2022 WEST VIRGINIA OBSERVATIONAL SEAT BELT SURVEY REPORT

2022 West Virginia Observational Seat Belt Survey Report

prepared for

West Virginia Governor's Highway Safety Program

prepared by

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Executive Summary

West Virginia has adopted the long-term goal of zero traffic fatalities, with an interim goal of reducing fatalities by one-half by 2030, using 2006 to 2010 as a five-year average base. According to the National Highway Traffic Safety Administration (NHTSA) Fatality Analysis Reporting System (FARS), from 2016 to 2020 the average percentage of unrestrained fatalities in the State was 29 percent. To reach the State's target of zero traffic fatalities, increasing seat belt use should be a top priority.

This report outlines the observed seat belt use rate in West Virginia collected between May 31 and June 12, 2022, during both the weekdays and weekends. This report also documents the seat belt use rate and identifies the primary sources of variation in seat belt use, allowing the Governor's Highway Safety Program (GHSP) and its stakeholders to develop and revise countermeasures to address unrestrained vehicle occupants.

Observers recorded seat belt information on 26,511 drivers and 7,301 onboard front seat passengers for a total of 33,812 observations. Observers were not able to record seat belt use for 199 observations, resulting in a statewide nonresponse unweighted rate of 0.59 percent for the 2022 survey, compared to a nonresponse rate of 1.00 percent for the State's 2021 survey. An observational seat belt survey was not conducted in 2020 due to the COVID-19 pandemic. As such, in the various charts and tables in this report there will be no data to report for 2020.

The 2022 seat belt rate in West Virginia improved to its highest ever recorded observed rate at 92.5 percent (Figure ES.1). The rate has a standard error of 0.01 percent (relative standard error = 0.01 percent), well within the standard requirement of 2.5 percent set forth by NHTSA. This is a substantial increase from the 2021 observed seat belt use rate of 88.1 percent. All 14 counties where observations occurred had seat belt use rates between 83.9 percent and 99.2 percent in 2022. These findings denote a return to the successes observed in 2018 and 2019, where seat belt use exceeded 90 percent.

Figure ES.1 West Virginia Observed Seat Belt Use Rates
            2012 to 2022
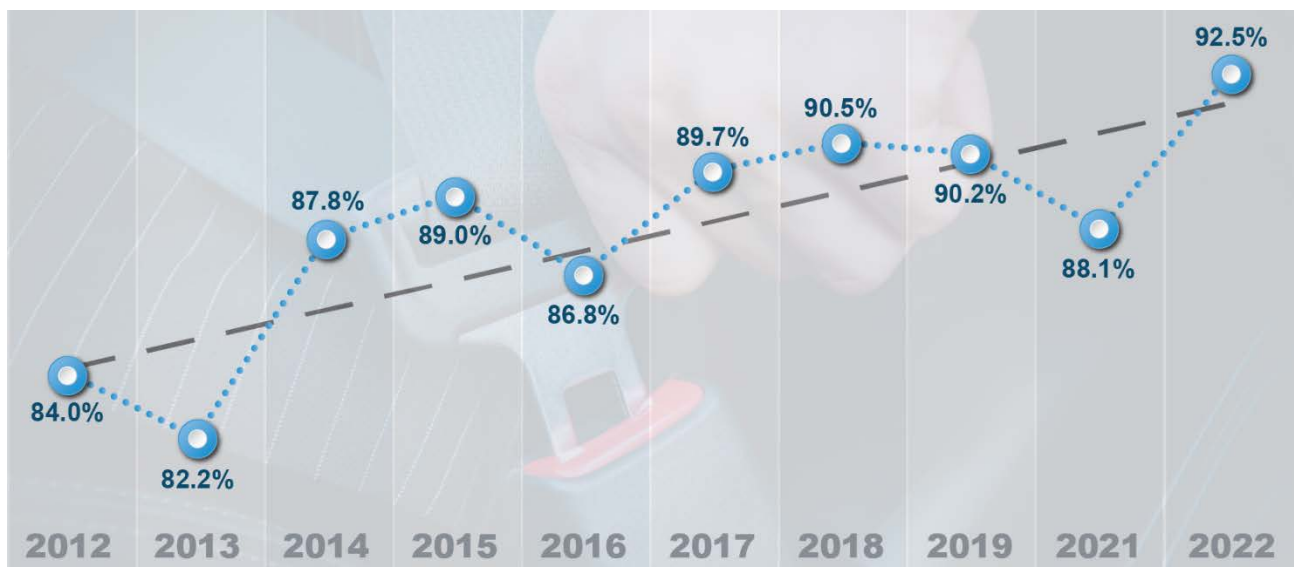
Source: https://cdan.nhtsa.gov/stsi.htm# and 2022 observational seat belt survey.

Section 1 of this report discusses the sampling procedures and methods used to obtain an estimate of the seat belt use rate in West Virginia; it also describes procedures for the selection of counties, stratification of roadways, and observation sites. Section 2 details the results of this effort, beginning with the statewide seat belt use rate and trends over several years, along with a summary of the characteristics of occupants, vehicles, and observation sites. The report concludes with an analysis of selected characteristics of vehicle occupants and observation sites. The information provided by this report will help to identify the conditions under which seat belts are more or less likely to be used, allowing safety stakeholders across the State to improve upon their strategies for addressing unrestrained vehicle occupants.

Acknowledgments

Cambridge Systematics, Inc. (CS) began a partnership with the GHSP in 2018 to aid in the selection of new survey sites. CS also was involved in the development of this report. The 2022 West Virginia Observational Seat Belt Survey Report would not have been possible without the administration and support of the GHSP staff. Specifically, CS would like to thank Bob Tipton, Director, Barbara Lobert, Federal Programs Administrator, and Amy Boggs, Grants Program Manager for their assistance in compiling the survey data, overseeing the observers, and managing the day-to-day operations of the project.

1.0   Methodology

In 2011, NHTSA issued new Uniform Criteria for State Observational Surveys of Seat Belt Use in Federal Register Vol. 76, No. 63 (April 1, 2011, Rules and Regulations, pages 18042–18059). This report represents West Virginia's fulfillment of the NHTSA requirement to submit a study and data collection protocol for an annual State survey to estimate passenger vehicle occupant restraint use. The current methodology is fully compliant with the Uniform Criteria and was used to implement West Virginia's 2018 seat belt survey and will remain in effect through 2022.

The present survey design and methodology is similar to previous years but updated to meet NHTSA's updated requirements. The surveyors selected the sample using a multistage, stratified cluster sampling procedure, to reflect the most recent roadway network conditions. West Virginia is divided into 55 counties and 35 of the counties account for 85 percent of all passenger vehicle fatalities. The present survey draws observation sites from an updated selection of 14 counties. Surveyors selected a total of 134 observation sites, resulting in 5 to 15 sites per county during the survey period in May and June. Surveyors used the same methodology approved by NHTSA in 2018 for the 2022 survey and the methodology is valid through 2022 unless otherwise noted.

