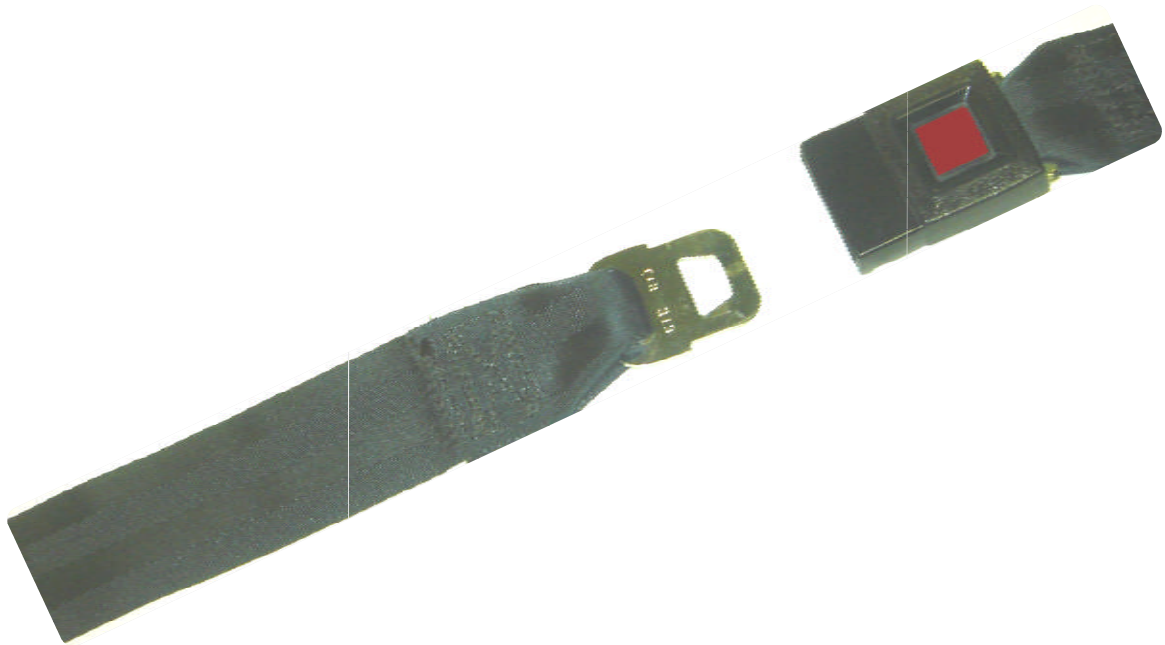


2007 SURVEY OF SEAT BELT USE IN NORTH DAKOTA

JUNE 2007



Office of Traffic Safety
North Dakota Department of Transportation
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The opinions, findings, and conclusions expressed in this report are those of the authors and not necessarily those of the North Dakota Department of Transportation, Office of Traffic Safety or the United States Department of Transportation, National Highway Traffic Safety Administration.

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EXECUTIVE SUMMARY

This report documents the results of the annual observational survey of vehicle seat belt use in North Dakota, conducted for the twelfth time since the seat belt law went into effect on July 14, 1994. The field data collection occurred during the first week of June 2007.

The purpose of North Dakota's studies of seat belt use is to provide statistically reliable data from which generalizations, comparative analyses, and recommendations can be developed. The survey provides the North Dakota Department of Transportation (NDDOT) with a system that monitors the use rate and permits the determination of seat belt use rates within the state. The National Highway Traffic Safety Administration (NHTSA) funded the study through the NDDOT's Office of Traffic Safety (OTS).

The sampling methodology for this study was originally developed in 2001. The 2001 data was collected in July of that year, after which data was collected during late June in 2002, mid-June in 2003, and the first week in June for the subsequent surveys in 2004, 2005, 2006, and 2007. Analysis incorporating the current method of weighting of the data, based on sampling probabilities and vehicle miles traveled for counties and sites within counties, began in 2004. As a result, the 2004 to 2007 studies are directly statistically comparable. Because the estimation methodologies have remained consistent, all the surveys in North Dakota are comparable. However, whenever some components of individual surveys changed, such as the data collection time frame or the analysis procedures, a new baseline was created. This was the case in 2001 when the sampling methodology changed significantly; in 2002 and 2003 when the data collection time frames changed; and in 2004, when, again, the data collection time frames changed and a revised weighting system was implemented. Since 2004, there have been no changes in the methodology or the details of the analysis procedures

This 2007 survey was based on a random probability sample of North Dakota counties and observation sites developed for and approved by NHTSA in 2001. Observations were made at the 319 sites pre-selected in 2001. All sites were surveyed over the same days of the week as in previous studies. Front seat drivers and outboard passengers in automobiles, vans, sport utility vehicles, and pickup trucks were observed for seat belt usage.

The general trends identified in previous statewide surveys conducted in the state remained consistent in 2007. For example, women were observed wearing their seat belts more often than were males. While drivers made up the great majority of the observations, passengers were more likely to be observed as belted. Occupants of vans and SUVs continued to have the highest rate of seat belt use, followed by occupants of automobiles, with a much lower rate for occupants of pickup trucks. Occupants in the southeast region of the state continued to be buckled up more than in the other regions. Vehicle occupants observed in rural areas and on interstate roadways continued to have higher rates of seat belt use than their counterparts in urban areas or on state and federal roadways. There were some changes in 2007 in terms of the usage rates for individual counties, which are detailed later in this report, with a high of 91.6% belted in Barnes County and a low of 56.2% belted in Pembina County.

For 2007, observers tracked 22,612 vehicles and drivers in 16 counties at 319 intersections. There were 4,312 passengers in those vehicles. The data indicate that 81.9% of the drivers and 83.7% of the passengers were observed wearing seat belts. For all vehicle occupants, drivers and passengers combined, 82.2% were observed wearing their seat belts. This finding represents an increase of 3.2 percentage points in seat belt use estimates in 2007 compared to 2006, and the final estimate of 82.2% is the highest rate recorded since 2001 when new sampling methodologies were implemented.

INTRODUCTION

DLN Consulting, Inc., located in Dickinson, ND, was contracted by NDDOT to conduct a field survey by using a sampling methodology recommended by NHTSA and NDDOT, and by following the requirements found in *The Federal Register, 23 CFR Part 1340*, published on September 1, 1998. The methodology was designed to yield a statistically valid estimate of current Seat Belt Use (SBU) rate in the State of North Dakota.

DLN consulting, Inc. is incorporated in the State of North Dakota. The corporation has a solid and reputable background and understanding of traffic safety issues and evaluation techniques. Deb Nelson, owner and president of DLN consulting, Inc., served as the project administrator. Keith Fernsler, Ph.D., Professor of Sociology at Dickinson State University provided the calculations and analysis for the 2007 study. Lydia Camp, Program Consultant for DLN Consulting, developed the spreadsheets, tables, and charts for this report. Field observers were hired and participated in extensive training and accuracy testing prior to conducting the field observations. DLN Consulting, Inc., staff completed the data coding, data entry, and quality assurance testing.

Data entry was conducted in the *Microsoft Excel Professional 2003* program, and then imported into the *Statistical Program for the Social sciences (SPSS) 14.0* for the data analysis. Tables and charts were created with *Microsoft Excel Professional 2007* for this report.

Objective

The objective of this study is:

- To determine the Seat Belt Use (SBU) rate of drivers and front seat outboard passengers in the State of North Dakota.

Further broken down, the objective is to also determine the SBU rate for the following:

- Occupant (driver, passenger)
- Gender (males, females)
- Population (rural, urban)
- Roadway (interstate, federal highway, state highway)
- Type of Vehicle (automobile, van, sport utility vehicle, pickup)
- County (16 observed counties)
- Region of State (northwest, northeast, southwest, southeast)

The technical section of this report presents the description of the various tasks involved in conducting the SBU survey. General information about the methods and protocols used to conduct the SBU survey is found beginning on the next page.

A summary of the survey is presented below:

Table 1
Summary of the Seat Belt Use Survey

Methodology	Probability Based Sampling (stratified intersections within selected counties)
Source of Samples	2001 Methodology, approved by NDDOT and NHTSA.
Identified Regions	Four Quadrants of the State Northwest Northeast Southwest Southeast
Selected Counties	Counties by Region: <i>Northwest:</i> Bottineau, Mountrail, Ward, Williams <i>Northeast:</i> Grand Forks, Pembina, Ramsey, Wells <i>Southwest:</i> Burleigh, Mercer, Morton, Stark <i>Southeast:</i> Barnes, Cass, Nelson, Stutsman
Survey Period	June 4 - 8, 2007
Sample Size	22,612 vehicles
Observation Duration Per Site	Thirty (30) minutes
Number of Sites	319
Geographic Coverage	State of North Dakota

METHODOLOGY

From 1998 to 2000, the methodology for the observational seat belt survey in North Dakota was based on simple random sampling of twelve counties and intersections within those selected counties. As a result of this sampling, the demographic character of the observations was predominantly rural, reflecting the rural character of North Dakota.

By the end of the 2000 survey, the staff of DLN Consulting, Inc. had concluded that these simple random sampling methods produced observations that were demographically representative of rural North Dakota, but not representative of traffic patterns and the distribution of drivers and passengers in North Dakota. After receiving approval from NDDOT, a new methodology eventually emerged. Every step in the process was reviewed, approved, and guided by Dennis Utter and Donna Glassbrenner of NHTSA.

The new methodology, followed since 2001, now includes sixteen counties representing the four quadrants of the state, and 319 intersections, about half of which are above and half below the mean of vehicle miles traveled within each county. In other words, the current methodology can be described as stratified random sampling modified by the inclusion of what are referred to in federal guidelines as “certainty” counties, those four counties which represent about three-fourths of North Dakota’s population and about two-thirds of the vehicle miles traveled in North Dakota. The new methodology was approved prior to the 2001 survey.

The current sample of counties and road segments has been unchanged since 2001 and has been used for each of the surveys from 2002-2007. The repeated use of the sample provides considerable comparability in the analysis of trends in the rate of seat belt compliance for North Dakota over the years in which this methodology has been in effect.

CALCULATING THE WEIGHTED ESTIMATES OF SEAT BELT USE

The typical analysis of North Dakota seat belt usage data has taken the form of aggregate calculations of overall county and state-weighted estimates using a spreadsheet design that incorporates the mathematical formulas. These formulas produced estimates of seat belt usage based on the formulas for estimating seat belt use in the different strata, where one stratum represents sites where the daily vehicle miles traveled are above the mean for the county and a second stratum represents sites where the daily vehicle miles traveled is below the mean for the county.

The formula for estimating belt use for the sample sites is as follows:

$$\frac{1}{\sum W_{ijk}VMT_{ijk}} \sum W_{ijk}VMT_{ijk} \left(B_{ijk} / O_{ijk} \right) = \text{Belt Use in Stratum, adapted to each stratum.}$$

Where the variables are:

i = county

j = stratum

k = designated sample site

W_{ijk} = the weight for the sample site in the stratum

(*Weight = Total sample sites in the stratum / number of sites sampled in the stratum*)

VMT_{ijk} = Daily vehicle miles traveled for the individual sample site in the stratum

B_{ijk} = Total number of belted drivers and passengers for the sample site in the stratum

O_{ijk} = Total number of observed drivers and passengers for the sample site in the stratum

These estimates are then used to create the county estimates using the following formula for the counties as follows:

$$\frac{VMT_{cs1}}{VMT_c} BeltUseStratum_1 + \frac{VMT_{cs2}}{VMT_c} BeltUseStratum_2$$

Where:

VMT_{cs1} = Total daily vehicle miles traveled for the upper stratum in the county

VMT_{cs2} = Total daily vehicle miles traveled for the lower stratum in the county

VMT_c = Total daily vehicle miles traveled for the county

The county estimates are then used to calculate the overall estimate for the state as follows:

$$\text{State Seat Belt Use} = \frac{\sum W_i V_i}{\sum W_i V_i P_i}$$

Where:

i = county

W_i = county weight (number of available counties in the quadrant / number of counties sampled in the quadrant)

V_i = total daily vehicle miles traveled for the county

P_i = seat belt use in the county

These formulas were incorporated into a spreadsheet to generate estimates for each county and for the state as a whole. Any additional analysis depended on unweighted data. For example, only unweighted estimates could be used in discussions of the variation of seat belt usage rates for the different regions, roadway types, vehicle types, gender of drivers and passengers, and so forth. This imposed a significant limitation on inferences from the data analysis since the unweighted data did not take into consideration adjustments for vehicle miles traveled or the probabilities of sample selection for counties and sites in the study.

During 2004, the staff of DLN Consulting, Inc. worked with the Traffic Records Research Manager at the Drivers License and Traffic Safety Division (now Office of Traffic Safety), NDDOT, to devise a method of weighting all of the data for analysis. The method involved the creation of a single weighting frequency for each observation. The steps involved in that process are as follows:

To produce an estimate for each county, the county's daily vehicle miles traveled was multiplied by the probability of each county's selection in the sample, or W_c * VMT_c. This produced an average, W_cVMT_c for each county.

To produce an estimate for each site in the sample, the site's daily vehicle miles traveled was multiplied by the probability of the selection of each site for the sample (out of all the sites within a county), or $VMT_{ik} * W_{ik}$ for each site, where i is the county and k is the sample site within the county.

These two estimates were added together to create an average of the two estimates. In order to reduce the size of the average, each result for each county and site was divided by a constant, the mean of the average of the two estimates.

The frequency that resulted from these calculations is unique to the cases in each site. It was used in SPSS's data weighting procedure as the multiplier for each observation in the data set. The results approximate the results for the aggregate formulas and should be reliable for the kinds of analysis typically done with the unweighted data.

As a final test, the percentages for a selected county were computed using both the traditional spreadsheet method of computation and the SPSS-based weighting procedure for the 2004 study. The results were virtually identical.

The unweighted overall frequencies and the weighted percentages were used to generate the tables and graphs for this report. Specific frequencies in the tables were then calculated based on the weighted percentages.

Overall, this process generated weighted data throughout the analysis that approximates the same results that would have been found if it had been possible to extend the spreadsheet approach to additional variables. The significant advantage is that all of the data reflect adjustments for sample probability and vehicle miles traveled in calculating seat belt usage rates based on the mathematical formulas.

Throughout this report, the percentage estimates of seat belt use reflect the weighted data. Where it is sometimes appropriate, unweighted counts, or frequencies, are provided. However, because the weighted frequencies are substantially inflated by the weighting process, those weighted frequencies are not reported. Readers are cautioned to note that weighted percentage estimates do not usually match unweighted frequencies and may be more confusing than enlightening. For that reason, weighted frequencies, or counts, are usually omitted in the tables and charts presented in the report.

