what's holding you back?
OKLAHOMA

SEAT BELT OBSERVATION STUDY
Summer 2012

Robert D. Delano, Ph.D.
Associate Professor

University of Central Oklahoma
College of Education and Professional Studies
Department of Adult Education and Safety Science
Industrial Safety Program
100 N. University Dr., HES 200A
Edmond, Oklahoma 73034

August 2012

This report was prepared for the Oklahoma Highway Safety Office in cooperation with the National Highway Traffic Safety Administration, U.S. Department of Transportation and/or Federal Highway Administration, U.S. Department of Transportation. The conclusions and opinions expressed in this report are those of the University of Central Oklahoma, College of Education and Professional Studies, Department of Adult Education and Safety Science, Industrial Safety Program, and do not necessarily represent those of the State of Oklahoma, the Oklahoma Highway Safety Office, the U.S. Department of Transportation, or any other agency of the State or Federal Government.

TABLE OF CONTENTS

Page Number

Executive Summary ii

Introduction 1

Study Methodology 2

Results of the Survey 12

Summary and Recommendations 15

References 17

Appendix A: Seat Belt Observation Sites 18

LIST OF TABLES

Table 1 – Oklahoma's Average Vehicle Crash-Related Fatalities by County 2007-2009 3

Table 2 – Population and Measure of Size and Probability of Selection, by Stratum, for County Selection 6

Table 3 - Seat Belt Use Codes and Definitions 11

Table 4: Estimate of Seat Belt Use in Oklahoma: Summer 2012 12

Table 5: Estimate of Seat Belt Use in Oklahoma by County: Summer 2012 13

EXECUTIVE SUMMARY

The 2012 statewide survey of safety belt use in Oklahoma was conducted in 19 counties at 299 observation sites during the month of June. The sampling procedures were entirely new in response to rule changes issued by the National Highway Traffic Safety Administration (NHTSA). Oklahoma was one of the first states to have our new methodology approved for the 2012 restraint usage survey.

In 2012, a total of 29,675 drivers and front-seat outboard passengers were observed. 83.8% of people were properly restrained. There were significant variations in usage rates across regions of the state, by road type, and by individual counties.

Estimate of Seat Belt Use in Oklahoma: Summer 2012				
	Number of Observations	**Weighted Estimate (PERCENT)**	**Standard Error (PERCENT)**	**Confidence Interval* (PERCENT)**
Statewide	29,675	83.8	2.0	+/- 3.9
Regions				
West	10,660	92.1	2.8	+/- 5.5
Northeast	11,043	79.0	1.4	+/- 2.7
Southeast	7,707	83.8	3.3	+/- 6.5
Roadway Type				
S1100 Primary Road	6,208	89.1	2.6	+/- 5.1
S1200 Secondary Road	10,757	81.9	3.7	+/- 7.3
S1400 Local and Rural	12,445	82.3	2.2	+/- 4.3

OKLAHOMA SEAT BELT OBSERVATION STUDY
SUMMER 2012

INTRODUCTION

In the spring of 2012, the Industrial Safety Program at the University of Central Oklahoma (UCO) contracted with the Oklahoma Highway Safety Office to perform the 2012 Oklahoma Seat Belt Observation Study.

Oklahoma's law requiring automobile drivers and front-seat passengers to buckle up became effective February 1, 1987. It was amended on February 1, 1989 to require drivers and front-seat passengers of pickup trucks and vans to wear seat belts as well. Until the enactment of House Bill 1443 in 1997, Oklahoma's law permitted only "secondary enforcement." An unbelted driver could be ticketed only after being stopped for another traffic violation. The 1997 law permits primary enforcement – a law enforcement officer can issue a citation solely for failure to buckle up. Oklahoma has joined 31 other states, the District of Columbia, American Somoa, the North Mariana Islands, Puerto Rico, and the Virgin Islands with primary enforcement laws (Governors Highway Safety Association, 2012).

Due to changes in the surveying methodology required by NHTSA, the 2012 results represent a significantly different research design than previous years making direct comparisons between 2012 and previous years difficult. The most important differences in the new Oklahoma methodology (approved by NHTSA in April, 2012) are (1) a shift from population-based sampling to a fatality-based sampling frame where the population of counties sampled from needed to contain greater than 85% of the state's traffic fatalities over the past few years; (2) the standard error of the weighted average (i.e., the overall usage rate) could not exceed 2.1%; (3) all paved roads (not just major arteries) needed to be available for sampling; (4) site selection shifted from a measure of traffic volume to a selection based upon road length due to the lack of traffic volume numbers associated with all of the local segments in Oklahoma.

Given these changes, it was expected that the overall usage rate would be materially impacted under the new methodology when compared to the previous technique. The expected reason for this is that previous data has shown that usage rates on highways has been traditionally higher on major roads than on local ones (e.g., 86.2% vs. 85.2% in 2011) and the percentage of local roads (and roads never before sampled because they were considered to have insufficient traffic volume) is significantly increased in the new methodology. Further, it is likely that having a sampling frame based upon fatalities versus population is more likely to include locations where people are less likely to buckle up. Finally, a lower usage rate was expected under the new methodology because the site sampling shifted to road length versus traffic volume and previous results indicate that people are less likely to buckle up on low traffic volume rural roadways than they are on high volume urban ones.

The 2012 survey included 299 observation sites, resulting in 29,675 drivers and front-seat outboard passengers being observed for safety belt use. This report presents the results of the summer 2012

survey and makes some comparisons to previous statewide surveys although these comparisons should be viewed cautiously due to the significant methodological differences between the 2012 and previous surveys. The 2013 survey will be an important survey from a change perspective as it will allow a direct comparison of the usage rates under the same methodological conditions.

STUDY METHODOLOGY

This section describes the process used to sample and allocate sites for observation and procedures for observation and data collection, weighting and data analysis, and observer selection and training. The survey findings are presented following the discussion of the study methodology.

Sample Design

The Oklahoma research design conforms to the requirements of the Uniform Criteria and will generate annual estimates of occupant restraint use for adults and children using booster seats in the front seats of passenger vehicles. Oklahoma intends to update the sample of data collection sites every five years in order to have survey results that reflect geographic areas with more than 85% of crash-related fatalities. The sample design was provided to Oklahoma under a consultant agreement with Dr. William Bommer of Fresno State University. The design approach includes a stratified systematic PPS sample of data collection sites and is described below:

1. All 77 counties in Oklahoma were listed in descending order of the average number of motor vehicle crash-related fatalities for the period of 2007 to 2009. Fatality Analysis Reporting System (FARS) data were used to determine the average number of crash-related fatalities per county. It was determined that 45 counties accounted for at least 85% of Oklahoma's total crash-related fatalities. These 45 counties comprise the sample frame and will be represented by a subsample of counties. (See Table 1).

2. The counties were stratified according to geographical region into three strata (region 1, region 2, and region 3). A total of 19 counties were selected. Seven counties were selected with PPS from the stratum region 1 (Western Oklahoma); 7 counties were selected PPS from the stratum region 2 (Northeastern Oklahoma) and 5 counties were selected PPS from the stratum region 3 (Southeastern Oklahoma). This represents the first stage of sample selection (See Table 2).

3. Road segments were selected randomly and with PPS from all segments in the sampled counties. Depending on the county (15 counties had 15 road segments selected while the two largest counties had 30 and the two smallest had 7) a number of road segments were identified for selection. A random, systematic sample of road segments was selected PPS to road segment length within each sampled county. This represents the first stage of sample selection as we did not stratify by road type (this decision was made due to the large number of dirt and other roads in S1400 category which would bias the sampling toward local roads and the lack of accurate VMT data to use for selection purposes). This process resulted in the selection of 299 road segments (15 counties x 15 sites per county +

2 counties x 30 sites per county + 2 counties x 7 sites per county). Additional sites were also selected to use as alternates.

4. It was expected there would be a sample size of approximately 110 vehicles per observation site and approximately 33,000 vehicles overall based on past experience with the Oklahoma Annual Seat Belt Use Study.

5. Additional stages of selection were and will be used to determine, travel direction, lane, and vehicles to be observed, at random and with known probability, as appropriate under the Uniform Criteria, as described in Section 4.1.

