Seat Belt Use on North Dakota Rural Roads: 2011

Andrea Huseth
Laurel Benson
Donald Malchose
Kimberly Vachal

Rural Transportation Safety and Security Center
Upper Great Plains Transportation Institute
North Dakota State University
Fargo, ND

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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 54% of the state's travel, in vehicle-miles, takes place on rural roads that interconnect small communities and join the rural geography to interstate corridors and urban centers (FHWA 2008). This level of rural driving is relatively high considering only about 25% of the nation's travel is attributed to rural roads (FHWA 2008). From a safety perspective, this poses an inherent challenge because the risk for serious injury and death on these roads is relatively high compared to their urban counterparts (U.S. DOT 2005, U.S. DOT 2009a). For North Dakota, the danger is even more pronounced, as fatal crash reports from 2007 to 2010 show that nearly 88% of serious injuries, including fatal and disabling injuries, occurred on rural roads (NDDOT 2011).

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 rural roads seat belt use. The U.S. Department of Transportation works with states to measure seat belt use through the annual National Occupant Passenger Use Survey (NOPUS). However, NOPUS does not include observation sites on local rural roads –the location for 1 in every 3 fatal crashes during the past five years (NDDOT 2008). This study is a continuation of previous measurement of rural seat belt usage in North Dakota.

2. METHODOLOGY

A direct observation survey method was used for this study. A first step in administering the survey was to define a representative and realistic survey sample. In 2009, stratified random sampling of the rural counties, or non-NOPUS counties, was conducted based on rural county populations and geographic representation of counties across four quadrants of the state. The quadrants were defined based on 2009 ND Safe Communities (NDSC) regions (now ND Community Traffic Safety Program regions), which closely align to the North Dakota Health Department administration regions. The regions were reassessed in 2010 and the regions used for the 2011 rural seat belt observations are shown in Figure 2.1.

Figure 2.1 Rural Seat Belt Regions: 2011

Counties were used as the boundaries for the initial selection stratum in the sample because population and other demographic information are readily available.

The counties excluded from the annual NOPUS survey in North Dakota were considered in the state's rural-county geography for this project. The three highest population counties in the NOPUS survey have approximately nine people per square mile, compared to only two people per square mile for the three highest in the rural county sample. Although some counties with lower population densities are included in the NOPUS sample, the counties selected for that survey include the most populated – thus most urban – counties in the state. Twenty-five of the 37 counties not surveyed in the annual NOPUS project 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 and August 2011. The seat belt observations were conducted in partnership with the NDDOT Traffic Safety Office and the ND Community Traffic Safety Program (CTSP). Each CTSP administrator was asked to participate in the project by conducting a survey of seat belt use in specific counties located in their region. Prior to conducting county observations, observers were required to complete Institutional Review Board (IRB) training as required by North Dakota State University. In addition, each coordinator was asked to become familiar with the "Rural Seat Belt Observation Training Guide" which outlined 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 CTSP Coordinators:

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 4,727 observations of driver seat belt use were collected during surveys conducted at 141 sites across the state (Table 3.1). This includes 168 instances where driver seat belt use was not known. 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 1,106 observations, will be used primarily to assess correlation with driver use. This includes 77 instances where passenger seat belt use was not known. These observations are not included when calculating passenger seat belt use in this report. 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).

Table 3.1 Observation Counts and Observation Site Counts by County: 2011

	Observations			2010 Population	
County	Count	% of TOTAL	Observation Sites Per County	Population	% of TOTAL
Benson	427	9.0%	13	6,660	7.9%
Billings	97	2.1%	4	783	0.9%
Burke	152	3.2%	6	1,968	2.3%
Cavalier	428	9.1%	16	3,993	4.7%
Dickey	354	7.5%	5	5,289	6.2%
Divide	128	2.7%	4	2,071	2.4%
Emmons	120	2.5%	4	3,550	4.2%
Foster	250	5.3%	4	3,343	3.9%
Golden Valley	122	2.6%	4	1,680	2.0%
Grant	102	2.2%	4	2,394	2.8%
Griggs	176	3.7%	4	2,420	2.9%
Hettinger	82	1.7%	4	2,477	2.9%
Kidder	120	2.5%	4	2,435	2.9%
Logan	105	2.2%	4	1,990	2.4%
McIntosh	188	4.0%	4	2,809	3.3%
McKenzie	174	3.7%	3	6,360	7.5%
Oliver	120	2.5%	4	1,846	2.2%
Ransom	160	3.4%	6	5,457	6.4%
Renville	174	3.7%	6	2,470	2.9%
Sargent	177	3.7%	6	3,829	4.5%
Sheridan	101	2.1%	4	1,321	1.6%
Sioux	150	3.2%	3	4,153	4.9%
Steele	119	2.5%	6	1,975	2.3%
Towner	435	9.2%	13	2,246	2.7%
Walsh	266	5.6%	6	11,119	13.1%
TOTAL	**4,727**	**100.0%**	**141**	**84,638**	**100.0%**