Confidence Intervals

To determine the validity of the sample of observations in the June 2007 seat belt survey, ninety-five percent confidence intervals were calculated for drivers, outboard passengers, and the combination of drivers and passengers. The results are presented in the following table:

TABLE 1

Confidence Intervals for Drivers, Passengers and All Occupants 2007 (Unweighted Data)					
Occupants	95% Confidence Interval				Standard Error of Mean
	Frequency	Mean	Lower Boundary	Upper Boundary	
Drivers	22,612	1.28	1.28	1.29	0.003
Passengers	4,312	1.22	1.21	1.23	0.006
All	26,924	1.27	1.27	1.28	0.003

The means reported in the table reflect a range of variation from a value of one (belted) and two (not belted). The "95% Confidence Intervals" mean that statistically it can be assumed that there is a ninety-five percent probability that the reported mean for the sample of vehicle occupants (1.27) falls within the lower boundary of 1.27 and the upper boundary of 1.28 in the real world. The standard error of the mean, which is .003 for all vehicle occupants, can be interpreted to mean that there are fewer than three chances out of one thousand that this sample is invalid.

Sample validity, as measured by the calculation of confidence intervals and the standard error of the mean, is dependent on sample size, with validity increasing as sample size increases. This is the reason why the table shows narrower confidence intervals and a lower standard error of the mean for drivers than for passengers. Whenever data are broken down by various combinations of variables, sample validity tends to decline and statistical significance drops. In other words, this study is valid, but some generalizations may not be if they are drawn from highly selected sub samples. This is most often the case where individual counties are examined and generalizations have to be based on a relatively small part of the larger set of observations.

Overall, most of the generalizations offered in this report are valid and statistically significant. When this is not the case, the reader will be cautioned about the limitations of the data.

PROTOCOLS

Observers

Sixteen observers and one alternate were hired to conduct the seat belt survey. Fourteen of the 17 people had observed in previous years and three were new observers. All observers were required to have a good driving record and provide proof of adequate insurance on the vehicle they were driving for the surveys. All observers were required to wear seat belts for the duration of the project.

Observational Protocols

The observational protocols were those employed every year since the 2001 survey, and were developed by DLN Consulting, Inc. What follows is a discussion of the methodological protocols for the observations.

The Order of Observation

Within clusters, the order of observation was assigned with the use of a random numbering procedure. For sites outside the clusters, the order was determined by proximity to clustered sites.

Traffic Direction

In those cases where the roadway moved in only one direction, no real choice was involved. When a site was on a county line, the traffic direction was toward the county associated with the survey. In all other instances involving decisions, a randomization process was employed. Usually, this involved a random choice of one of two directions, north or south, or east or west.

Day of the Week

Observations were conducted Monday through Friday. Since most of the counties involve a significant number of square miles with considerable distance between sites, observers proceeded from one site to the next in the order already determined and listed in their directions.

Time of Day

A twelve-hour block of daylight, from 7:00 A.M. to 7:00 P.M., was identified for the parameters of the observational period. Each site observation occurred in half-hour time slots, beginning at the first five-minute interval after arrival at the site, and ending exactly thirty minutes later.

Traffic Conditions and Data Collection Problems

Observers were trained to cope with traffic problems in the following manners:

- When traffic was heavy and there were too many vehicles to count visually, counting was done as long as possible and then stopped until the observer's count could catch up with observations. Some vehicles were, of necessity, skipped under these circumstances. When this occurred, counting resumed after no more than a one-minute pause. Once an observer's eyes were locked on a vehicle, a count of that vehicle had to be entered on the observation form.
- At sites with more than one lane of traffic in the predetermined direction, observations were made from the lane closest to the observer.
- Vehicles with darkened windows were ignored because visibility problems were likely to reduce accuracy.
- Field observers could terminate a pre-selected observation if any of the following circumstances arose: (1) Heavy rain or hail that would hinder the accuracy of the observations; (2) Traffic flow that was so heavy that it might have endangered the seat of the observer; (3) Crashes or road construction that rendered observations unfeasible, especially when a detour was involved. If a pre-selected site was to be terminated, the observer was to note the reason and mark the time of termination on the form. The observer was instructed to notify the supervisor as soon as possible if any of these situations were to occur.

Site Accessibility Problems

If a pre-selected site was not available on the survey date and time, the observer made the following modifications:

- On mile-posted roads, observations were to be made at a location with a mile point that was one mile higher on the same roadway in the same direction as the assigned traffic flow. If this point was not accessible, one more mile could be added. Increments up to three miles could be added with such changes noted on the observation forms.
- On non-mile point streets and local roadways, the observer was to proceed in the same direction as the assigned traffic flow in one-quarter mile increments, not to exceed three-quarters of a mile, until an appropriate observation site was found and so noted on the observation form.
- In cases of road construction where traffic was detoured, the observer was required to select a site on the detour as close to the original site as possible, no more than two miles away on mile-posted roadways and no more than one-half mile on non-mile point streets and local roadways. The change in site location and the reason for the change was noted on the observation form.

Observed Vehicles

All passenger vehicles were observed and classified on the observation form as automobiles, vans, pickup trucks, and sport utility vehicles.

Observations

Seat belt usage and gender characteristics were recorded for both drivers and passengers. The observations occurred from the observer's vehicle whenever possible, so the observer was parked as close as possible for accurate observation without compromising the observer's safety. If an observer could not observe from a vehicle, the observer was allowed to stand off the roadway at an intersection and required to wear a safety vest to insure safety.

Problems Encountered by Observers

Rain created site observation difficulty and issues with observer safety at many sites throughout the state on June 7. The only area unaffected by rain was the northwest quadrant. Observers in most counties were able to observe through the rain, but heavy rain and high wind velocities in Mercer, Morton, Stark and Stutsman counties required rescheduling of sites to ensure observer safety. In Mercer County, one site was rescheduled to the next day because of flash flooding at the site. Morton county sites scheduled on June 7 had to be rescheduled to Saturday, June 9. Sites in Stark and Stutsman counties were rescheduled to different timeframes.

Road construction created site accessibility issues for some sites in several counties. One site in Stutsman County was aborted. When an attempt was made to move the site as instructed, the next available location was another identified observation site. Sites in Cass County, Burleigh County, Ramsey County, Barnes County, and Grand Forks County were moved within the limitations required by the protocols.

QUALITY ASSURANCE*Observers*

The observer training session was held on June 1, 2007. Each observer was required to participate in the classroom instruction and in training observations. Each observer was tested for an inter-accuracy ratio through participation in a minimum of four observation test sites. Test sites were selected to represent the types of sites and situations observers could expect to encounter in the field. None of the practice/test sites were actual sites in the sample of roadway segments. Observers worked in teams of two, observing the same vehicles, but recording data independently on separate observation forms. Teams were rotated throughout the training to ensure that each observer was paired at least four times with different partners. Each observer recorded type of vehicle, seat belt use, and gender during the tests. The average inter-accuracy ratio for all observers after testing was 96.3%.

Data Entry

Quality control standards were developed for the data entry. The following steps were taken by the data entry supervisor to ensure quality control:

- Each site packet was double-checked to determine the actual number of sheets was the same as that noted by the observers.
- Each observation sheet was double-checked to ensure the number of observations entered by the data entry operators equaled the number of observations.
- Any problems detected in the coding by the data entry operators were noted and brought to the attention of the project coordinator prior to the data cleaning. The coordinator made a determination as to the correct code.
- Each observation sheet was compared with the actual data entry for that sheet.
- Data entry accuracy was recorded at 99.73%. All errors discovered during quality assurance checks were corrected to achieve 100% accuracy.

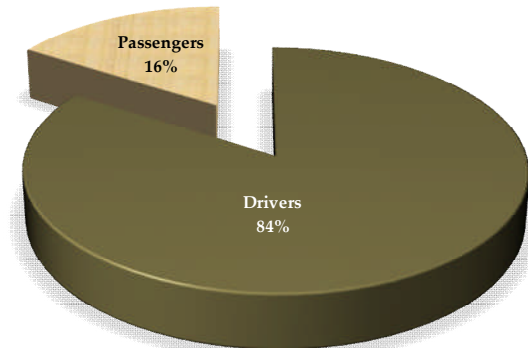
RESULTS

The results of the 2007 survey of seat belt use in North Dakota indicate that 81.9% of drivers, 83.7% of passengers, and a combined 82.2% of all vehicle occupants were observed to be wearing their seat belts. However, before discussing these results, some information on the sample of observations is in order.

In June of 2007, sixteen observers at 319 intersections recorded data on seat belt use for 26,924 drivers and 4,312 outboard passengers in 22,612 vehicles. Drivers represent 84.0% of the total observations, or a ratio of 5.2 drivers for every observed passenger. The composition of the sample is illustrated in the following chart.

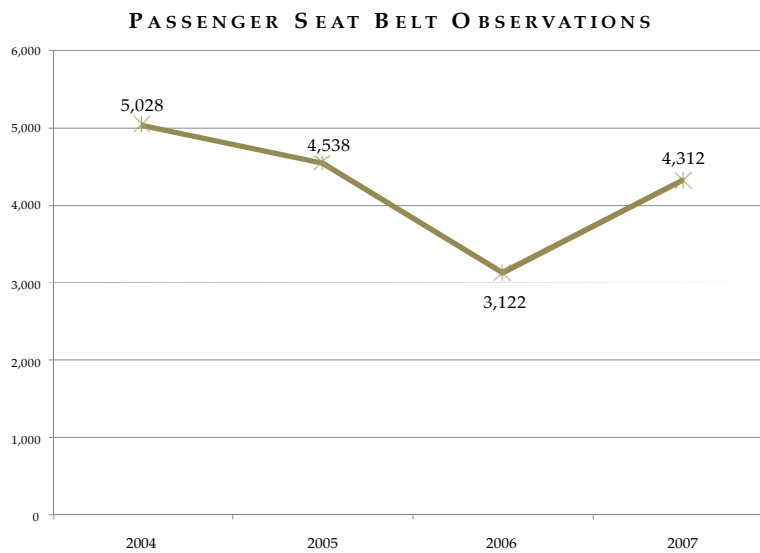
CHART 1

SEAT BELT OBSERVATIONS BY
VEHICLE OCCUPANT



The driver-to-passenger ratio has varied from 5.6 in 2005, to 6.7 in 2006, and 5.2 in 2007. In other words, the number of “driver only” vehicles with no passengers has actually declined and drivers, who were 87.0% of observations in 2006, are 84.0% of the observations in 2007. The number of passengers increased by 1,190 observations between 2006 and 2007, this represents a 38.1% increase. This increase reversed the decline in vehicles with passengers between 2004 and 2007, as illustrated in the following chart.

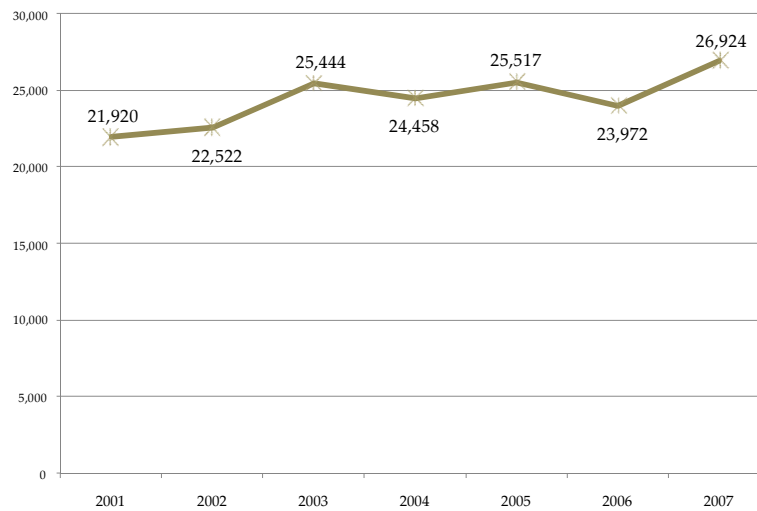
CHART 2



Since a new sampling methodology was introduced in 2001, the average number of observations has been 24,394 vehicle occupants, with a low of 21,920 in 2001 to a high of 26,924 in 2007. There are 2,952 more observations in 2007 than there were in 2006, an increase of 12.3%. For the annual surveys between 2001 and 2007, observers have tracked the seat belt use of 170,757 drivers and passengers. The number of observations has been fairly consistent over the past seven years, as is illustrated in the following chart.

CHART 3

FREQUENCY OF OBSERVATIONS BY YEAR
2001 - 2007

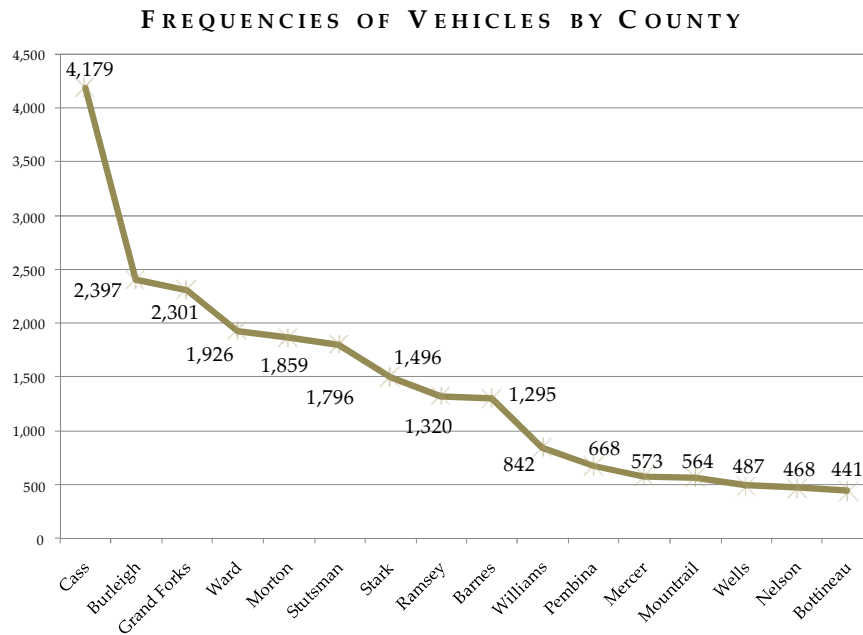


For 2007, observations were completed for the same sixteen counties as in each of the survey years since 2001 when the sampling methodology changed. In the following table, these counties, the frequency of observed vehicles, the percentage of the total sample of vehicles, and the cumulative percentage are reported in descending order. The chart that follows also illustrates the results.

TABLE 2

Frequencies for Drivers, Passengers, and All Occupants by County			
County	Drivers	Passengers	All Occupants
Barnes	1,295	320	1,615
Bottineau	441	104	545
Burleigh	2,397	148	2,545
Cass	4,179	932	5,111
Grand Forks	2,301	336	2,637
Mercer	573	129	702
Morton	1,859	133	1,992
Mountrail	564	140	704
Nelson	468	166	634
Pembina	668	214	882
Ramsey	1,320	356	1,676
Stark	1,496	256	1,752
Stutsman	1,796	279	2,075
Ward	1,926	529	2,455
Wells	487	144	631
Williams	842	126	968
Total	22,612	4,312	26,924

CHART 4



Four counties, Cass, Burleigh, Grand Forks and Ward, account for 47.8% of the total vehicles in the sample, which is similar to the findings in 2006 when they accounted for 46.9% of the total observations. On the other hand, the six counties of Pembina, Mercer, Mountrail, Wells, Nelson and Bottineau represent a combined total of 14.3% of the observed vehicles. These results reflect the major differences between the small number of large counties with dense vehicle traffic and the larger number of counties with low levels of population and fewer vehicle miles traveled.

