60.0%	59.8%	63.4%	66.0%	65.5%	66.3%	65.8%	70.8%
Pickup	42.2%	60.2%	41.9%	68.5%	46.7%	63.6%	45.6%	53.7%
Van	61.2%	64.2%	66.3%	81.6%	60.8%	77.3%	63.8%	74.0%

When also considering the road environment, the highest use rate was among females driving SUVs on rural highways. Seat belts were in use for 89.4% of drivers observed in this group (Table 3.5). The lowest use rate, 32.9%, was found among males driving pickups in rural towns. Seat belt use increased across all gender and vehicle groups on the rural highways comparing 2014 to the previous three-year average with the exceptions of female drivers of pickups and vans. Change for seat belt use rates in rural towns was mixed for both the male and female drivers compared to the previous three years. Use in pickups was up for both groups, while use in SUVs was down for both males and females.

Table 3.5 Driver Seat Belt Use by Vehicle Type, Gender, and Road Type

	Average, 2010-2013				2014			
	Rural Highway		Rural Town		Rural Highway		Rural Town	
	Male	Female	Male	Female	Male	Female	Male	Female
Car	68.6%	74.2%	42.9%	54.8%	75.1%	79.0%	48.4%	48.2%
SUV	74.4%	75.9%	45.8%	51.9%	75.7%	89.4%	43.9%	48.9%
Pickup	53.6%	75.8%	32.2%	40.9%	60.2%	61.0%	32.9%	44.6%
Van	71.6%	87.5%	45.8%	58.5%	75.3%	87.1%	39.3%	65.2%

3.2 Passenger Rural Seat Belt Use

As previously mentioned, the passenger observations were collected when traffic flow and field of vision allowed observers to collect information in addition to the driver seat belt use (Figure 3.8). Passenger seat belt use was 80.5% on rural highways and 53.0% in rural towns, reflecting an increase in seat belt use on highways and a decrease in use in towns. Neither change is statistically significant. Unlike the driver population, a majority of passengers were female, comprising 55.9% of the group.

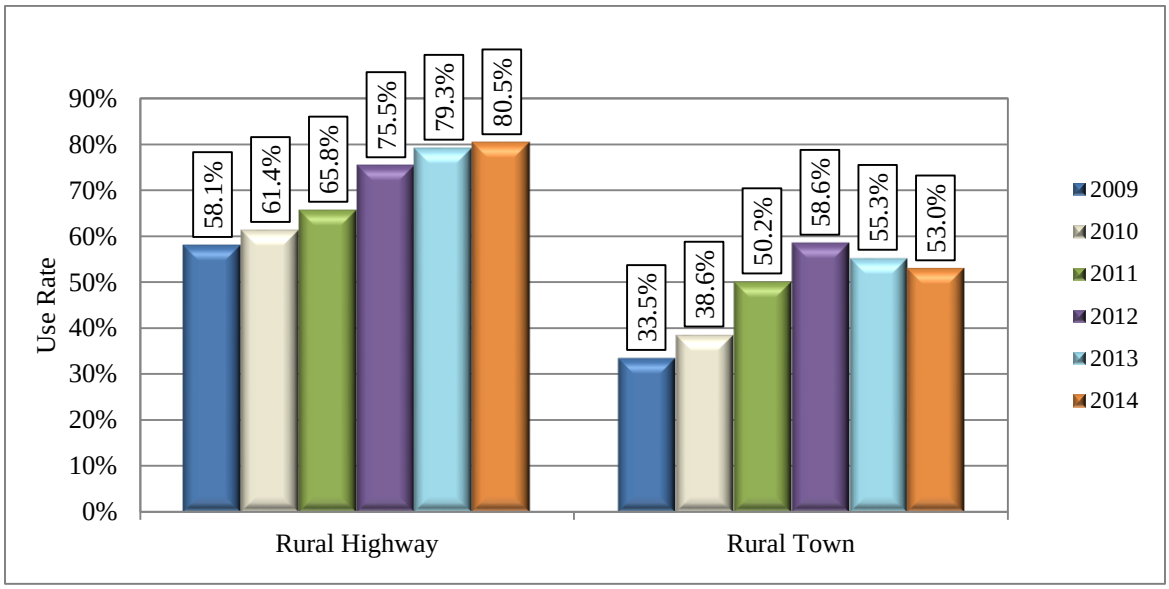

Figure 3.8 Seat Belt Use in Passenger Observation Cases

As with driver observations, gender was a significant characteristic in passenger seat belt use (χ^2=124.17, p<0.0001, n=1,276). Recall that the effects of the road type mix along with the passenger gender trends may skew these overall figures considering the stark difference between highway and town usage. Consequently, the use rates are presented in the context of the road type (Figure 3.9). Figures by gender and road type show increases in both genders on the rural highways. Male passenger use increased slightly in rural towns and female use declined. The increase in female use on rural highways is significant (χ^2=8.1735, p<0.0043, n=1,003).