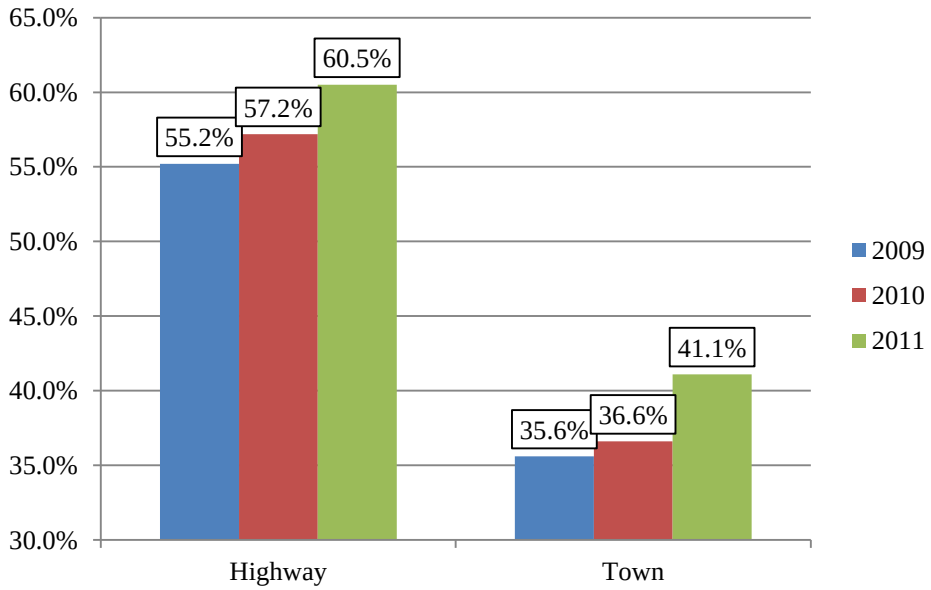
3.1 Rural Seat Belt Use

3.1.1 By Road Type

Because the 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 would be 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 3% of fatal crashes on rural roads occur in town (NDDOT 2009). Therefore, rural highways are given special attention.

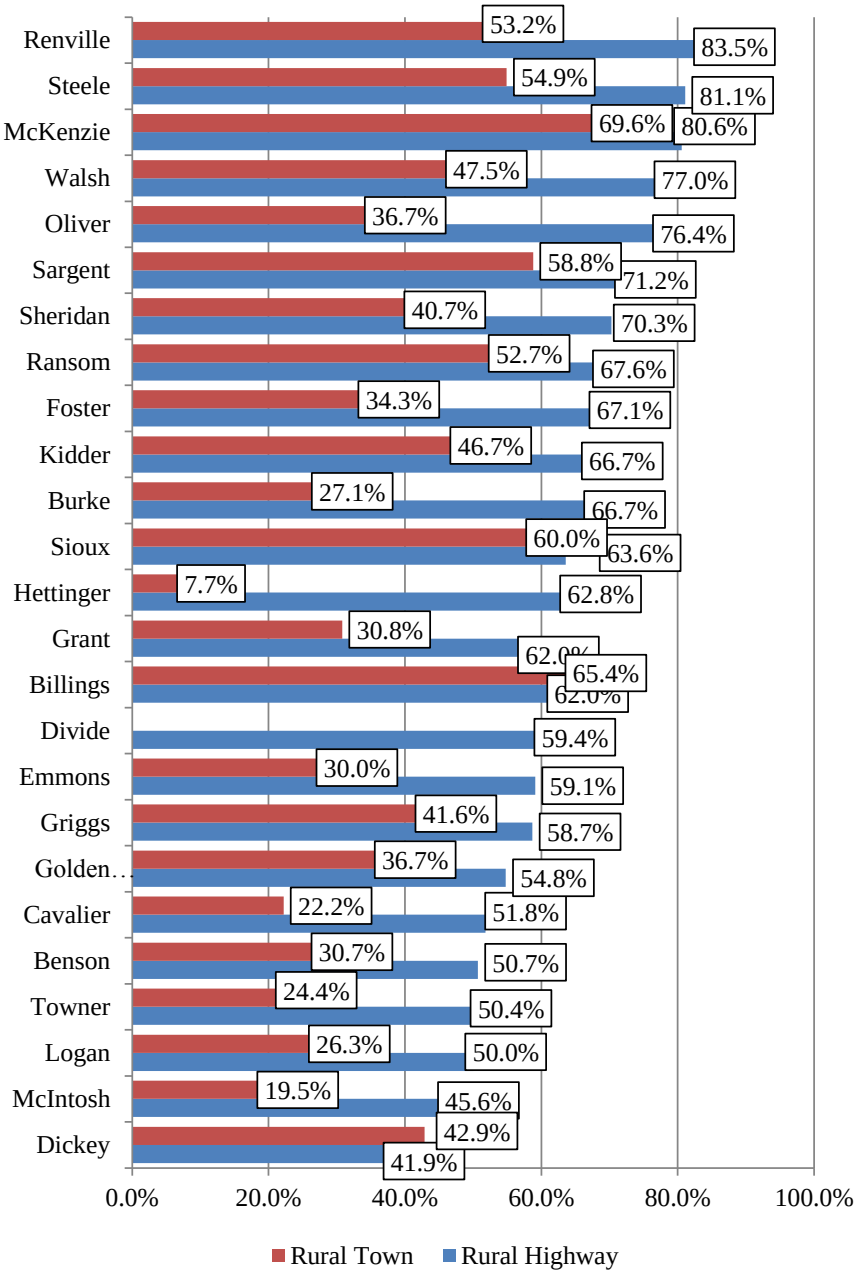
The observed seat belt use rate for drivers on rural highways, 60.1%, is significantly different than the use rate in rural towns at 39.2% (χ^2=189.984, ρ<0.0001, n=4,503). The overall adjusted state use rates are 60.5% and 41.1% for rural highways and rural towns, respectively, based on county population weights (Figure 3.1). Both of these figures fall below the statewide NOPUS rate of nearly 77%. However, town and highway use both have seen increases in the last two years (from 2009 to 2010 and from 2010 to 2011). From 2010 to 2011 highway use increased from 57.2% to 60.5%, while town use increased from 36.6% to 41.1%. Increases in seat belt usage from 2010 to 2011 for either road type were not significant.

