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2016 Safety Belt Usage Survey in Kentucky

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Research Report
KTC-16-16/KSP1-16-1F

2016 SAFETY BELT USAGE SURVEY IN KENTUCKY

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1.0 INTRODUCTION AND BACKGROUND

The use of safety belts and child safety seats is a proven means of reducing injuries to motor vehicle occupants involved in traffic crashes. There have been various methods used in efforts to increase safety belt and safety seat usage. Past efforts have included public information campaigns, local and statewide legislation, and enforcement of the legislation.

Most recently, Kentucky changed the statewide legislation requiring the use of safety belts for all vehicle occupants from secondary to primary enforcement. A statewide law providing secondary enforcement was enacted in 1994, with the primary enforcement law passed in 2006. The first legislation in this area in Kentucky was a law enacted by the 1982 Kentucky General Assembly. This required the use of a "child restraint system" for children 40 inches or less in height. Prior to the statewide law, there were local safety belt usage laws in several jurisdictions in Kentucky. The first local law, which became effective in July 1990, was enacted by the Lexington-Fayette Urban County Government.

The first statewide observational surveys were conducted in Kentucky in 1982 and have been conducted annually to document safety belt and safety seat usage. Following the enactment of the statewide secondary law, safety belt usage among drivers increased each survey year, from four percent in 1982 to 58 percent in 1994. The rate has steadily climbed since 1994. Examples of the increasing rates are 60 percent in 2000, 66 percent in 2004, 73 percent in 2008, and 86 percent in 2014.

Statewide usage of child safety seats (CSS) or safety belts for children under four years of age increased from about 15 percent in 1982, before enactment of the mandatory child restraint law, to 30 percent for 1984 through 1986. After a financial penalty was added to the law, this percentage increased to almost 50 percent in 1988. There has been a continued increase in usage, with rates of reaching 98 percent in recent years. However, while usage rates are very high, studies have found problems with the proper use of child safety seats.

The survey methodology used to collect data has been revised slightly a few times. For several years, the statewide belt use survey was based on 200 observation sites in 58 counties taken in the weeks immediately after completing the annual "Click It or Ticket" (CIOT) campaigns. Enforcement and publicity activities related to this campaign typically finish around Memorial Day. Mini-surveys (taken at 21 of the 200 statewide sites) were taken prior to the CIOT, in April, and during the enforcement phase of the CIOT. The relatively large number of sites scattered in so many counties made data collection time-consuming. The most recent survey design (prior to the design used first for the 2013 survey) collected data at 160 sites in 18 counties.

The National Highway Traffic Safety Administration (NHTSA) has issued new Uniform Criteria for State Observational Surveys of Seat Belt Use. The final rule was published in Federal Register Volume 76, Number 63. The revised methodology is described in detail in the following

section of this report. This methodology was developed in light of the research team's experience of collecting safety belt usage rates over the past 30 years in Kentucky along with the guidelines contained in the final rule. The new methodology was implemented beginning with the 2013 statewide survey.

The objective of the survey summarized in this report was to establish a statewide safety belt usage rate in Kentucky for 2016. This rate can be compared to those determined from previous surveys. The 2016 statewide survey documents the continued increase in usage associated with the change in the law to allow primary enforcement and related education and enforcement.

2.0 SURVEY METHODOLOGY

2.1 SELECTION OF COUNTIES AND NUMBER OF SITES IN EACH COUNTY

- The number of highway fatalities was summarized for each of Kentucky's 120 counties for the five-year period of 2006 through 2010. The source of the data was Kentucky's crash database (Collision Report Analysis for Safer Highways (CRASH)). The county totals were sorted and those in the lowest 15th percentile were identified and excluded from consideration. The result was a sample of 75 counties to be considered as potential survey counties.

- The procedure used prior to 2013 involved collecting data in 18 counties at 160 sites. The past data collection has resulted in a standard error of approximately one percent. Based on past experience, the decision was made to sample 20 percent of the 75 counties, which required the identification of 15 counties for data collection.

- The method selected to ensure a geographically representative sample of counties across Kentucky was to randomly select a county in each of the 12 Transportation Cabinet highway districts. The districts have similar numbers of counties and provide a good distribution across the state. Three of the districts include the major urban areas in the state. Two counties were selected in each of these three urban districts, which resulted in the selection of a total of 15 counties.

- One county from each rural highway district and two counties from the three urban highway districts were randomly selected. The only exception to the random selection was the automatic selection of Jefferson and Fayette Counties (in two of the urban districts). This was done because these counties (which contain Louisville and Lexington) have much higher vehicle miles traveled than any other county. Any meaningful statewide sample must include these counties because they are largest urban centers in Kentucky.

- The objective was to identify 150 data collection sites in the 15 selected counties. Based on the results from past data collection, this number of sites would easily meet the 2.5 percentage point standard error criterion. Additional data would be collected if the standard error exceeded 2.5 percent.

- Past experience has shown that the number of vehicles observed varies dramatically by site (depending on the average daily traffic [ADT] at the site). At each site, it is expected that the number of observations would range from 50 to 1,500. Based on previous surveys, there would be no sites with zero observations and the total statewide sample size should be over 50,000. The number of sites selected in each county was based on the vehicle miles traveled (VMT) in each county. Six categories of VMT were determined, with the number of sites in a county varying from six to 22. The number of sites in each county is proportional to that county's VMT. The counties with the most sites are Jefferson (22 sites) and Fayette (16 sites) as they have a much higher VMT than other counties.

- Table 1 lists the counties selected. The numbers of fatalities and vehicle miles traveled are given for each county. The six groupings of counties (based on VMT) are shown, and the number of sites in each county noted.

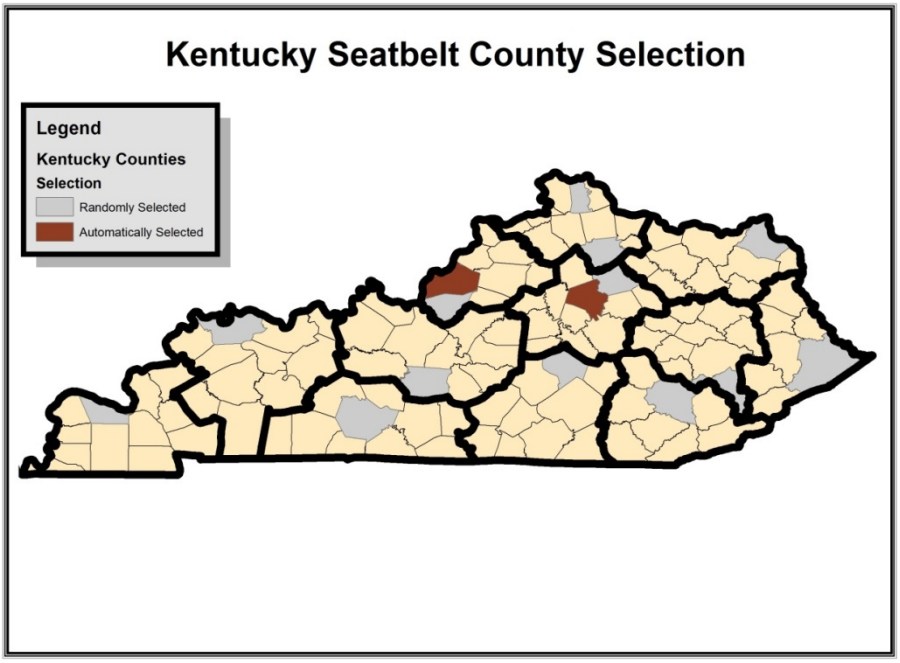
Table 1. Selected Counties

County	Number of Fatalities (2006-2010)	Percent of Statewide Fatalities	Highway District	VMT (x1,000)	Population	VMT Group	Number of Sites
Harrison	24	1.97	6	149,652	18,654	1	6
Clay	52	4.27	11	210,588	23,930	1	6
Bourbon	23	1.89	7	217,836	19,828	1	6
Lincoln	49	4.02	8	247,395	25,072	1	6
Perry	49	4.02	10	340,146	29,241	2	8
Greenup	29	2.38	9	348,777	37,388	2	8
Hart	48	3.94	4	423,369	18,561	2	8
Henderson	56	4.60	2	524,601	45,462	3	10
Pike	123	10.10	12	766,020	65,331	3	10
McCracken	70	5.75	1	792,502	65,109	3	10
Bullitt	55	4.52	5	930,991	75,028	3	10
Warren	95	7.80	3	1,347,271	105,862	4	12
Kenton	51	4.19	6	1,460,873	157,629	4	12
Fayette	127	10.43	7	2,855,813	282,114	5	16
Jefferson	367	30.13	5	6,539,839	713,877	6	22

- The following list sorts selected counties by highway district. The three urban districts have two counties each and the other nine districts have one county each.

District Number	County	Number of Sites
1	McCracken	10
2	Henderson	10
3	Warren	12
4	Hart	8
5	Bullitt	10
	Jefferson	22
6	Kenton	12
	Harrison	6
7	Bourbon	6
	Fayette	16
8	Lincoln	6
9	Greenup	8
10	Perry	8
11	Clay	6
12	Pike	10

- The following map shows the location of the districts and counties across the state.



2.2 ASSIGN SITES BY HIGHWAY TYPE

- After the counties and the total numbers of data collection sites in each county were determined, the next step was to assign the number of sites by highway type (in each county). The following three roadway types (road class stratum) were used:

    1. limited access
    2. arterials
    3. local

    The survey sites in each county were partitioned among the three highway types based on the VMT for each highway type in that county. In seven of the 15 counties there were no roads in the "limited access" category. Therefore, since there was no VMT and no chance of selection, no road segments for this category were included for these seven counties.

- The numbers of sites were adjusted so that data were collected on at least one road in each road stratum class — as long as the county had a road in each class

- Using the criteria as noted, the following data (Table 2) present the number of sites by county and highway type. Of the 150 sites, there are 43 sites on limited access roadways, 67 sites on arterials and 40 sites on local roads.

    The number of sites in each of the three road classes was determined based on the vehicle miles traveled in each road class. The adjusted number was derived based on the distribution using vehicle miles traveled to ensure that the proper number of sites was provided in each county.