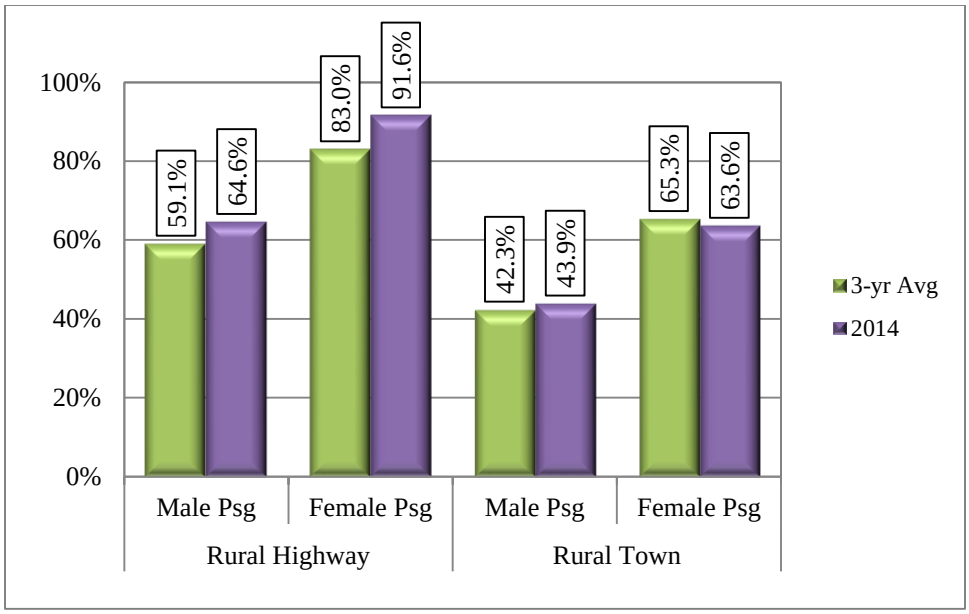

Figure 3.9 Passenger Seat Belt Use by Road Type and Gender, Previous 3-Year Average and Current Year

The driver and passenger seat belt use rates were strongly correlated in cases where passenger use could be recorded (Pearson's Corr.=0.75, p<.0001, n=1,267). These findings are consistent with earlier research (Nambisan and Vasudevan 2007). In 65.6% of the cases, both the driver and passenger were belted (Figure 3.10). Neither passenger nor driver was belted in 23.9% of the cases. The driver was belted and passenger unbelted in 4.4% of the cases and the passenger was belted and the driver unbelted in 6.1% of the cases. Males were driving in a majority of the cases where passenger gender and belt use was recorded, representing 68.8% of the drivers. Passenger seat belt use was not found to be significantly related to driver gender.