Figure 3.1 Driver Seat Belt Use by Road Type: 2009-2011 (Weighted)



The range of highway seat belt use by county was large, considering a high of 83.5% in Renville County and a low of 41.9% in Dickey County (Figure 3.2). The range in seat belt use suggests some 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 surrounding the higher rates. Seat belt use in rural towns ranges from a high of 69.6% in McKenzie County to a low of 7.7% in Hettinger County.

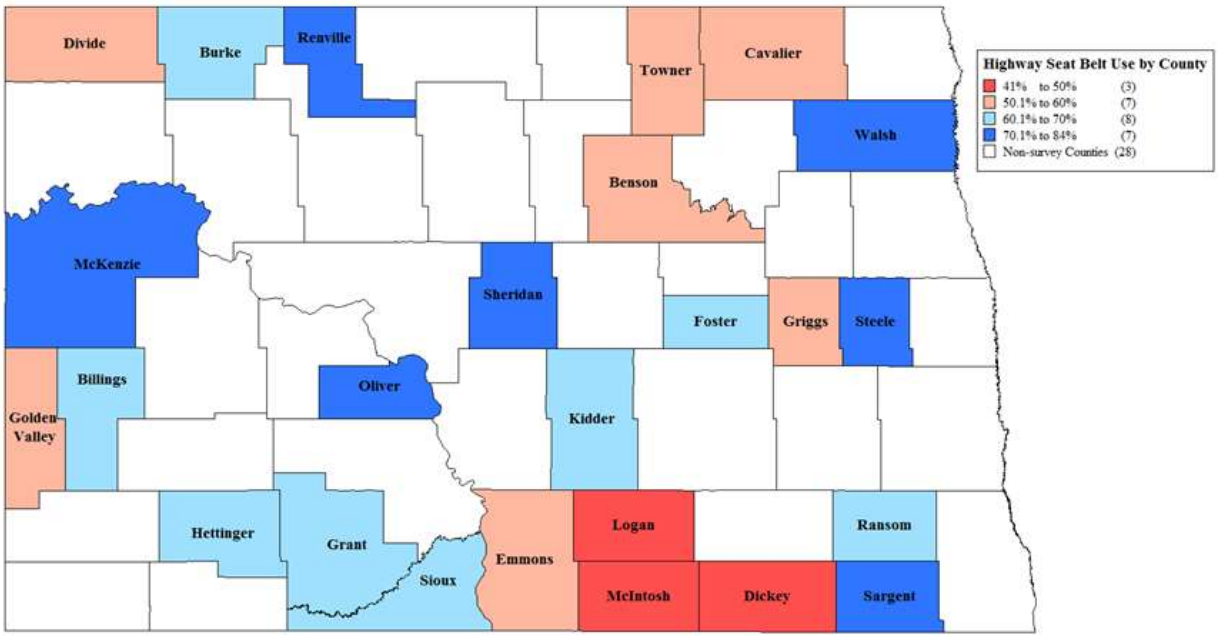
Figure 3.2 Driver Seat Belt Use by Road Type by County: 2011



**Rural town observations were not completed in Divide County*

While the counties with higher highway seat belt use are not localized within the state, those counties with the lowest highway seat belt use rates are grouped in the south central part of the state (Logan, McIntosh, and Dickey Counties) (Figure 3.3).

Figure 3.3 Highway Seat Belt Use by County: 2011



Of the counties that were observed both in 2010 and 2011, Walsh and Hettinger Counties had the largest increases in highway seatbelt use (Table 3.2). Counties with the largest declines in highway seat belt use were Dickey and Towner Counties. Once again, it is possible that the fluctuations in seat belt use identified here are attributable to driver behavior, but other issues might be at play.

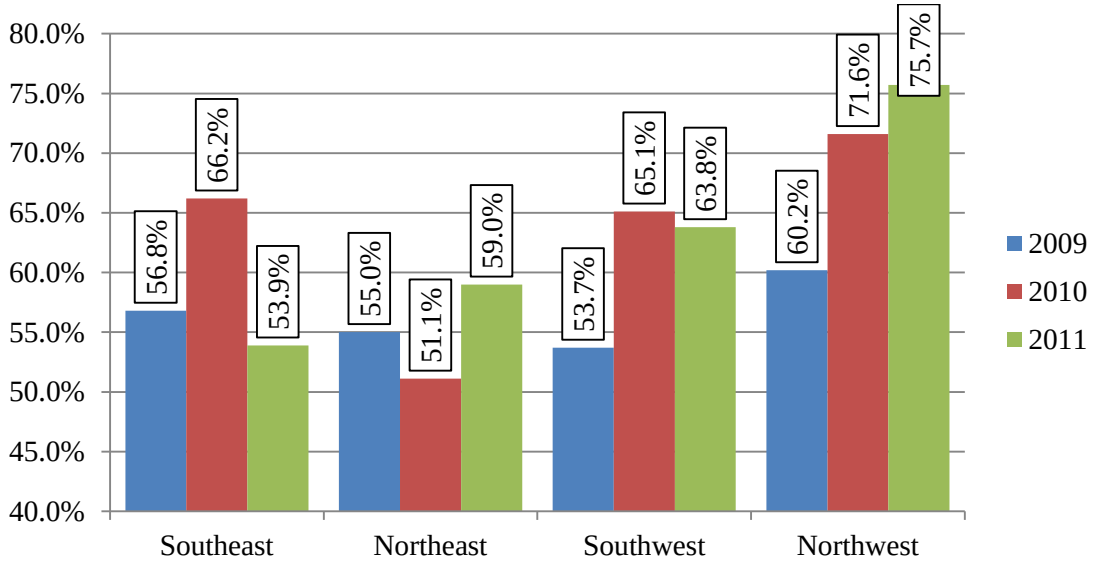
Table 3.2 Highway Seat Belt Use by County: 2009-2011