Table 1 – Oklahoma's Average Vehicle Crash-Related Fatalities by County 2007-2009*

County	Average Fatality Counts	Fatality Percentage Within Oklahoma	Cumulative Fatality Percentage
Oklahoma	75.3	9.9	9.9
Tulsa	73.7	9.7	19.6
Cleveland	21.3	2.8	22.4
Rogers	19.3	2.5	25.0
Comanche	18	2.4	27.4
Canadian	17.3	2.3	29.6
Creek	17	2.2	31.9
Le Flore	16.7	2.2	34.1
Pottawatomie	16.7	2.2	36.3
Kay	16.3	2.2	38.4
Caddo	15.7	2.1	40.5
Pittsburg	15.7	2.1	42.5
Beckham	13.3	1.8	44.3
Osage	13.3	1.8	46.1
Seminole	13.3	1.8	47.8
Cherokee	12.7	1.7	49.5
Carter	12.3	1.6	51.1
Lincoln	12	1.6	52.7
Mayes	12	1.6	54.3
Okmulgee	12	1.6	55.9
Washita	12	1.6	57.4
McCurtain	11.7	1.5	59.0
Payne	11.7	1.5	60.5
Bryan	11	1.4	62.0

Ottawa	11	1.4	63.4
Wagoner	11	1.4	64.9
McClain	10.7	1.4	66.3
Muskogee	10.7	1.4	67.7
Grady	10.3	1.4	69.0
Washington	10.3	1.4	70.4
Pontotoc	9.7	1.3	71.7
Stephens	9.3	1.2	72.9
Delaware	9	1.2	74.1
Logan	9	1.2	75.3
Sequoyah	9	1.2	76.4
McIntosh	8.7	1.1	77.6
Custer	7.7	1	78.6
Garfield	7.3	1	79.6
Atoka	7	0.9	80.5
Garvin	7	0.9	81.4
Blaine	6.7	0.9	82.3
Marshall	6.7	0.9	83.2
Adair	6.3	0.8	84.0
Haskell	6.3	0.8	84.8
Okfuskee	6.3	0.8	85.7
Johnston	5.7	0.7	86.4
Texas	5.7	0.7	87.2
Noble	5.3	0.7	87.9
Pawnee	5.3	0.7	88.6
Pushmataha	5.3	0.7	89.3
Woodward	5.3	0.7	90.0
Hughes	5	0.7	90.6
Jackson	5	0.7	91.3
Love	5	0.7	91.9
Craig	4.7	0.6	92.6
Latimer	4.3	0.6	93.1
Choctaw	4	0.5	93.7
Murray	3.7	0.5	94.1
Nowata	3.5	0.5	94.6
Major	3.3	0.4	95.0
Coal	3	0.4	95.4
Dewey	3	0.4	95.8
Greer	3	0.4	96.2

Harper	3	0.4	96.6
Grant	2.7	0.4	97.0
Jefferson	2.7	0.4	97.3
Ellis	2.5	0.3	97.7
Kingfisher	2.5	0.3	98.0
Cotton	2.3	0.3	98.3
Alfalfa	2	0.3	98.6
Roger Mills	2	0.3	98.8
Tillman	2	0.3	99.1
Woods	2	0.3	99.3
Beaver	1.7	0.2	99.6
Kiowa	1.3	0.2	99.7
Cimarron	1	0.1	99.9
Harmon	1	0.1	100.0

*Fatality data from the Fatality Analysis Reporting System (FARS) 2007-2009

Sample Size and Precision

A standard error of less than 2.5% for the seat belt use estimates is required by the Final Rule issued by NHTSA. Since 1999, Oklahoma has conducted the Oklahoma Annual Seat Belt Use Study, and has historically obtained standard errors below this threshold (e.g. most recently 2.1%) via observed sample sizes of approximately 31,000 vehicles. These observed sample sizes have been obtained from previous sample designs using similar numbers of counties and observation sites. Therefore, since the proposed design is expected to yield a sample size of approximately 33,000 observations (299 sites across 19 counties x 110 observations per site), the precision objective should be achieved. In the event that the precision objective is not met, additional observations will be taken starting with sites having the fewest observations. New data will be added to existing data until the desired precision is achieved.

County Selection

Table 1 lists the counties and their average number of motor vehicle crash-related fatalities for the period 2007-2009 as reported in the Fatality Analysis Reporting System (FARS). Of these 77 counties, 45 counties accounted for 85.7% of the total fatalities and represented the first stage of sampling. We then stratified the 45 counties into three groups according to their geographic region (Northeast, Southeast, and West). From these strata, we selected 7 counties from the larger Northeast and Southeast regions and 5 counties from the smaller Southeastern region. These 19 counties were selected PPS as the first stage of sampling. The sampled counties, their measure of size (MOS), and probabilities of selection are shown in Table 2.

Table 2 – Population and Measure of Size and Probability of Selection, by Stratum, for County Selection

Strata	County (ID#)	County Road Miles	Region Road Miles Total	Final Probabilities of Selection
Region 1: West	Oklahoma (109)	4909.85		1.00*
	Canadian (17)	2191.01		1.00*
	Cleveland (27)	2161.99		0.999868*
	Comanche (31)	1936.03		0.895367*
	Grady (51)	1934.69		0.894747
	Logan (83)	1666.21		0.770582*
	McClain (87)	1128.72		0.522006*
	Beckham (9)	303.76		0.140482
	Caddo (15)	277.53		0.128351
	Carter (19)	238.76		0.110421
	Garvin (49)	232.63		0.107586
	Custer (39)	218.46		0.101032
	Garfield (47)	213.77		0.098863*
	Washita (149)	206.09		0.095312
	Stephens (137)	166.87		0.077173
	Blaine (11)	125.87	17912.24	0.058212
Region 2: Northeast	Tulsa (143)	4008.82		1.00*
	Osage (113)	2200.37		1.00*
	Lincoln (81)	1860.59		1.00*
	Creek (37)	1690.73		1.00*
	Rogers (131)	1648.01		1.00*
	Wagoner (145)	1343.47		1.00*
	Mayes (97)	248.15		0.584382*
	Payne (119)	215.98		0.508623
	Kay (71)	202.24		0.476266
	Delaware (41)	164.6		0.387625
	Cherokee (21)	143.5		0.337936
	Ottawa (115)	137.41		0.323594
	Adair (1)	93.83		0.220965
	Washington (147)	68.2	14025.9	0.160608
Region 3: Southeast	Le Flore (79)	2007.81		1.00*
	Okmulgee (111)	1373.39		1.00*
	Sequoyah (135)	1202.95		1.00*
	Muskogee (101)	300.58	6950.37	0.254059

	Pittsburg (121)	299.41		0.25307*
	McCurtain (89)	260.73		0.220377
	Bryan (13)	234.59		0.198282
	McIntosh (91)	210.8		0.178174
	Pontotoc (123)	182.85		0.15455
	Pottawatomie (125)	177.85		0.150324*
	Atoka (5)	174.98		0.147898
	Seminole (133)	161.12		0.136183
	Okfuskee (107)	145.1		0.122643
	Haskell (61)	109.64		0.092671
	Marshall (95)	108.57		0.091767

Note: * Denotes counties selected

Within each stratum, counties were selected with probability proportional to size with the MOS being road miles. Let $g = 1,2, \ldots G$ be the first stage strata, v_{gc} be road miles for county c in stratum g, $v_g = \sum_{all\ c\ in\ g} v_{gc}$ be the total road miles for all counties in first stage stratum g. Then PSU inclusion probability is: $\pi_{gc} = n_g v_{gc} / v_g$, here n_g is the PSU sample size for first stage stratum g that was allocated. If a county was selected with certainty (i.e., its MOS was equal to or exceeded v_g / n_g), it was set aside as a certainty selection and the probabilities of selection were recalculated for the remaining counties in the stratum. This was repeated and the certainty selections were identified successively until no county's MOS was equal to or exceeded the recalculated v_g / n_g. For example, in region 2, Tulsa and Osage Counties were selected with certainty with probabilities of 2.000709 and 1.098153. Next, the total road miles for region 2 was recalculated without Tulsa or Osage counties, giving a new total road miles of 7,817. The probabilities of the remaining counties were recalculated with this new total road miles as well as a new number of remaining counties to select (i.e., 5 instead of 7), and Lincoln, Creek, and Rogers counties were then selected with certainty with new probability of 1.190136, 1.081484, and 1.054158. This process was repeated and Wagoner County was selected with certainty with a new probability of 1.539864. The total road miles of the stratum was then recalculated again, as well as the probabilities of selection for the remaining counties, until no more counties were selected with certainty for the second stratum.