The 2018 observation survey design utilized in 2022 involved a five-step process. The steps included:

1. The selection of counties based on vehicle occupant fatalities and regions of the State.

2. The stratification of roads based on functional use classes.

3. The selection of specific road segments within each stratum and county.

4. The development of seat belt use estimation procedures and computations.

5. The establishment of data collection and quality procedures consistent with NHTSA requirements.

1.1   County Selection

Surveyors identified a total of 35 counties as having the most passenger vehicle occupant fatalities. These counties accounted for 85 percent of all fatalities during this time period studied. Of the 35 counties, 14 were selected for inclusion in the 2018 observation survey to represent all three regions of the State. The selection procedure involved dividing the State into three geographic regions, then allocating the number of counties by region based on the number of qualified counties in the region, and within each region making probability-proportional-to-size (PPS) selections with the odds of selection proportional to the county's total roadway length. Appendix A shows the selected counties and identified regions of the State on the map.

1.1.1   Roadway Stratification and Definitions

The 2018 survey design identified 169 total observation sites across 14 counties in the State. A large number of observation sites were necessary to meet NHTSA's requirement of having a standard error no greater than 2.5 percent. The surveyors determined the 169 sites by the mix of counties and road type distributions within counties. Consistent with NHTSA guidelines, the 2018 survey excluded rural local roads in non-Metropolitan Statistical Area (MSA) counties. Road strata include Primary Roadways, Secondary Roadways, and Local Roads (excluding rural local roads in non-MSA counties). Each of the 14 counties has

road segments in two or all three road strata. The weekday survey used six segments in Primary Roadways Strata, four segments in Secondary Roadways Strata, and two segments in Local Roads Strata (excluding rural local roads in non-MSA counties). The weekend survey added one segment in each strata. The weekday and weekend surveys together included 15 segments per county.

1.1.2   Roadway Segment and Site Selection

The surveyors used an approach to identify specific roadway segments that involved a PPS procedure, with lengths of roadways defined as the "size." Segments were randomly drawn from county-stratum populations of road segments, with the probability of drawing any segment proportional to its portion of the total roadway lengths within the county-stratum. Sampling called for selecting twice the number of road segments required, retaining the order of selection, to provide for the necessary sample and an equal number of alternates, or "spare" segments. Surveyors selected and distributed a total of five certainty segments among the 169 primary and alternate segments across the roadway functional strata.

Prior to actual data collection, surveyors selected specific locations for data observations based on visits to the locations, maps, and/or online road-level images. The direction of travel to be observed was randomly selected for each segment and/or site. Sites were selected based on having a clear view of the vehicles and considering observer and direction of travel of vehicles. Efforts also were made to select observation sites where traffic naturally slows to improve accuracy. When specific site locations were unusable or not able to provide a clear view of belt use, observers chose alternate locations within the road segment where they could more effectively observe the same traffic stream. Surveyors documented details and reasons for changing locations; Appendix B provides a complete list of selected primary road segments.

1.1.3   Seat Belt Rate and Standard Error Calculations

Surveyors calculated seat belt use rates using formulas based on the proportion of the State's total roadway length "represented" by the site. Seat belt use rate calculations followed a four-step process. First, estimated rates were calculated for each road type stratum within each county. The general formula for combining observed belt use rates from observation sites on individual segments, for a single county-stratum, is shown in formula (1).

This formula is used when the county-stratum contains certainty segments; the contribution of each segment to the overall county-stratum rate is proportional to the "size" of the segment's contribution to the entire county-stratum traffic (i.e., its roadway length, adjusted by the inverse of the probability of the segment's being selected into the sample).

$$p_{i(j)k} = \frac{\sum_l S_{i(j)k} W_{i(j)k} p_{i(j)k}}{\sum_l S_{i(j)k} W_{i(j)k}} \quad (1)$$

Where $i(j)$ = county i within region j, k = stratum, l = site within stratum and county, $S_{i(j)k}$ = roadway length for segment l in county-stratum $i(j)k$, and $p_{i(j)k}$ = the observed seat belt use rate at site $i(j)k = BS_{i(j)k}/O_{i(j)k}$ where $B_{i(j)k}$ = total number of belted occupants (drivers and outboard front seat passengers) observed at site, $O_{i(j)k}$ = total number of occupants with known belt use observed at site; and $W_{i(j)k}$ = the inverse of the probability of segment l's selection, as described above: (certainty segments) $W_{i(j)k}$ = 1.00 or (random segments).

$$W_{i(j)k} = \frac{\sum_{m=1}^{N} S_{i(j)klm}}{n * S_{i(j)k}}$$

Where N = total number of segments in county-stratum $i(j)k$ excluding the certainty segments and n = number of segments to be randomly selected excluding certainty segments. In the case where there were no certainty segments in the county-stratum, formula (1) reduces to the simple formula (1a):

$$p_{i(j)k} = \frac{\sum_{l=1}^{n_{i(j)k}} p_{i(j)k}}{n_{i(j)k}} \quad (1a)$$

Where $i(j)$ = county i within region j, k = stratum, l = site within stratum and county, $n_{i(j)k}$ = number of sites within the stratum-county combination, and $p_{i(j)k}$ = the observed seat belt use rate at site $i(j)kl$ = $BS_{i(j)kl}/O_{i(j)kl}$ where $B_{i(j)kl}$ = total number of belted occupants (drivers and outboard front seat passengers) observed at site, $O_{i(j)kl}$ = total number of occupants with known belt use observed at site.

Second, a county-by-county seat belt use rate, $p_{i(j)k}$, was obtained by combining county-stratum seat belt use rates across strata within counties, weighted by the stratum's relative contribution to total county roadway length:

$$p_{i(j)} = \frac{\sum_k S_{i(j)k} p_{i(j)k}}{\sum_k S_{i(j)k}} \quad (2)$$

Where $S_{i(j)k}$ = roadway length for all roads in stratum k in county $i(j)$, $p_{i(j)k}$ = the observed seat belt use rate for stratum k in county $i(j)$.

In the third step, category-weighted seat belt use rates for each region of counties were obtained by combining and weighting the rates from the sampled counties in each region by their roadway length and probabilities of being selected:

$$p_j = \frac{\sum_i S_{i(j)} W_{i(j)} p_{i(j)}}{\sum_i S_{i(j)} W_{i(j)}} \quad (3)$$

Where $S_{i(j)k}$ = roadway length for all roads k in county i and region j, $W_{i(j)}$ = the inverse of the probability of the county's selection: $W_{i(j)}$ = 1 for certainty counties; and:

$$W_{i(j)} = \frac{\sum_{l=1}^{N(j)} S_{i(j)l}}{n_{i(j)} * S_{i(j)}}$$

Where $N_{(j)}$ = the number of high-fatality counties in region j and $n_{i(j)}$ = the number of those counties selected.

Finally, the statewide seat belt use proportion was calculated by combining the category proportions weighted by their proportion of statewide roadway length:

$$p = \frac{\sum_{j=1}^{3} S_j p_j}{\sum_{j=1}^{3} S_j} \quad (4)$$

The result was a combination of the individual site seat belt use rates weighted to reflect each site's importance in total State roadway length.