County	2009	2010	2011	2010-2011 Percentage Point Difference
Adams	53.5%	59.0%		N/A
Benson	39.9%	44.7%	41.7%	3.0%
Billings	64.6%	63.0%	62.9%	-0.1%
Bowman	29.6%	42.8%		N/A
Burke			51.0%	N/A
Cavalier	46.4%	42.6%	45.1%	2.5%
Dickey	50.0%	52.1%	42.2%	-9.9%
Divide	74.0%	70.7%	59.4%	-11.3%
Dunn	52.1%	50.0%		N/A
Eddy	46.5%	42.3%		N/A
Emmons			51.7%	N/A
Foster			53.5%	N/A
Golden Valley			43.0%	N/A
Grant			53.6%	N/A
Griggs	42.8%	48.6%	47.7%	-0.9%
Hettinger	51.5%	45.5%	36.6%	-8.9%
Kidder			61.7%	N/A
LaMoure	34.6%	45.3%		N/A
Logan			37.1%	N/A
McHenry	48.0%	58.0%		N/A
McIntosh			29.0%	N/A
McKenzie	57.0%	72.3%	76.7%	4.4%
McLean	36.6%	60.7%		N/A
Oliver			66.4%	N/A
Pierce	42.6%	39.8%		N/A
Ransom	39.6%	45.0%	60.1%	15.1%
Renville			75.3%	N/A
Rolette	37.5%	35.6%		N/A
Sargent	41.5%	52.9%	63.0%	10.1%
Sheridan			62.4%	N/A
Sioux			62.2%	N/A
Slope	61.7%	56.4%		N/A
Steele		61.1%	68.3%	7.2%
Towner	41.8%	48.3%	47.7%	-0.6%
Traill	39.4%			N/A
Walsh	56.6%	58.5%	63.3%	4.8%

3.1.3 By Region

Based on the regions defined in the methodology section, drivers in the Northwest region have the highest highway seat belt use at 75.7%, followed by the Southwest at 63.8%, the Northeast at 59.0%, and the Southeast at 53.9% (Figure 3.4). The Northeast and Northwest regions both saw increases in highway seatbelt use from 2010 to 2011, while the southern regions of the state saw declines.

Figure 3.4 Highway Driver Seat Belt Use by Region: 2009-2011 (Weighted)



3.1.4 Driver Gender

Males present at a ratio of about 1.5 to 1 in the driver population for the rural roads seat belt observations. Of the 4,655 drivers observed where gender was determined, 3,035 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 41.0% compared to 31.3% on the highways. 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, as found in this study, is consistent with other research (U.S. DOT 2008, Gross et al. 2007, Vivida et al 2007, McCartt and Northrup 2004).

Comparing usage rates by gender for road type, the adjusted female use on rural highways was at 71.8% compared to 55.2% for males (Figure 3.5). These weighted seat belt figures produce rates in rural towns of 49.6% for female drivers and only 35.7% for males.

Figure 3.5 Driver Seat Belt Use by Gender and Road Type: 2009-2011 (Weighted)

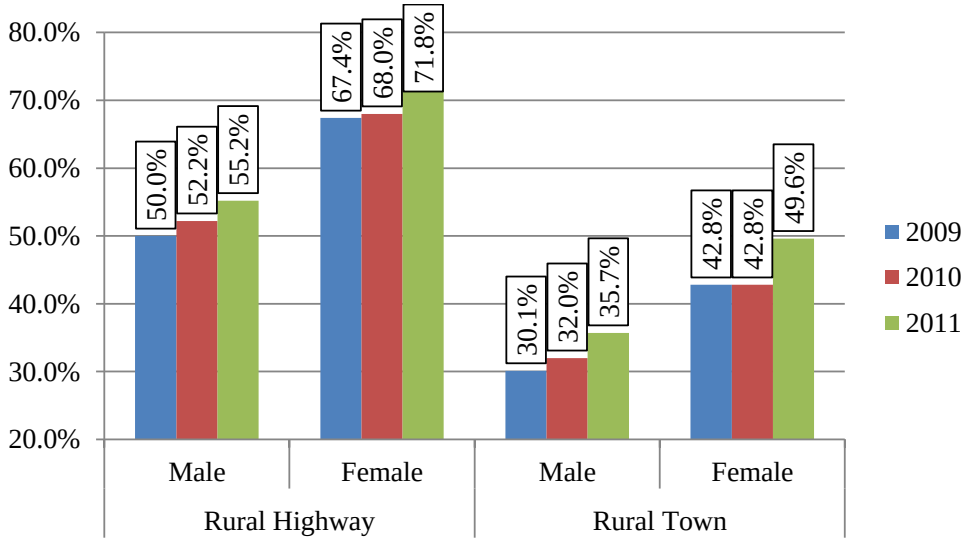


Table 3.3 shows county-level seat belt use rates on rural highways and in rural towns by gender. The county information shows the highest female use rates for 2011 on rural highways are in Walsh, Kidder, Renville, Sargent, Billings, Logan, Steele, and McKenzie Counties, which all had usage rates at 90% or greater. The lowest rates seen among female drivers, with rates under 60%, were in Towner, Griggs, and Dickey Counties. Steele, McKenzie, Renville, Walsh, and Oliver Counties had the highest use rates among male drivers on rural highways, ranging from 78.0% to 70.0%. The lowest rates among male drivers, with rates under 40%, were in Dickey, McIntosh, and Logan Counties.