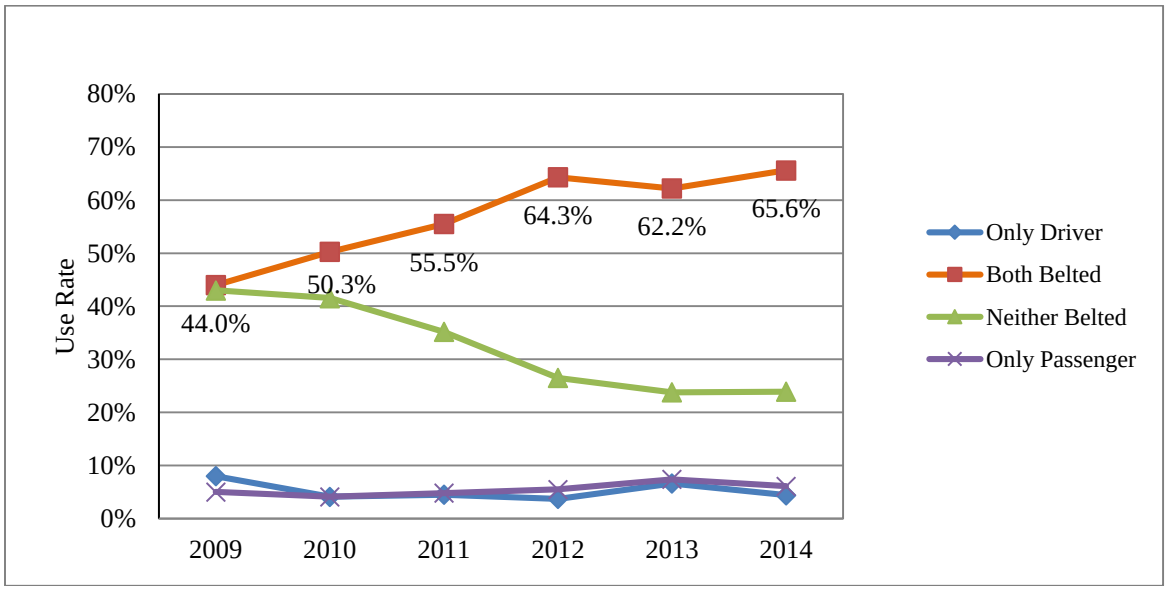

Figure 3.10 Passenger Seat Belt Use by Road Type

Stratifying the passenger seat belt cases by road type does show that passengers were consistently more likely to be belted on rural highways than in rural towns over the past six years (Figure 3.11). The unbelted passengers were found most frequently in rural towns, with use on these roads slipping again between 2013 and 2014. The continued positive trend by passengers observed on rural highways is a key gain in traffic safety as the likelihood for serious injury crash outcomes is greater on these roads due to factors such as higher speeds and farther proximity to emergency services. The 1.5 percentage point increase in use on rural highways from 2013 to 2014 is significant at the 95th percentile (χ^2=4.6316, p=.03, n=1,748).

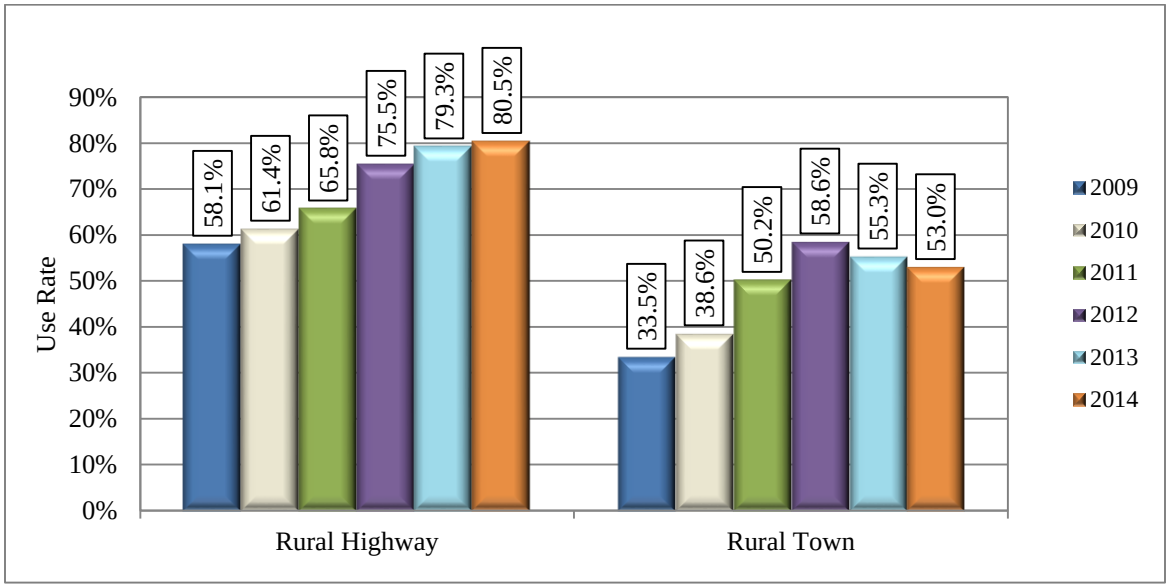

Figure 3.11 Passenger Observation Cases by Road Type

3.3 Motorcycle Helmet Use

Although the primary target for this occupant use survey is drivers of passenger vehicles, observers were also asked to collect information about motorcycle driver and passenger helmet use when traffic and visibility allowed. During the 2014 survey, 57 motorcycle observations were collected. Statistics are reported, but due to the very small number of observations any statistics should be used with great caution in making generalizations about the larger motorcycle driver population. Males were drivers in 55 of the 57 cases.