By far, the county with the most observations was Cass County, with 4,179 observed vehicles and 18.5% of the total sample, just as was the case in 2006 when Cass County contributed 18.7% of the total observations.

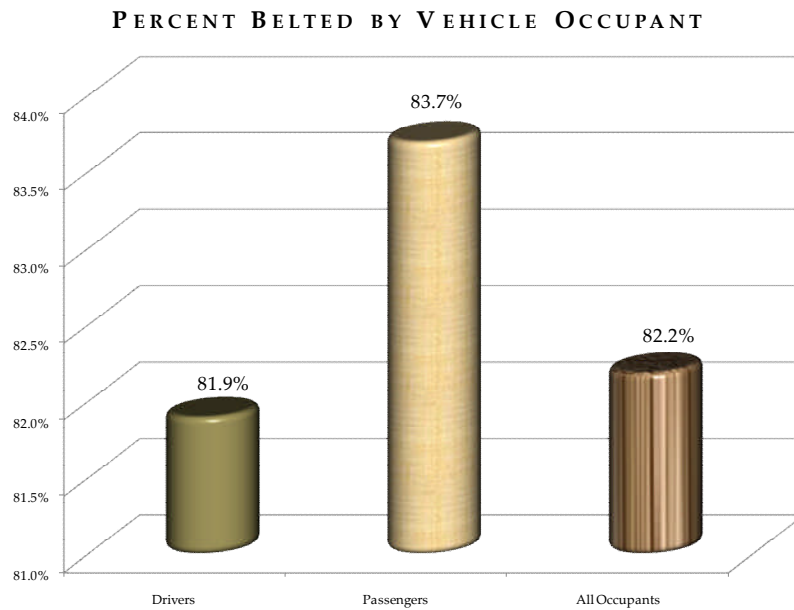
The significance of these numbers is that the seat belt compliance rate estimates for North Dakota depend to a considerable extent on the behavior of drivers and passengers in a relatively small number of counties with the largest numbers of vehicle occupants.

Results by Vehicle Occupants

There were 22,812 observations of drivers and 4,312 passengers for the 2007 seat belt usage survey in North Dakota. To produce the estimates of seat belt use, these observations were weighted to reflect sampling probabilities and estimates of vehicle miles traveled for counties and the sites within the counties. All of the estimates of seat belt use reported in this study are based on these weighted calculations.

For the 2007 survey, 81.9% of the drivers and 83.7% of the passengers were observed wearing seat belts. For the drivers and passengers combined, 82.2% were observed as belted, and this figure of 82.2% represents the 2007 estimate of seat belt use for vehicle occupants in North Dakota. These results are illustrated in the following chart.

CHART 5

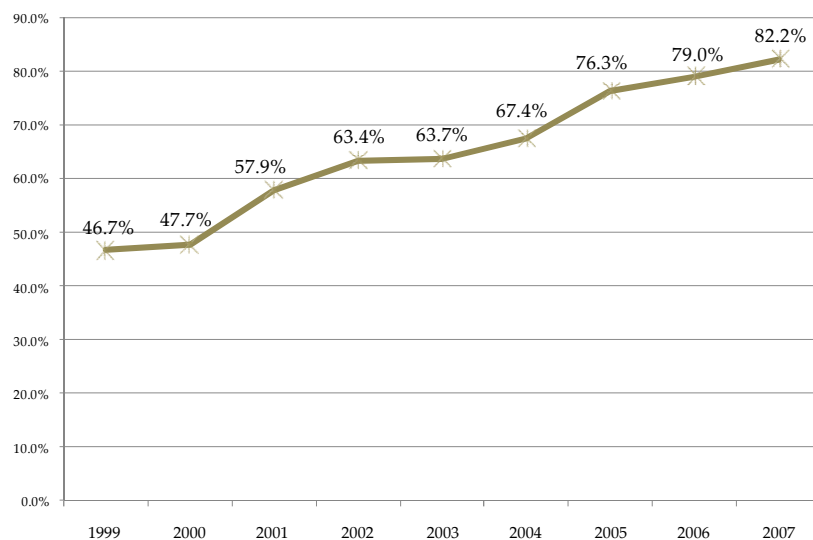


The total seat belt utilization rate of 82.2% represents an increase of 3.2 percentage points¹ over the 2006 rate of 79.0%. Most of the increase came from a higher rate for drivers in 2007 at 81.9% in 2007 compared to a rate of 78.4% in 2006, an increase of 3.5%. On the other hand, there was relatively little change in seat belt use for passengers, which is 83.7% in 2007 compared to 83.2% in 2006, an increase of only 0.5%. The increase for drivers is statistically significant, while the increase for passengers is not, except for the fact that there was a higher percentage of the sample attributable to passengers in 2007.²

Seat belt use rates in North Dakota have risen considerably between 1999 and 2007, as is illustrated in the following chart.

CHART 6

PERCENT BELTED BY YEAR
1999 - 2007



¹ Hereinafter, percentage point increases will be noted simply as “%” for ease in writing and reading.

² Statistical significance was determined by the use of the Chi-Square test for nominal scale data. The significance of Chi-Square was .006 for drivers, .384 for passengers, and .056 for drivers and passengers combined.

There have been years when the rate of increase was somewhat dramatic. It increased by 10.2% between 2000 and 2001 when the new sampling methodology was introduced to reflect a usage rate based on actual traffic density and vehicle miles traveled rather than a simple random sample of counties and sites. This was followed by a 5.5% increase between 2001 and 2002. Another dramatic increase occurred when the rates reflected an 8.9% increase between 2004 and 2005. Since 2005, there was a rate increase of 2.7% between 2005 and 2006, and then the current increase of 3.2% between 2006 and 2007. The average increase between 1999 and 2007 has been 4.4% per year, but this does not reflect the considerable variation between years.³

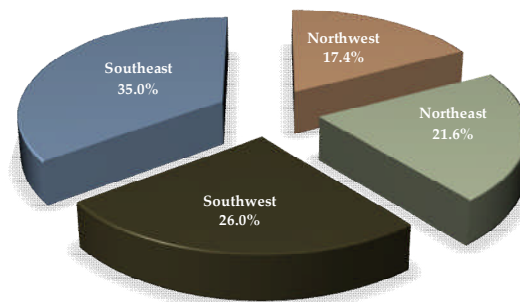
³ The increases reported here are basic percentage changes from year to year. Another way to calculate percentage increases is to take the current percentage, subtract the percentage from the previous year, and divide the result by the percentage for the previous year. Using this method, the rate of increase between 2006 and 2007 was 4.1%. Between 1999 and 2007, the increase using this method was 76.0%.

Results by Region of North Dakota

The sampling methodology divides the state into four quadrants: Northwest, Northeast, Southwest and Southeast. Each region contains a “certainty” county and three additional randomly selected counties from all the counties in each quadrant.⁴ The largest proportion of the total observed vehicle occupants comes from the Southeast, containing the State’s most populated county, Cass County, followed by the Southwest, the Northeast, and the Northwest. For the total of 26,924 vehicle occupants, the percentage of the sample for each region is illustrated in the following chart.

CHART 7

PERCENTAGE OF SAMPLE BY REGION



⁴ See the discussion of the sampling methodology for details on certainty counties and the selection process.

The Southeast region has a significant impact on the overall seat belt usage rate in North Dakota, partly because of the large number of observations that come from this region and the large number of vehicle miles traveled, which figures in the weighing process. At a rate of 84.4% of vehicle occupants belted, the Southeast is the only region higher than the overall state rate of 82.2% belted. The rates by region are presented in the following table.

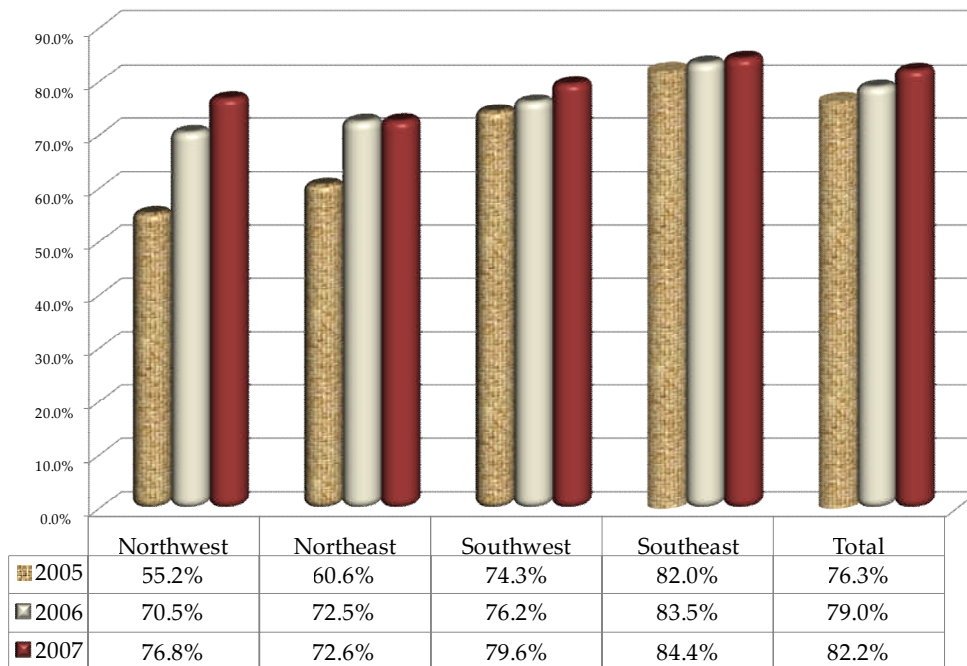
TABLE 3

Frequencies and Percent Belted by Region and Vehicle Occupant						
	Drivers		Passengers		All Occupants	
	Frequency	Percent Belted	Frequency	Percent Belted	Frequency	Percent Belted
Northwest	2,540	76.0%	674	80.4%	3,214	76.8%
Northeast	2,993	71.5%	720	77.4%	3,713	72.6%
Southwest	4,491	78.5%	550	89.7%	5,041	79.6%
Southeast	6,231	84.5%	1,410	84.1%	7,641	84.4%
Total	16,255	81.9%	3,354	83.7%	19,609	82.2%

For the past several years, the Southeast has had a very stable seat belt usage rate, ranging from 82.05 in 2005 to 84.4% in 2007, an increase of 2.4%. The Southwest region has shown slightly higher change of 5.35 between 2005 and 2007. The Northeast region increased dramatically from a low of 60.6% in 2005 to a high of 79.6% in 2007, a percentage change of 12.0%. However, the greatest change has occurred in the Northwest, where seat belt usage rates have typically been the lowest of all the regions. The rate in the Northwest jumped from a very low 55.2% in 2005 to a rate of 76.8% in 2007, a 21.6% increase. For the 2007 survey, the Northwest now has the third highest seat belt use rate for all vehicle occupants. The rates for the various regions between 2005 and 2007 are illustrated in the following chart.

CHART 8

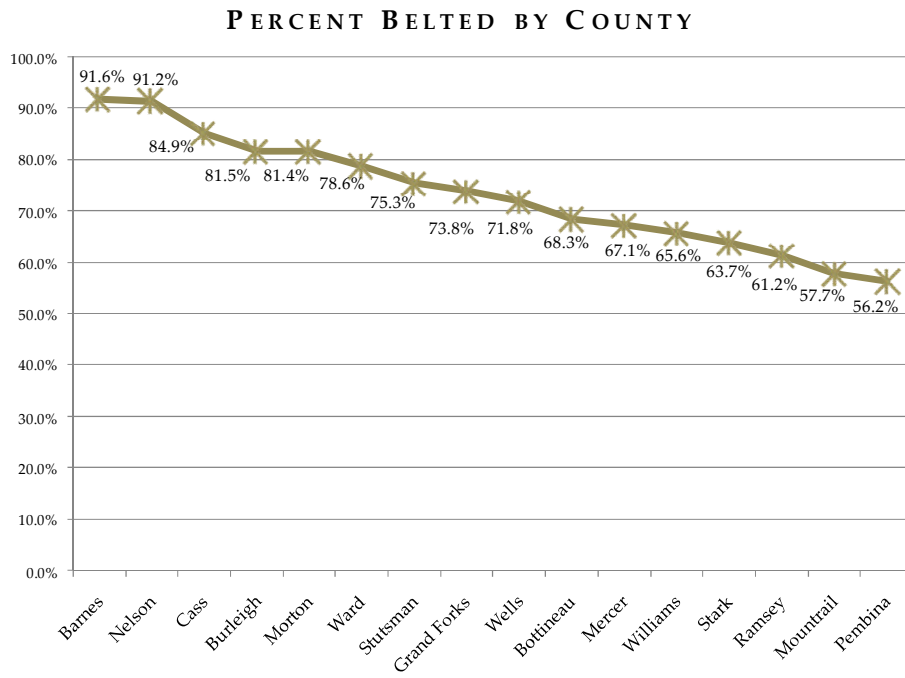
**PERCENT BELTED BY REGION AND
YEAR OF SURVEY 2005-2007**



Results by County

The seat belt usage rates for all vehicle occupants in the sixteen counties included in the sample are illustrated in the following chart, listed in descending order from the county with the highest rate to the county with the lowest rate.

CHART 9



Between 2006 and 2007, the most dramatic changes occurred in Barnes and Nelson Counties. Barnes County seat belt usage rate increased from 83.0% in 2006 to 91.6% in 2007, an increase of 8.6%. Nelson County increased even more, from a rate of 70.8% in 2006 to 91.2% in 2007, a change of 20.4%. Wells County also increased significantly from 61.4% in 2006 to 71.8% in 2007, an increase of 10.4%. Although Mountrail County continues to have one of the lowest rates of seat belt use, the rate did increase from 46.9% to 57.7%, a change of 10.8%. Several counties

have rates which decreased between 2006 and 2007, with the largest declines occurring in Stutsman, Grand Forks, Stark and Ramsey Counties.⁵

TABLE 4

Percent Belted by County and Year of Survey			
County	All Occupants Percent Belted		Percent Change
	2006	2007	
Barnes	83.0%	91.6%	8.6%
Nelson	70.8%	91.2%	20.4%
Cass	85.1%	84.9%	-0.2%
Burleigh	78.7%	81.5%	2.8%
Morton	80.2%	81.4%	1.2%
Ward	76.6%	78.6%	2.0%
Stutsman	80.3%	75.3%	-5.0%
Grand Forks	79.9%	73.8%	-6.1%
Wells	61.4%	71.8%	10.4%
Bottineau	68.1%	68.3%	0.2%
Mercer	61.9%	67.1%	5.2%
Williams	60.0%	65.6%	5.6%
Stark	71.5%	63.7%	-7.8%
Ramsey	65.6%	61.2%	-4.4%
Mountrail	46.9%	57.7%	10.8%
Pembina	48.6%	56.2%	7.6%
Total	79.0%	82.2%	3.2%

⁵ Caution is recommended for the interpretation of these results for some of the smallest counties, many of which have fewer than a thousand total observations.