Table 3.3 Driver Seat Belt Use by Gender by Road Type by County: 2009-2011

	2009				2010				2011			
	Rural Highway		Rural Town		Rural Highway		Rural Town		Rural Highway		Rural Town	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Adams	47.8%*	71.4%**			67.7%	66.7%*	40.0%*	44.8%*				
Benson	48.3%	53.1%	15.8%	27.2%	58.2%	69.2%	24.4%	33.3%	41.9%	69.6%	27.3%	36.2%
Billings	62.9%	70.8%*			63.5%	60.0%*	NA	NA	56.5%	100.0%**	47.1%*	100.0%**
Bowman	21.7%	44.0%*			47.3%	70.5%	15.6%	24.4%				
Burke									60.3%	78.1%	18.6%	50.0%*
Cavalier	55.1%	55.7%	31.3%	25.6%	44.2%	74.1%	19.7%	34.0%	43.9%	69.5%	24.1%	19.4%
Dickey	51.4%	89.7%	22.5%	64.2%	63.0%	81.3%	36.4%	47.2%	36.4%	49.6%	44.7%	40.5%
Divide	72.0%	81.3%			70.3%	71.8%	NA	NA	49.3%	83.9%		
Dunn	48.3%	68.4%	47.9%	42.9%*	50.0%	64.7%*	38.6%	63.3%				
Eddy	51.1%	62.0%	30.1%	37.8%	39.7%	58.6%	11.8%*	11.1%*				
Emmons									51.8%	71.9%	16.7%*	38.9%*
Foster									64.3%	73.3%	23.5%	45.1%
Golden Valley									46.9%	80.0%*	34.1%	39.5%
Grant									55.6%	73.1%*	16.7%*	42.9%*
Griggs	78.1%	69.2%	31.0%	45.7%	51.1%	76.5%*	42.7%	45.2%	63.2%	52.0%*	31.7%	55.3%
Hettinger	46.8%	63.2%*			51.8%	65.5%*	11.1%*	7.7%*	54.2%*	73.7%*	12.0%*	0.0%*
Kidder									52.5%	93.5%	30.8%*	58.8%*
LaMoure	36.7%	70.2%	19.2%	34.7%	58.3%	74.2%	15.4%	33.3%				
Logan									39.5%	90.0%*	19.5%	43.8%*
McHenry	52.6%	68.3%	35.2%	45.9%	65.6%	76.2%	21.4%*	28.6%*				
McIntosh									39.6%	66.7%*	17.5%	21.8%
McKenzie	48.7%	72.2%	54.0%	41.5%	80.2%	88.5%*	54.3%	64.7%	77.1%	95.0%*	68.3%	73.3%*
McLean	50.0%	69.0%	19.8%	36.5%	80.6%	90.5%*	46.8%	43.9%				
Oliver									70.0%	89.7%*	26.1%*	71.4%**
Pierce	48.3%	73.4%	17.6%	41.5%	33.3%	64.0%*	18.2%*	47.8%*				
Ransom	56.8%	63.0%	25.2%	33.0%	59.5%	68.0%*	40.5%	49.6%	62.3%	81.0%*	42.6%	70.4%*
Renville									73.8%	100.0%	37.0%*	75.0%*

Table 3.3 Driver Seat Belt Use by Gender by Road Type by County: 2009-2011 continued

	2009				2010				2011			
	Rural Highway		Rural Town		Rural Highway		Rural Town		Rural Highway		Rural Town	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Rolette	47.9%	56.8%	32.5%	39.5%	33.3%	53.1%	28.1%	36.3%				
Sargent	57.0%	63.1%	27.4%	28.8%	64.4%	78.6%*	31.0%	55.0%*	65.9%	100.0%**	42.3%	76.0%
Sheridan									68.9%	76.9%*	17.6%*	80.0%*
Sioux									58.7%	69.0%	55.2%*	64.5%
Slope	54.8%	77.8%*			56.6%	70.8%*	52.0%	46.7%*				
Steele					74.0%	100.0%*	41.1%	52.4%*	77.5%	92.3%*	39.3%*	73.9%*
Towner	46.2%	60.7%	25.8%	38.1%	62.6%	82.9%	16.1%	43.4%	47.7%	56.1%	25.0%*	23.5%*
Traill			31.0%	50.0%								
Walsh	50.0%	86.0%	43.2%	66.7%	58.8%	85.1%	41.1%	59.1%	72.1%	91.4%	41.2%	62.9%

**Fewer than 30 observations (results may be unreliable due to low number of observations)*

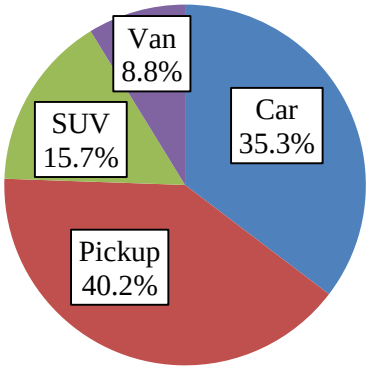
***Fewer than 10 observations (results may be highly unreliable due to low number of observations*

3.1.5 By 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 outlays 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 usage rates for this vehicle type were found here, with male pickup truck drivers having the lowest use rates among the gender-fleet mix.