Standard error of estimate values was estimated through a jackknife approach, based on the general formula:

$$\hat{\sigma}_{\hat{p}} = \left[\frac{1}{n*(n-1)} \sum_{i=1}^{n} (\hat{p}_i - \hat{p})^2 \right]^{1/2}$$

Where $\hat{\sigma}_{\hat{p}}$ = standard deviation (standard error) of the estimated statewide seat belt use proportion $\hat{p}$ (equivalent to p in the notation of formulas 1–4), n = the number of sites, i.e., 133, and $\hat{p}_i$ = the estimated statewide seat belt use proportion with site i excluded from the calculation. The relative error rate was calculated, as well as the 95 percent confidence interval, i.e., $\hat{p} \pm 1.96\hat{\sigma}_{\hat{p}}$. These values are reported for the overall statewide seat belt use rate.

1.2   Procedures

Specific data collection procedures were established prior to the initiation of data collection, guided by the updated 2011 Uniform Criteria for State Observational Surveys of Seat Belt Use established by NHTSA.

1.2.1   Observers

The seat belt survey observers were hired under the direction of the GHSP. These observers performed all field data collection. Prior to any data collection, all observers received approximately one day of training by CS staff in 2018 after the current methodology used was approved by NHTSA. The observers received classroom instruction and several hours in the field practicing observation. Before observers conducted the training in 2021 GHSP provided a refresher training. The staff developed training to adhere to the observation procedures found in the Uniform Criteria for State Observational Surveys of Seat Belt Use (23 Code of Federal Regulations [CFR] § 1340.7). The topics covered in this training were:

- Review requirements and purpose of the observational seat belt survey.

- Review observation procedures and survey data to be collected.

- Discuss survey scenarios.

- Review survey application.

- Review survey dates and submission process.

Observation protocols dictate that all survey data must be collected through direct observation, surveys must occur at the selected observation sites, surveys must occur on the day and time indicated, and observations should last exactly one hour for each survey site. If the observation point was on a heavily traveled roadway making it difficult for the observer to note every vehicle, a reference point on the roadway in the appropriate lane should be chosen. That same reference point then would be used for the remainder of the observations.

The safety of the observers was a priority and covered in the training as well. All observers were to wear a reflective vest and not stand in a location that would impede traffic. Observers were advised that if

construction or weather conditions, such as heavy rain or fog, were present that it was permissible, after notifying GHSP, to reschedule or request an alternate site for the same day and time.

To ensure quality control, the staff assessed accuracy of observers at the end of classroom training previously conducted. This was done by conducting observations outside the training facility and comparing the simultaneous observations of the same traffic by different observers. Staff identified any differences noted after the observation was completed and discussed and resolved them with the observers.

Lastly, per 23 CFR § 1340.7, observer quality control was overseen by GHSP monitors who went into the field and conducted random unannounced visits at no less than five percent of observation sites. These unannounced visits confirmed that observers were conducting observations at the location, day, and time established in the planning and selection phase. For the 2022 survey, the observer staff remained the same as the previous year. The observers were provided with the PowerPoint presentation from 2018 to serve as a refresher for adherence to the observation procedures found in the Uniform Criteria for State Observational Surveys of Seat Belt Use (23 CFR § 1340.7).

1.2.2   Observation Schedule

Using the new survey sites approved by NHTSA in March of 2018, CS worked with the GHSP to establish the observation schedule for 2022. Observations were scheduled between 7:00 a.m. and 6:00 p.m. Exact timing of the observation periods was subject to adjustment so that the resulting number of sites being observed throughout the chosen timeframe were approximately equal. Whenever possible, three to five sites within relative proximity to each other were scheduled for one observer on any day. The days of the week assigned were balanced to similar counties to ensure all days of the week have similar clusters. The first site in any cluster to be observed each day was randomly selected, and the additional sites were assigned in an order that provided balance by type of site and time of day while minimizing travel distance and time.

1.2.3   Data Collection Application

To improve not only the timeliness of the observed seat belt use rate results, but also the uniformity and accuracy of the data collected, observers used a survey application (App) on tablet computers. The survey App (see Appendix C) was specifically tailored for West Virginia's observers and did not materially change between its use in the 2018 survey and the 2022 survey. CS worked with the App developer to provide them with all the specific 2022 survey site information. The observers were able to select their survey site from a list; the App provided a map overview of the area to conduct the survey and, if applicable, the survey direction.

As part of the observer training, staff conducted an in-class review of the App when it was first utilized in 2018, followed by a one-hour period of testing the App and submitting results. Information collected on the survey App included information on the specific observation site and vehicle and occupant information (Appendix C).

Figure 1.1   Data Collected from Observational Surveys

Observation Site	**Observer's Name**	**Site number, city name, and notes**	**Weather condition (i.e., clear, foggy, cloudy, light rain)**
Direction of travel observed	**Time observation started/ended**	**Vehicle and Occupant**	**Vehicle Type (i.e., car, pick-up, SUV, van)**
Driver and front seat passenger gender	**Driver and front seat passenger seat belt use (i.e., yes, no, unknown)**	**Driver cell phone in use (i.e., yes, no, unknown)**	

2.0   Results

This section presents the results of the analysis on the 33,812 vehicle and occupant observations made in 2022. Surveyors made an extensive effort to summarize the characteristics of occupants, vehicles, and observation sites. The table below provides the seat belt use rate based on the weighted sample of observations. In addition to the overall seat belt use rate, this section presents descriptions of the weighted belt use rate by county, roadway type, gender, vehicle type, cell phone use, and observed belt use of both the driver and front seat passenger. The analysis begins with a description of the sample, including the known and unknown number of occupants, their use of a seat belt, and the nonresponse rate for the survey. This information is followed by a brief analysis of the total sample of both drivers and passengers by county.

Table 2.1   Seat Belt Use Rate

Statistic	Values	Notes
WV Statewide Seat Belt Use Rate	92.46%	
Standard Error	0.01%	<2.50%
Relative Error Rate	0.01%	(0.0001 / 0.9249)
95 Percent Confidence Interval Upper Bound	92.5%	0.9246 + 1.96*0.0001
95 Percent Confidence Interval Lower Bound	92.4%	0.9246 - 1.96*0.0001

The table below provides a description of the number of occupants using and not using a seat belt and the statewide nonresponse rate. Observers were able to ascertain seat belt use for 33,812 occupants, including 26,511 drivers and 7,301 front seat passengers. However, observers were not able to record seat belt use for 199 observations. This resulted in a statewide nonresponse rate (weighted) of 1.75 percent for the 2022 survey, well within the 2.5 percent threshold of acceptability.

Table 2.2   Statewide Seat Belt Use and Nonresponse Rate

Statistic	Values	Notes
Total Occupants with Unknown Seat Belt Status	199	
Total Occupants Observed	33,812	
Sample Nonresponse Rate	0.59%	
Statewide Nonresponse Rate (Weighted)	1.75%	< 10%

The table below displays the total number and percentage of observed front seat occupants. As shown, a total of 26,511 drivers and 7,301 outboard front seat passengers were observed. These observations were compiled across 134 observation sites, except for one site for which no records occurred during the observation period, and 14 counties. Four counties had observation counts that exceeded 11 percent of all observations, Berkeley (14.6 percent), Harrison (13.0 percent), Lewis (11.9 percent), and Monongalia (11.9 percent). These four counties collectively account for over 50 percent of all observations in the state (51.3 percent).