Table 2 **Number of Sites in each County by Roadway Class**

County	Sites Allocated	County VMT	Road Class Stratum	Road Class VMT	Number of Sites if Allocated by VMT	Adjusted Number of Sites	Adjusted Total
Jefferson	**22**	6,538,839,240	1	3,424,627,751	11.52	**11**	22
			2	2,665,785,337	8.97	**9**	
			3	448,426,153	1.51	**2**	
Fayette	**16**	2,855,812,630	1	1,019,472,164	5.71	**6**	16
			2	1,265,598,299	7.09	**7**	
			3	570,742,166	3.20	**3**	
Bourbon	**6**	217,836,350	1	0	0.00	**0**	6
			2	138,269,100	3.81	**4**	
			3	79,567,250	2.19	**2**	
Bullitt	**10**	930,990,570	1	494,107,859	5.31	**5**	10
			2	234,167,018	2.52	**3**	
			3	202,715,693	2.18	**2**	
Clay	**6**	210,587,750	1	0	0.00	**0**	6
			2	104,637,470	2.98	**3**	
			3	105,950,280	3.02	**3**	
Greenup	**8**	348,776,980	1	0	0.00	**0**	8
			2	216,940,991	4.98	**5**	
			3	131,835,989	3.02	**3**	
Harrison	**6**	149,652,490	1	0	0.00	**0**	6
			2	74,279,292	2.98	**3**	
			3	75,373,198	3.02	**3**	
Hart	**8**	423,368,750	1	276,205,327	5.22	**5**	8
			2	15,474,129	0.29	**1**	
			3	131,689,294	2.49	**2**	
Henderson	**10**	524,601,430	1	41,372,008	0.79	**1**	10
			2	342,108,540	6.52	**7**	
			3	141,120,881	2.69	**2**	
Kenton	**12**	1,460,873,030	1	829,034,625	6.81	**7**	12
			2	351,472,650	2.89	**3**	
			3	280,365,755	2.30	**2**	
Lincoln	**6**	247,394,860	1	0	0.00	**0**	6
			2	150,841,056	3.66	**4**	
			3	96,553,804	2.34	**2**	
McCracken	**10**	792,502,460	1	228,178,782	2.88	**3**	10
			2	340,918,903	4.30	**4**	
			3	223,404,774	2.82	**3**	
Perry	**8**	340,145,980	1	0	0.00	**0**	8
			2	169,095,048	3.98	**4**	
			3	171,050,932	4.02	**4**	
Pike	**10**	766,019,970	1	0	0.00	**0**	10
			2	452,117,144	5.90	**6**	
			3	313,902,826	4.10	**4**	
Warren	**12**	1,347,270,910	1	544,629,990	4.85	**5**	12
			2	456,725,567	4.07	**4**	
			3	345,915,353	3.08	**3**	
Totals	**150**	17,154,673,400	1	6,857,628,506	43.09	**43**	150
			2	6,978,430,544	64.93	**67**	
			3	3,318,614,350	41.98	**40**	
			-	17,154,673,400	150.00	**150**	

2.3 SELECTION OF DATA COLLECTION SITES

- After the counties and number of sites (by roadway type) in each county were selected, the next portion of the methodology involved: a) randomly selecting roadway segments in each roadway type and b) selecting specific sites within each segment. A file containing all roads in the state (including both state maintained and locally maintained) was used to randomly select roadway segments. The source of the road segment data was the Highway Performance Monitoring System (HPMS) file. This file is updated annually and contains data for all public roadways. No exclusions were made.

- The segments were divided into the three highway type categories as previously noted. Segments were randomly selected (by highway type). Segment length was factored into the selection process, with longer sections having a higher probability of selection than shorter sections. The number of randomly selected segments for each highway type category in each county was more than required (see Table 2) to compensate for segments where there were no appropriate data collection sites.

- The randomly selected segments were inspected either remotely, using online imagery, or through a site visit. The necessary numbers of data collection sites (shown in Table 2) were identified for each county and highway type (using the randomly selected segments). Site selection ensured that the observers could obtain data safely and effectively

- Appendix A contains a list of the 150 data collection sites (and alternate sites). The county and road name or number are given along as well as a reference to locate the observation site. The highway where the data is to be collected is identified. The probability of selection for each site is provided.

- At least one alternative site was identified for each highway type in each county in the event data could not be obtained at one of the identified sites. If a site was temporarily unavailable, the data collection was rescheduled for a similar day and time. If a site was unavailable for a substantial period of time, the alternative site was used, with data collected at a similar day and time. To remain consistent, the alternate site will replace the discarded site in future surveys.

- The number of approaches (by direction of travel) and lanes on the approaches on the specified road were identified at each site. The approach and lane used to collect data were randomly selected.

- Data collectors were positioned at a location to ensure their safety while collecting data.

2.4 DATA COLLECTION PROCEDURE

- Observation times for the 150 sites were randomly assigned (with consideration of grouping sites in counties). Sites in relatively close proximity to one another were designated 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 a random time on the same day to maximize efficiency (and minimize time and travel costs).

- Data were collected for one hour at each site with either one or two data collectors (depending on the number of directions of travel included). One hour was required if data were gathered by one data collector on one direction of travel, whereas ½ hour was needed if there were two data collectors on separate directions of travel. There is a reasonable assumption that, for sites where one observer is used, the observed vehicles in one direction on a specific route in one hour will equal the number of vehicles on both directions on that route in ½ hour. Sites requiring only one observer are low-volume roads or T-intersections. On roads with higher traffic volumes, an equal distribution of traffic flow in each direction cannot be assumed; therefore, two observers were used, with one observing each direction. The use of a variable observation period (as described) does not affect the probability of selection.

- Data collection was scheduled to occur between June 1 and July 31. Data collection guidelines stated that data would be collected between 7 am and 6 pm, with all days of the week eligible. The schedule included rush hour and non-rush hour observations. Start times were staggered to ensure the surveys captured a representative number of sites for each day of the week and time of day.

- Data were collected through direct observation. Appendix B contains the form used to collect and record data. Data were collected using paper forms. The form allows data collectors to record information such as the site number and the date and time of data collection. For drivers and front seat passengers the categories are:

    1. safety belt used (shoulder belt is in front of shoulder),
    2. safety belt not used (shoulder belt not in front of shoulder), and
    3. unknown (cannot be determined if belt is used).

  The presence or absence of a passenger in the right front seat is shown by comparing the total number of drivers and passengers in the sample size. Observation for any right seat passenger was obtained for all vehicles. The number of vehicles at a site with only a driver can be calculated by subtracting the total number of front seat passengers from the total number of vehicles observed. The ratio of the total number of recorded unknown values of

belt use to the total number of drivers and passengers observed must not exceed 10 percent. Additional data were collected if the nonresponse threshold was surpassed.

- The following vehicle types (both in-state and out-of-state vehicles) were included in the data collection:

    1. Passenger car (PC) (including commercial vehicles under 10,000 pounds)
    2. Pickup (PU)
    3. Van
    4. Sport utility vehicle (SUV)

    Separate data for motorcycles and bicycles were also collected to compare current data to past data for these categories.

- Before starting data collection, data collectors were provided training on the data collection procedure. The training included:

    1. An overview of the project
    2. Description of the data collection form and procedure
    3. Scheduling procedures
    4. Identification of survey sites (and alternatives)
    5. Data input.

    After the classroom portion of the training, the data collectors conducted trial surveys at locations representative of the three roadway types included in the survey. The trial survey results were evaluated to ensure that the data collectors provided consistent and accurate data.

- Times and locations were assigned, with data collected using the previously described form. Drivers received no indication that the data collectors were conducting a safety belt survey. For high volume locations, randomized selection was achieved by recording data for the next vehicle in view after recording the previous data. At low volume locations, data for the driver and outboard front seat passenger were obtained for all vehicles so there was no need for a random selection. For each vehicle, the usage for the driver and any outboard front seat passenger was noted. At intersections, data were collected for vehicles either stopped or moving slowly. At overpasses on limited access highways, an observation position was chosen to allow for an unobstructed view of the vehicle's front seat.

- The objective was that a quality control monitor would conduct random, unannounced visits and collect data at a minimum of 15 of the data collection sites. It was anticipated that there would be approximately four to six data collectors with a couple of quality control monitors. All data collectors were monitored on at least two occasions.

2.5 USAGE RATE CALCULATIONS

- The following paragraphs summarize the calculation used to estimate the statewide seat belt usage rate.

  Seat belt usage rates were calculated using formulas based on the proportion of the state's total VMT represented by the site. The seat belt usage rate calculations followed a four-step process.

  First, estimated rates were calculated for each of the road strata within each county. Observed usage rates for all of the sites within each stratum-county combination were combined through simple averaging, as shown in the following formula (1). (Since the sites' original probability of being included in the sample was proportional to their VMT, averaging their usage rates makes use of that sampling probability to reflect their different VMTs).

$$p_{i(j)k} = \sum_{l=1}^{n_{i(j)k}} p_{i(j)kl} / n_{i(j)k} \qquad (1)$$

  where $i(j)$ = county i within category j (category 1 = the 2 certain-selection counties, Jefferson and Fayette Counties, and category 2 = the 13 random-selection counties); k = road functional class stratum; l = site within stratum and county; $n_{i(j)k}$ = number of sites within the stratum-county combination; and $p_{i(j)kl}$ = the observed seat belt use rate at site $i(j)kl$ = $B_{i(j)kl}/O_{i(j)kl}$ (where $B_{i(j)kl}$ = total number of belted occupants (drivers and outboard front-seat passengers) observed at the site and $O_{i(j)kl}$ = total number of occupants (excluding unknown usage) whose belt use was observed at the site).

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

$$p_{i(j)} = \frac{\sum_k VMT_{i(j)k}\, p_{i(j)k}}{\sum_k VMT_{i(j)k}} \qquad (2)$$

  where $VMT_{i(j)k}$ = VMT of all roads in stratum k in county $i(j)$, and $p_{i(j)k}$ = seat belt use rate for stratum k in county $i(j)$.

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

$$p_j = \frac{\sum_i VMT_{i(j)} W_{i(j)} p_{i(j)}}{\sum_i VMT_{i(j)} W_{i(j)}} \qquad (3)$$

where $VMT_{i(j)}$ = total VMT for county *i* in category *j* and $W_{i(j)}$ = the inverse of the probability of the county's selection: where j is one of the three following categories:

<u>One county randomly selected from district (j = 1)</u>

Highway Districts 1,2,3,4,8,9,10,11, and 12

$W_{i(1)} = \frac{\sum_{L=1}^{x_m} VMT_{L(1)}}{VMT_{i(1)}}$ where m = county i's district, x_m = the number of counties in District m, L is the Lth county in District m, $VMT_{L(1)}$ = the VMT in county L, $VMT_{i(1)}$ = the VMT in county i.

<u>One county randomly selected from district and one county certainly selected (j = 2)</u>

Highway Districts 5 and 7

$W_{i(2)} = \frac{\sum_{L=1}^{y_m} VMT_{L(2)}}{VMT_{i(2)}}$ where m = county i's district, y_m = the number of counties in district m excluding the certain county, L is the Lth county in district m, $VMT_{L(2)}$ = the VMT in county L, $VMT_{i(2)}$ = the VMT in county i.

Or for certainty counties:

$W_{i(2)} = 1$

<u>Two counties randomly selected from district (j = 3)</u>

Highway District 6 only

$W_{i(3)} = \frac{\sum_{L=1}^{11} VMT_{L(3)}}{2 \cdot VMT_{i(3)}}$ where L is the Lth county in District 6, $VMT_{L(3)}$ = the VMT in county L, $VMT_{i(3)}$ = the VMT in county i.

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

$$p = \frac{\sum_{j=1}^{3} VMT_j \, p_j}{\sum_{j=1}^{3} VMT_j} \qquad (4)$$

The result is a combination of the individual site seat belt usage rates weighted to reflect each site's importance in the total state VMT.