Helmet use on rural highways was estimated at 53.8% and 5.0% in rural towns (Figure 3.12). The helmet use on highways was well above 2013, but there is a large variation across time likely related to limited observations. Only 16 observations were collected for rural towns with about 5% of drivers reportedly wearing helmets. Passenger helmet use was collected for 8 cases. In these cases, all the passengers were female and were wearing helmets.

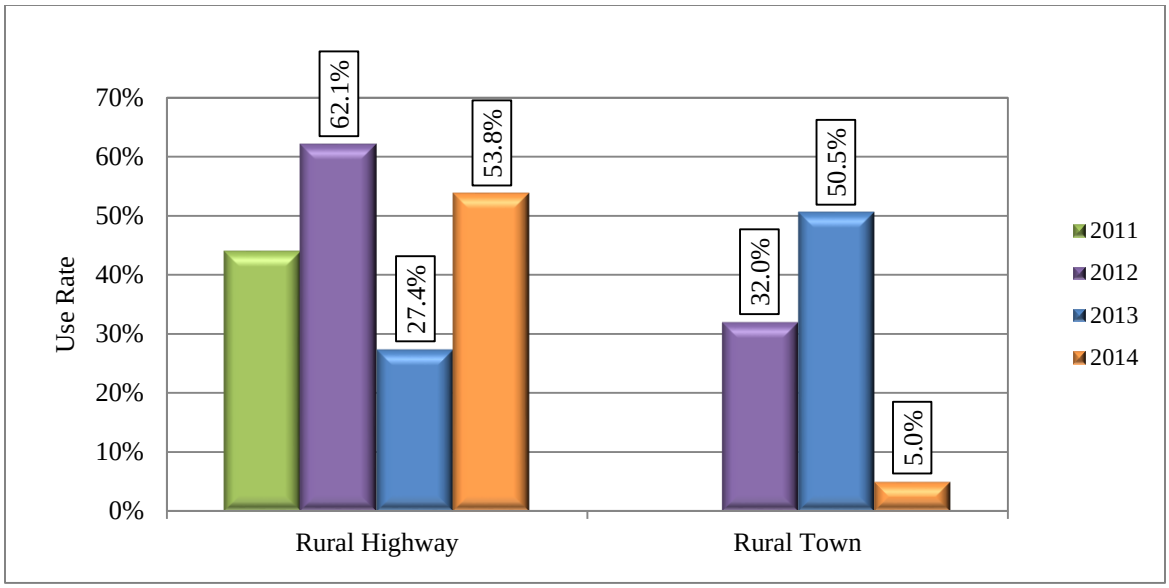

Figure 3.12 Driver Helmet Use by Road Type

Limited observations show mixed results as male use increased on highways and declined in town (Figure 3.13). No observations were collected for females in rural towns during the 2014 survey. Two female rides were observed on rural highways – one was wearing a helmet. All figures should be used with caution because of the limited observations.