Table 2.3   Observed Rate by County

County	Drivers N	Drivers %	Passengers N	Passengers %	Total N	Total %
Berkeley	3,989	15.0%	961	13.2%	4,950	14.6%
Boone	839	3.2%	295	4.0%	1,134	3.4%
Braxton	2,139	8.1%	788	10.8%	2,927	8.7%
Greenbrier	1,894	7.1%	614	8.4%	2,508	7.4%
Harrison	3,584	13.5%	796	10.9%	4,380	13.0%
Jackson	1,582	6.0%	567	7.8%	2,149	6.4%
Lewis	3,022	11.4%	1,003	13.7%	4,025	11.9%
McDowell	295	1.1%	100	1.4%	395	1.2%
Mingo	203	0.8%	53	0.7%	256	0.8%
Monongalia	3,301	12.5%	706	9.7%	4,007	11.9%
Pendleton	364	1.4%	105	1.4%	469	1.4%
Putnam	2,239	8.4%	421	5.8%	2,660	7.9%
Raleigh	2,546	9.6%	775	10.6%	3,321	9.8%
Randolph	514	1.9%	117	1.6%	631	1.9%
Total	**26,511**	**100.0%**	**7,301**	**100.0%**	**33,812**	**100.0%**

Historically, over time, West Virginia has seen its weighted seat belt use rate climb. In 1992, the usage rate was at 32 percent and climbed to 49.5 percent in 2000. The rate of 92.46 percent achieved in 2022 is the highest ever observed seat belt use rate, surpassing the 2018 observed rate by two full percentage points from 90.5 percent. Figure 2.1 shows the linear trend over the last 10 years continues to move upwards, indicating the overall observed seat belt use rate continues to improve despite some historical year-over-year downturns.

Figure 2.1   Observed Seat Belt Use Rates
2012 to 2022
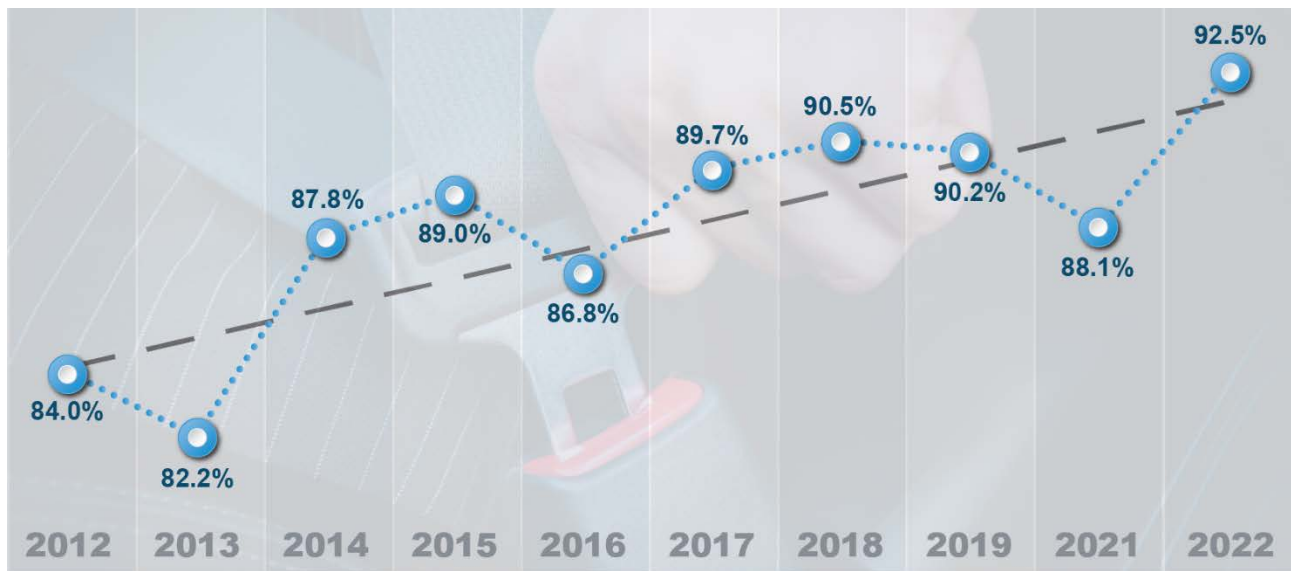
Source: https://cdan.nhtsa.gov/stsi.htm# and 2022 observational seat belt survey.

The percent weighted seat belt use rate for all vehicle occupants by county for 2022 is shown in Figure 2.2. Eight counties had weighted seat belt use rate above 95 percent, including Berkeley, Braxton, Greenbrier, Harrison, Lewis, Monongalia, Raleigh, and Randolph. The lowest rate was observed in Jackson County with a rate of 83.9 percent (declined from 90.4 percent in 2021). Of the 14 counties where observations took place, nine counties had an observed rate greater than 90 percent, equivalent to nearly two thirds of counties.