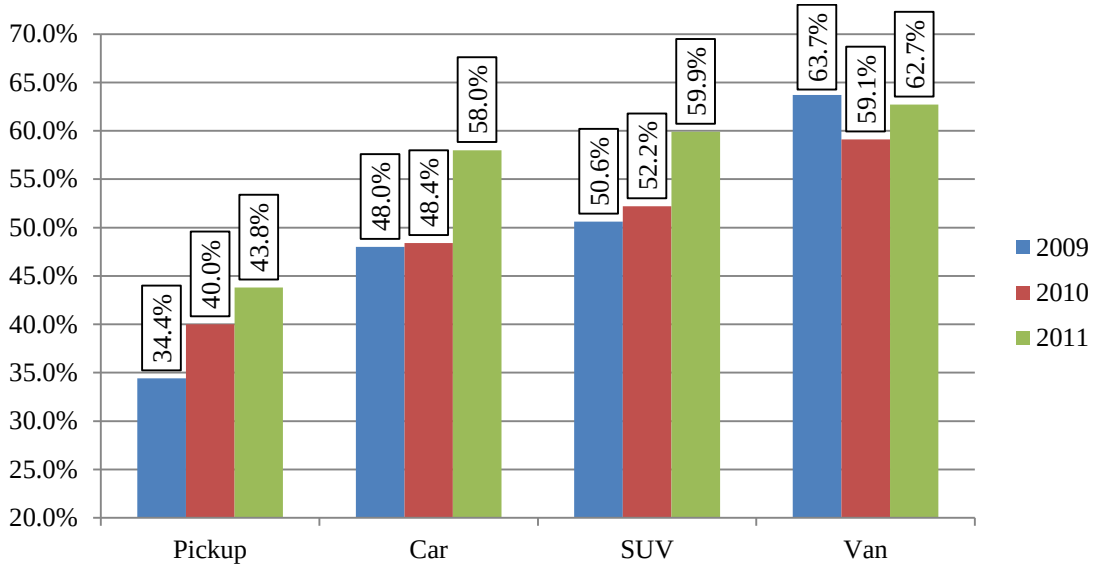
The rural seat belt observations included more pickup trucks than cars (1,922 and 1,579, respectively), along with 813 sport utility vehicles (SUVs), and 358 vans (Figure 3.6).

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 (χ^2=128.186, p<0.0001, n=4,504). In 2011, driver seat belt use in cars was 58.0% compared to 43.8% for pickup truck drivers (Figure 3.7). Sport utility vehicle and van drivers both had higher observed use rates than drivers in cars and pickups at 59.9% and 62.7%, respectively. From 2010 to 2011, drivers of cars and SUVs saw substantial increases in seat belt usage, while seat belt use among drivers of trucks and vans increased only slightly. Cars and SUVs had the only statistically significant change in seat belt use among vehicle types from 2010 to 2011 (cars: χ^2=12.485, p<0.0001, n=3,512; SUVs: χ^2=5.774, p=0.016, n=1,656).

Figure 3.7 Driver Seat Belt Use by Vehicle Type: 2009-2011 (Weighted)



Further stratification for gender shows that female drivers have higher seat belt use rates among all vehicle classes, ranging from 59.8% for SUVs to 64.2% for vans (Table 3.4). Males, in comparison, used seat belts only 42.2% of the time in pickup trucks and 61.2% of the time in vans. A significant difference was not found in seat belt use between female and male drivers for SUVs or vans. The variance is significant for car (χ^2=3.446, ρ<0.0001, n=1,529) and pickup truck drivers (χ^2=4.778, ρ<0.0001, n=1,844). Seat belt use increased for both male and female drivers for all vehicle types. The only statistically significant difference in seat belt usage between 2010 and 2011 was for female drivers of cars (χ^2=9.878, p=0.002, n=1,772).

Table 3.4 Driver Seat Belt Use by Vehicle Type and Gender: 2009-2011 (Weighted)

	2009		2010		2011	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**
Car	44.9%	47.8%	44.0%	52.6%	52.6%	63.5%
Pickup	33.2%	41.5%	38.4%	51.7%	42.2%	60.2%
SUV	42.0%	55.5%	51.8%	52.6%	60.0%	59.8%
Van	62.6%	64.6%	58.2%	60.0%	61.2%	64.2%

When also considering the road environment, the highest use rate was among females driving vans on rural highways. Seat belts were in use for 76.6% of drivers observed in this group (Table 3.5). The lowest use rate, 30.3%, was found among males driving pickups in rural towns. Seat belt use in rural towns for male and female drivers increased for cars, vans, and SUVs, decreased for pick-ups for both genders. Seat belt use on rural highways for males and females increased for cars, trucks, and SUVs and decreased for vans.