Complete details on the results by county are provided in the following table, which presents the data for drivers, passengers, and all vehicle occupants by county.

TABLE 5

Percent Belted for Drivers, Passengers, and All Occupants by County			
County	Drivers	Passengers	All Occupants
Barnes	90.7%	95.2%	91.6%
Bottineau	66.3%	77.0%	68.3%
Burleigh	80.7%	93.9%	81.5%
Cass	85.2%	83.5%	84.9%
Grand Forks	72.9%	79.7%	73.8%
Mercer	65.0%	76.6%	67.1%
Morton	80.6%	92.7%	81.4%
Mountrail	57.5%	58.4%	57.7%
Nelson	89.9%	94.9%	91.2%
Pembina	53.6%	64.3%	56.2%
Ramsey	58.9%	69.6%	61.2%
Stark	61.3%	77.5%	63.7%
Stutsman	73.4%	87.6%	75.3%
Ward	78.0%	80.9%	78.6%
Wells	68.1%	84.1%	71.8%
Williams	63.1%	82.0%	65.6%
Total	81.9%	83.7%	82.2%

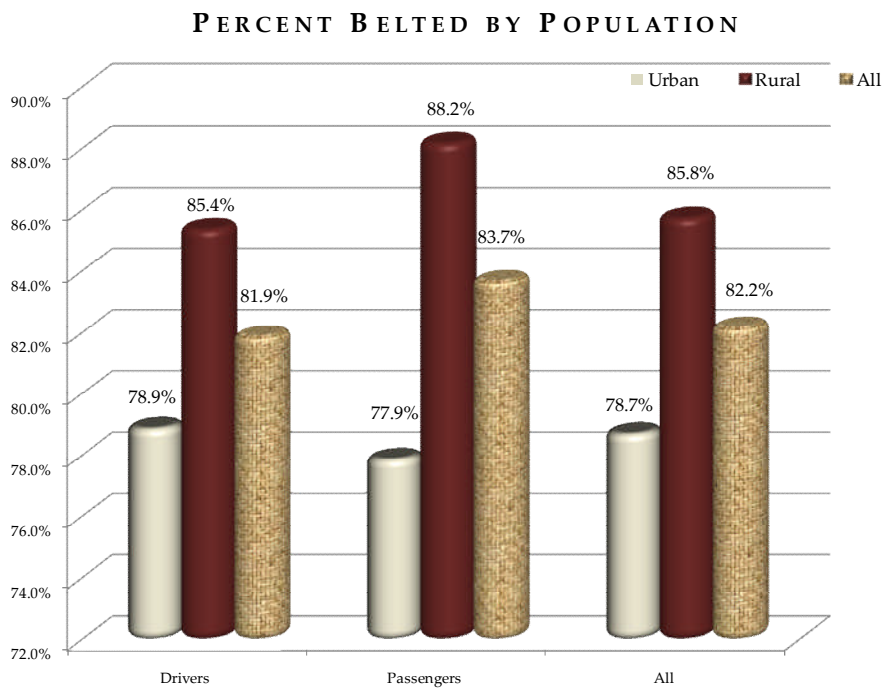
Results by Population Density, (Urban and Rural Areas)

In North Dakota, urban areas are defined as areas with a population of 2,500 or more residents, while rural areas are defined as having fewer than 2,500 residents. As a result, many of the “urban” areas of North Dakota actually have a very small town or rural character. At the same time, most of the observed vehicles in the seat belt surveys are likely to be seen in these urban areas. In the 2007 survey, 72.8% of the observations were in urban areas.

The influence of the small towns may help explain why seat belt use is typically about the same or lower in urban areas compared to rural areas in North Dakota. Seat belt use may be greater in some of North Dakota's larger cities (Fargo, Grand Forks, Minot, etc.), but not enough to offset low usage rates in the large number of smaller towns. On the other hand, many of the "rural" intersections may be located on interstates, or federal roadways, where seat belt use is often greater, thereby offsetting lower rates on open road, state highways.

In the North Dakota 2007 survey of seat belt use, 78.7% of urban vehicle occupants were observed as belted, compared to 85.8% of vehicle occupants observed in rural sites. The data are illustrated in the following chart.

CHART 10



Results by Roadway

Observations of seat belt use in North Dakota are classified on the basis of the type of roadway, which includes state-designated, federally-designated, and interstate highways. In 2007, the federal and interstate sites accounted for 70.4% of all observations, while the rest, 29.6% were on state-designated roadways. These results are illustrated by the following table.

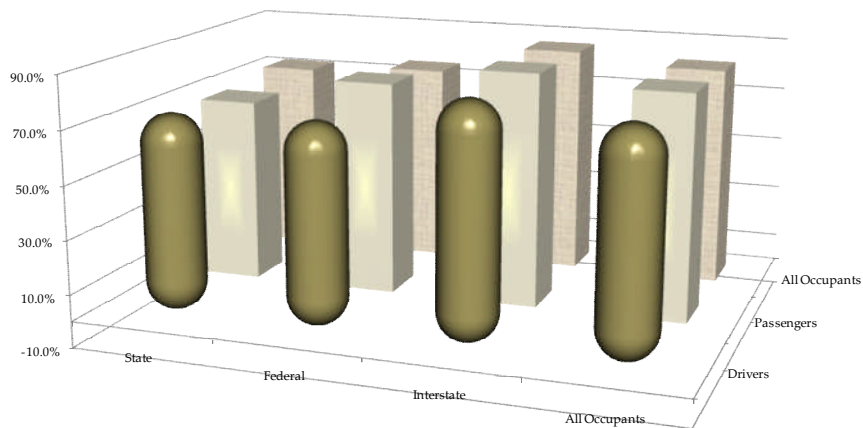
TABLE 6

Frequency and Percent of Sample by Vehicle Occupant						
Roadway	Drivers		Passengers		All Occupants	
	Unweighted Count	Percent of Sample	Unweighted Count	Percent of Sample	Unweighted Count	Percent of Sample
State	6,525	28.9%	1,443	33.5%	7,968	29.6%
Federal	8,126	35.9%	1,476	34.2%	9,602	35.7%
Interstate	7,961	35.2%	1,393	32.3%	9,354	34.7%
All	22,612	100.0%	4,312	100.0%	26,924	100.0%

A typical result for North Dakota seat belt surveys is to find the highest rates of seat belt use on interstate roadways, followed by federal roadways, with the lowest rates on state-designated roadways. The results for the 2007 statewide survey are consistent with the past trends, as illustrated by the following chart.

CHART 11

**PERCENT BELTED BY ROADWAY AND
VEHICLE OCCUPANT**



	State	Federal	Interstate	All Occupants
Drivers	73.4%	74.5%	86.1%	81.9%
Passengers	69.1%	79.7%	87.1%	83.7%
All Occupants	72.6%	75.3%	86.2%	82.2%

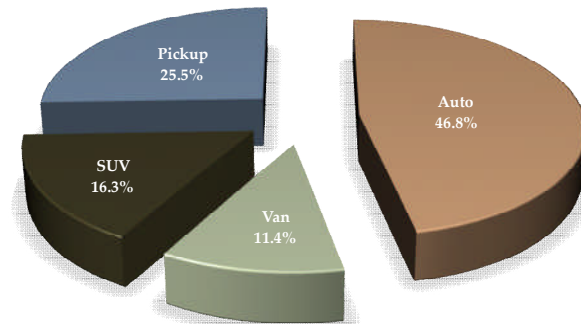
Interstate vehicle occupants were observed as belted 86.2% of the time, a rate 13.6% higher than for vehicle occupants on state-designated roadways, and 10.9% higher than the rate for occupants observed on federally-designated roadways.

Results by Vehicle Type

In the 2007 North Dakota survey, a little less than half of the observations (46.8%) were of automobile occupants. Another quarter (25.5%) of the occupants were in pickup trucks, which means that almost three-fourths (72.3%) of drivers and passengers were in autos and pickup trucks. The rest of the observations (27.7%) were of occupants of vans (11.4%) or SUVs (16.3%). These results are illustrated in the following chart.

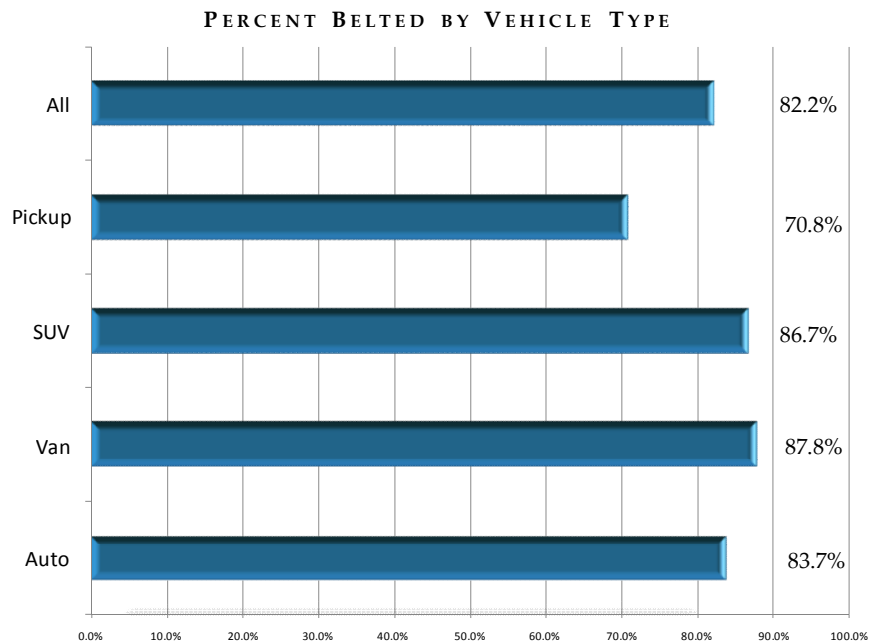
CHART 12

PERCENTAGE OF OBSERVATIONS BY VEHICLE TYPE



For 2007, seat belt use was above the statewide average for vehicle occupants of automobiles, vans, and SUVs. The highest rate of seat belt use was in vans, followed closely by occupants of SUVs. However, occupants of pickup trucks were belted at a rate of 70.8%. While this is slightly higher than the 2006 rate of 67.4%, it is still relatively low. These results are illustrated by the following chart.

CHART 13



The long-term trend in seat belt use surveys in North Dakota and other rural states has been to show low rates of seat belt use for drivers and passengers, but especially drivers, in pickup trucks. The explanation for this highly consistent trend usually points to gender because most pickup truck occupants are male (83.6% in the 2007 North Dakota survey), and males usually have lower seat belt use rates. However, gender accounts for only a part of the variation, as we shall see in the next section.

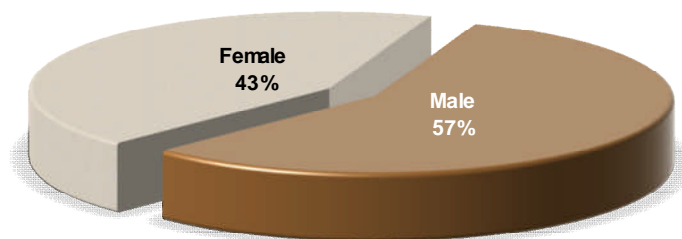
It appears that there is something special about the combination of males and pickup trucks. They have been stereotyped as “a defiant group of people who don’t want to be told what to do.”⁶ Another factor may have to do with the definition of the pickup as a work vehicle in which seat belt use depends heavily on whether the employer requires seat belt use for insurance purposes or whether such use can be monitored by employers. In general, pickup trucks are not defined as “family” type vehicles in the same way as autos, vans, and SUVs, which may help account for the lower rate of seat belt use in pickups.

Results by Gender and Seat Belt Use

As in prior surveys of seat belt use in North Dakota, the majority of drivers were males, the majority of passengers were female, and, since drivers far outnumber passengers, males represented most of the vehicle occupants. These results are illustrated by the following chart.

CHART 14

PERCENT OF TOTAL VEHICLE OCCUPANTS
BY GENDER

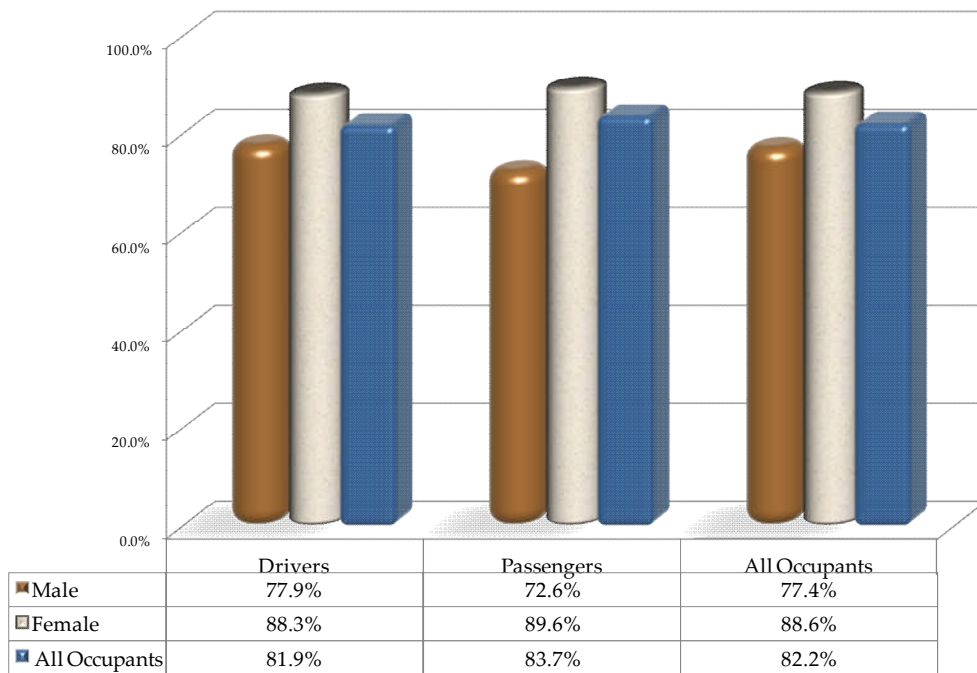


⁶ See the NDDOT “403 Research Grant PI&E Campaign, 2002-2004, page 1. The report concerns the results of a special initiative to try and raise seat belt use by targeting male pickup truck drivers.

Higher rates of seat belt use for females have been a consistent finding in all of the annual North Dakota seat belt surveys, including this survey. For all vehicle occupants, males were observed to be belted 77.4% of the time and females were belted 88.6% of the time, a difference of 11.2% in seat belt use by gender. Usually, passengers have higher rates of seat belt use regardless of gender, but the 2007 produced an anomaly: males were more likely to be belted as drivers than they were as passengers. These results are illustrated in the following chart.