After all certainty counties were identified, a sampling interval (I) was calculated as the total (i.e., remaining) road length across all counties not selected with certainty within the region divided by the number of counties still needed to be selected within each region. A random start (RS) was selected between 0 and the calculated sampling interval (I), which determines the first county selected. Subsequent counties selected were determined by adding multiples of I to the RS until the desired number of counties was selected and/or the end of the sorted list was reached.

Road Segment Selection

After the 19 sampled counties were selected, the road segments needed to be selected. To do this,

we ordered the counties by their miles of paved roads. Thirty road segments were selected PPS from the largest two counties, 15 road segments were selected with PPS from each of the next 15 sized counties, and 7 segments were selected with PPS from the smallest two counties. Oklahoma employed the Census TIGER data for the selection of road segments. Oklahoma exercised the available exclusion option and removed rural local roads in counties that are not within Metropolitan Statistical Areas (MSAs), and other non-public roads, unnamed roads, unpaved roads, vehicular trails, access ramps, cul-de-sacs, traffic circles, and service drives from the dataset.

The list of eligible road segments within each selected county was sorted by segment length to obtain an ordered list. Road segments were selected with PPS using road length as the MOS. A sampling interval (I) was calculated as the total length across all remaining road segments within the county divided by the number of road segments to select within each county (i.e. 15). A random start (RS) was selected between 0 and the calculated I, which determined the first road segment selected. Subsequent road segments selected were determined by adding multiples of I to the RS until the desired number of road segments was selected and/or the end of the sorted list was reached.

Appendix A presents the selected road segments within each county and their probabilities of selection.

Reserve Sample

In the event that an original road segment is permanently unavailable, a reserve road segment will be used. The reserve road segment sample consists of two additional road segments per original road segment selected, resulting in a reserve sample of 598 road segments. These approrporiate reserve segments were identified and selected as the road segments immediately preceding and immediately following the original road segment actually selected, and thus are implicitly stratified by segment length to correspond to the original road segment actually selected. Thus, these are considered selected with PPS using road segment length as MOS by the same approach as described in Section 3.3. With this in mind, for the purposes of data weighting, the reserve road segment inherits all probabilities of selection and weighting components up to and including the road segment stage of selection from the original road segment actually selected. Probabilites and weights for any subsequent stages of selection (e.g., the sampling of vehicles) will be determined by the reserve road segment itself.

Observation and Data Collection Procedures

Site Selection

Road segments were mapped according to the latitude and longitude of their midpoints. The selected road segment was identified by an intersection or interchange that occurred within or just beyond the segment. If no intersection or interchange occurred within the segment, then any point on that road could be used for observation. Data collection sites were deterministically

selected such that traffic would be moving during the observation period. Therefore, sites were assigned to locations within the segment that were approximately 50 yards from any controlled intersections. For interstate highways, data collection will occur on a ramp carrying traffic that is exiting the highway. The observed direction of travel was randomly assigned for each road segment. The locations of the data collection sites were described on Site Assignment Sheets for each county and maps were developed to aid the Data Collectors and QC Monitors in travelling to the assigned locations.

Training

Oklahoma recruited and hired 8-10 Data Collectors for each survey. Oklahoma also utilized 2 QC Monitors to monitor and review the Data Collectors.

The criteria used in selecting observers and QC Monitors required that each person be at least 21 years of age, hold a valid driver's license, and be able to maintain the assigned schedule and research protocol for the observations. Each observer was trained on the types of vehicles to count, how to record the belted/not belted occupants, and other information necessary to complete their assignment. They also were provided an observer manual with specific instructions regarding the process for collecting data as well as a troubleshooting guide. The training session provided the observers with information on: (1) identifying eligible vehicles; (2) counting procedures for limited access roads; and, (3) completing the observation record sheet.

The training session also included explicit directions on counting an improperly used shoulder belt as "not using" and determining the number of lanes to be observed when traffic volume was high. During the survey period, on-site audits were conducted to ensure compliance and quality data collection by various observers.

Data Collector and QC Monitor training was conducted at the University of Central Oklahoma in June 2012. Training included classroom lecture and field exercises.

At the conclusion of the training, Data Collectors and QC Monitors were given a quiz to ensure that they understood the survey terminology, the data collection protocols, and reporting requirements.

QC Monitors were given an additional half day training focusing on their specific duties. These included conducting unannounced site visits to various Data Collectors at a minimum of 15 sites (or 5% of all sites) and reviewing the field protocol during the visit. The QC Monitor was also available during the survey to respond to questions and offer assistance to Data Collectors as needed.

Observation Periods and Quality Control

All seat belt and booster seat use observations were conducted during weekdays and weekends between 7 a.m. and 8:00 p.m. The schedule included rush hour (before 9:30 AM and after 3:30 PM) and non-rush hour observations. Data collection was conducted for 60 minutes at each site, and a minimum of 6 sites were scheduled each day. Start times were staggered to ensure that a representative number of weekday/weekend/ rush hour/non-rush hour sites were included.

Maps showing the location of all observation sites and Site Assignment Sheets were provided to the Data Collectors and QC Monitors. These indicated the observed road name, the crossroad included within the road segment (or nearest crossroad), assigned date, assigned time, and direction of travel. Sites within relatively close geographic proximity were assigned as data collection clusters. The first site within each cluster was assigned a random day and time for completion. Next, all other sites within a cluster were assigned to the same day in order to minimize travel costs. They were scheduled by geographic proximity to maximize the efficiency of travel within the cluster.

Data Collection

All passenger vehicles, including commercial vehicles weighing less than 10,000 pounds, were eligible for observation. A cover sheet was designed to allow for documentation of descriptive site information, including: date, site location, site number, alternate site data, assigned traffic flow, number of lanes available and observed, start and end times for observations, and weather conditions. This cover sheet was completed by the Data Collector at each site.

The observation form was used to record seat belt use by drivers and front seat passengers. Additional observation forms were used when more than 40 vehicles are observed at a site. The forms were labeled as 1 of 2, and 2 of 2, etc.

The data collector observed as many lanes of traffic as s/he could comfortably monitor while obtaining data on 99% of the vehicles. Only one direction of traffic was observed at any given site.

Observations were made of all drivers and right front seat occupants. This included children riding in booster seats. *The only right front seat occupants excluded from this study were child passengers who were traveling in child seats with harness straps*. The codes in Table 3 were used to record seat belt use.

Table 3 - Seat Belt Use Codes and Definitions

Code	Meaning	Definition
Y	Yes, belted	The shoulder belt is in front of the person's shoulder.
N	No, unbelted	The shoulder belt is not in front of the person's shoulder.
U	Unknown	It cannot reasonably be determined whether the driver or right front passenger is belted.
NP	No passenger	There is no right front passenger present.

According to the codes above, both a vacancy for the right front passenger or a child, restrained in a car seat with harnesses was coded as NP since we do not observe harnessed children in this study.

Alternate Sites and Rescheduling

When a site was temporarily unavailable due to a crash, road construction, or inclement weather, data collection would be rescheduled for a similar time of day and type of day of week. In the event that the site was permanently unworkable, such as being located within a gated community, then an alternate site, selected as part of the reserve sample, would be used as a permanent replacement. The two alternates for each site would be clearly identified and listed on the Site Assignment Sheet. Data Collectors would pick one of the reserve sites at random. If the selected reserve was also permanently unworkable, then the Data Collector would use the other reserve site.

Quality Control Procedures

A QC Monitor made unannounced visits to at least 5% of the data collection sites. During these visits, the QC Monitor first evaluated the Data Collector's performance from a distance (if possible), and then worked alongside the Data Collector. The QC Monitor ensured that the Data Collector was following all survey protocol including: being on time at assigned sites, completing the cover sheet and observation forms, and making accurate observations of seat belt use. The QC Monitor prepared a site visit report highlighting any problems with data collection site locations and Data Collector performance.