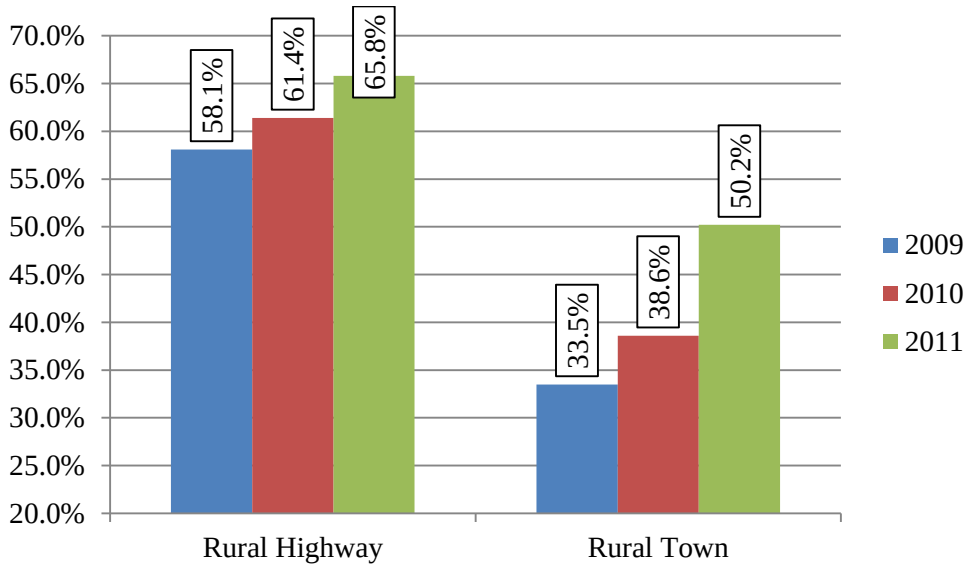
Table 3.5 Driver Seat Belt Use by Vehicle Type, Gender, and Road Type: 2009-2011 (Weighted)

	2009				2010				2011			
	Rural Highway		Rural Town		Rural Highway		Rural Town		Rural Highway		Rural Town	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Car	53.9%	64.1%	38.0%	39.5%	51.1%	65.9%	35.7%	42.6%	62.5%	72.4%	35.2%	52.5%
Pickup	44.9%	52.0%	22.8%	36.1%	46.7%	64.8%	29.6%	41.7%	48.2%	73.3%	30.3%	37.9%
SUV	54.8%	72.6%	32.3%	45.6%	65.8%	68.5%	33.1%	41.9%	68.6%	68.8%	47.6%	46.4%
Van	73.0%	81.9%	52.3%	53.0%	70.2%	80.4%	36.2%	46.2%	65.8%	76.6%	54.9%	52.4%

3.1.6 Passenger Seat Belt Use

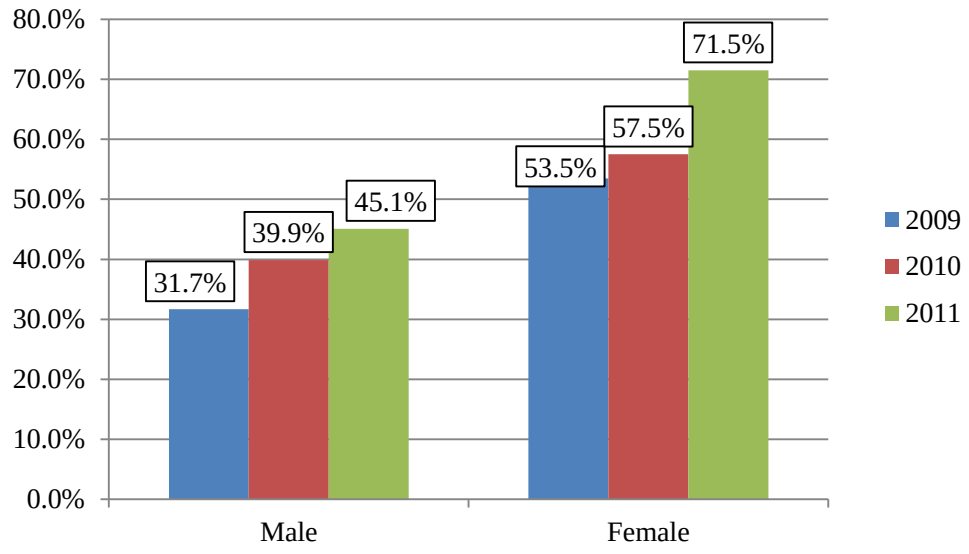
As previously mentioned, the passenger observations were collected when traffic flow and field of vision allowed observers to collect information in addition to the driver seat belt use. (Figure 3.8). Differences in seat belt use by road type were significant (χ^2=26.503, p<0.0001, n=1,022). Passenger seat belt use was 65.8% on rural highways and 50.2% in rural towns. Both rural highway and rural town passenger seat belt use increased from 2010 to 2011. Unlike the driver population, a majority of passengers were female, comprising 59.4% of the group.

Figure 3.8 Passenger Seat Belt Use by Road Type: 2009-2011 (Weighted)