Figure 2.2   Weighted Seat Belt Use Rate by County
2022
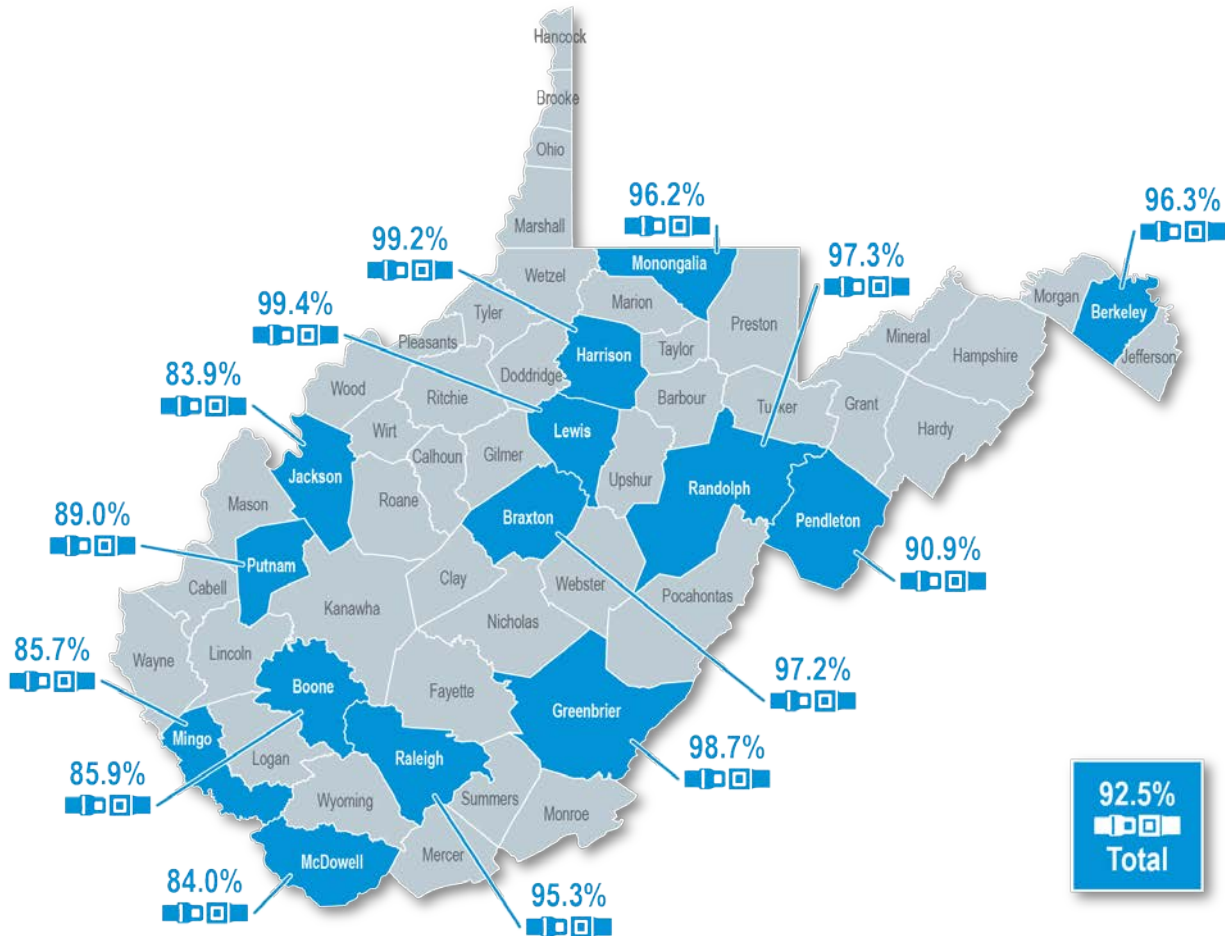
Table 2.4 displays the weighted seat belt use rate by county for 2017 to 2022. However, since new survey sites were selected in 2018, some counties may not have current information. Of the 14 counties where observations occurred in 2018, 7 counties were also observed in 2017. Of these seven counties with historical trends, five counties (Berkeley, Greenbrier, Harrison, Monongalia, and Raleigh) had a higher observed rate in 2022 than 2017, up from three counties in 2021. New survey sites and counties will be used from 2023. The 2023 iteration of the seat belt survey will examine the similarities between the 2018 county selection and the updated county selection.

Table 2.4   Select County Observed Seat Belt Rates
2017–2022

County	2017	2018	2019	2021	2022
Berkeley	89.0%	91.6%	99.7%	83.9%	96.3%
Boone	88.7%	88.4%	93.1%	83.5%	85.9%
Cabell	92.9%				
Fayette	90.2%				
Greenbrier	90.6%	88.5%	94.9%	95.9%	98.7%
Harrison	82.1%	88.5%	62.2%	85.7%	99.2%
Jackson	93.5%	93.3%	90.1%	90.4%	83.9%
Jefferson	88.5%				
Kanawha	92.0%				
Mason	99.0%				
Mercer	90.3%				
Monongalia	80.7%	95.4%	97.2%	95.5%	96.2%
Raleigh	89.5%	92.7%	97.1%	89.0%	95.3%
Wood	86.4%				
Total	**89.7%**	**90.5%**	**90.2%**	**88.1%**	**92.5%**

Table 2.5 shows the survey results for the 14 counties where observations occurred in 2018 through 2022 (except for 2020 because no seat belt data was collected due to COVID-19). Notably, there was a nearly 37-point gain in Harrison County from 2019 to 2022. This change falls outside the deviation that would be expected over the 2019 to 2022 period, but generally post-COVID trends were unpredictably dynamic. Declines were observed across eight counties between 2019 and 2022, the largest of which occurred in Pendleton County where a drop of 7.6 percent was recorded.

Table 2.5   County Observed Seat Belt Rates
2019–2022

County	2018	2019	2021	2022
Berkeley	91.6%	99.7%	83.9%	96.3%
Boone	88.4%	93.1%	83.5%	85.9%
Braxton	93.8%	92.7%	96.9%	97.2%
Greenbrier	88.5%	94.9%	95.9%	98.7%
Harrison	88.5%	62.2%	85.7%	99.2%
Jackson	93.3%	90.1%	90.4%	83.9%
Lewis	91.3%	95.8%	92.7%	99.4%
McDowell	72.0%	80.5%	73.8%	84.0%
Mingo	91.7%	72.1%	85.6%	85.7%

County	2018	2019	2021	2022
Monongalia	95.4%	97.2%	95.5%	96.2%
Pendleton	91.3%	98.5%	89.6%	90.9%
Putnam	96.0%	90.5%	87.6%	89.0%
Raleigh	92.7%	97.1%	89.0%	95.3%
Randolph	97.0%	99.7%	88.0%	97.5%
Total	**90.5%**	**90.2%**	**88.1%**	**92.5%**

2.1   Characteristics of Belted Drivers and Passengers

This section analyzes various characteristics of drivers and passengers and their relationships with belt use to identify variations in seat belt use by occupant, site characteristics, and vehicle type. It is anticipated this information will help to identify the conditions where seat belts are more or less likely to be used in the State to help develop appropriate countermeasures in education and enforcement.

When segmenting the data by seat belt rate for drivers with or without a passenger in the front seat, the observations led to some interesting findings. In the 2018 survey, male drivers had a 4.5-point higher seat belt rate with a passenger than when driving alone. Conversely, female drivers had a 12.6-point lower seat belt rate with a passenger than without. For the 2019 survey, male drivers had a 3.5-point lower seat belt rate with a passenger than driving alone. Female drivers had a 0.9-point higher seat belt rate with a passenger than without. In the 2021 survey, male drivers had an 11.2-point higher seat belt rate with a passenger than driving alone, and female drivers had a 2.8-point higher seat belt rate with a passenger than without. Finally, in the 2022 survey, male drivers had a 4.8-point higher seat belt rate with a passenger than driving alone, and female drivers had a 1.9-point higher seat belt rate with a passenger than without. In comparing the three years of data, it appears there may be a correlation emerging that drivers, specifically males, with a passenger are more likely to be belted, though no statistically significant conclusions are assessed. As additional years' worth of data become available, stronger conclusions and correlations may be possible.