Estimates of subgroups of occupants, such as drivers or passengers and vehicle type (passenger car, pickup, etc.) were calculated using the same procedure.

2.6 NONRESPONSIVE JUDGEMENT

- Based on data collection protocol and past experience, including the provision for using alternate observation sites, road segments with non-zero eligible volume and zero observations conducted should not occur. Nevertheless, if eligible vehicles passed an eligible site or an alternate eligible site during the observation time, but no usable data were collected for some reason, this site would be considered a non-responding site. The weight for a non-responding site was distributed over other sites in the same road type in the same PSU.

  Let:

  $$\pi_{gchi} = \pi_{gc}\pi_{hi|gc}$$

  be the road segment selection probability, and

  $$w_{gchi} = \frac{1}{\pi_{gchi}}$$

  be the road segment weight.

The non-responding site nonresponse adjustment factor:

$$f_{gch} = \frac{\sum_{all\ i} w_{gchi}}{\sum_{responding\ i} w_{gchi}}$$

would be multiplied to all weights of non-missing road segments in the same road type of the same county, and the missing road segments would be dropped from the analysis file. However, if there were no vehicles passing the site during the selected observation time (60 minutes) this was treated as an empty block at this site. Accordingly, the site would not be considered as a non-responding site and would not require non-response adjustment.

2.7 IMPUTATION

No imputation was done on missing data.

2.8 STANDARD ERROR CALCULATION

- The standard error of the overall seat belt use rate was calculated using the following procedure. Standard error of estimate values was estimated through a jackknife approach, based on the general formula:

$$\hat{\ }_{\hat{p}} = [\frac{n\ \ 1}{n}\ {}^{n}_{i=1}\ (\hat{p}_i\ \ \ \hat{p})^2]^{1/2} \qquad (5)$$

where $\hat{\ }_{\hat{p}}$ = 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., 150); and $\hat{p}_i$ = the estimated statewide belt use proportion with site i excluded from the calculation.

The relative error rate, i.e., $\hat{\ }_{\hat{p}} / \hat{p}$, was also calculated, as well as the 95% confidence interval, i.e., $\hat{p} \pm 1.96\ \hat{\ }_{\hat{p}}$. These values were reported for the overall statewide seatbelt use rate.

3.0 SURVEY RESULTS

- Table 3 summarizes usage rates for all front seat occupants (drivers and passengers) for the various types of highways and road classifications. The overall statewide usage rate in 2016, using the data collected at 150 sites and the described weighting procedure, was 86.5 percent. The 95 percent confidence interval is approximately 0.7 percent (85.8 to 87.2).

- The sample size of all front seat occupants was approximately 75,907. The statewide rate for drivers was 86.7 percent, and it was 85.6 percent for front seat passengers.

TABLE 3. USAGE RATE FOR FRONT-SEAT OCCUPANTS (BY ROAD CLASS)

	PERCENT USAGE BY TYPE		
ROAD CLASSIFICATION	DRIVERS	PASSENGERS	ALL
Limited Access	92.3	92.7	92.4
Arterials	86.9	85.3	86.6
Locals	80.7	76.7	79.9
All	86.7	85.6	86.5

- Appendices D and E provide summaries of the data collected (by site). For each site, the usage rate and sample size are given for all front seat occupants, drivers, and front seat passengers. The relative error and confidence interval are given for the "all front seat occupants" category. The percent unknown is given for each site. Also, the site type (original or alternate), date observed, and sample weight are provided.

- Usage rates ranged from 55.7 percent (a rural, local location in Clay County) to 96.6 percent (an interstate location in Jefferson County). There were 52 sites that had a usage rate of 90 percent or more, with 34 on a limited access road and 16 on an arterial and two on a local road. The highest rate found on a non-limited access road was 95.0 percent at a high-volume urban arterial in Fayette County.

- The highest unknown rate was 8.9 percent. Only three sites had unknown usage rates exceeding five percent.

- A substantial difference in usage rate (for all front seat occupants) was noted when vehicle type and road class were considered (Table 4). The rate varied by vehicle type from a low of 78.7 percent for pickup trucks to 89.4 percent for SUVs.

- For each vehicle type, the lowest usage rate was on local roads, while the highest rate was on limited access highways.

- Examining usage rates according to road class revealed that rates ranged from 79.9 percent on local roads to 92.4 percent on limited access highways.

- The lowest usage was 70.0 percent, recorded for pickups on local roads.

- The highest usage rate (94.2 percent), recorded was for SUVs on limited access highways.

TABLE 4. USAGE RATE FOR FRONT-SEAT OCCUPANTS (BY ROAD CLASS AND VEHICLE TYPE)

	PERCENT USAGE BY VEHICLE TYPE				
ROAD CLASSIFICATION	PC	PU	VAN	SUV	ALL*
Limited Access	92.8	87.0	92.3	94.2	92.4
Arterials	87.7	78.4	89.0	89.4	86.6
Locals	84.1	70.0	84.8	83.2	79.9
All	88.1	78.7	88.8	89.4	86.5

PC – passenger car
PU – pickup
VAN – van
SUV – sport utility vehicle

- Table 5 summarizes usage rate by county. The rate varied from a high of 90.2 percent in Jefferson County and Kenton County to a low of 68.6 percent in Clay County. The rate exceeded 90 percent in two counties and was less than 80 percent in five counties.

- Pike County had the second lowest usage rate (73.2 percent), while Lincoln Country had the the third lowest rate (74.9 percent). Each of the three counties located in the southeast portion of the state (Clay, Pike, and Perry Counties) had usage rates under 80 percent.

- From 2015 to 2016, usage rates increased in five of the 15 counties. The largest increase in the usage rate (4.6 percent) occurred in Bourbon County. The largest decrease was in Clay County (2.7 percent).

TABLE 5. USAGE RATE FOR FRONT-SEAT OCCUPANTS (BY COUNTY)

	PERCENT USAGE BY TYPE		
COUNTY	DRIVERS	PASSENGERS	ALL
Bourbon	82.8	78.5	82.3
Bullitt	89.2	87.1	88.8
Clay	69.2	67.4	68.6
Fayette	89.4	89.2	89.4
Greenup	83.0	86.2	83.9
Harrison	74.8	87.6	77.0
Hart	85.2	83.2	84.7
Henderson	86.7	86.6	86.8
Jefferson	90.4	88.9	90.2
Kenton	90.6	88.8	90.2
Lincoln	75.6	72.5	74.9
McCracken	89.8	89.7	89.7
Perry	78.0	70.1	76.2
Pike	73.6	71.8	73.2
Warren	87.8	85.8	87.4
All	86.7	85.6	86.5

- Usage rates by county and vehicle type are presented in Table 6. These rates ranged from a high of 92.6 percent for vans in McCracken and Warren Counties and SUVs in Kenton County to a low of 54.7 percent for pickup trucks in Clay County. The usage rate for pickup trucks was less than 70 percent in six counties.

TABLE 6. USAGE RATE FOR FRONT-SEAT OCCUPANTS (BY COUNTY AND VEHICLE TYPE)

	PERCENT USAGE BY VEHICLE TYPE				
COUNTY	PC	PU	VAN	SUV	ALL
Bourbon	84.9	67.3	89.1	89.2	82.3
Bullitt	90.4	82.1	90.5	89.1	88.8
Clay	74.6	54.7	77.0	75.4	68.6
Fayette	90.0	83.8	91.3	91.5	89.4
Greenup	87.1	75.3	87.5	90.4	83.9
Harrison	81.3	66.9	80.7	84.2	77.0
Hart	86.0	75.7	92.3	87.3	84.7
Henderson	90.7	78.0	89.5	89.4	86.8
Jefferson	90.8	83.6	89.6	92.2	90.2
Kenton	91.6	80.9	91.5	92.6	90.2
Lincoln	78.4	60.1	82.8	79.1	74.9
McCracken	91.1	84.1	92.6	91.4	89.7
Perry	76.8	67.6	73.9	82.4	76.2
Pike	77.3	63.7	82.9	77.0	73.2
Warren	90.1	79.7	92.6	89.8	87.4
All	88.1	78.7	88.8	89.4	86.5

- While the data collection procedure has changed several times, 2016 usage rates can still be compared to the statewide rates from past years (Table 7). Statewide rates have dramatically increased from four percent in 1982 to 87 percent in 2016. Increased usage over the years is related to a combination of changes in safety belt legislation and increased enforcement and education.

TABLE 7. TREND IN STATEWIDE USAGE RATES

	PERCENT USING SAFETY BELTS		
YEAR	ALL FRONT SEAT OCCUPANTS	DRIVERS	CHILDREN UNDER FOUR YEARS OF AGE*
1982	**	4	15
1983	**	6	24
1984	**	7	30
1985	9	9	29
1986	13	13	30
1988	20	21	48
1989	25	26	49
1990	33	32	57
1991	39	39	57
1992	40	41	62
1993	42	42	61
1994	58	58	72
1995	54	54	66
1996	55	55	79
1997	54	54	82
1998	54	54	80
1999	59	59	89
2000	60	60	87
2001	62	62	89
2002	62	62	93
2003	66	65	95
2004	66	66	96
2005	67	67	94
2006	67	68	94
2007	72	72	98
2008	73	74	98
2009	80	80	99
2010	80	81	96
2011	82	83	97
2012	84	84	98
2013	85	85	**
2014	86	87	**
2015	87	87	**
2016	87	87	**

*Children using either safety seat or safety belt. Children seated in front or rear seat.
**Data not obtained.

- Survey locations have changed due to modifications of the data collection procedure (in 1990, 1999, 2009, and 2013). For the past several years, a mini-survey has been conducted with data collected at 21 sites (selected from the 200 sites for the survey first used prior to the change in sites made in 2009).

  This mini-survey was conducted in 2016 to enable a comparison of identical sites over a long number of years. Appendix F contains the results for the mini-survey sites. The usage rate at the mini-survey locations in 2016 was 87.2 percent. This shows consistency with the official 2016 data. The statewide rate in 2016 for the mini-survey locations decreased 0.4 percent compared to 2015 (which was similar to the results for the official survey). Usage rates increased at eight locations and decreased at twelve locations, with one not changing.

- Bicycle helmet use was observed during data collection. Only 222 bicyclists were observed during the survey, and just 24 used helmets (11 percent). The small sample size prevents drawing inferences about usage trends but does support the opinion that bicycle helmet usage rate continues to be very low.

- During the survey, data collectors observed helmet use by motorcyclists. The sample size was 573. Until repealed in 1998, Kentucky had a statewide law requiring the use of a helmet by a motorcyclist. Surveys before the law's repeal found a helmet usage rate exceeding 95 percent. The helmet usage rates for motorcyclists for 1999 through 2016 (after repeal of the mandatory helmet law) are given in Table 8. The average usage rate over the 18-year period following the repeal of mandatory helmet usage laws was 58.5 percent (with 59 percent in 2016). The usage rate over these years has ranged from a low of 50 percent in 2010 to a high of 70 percent in 2000.