CHART 15

PERCENT BELTED BY GENDER AND
OCCUPANT STATUS

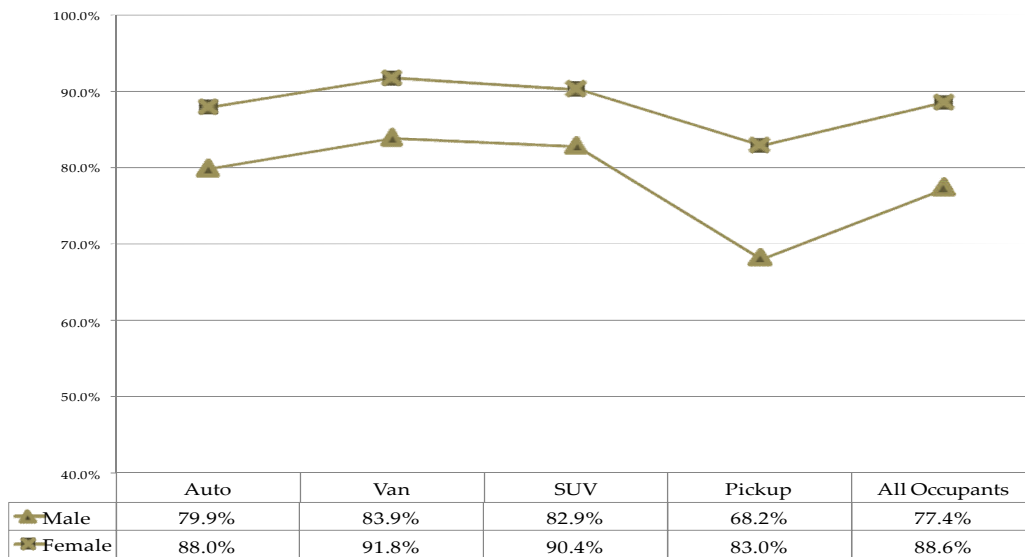


Results by Gender, Vehicle Type, and Seat Belt Use

For the 2007 survey, females had higher rates of seat belt use for all types of vehicles. Both males and females had the highest rates of seat belt use in vans, followed by SUVs and automobiles. The lowest rate of seat belt use for both genders was in pickup trucks. However, the rate for females in pickups was 83.0%, which is 14.8% higher than the rate of 68.2% for males in pickups. This result is consistent with the finding in the 2006 survey, when seat belt use by females in pickups was 17.8% higher than the rate for males in pickup trucks. As a result, it seems reasonable to conclude that gender is a dominant factor across vehicle types, including pickup trucks, with higher rates of seat belt use. These results are illustrated in the following chart.

CHART 16

PERCENT BELTED BY GENDER AND VEHICLE TYPE



The context for the rates of seat belt use for gender and vehicle type is found in the representation of men and women among the various vehicle types. Men were a small majority of drivers for all types of vehicles, except pickup trucks, where men were 89.3% of the drivers in the 2007 North Dakota Survey. On the other hand, women were significantly more likely to be passengers in all vehicles except pickup trucks, where women were a small majority of the passengers. It appears to be the case that driving is more likely to be a masculine activity, and, when passengers are present, men are somewhat more likely to be the drivers. Pickup trucks continue to be the most masculine of the vehicles, and the drivers are usually men.

On the other hand, because women represent such a high percentage of passengers for automobiles, vans, and SUVs, the distribution is tipped toward the females who become a small majority of vehicle occupants in these vehicles. Because of the dominance of male drivers and nearly as many male as female passengers, pickups are the one type of vehicle dominated by male occupants. This may be due in part to the fact that many occupations that make use of pickup trucks are still occupations with a very high percentage of males.

These results are illustrated in the following charts.

CHART 17

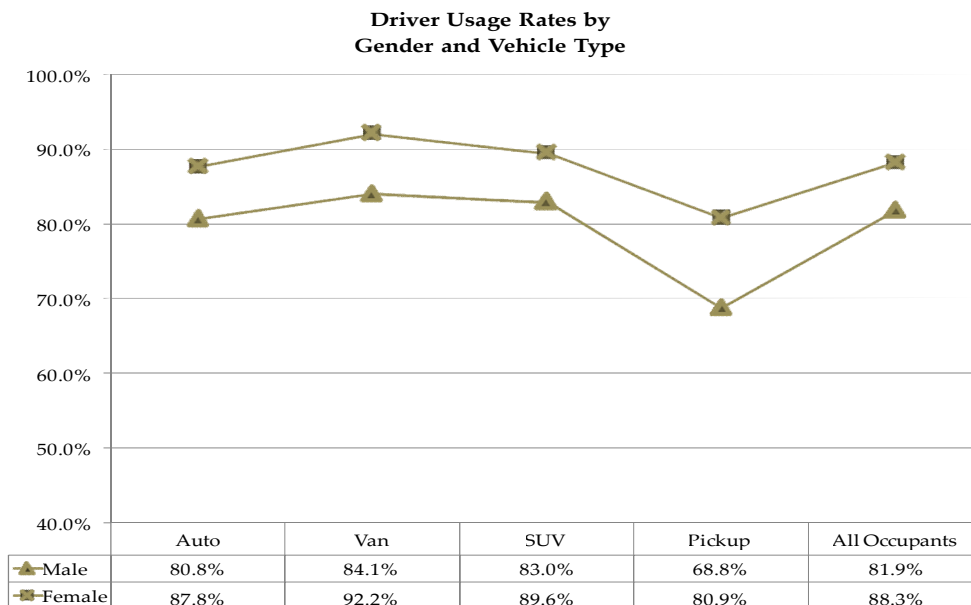
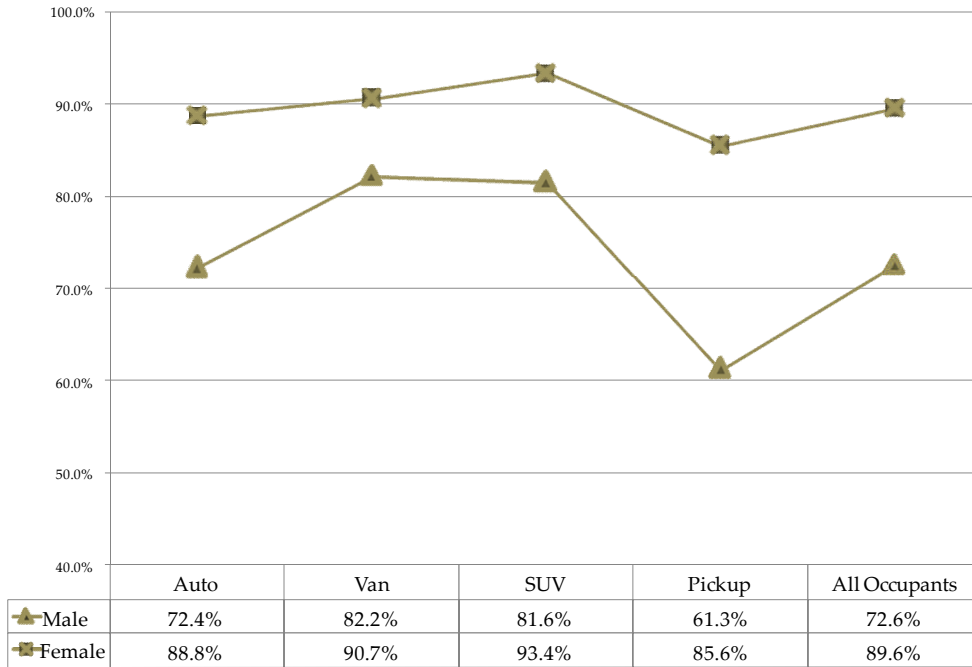


CHART 18

PASSENGER USAGE RATES BY GENDER AND VEHICLE TYPE



Summary and Discussion

The 2007 survey of seat belt use in North Dakota resulted in observations of 22,612 vehicles and drivers, 4,312 passengers, for a total of 26,924 vehicle occupants. This represents an increase of 2,952 observations over the observations in the 2006 survey. A comparison of observation totals for selected variables in 2006 and 2007 is presented in the following table.⁷

TABLE 7

Comparison of Observations 2006 - 2007			
Drivers		2006	2007
	Belted	78.4%	81.9%
	Not Belted	21.6%	18.1%
	Total	100.0%	100.0%
Passengers			
	Belted	83.2%	83.7%
	Not Belted	16.8%	16.3%
	Total	100.0%	100.0%
Both			
	Belted	79.0%	82.2%
	Not Belted	21.0%	17.8%
	Total	100.0%	100.0%

Some of the highlights of the data in the above table are as follows.

- There were increases for both drivers and passengers in 2007 compared to 2006.
- There were increases for all regions of the state, but the largest increase occurred in the Southeast, perhaps reflecting increased traffic in that region. This increase is important to the estimate of seat belt use because the highest rate of use occurs in the southeast quadrant of the state.

⁷ All of the frequencies are unweighted counts. All of the estimates of seat belt use, which follow, are based on data weighted for sampling probabilities and vehicle miles traveled.

- Observations increased significantly in urban areas, but declined in rural areas, perhaps suggesting another traffic change on North Dakota roadways. This change might have suppressed the overall estimate of seat belt use because the rate is higher in rural areas.
- There were increases in observations for all the roadway types, with the largest increase occurring on interstates. This may have helped raise the estimate of seat belt use because the usage rate was highest on interstates.
- There were increases in observations for all types of vehicles, especially for automobiles, and, to a lesser extent, pickup trucks. These changes may have had some small effect on estimates of seat belt use due to increases in use for the largest number of vehicles, automobiles, and pickups.
- There were increases in observations for both genders, with a slightly higher increase for females. This may have had some effect on the estimates of seat belt use because of the higher usage rate for females.

The overall estimate of seat belt use in North Dakota in 2007 is 82.2% belted. This represented an increase of 3.2% over the rate of 79.0% in 2006. Most of the increase was due to a higher rate of seat belt use for drivers, by far the largest number of vehicle occupants observed in North Dakota surveys. The results are detailed in the following table comparing seat belt use in 2006 with 2007 for selected variables.

TABLE 8

Comparison of Seat Belt Use 2006 - 2007		
Drivers	2006	2007
Belted	15,424	16,255
Not Belted	5,425	6,357
Total	20,849	22,612
Passengers		
Belted	2,490	3,354
Not Belted	632	958
Total	3,122	4,312
Both		
Belted	17,914	19,609
Not Belted	6,057	7,315
Total	23,971	26,924

- There was a significant increase in seat belt use in the northwest region, with a smaller increase in the southwest. While both these regions remain behind the state average for seat belt use, these increases certainly helped raise the overall rate of seat belt use.
- There was an increase in seat belt use in both urban and rural regions, with a higher increase in rural sites. This difference probably had a small effect on the overall estimate because of the smaller number of observations in rural areas.
- There were increases in seat belt use for all types of vehicles. The largest increase occurred for occupants of SUVs, but this change probably had little effect on the change in the overall estimate because of the relatively small number of SUVs. The increases for occupants of automobiles and pickups certainly helped increase the overall estimate of seat belt use between 2006 and 2007.
- There were increases in seat belt use for both genders. Even though males have a usage rate below the overall state average, the male increase in seat belt use elevated the overall estimate because of their large numbers, especially among drivers. However, it should be noted that the increase in the rate for females also helped raise the overall usage rate for North Dakota in 2007.

Overall, the 2007 survey of seat belt use in North Dakota is based on a valid sample of observations, as established by the calculation of confidence intervals and the standard error of the mean. It was found that the number of vehicles with passengers increased in 2007, suggesting that the long-term trend of increases in “driver only” vehicles may have abated, at least for this year.

Most of the observations come from four counties, Cass, Burleigh, Grand Forks, and Ward Counties, as has been true in previous surveys. Several counties, especially Barnes and Nelson, experienced increases in seat belt use between 2006 and 2007, while a few counties did show declines in seat belt use. The most populated counties, especially Cass County, continue to have a major impact on the overall estimate of seat belt use, partly because of the usage rate in those larger counties and because of their higher levels of traffic density.

Overall, any declines in seat belt use within the values of some variables were offset by increases in other variables. The result is an increase in seat belt use of 3.2% between 2006 and 2007, an increase that fits the long-term trend of modest but steady increases in seat belt use in North Dakota since the annual survey was first conducted.

APPENDICES

Appendix A

Site Locations

BARNES COUNTY

Site #	Hwy	Description	Direction	Map
1	I-94	Urbana Exit 272	E	2-2
2	I-94	4 mi. East of Site 1 at Eckelson Exit 276	W	2-2
3	94 Bus Lp	Westbound ramp to I-94	W	Valley City 2-2
4	I-94	South Hwy 1 Exit 288, 2 miles west of Valley City	E	2-2
5	1	Southeast limits of Dazey, Hwy 1 & 26	N&S	2-2
6	1	Southeast limits of Rogers	N&S	Rogers 2-2
7	I-94	6 miles east of Site 2, Exit 283	W	2-2
8	I-94	West Exit of Valley City. Exit 290 Park on eastbound on ramp	E	Valley City 2-2
9	94 Bus Lp	Main St. & 12th Ave. E	E&W	Valley City 2-2
10	I-94	4 ½ mi. east of Valley City. Exit 298	W	2-2
11	I-94	County Line exit 307 at Tower City	W	2-2
12	32	Camp Arnold Historic Site 3 ½ mi. North of Oriska (Watch Mileage).	N&S	2-2
13	32	Southeast limits of Oriska	N&S	Oriska 2-2
14	I-94	Oriska Exit 302	W	2-2
15	32	Northeast limits of Nome	N&S	Nome 2-1
16	46	Intersection with Hwy 1	E&W	2-1
17	1	2 mi. north of Hwy 46. County Road 38 and Hwy 1	N&S	2-1
18	94 Bus Lp	Service road to I-94 east edge of Valley City. Exit 294	E	2-2
19	I-94	2 mi. east of Valley City. Exit 296	E	2-2
20	I-94	East exit to Valley City. Exit 294	W	Valley City 2-2

BOTTINEAU COUNTY

Site #	Hwy	Description	Direction	Map
1	5	Intersection with Main street	W	Bottineau 5-1
2	5	Intersection with Co.Rd. 57	E&W	5-1
3	60	Southeast limits of Willow City	N	Willow City 5-1
4	60	Northwest limits of Willow City	S	Willow City 5-1
5	60	Intersection with Co.Rd. 22	N&S	5-1
6	60	"Y" Intersection (see map)	S	5-1
7	5	Intersection with 13th ave NE, east of Bottineau	W	5-1
8	5	Intersection with Co.Rd ; One mile West of Site # 1	E	5-1
9	14	1 mile south of Hwy 5 intersection	N&S	5-1
10	14	Intersection with 2nd Ave. at Kramer	N	Kramer 5-1
11	14	3 mi. south of Kramer	N	5-1
12	5	Intersection with Hwy 83	W	5-2
13	83	At Westhope (see map)	N	Westhope 5-2
14	83	½ mi. north of Westhope	N&S	5-2
15	83	Intersection with Hwy 5	N	5-2
16	5	3 mi. north of Maxbass	N	5-2
17	5	Intersection with Co.Rd. 3	E&W	5-2
18	83	Intersection with Hwy 5	5	5-2
19	256	Intersection with Co.Rd. 6, 4 mi. south of Antler	S	5-2
20	256	At Antler	S	5-2