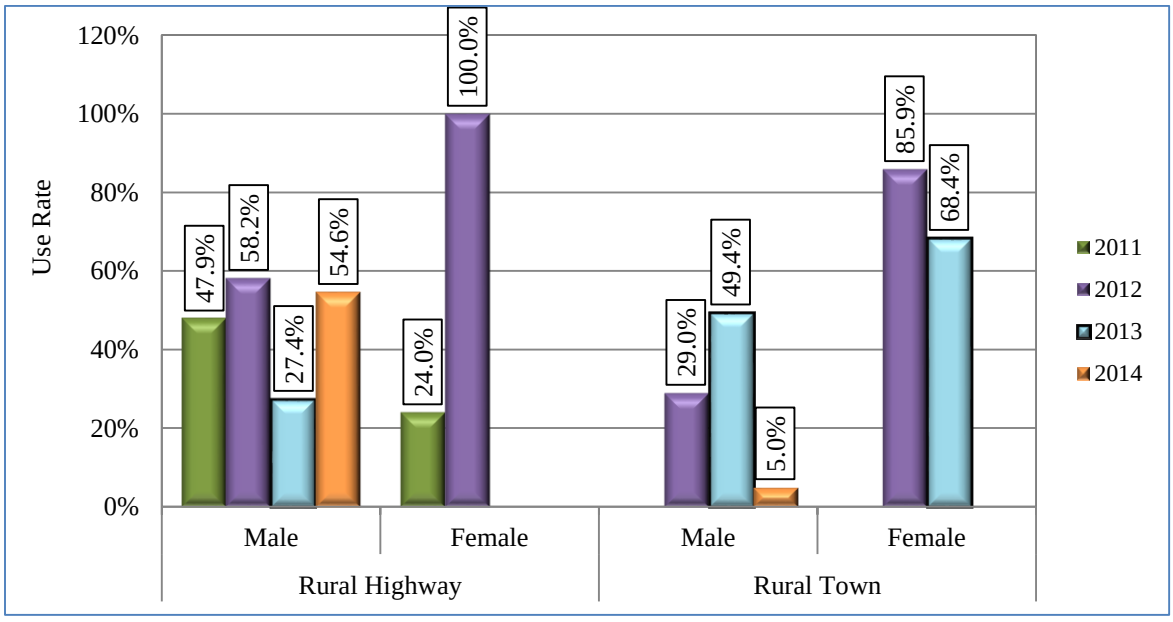

Figure 3.13 Driver Helmet Use by Gender and Road Type

4. DISCUSSION

North Dakota's roads provide vital economic and social connections for residents and visitors. These roads are a relatively high-risk travel environment. Rural roads account for 75% of annual travel and nearly 89% of fatal crashes and 71% of serious injury crashes. While there are many important aspects of road safety, interest here is in measuring seat belt use for managing it as a safety priority.

A total of 5,687 driver seat belt observations were collected at 142 sites across 24 rural counties. Highway seat belt use increased from 69.0% in 2013 to 71.7% in 2014. Since 2009, the survey has measured a 16.5 percentage point increase in rural highway seat belt use. Similar to previous findings, seat belt use was found to be significantly different on rural highways compared to rural towns. Observed highway use rates for counties ranged from 51.2% to 81.7% and 13.9% to 68.4% in towns. The large ranges are similar to previous studies. In addition to statewide media efforts, local programs focusing on education and high visibility seat belt enforcement (such as the *Click it Or Ticket* campaign), individual agency campaigns, and multi-agency enforcement efforts, may have contributed to the increase.

A significant increase in use by male drivers on highways was measured. Female driver seat belt use on highways rose from 78.6% in 2013 to more than 80% in 2014. It remained higher than that of male drivers at 66.4%. The change in the female use rate was significant among car drivers. It is the first decline in the female driver seat belt use rate that had previously trended upward. It appears that a specific education or enforcement campaign triggered a larger than 'normal' increase in this user group in 2012, based on year-to-year movements in the trend. It appears the large gain was not sustained in 2013 but was again back on its upward trend in 2014, considering the other years.

Seat belt use rates on highways were also found to vary significantly by vehicle type. Pickup truck drivers had the lowest propensity to use seat belts, at 60.2%, and SUV drivers had the highest use rate at 82.2%. Stratification for gender and vehicle shows that female drivers have higher seat belt use rates among all vehicle classes. As with previous surveys, comparable town seat belt use rates were lower than highways across all gender and vehicle strata.

Results also continued to show a strong relationship between driver and passenger seat belt use. Where observations were collected in driver and passenger shared seat belt behavior, both were belted in 65.6% of cases – an increase from 62.2% in 2013, while neither was belted in 23.9% of cases.

The limited number of motorcycle helmet use observations that were collected show an increase in usage on rural highways and a decrease in towns, but figures were not statistically useful.

The seat belt use rate on the state's rural roads was found to be lower than the commonly reported NOPUS use rate collected in the annual statewide seat belt survey. The relative risk and significant difference in use rates between rural highways and towns should continue to be considered in research related to rural seat belt use. In addition, the need for continued assessment of programs to increase local seat belt enforcement or awareness on rural roads is recognized.

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APPENDIX: SEAT BELT OBSERVATION TRAINING GUIDE

SEAT BELT OBSERVATION TRAINING GUIDE

Purpose

The purpose of this training guide is to outline procedures recommended for conducting rural seat belt observations in North Dakota.

Site Selection

- Please observe at 1-2 sites WITHIN towns and 3-4 sites OUTSIDE of towns. This will result in 4-6 total observation sites.
- Select sites which are a minimum of 20 miles away from any interstate (I-29, I-94).

Collection Form

Observers will document seat belt use of drivers and front seat **outboard** passengers on a seat belt survey form. A sample form is found in Appendix A. Helmet use is recorded for motorcycle drivers and passengers on the same form.