- There has been a goal to achieve a statewide usage rate of 90 percent. This rate was obtained at about 79 percent of the limited access roadway sites compared to about 24 percent at the arterial locations and only five percent at the local road sites.

TABLE 8. TREND IN MOTORCYCLE HELMET USAGE

	PERCENT USING HELMET	
YEAR	SAMPLE SIZE	PERCENT USAGE
1999	452	65
2000	427	70
2001	395	56
2002	596	57
2003	512	56
2004	631	58
2005	918	59
2006	949	60
2007	897	56
2008	1,244	58
2009	537	64
2010	780	50
2011	699	52
2012	833	53
2013	487	57
2014	494	61
2015	605	62
2016	573	59

4.0 CONCLUSIONS AND RECOMMENDATIONS

- The data show that the level of safety belt usage in 2016 (86.5 percent) was statistically the same as the 2015 rate. The usage rate remains the highest since surveys began in 1982. However, the usage rate decreased 0.2 percent in 2016 compared to 2015. The progressive increases in usage rates observed since 1982 can be related to the enactment and enforcement of safety belt laws along with increased education. However, the increase has only been three percent in the past five years. Large annual increases cannot be expected as the usage rate approaches 90 percent.

- The data support maintaining the education and enforcement efforts of the primary safety belt law. Safety belt usage varies by county and vehicle type. Focusing on this variability indicates locations where more emphasis would be beneficial.

- Modifying the driver point system so that a driver receives points when they are cited for failure to use a safety belt should be considered. This could aid enforcement.

- Consideration should be given to increasing the amount drivers are fined when cited for failure to wear a safety belt.

Appendix A.

Data Collection Sites

Appendix A- Table 1. Data Collection Sites

Site	County	Road Type	Road Surveyed	Reference	Section Length (mi)	Total Length (mi)	Probability of Selection
1	Bourbon	Arterial	US 27	Fords Mill Rd	1.335	61.22	0.0218
2	Bourbon	Arterial	US 460	US 27	0.941	61.22	0.0154
3	Bourbon	Arterial	US 460	US 68	12.402	61.22	0.2026
4	Bourbon	Arterial	US 68	4th Street	0.844	61.22	0.0138
5	Bourbon	Local Road	Castle Blvd	KY 1939	0.54	329.975	0.0016
6	Bourbon	Local Road	KY 1678	KY 57 (Briar Hill Rd)	7.63	329.975	0.0231
7	Bullitt	Arterial	KY 44	US 31EX	2.97	67.52	0.0440
8	Bullitt	Arterial	KY 61	KY 44	2.52	67.52	0.0373
9	Bullitt	Arterial	US 31E	KY 44	1.569	67.52	0.0232
10	Bullitt	Limited Access	I-65	KY 733 overpass	8.465	19.871	0.4260
11	Bullitt	Limited Access	I-65	KY 245 interchange	3.801	19.871	0.1913
12	Bullitt	Limited Access	I-65	KY 3219 overpass	3.801	19.871	0.1913
13	Bullitt	Limited Access	I-65	KY 61 overpass	7.606	19.871	0.3828
14	Bullitt	Limited Access	I-65	KY 1526 interchange	7.606	19.871	0.3828
15	Bullitt	Local Road	Armstrong Ln	KY 44	0.576	727.145	0.0008
16	Bullitt	Local Road	Smith Ln	Hillview Blvd	0.506	727.145	0.0007
17	Clay	Arterial	Hal Rogers Pkwy	KY 80 underpass	25.336	41.431	0.6115
18	Clay	Arterial	US 421	2nd Street	8.808	41.431	0.2126
19	Clay	Arterial	US 421	KY 638	1.997	41.431	0.0482
20	Clay	Local Road	KY 11	US 421	17.732	729.333	0.0243
21	Clay	Local Road	KY 638	KY 472	8.222	729.333	0.0113
22	Clay	Local Road	KY 1524	US 421	0.369	729.333	0.0005
23	Fayette	Arterial	Cooper Dr	Nicholasville Rd	0.078	155.491	0.0005
24	Fayette	Arterial	Man O War Blvd	Clays Mill Rd	4.4	155.491	0.0283
25	Fayette	Arterial	Man O War Blvd	Tates Creek Rd	4.4	155.491	0.0283
26	Fayette	Arterial	New Circle Rd	N. Broadway	1.58	155.491	0.0102
27	Fayette	Arterial	Russell Cave Rd	New Circle Rd	9.117	155.491	0.0586
28	Fayette	Arterial	Versailles Rd	Man O War Blvd.	1.516	155.491	0.0097
29	Fayette	Arterial	Winchester Rd	Elkhorn Dr	1.173	155.491	0.0075
30	Fayette	Limited Access	I-64	KY 859 interchange	7.71	49.024	0.1573
31	Fayette	Limited Access	I-64	Yarnallton Pk overpass	3.729	49.024	0.0761
32	Fayette	Limited Access	I-75	KY 353 overpass	7.016	49.024	0.1431
33	Fayette	Limited Access	I-75	KY 418 interchange	6.187	49.024	0.1262
34	Fayette	Limited Access	KY 4	Alumni Dr interchange	2.905	49.024	0.0593
35	Fayette	Limited Access	KY 4	Georgetown Rd interchange	2.085	49.024	0.0425

Appendix A- Table 1. Data Collection Sites (continued)

Site	County	Road Type	Road Surveyed	Reference	Section Length (mi)	Total Length (mi)	Probability of Selection
36	Fayette	Local Road	Alexandria Dr	Versailles Rd	2.776	1240.085	0.0022
37	Fayette	Local Road	Kenesaw Dr	Tates Creek Rd	0.575	1240.085	0.0005
38	Fayette	Local Road	Newtown Pk	Ironworks Rd	3.141	1240.085	0.0025
39	Greenup	Arterial	KY 10	US 23	11.582	66.893	0.1731
40	Greenup	Arterial	KY 67	US 23	7.53	66.893	0.1126
41	Greenup	Arterial	KY 693	KY 207 (Argillite Rd)	1.656	66.893	0.0248
42	Greenup	Arterial	US 23	KY 67	8.595	66.893	0.1285
43	Greenup	Arterial	US 23	KY 10	10.813	66.893	0.1616
44	Greenup	Local Road	KY 2	US 23	0.373	929.912	0.0004
45	Greenup	Local Road	KY 827	KY 7	5.647	929.912	0.0061
46	Greenup	Local Road	Pond Run Rd	KY 750	0.902	929.912	0.0010
47	Harrison	Arterial	KY 36	Locust St	15.309	47.165	0.3246
48	Harrison	Arterial	US 27	KY 32	1.067	47.165	0.0226
49	Harrison	Arterial	US 62	US 27	0.273	47.165	0.0058
50	Harrison	Local Road	KY 1054	KY 36	6.851	499.878	0.0137
51	Harrison	Local Road	KY 1842	KY 32	6.214	499.878	0.0124
52	Harrison	Local Road	KY 392	US 62	11.337	499.878	0.0227
53	Hart	Arterial	US 31W	KY 218	6.758	21.574	0.3132
54	Hart	Limited Access	I-65	KY 2746 overpass	20.666	20.665	1.0000
55	Hart	Limited Access	I-65	KY 218	20.666	20.665	1.0000
56	Hart	Limited Access	I-65	Rowletts Cave Springs Rd overpass	20.666	20.665	1.0000
57	Hart	Limited Access	I-65	KY 88 overpass	20.666	20.665	1.0000
58	Hart	Limited Access	I-65	KY 728 interchange	20.666	20.665	1.0000
59	Hart	Local Road	KY 728	US 31W	13.329	711.88	0.0187
60	Hart	Local Road	KY 88	US 31E	12.665	711.88	0.0178
61	Henderson	Arterial	KY 351	US 41A	1.817	98.715	0.0184
62	Henderson	Arterial	KY 425	US 60	2.429	98.715	0.0246
63	Henderson	Arterial	KY 425	US 41A	2.429	98.715	0.0246
64	Henderson	Arterial	US 41	Watson Ln	4.994	98.715	0.0506
65	Henderson	Arterial	US 41	KY 425	3.738	98.715	0.0379
66	Henderson	Arterial	US 41A	KY 136 (Sand Ln)	2.709	98.715	0.0274
67	Henderson	Arterial	US 60	KY 425	1.573	98.715	0.0159
68	Henderson	Limited Access	Breathitt Pkwy	KY 812 overpass	2.052	4.457	0.4604
69	Henderson	Local Road	KY 3	US 60	0.073	752.948	0.0001
70	Henderson	Local Road	KY 416	KY 351	5.274	752.948	0.0070
71	Jefferson	Arterial	2nd Street	Broadway (US 150)	0.61	445.833	0.0014
72	Jefferson	Arterial	Bardstown Rd	Taylorsville Rd	3.768	445.833	0.0085
73	Jefferson	Arterial	Barret Ave	Broadway (US 150)	1.072	445.833	0.0024
74	Jefferson	Arterial	Bluegrass Pkwy	Hurstbourne Pkwy	0.13	445.833	0.0003
75	Jefferson	Arterial	Crittenden Dr	Central Ave	2.754	445.833	0.0062

Appendix A- Table 1. Data Collection Sites (continued)

Site	County	Road Type	Road Surveyed	Reference	Section Length (mi)	Total Length (mi)	Probability of Selection
76	Jefferson	Arterial	Newburg Rd	Trevilian Way	1.854	445.833	0.0042
77	Jefferson	Arterial	KY 841	National Turnpike	4.216	445.833	0.0095
78	Jefferson	Arterial	Phillips Ln	Fairgrounds Road	0.772	445.833	0.0017
79	Jefferson	Arterial	Shepherdsville Rd	Outer Loop (KY 1065)	0.689	445.833	0.0015
80	Jefferson	Limited Access	I-264	KY 1932 interchange	3.396	109.343	0.0311
81	Jefferson	Limited Access	I-64	Cannons Ln interchange	6.77	109.343	0.0619
82	Jefferson	Limited Access	I-264	US 42 interchange	2.192	109.343	0.0200
83	Jefferson	Limited Access	I-265	Smyra Parkway	9.64	109.343	0.0882
84	Jefferson	Limited Access	I-265	Preston Hwy interchange	2.159	109.343	0.0197
85	Jefferson	Limited Access	I-64	English Station Rd overpass	4.415	109.343	0.0404
86	Jefferson	Limited Access	I-65	Outer Loop interchange	1.143	109.343	0.0105
87	Jefferson	Limited Access	I-65	Fern Valley Rd interchange	3.272	109.343	0.0299
88	Jefferson	Limited Access	I-71	KY 1694 overpass	2.252	109.343	0.0206
89	Jefferson	Limited Access	I-71	Lime Kiln Ln overpass	4.097	109.343	0.0375
90	Jefferson	Limited Access	KY-841	US 42 overpass	1.575	109.343	0.0144
91	Jefferson	Local Road	McCawley Rd	Preston Highway	0.085	2977.538	0.0000
92	Jefferson	Local Road	W. Manslick Rd	3rd Street Rd	2.256	2977.538	0.0008
93	Kenton	Arterial	KY 17	Dudley Pk	2.729	70.185	0.0389
94	Kenton	Arterial	KY 1829	KY 1303	2.895	70.185	0.0412
95	Kenton	Arterial	US 25	KY 236	2.29	70.185	0.0326
96	Kenton	Limited Access	I-275	KY 16 interchange	4.451	19.423	0.2292
97	Kenton	Limited Access	I-275	KY 1303 interchange	4.451	19.423	0.2292
98	Kenton	Limited Access	I-275	Hulbert Ave	1.75	19.423	0.0901
99	Kenton	Limited Access	I-75	Kyles Ln interchange	2.477	19.423	0.1275
100	Kenton	Limited Access	I-75	Buttermilk Pike interchange	2.98	19.423	0.1534
101	Kenton	Limited Access	I-75	Dixie Highway interchange	2.98	19.423	0.1534
102	Kenton	Limited Access	I-75	KY 236 interchange	1.038	19.423	0.0534
103	Kenton	Local Road	KY 2047	KY 16	2.587	920.539	0.0028
104	Kenton	Local Road	Marshall Rd	Taylor Mill Rd	2.497	920.539	0.0027
105	Lincoln	Arterial	US 150	US 27	8.473	51.441	0.1647