Figure 2.3   Weighted Seat Belt Use Rate for Drivers with Passenger Versus Without
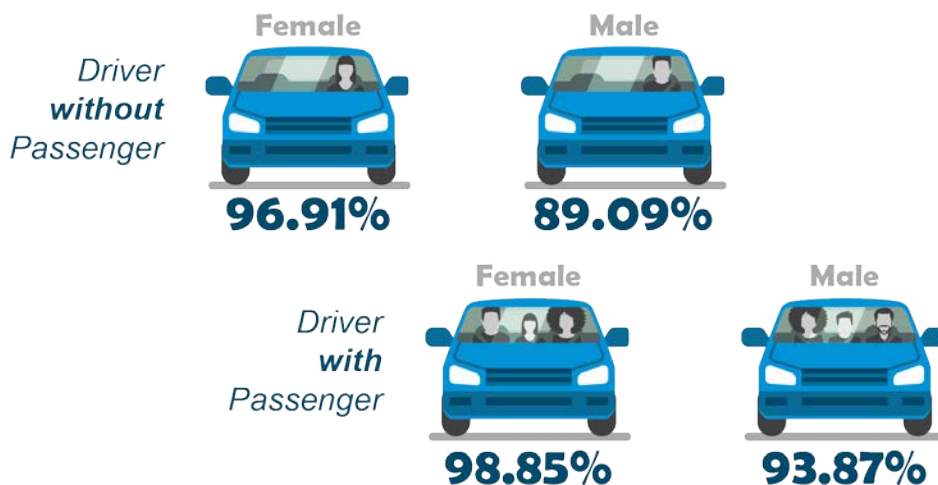
Generally speaking, male drivers were less likely to use seat belts compared to female drivers (Table 2.6). This finding is consistent with previous observational surveys in West Virginia over the past several years. Male drivers (90.6 percent) continued to be less likely to be observed wearing a seat belt in comparison to female drivers (94.9 percent). In 2022, the gap between male and female decreased from 9 to 4 points. Similarly, in Table 2.7, male passengers were less likely to use a seat belt (83.6 percent) compared to female passengers (94.3 percent).

Table 2.6 shows the distribution of the driver's seat belt use by gender and county in 2022. Across the 14 counties studied, the belt use rate for males (90.6 percent) was lower than females (94.9 percent). Females had a higher seat belt rate in 13 of the 14 counties. Only in McDowell County did females (54.8 percent) have a lower seat belt rate than males (97.8 percent). This disparity is likely not the result of a trend, but a low observation count resulting in a high relative proportion of non-use female drivers. This county is also the largest disparity between male and female driver use rates in 2022. Reviewing previous years' data suggests that the gender gap among drivers is not shrinking (according to 2022 data).

Table 2.6   Driver Belt Use Rates by Gender and County

	Drivers		
	Male %	**Female %**	**Total %**
Berkeley	92.2%	99.9%	94.7%
Boone	79.3%	99.6%	86.3%
Braxton	95.9%	98.5%	96.9%
Greenbrier	96.8%	99.8%	98.4%
Harrison	99.1%	99.6%	99.2%
Jackson	72.0%	95.0%	79.1%
Lewis	99.2%	99.8%	99.4%
McDowell	97.8%	54.8%	87.2%
Mingo	84.4%	92.6%	87.6%
Monongalia	95.3%	96.8%	96.1%
Pendleton	85.5%	97.5%	90.3%
Putnam	87.4%	97.7%	91.7%
Raleigh	90.7%	98.7%	93.9%
Randolph	95.9%	100.0%	96.8%
Total	**90.6%**	**94.9%**	**92.5%**

The following table (Table 2.7) displays the results of seat belt use for passengers by gender and county. Similar to the results for drivers, the findings showed correlations between seat belt use of passengers by gender. Across the 14 counties studied, the belt use rate for male passengers (83.6 percent) is much less than females passengers (94.3 percent) based on the algorithm used for all sites in the same county and same road stratum weight. The largest disparity was in Putnam County where male passengers were observed using seat belts 44.6 percent of the time compared to 99.8 percent for their female counterparts. This is likely, again, a result of statistical nuance rather than a widespread concern of 50-point differentials; though, within the passenger category, male usage of seat belts was substantially lower than female usage statewide. (According to methodology high weight is allocated to the local roads, and in Putnam County there were very few male passenger observations with low rate for seat belt use on local roads).

Table 2.7   Passenger Belt Use Rates by Gender and County

	Passengers		
	Male %	**Female %**	**Total %**
Berkeley	100.0%	99.9%	100.0%
Boone	55.8%	99.8%	88.7%
Braxton	97.4%	98.4%	98.2%
Greenbrier	99.9%	100.0%	100.0%
Harrison	88.6%	99.3%	99.1%
Jackson	97.2%	87.6%	94.1%
Lewis	88.4%	99.9%	94.7%
McDowell	81.1%	69.9%	69.5%
Mingo	68.0%	76.1%	77.9%
Monongalia	93.0%	94.7%	94.3%
Pendleton	82.8%	100.0%	93.0%
Putnam	44.6%	99.8%	78.8%
Raleigh	99.4%	100.0%	99.9%
Randolph	88.3%	100.0%	99.7%
Total	**83.6%**	**94.3%**	**91.4%**

As with most of the nation, West Virginia saw its lowest seat belt use rate in pickup trucks (87.1 percent), followed by cars (90.6 percent), then vans (94.9 percent) and SUVs (94.6 percent) which tend to both be similar in use rate. Geographically, the Northern region of the State saw the highest seat belt use rate (95.5 percent), followed by the Eastern Panhandle (93.6 percent), with the lowest use rate coming from the Southern region of the State (89.8 percent). These results are similar to those of last year's study (2021). A map of the State's regions can be found in Appendix A. When reviewing roadway functional class, local roadways had the lowest observed seat belt rate at 87 percent, followed by secondary roadways at 89.6 percent, with primary roadways showing the highest rate with 93.8 percent.

Table 2.8   Seat Belt Use Rate for Drivers and Passengers by Vehicle Type and Site Characteristics

Vehicle Type and Site Characteristics	Driver	Passenger	Total
Vehicle Type			
Car	90.4%	93.9%	90.6%
Pickup Truck	87.2%	92.6%	87.1%
Van	95.8%	98.4%	94.9%
SUV	95.5%	97.1%	94.6%
Region			
Eastern Panhandle	92.5%	96.5%	93.6%
North	94.6%	96.7%	95.5%
South	90.9%	85.8%	89.8%

Vehicle Type and Site Characteristics	Driver	Passenger	Total
Functional Class			
Primary	95.3%	96.0%	95.4%
Secondary	91.4%	92.3%	91.6%
Local	92.4%	90.2%	92.3%

Cell phone use while driving is one form of distracted driving. The seat belt observers also were able to capture observed cell phone use during the survey. The table below shows the number of observations of driver cell phone use and no cell phone use and breaks it down by gender and whether a seat belt was in use. Males had an observed cell phone use of 2.8 percent, whereas females had a slightly higher observed use of 3.6 percent. Of drivers using a cell phone, 88.9 percent were using a seat belt, whereas drivers not using a cell phone were observed using a seat belt 95.6 percent of the time. This could suggest a correlation between belted drivers being less likely to use a cell phone while driving.