BURLEIGH COUNTY

Site #	Hwy	Description	Direction	Map
1	83N	Intersection with Co.Rd. 16, 4 mi. south of Wilton	S	8-1
2	83N	9 mi. north of Bismarck	N	8-2
3	83N	At Northwood Estates, 6 ½ mi. north of I-94 exit	N	8-2
4	I-94	At Divide Ave. Exit	E	Bismarck 8-2
5	1804	Junction River Road and 1804 (At Eagles Park)	S	8-2
6	94 Bus Lp	Intersection with Memorial Highway and Fraine Barracks Road; east entrance memorial bridge	W	Bismarck 8-2
7	94 Bus Lp	Intersection with Divide, near Oasis Truck Stop	N	Bismarck 8-2
8	I-94	East Exit at Bismarck	W	Bismarck 8-2
9	I-94	2 mi. east of East Bismarck exit	E	8-2
10	I-94	7 mi. east of Sterling exit (at the Driscoble exit)	W	8-2
11	83S	2 mi. south of I-94 @ Sterling	N&S	8-2
12	36	East limits of Wing	W	Wing 8-1
13	14	West limits of Wing	S	Wing 8-1
14	94 Bus Lp	Bismarck Expressway & 26th St.	W	Bismarck 8-2
15	83 Bus Lp	7th St. S. & Bismarck Expressway	S	Bismarck 8-2
16	94 Bus Lp	Broadway & Washington	E	Bismarck 8-2
17	83 Bus Lp	9th St. S & Bismarck Expressway	N	Bismarck 8-2
18	83 Bus Lp	7th St. N & Broadway	S	Bismarck 8-2
19	83 Bus Lp	7th St. N & Main	S	Bismarck 8-2
20	I-94	Intersection with Hwy 83 @ Bismarck. Went 1 block East so could count traffic coming on to I-94 from Bismarck going East.	E	Bismarck 8-2

CASS COUNTY

Site #	Hwy	Description	Direction	Map
1	I-29	6 mi. north of Gardner exit 92 @ County Line	S	9-1
2	I-29	1 mi. south of Argusville exit, mile marker 78	N	9-1
3	I-29	Gardner exit 86	S	9-1
4	I-29	Argusville exit 79	S	9-1
5	I-29	1 mi. north of Argusville exit, mile marker 80	N	9-1
6	I-29	19th Ave N (exit 67), Fargo	S	Fargo 9-1
7	I-29	Rest area north of Harwood	N	9-1
8	I-29	Harwood exit	S	9-1
9	81 Bus Lp	19th Ave N and University, Fargo	S	Fargo 9-1
10	81 Bus Lp	University and Dakota Dr. (8th Ave N), Fargo	S	Fargo 9-1
11	I-29	Main Street Exit, Fargo	S	Fargo 9-1
12	294	12th Ave N and Dakota Drive, Fargo	E	Fargo 9-1
13	I-29	Hickson exit 50	N	9-2
14	46	South of Leonard, Intersection of Hwy 18	E	9-2
15	I-94	Leonard and Hwy 18, Exit 331 at Casselton	E	9-2
16	10 Bus Lp	University and Main Avenue, Fargo	W	Fargo 9-1
17	I-94	Intersection with Hwy 81 (University) exit 351, Fargo	W	Fargo 9-1
18	I-29	Horace/WildRice exit 56	N	9-2
19	10 Bus Lp	Main Avenue and 45th St, Fargo	W	Fargo 9-2
20	10 Bus Lp	Main Avenue and 42nd St., Fargo	E	Fargo 9-2

GRAND FORKS COUNTY

Site #	Hwy	Description	Direction	Map
1	15	North limits of Northwood	E	Northwood 18-2
2	18	Intersection with Hwy 15, 5 mi. east of Northwood	S	18-2
3	15	7 mi. east of Site #2 at curve	E	18-2
4	15	Intersection with Legion Baseball Field Road @ Thompson	E&W	Thompson 18-2
5	15	Intersection with I-29	W	18-2
6	I-29	5.3 mi. north of Hwy 15	N	18-2
7	81 bus lp	Columbia Rd. and 32nd Ave, Grand Forks	N	Gr. Forks 18-2
8	297	DeMers and 12th St. at Hardees	E	Gr. Forks 18-2
9	81 bus lp	Washington St. and 8th Ave.S., Grand Forks	S	Gr. Forks 18-2
10	I-29	Intersection with DeMers and Hwy 297	S	Gr. Forks 18-2
11	2	Gateway Drive and 42nd St .N., Grand Forks	W	Gr. Forks 18-2
12	2	Gateway Drive and 20th St. N., Grand Forks	E	Gr. Forks 18-2
13	81 bus lp	81 (Wash) and 10th Ave. N, Grand Forks	N	Gr. Forks 18-2
14	2	Gateway and 3rd St. N. (from SE), Grand Forks Pay attention to the map	W	Gr. Forks 18-2
15	2	Gateway and Columbia Rd., Grand Forks	E	Gr. Forks 18-2
16	2	4 mi. west of Emerado	E	18-2
17	2	Northwest limits of Emerado East of AFB exit. (Use Median Crossing east of Exit)	E&W	Emerado 18-2
18	I-29	Manvel Exit (exiting Manvel by I-29 south)	S	18-1
19	I-29	4 mi. north of Manvel Exit 157	N	18-1
20	81	Intersection with Co.Rd. 8 @ Manvel	E&W	18-1

MERCER COUNTY

Site #	Hwy	Description	Direction	Map
1	49	Intersection with Co.Rd. 34, 9 mi. south of Beulah (Hannover Exit)	N	29-2
2	200	@ Golden Valley	E	29-2
3	49	Intersection with Hwy 200	S	29-2
4	1806	@ curve near Hille Wildlife Management Area	E	29-1
5	200	Main St. and 2nd Ave. E. Pick City	W	Pick City 29-1
6	200	1 mi. west of Pick City	E	29-1
7	200	Intersection with 200A	W	29-2
8	200A	3 mi. east of Intersection with Hwy 200 and Hwy 31 intersection	E	29-2
9	200A	Intersection with Hwy 31 to Stanton. About 2 miles East of Site 8.	W	29-2
10	200A	4 mi. east of Stanton Rd.	W	29-2
11	31	Intersection with South Ave, Stanton	S	Stanton 29-2
12	200	Intersection with 6th Ave. NE, Hazen	E	Hazen 29-2
13	200	Intersection with 9th Ave. NW, Hazen	W	Hazen 29-2
14	200	Intersection with 3rd Ave NW, Hazen, Jct. Mercer Co. Rd. 27	E	Hazen 29-2
15	200	2 mi. west of Hazen	E	29-2
16	49	Intersection with Main St., Beulah	N	Beulah 29-2
17	49	Intersection with 7th St. NW, Beulah	S	Beulah 29-2
18	200	2 mi. east of intersection with Hwy 49	W	29-2
19	49	Intersection with Co.Rd. 22, North of river on the south side of Beulah	N	Beulah 29-2
20	49	Intersection with subdivision road south of Beulah	S	Beulah 29-2

MORTON COUNTY

Site #	Hwy	Description	Direction	Map
1	6	Intersection with 19th St. SW, Mandan	N	Mandan 30-1
2	94 bus lp	Memorial Hwy and 3rd St. SE, Mandan	W	Mandan 30-1
3	1806	Intersection with 19th St. SE, Mandan	N	Mandan 30-1
4	1806	At Fort Rice	N	30-2
5	94 bus lp	Memorial Hwy @ exit from I-94, Mandan	W	Mandan 30-1
6	94 bus lp	Memorial Hwy @ Redwing Dr., Mandan	E	Mandan 30-1
7	6	Intersection with 3rd St. SW, Mandan	S	Mandan 30-1
8	94 bus lp	Intersection of Hwy 1806 and Old Red Trail, Mandan	E	Mandan 30-1
9	I-94	Mandan Ave., Exit 153, Mandan	E	Mandan 30-1
10	94 bus lp	Old Red Trail and 8th Ave. NE, Mandan	W	Mandan 30-1
11	I-94	Intersection with Hwy 25 @ Truck Stop west of Mandan, Exit 147	W	30-1
12	I-94	Sweet Briar Lake/Judson Exit 134	E	30-1
13	6	Intersection with Co.Rd. 136	N&S	30-2
14	6	@ Bridge to Selfridge at county line	N&S	30-2
15	6	Intersection with Hwy 21	E (N)	30-2
16	21	Main and Hwy 21, Flasher	E&W	Flasher 30-2
17	I-94	Rest area east of Glen Ullin, mile 120	W	30-3
18	49	Intersection with I-94, north of Glen Ullin	S	30-3
19	49	Intersection with Co.Rd. 6 at the west edge of Glen Ullin (Corner where 49 turns South)	N (E)	30-3
20	I-94	Hebron exit 97	E	30-3

MOUNTRAIL COUNTY

Site #	Hwy	Description	Direction	Map
1	8	5 mi. north of Stanley	S	31-1
2	2	Intersection of Hwy 8 & 6th Ave. SE, Stanley	N	Stanley 31-1
3	2	Intersection with Hwy 8, Stanley	E&W	Stanley 31-1
4	2	1 mi. east of Stanley	E	31-1
5	2	Southwest limits of Palermo	W	31-1
6	2	Intersection with Co.Rd. 37 to Blaisdell	E	31-1
7	2	Intersection with Co.Rd. 5 to White Earth	E	31-1
8	2	½ mi. east of Ross	W	31-1
9	8	Corner of 6th Ave. SW. and Main St., Stanley	N&E	Stanley 31-1
10	8	Intersection with 1st Ave. N., Stanley	N&S	Stanley 31-1
11	8	2 ½ mi. south of Stanley	S	31-1
12	8	5 ½ mi. south of Stanley at curve	N	31-1
13	8	4 mi. north of Intersection with Hwy 23	S	31-2
14	23	Intersection with Hwy 8	E&W	31-2
15	23	Intersection with Hwy 37	E&W	31-2
16	37	Intersection of 3rd St. East and 3rd Ave. South, Parshall	N	Parshall 31-2
17	37	Intersection of 3rd St. E and Railroad Ave., Parshall	N&S	Parshall 31-2
18	23	Intersection with Hwy 1804, New Town	E&W	N.Town 31-2
19	1804	4 mi. northwest of New Town	E	31-2
20	1804	10 mi. northwest of New Town	N&S	31-2

NELSON COUNTY

Site #	Hwy	Description	Direction	Map
1	15	Intersection with Co.Rd. 5, 1 mi. south of Tolna	E	32-1
2	15	Intersection of Railroad Ave and First St., Pekin	E&W	Pekin 32-1
3	1	Intersection with Hwy 15, ½ mi. east of Pekin	N	32-1
4	15	Intersection with Hwy 1, ½ mi. east of Pekin	E&W	32-1
5	1	6 mi. north of intersection with Hwy 15 @ Old Settlers Park	N&S	32-1
6	1	Intersection with Hwy 2 @ Lakota	N	Lakota 32-1
7	1	Northeast limits of Lakota	S	Lakota 32-1
8	1	Intersection with Co.Rd. 4, 7 mi. north of Lakota (Site 7)	S	32-1
9	35	Intersection at South 3rd St. and Jeanette Ave, Michigan	N	Michigan 32-1
10	2	Intersection with Hwy 35, Michigan	E&W	Michigan 32-1
11	35	Intersection with Hwy 2, Michigan (Hwy 2 is split by a median)	N&S	Michigan 32-1
12	2	1 mi. west of Petersburg	E&W	32-1
13	2	Intersection with 5th St., Petersburg	W	Petersburg 32-1
14	2	Intersection with Hwy 32 Petersburg	E	Petersburg 32-1
15	32	Intersection with Co.Rd. 20, 7 mi. south of Petersburg	N&S	32-1
16	32	Intersection with Hwy 15	N&S	32-1
17	15	Intersection with Co.Rd. 21, 4 mi. west of Hwy 32	E&W	32-1
18	15	Intersection with Co.Rd. 15 at southeast limits of McVile	W	McVile 32-1
19	15	Southwest limits of McVile	E	McVile 32-1
20	1	Intersection with Co.Rd. 36, 7 mi. south of Pekin	N	32-1

PEMBINA COUNTY

Site #	Hwy	Description	Direction	Map
1	32	Intersection with Co.Rd. 10 , Walhalla	N&S	Walhalla 34-1
2	18	Northwest limits of Neche	S	Neche 34-1
3	18	Intersection with Co.Rd. 10, 4 mi. west of Bathgate	N&S	34-1
4	5	3 mi. west of intersection with Hwy 18 (Co. Rd. 15)	E&W	34-1
5	32	1 mi. north of intersection with Hwy 5, near Oak Lawn Cemetery Historical Site	N&S	34-2
6	32	Intersection with Co.Rd. 24, Mountain	N&S	Mountain 34-2
7	5	Intersection with Hwy 32, 5 mi. north of Mountain	E	34-2
8	5	Intersection with Co.Rd. 11, near Icelandic State Park	E&W	34-2
9	5	Intersection with Bedrock Lake Rd, west limits of Cavalier	E&W	Cavalier 34-2
10	18	Southern limits of Cavalier	N&S	Cavalier 34-2
11	18	Intersection with Hwy 66, 2 mi. east of Crystal	N&S	34-2
12	91	Intersection with Hwy 81, St. Thomas	N	St.Thomas 34-2
13	81	1 ½ mi. north of St. Thomas	N&S	34-2
14	I-29	Intersection with Co.Rd. 28 @ Pittsburg exit	S	34-2
15	66	At I-29 exit, Drayton	E	Drayton 34-2
16	66	Intersection with Main St. (Hwy 44), Drayton	W	Drayton 34-2
17	44	Main St. and Divide St., Drayton	N&S	Drayton 34-2
18	44	Main St. and Scribner St., Drayton	N&S	Drayton 34-2
19	66	Intersection with Co.Rd. 29, 5 mi. west of Drayton	E&W	34-2
20	66	Intersection with Hwy 81, 3 mi. south of St. Thomas	E&W	34-2