Appendix A- Table 1. Data Collection Sites (continued)

Site	County	Road Type	Road Surveyed	Reference	Section Length (mi)	Total Length (mi)	Probability of Selection
106	Lincoln	Arterial	US 150	Spring Valley Dr	0.125	51.441	0.0024
107	Lincoln	Arterial	US 27	KY 78	2.182	51.441	0.0424
108	Lincoln	Arterial	US 27	Lancaster St	2.182	51.441	0.0424
109	Lincoln	Local Road	Cordier Rd	US 150	0.421	633.961	0.0007
110	Lincoln	Local Road	KY 2750	US 150	0.974	633.961	0.0015
111	McCracken	Arterial	Jefferson St	N. 9th St	0.052	95.398	0.0005
112	McCracken	Arterial	KY 994	S. 21st St	0.748	95.398	0.0078
113	McCracken	Arterial	US 60	KY 996	7.118	95.398	0.0746
114	McCracken	Arterial	US 60	KY 284 (Bridge St)	3.258	95.398	0.0342
115	McCracken	Limited Access	I-24	US 62 interchange	6.707	17.319	0.3873
116	McCracken	Limited Access	I-24	US 68 interchange	5.235	17.319	0.3023
117	McCracken	Limited Access	I-24	KY 994 overpass	6.707	17.319	0.3873
118	McCracken	Local Road	KY 1288	US 45	3.294	760.039	0.0043
119	McCracken	Local Road	KY 1954	KY 348	3.04	760.039	0.0040
120	McCracken	Local Road	Highland Church Rd	US 62	1.632	760.039	0.0021
121	Perry	Arterial	Hal Rogers Pkwy	Morton Blvd.	6.474	41.192	0.1572
122	Perry	Arterial	KY 15	KY 451	5.007	41.192	0.1216
123	Perry	Arterial	KY 15	KY 80	9.211	41.192	0.2236
124	Perry	Arterial	KY 80	Justice Dr	6.74	41.192	0.1636
125	Perry	Local Road	KY 451	KY 28	0.823	738.756	0.0011
126	Perry	Local Road	KY 1096	Polly Hollow	5.42	738.756	0.0073
127	Perry	Local Road	KY 451	Main St	1.904	738.756	0.0026
128	Perry	Local Road	KY 1146	KY 476	10.527	738.756	0.0142
129	Pike	Arterial	KY 1426	KY 1460	0.738	118.625	0.0062
130	Pike	Arterial	KY 194	KY 632	13.683	118.625	0.1153
131	Pike	Arterial	US 119	US 23	2.672	118.625	0.0225
132	Pike	Arterial	US 119	KY 308	2.021	118.625	0.0170
133	Pike	Arterial	US 23	Julius Avenue	1.956	118.625	0.0165
134	Pike	Arterial	US 23	Island Creek Rd	1.956	118.625	0.0165
135	Pike	Local Road	KY 611	US 23	0.226	1226.433	0.0002
136	Pike	Local Road	KY 122	US 460	15.942	1226.433	0.0130
137	Pike	Local Road	KY 2016	US 23	3.247	1226.433	0.0026
138	Pike	Local Road	KY 610	KY 805	7.969	1226.433	0.0065
139	Warren	Arterial	KY 234	KY 880	2.347	82.267	0.0285
140	Warren	Arterial	KY 446	Corvette Dr	0.97	82.267	0.0118
141	Warren	Arterial	US 231	KY 880	1.413	82.267	0.0172
142	Warren	Arterial	US 31W	KY 1402	1.249	82.267	0.0152
143	Warren	Limited Access	I-65	KY 240 overpass	5.689	36.621	0.1553
144	Warren	Limited Access	I-65	US 231 interchange	1.43	36.621	0.0390

Appendix A- Table 1. Data Collection Sites (continued)

Site	County	Road Type	Road Surveyed	Reference	Section Length (mi)	Total Length (mi)	Probability of Selection
145	Warren	Limited Access	I-65	Bristow Road overpass	7.565	36.621	0.2066
146	Warren	Limited Access	I-65	KY 101 interchange	5.312	36.621	0.1451
147	Warren	Limited Access	Natcher Pkwy	US 231 interchange	5.003	36.621	0.1366
148	Warren	Local Road	KY 1297	KY 101	9.264	1318.503	0.0070
149	Warren	Local Road	KY 622	US 231	3.229	1318.503	0.0024
150	Warren	Local Road	KY 101	US 31W	0.568	1318.503	0.0004

Appendix A- Table 2. Alternate Data Collection Sites

Site	Road Class	County	Road Surveyed	Reference
151	Arterial	Bourbon	US 627 (Winchester Rd)	KY 57
152	Local Road	Bourbon	KY 57	US 627 (Winchester Rd)
153	Arterial	Bullitt	KY 61	KY 1526
154	Limited Access	Bullitt	I-65	KY 44 interchange
155	Local Road	Bullitt	KY 1531	KY 1319
156	Arterial	Clay	US 421	KY 638
157	Local Road	Clay	KY 472	Bray Creek Rd
158	Arterial	Fayette	Tates Creek Rd	Lansdowne Dr
159	Limited Access	Fayette	I-64	KY 1678 overpass
160	Local Road	Fayette	Alexandria Dr	US 421
161	Arterial	Greenup	US 23	Ferry St
162	Local Road	Greenup	KY 503 (Naples Rd)	KY 207 (Argillite Rd)
163	Arterial	Harrison	US 27 (Falmouth Rd)	KY 1032 (Berry-Kelat Rd)
164	Local Road	Harrison	KY 19	US 62
165	Arterial	Hart	US 31W	Union St
166	Limited Access	Hart	I-65	Rest Area
167	Local Road	Hart	KY 88	US 31W
168	Arterial	Henderson	US 41	Marywood Dr
169	Limited Access	Henderson	Breathitt Parkway	KY 2099 overpass
170	Local Road	Henderson	KY 812	KY 1078
171	Arterial	Jefferson	KY 146	Whipps Mill Rd
172	Limited Access	Jefferson	I-71	Zorn Ave interchange
173	Local Road	Jefferson	W Kentucky St	S 7th Street
174	Arterial	Kenton	KY 16	U Grand Ave
175	Limited Access	Kenton	I-275	US 25 interchange
176	Local Road	Kenton	Autumn Rd	Old Turkey Foot Rd
177	Arterial	Lincoln	US 27	Shopping Center Ent. (Stanford)
178	Local Road	Lincoln	KY 1770	US 150
179	Arterial	McCracken	KY 1286	US 62
180	Limited Access	McCracken	I-24	KY 787 overpass
181	Local Road	McCracken	Powers Rd	KY 131
182	Arterial	Perry	KY 15	KY 1095
183	Local Road	Perry	KY 1146	KY 80
184	Arterial	Pike	US 23	Island Creek Rd
185	Local Road	Pike	KY 468	KY 292
186	Arterial	Warren	US 68	US 231
187	Limited Access	Warren	Natcher Parkway	KY 884 overpass
188	Local Road	Warren	KY 263	KY 185

Appendix B.

Data Collection Form

SAFETY BELT DATA COLLECTION FORM

Date: _____ Starting Time: _____ Ending Time: _____ Int #: _____

Location: _____ Sheet #: _____

Observer: _____ Comment: _____

DRIVER USAGE

Vehicle	Safety Belt	None	Unknown
PC			
PU			
VAN			
SUV			

FRONT-SEAT OCCUPANT USAGE (OVER 3 YEARS OF AGE)