- On each form observers will record the date, county, observer name, page number, start time, end time, site location description, vehicle type, driver gender, driver protection, passenger gender, and passenger protection.
- Eligible vehicles include cars, pickup trucks, SUVs (including crossover vehicles), vans, and motorcycles.

  DO NOT count large trucks (semi or large box trucks), commercial vehicles (taxi cabs, delivery vans, city vehicles), emergency vehicles (police/fire vehicles), or RVs/motor homes.

QUICK REFERENCE

- *Eligible vehicles include:*
  - *Cars*
  - *Pickups*
  - *SUVs (including crossover vehicles)*
  - *Vans*
  - *Motorcycles (helmet use)*

- Children riding in the front seat (NOT in a child car seat) are counted the same as other front seat passengers.
- Your observations should include all eligible vehicles regardless of state of origin, i.e. count both in-state and out-of-state vehicles.

Time

- Observers will observe between 7am and 7pm.

Observation Methods

Observers will record seat belt use for eligible occupants in cars, pickups, SUVs, and vans, as well as helmet use for motorcycle occupants. Eligible occupants are the driver of the vehicle and the outboard front seat passenger. (Example: If there are three passengers in the front seat of the vehicle, only count the driver and outermost passenger.)

QUICK REFERENCE

- *Observers must attempt to record all vehicles they view. If observers cannot determine SB use, the vehicle must still be recorded on the observation survey form. If traffic is too busy to record all vehicles, observers should stop to catch up then resume as soon as possible, waiting no longer than 1 minute to continue. Once an observer's eyes are locked on a vehicle, a count of that vehicle must be recorded.*

- Observers will be supplied with observation forms, and site descriptions from the previous year.
- There will be 1 observer per site. If traffic is too heavy to observe all vehicles, stop/catch up, and resume recording seat belt observations as soon as possible; waiting no longer than 1 minute to resume.
- Position vehicle so observations can be conducted safely and without distraction to other vehicle drivers. Where possible, observers should remain in their vehicles to record seat belt use. If it is not possible to observe from a vehicle vantage point, the observer may leave the vehicle but must remain off the roadside.
- **Each observer will observe for a minimum of 30 minutes. If a minimum of 30 observations cannot be recorded in 30 minutes, the observer will continue observing up to an hour. If 30 observations still cannot be recorded after an hour of observing, the observation should be considered complete.**
- Do not record observations of vehicles with windows that are excessively tinted because accuracy may be compromised.
- Only properly worn seat belts are recorded as using protection. Incorrect seat belt use is recorded as no seat belt (Example: shoulder strap under arm, behind the back, lap belt only).
- If observations at a site are terminated due to inclement weather or observer safety issues etc., record the time and reason that observations halted, and move to an alternate location.

Safety

Safety of the observers and vehicle occupants is paramount in conducting the seat belt use survey.

- Observations can be made from the observer's vehicle. To ensure the safety of the observers and other vehicle occupants, observers' vehicles must not hinder traffic flow. Park off the road away from the pavement's edge.
- When observations from inside a vehicle are not possible, observers should ensure they do not stand on the roadway when recording seat belt use. Always practice safety when crossing roads.
- Observers must not distract drivers of vehicles they are observing.
- When in their vehicle, observers must always wear seat belts.
- Observers must stay alert at all times. Do not work while under the influence of alcohol, drugs, or prescription medications.
- Dress appropriately for the weather.
- Do not bring children or pets with you to the observation sites.

Conclusion

Dress for the work. A hat, sunscreen and sun glasses are essential.

Be thoroughly familiar with all the procedures in this manual. Accurate information is of paramount importance.

Each observer is ultimately responsible for his/her work, as well as safety. Remember, observation requires that are within close proximity to traffic. Stay alert and be ready to react.

Seat Belt Survey Form

Page # _____ of_____

Start Time: _____ AM/PM

Date_____

End Time: _____ AM/PM

County:_____

Observer Name:_____

Site Location Description:

_____

Obs	Vehicle Type					Driver					Passenger				
						Gender		Protection			Gender		Protection		
1	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
2	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
3	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
4	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
5	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
6	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
7	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
8	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
9	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
10	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
11	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
12	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
13	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
14	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
15	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
16	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
17	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
18	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
19	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
20	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
21	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
22	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
23	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
24	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
25	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
26	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK
27	Car	Trck	SUV	Van	Mcycl	M	F	Y	N	DK	M	F	Y	N	DK