RAMSEY COUNTY

Site #	Hwy	Description	Direction	Map
1	2	Intersection with Co.Rd. 20 @ Penn	E	36-2
2	2	At Grand Harbor & Darby No Marker	W	36-2
3	2	Highway 2 intersecting with Frontage Road @ Davis Hotel.	E	D. Lake 36-2
4	19	Intersection with Hwy 2, Devils Lake. Park North of stoplights. Park at the entrance of Roosevelt Park. Observe southbound traffic. Road is designated West.	W	D. Lake 36-2
5	19	Corner of Devils Lake city limits	E	D. Lake 36-2
6	20	Intersection with 21st St.	N	D. Lake 36-2
7	20	At Webster	N&S	36-1
8	17	Intersection with Co.Rd. 27 (Ram Co. sign #3)	E&W	36-1
9	17	At eastern limits, Edmore	E&W	36-1
10	2	Intersection with Co.Rd. 27, Crary exit	W	36-2
11	2	Intersection with Co.Rd. 27 at Crary Wildlife Management Area (this is a rest stop)	E	36-2
12	2	Intersection With southeast city limits, Devils Lake – US #2 and Elks Drive	W	D. Lake 36-2
13	20	Directly across from Lake Region State College highway sign facing East. Devils Lake	S	D. Lake 36-2
14	20	Intersection with Hwy 19, Devils Lake	N	D. Lake 36-2
15	20	Intersection with southern limits, Devils Lake	N	D. Lake 36-2
16	19	@ southeast boundary of Airport, Devils Lake	E	D. Lake 36-2
17	2	Intersection with Hwy 20, Devils Lake	E	D. Lake 36-2
18	2	Intersection with 14th Ave., Devils Lake	W	D. Lake 36-2
19	20	Intersection with Shamrock Lane, Devils Lake	S	D. Lake 36-2
20	20	Intersection with Hwy 57 By Casino	N	36-2

STARK COUNTY

Site #	Hwy	Description	Direction	Map
1	22	2 mi. north of Dickinson (32 St. SW by Jay R's Auto Body)	S	45-2
2	I-94	Intersection with Hwy 22 exit, Dickinson	W	Dix 45-2
3	22	3rd Ave. W & 12th ST. W, or Museum Drive, Dickinson	S	Dix 45-2
4	I-94	Exit 59, west of Dickinson	E	Dix 45-2
5	85	Intersection with Co.Rd. 22, 13 mi. south of Belfield, 13 mi So. of old Hwy 10; 25 mi off eastside of school	N&S	45-2
6	85	Intersection with I-94, south side of interstate, Belfield	N&S	Belfield 45-2
7	I-94	Intersection with 85 at Belfield	E	Belfield 45-2
8	I-94	Exit at South Heart	W	45-2
9	22	3rd Ave. W and 8th St. S, (Loaf N Jug) Dickinson	N	Dix 45-2
10	94 bus lp	State Ave & 2nd St. W., Dickinson	E	Dix 45-2
11	22	Prairie Hills Mall entrance, Dickinson	S	Dix 45-2
12	22	3rd Ave. W and 21st St. W., Dickinson	N	Dix 45-2
13	I-94	@ old Green River Rest Area	E	45-2
14	I-94	@ Taylor Exit 78	W	45-1
15	8	Intersection with Co.Rd. 24, 13 mi. south of Richardton	N&S	45-1
16	8	Intersection with Hwy 10 west of Richardton	S&E	45-1
17	94 bus lp	Villard & 10th Ave. E (Kum & Go), Dickinson	W	Dix 45-2
18	I-94	Exit 64 east of Dickinson	E	Dix 45-2
19	94 bus lp	States Ave and Villard, Dickinson	N	Dix 45-2
20	22	3rd Ave. W and 4th St. W, Dickinson	S	Dix 45-2

STUTSMAN COUNTY

Site #	Hwy	Description	Direction	Map
1	I-94	Intersection with Hwy 30, 1 mi. west of Medina, Exit 228	E	47-2
2	I-94	Medina Exit	E	47-2
3	I-94	Windsor Exit 242	E	47-2
4	94 bus lp	Bus. Loop and 14th Ave. SW, Jamestown	W	J.town 47-2
5	281	Intersection of 94 Bus. Loop and 281, Jamestown	N	J.town 47-2
6	52	2 mi. north of Jamestown at Pipestem Lake	S	47-2
7	36	West of Woodworth at curve	E	47-1
8	36	Intersection with Hwy 52 at Pingree	W	Pingree 47-1
9	46	Intersection with Hwy 281	N	47-2
10	281	Intersection with Co.Rd. to Sydney, 10 mi. south of Jamestown	N&S	47-2
11	281	3 mi. south of Jamestown	N&S	47-2
12	281	Last intersection in south Jamestown	N	J.town 47-2
13	52	12th Ave. SE and the road intersecting between 12th and 13th street, Jamestown	E	J.town 47-2
14	281	Intersection with 4th Ave. SW, Jamestown	N	J.town 47-2
15	9	Intersection with Hwy 20, Courtenay	W	Courtenay 47-2
16	9	@Kensal city limits	S	47-1
17	281	@ Buffalo Mall entrance (25th St. SW), Jamestown	N&S	J.town 47-2
18	I-94	5 mi. east of Jamestown, Bloom exit 262	W	47-2
19	I-94	East Jamestown exit	W	J.town 47-2
20	281	Intersection immediately south of Buffalo Mall, Jamestown	N	J.town 47-2

WARD COUNTY

Site #	Hwy	Description	Direction	Map
1	52	Intersection with Hwy 50	N&S	51-1
2	50	Intersection with Hwy 52	W	51-1
3	52	Northwest limits of Donnybrook	N&S	D.Brook 51-1
4	28	Northern limits of Carpio	N&S	Carpio 51-2
5	52	Intersection Co.Rd. 11 and Co. Rd. 8 at Foxholm, 128 ave. NW	N&S	51-2
6	2	1 mi. east of Berthold	E&W	51-2
7	52	Intersection with Hwy 2	N&S	51-2
8	2	At Burlington exit	E&W	51-2
9	2	Intersection with Hwy 83 Bypass at Minot	E	Minot 51-2
10	52 bus loop	Intersection with Hwy 2, Minot	N&E	Minot 51-2
11	83	4 mi. north of Ruthville	S	51-2
12	83	Intersection with Co.Rd. 8 at Ruthville	N	51-2
13	83	Intersection with 20th Ave. SE, Minot	N	Minot 51-2
14	83	Intersection with Hwy 2	S	Minot 51-2
15	83	Intersection with Hwy 23	N	51-3
16	83	Intersection with Co.Rd. 24 to Douglas, 359th st. SW	S	51-3
17	23	Intersection with Hwy 28 to Ryder	W	51-3
18	52 Bus loop	Intersection with 8th Ave. SE, Minot	E	Minot 51-2
19	52 Bus loop	Intersection with Hiawatha, Minot	W	Minot 51-2
20	2	Intersection with 6th St. SE, Minot	W	Minot 51-2

WELLS COUNTY

Site #	Hwy	Description	Direction	Map
1	3	1 mi. north of North St. in Harvey	S	Harvey 52-1
2	3	Intersection with Hwy 91 at Harvey	S	Harvey 52-1
3	52 Bus Loop	Intersection with Hwy 3 at Harvey	E&W	Harvey 52-1
4	52	Intersection with Hwy 52 Bus Loop south of Harvey	E&W	52-1
5	30	3 mi. north of Hamburg	N&S	52-1
6	30	Intersection with Railroad Ave., Hamburg	N&S	Hamburg 52-1
7	52	@ Manfred	E&W	52-1
8	15	Intersection with Hwy 30, 5 mi. east of Fessenden	W	52-1
9	15	½ mi. east of Fessenden	E	52-1
10	15	Intersection with Vine Ave., Fessenden	E	Fessenden 52-1
11	15	Intersection with Hwy 52 at Fessenden	W	Fessenden 52-1
12	52	1 mi. south of Fessenden	N	52-1
13	52	3 mi. south of Fessenden	S	52-1
14	200	Intersection with Hwy 3, 1 ½ mi. west of Hurdsfield	E	52-2
15	3	½ mi. north of Hurdsfield	N&S	52-2
16	3	Northern city limits of Hurdsfield	N&S	Hurdsfield 52-2
17	200	Intersection with Bowdon exit	E&W	52-2
18	52	Intersection with Hwy 200	S/E	52-2
19	52	Intersection at Sykeston exit	E&W	52-2

WILLIAMS COUNTY

Site #	Hwy	Description	Direction	Map
1	50	Intersection with Main St., Grenora	E&W	Grenora 53-2
2	50	1 mi. west of Zahl, at junction with Co.Rd. 3A	E&W	53-2
3	50	Intersection with Hwy 42, 6 ½ mi. east of Alamo	W	53-2
4	50	3 ½ mi. south of Wildrose	E	53-2
5	40	Intersection with Hwy 2, 10 mi. east of Ray	N&S	53-1
6	2	6 mi. east of Ray, OR 4 mi. west of Site 5	E&W	53-1
7	2	Intersection with Co.Rd. 41 at Ray	W	Ray 53-1
8	2	Intersection with Co.Rd. 33, 4 mi. north of Epping	E&W	53-1
9	2	Intersection with Hwy 85, north of Williston	S	53-3
10	2/85	At Hi-Land Heights, north of Williston	S	53-3
11	2 Bus Loop	Intersection with 22nd St. W, Williston	N	Williston 53-3
12	1804	Intersection with Main St., Williston	W	Williston 53-3
13	1804	Intersection with 9th Ave. E, Williston	E	Williston 53-3
14	1804	Intersection with East Dakota Parkway, Williston	W	Williston 53-3
15	1804	Intersection with 20th Ave. E, Williston	E	Williston 53-3
16	1804	Intersection with 27th Ave. E, Williston	W	Williston 53-3
17	1804	Intersection with Co.Rd. 33 to Lewis & Clark State Park, east of Williston	E&W	53-1
18	1804	Intersection with Co.Rd. 51, 16 mi. east of Lewis & Clark State Park	E&W	53-1
19	2	Intersection with Hwy 85 South, west of Williston	W	53-3
20	2	Intersection with Hwy 1804, west of Williston	E	53-3

Appendix B

Quality Assurance Report

Quality Assurance Report Post Survey: June 4th-9th			
County	# of errors	# of fields	field Acc %
Barnes	14	4904	99.71%
Bottineau	0	1711	100.00%
Burleigh	41	7888	99.48%
Cass	11	14659	99.92%
Grand Forks	9	7835	99.89%
Mercer	6	2235	99.73%
Morton	9	6164	99.85%
Mountrail	0	2232	100.00%
Nelson	15	1998	99.25%
Pembina	14	2694	99.48%
Ramsey	0	4937	100.00%
Stark	0	5250	100.00%
Stutsman	69	6110	98.87%
Ward	10	7401	99.86%
Wells	13	1994	99.35%
Williams	7	3023	99.77%
Total	218	81035	99.73%

Appendix C

Code Book

FILE INFORMATION: CODEBOOK ND JUNE 2007

Notes		
Output Created		21-JUN-2007 11:21:25
Comments		
Input	Data	B:\Seat Belt Survey\North Dakota\06-04-07 Statewide Survey\Post 07 SPSS\ND June 2007.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	22612
Syntax		DISPLAY DICTIONARY.
Resources	Elapsed Time	0:00:00.00

[DataSet1] B:\Seat Belt Survey\North Dakota\06-04-07 Statewide Survey\Post 07 SPSS\ND June 2007.sav

Variable Information								
Variable	Position	Label	Measurement Level	Column Width	Alignment	Print Format	Write Format	Missing Values
YEAR	1	Year of Study	Nominal	8	Right	F11	F11	9999
COUNTY	2	County	Nominal	8	Right	F11	F11	99
INTSECTN	3	Intersection	Nominal	8	Right	F11	F11	999
POP	4	Population Density	Nominal	8	Right	F11	F11	9
ROAD	5	Roadway Type	Nominal	8	Right	F11	F11	9
DAY	6	Weekday Status	Nominal	8	Right	F11	F11	9
OBS	7	Observer	Nominal	8	Right	F11	F11	99
REGION	8	Region of State	Nominal	8	Right	F11	F11	9
SiteVMT	9	Site VMTs	Scale	8	Right	F11.1	F11.1	
CoVMT	10	County VMTs	Nominal	8	Right	F11.8	F11.8	
WC	11	County Weight	Nominal	8	Right	F11.2	F11.2	
WS	12	Site Weight	Scale	8	Right	F11.1	F11.1	
CASENO	13	Case Number	Nominal	22	Right	F11	F11	
VEHICLE	14	Vehicle Type	Nominal	8	Right	F11	F11	9
DRIVER	15	Driver Status	Nominal	8	Right	F11	F11	9
DRSEX	16	Driver Gender	Nominal	8	Right	F11	F11	9
PASSNGR	17	Passenger Status	Nominal	8	Right	F11	F11	9
PASSEX	18	Passenger Gender	Nominal	8	Right	F11	F11	9
filter_\$	19	OBS = 2 (FILTER)	Scale	10	Right	F1	F1	
wcvmtc	20	COMPUTE wcvmtc = WC * CoVMT	Scale	10	Right	F8.2	F8.2	
swwvmts	21	COMPUTE swwvmts = WS * SiteVMT	Scale	10	Right	F8.2	F8.2	
cscomb	22	COMPUTE cscomb = TotWcVc * TotWsVs	Scale	10	Right	F8.2	F8.2	
finwt	23	COMPUTE finwt = cscomb	Scale	10	Right	F8.2	F8.2	
TotWcVc	24	COMPUTE TotWcVc = wcvmtc/359271152.996	Scale	10	Right	F8.2	F8.2	
TotWsVs	25	COMPUTE TotWsVs = swwvmts/45317.50	Scale	10	Right	F8.2	F8.2	

Variables in the working file

Variable Values		
Value		Label
COUNTY	1	Barnes
	2	Bottineau
	3	Burleigh
	4	Cass
	5	Grand Forks
	6	Mercer
	7	Morton
	8	Mountrail
	9	Nelson
	10	Pembina
	11	Ramsev
	12	Stark
	13	Stutsman
	14	Ward
	15	Wells
	16	Williams
POP	1	Urban
	2	Rural
ROAD	1	State
	2	Federal
	3	Interstate
DAY	1	Thursday
	2	Friday
	3	Saturday
	4	Wednesday
	5	Monday
	6	Tuesday
	7	Sunday

OBS	6	Ida Harmon
	7	Susie Kapelovitz
	13	Ken Nelson
	16	Naomi Thorson
	19	Richard Benz
	22	Pat Zastoupil
	23	Tyler Frank
	25	Josh Johnson
	26	Leon Rustand
	27	Dawn Gutierrez
	31	Don Kostelecky
	32	Lucy Kostelecky
	35	Joan Johnson
	37	Larry Rustand
	38	Daryl Andes
	39	Bonnie Evenson

REGION	1	Northwest
	2	Northeast
	3	Southwest
	4	Southeast
VEHICLE	1	Auto
	2	Van
	3	SUV
	4	Pickup
DRIVER	1	Belted
	2	Not Belted
DRSEX	1	Male
	2	Female
PASSNGR	1	Belted
	2	Not Belted
PASSEX	1	Male
	2	Female
filter_\$	0	Not Selected
	1	Selected