In the event it was discovered that a Data Collector had falsified data, the Data Collector would be replaced by the back-up Data Collector. The back-up Data Collector would revisit all sites proven to be or suspected to be falsified and recollect all data.

If the rate of unknowns exceeds 10% for any site (potentially leading to an overall nonresponse rate of 10% or more), then the Data Collector would be sent back to that site for an additional observation period.

RESULTS OF THE SURVEY

During June 2012, observers visited the 299 sites in the 19 sample counties. They collected data for 29,675 drivers and front-seat outboard passengers. Of the total individuals observed, only 265 (approximately 0.9%) observations were classified as "unknown". Drivers accounted for approximately 76.1% of the individuals observed while about 23.9% were front seat passengers.

Table 4 shows the estimates of safety belt use and confidence intervals for the state, the three regions, and roadway types (major and local). The statewide seat belt usage rate for drivers and front-seat outboard passengers was 83.8 percent. The Western Region led all regions with 92.1 percent buckled. The Northeast region had the lowest percentage buckled (79.0 percent). Drivers and passengers observed traveling on primary roads were significantly more likely to be buckled (89.1 percent) than those observed on secondary (81.9 percent) or local roadways (82.3 percent).

Table 4
Estimate of Seat Belt Use in Oklahoma:
Summer 2012

	Number of Observations	Weighted Estimate (PERCENT)	Standard Error (PERCENT)	Confidence Interval* (PERCENT)
Statewide	29,675	83.8	2.0	+/- 3.9
Regions				
West	10,660	92.1	2.8	+/- 5.5
Northeast	11,043	79.0	1.4	+/- 2.7
Southeast	7,707	83.8	3.3	+/- 6.5
Roadway Type				
S1100 Primary Road	6,208	89.1	2.6	+/- 5.1
S1200 Secondary Road	10,757	81.9	3.7	+/- 7.3
S1400 Local and Rural	12,445	82.3	2.2	+/- 4.3

***** Based on a 95 percent confidence level, the actual belt use for each category shown in the table is the estimated percentage use + or – the standard error (S.E.) multiplied by 1.96. Standard errors were calculated using SPSS v19 Complex Samples Module.

Although the breakdown by region is useful for targeting problem areas for seat belt use, an examination of the differences among sampled counties within the regions provides further insights (Table 5). Since the variation among counties within a region can be substantial, a comparison of county data provides more specific information that can be used for targeted media campaigns and enhanced enforcement in areas where seat belt usage is lowest.

The five sampled counties with the **lowest** seat belt compliance rate for 2012 include:

	2012
Lincoln County	61.9%
Okmulgee County	73.9%
Osage County	75.8%
Wagoner County	78.4%
Cleveland County	78.4%

Mayes County just missed the list with a buckled rate of 78.6 percent. Of the six counties mentioned here, four of them are located in the Northeastern portion of the state. In this light, it is not surprising that the Northeast also had the lowest usage rate of the three regions.

Table 5
Estimate of Seat Belt Use in Oklahoma by County: Summer 2012
Percent

	Weighted Combined	**Primary Roads**	**Secondary Roads**	**Local/Rural Roads**
Regions				
West	**92.1**	**95.7**	**94.9**	**88.5**
Oklahoma	80.0	83.8	81.4	79.4
Canadian	86.1	n/a	n/a	86.1
Cleveland	78.4	86.1	n/a	77.5
Comanche	95.4	97.9	89.5	95.9
Logan	96.0	98.2	98.4	94.3
McClain	89.9	92.8	85.4	94.8
Garfield	98.8	n/a	98.8	n/a
Northeast	**79.0**	**87.6**	**75.7**	**76.7**
Tulsa	83.3	85.5	86.1	83.2
Osage	75.8	n/a	75.3	75.9
Lincoln	61.9	n/a	78.2	54.4
Creek	94.7	98.0	91.0	96.1

Table 5 Estimate of Seat Belt Use in Oklahoma by County: Summer 2012 Percent				
Rogers	80.8	92.9	85.9	71.1
Wagoner	78.4	82.7	n/a	77.1
Mayes	78.6	87.5	74.3	72.5
Southeast	**83.8**	**89.2**	**80.3**	**82.3**
LeFlore	81.5	n/a	75.9	83.7
Okmulgee	73.9	82.6	76.0	66.1
Sequoyah	86.1	82.2	79.7	90.6
Pittsburg	81.1	84.3	79.2	n/a
Pottawatomie	98.9	98.6	100.0	n/a

On the other hand, the five sampled counties with the **highest** seat belt compliance for 2012 include:

	2012
Pottawatomie County	98.9%
Garfield County	98.8%
Logan County	96.0%
Comanche County	95.4%
Creek County	94.7%

Among the five counties with the highest seat belt compliance rates, neither Pottawatomie nor Garfield counties had any S1400 (local or rural) road segments observed. This likely led to a biasing upward of their overall usage rates. Of the five counties listed here, three were in the Western region, which was the region with the highest use overall. It should be noted that the usage rate in the Western region (92.1 percent) was much higher than the other two regions in the state.

Comparisons to Previous Surveys

At first look, it would appear that the usage rates actually declined significantly between 2011 and 2012. In 2011, the overall usage rate was 85.9% and it was 83.8% in 2012. This conclusion, however, is not the result of an “apples to apples” comparison due to the significant changes in methodology between 2011 and 2012 described earlier in this report.

Upon closer examination, however, the only numbers which are reasonably comparable between 2011 and 2012 are primary road usage rates. Even this number may be biased downward slightly in 2012 versus 2011 due to the shift to a fatality-based sampling frame, but overall these numbers are the most directly comparable across the two time frames. In 2011, 86.2% of drivers on major roads buckled up while in 2012 this number actually rose to 89.1%. For the other road types, the comparison is less straightforward, but a preponderance of the evidence suggests that for smaller roads, the usage rates may have gone down slightly between 2011 and 2012 but an exact amount is difficult to estimate because of differences in the ways that the roads were categorized under the old and new methodologies.

SUMMARY AND RECOMMENDATIONS

This report provides an analysis of a statewide observation study of safety belt use among 29,675 Oklahoma drivers and front-seat outboard passengers conducted in June 2012. The research design used a fully compliant statewide, multistage, probability sample of road segments. It represents a probability sample of all roadways in the state, taking into account the number of fatalities which have occurred by county and provides a thorough representation of all paved roads in Oklahoma using the three major road classifications from the TIGER database. The 299 sites were chosen to produce both an accurate representation of counties based on fatalities and satisfactory estimates by region.

The results of the summer 2012 survey can be summarized as follows:

- The summer 2012 survey results reveals that statewide safety belt use was 83.8%.
- The Western Region had a significantly higher usage rate (92.1 percent) than the other two regions (Northeast at 79.0 percent and the Southeast with 83.8%)
- Five counties had usage rates over 90%.
- Two counties (Lincoln and Okmulgee) had usage rates under 75%.
- Overall, drivers on primary roads had significantly higher usage rates (89.1 percent) than did drivers on either secondary (81.9 percent) or local (82.3 percent) roads.

Three factors that have been demonstrated to play key roles in determining a state's use rate are: 1) the nature of the state's seat belt law, and 2) media campaigns conducted to raise use. The 2009 NHTSA survey found that those states with stronger belt enforcement laws (primary enforcement) continue to exhibit generally higher buckled rates than states with weaker laws (secondary enforcement) or no laws; and 3) an analysis conducted for this study of the usage rates from 2010 finds that states with higher fines have higher usage rates ($r = .49$).
With respect to public education, the main theme of the national advertising campaign promoted by NHTSA has been *Click It or Ticket*. It conveys a message that it is illegal not to use safety belts, law enforcement officers are looking for nonuse, and offenders will be ticketed. The campaign is

viewed as a success with safety belt use increases coincident with the advertising campaign.

A recent study assessing *Click It or Ticket* programs confirms that primary law states had substantially higher seat belt use and higher levels of enforcement than secondary states. They also noted that *Click It or Ticket* programs aimed at the general driving population and supplemented by more targeted programs directed at low use groups (e.g., occupants of pickups and rural residents) are key to increasing seat belt use. However, media programs without enforcement are not nearly as successful. Thus, enforcement is important. The more seat belt laws are enforced, the higher the seat belt use rate.