Vehicle	Safety Belt	None	Unknown
PC			
PU			
VAN			
SUV			

USAGE OF MOTORCYCLE HELMET

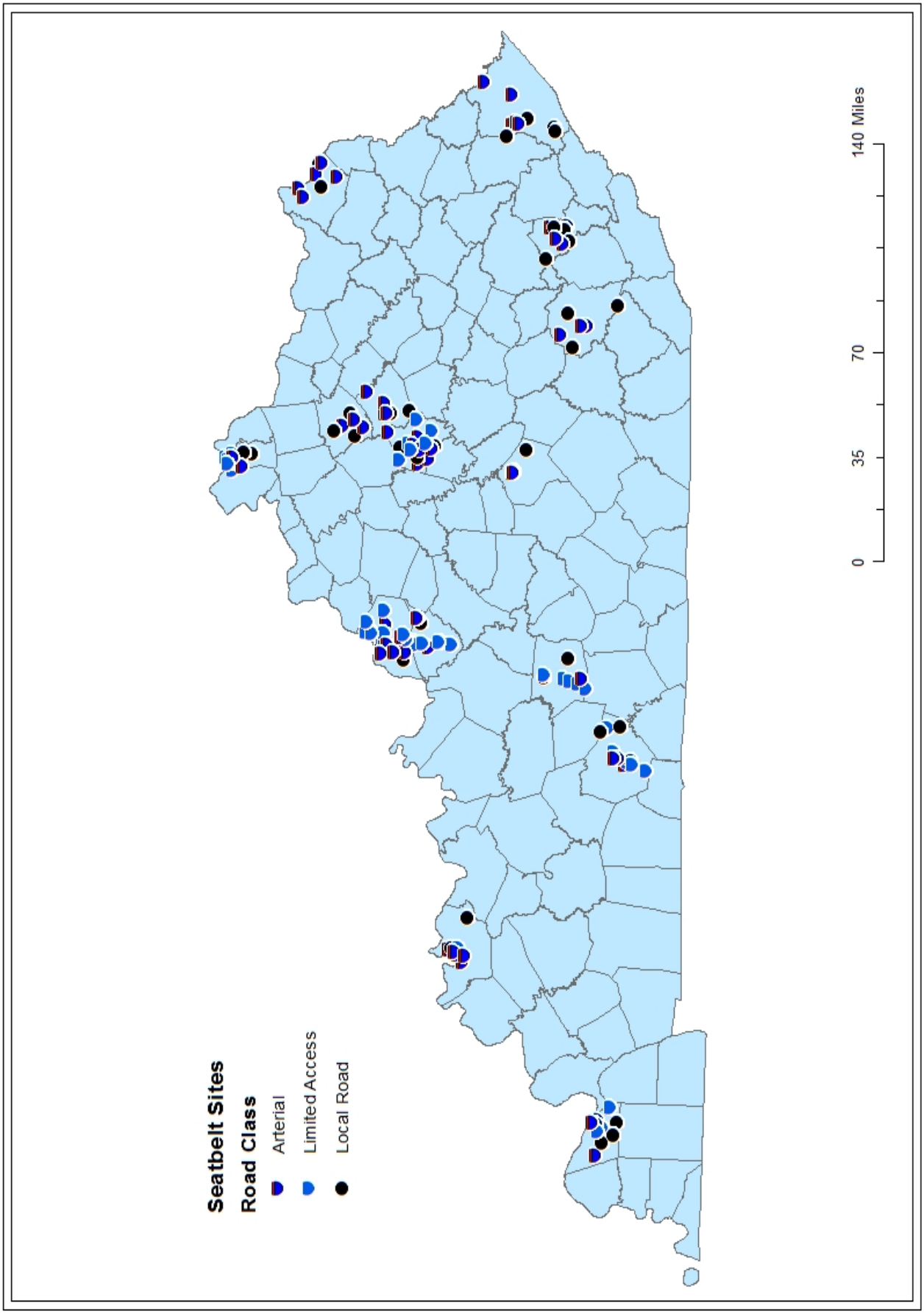
YES	NO

USAGE OF BICYCLE HELMET

YES	NO

Appendix C.

Data Collection Site Map


Seatbelt Sites
Road Class
Arterial
Limited Access
Local Road
0
35
70
140 Miles

Appendix D.

Summary of Data (by Site)

APPENDIX D. SUMMARY OF DATA

	ALL FRONT SEAT OCCUPANTS					CATEGORY			
						DRIVERS		FRONT SEAT PASSENGERS	
Location Number	Sample	Percent Usage	Relative Error*	Confidence Interval*	Percent Unknown	Sample	Percent Usage	Sample	Percent Usage
1	386	90.2	3.3	3.0	0.8	315	91.4	71	84.5
2	256	87.1	4.7	4.1	0.8	214	88.8	42	78.6
3	113	77.0	10.1	7.8	0.0	101	77.2	12	75.0
4	284	79.6	5.9	4.7	0.4	222	80.2	62	77.4
5	66	80.3	11.9	9.6	2.9	57	82.5	9	66.7
6	71	80.3	11.5	9.3	2.7	53	77.4	18	88.9
7	747	88.1	2.6	2.3	1.1	620	87.7	127	89.8
8	529	85.4	3.5	3.0	1.3	458	85.8	71	83.1
9	534	90.6	2.7	2.5	1.1	435	92.0	99	84.8
10	1051	91.8	1.8	1.7	0.7	776	92.4	275	90.2
11	1110	95.9	1.2	1.2	1.3	798	95.5	312	96.8
12	1239	95.6	1.2	1.1	1.3	895	95.5	344	95.6
13	1603	90.1	1.6	1.5	2.0	1047	88.9	556	92.4
14	1286	89.0	1.9	1.7	0.9	981	88.6	305	90.2
15	374	86.1	4.1	3.5	1.6	290	89.0	84	76.2
16	103	75.7	10.9	8.3	0.0	89	76.4	14	71.4
17	153	81.0	7.7	6.2	0.6	105	81.0	48	81.3
18	770	71.9	4.4	3.2	0.8	561	74.2	209	66.0
19	450	70.2	6.0	4.2	0.9	324	73.1	126	62.7
20	245	55.9	11.1	6.2	0.4	178	56.7	67	53.7
21	44	77.3	16.0	12.4	2.2	31	77.4	13	76.9
22	106	55.7	17.0	9.5	0.0	81	53.1	25	64.0
23	537	95.0	1.9	1.8	3.1	467	95.1	70	94.3
24	542	89.1	2.9	2.6	1.1	502	88.8	40	92.5
25	544	86.8	3.3	2.8	0.5	474	87.6	70	81.4
26	623	87.6	2.9	2.6	1.0	547	88.3	76	82.9
27	636	85.7	3.2	2.7	0.3	561	86.8	75	77.3
28	547	93.1	2.3	2.1	1.4	495	92.9	52	94.2
29	662	90.6	2.4	2.2	1.5	552	90.6	110	90.9
30	697	86.2	3.0	2.6	0.7	502	85.9	195	87.2
31	626	93.0	2.2	2.0	1.3	488	92.6	138	94.2
32	1097	91.7	1.8	1.6	1.8	780	90.8	317	94.0
33	748	90.0	2.4	2.2	1.2	585	89.2	163	92.6
34	887	94.3	1.6	1.5	0.4	742	94.9	145	91.0
35	735	90.5	2.3	2.1	1.5	628	90.3	107	91.6
36	483	85.7	3.6	3.1	1.6	414	85.5	69	87.0
37	243	88.1	4.6	4.1	1.2	174	88.5	69	87.0
38	384	84.4	4.3	3.6	1.0	326	83.4	58	89.7
39	194	88.7	5.0	4.5	3.0	145	89.7	49	85.7
40	95	86.3	8.0	6.9	4.0	72	86.1	23	87.0
41	408	85.3	4.0	3.4	1.0	334	85.6	74	83.8

APPENDIX D. SUMMARY OF DATA

	ALL FRONT SEAT OCCUPANTS					CATEGORY			
						DRIVERS		FRONT SEAT PASSENGERS	
Location Number	Sample	Percent Usage	Relative Error*	Confidence Interval*	Percent Unknown	Sample	Percent Usage	Sample	Percent Usage
42	307	84.7	4.8	4.0	2.5	237	84.4	70	85.7
43	211	91.0	4.2	3.9	2.3	175	90.3	36	94.4
44	221	78.7	6.9	5.4	0.5	176	76.1	45	88.9
45	85	71.8	13.3	9.6	1.2	58	67.2	27	81.5
46	327	84.7	4.6	3.9	0.6	280	85.0	47	83.0
47	165	81.2	7.3	6.0	3.5	131	80.9	34	82.4
48	339	85.0	4.5	3.8	0.6	278	84.9	61	85.2
49	90	87.8	7.7	6.8	3.2	77	85.7	13	100.0
50	54	66.7	18.9	12.6	1.8	45	60.0	9	100.0
51	28	71.4	23.4	16.7	0.0	22	68.2	6	83.3
52	108	70.4	12.2	8.6	2.7	88	69.3	20	75.0
53	276	79.7	6.0	4.7	3.2	224	78.1	52	86.5
54	776	95.4	1.6	1.5	2.3	508	97.0	268	92.2
55	872	91.3	2.1	1.9	1.1	595	92.8	277	88.1
56	650	94.2	1.9	1.8	1.2	462	94.8	188	92.6
57	787	94.2	1.7	1.6	0.9	521	94.0	266	94.4
58	606	87.3	3.0	2.7	1.3	401	86.0	205	89.8
59	104	69.2	12.8	8.9	2.8	76	68.4	28	71.4
60	48	68.8	19.1	13.1	5.9	38	71.1	10	60.0
61	464	89.0	3.2	2.8	2.1	379	89.4	85	87.1
62	345	87.5	4.0	3.5	3.1	296	87.2	49	89.8
63	346	90.5	3.4	3.1	1.1	300	91.0	46	87.0
64	706	91.8	2.2	2.0	0.7	568	91.4	138	93.5
65	272	86.0	4.8	4.1	0.7	212	88.2	60	78.3
66	632	87.2	3.0	2.6	1.7	524	86.8	108	88.9
67	431	87.2	3.6	3.1	2.7	350	88.3	81	82.7
68	663	92.2	2.2	2.0	0.6	496	90.9	167	95.8
69	283	82.0	5.5	4.5	1.0	214	81.3	69	84.1
70	41	80.5	15.1	12.1	0.0	29	79.3	12	83.3
71	484	81.0	4.3	3.5	2.4	445	82.0	39	69.2
72	556	83.3	3.7	3.1	2.3	516	83.1	40	85.0
73	607	83.7	3.5	2.9	2.1	523	84.5	84	78.6
74	667	90.4	2.5	2.2	1.8	582	90.4	85	90.6
75	549	88.7	3.0	2.6	0.4	476	89.1	73	86.3
76	638	92.2	2.3	2.1	0.6	547	92.3	91	91.2
77	381	86.6	3.9	3.4	0.8	345	86.4	36	88.9
78	263	87.5	4.6	4.0	1.1	227	87.2	36	88.9
79	524	85.3	3.6	3.0	2.2	453	85.4	71	84.5
80	1468	90.3	1.7	1.5	0.9	1278	90.3	190	90.5
81	1065	91.9	1.8	1.6	0.5	916	91.4	149	95.3
82	1017	94.5	1.5	1.4	1.0	854	94.8	163	92.6