Table 2.9   Observed Cell Phone Use by Gender and Seat Belt Use

	Cell Phone Use		No Cell Phone Use	
	Number	Percent	Number	Percent
Gender				
Male Driver	467	57.7%	16,377	64.1%
Female Driver	342	42.3%	9,177	35.9%
Seat Belt Use				
Use	719	88.9%	24,419	95.6%
No Use	90	11.1%	1,129	4.4%

Appendix A. Seat Belt Observational Counties and Regions
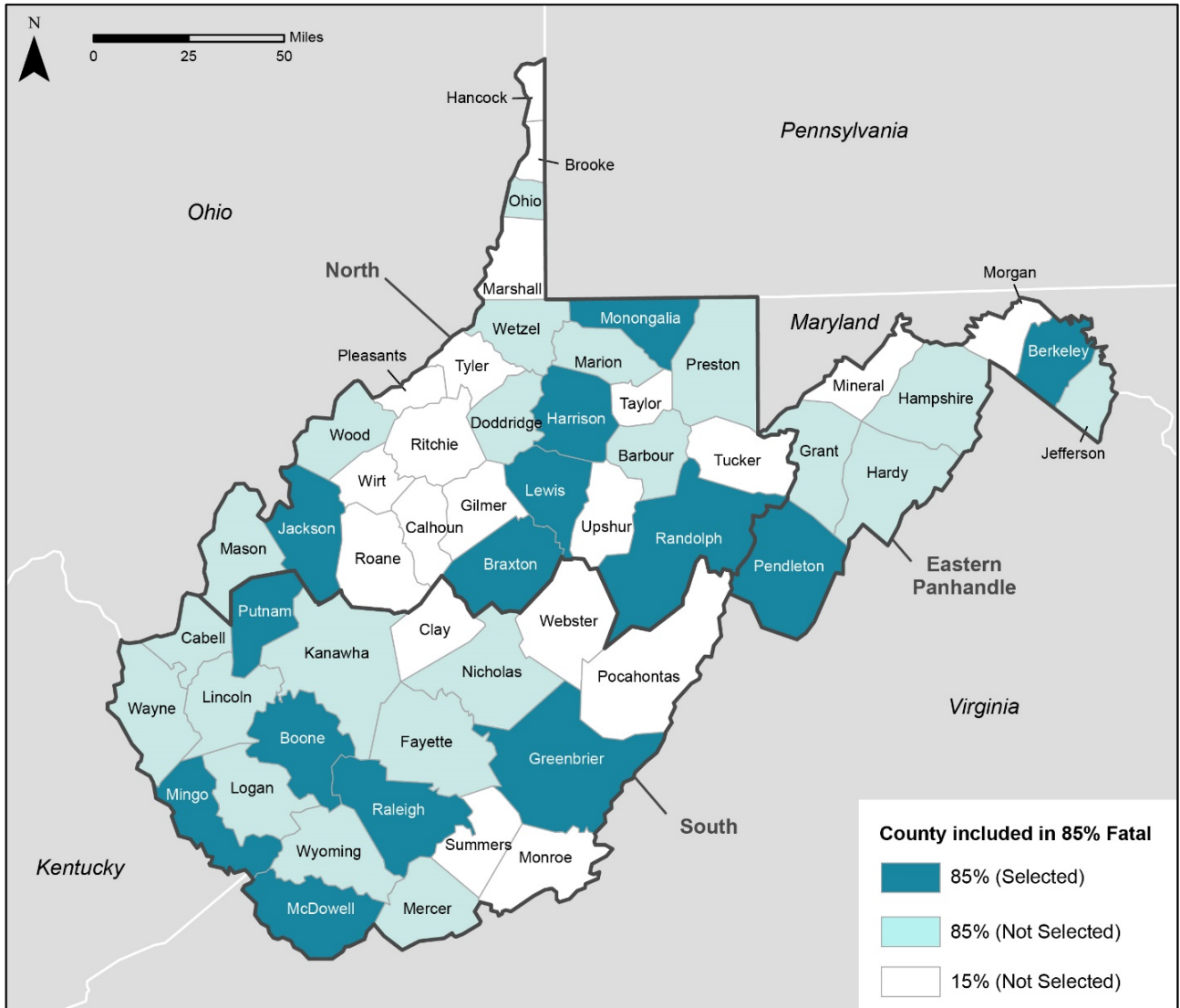
Appendix B. Seat Belt Observational Survey Site List

Site ID	Site Type	Date Observed	Sample Weight	Number of drivers	Number of front passengers	Number of occupants[1] belted	Number of occupants unbelted	Number of occupants with unknown belt use
1	Original	6/4/2022	45.73361342	234	102	316	16	4
2	Original	6/4/2022	77.33587919	191	66	241	14	2
3	Original	6/8/2022	86.0043023	96	13	100	7	2
4	Original	6/4/2022	89.21923321	282	106	364	16	8
5	Original	6/8/2022	1987.461907	9	0	7	2	0
6	Original	6/8/2022	5987.249553	27	8	32	3	0
7	Original	6/12/2022	6.917372873	160	74	224	10	0
8	Original	6/7/2022	11.62141419	191	49	220	20	0
9	Original	6/12/2022	13.48384514	326	106	410	22	0
10	Original	6/12/2022	14.65486102	277	103	367	13	0
11	Original	6/12/2022	20.87274804	300	103	388	15	0
12	Original	6/6/2022	21.04028957	241	81	320	2	0
13	Original	6/7/2022	44.87850133	44	13	56	1	0
14	Original	6/7/2022	82.89732518	48	17	62	3	0
15	Original	6/6/2022	152.6504872	224	51	272	2	1
16	Original	6/7/2022	169.8612529	24	9	33	0	0
17	Original	6/6/2022	192.9030542	34	7	40	1	0
18	Original	6/6/2022	230.8339708	25	1	26	0	0
19	Original	6/4/2022	45.02737322	20	5	22	3	0
20	Original	6/1/2022	51.14730567	137	43	153	20	7
21	Original	6/4/2022	54.76903659	17	5	18	3	1
22	Original	6/4/2022	56.46354934	107	44	127	22	2
23	Original	6/1/2022	19.39845236	4	0	3	1	0
24	Original	6/1/2022	35.54882612	10	3	12	1	0
25	Original	6/5/2022	88.65104318	29	8	33	4	0
26	Original	5/31/2022	37.0851945	24	6	15	11	4
27	Original	6/5/2022	55.62878529	39	11	43	7	0
28	Original	5/31/2022	86.9108837	76	16	68	17	7
29	Original	5/31/2022	522.314564	31	9	26	9	5
30	Original	6/5/2022	57.08452165	4	3	5	0	2
31	Original	6/2/2022	3.680139945	448	80	508	17	3
32	Original	6/4/2022	9.967681249	242	36	262	16	0
33	Original	6/3/2022	10.15592279	74	19	87	5	1