In light of the data collected as part of the 2012 observation study, the following recommendations are presented:

- Continue to encourage law enforcement agencies to *vigorously* enforce the Oklahoma Mandatory Seat Belt Use Act on a consistent basis;

- Begin to collect county-level data on enforcement of the use of seat belts to document the relationship between enforcement efforts and safety restraint use;

- Continue to pursue a multimedia strategy for educating the public about the benefits of using seat belts and the consequences of non-compliance with the state seat belt law; and

- Targeting specific counties and regions with low usage rates (i.e., the Northeast region, in general, and counties such as Lincoln and Osage in particular) would likely have a positive impact on rates in those areas. Okmulgee County is another specific county which should be monitored for future usage rates.

- Consider increasing the fines for seat belt violations. The average fine in states with primary seat belt laws was $51.28 versus the current $20 fine in Oklahoma.

REFERENCES

Chen, Y. and Ye, T. 2010. *Safety Belt Use in 2009 – Use Rates in the States and Territories* (DOT HS 811 106). Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis. Washington, D.C. May.

Glassbrenner, D. 2004. *Safety Belt Use in 2004 – Use Rates in the States and Territories* (DOT HS 809 813). Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis. Washington, D.C. November.

Governors Highway Safety Association (2012). Seat Belt Laws August 2012. Retrieved from http://www.ghsa.org/html/stateinfo/laws/seatbelt_laws.html

Hedlund, J., Gilbert, S., Ledingham, K., and Preusser, D. 2008. How States Achieve High Belt Use Rates (DOT HS 810 962). Department of Transportation, National Highway Traffic Safety Administration. Washington, D.C.

James, T., Hall K., and Krimmer, M.. 2008. *Seat Belt Observation Study.* University of Oklahoma, Institute for Public Affairs. Norman, OK. July.

Pickrell, T and Ye, T. 2009. *Safety Belt Use in 2008 – Demographic Characteristics* (DOT HS 811 183). Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis. Washington, D.C. August .

Solomon, M.G., Chaudhary, N., and Cosgrove, L. 2003. *Click It or Ticket Safety Belt Mobilization Evaluation.* Department of Transportation, National Highway Traffic Safety Administration, National Center for Statistics and Analysis. Washington, D.C. May.

Tison, J. and Williams, A. 2010. *Analyzing the First Years of the Click It or Ticket Mobilizations*. (DOT HS 811 232). Department of Transportation, National Highway Traffic Safety Administration. Washington, D.C. January.

APPENDIX A
Seatbelt Observation Sites – June 2012

County	Road Type	Road Name	Latitude	Longitude	Segment Length (mi)	Probability of Selection
Oklahoma	S1400	W Hefner Rd	35.58264	-97.5951	0.936778	0.00572404
Oklahoma	S1200	Broadway Exd	35.55878	-97.514	0.520414	0.00317991
Oklahoma	S1400	NE 78th St	35.5511	-97.4378	0.430351	0.00262960
Oklahoma	S1100	I- 35	35.51017	-97.4596	0.353289	0.00215872
Oklahoma	S1400	SE 44th St	35.42067	-97.2095	0.296666	0.00181273
Oklahoma	S1200	E Danforth Rd	35.66696	-97.2277	0.256665	0.00156831
Oklahoma	S1400	Corbett Dr	35.42465	-97.4435	0.237993	0.00145422
Oklahoma	S1400	3290 Rd	35.54907	-97.1414	0.221216	0.00135171
Oklahoma	S1400	NE 150th St	35.62357	-97.2897	0.203516	0.00124355
Oklahoma	S1400	W Danforth Rd	35.66751	-97.5073	0.186272	0.00113819
Oklahoma	S1400	Rasheed Rd	35.66804	-97.5076	0.172945	0.00105675
Oklahoma	S1400	Harrah Rd	35.57245	-97.1587	0.159531	0.00097479
Oklahoma	S1400	S Trail Ridge Rd	35.6558	-97.5174	0.147039	0.00089846
Oklahoma	S1400	N Harrah Rd	35.55286	-97.1586	0.135202	0.00082613
Oklahoma	S1400	NW 122nd St	35.59464	-97.5506	0.125377	0.00076610
Oklahoma	S1400	NW 23rd St	35.49333	-97.629	0.119517	0.00073029
Oklahoma	S1400	NE 68th St	35.54206	-97.4931	0.117005	0.00071494
Oklahoma	S1400	NW 206th St (Covell Rd)	35.6822	-97.5661	0.109016	0.00066613
Oklahoma	S1400	NW 81st St	35.55405	-97.5166	0.100208	0.00061231
Oklahoma	S1400	Saddle River Dr	35.66199	-97.5415	0.092264	0.00056377
Oklahoma	S1400	N Asbury Ave	35.51569	-97.6309	0.084659	0.00051730
Oklahoma	S1400	NW 68th St	35.5413	-97.6183	0.077624	0.00047431
Oklahoma	S1400	N Harvey Ave	35.47772	-97.5176	0.071589	0.00043743
Oklahoma	S1400	N Macarthur Ave	35.64462	-97.6207	0.067494	0.00041241
Oklahoma	S1400	S Prospect Ave	35.42488	-97.486	0.062937	0.00038457
Oklahoma	S1400	N Bath Ave	35.48506	-97.485	0.058738	0.00035891
Oklahoma	S1400	Maple Ridge Rd	35.59756	-97.5826	0.053857	0.00032909
Oklahoma	S1400	NE 36th St	35.50763	-97.3891	0.047961	0.00029306
Oklahoma	S1400	NE 42nd St	35.51487	-97.3073	0.0374	0.00022853
Oklahoma	S1400	S Douglas Blvd	35.44461	-97.3708	0.02406	0.00014702
Canadian	S1400	N John Kilpatrick Tpke	35.60302	-97.682	1.232144	0.00843549
Canadian	S1400	S Cimarron Rd	35.41433	-97.813	0.88505	0.00605922
Canadian	S1400	N Heaston Rd	35.72047	-98.0837	0.676486	0.00463135
Canadian	S1400	Black Kettle Blvd	35.632892	-97.994759	0.531352	0.00363774
Canadian	S1400	164th St NE	35.63851	-97.9279	0.471992	0.00323135