APPENDIX D. SUMMARY OF DATA

	ALL FRONT SEAT OCCUPANTS					CATEGORY			
						DRIVERS		FRONT SEAT PASSENGERS	
Location Number	Sample	Percent Usage	Relative Error*	Confidence Interval*	Percent Unknown	Sample	Percent Usage	Sample	Percent Usage
83	1416	94.1	1.3	1.2	1.0	1234	93.8	182	96.2
84	1143	92.8	1.6	1.5	0.8	985	93.6	158	88.0
85	1066	96.6	1.1	1.1	1.3	800	97.6	266	93.6
86	1309	91.0	1.7	1.6	0.6	1009	90.2	300	93.7
87	1207	92.0	1.7	1.5	0.5	960	92.1	247	91.9
88	955	96.6	1.2	1.1	0.3	729	97.1	226	95.1
89	733	94.0	1.8	1.7	0.9	567	93.3	166	96.4
90	502	95.2	2.0	1.9	0.2	440	95.0	62	96.8
91	418	85.6	3.9	3.4	1.2	337	87.5	81	77.8
92	95	86.3	8.0	6.9	1.0	74	89.2	21	76.2
93	758	90.1	2.4	2.1	1.3	673	90.0	85	90.6
94	536	89.0	3.0	2.6	1.5	470	88.5	66	92.4
95	851	91.1	2.1	1.9	1.2	714	91.6	137	88.3
96	1346	88.5	1.9	1.7	0.4	1092	87.9	254	90.9
97	1004	90.3	2.0	1.8	0.3	839	90.5	165	89.7
98	436	89.9	3.1	2.8	0.5	354	91.0	82	85.4
99	907	89.1	2.3	2.0	0.8	690	88.6	217	90.8
100	1277	93.0	1.5	1.4	0.8	1007	93.2	270	91.9
101	1165	91.4	1.8	1.6	2.3	876	91.3	289	91.7
102	689	91.6	2.3	2.1	1.6	587	92.0	102	89.2
103	102	88.2	7.1	6.3	1.9	82	91.5	20	75.0
104	122	91.0	5.6	5.1	3.2	97	90.7	25	92.0
105	213	76.5	7.4	5.7	4.9	151	76.2	62	77.4
106	300	82.3	5.2	4.3	7.1	235	83.4	65	78.5
107	349	76.5	5.8	4.4	1.1	273	79.1	76	67.1
108	508	84.3	3.8	3.2	0.4	390	83.8	118	85.6
109	67	65.7	17.3	11.4	0.0	48	68.8	19	57.9
110	67	68.7	16.2	11.1	0.0	45	66.7	22	72.7
111	340	94.4	2.6	2.4	0.3	314	94.3	26	96.2
112	302	89.1	3.9	3.5	2.3	243	89.3	59	88.1
113	241	88.0	4.7	4.1	2.0	199	89.4	42	81.0
114	492	90.4	2.9	2.6	2.2	380	91.6	112	86.6
115	622	89.1	2.8	2.5	1.9	478	88.3	144	91.7
116	618	89.3	2.7	2.4	0.6	493	89.5	125	88.8
117	739	93.2	1.9	1.8	0.8	525	93.5	214	92.5
118	100	83.0	8.9	7.4	2.0	81	81.5	19	89.5
119	97	89.7	6.7	6.1	4.0	78	89.7	19	89.5
120	235	90.6	4.1	3.7	0.8	188	89.9	47	93.6
121	430	84.9	4.0	3.4	0.5	356	84.6	74	86.5
122	251	77.7	6.6	5.1	3.5	210	78.6	41	73.2
123	561	80.4	4.1	3.3	1.9	407	80.3	154	80.5

APPENDIX D. SUMMARY OF DATA

	ALL FRONT SEAT OCCUPANTS					CATEGORY			
						DRIVERS		FRONT SEAT PASSENGERS	
Location Number	Sample	Percent Usage	Relative Error*	Confidence Interval*	Percent Unknown	Sample	Percent Usage	Sample	Percent Usage
124	942	89.5	2.2	2.0	0.7	709	89.7	233	88.8
125	41	63.4	23.2	14.7	4.7	31	67.7	10	50.0
126	78	65.4	16.1	10.6	0.0	60	70.0	18	50.0
127	240	75.0	7.3	5.5	2.0	178	77.5	62	67.7
128	107	73.8	11.3	8.3	1.8	90	75.6	17	64.7
129	486	74.1	5.3	3.9	0.4	435	72.9	51	84.3
130	139	64.0	12.5	8.0	2.8	110	66.4	29	55.2
131	195	83.1	6.3	5.3	0.5	158	82.9	37	83.8
132	333	76.6	5.9	4.5	1.5	282	74.8	51	86.3
133	329	77.2	5.9	4.5	1.5	264	76.9	65	78.5
134	500	82.2	4.1	3.4	1.8	418	83.3	82	76.8
135	41	63.4	23.2	14.7	8.9	35	65.7	6	50.0
136	154	76.0	8.9	6.7	1.3	123	77.2	31	71.0
137	161	67.7	10.7	7.2	1.2	125	66.4	36	72.2
138	104	68.3	13.1	8.9	1.0	78	70.5	26	61.5
139	786	92.2	2.0	1.9	1.0	660	92.1	126	92.9
140	552	87.7	3.1	2.7	2.5	465	87.3	87	89.7
141	820	91.8	2.0	1.9	0.5	684	92.1	136	90.4
142	541	85.2	3.5	3.0	0.7	469	85.5	72	83.3
143	793	92.2	2.0	1.9	1.1	560	92.5	233	91.4
144	808	94.2	1.7	1.6	0.9	592	94.6	216	93.1
145	957	92.3	1.8	1.7	0.2	772	92.4	185	91.9
146	635	91.3	2.4	2.2	1.1	464	90.9	171	92.4
147	116	86.2	7.3	6.3	1.7	105	84.8	11	100.0
148	52	73.1	16.5	12.1	0.0	44	75.0	8	62.5
149	428	81.3	4.5	3.7	0.7	358	83.5	70	70.0
150	336	82.7	4.9	4.0	3.2	297	83.8	39	74.4

Appendix E.

Summary of Data (with sample weights)

APPENDIX E. Summary of Data (with sample weights)

Site ID	County-RC	County	Category	Site Type	Date Observed	Site Sample Weight	County-RC Sample Weight	County Sample Weight	Category Sample Weight
1	9-2	Bourbon	2	Original	6/2/2016	0.67	0.20	0.21	0.40
2	9-2	Bourbon	2	Original	6/2/2016	0.67	0.20	0.21	0.40
3	9-2	Bourbon	2	Original	7/8/2016	0.67	0.20	0.21	0.40
4	9-2	Bourbon	2	Original	7/18/2016	0.67	0.20	0.21	0.40
5	9-3	Bourbon	2	Original	6/2/2016	0.67	0.23	0.21	0.40
6	9-3	Bourbon	2	Original	6/6/2016	0.67	0.23	0.21	0.40
7	15-2	Bullitt	2	Original	6/23/2016	0.67	0.46	0.54	0.40
8	15-2	Bullitt	2	Original	6/23/2016	0.67	0.46	0.54	0.40
9	15-2	Bullitt	2	Original	7/2/2016	0.67	0.46	0.54	0.40
10	15-1	Bullitt	2	Original	6/21/2016	0.67	0.58	0.54	0.40
11	15-1	Bullitt	2	Original	6/23/2016	0.67	0.58	0.54	0.40
12	15-1	Bullitt	2	Original	6/23/2016	0.67	0.58	0.54	0.40
13	15-1	Bullitt	2	Original	6/24/2016	0.67	0.58	0.54	0.40
14	15-1	Bullitt	2	Original	6/21/2016	0.67	0.58	0.54	0.40
15	15-3	Bullitt	2	Original	6/24/2016	0.67	0.59	0.54	0.40
16	15-3	Bullitt	2	Original	6/24/2016	0.67	0.59	0.54	0.40
17	26-2	Clay	2	Original	6/16/2016	0.67	0.20	0.20	0.40
18	26-2	Clay	2	Original	6/16/2016	0.67	0.20	0.20	0.40
19	26-2	Clay	2	Original	6/16/2016	0.67	0.20	0.20	0.40
20	26-3	Clay	2	Original	7/11/2016	0.67	0.21	0.20	0.40
21	26-3	Clay	2	Original	6/8/2016	0.67	0.21	0.20	0.40
22	26-3	Clay	2	Original	6/16/2016	0.67	0.21	0.20	0.40
23	34-2	Fayette	1	Original	6/13/2016	0.67	1.05	1.04	1.44
24	34-2	Fayette	1	Original	6/1/2016	0.67	1.05	1.04	1.44
25	34-2	Fayette	1	Original	6/27/2016	0.67	1.05	1.04	1.44
26	34-2	Fayette	1	Original	7/5/2016	0.67	1.05	1.04	1.44
27	34-2	Fayette	1	Original	7/5/2016	0.67	1.05	1.04	1.44
28	34-2	Fayette	1	Original	6/1/2016	0.67	1.05	1.04	1.44
29	34-2	Fayette	1	Original	7/21/2016	0.67	1.05	1.04	1.44
30	34-1	Fayette	1	Original	6/27/2016	0.67	0.99	1.04	1.44
31	34-1	Fayette	1	Original	6/6/2016	0.67	0.99	1.04	1.44
32	34-1	Fayette	1	Original	6/6/2016	0.67	0.99	1.04	1.44
33	34-1	Fayette	1	Original	6/1/2016	0.67	0.99	1.04	1.44
34	34-1	Fayette	1	Original	7/21/2016	0.67	0.99	1.04	1.44
35	34-1	Fayette	1	Original	6/1/2016	0.67	0.99	1.04	1.44
36	34-3	Fayette	1	Original	6/1/2016	0.67	1.11	1.04	1.44
37	34-3	Fayette	1	Original	6/11/2016	0.67	1.11	1.04	1.44
38	34-3	Fayette	1	Original	7/21/2016	0.67	1.11	1.04	1.44
39	45-2	Greenup	2	Original	6/9/2016	0.67	0.25	0.25	0.40

APPENDIX E. Summary of Data (with sample weights)

Site ID	County-RC	County	Category	Site Type	Date Observed	Site Sample Weight	County-RC Sample Weight	County Sample Weight	Category Sample Weight
40	45-2	Greenup	2	Original	6/9/2016	0.67	0.25	0.25	0.40
41	45-2	Greenup	2	Original	7/18/2016	0.67	0.25	0.25	0.40
42	45-2	Greenup	2	Original	7/18/2016	0.67	0.25	0.25	0.40
43	45-2	Greenup	2	Original	6/9/2016	0.67	0.25	0.25	0.40
44	45-3	Greenup	2	Original	7/7/2016	0.67	0.26	0.25	0.40
45	45-3	Greenup	2	Original	7/18/2016	0.67	0.26	0.25	0.40
46	45-3	Greenup	2	Original	7/7/2016	0.67	0.26	0.25	0.40
47	49-2	Harrison	2	Original	6/27/2016	0.67	0.14	0.15	0.40
48	49-2	Harrison	2	Original	6/27/2016	0.67	0.14	0.15	0.40
49	49-2	Harrison	2	Original	6/27/2016	0.67	0.14	0.15	0.40
50	49-3	Harrison	2	Original	6/17/2016	0.67	0.15	0.15	0.40
51	49-3	Harrison	2	Original	6/23/2016	0.67	0.15	0.15	0.40
52	49-3	Harrison	2	Original	6/17/2016	0.67	0.15	0.15	0.40
53	50-2	Hart	2	Original	6/30/2016	0.67	0.09	0.31	0.40
54	50-1	Hart	2	Original	6/14/2016	0.67	0.32	0.31	0.40
55	50-1	Hart	2	Alternate	6/30/2016	0.67	0.32	0.31	0.40
56	50-1	Hart	2	Original	6/14/2016	0.67	0.32	0.31	0.40
57	50-1	Hart	2	Original	6/14/2016	0.67	0.32	0.31	0.40
58	50-1	Hart	2	Alternate	7/20/2016	0.67	0.32	0.31	0.40
59	50-3	Hart	2	Original	6/14/2016	0.67	0.38	0.31	0.40
60	50-3	Hart	2	Original	7/20/2016	0.67	0.38	0.31	0.40
61	51-2	Henderson	2	Original	6/22/2016	0.67	0.28	0.31	0.40
62	51-2	Henderson	2	Original	6/17/2016	0.67	0.28	0.31	0.40
63	51-2	Henderson	2	Original	6/9/2016	0.67	0.28	0.31	0.40
64	51-2	Henderson	2	Original	6/22/2016	0.67	0.28	0.31	0.40
65	51-2	Henderson	2	Original	6/9/2016	0.67	0.28	0.31	0.40
66	51-2	Henderson	2	Original	6/17/2016	0.67	0.28	0.31	0.40
67	51-2	Henderson	2	Original	6/17/2016	0.67	0.28	0.31	0.40
68	51-1	Henderson	2	Original	6/3/2016	0.67	0.24	0.31	0.40
69	51-3	Henderson	2	Original	6/3/2016	0.67	0.41	0.31	0.40
70	51-3	Henderson	2	Original	6/3/2016	0.67	0.41	0.31	0.40
71	56-2	Jefferson	1	Original	6/16/2016	0.67	1.73	1.73	1.44
72	56-2	Jefferson	1	Original	6/16/2016	0.67	1.73	1.73	1.44
73	56-2	Jefferson	1	Original	6/30/2016	0.67	1.73	1.73	1.44
74	56-2	Jefferson	1	Original	6/30/2016	0.67	1.73	1.73	1.44
75	56-2	Jefferson	1	Original	6/1/2016	0.67	1.73	1.73	1.44
76	56-2	Jefferson	1	Original	6/1/2016	0.67	1.73	1.73	1.44
77	56-2	Jefferson	1	Original	6/2/2016	0.67	1.73	1.73	1.44