Site ID	Site Type	Date Observed	Sample Weight	Number of drivers	Number of front passengers	Number of occupants[1] belted	Number of occupants unbelted	Number of occupants with unknown belt use
34	Original	6/2/2022	11.98994905	528	79	581	24	2
35	Original	6/3/2022	12.97875742	119	21	127	12	1
36	Original	6/3/2022	15.67990886	252	71	295	27	1
37	Original	6/2/2022	25.24157226	250	21	260	6	5
38	Original	6/4/2022	40.43694513	66	25	88	2	1
39	Original	6/4/2022	47.97156484	14	2	16	0	0
40	Original	6/2/2022	166.5711631	185	51	218	17	1
41	Original	6/4/2022	375.3825232	14	7	19	2	0
42	Original	6/3/2022	1375.133871	47	9	47	8	1
43	Original	6/5/2022	13.2754785	381	181	553	6	3
44	Original	6/5/2022	15.76712546	364	143	499	6	2
45	Original	6/5/2022	17.64353949	591	151	736	6	0
46	Original	6/6/2022	17.82385636	221	76	295	2	0
47	Original	6/6/2022	18.1698435	272	66	336	2	0
48	Original	6/6/2022	30.0381895	237	74	309	2	0
49	Original	5/31/2022	19.1669831	76	11	79	6	2
50	Original	5/31/2022	26.82268766	102	9	103	5	3
51	Original	6/6/2022	40.74293337	40	7	47	0	0
52	Original	6/5/2022	49.21841744	81	21	97	4	1
53	Original	5/31/2022	580.676087	12	5	16	1	0
54	Original	5/31/2022	7527.688721	169	31	192	8	0
55	Original	6/4/2022	6.458066299	347	129	471	3	2
56	Original	6/4/2022	6.672338524	410	134	538	3	3
57	Original	6/4/2022	8.878934806	294	113	396	10	1
58	Original	6/4/2022	9.629536395	393	195	580	7	1
59	Original	6/3/2022	29.59831857	70	16	83	2	1
60	Original	6/4/2022	11.99002695	340	118	438	12	8
61	Original	6/3/2022	13.44068885	53	19	69	3	0
62	Original	6/3/2022	20.20759064	44	14	55	1	2
63	Original	6/3/2022	38.15957514	104	25	119	6	4
64	Original	6/3/2022	53.24532237	84	25	104	5	0
65	Original	5/31/2022	3.773260895	579	139	688	25	5
66	Original	5/31/2022	11.67857262	536	156	635	52	5
67	Original	6/1/2022	12.48739186	591	161	725	21	6
68	Original	6/6/2022	13.16497018	193	61	210	39	5
69	Original	6/6/2022	22.41010536	188	47	199	36	0

Site ID	Site Type	Date Observed	Sample Weight	Number of drivers	Number of front passengers	Number of occupants[1] belted	Number of occupants unbelted	Number of occupants with unknown belt use
70	Original	6/1/2022	23.02434555	646	78	705	17	2
71	Original	6/6/2022	22.07383138	327	26	305	46	2
72	Original	5/31/2022	32.70667422	197	50	227	17	3
73	Original	5/31/2022	84.85794074	88	17	98	5	2
74	Original	6/1/2022	72.81256245	232	60	279	12	1
75	Original	6/1/2022	500.1112784	2	0	2	0	0
76	Original	6/6/2022	3883.041244	5	1	6	0	0
77	Original	6/4/2022	6.360541763	492	284	769	7	0
78	Original	6/2/2022	6.720138057	216	36	241	10	1
79	Original	6/6/2022	7.266688998	90	17	94	11	2
80	Original	6/6/2022	9.068643987	44	13	44	12	1
81	Original	6/6/2022	9.291824273	146	69	194	21	0
82	Original	6/6/2022	20.31765929	108	27	113	21	1
83	Original	6/2/2022	15.98874418	153	38	180	8	3
84	Original	6/2/2022	26.0644118	67	14	65	16	0
85	Original	6/2/2022	27.30151327	87	14	99	2	0
86	Original	6/4/2022	37.9293746	122	33	116	38	1
87	Original	6/4/2022	142.216037	53	20	60	12	1
88	Original	6/4/2022	419.0045198	4	2	5	1	0
89	Original	6/1/2022	1.160905053	224	57	259	17	5
90	Original	6/5/2022	1.226107188	595	215	781	28	1
91	Original	6/2/2022	2.032942072	395	170	556	9	0
92	Original	6/1/2022	4.894127115	311	74	361	23	1
93	Original	6/5/2022	5.56566774	693	242	913	21	1
94	Original	6/2/2022	6.651599968	427	163	588	2	0
95	Original	6/1/2022	10.16396576	94	15	99	10	0
96	Original	6/2/2022	60.75669642	71	14	81	4	0
97	Original	6/2/2022	55.97688235	41	6	42	5	0
98	Original	6/5/2022	66.3627308	158	45	191	12	0
99	Original	6/5/2022	116.279576	(Null)	(Null)	(Null)	(Null)	(Null)
100	Original	6/1/2022	113.6754481	13	2	15	0	0
101	Original	6/2/2022	4.859817691	314	54	339	29	0
102	Original	6/2/2022	7.789949126	428	89	485	32	0
103	Original	6/2/2022	8.084083209	522	129	597	54	0
104	Original	6/1/2022	17.2762051	285	73	329	29	0
105	Original	6/3/2022	18.18077989	350	67	393	23	1

Site ID	Site Type	Date Observed	Sample Weight	Number of drivers	Number of front passengers	Number of occupants[1] belted	Number of occupants unbelted	Number of occupants with unknown belt use
106	Original	6/3/2022	20.99163356	378	131	471	32	6
107	Original	6/1/2022	20.10298684	223	31	232	21	1
108	Original	6/2/2022	20.84503839	176	16	182	10	0
109	Original	6/1/2022	21.20013156	78	7	83	2	0
110	Original	6/3/2022	21.78288159	306	55	335	23	3
111	Original	6/1/2022	7655.119362	4	0	4	0	0
112	Original	6/3/2022	9124.738	237	54	268	20	3
113	Original	6/7/2022	14.12061586	11	6	17	0	0
114	Original	6/6/2022	17.33476672	92	20	110	2	0
115	Original	6/6/2022	26.73697507	126	10	131	5	0
116	Original	6/6/2022	217.8398745	257	76	321	12	0
117	Original	6/6/2022	361.603913	15	3	17	1	0
118	Original	6/7/2022	735.9789027	13	2	15	0	0
119	Original	6/7/2022	25.83828668	454	73	512	7	8
120	Original	6/7/2022	3.544109587	572	123	675	13	7
121	Original	6/11/2022	26.091247	96	19	112	2	1
122	Original	6/8/2022	9.856788075	768	200	951	12	5
123	Original	6/8/2022	33.39368988	175	25	194	5	1
124	Original	6/11/2022	22.01213576	482	190	651	16	5
125	Original	6/8/2022	33.04690912	397	97	483	8	3
126	Original	6/11/2022	32.86971207	206	45	246	3	2
127	Original	6/7/2022	41.08583958	523	86	582	19	8
128	Original	6/11/2022	51.48441354	248	85	325	7	1
129	Original	6/8/2022	7208.464058	59	14	73	0	0
130	Original	6/7/2022	1090.305537	9	4	12	1	0
131	Original	6/6/2022	54.14691436	89	24	106	7	0
132	Original	6/6/2022	23.06696604	83	28	97	13	1
133	Original	6/6/2022	23.97637035	71	17	79	9	0
134	Original	6/6/2022	26.69455678	121	36	144	13	0
Total				**26,511**	**7,301**	**32,142**	**1,471**	**199**

[1] Occupants refer to both drivers and passengers.

Appendix C. Observational Survey Collection Form

WVGHSP

Step 1: Pre-Survey	Step 2: Survey	Step 3: Post-Survey	Step 4: Finished

Exit	59:30		Pause

Vehicle Type	**Driver**			**Passenger**	
Car	Gender	Seat Belt	Cell Phone in Use	Gender	Seat Belt
Truck	Male	Yes	Yes	Male	Yes
Van	Female	No	No	Female	No
SUV	Unknown	Unknown	Unknown	Unknown	Unknown
2		Clear Selections		Next Vehicle	