County	Road Type	Road Name	Latitude	Longitude	Segment Length (mi)	Probability of Selection
Canadian	S1400	SW 15th St	35.44987	-97.7717	0.406391	0.00278223
Canadian	S1400	122nd St NW	35.59483	-98.113958	0.339167	0.00232200
Canadian	S1400	County Line Rd	35.68002	-97.674	0.282253	0.00193236
Canadian	S1400	S 8th St	35.50194	-97.7546	0.238637	0.00163375
Canadian	S1400	Hwy 66W	35.536591	-98.209189	0.200128	0.00137011
Canadian	S1400	W Wilshire Blvd	35.55111	-97.6963	0.160596	0.00109947
Canadian	S1400	W Hefner Rd	35.5801	-97.7107	0.126518	0.00086617
Canadian	S1400	S Mustang Rd	35.36361	-97.7244	0.097761	0.00066929
Canadian	S1400	SW 89th St	35.37727	-97.92	0.068387	0.00046819
Canadian	S1400	N Shannon Way	35.39556	-97.7506	0.049454	0.00033857
Cleveland	S1400	S Westminster Rd	35.34495	-97.3356	0.555075	0.00385112
Cleveland	S1400	SE 134th St	35.33427	-97.4111	0.384147	0.00266522
Cleveland	S1100	I- 35	35.29458	-97.4889	0.298758	0.00207279
Cleveland	S1400	Alameda Dr	35.22927	-97.3004	0.243085	0.00168653
Cleveland	S1400	SW 119th St	35.34834	-97.6339	0.207628	0.00144053
Cleveland	S1400	84th Ave SE	35.20522	-97.31803	0.178622	0.00123928
Cleveland	S1400	NW 17th St	35.35275	-97.4998	0.153957	0.00106816
Cleveland	S1400	NW 3rd St	35.34149	-97.4912	0.13309	0.00092338
Cleveland	S1400	Bellaire Dr	35.35727	-97.489	0.116388	0.00080750
Cleveland	S1400	SE 104th St	35.36321	-97.4208	0.098452	0.00068306
Cleveland	S1400	Elm Ave	35.20143	-97.4479	0.083898	0.00058209
Cleveland	S1400	SE 149th St	35.31913	-97.2216	0.069274	0.00048062
Cleveland	S1400	192nd Ave NE	35.31402	-97.1596	0.056736	0.00039364
Cleveland	S1400	Briarhollow Ln	35.33925	-97.5323	0.046616	0.00032342
Cleveland	S1400	Old Mill Rd	35.34852	-97.4716	0.028896	0.00020048
Comanche	S1100	I- 44	34.75966	-98.343	1.266336	0.00981149
Comanche	S1400	SE 60th St	34.6012	-98.3172	0.941146	0.00729194
Comanche	S1400	State Hwy 115	34.585413	-98.632752	0.745806	0.00577846
Comanche	S1100	I- 44	34.77455	-98.312	0.587244	0.00454993
Comanche	S1400	SW Woodlawn Dr	34.550896	-98.487849	0.487611	0.00377798
Comanche	S1400	SE 165th St	34.5825	-98.1948	0.411295	0.00318669
Comanche	S1200	State Hwy 17	34.75365	-98.1388	0.331846	0.00257112
Comanche	S1200	St Highway115	34.74883	-98.5812	0.263515	0.00204170
Comanche	S1200	State Hwy 65	34.58472	-98.2123	0.216444	0.00167699
Comanche	S1400	SE Coombs Rd	34.56509	-98.2106	0.175394	0.00135894
Comanche	S1200	State Hwy 7	34.59401	-98.2136	0.136564	0.00105809
Comanche	S1400	Apache Gate Rd	34.71606	-98.4048	0.103693	0.00080341
Comanche	S1200	SW Lee Blvd	34.59434	-98.4162	0.082579	0.00063982

County	Road Type	Road Name	Latitude	Longitude	Segment Length (mi)	Probability of Selection
Comanche	S1400	NW 13th St	34.62382	-98.4082	0.06418	0.00049726
Comanche	S1400	SE Goodin Rd	34.53615	-98.2301	0.04181	0.00032394
Logan	S1100	I-35	35.84899	-97.3941	0.992209	0.00893238
Logan	S1400	N Portland Ave	36.078412	-97.586077	0.812168	0.00731156
Logan	S1400	S Academy Rd	35.836976	-97.46042	0.635988	0.00572550
Logan	S1400	State Hwy 74D	36.057271	-97.59067	0.50803	0.00457355
Logan	S1400	N Post Rd	35.903693	-97.354027	0.45224	0.00407130
Logan	S1400	State Hwy 51	36.116168	-97.662999	0.383055	0.00344846
Logan	S1400	N3190 Rd	35.751862	-97.318406	0.323897	0.00291589
Logan	S1400	S Kelly Ave	35.73015	-97.4962	0.271514	0.00244431
Logan	S1400	S Sooner Rd	35.74344	-97.4261	0.231692	0.00208581
Logan	S1400	Waterloo Rd	35.725383	-97.480461	0.188587	0.00169776
Logan	S1400	S Kelley Ave	35.77013	-97.4962	0.151433	0.00136328
Logan	S1400	State Hwy 105	35.8779	-97.3779	0.117666	0.00105929
Logan	S1400	S Santa Fe	35.75037	-97.514	0.084871	0.00076405
Logan	S1400	N Massachusetts Ave	35.9446	-97.2532	0.066052	0.00059463
Logan	S1400	W Charter Oak	35.75451	-97.4924	0.035415	0.00031882
McClain	S1200	State Hwy 59	34.89887	-97.468	0.941476	0.01251186
McClain	S1400	Bell Rd	34.957009	-97.663968	0.69417	0.00922526
McClain	S1400	SW 16th St	35.232868	-97.630322	0.551293	0.00732648
McClain	S1200	State Hwy 39	35.02756	-97.6221	0.476389	0.00633103
McClain	S1200	State Hwy 59	34.91346	-97.4102	0.418516	0.00556192
McClain	S1400	NW 24th St	35.27643	-97.6389	0.3664	0.00486932
McClain	S1400	SW 16th St	35.23291	-97.6072	0.316253	0.00420288
McClain	S1200	State Hwy 74	34.94659	-97.3994	0.270202	0.00359088
McClain	S1100	I- 35	35.04958	-97.3794	0.233573	0.00310410
McClain	S1400	State Hwy 76	35.045622	-97.653075	0.195091	0.00259269
McClain	S1200	State Hwy 74	35.06561	-97.4072	0.156129	0.00207490
McClain	S1400	Meridian Ave	34.95061	-97.6001	0.119532	0.00158854
McClain	S1400	W Brule St	35.00997	-97.3638	0.089968	0.00119564
McClain	S1200	E Ripley St	34.87445	-97.0516	0.066127	0.00087880
McClain	S1400	May Ave	35.07568	-97.5647	0.02537	0.00033716
Garfield	S1200	State Hwy 132	36.22482	-98.0332	0.999839	0.03273561
Garfield	S1200	State Hwy 15	36.53487	-97.4915	0.620945	0.02033029
Garfield	S1200	E0425 Rd	36.39747	-97.5548	0.478928	0.01568052
Garfield	S1200	State Hwy 45	36.4777	-98.0368	0.418112	0.01368935
Garfield	S1200	W Carrier Rd	36.46333	-97.9693	0.281138	0.00920471
Garfield	S1200	E Owen K Garriott Rd	36.391	-97.8397	0.195978	0.00641649

County	Road Type	Road Name	Latitude	Longitude	Segment Length (mi)	Probability of Selection
Garfield	S1200	N 4th St	36.44251	-97.8726	0.101631	0.00332749
Tulsa	S1400	E 106th St N	36.30754	-95.8934	0.915355	0.00685197
Tulsa	S1400	E 131st St	35.97381	-95.9458	0.590421	0.00441965
Tulsa	S1400	E 171st St S	35.91557	-95.909	0.469649	0.00351560
Tulsa	S1400	S Yale Ave	35.86357	-95.9261	0.371351	0.00277978
Tulsa	S1400	E 101st St	36.01737	-95.8617	0.301148	0.00225427
Tulsa	S1400	E 101st St	36.01744	-95.7772	0.255904	0.00191559
Tulsa	S1400	Courtney Ln	35.95082	-96.0192	0.234662	0.00175658
Tulsa	S1400	W 106th St	36.01016	-95.9779	0.212446	0.00159028
Tulsa	S1400	S 33rd E Ave	35.97238	-95.9402	0.193463	0.00144818
Tulsa	S1200	E 46th St N	36.22283	-95.8209	0.177145	0.00132603
Tulsa	S1400	E 26th St	36.1273	-95.9773	0.161834	0.00121142
Tulsa	S1400	E 101st St	36.01736	-95.9392	0.147634	0.00110513
Tulsa	S1400	E 186th St N	36.42368	-95.9597	0.134309	0.00100538
Tulsa	S1400	S Braden Ave	36.14691	-95.9202	0.125761	0.00094140
Tulsa	S1400	E 66th St N	36.24956	-95.9569	0.120753	0.00090391
Tulsa	S1400	S Elm Pl	36.0427	-95.7975	0.115223	0.00086251
Tulsa	S1400	61st St S	36.07566	-96.1346	0.106124	0.00079440
Tulsa	S1400	W 2nd Pl	36.15075	-96.0092	0.096502	0.00072237
Tulsa	S1400	E 28th St	36.12426	-95.8318	0.088045	0.00065907
Tulsa	S1200	Broken Arrow Expy	36.09453	-95.8489	0.080648	0.00060370
Tulsa	S1400	E 31st St S	36.11899	-95.8204	0.073263	0.00054842
Tulsa	S1400	E 67th St	36.06764	-95.8522	0.068319	0.00051141
Tulsa	S1400	S Pittsburg Ave	36.09595	-95.9313	0.064359	0.00048177
Tulsa	S1400	E 31st St	36.11894	-95.8905	0.06102	0.00045677
Tulsa	S1400	E 95th St	36.07967	-95.9089	0.05797	0.00043394
Tulsa	S1400	Woodward Blvd	36.12329	-95.9787	0.054407	0.00040727
Tulsa	S1400	N Butternut Ave	36.05409	-95.8455	0.050186	0.00037567
Tulsa	S1400	E 30th Pl	36.11977	-95.9647	0.042225	0.00031608
Tulsa	S1100	I- 244	36.16488	-95.8599	0.032427	0.00024274
Tulsa	S1400	W 21st St	36.13259	-95.9907	0.017475	0.00013081
Osage	S1400	Co Rd 3851	36.81053	-96.2089	1.028349	0.00701020
Osage	S1400	State Hwy 10	36.932553	-96.080587	0.76603	0.00522198
Osage	S1200	John Dahl Ave	36.6888	-96.314	0.60467	0.00412200
Osage	S1400	Wulf Rd	36.57454	-96.8783	0.497671	0.00339259
Osage	S1400	Phillips Rd	36.42945	-96.0279	0.419209	0.00285772
Osage	S1200	US Hwy 60	36.6768	-96.972	0.356135	0.00242775
Osage	S1400	Cr 2355	36.53061	-96.121	0.299999	0.00204508