Appendix D

Frequencies

Estimated Seat Belt Use (Percent) and Unweighted Frequencies for Vehicle Occupants				
Occupant	Status	Estimated Percent	Unweighted Count	Percent of Sample
Drivers	Belted	81.9%	16,255	
	Not Belted	18.1%	6,357	
	Total	100.0%	22,612	84.0%
Passengers	Belted	83.7%	3,354	
	Not Belted	16.3%	958	
	Total	100.0%	4,312	16.0%
Both	Belted	82.2%	19,609	
	Not Belted	17.8%	7,315	
	Total	100.0%	26,924	100.0%

Total Observations by County, ND 2007 (Unweighted Data)		
County	Frequency	Percent
Cass	4,179	18.5%
Burleigh	2,397	10.6%
Grand Forks	2,301	10.2%
Ward	1,926	8.5%
Morton	1,859	8.2%
Stutsman	1,796	7.9%
Stark	1,496	6.6%
Ramsey	1,320	5.8%
Barnes	1,295	5.7%
Williams	842	3.7%
Pembina	668	3.0%
Mercer	573	2.5%
Mountrail	564	2.5%
Wells	487	2.2%
Nelson	468	2.1%
Bottineau	441	2.0%
Total	22,612	100.0%

Percent Belted by County									
County	Driver			Passenger			All		
	Belted	Not Belted	Unweighted Count	Belted	Not Belted	Unweighted Count	Belted	Not Belted	Unweighted Count
Barnes	90.7%	9.3%	1,295	95.2%	4.8%	320	91.6%	8.4%	1,615
Bottineau	66.3%	33.7%	441	77.0%	23.0%	104	68.3%	31.7%	545
Burleigh	80.7%	19.3%	2,397	93.9%	6.1%	148	81.5%	18.5%	2,545
Cass	85.2%	14.8%	4,179	83.5%	16.5%	932	84.9%	18.2%	5,111
Grand Forks	72.9%	27.1%	2,301	79.7%	20.3%	336	73.8%	26.2%	2,637
Mercer	65.0%	35.0%	573	76.6%	23.4%	129	67.1%	32.9%	702
Morton	80.6%	19.4%	1,859	92.7%	7.3%	133	81.4%	18.6%	1,992
Mountrail	57.5%	42.5%	564	58.4%	41.6%	140	57.7%	42.3%	704
Nelson	89.9%	10.1%	468	94.9%	5.1%	166	91.2%	8.8%	634
Pembina	53.6%	46.4%	668	64.3%	35.7%	214	56.2%	43.8%	882
Ramsey	58.9%	41.1%	1,320	69.6%	30.4%	356	61.2%	38.8%	1,676
Stark	61.3%	38.7%	1,496	77.5%	22.5%	256	63.7%	36.3%	1,752
Stutsman	73.4%	26.6%	1,796	87.6%	12.4%	279	75.3%	24.7%	2,075
Ward	78.0%	22.0%	1,926	80.9%	19.1%	529	78.6%	21.4%	2,455
Wells	68.1%	31.9%	487	84.1%	15.9%	144	71.8%	28.2%	631
Williams	63.1%	36.9%	842	82.0%	18.0%	126	65.6%	34.4%	968
Total	81.9%	18.1%	22,612	83.7%	16.3%	4,312	82.2%	17.8%	26,924

Percent Belted by Year 1999-2007		
Year	Percent	Percent Change
1999	46.7%	
2000	47.7%	1.0%
2001	57.9%	10.2%
2002	63.4%	5.5%
2003	63.7%	0.3%
2004	67.4%	3.7%
2005	76.3%	8.9%
2006	79.0%	2.7%
2007	82.2%	3.2%
Average	64.9%	4.4%

SEAT BELT USE IN NORTH DAKOTA

June, 2007

Percent Belted by Region											
		Northwest		Northeast		Southwest		Southeast		All	
Occupant	Status	Unweighted		Unweighted		Unweighted		Unweighted		Unweighted	
		Percent	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count
Driver	Belted	76.0%	2,540	71.5%	2,993	78.5%	4,491	84.5%	6,231	81.9%	16,255
	Not Belted	24.0%	1,233	28.5%	1,783	21.5%	1,834	15.5%	1,507	18.1%	6,357
	Total	100.0%	3,773	100.0%	4,776	100.0%	6,325	100.0%	7,738	100.0%	22,612
Passenger	Belted	80.4%	674	77.4%	720	89.7%	550	84.1%	1,410	83.7%	3,354
	Not Belted	19.6%	225	22.6%	330	10.3%	116	15.9%	287	16.3%	958
	Total	100.0%	899	100.0%	1,050	100.0%	666	100.0%	1,697	100.0%	4,312
All	Belted	76.8%	3,214	72.6%	3,713	79.6%	5,041	84.4%	7,641	82.2%	19,609
	Not Belted	23.2%	1,458	27.4%	2,113	20.4%	1,950	15.6%	1,794	17.8%	7,315
	Total	100.0%	4,672	100.0%	5,826	100.0%	6,991	100.0%	9,435	100.0%	26,924

Percent of Vehicle Occupants Belted by Region and Year 2005-2007					
Region	Year			Percent Change	
	2005	2006	2007	2005-2007	2006-2007
Northwest	55.2%	70.5%	76.8%	21.6%	6.3%
Northeast	60.6%	72.5%	72.6%	12.0%	0.1%
Southwest	74.3%	76.2%	79.6%	5.3%	3.4%
Southeast	82.0%	83.5%	84.4%	2.4%	0.9%
Total	76.3%	79.0%	82.2%	5.9%	3.2%

Percent Belted by Vehicle Occupant and Population Density

Population	Drivers			Passengers			All Occupants			Percent of Sample
	Belted	Not Belted	Unweighted Count	Belted	Not Belted	Unweighted Count	Belted	Not Belted	Unweighted Count	
Urban	78.9%	21.1%	16,255	77.9%	22.1%	3,354	78.7%	21.3%	19,609	72.8%
Rural	85.4%	14.6%	6,357	88.2%	11.8%	958	85.8%	14.2%	7,315	27.2%
All	81.9%	18.1%	22,612	83.7%	16.3%	4,312	82.2%	17.8%	26,924	100.0%

Percent Belted by Roadway and Vehicle Occupant

Roadway	Drivers			Passengers			All Occupants			Percent of Sample
	Belted	Not Belted	Unweighted Count	Belted	Not Belted	Unweighted Count	Belted	Not Belted	Unweighted Count	
State	73.4%	26.6%	6,525	69.1%	30.9%	1,443	72.6%	27.4%	7,968	29.6%
Federal	74.5%	25.5%	8,126	79.7%	20.3%	1,476	75.3%	24.7%	9,602	35.7%
Interstate	86.1%	13.9%	7,961	87.1%	12.9%	1,393	86.2%	13.8%	9,354	34.7%
All	81.9%	18.1%	22,612	83.7%	16.3%	4,312	82.2%	17.8%	26,924	100.0%

Percent Belted by Vehicle Type and Vehicle Occupant

Vehicle Type	Driver			Passenger			All Occupants			Percent of Sample
	Belted	Not Belted	Unweighted Count	Belted	Not Belted	Unweighted Count	Belted	Not Belted	Unweighted Count	
Auto	83.9%	16.1%	10,545	82.7%	17.3%	2,065	83.7%	16.3%	12,610	46.8%
Van	87.7%	12.3%	2,445	88.4%	11.6%	624	87.8%	12.2%	3,069	11.4%
SUV	86.0%	14.0%	3,730	90.4%	9.6%	651	86.7%	13.3%	4,381	16.3%
Pickup	70.1%	29.9%	5,892	75.1%	24.9%	972	70.8%	29.2%	6,864	25.5%
All	81.9%	18.1%	22,612	83.7%	16.3%	4,312	82.2%	17.8%	26,924	100.0%

Frequency and Percent of Sample by Vehicle Type and Vehicle Occupant						
Vehicle Type	Driver		Passenger		All Occupants	
	Unweighted Count	Percent of Sample	Unweighted Count	Percent of Sample	Unweighted Count	Percent of Sample
Auto	10,545	46.6%	2,065	47.9%	12,610	46.8%
Van	2,445	10.8%	624	14.5%	3,069	11.4%
SUV	3,730	16.5%	651	15.1%	4,381	16.3%
Pickup	5,892	26.1%	972	22.5%	6,864	25.5%
All	22,612	100.0%	4,312	100.0%	26,924	100.0%

Frequency and Percent of Observations by Gender and Vehicle Occupant						
Gender	Drivers		Passengers		All Occupants	
	Percent	Frequency	Percent	Frequency	Percent	Frequency
Male	61.2%	13,834	34.5%	1,489	56.9%	15,323
Female	38.8%	8,778	65.5%	2,822	43.1%	11,600
All	100.0%	22,612	100.0%	4,311	100.0%	26,923

Percent Belted by Gender, Vehicle Type, and Vehicle Occupant				
Vehicle Type	Gender	Driver	Passenger	All Occupants
Auto	Male	80.8%	72.4%	79.9%
	Female	87.8%	88.8%	88.0%
	All	83.9%	82.7%	83.7%
Van	Male	84.1%	82.2%	83.9%
	Female	92.2%	90.7%	91.8%
	All	87.7%	88.4%	87.8%
SUV	Male	83.0%	81.6%	82.9%
	Female	89.6%	93.4%	90.4%
	All	86.0%	90.4%	86.7%
Pickup	Male	68.8%	61.3%	68.2%
	Female	80.9%	85.6%	83.0%
	All	70.1%	75.1%	70.8%

Percent of Observations by Gender,
Vehicle Type and Vehicle Occupant

Gender	Drivers		Passengers		All	
	Unweighted Count	Percent of Sample	Unweighted Count	Percent of Sample	Unweighted Count	Percent of Sample
Auto						
Male	5,374	51.0%	661	32.0%	6,035	47.9%
Female	5,171	49.0%	1,404	68.0%	6,575	52.1%
All	10,545	100.0%	2,065	100.0%	12,610	100.0%
Van						
Male	1,259	51.5%	160	25.6%	1,419	46.2%
Female	1,186	48.5%	464	74.4%	1,650	53.8%
All	2,445	100.0%	624	100.0%	3,069	100.0%
SUV						
Male	1,941	52.0%	192	29.5%	2,133	48.7%
Female	1,789	48.0%	459	70.5%	2,248	51.3%
All	3,730	100.0%	651	100.0%	4,381	100.0%
Pickup						
Male	5,260	89.3%	476	49.0%	5,736	83.6%
Female	632	10.7%	495	51.0%	1,127	16.4%
All	5,892	100.0%	971	100.0%	6,863	100.0%

Safety Belt Use by Gender and Vehicle Occupant									
Gender	Drivers			Passengers			All Occupants		
	Belted	Not Belted	Unweighted Count	Belted	Not Belted	Unweighted Count	Belted	Not Belted	Unweighted Count
Male	77.9%	22.1%	13,834	72.6%	27.4%	1,489	77.4%	22.6%	15,323
Female	88.3%	11.7%	8,778	89.6%	10.4%	2,822	88.6%	11.4%	11,600
All	81.9%	18.1%	22,612	83.7%	16.3%	4,311	82.2%	17.8%	26,923

Safety Belt Use by Gender and Vehicle Occupant											
Vehicle Type	Gender	Drivers			Passengers			All Occupants			
		Belted	Not Belted	Unweighted Count	Belted	Not Belted	Unweighted Count	Belted	Not Belted	Unweighted Count	Percent of Sample
Auto	Male	80.8%	19.2%	5,374	72.4%	27.6%	661	79.9%	20.1%	6,035	47.9%
	Female	87.8%	12.2%	5,171	88.8%	11.2%	1,404	88.0%	12.0%	6,575	52.1%
	All	83.9%	16.1%	10,545	82.7%	17.3%	2,065	83.7%	16.3%	12,610	100.0%
Van	Male	84.1%	15.9%	1,259	82.2%	17.8%	160	83.9%	16.1%	1,419	46.2%
	Female	92.2%	7.8%	1,186	90.7%	9.3%	464	91.8%	8.2%	1,650	53.8%
	All	87.7%	12.3%	2,445	88.4%	11.6%	624	87.8%	12.2%	3,069	100.0%
SUV	Male	83.0%	17.0%	1,941	81.6%	18.4%	192	82.9%	17.1%	2,133	48.7%
	Female	89.6%	10.4%	1,789	93.4%	6.6%	459	90.4%	9.6%	2,248	51.3%
	All	86.0%	14.0%	3,730	90.4%	9.6%	651	86.7%	13.3%	4,381	100.0%
Pickup	Male	68.8%	31.2%	5,260	61.3%	38.7%	476	68.2%	31.8%	5,736	83.6%
	Female	80.9%	19.1%	632	85.6%	14.4%	495	83.0%	17.0%	1,127	16.4%
	All	70.1%	29.9%	5,892	75.1%	24.9%	971	70.8%	29.2%	6,863	100.0%

Appendix E

Survey Instrument

North Dakota Safety Belt Survey
DLN Consulting, Inc. - Dickinson, ND

Year	___ ___ ___	Page	___ of ___
County	___ ___	Observer Name	_____
Intersection	___ ___ ___	County	_____
Population Density	___	Site #	_____
Roadway	___	Day / Date	_____
Day	___	Time Started	_____
Observer	___ ___	Time Ended	_____
Weight	___ ___ ___	Observer Comments:	
VMT	___ ___ ___		

Case# ___ ___ ___

Driver		Passenger	
(1) Auto	(2) Van	(3) SUV	(4) PU
(1) M	(2) F	(1) M	(2) F
(1) Y	(2) N	(1) Y	(2) N

Case# ___ ___ ___

Driver		Passenger	
(1) Auto	(2) Van	(3) SUV	(4) PU
(1) M	(2) F	(1) M	(2) F
(1) Y	(2) N	(1) Y	(2) N

Case# ___ ___ ___

Driver		Passenger	
(1) Auto	(2) Van	(3) SUV	(4) PU
(1) M	(2) F	(1) M	(2) F
(1) Y	(2) N	(1) Y	(2) N

Case# ___ ___ ___

Driver		Passenger	
(1) Auto	(2) Van	(3) SUV	(4) PU
(1) M	(2) F	(1) M	(2) F
(1) Y	(2) N	(1) Y	(2) N

Case# ___ ___ ___

Driver		Passenger	
(1) Auto	(2) Van	(3) SUV	(4) PU
(1) M	(2) F	(1) M	(2) F
(1) Y	(2) N	(1) Y	(2) N

Case# ___ ___ ___

Driver		Passenger	
(1) Auto	(2) Van	(3) SUV	(4) PU
(1) M	(2) F	(1) M	(2) F
(1) Y	(2) N	(1) Y	(2) N

Case# ___ ___ ___

Driver		Passenger	
(1) Auto	(2) Van	(3) SUV	(4) PU
(1) M	(2) F	(1) M	(2) F
(1) Y	(2) N	(1) Y	(2) N

Case# ___ ___ ___

Driver		Passenger	
(1) Auto	(2) Van	(3) SUV	(4) PU
(1) M	(2) F	(1) M	(2) F
(1) Y	(2) N	(1) Y	(2) N