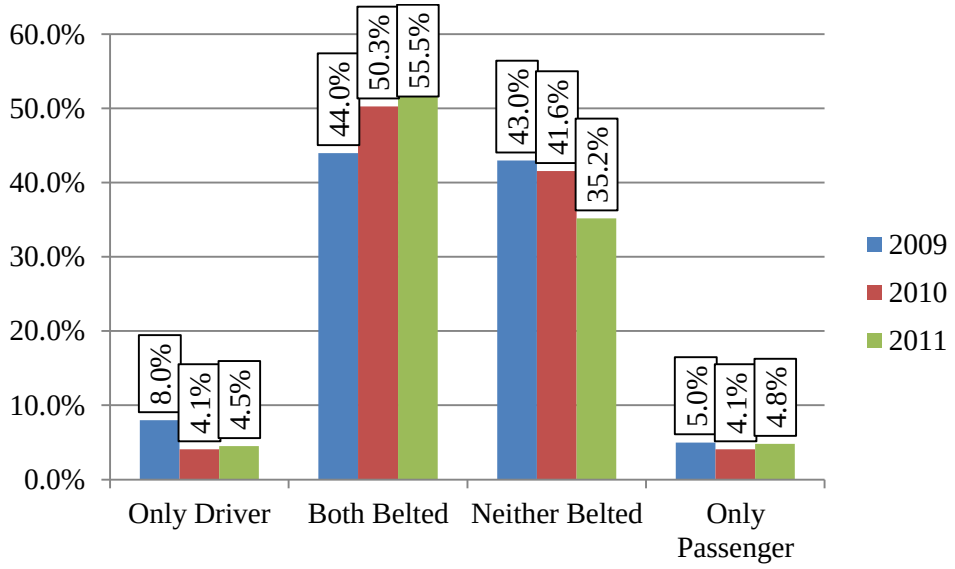
As with driver observations, gender was a significant factor in seat belt use (χ^2=74.485, p<0.0001, n=1,022). Female passengers were using seat belts in 71.5% of the observations, compared to 45.1% for males (Figure 3.9). While female passenger belt use increased significantly from 2010 seeing an increase from 57.5% to 71.5% usage, male passenger belt use did not increase as dramatically- increasing from 39.9% in 2010 to 45.1% in 2011.

Figure 3.9 Passenger Seat Belt Use by Gender: 2009-2011 (Weighted)



The driver and passenger seat belt use rates were strongly correlated in cases where passenger use could be recorded (Pearson's Corr.=0.806, p<.0001, n=998). These findings are consistent with earlier research (Nambisan and Vasudevan 2007), and with the 2009 and 2010 results (Vachal et al. 2009; Huseth et al. 2010). In more than half of the cases both the driver and passenger were belted (Figure 3.10). Neither passenger nor driver was belted in 35.2% of the cases. The driver was belted and passenger unbelted in 4.5% of the cases, while the passenger was belted and the driver unbelted in 4.8% of the cases. Males were driving in a majority of the cases where passenger gender and belt use was recorded, representing 69.0% of the drivers. Passenger seat belt use was found to be significantly related to driver gender ($\chi 2$=4.373, p=0.037, n=1,018).

Figure 3.10 Seat Belt Use in Passenger Observation Cases: 2009-2011



Stratifying the passenger seat belt cases by road type does show that the belted passenger and belted driver observations scenario accounted for the greatest share of the observed cases for the rural highways at 61.5% (Table 3.6). The unbelted passenger and unbelted driver observations scenario was the most common in rural towns at 45.6%. Slightly less than one-third of the observations found neither occupant to be belted on rural highways. Cases with only the driver belted were 3.8% and 6.2% of the cases on highways and in towns, respectively.

Table 3.6 Passenger Observation Cases by Road Type: 2009-2011

	2009		2010		2011	
	Highway ***n=588***	**Town** ***n=463***	**Highway** ***n=750***	**Town** ***n=571***	**Highway** ***n=691***	**Town** ***n=307***
Neither Belted	32.1%	56.8%	31.3%	55.0%	30.5%	45.6%
Only Passenger	4.6%	5.2%	3.6%	4.7%	4.2%	6.2%
Only Driver	6.8%	9.5%	4.0%	4.2%	3.8%	6.2%
Both Belted	56.5%	28.5%	61.1%	36.0%	61.5%	42.0%

The high degree of correlation between the driver and passenger observations may dissuade future investment associated with increasing passenger data collection. An example would be using an observer team rather than an individual observer to collect both driver and passenger seat belt use – this cost may not be justified considering the benefit of the knowledge gained, because the passenger seat belt use rate follows the data already collected by observing the driver. Certainly, collection where possible by a single observer and special case studies may be justified with regard to the passenger seat belt observations.

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 55% of annual travel and nearly 89% of fatal and disabling 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 4,727 driver seat belt observations were collected at 141 sites across 25 rural counties. Highway seat belt use increased from 57.2% in 2010 to 60.5% in 2011. Since 2009, rural highway seat belt use has increased from 55.2% to 60.5% - an increase of 5.3 percentage points, an increase more than two times greater than the increases seen in the overall statewide seat belt use rate (NOPUS), which has experienced a less than two percentage point increase from 2009 to 2011. Local programs focusing on high visibility seat belt enforcement such as the Click it Or Ticket effort most likely played a role in these increases.

Similar to previous findings, seat belt use was found to be significantly different on rural highways and in rural towns. The statewide seat belt use rates of 60.5% and 41.4% were estimated on highways and in towns, respectively. Observed highway use rates for counties ranged from 83.5% in Renville County to less than 42% in Dickey County. Female driver seat belt use, at 62.2%, was higher than the 47.2% seat belt use rate found among male drivers. Seat belt use rates were also found to vary significantly by vehicle type with pickup truck drivers having the lowest propensity to use seat belts at 43.8% and van drivers having the highest use rate at 62.7%.

Results also continue 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 55.5% of cases, while neither was belted in 35.2% of cases. These relationships may be useful in assessing the relative benefits for allocating additional resources to collect additional passenger seat belt observations.

Seat belt use on the state's rural roads was found to be significantly less than the commonly reported statewide seat belt use rate collected in the annual NOPUS survey of all state roads. 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, continued assessment of programs to increase local seat belt enforcement or awareness on rural roads is suggested.

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Appendix A – 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.

Any questions or concerns should be reported to Andrea Huseth: 701-231-6427.

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