County	Road Type	Road Name	Latitude	Longitude	Segment Length (mi)	Probability of Selection
Osage	S1400	Co Rd 2301	36.62401	-96.1122	0.251355	0.00171347
Osage	S1400	Sunset Blvd	36.76037	-96.0007	0.207768	0.00141634
Osage	S1400	52nd W Ave	36.30231	-96.0494	0.170189	0.00116017
Osage	S1200	State Hwy 11	36.78202	-96.7095	0.133979	0.00091333
Osage	S1400	Lenapah St	36.37005	-96.0313	0.101772	0.00069377
Osage	S1400	Bowring Rd	36.85486	-96.1253	0.074542	0.00050815
Osage	S1400	Prue Rd	36.217999	-96.208029	0.053419	0.00036415
Osage	S1400	20th W Ave	36.35423	-96.0134	0.019651	0.00013396
Lincoln	S1400	N3460 Rd	35.6609	-96.8401	0.656364	0.00529155
Lincoln	S1400	State Hwy 18	35.742635	-96.884683	0.504752	0.00406927
Lincoln	S1400	E870 Rd	35.75362	-96.9704	0.437989	0.00353103
Lincoln	S1400	N3320 Rd	35.89254	-97.0881	0.370037	0.00298321
Lincoln	S1400	US Hwy 177	35.59881	-96.999233	0.320736	0.00258575
Lincoln	S1400	E1010 Rd	35.55047	-96.7242	0.278143	0.00224237
Lincoln	S1400	E1030 Rd	35.520903	-96.68847	0.243446	0.00196264
Lincoln	S1400	17th St	35.76776	-96.643	0.213464	0.00172093
Lincoln	S1200	S 3320 Rd	35.68391	-97.0882	0.185539	0.00149580
Lincoln	S1400	3420 Rd	35.74223	-96.9114	0.156599	0.00126249
Lincoln	S1400	N3500 Rd	35.483707	-96.771168	0.129613	0.00104493
Lincoln	S1200	Mahoney St	35.59459	-96.8222	0.102799	0.00082876
Lincoln	S1200	US Hwy 62	35.48679	-96.7188	0.075895	0.00061186
Lincoln	S1400	N3500 Rd	35.93456	-96.7672	0.05688	0.00045856
Lincoln	S1400	State Hwy 66	35.750231	-96.682645	0.013374	0.00010782
Creek	S1100	I- 44	35.95699	-96.236	0.966414	0.00857409
Creek	S1400	State Hwy 48	36.144778	-96.399719	0.499992	0.00443596
Creek	S1400	N3790 Rd	35.82332	-96.2637	0.390855	0.00346769
Creek	S1200	State Hwy 48	35.96981	-96.4048	0.318747	0.00282794
Creek	S1400	W 151st St S	35.9448	-96.1989	0.262725	0.00233091
Creek	S1200	New Sapulpa Rd	36.05945	-96.0709	0.229097	0.00203256
Creek	S1100	I- 44	35.82381	-96.4745	0.196639	0.00174459
Creek	S1400	Industrial Rd	35.82741	-96.395	0.168864	0.00149817
Creek	S1400	N3710 Rd	35.93383	-96.405	0.144863	0.00128523
Creek	S1400	State Hwy 48	36.018573	-96.387154	0.122782	0.00108933
Creek	S1400	W 71st St S	36.062031	-96.09897	0.104836	0.00093011
Creek	S1400	W 131st St S	35.97381	-96.2314	0.085504	0.00075860
Creek	S1400	W Monterey Ave	35.97282	-96.1132	0.069221	0.00061413
Creek	S1400	S Hickory St	35.95893	-96.1188	0.055433	0.00049181
Creek	S1200	State Hwy 66	35.90106	-96.3642	0.035264	0.00031286

County	Road Type	Road Name	Latitude	Longitude	Segment Length (mi)	Probability of Selection
Rogers	S1200	US Hwy 169	36.54654	-95.6956	1.096333	0.00976544
Rogers	S1100	I-44	36.18082	-95.7353	0.657835	0.00585958
Rogers	S1400	S 4230 Rd	36.38705	-95.4714	0.49994	0.00445315
Rogers	S1400	E 300 Rd	36.58271	-95.4499	0.398226	0.00354714
Rogers	S1400	S 4190 Rd	36.30487	-95.5431	0.321082	0.00285999
Rogers	S1400	E 300 Rd	36.58267	-95.3847	0.264061	0.00235209
Rogers	S1200	E Hwy 20	36.30782	-95.7107	0.228835	0.00203832
Rogers	S1400	S 4150 Rd	36.35223	-95.6148	0.195131	0.00173810
Rogers	S1100	I-44	36.163	-95.7468	0.166001	0.00147863
Rogers	S1400	E 620 Rd	36.11881	-95.4819	0.139071	0.00123876
Rogers	S1200	E 530 Rd	36.24941	-95.6732	0.118091	0.00105188
Rogers	S1200	S Hwy 169	36.43443	-95.7095	0.097691	0.00087017
Rogers	S1400	W 4th St	36.5379	-95.4312	0.076927	0.00068522
Rogers	S1100	I-44	36.28578	-95.6171	0.059732	0.00053205
Rogers	S1400	2nd St SW	36.14882	-95.508	0.035255	0.00031403
Wagoner	S1100	Muskogee Tpke	35.82523	-95.339	0.972779	0.01086095
Wagoner	S1400	N Gertrude	35.99288	-95.3685	0.661087	0.00738095
Wagoner	S1400	S 193rd Ave E	35.94105	-95.7616	0.501723	0.00560167
Wagoner	S1400	S 23rd St	36.04342	-95.7616	0.415891	0.00464337
Wagoner	S1400	E 153rd St S	35.93514	-95.533	0.327798	0.00365982
Wagoner	S1400	E 81st St N	35.85794	-95.2849	0.264736	0.00295574
Wagoner	S1400	E 161st St S	35.93001	-95.6274	0.226833	0.00253256
Wagoner	S1400	Nedra Rd	36.03304	-95.6008	0.185407	0.00207004
Wagoner	S1400	E 41st St	36.10426	-95.6503	0.150195	0.00167691
Wagoner	S1400	S 261st E Ave	36.01577	-95.6835	0.123148	0.00137493
Wagoner	S1400	E 41st St	36.10446	-95.7561	0.099477	0.00111065
Wagoner	S1400	Pin Oak Ln	36.06884	-95.6717	0.079287	0.00088523
Wagoner	S1400	NE 12th St	35.97176	-95.3643	0.067611	0.00075487
Wagoner	S1400	N Elm St	35.96192	-95.6429	0.053503	0.00059735
Wagoner	S1400	E 171st St S	35.91547	-95.6222	0.03134	0.00034991
Mayes	S1100	Cherokee Tpke	36.17109	-95.2428	1.186709	0.07171892
Mayes	S1200	State Hwy 28	36.43776	-95.4086	0.944265	0.05706678
Mayes	S1200	US Hwy 412	36.16943	-95.3972	0.776092	0.04690322
Mayes	S1100	Cherokee Tpke	36.18748	-95.1318	0.59188	0.03577035
Mayes	S1200	State Hwy 69A	36.24936	-95.2341	0.505577	0.03055461
Mayes	S1200	State Hwy 20	36.29849	-95.1895	0.429883	0.02598004
Mayes	S1200	US Hwy 412	36.17662	-95.2714	0.355433	0.02148064
Mayes	S1200	State Hwy 20	36.32763	-95.115	0.307102	0.01855975