APPENDIX E. Summary of Data (with sample weights)

Site ID	County-RC	County	Category	Site Type	Date Observed	Site Sample Weight	County-RC Sample Weight	County Sample Weight	Category Sample Weight
78	56-2	Jefferson	1	Original	6/2/2016	0.67	1.73	1.73	1.44
79	56-2	Jefferson	1	Original	6/16/2016	0.67	1.73	1.73	1.44
80	56-1	Jefferson	1	Original	6/16/2016	0.67	1.81	1.73	1.44
81	56-1	Jefferson	1	Original	6/16/2016	0.67	1.81	1.73	1.44
82	56-1	Jefferson	1	Original	6/1/2016	0.67	1.81	1.73	1.44
83	56-1	Jefferson	1	Original	6/1/2016	0.67	1.81	1.73	1.44
84	56-1	Jefferson	1	Original	6/1/2016	0.67	1.81	1.73	1.44
85	56-1	Jefferson	1	Original	7/6/2016	0.67	1.81	1.73	1.44
86	56-1	Jefferson	1	Original	6/2/2016	0.67	1.81	1.73	1.44
87	56-1	Jefferson	1	Original	6/2/2016	0.67	1.81	1.73	1.44
88	56-1	Jefferson	1	Original	6/6/2016	0.67	1.81	1.73	1.44
89	56-1	Jefferson	1	Original	7/6/2016	0.67	1.81	1.73	1.44
90	56-1	Jefferson	1	Original	6/6/2016	0.67	1.81	1.73	1.44
91	56-3	Jefferson	1	Original	6/16/2016	0.67	1.31	1.73	1.44
92	56-3	Jefferson	1	Original	7/6/2016	0.67	1.31	1.73	1.44
93	59-2	Kenton	2	Original	6/10/2016	0.67	0.68	0.71	0.40
94	59-2	Kenton	2	Original	7/5/2016	0.67	0.68	0.71	0.40
95	59-2	Kenton	2	Original	6/24/2016	0.67	0.68	0.71	0.40
96	59-1	Kenton	2	Original	7/20/2016	0.67	0.69	0.71	0.40
97	59-1	Kenton	2	Original	6/10/2016	0.67	0.69	0.71	0.40
98	59-1	Kenton	2	Original	7/20/2016	0.67	0.69	0.71	0.40
99	59-1	Kenton	2	Original	6/10/2016	0.67	0.69	0.71	0.40
100	59-1	Kenton	2	Original	6/24/2016	0.67	0.69	0.71	0.40
101	59-1	Kenton	2	Original	6/24/2016	0.67	0.69	0.71	0.40
102	59-1	Kenton	2	Original	6/1/2016	0.67	0.69	0.71	0.40
103	59-3	Kenton	2	Original	7/5/2016	0.67	0.82	0.71	0.40
104	59-3	Kenton	2	Original	7/5/2016	0.67	0.82	0.71	0.40
105	69-2	Lincoln	2	Original	7/24/2016	0.67	0.22	0.24	0.40
106	69-2	Lincoln	2	Original	7/25/2016	0.67	0.22	0.24	0.40
107	69-2	Lincoln	2	Original	7/21/2016	0.67	0.22	0.24	0.40
108	69-2	Lincoln	2	Original	6/23/2016	0.67	0.22	0.24	0.40
109	69-3	Lincoln	2	Original	6/15/2016	0.67	0.28	0.24	0.40
110	69-3	Lincoln	2	Original	6/15/2016	0.67	0.28	0.24	0.40
111	73-2	McCracken	2	Original	6/14/2016	0.67	0.50	0.46	0.40
112	73-2	McCracken	2	Original	6/28/2016	0.67	0.50	0.46	0.40
113	73-2	McCracken	2	Original	7/22/2016	0.67	0.50	0.46	0.40
114	73-2	McCracken	2	Original	7/22/2016	0.67	0.50	0.46	0.40
115	73-1	McCracken	2	Original	6/28/2016	0.67	0.44	0.46	0.40
116	73-1	McCracken	2	Original	6/28/2016	0.67	0.44	0.46	0.40

APPENDIX E. Summary of Data (with sample weights)

Site ID	County-RC	County	Category	Site Type	Date Observed	Site Sample Weight	County-RC Sample Weight	County Sample Weight	Category Sample Weight
117	73-1	McCracken	2	Original	6/14/2016	0.67	0.44	0.46	0.40
118	73-3	McCracken	2	Original	7/22/2016	0.67	0.43	0.46	0.40
119	73-3	McCracken	2	Original	7/8/2016	0.67	0.43	0.46	0.40
120	73-3	McCracken	2	Original	7/8/2016	0.67	0.43	0.46	0.40
121	97-2	Perry	2	Original	7/13/2016	0.67	0.25	0.25	0.40
122	97-2	Perry	2	Original	7/7/2016	0.67	0.25	0.25	0.40
123	97-2	Perry	2	Original	7/22/2016	0.67	0.25	0.25	0.40
124	97-2	Perry	2	Original	7/22/2016	0.67	0.25	0.25	0.40
125	97-3	Perry	2	Original	7/13/2016	0.67	0.25	0.25	0.40
126	97-3	Perry	2	Original	7/13/2016	0.67	0.25	0.25	0.40
127	97-3	Perry	2	Original	7/22/2016	0.67	0.25	0.25	0.40
128	97-3	Perry	2	Original	7/7/2016	0.67	0.25	0.25	0.40
129	98-2	Pike	2	Original	6/8/2016	0.67	0.44	0.45	0.40
130	98-2	Pike	2	Original	6/21/2016	0.67	0.44	0.45	0.40
131	98-2	Pike	2	Original	6/21/2016	0.67	0.44	0.45	0.40
132	98-2	Pike	2	Original	6/8/2016	0.67	0.44	0.45	0.40
133	98-2	Pike	2	Original	7/8/2016	0.67	0.44	0.45	0.40
134	98-2	Pike	2	Original	7/8/2016	0.67	0.44	0.45	0.40
135	98-3	Pike	2	Original	6/7/2016	0.67	0.46	0.45	0.40
136	98-3	Pike	2	Original	6/7/2016	0.67	0.46	0.45	0.40
137	98-3	Pike	2	Original	6/19/2016	0.67	0.46	0.45	0.40
138	98-3	Pike	2	Original	7/8/2016	0.67	0.46	0.45	0.40
139	114-2	Warren	2	Original	6/7/2016	0.67	0.67	0.65	0.40
140	114-2	Warren	2	Original	6/7/2016	0.67	0.67	0.65	0.40
141	114-2	Warren	2	Original	6/7/2016	0.67	0.67	0.65	0.40
142	114-2	Warren	2	Original	7/17/2016	0.67	0.67	0.65	0.40
143	114-1	Warren	2	Original	6/15/2016	0.67	0.63	0.65	0.40
144	114-1	Warren	2	Original	6/7/2016	0.67	0.63	0.65	0.40
145	114-1	Warren	2	Original	6/30/2016	0.67	0.63	0.65	0.40
146	114-1	Warren	2	Original	7/19/2016	0.67	0.63	0.65	0.40
147	114-1	Warren	2	Original	6/22/2016	0.67	0.63	0.65	0.40
148	114-3	Warren	2	Original	7/19/2016	0.67	0.67	0.65	0.40
149	114-3	Warren	2	Original	7/19/2016	0.67	0.67	0.65	0.40
150	114-3	Warren	2	Original	6/30/2016	0.67	0.67	0.65	0.40

Appendix F.

Mini-Survey Data

APPENDIX F. Mini-Survey Data

Site	County	VMT%	Intersection Description	Town	2010	2011	2012	2013	2014	2015	2016
5	Barren	3.46	I-65 at Exit 53	Cave City	87	89	91	91	89	91	90
11	Meade	6.00	US 31W at KY 1638	Muldraugh	83	82	85	88	88	89	88
27	Grayson	6.95	KY 259 at US 62	Leitchfield	77	81	81	84	85	85	79
37	Logan	3.07	US 68 at US 79	Russellville	78	81	79	84	83	82	86
44	Hopkins	2.13	Pennyrile Parkway at Exit 44	Madisonville	83	87	87	87	91	91	95
54	Henderson	3.52	Us 41A at 5th St.	Henderson	75	83	84	85	85	88	80
63	Calloway	3.35	KY 1637 at 16th	Murray	76	79	82	82	85	87	88
76	Shelby	8.31	I-64 at Exit 28	Simpsonville	87	86	89	88	93	95	94
80	Woodford	1.92	US 60 at US 62	Versailles	86	89	84	94	93	89	93
88	Oldham	4.01	KY 146 at KY 329B	La Grange	86	89	89	88	90	92	92
98	Franklin	1.41	KY 2820 at US 127	Frankfort	74	75	80	87	87	79	73
110	Kenton	17.65	I-75 at Exit 186	Crescent Springs	87	88	88	91	92	92	93
121	Jefferson	8.71	US 31W at KY 841	Louisville	74	79	78	85	87	87	84
144	Boone	7.65	US 42 at US 25	Walton	83	84	87	86	87	88	91
154	Boyd	2.48	I-64 at Exit 185	Ashland	81	85	86	84	90	91	85
166	Lincoln	6.56	US 27 at US 150	Stanford	76	77	80	86	86	82	87
174	Carter	5.94	US 60 at KY 7	Grayson	67	72	78	80	81	81	80
180	Floyd	3.13	KY 680 at KY 122	Drift	57	60	60	70	71	68	63
188	Rowan	0.41	I-64 at Exit 137	Morehead	83	84	86	84	89	89	83
194	Laurel	1.89	US 25E at US 25	Corbin	77	79	79	79	81	85	82
200	Pulaski	1.45	KY 80 at KY 2296	Somerset	74	76	84	79	81	85	88
					79.8	82.2	83.4	85.8	87.4	87.6	87.2