County	Road Type	Road Name	Latitude	Longitude	Segment Length (mi)	Probability of Selection
Mayes	S1100	I- 44	36.50889	-95.2726	0.255067	0.01541501
Mayes	S1200	State Hwy 28	36.4378	-95.3715	0.214042	0.01293566
Mayes	S1200	State Hwy 28	36.43782	-95.3585	0.171402	0.01035870
Mayes	S1200	State Hwy 20	36.31727	-95.1238	0.13213	0.00798529
Mayes	S1200	State Hwy 28	36.48128	-95.0785	0.100359	0.00606521
Mayes	S1200	N E 1st St	36.30737	-95.2879	0.066911	0.00404378
Mayes	S1200	State Hwy 82A	36.46773	-95.0437	0.027035	0.00163386
Le Flore	S1400	Co Rd 254	34.61525	-94.7317	5.691935	0.04252367
Le Flore	S1400	State Hwy 9a	35.312023	-94.475357	1.290154	0.00963856
Le Flore	S1200	US Hwy 259	34.70937	-94.644	0.793927	0.00593132
Le Flore	S1200	US Hwy 270	34.91637	-94.6511	0.572503	0.00427709
Le Flore	S1400	Old Pike Rd	34.94504	-94.6194	0.456626	0.00341139
Le Flore	S1400	Petetree Rd	34.99662	-94.8276	0.374043	0.00279442
Le Flore	S1400	Co Rd 260	34.51119	-94.6194	0.306946	0.00229315
Le Flore	S1400	Co Rd N4770	35.11448	-94.5403	0.257271	0.00192204
Le Flore	S1200	US Hwy 59	35.31704	-94.7612	0.222881	0.00166511
Le Flore	S1400	Indian Service Rd @ State Hwy 144	35.01467	-94.7801	0.183772	0.00137294
Le Flore	S1200	US Hwy 59	35.2635	-94.7612	0.149321	0.00111556
Le Flore	S1400	Cowlington Rd	35.3039	-94.7953	0.118523	0.00088547
Le Flore	S1400	Co Rd N4660	35.16449	-94.7349	0.089626	0.00066958
Le Flore	S1400	N Walters St	35.05536	-94.6147	0.066678	0.00049814
Le Flore	S1400	Mountain View Rd	35.08158	-94.6434	0.04647	0.00034717
Okmulgee	S1100	I- 40	35.43035	-95.8989	1.28276	0.01401005
Okmulgee	S1200	State Hwy 56	35.60582	-96.1574	0.724319	0.00791087
Okmulgee	S1400	N3980 Rd	35.49635	-95.9285	0.537981	0.00587572
Okmulgee	S1200	State Hwy 52	35.66453	-95.8553	0.459227	0.00501559
Okmulgee	S1200	State Hwy 56	35.64625	-95.9476	0.381463	0.00416626
Okmulgee	S1400	E1120 Rd	35.39131	-96.0359	0.321402	0.00351029
Okmulgee	S1100	I- 40	35.43259	-95.8789	0.270825	0.00295790
Okmulgee	S1400	N3915 Rd	35.59557	-96.0452	0.234944	0.00256601
Okmulgee	S1200	Beeline	35.74933	-96.0097	0.196288	0.00214382
Okmulgee	S1400	E0870 Rd	35.7552	-96.0117	0.162272	0.00177230
Okmulgee	S1400	E0860 Rd	35.7699	-96.0497	0.12862	0.00140476
Okmulgee	S1400	W Skelton St	35.61749	-95.983	0.104379	0.00114001
Okmulgee	S1200	6th St	35.45836	-95.9602	0.078807	0.00086071
Okmulgee	S1400	N3980 Rd	35.63943	-95.9264	0.064879	0.00070860
Okmulgee	S1400	N 251 St	35.79872	-96.0061	0.045366	0.00049548
Sequoyah	S1400	N4740 Rd	35.62714	-94.5762	0.781556	0.00974590

County	Road Type	Road Name	Latitude	Longitude	Segment Length (mi)	Probability of Selection
Sequoyah	S1200	State Hwy 64D	35.42645	-94.4379	0.531902	0.00663275
Sequoyah	S1400	E4460 Rd	35.51683	-95.0813	0.413593	0.00515745
Sequoyah	S1100	I- 40	35.45333	-94.8377	0.332868	0.00415082
Sequoyah	S1400	Will Morgan Rd	35.41524	-94.5938	0.277326	0.00345822
Sequoyah	S1400	Sequoyah St	35.39884	-94.6399	0.238787	0.00297764
Sequoyah	S1200	State Hwy 101	35.5164	-94.6555	0.204107	0.00254519
Sequoyah	S1100	I- 40	35.40925	-94.5186	0.172817	0.00215500
Sequoyah	S1200	US Hwy 64	35.40014	-94.4449	0.14344	0.00178868
Sequoyah	S1200	N Maple St	35.48692	-94.7965	0.120991	0.00150874
Sequoyah	S1400	Thompson St	35.50434	-94.9646	0.099696	0.00124320
Sequoyah	S1400	Swon Rd	35.47777	-94.5398	0.081584	0.00101734
Sequoyah	S1400	Russell St	35.38649	-94.6932	0.065639	0.00081851
Sequoyah	S1200	N Wheeler Ave	35.4909	-94.778	0.048829	0.00060889
Sequoyah	S1200	State Hwy 100	35.56607	-95.0986	0.022616	0.00028202
Pittsburg	S1100	Indian Nation Tpke	34.97776	-95.8564	1.166261	0.05842991
Pittsburg	S1100	Indian Nation Tpke	34.72647	-95.7639	0.890418	0.04461012
Pittsburg	S1200	US Hwy 69	35.00897	-95.7189	0.724765	0.036310872
Pittsburg	S1200	US Hwy 69	34.95229	-95.7255	0.586773	0.029397445
Pittsburg	S1200	State Hwy 113	35.14869	-95.7724	0.497322	0.024915932
Pittsburg	S1200	State Hwy 31	34.85174	-96.0311	0.397986	0.019939178
Pittsburg	S1200	Hartshorne Ave	34.89889	-95.6865	0.318523	0.015958066
Pittsburg	S1200	US Hwy 270	34.89397	-95.6332	0.264346	0.013243788
Pittsburg	S1200	US Hwy 69 Bus	35.00002	-95.7255	0.226705	0.011357966
Pittsburg	S1200	State Hwy 31A	34.92241	-95.9475	0.186135	0.009325401
Pittsburg	S1200	State Hwy 9-A	35.2245	-95.5792	0.152675	0.007649048
Pittsburg	S1200	US Hwy 69 Bus	34.99996	-95.7214	0.118521	0.005937926
Pittsburg	S1200	State Hwy 43	34.61488	-95.5367	0.089762	0.004497094
Pittsburg	S1200	US Hwy 69	34.73183	-95.8995	0.060121	0.003012074
Pittsburg	S1200	State Hwy 2	35.10501	-95.3491	0.001373	0.000068786
Pottawatomie	S1100	I-40	35.38377	-97.0995	0.713323	0.028083583
Pottawatomie	S1100	I-40	35.38608	-96.829	0.48954	0.019273228
Pottawatomie	S1200	Ns Co Rd 337	35.45689	-97.0006	0.374148	0.014730236
Pottawatomie	S1100	I-40	35.38398	-96.9186	0.250336	0.009855748
Pottawatomie	S1100	I-40	35.384	-97.1266	0.184327	0.007256969
Pottawatomie	S1200	State Hwy 102	35.10993	-97.0541	0.122784	0.004834016
Pottawatomie	S1100	I-40	35.37725	-97.0548	0.060543	0.002383583