

2010 ANNUAL DIRECT OBSERVATION SURVEY OF SAFETY BELT USE

Prepared for:
Office of Highway Safety Planning
333 South Grand Avenue
Lansing, MI

Prepared by:
Wayne State University
Transportation Research Group
Detroit, MI

Date: October 2010



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| 16. Abstract This report documents the results of the 2010 Annual Direct Observation Survey of safety belt use. A total of 192 intersection/interchange sites were observed in August and September of 2010. All drivers and front-seat passengers were observed for safety belt use and categorized by vehicle type, vehicle use, gender, age and race. The results of this survey show that the safety belt usage rate in the State of Michigan is 95.2 percent. Males and pick-up truck drivers continue to trail in the use of safety belts. | | | |
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1.0 INTRODUCTION

Increasing the use of safety restraint systems, while driving or traveling as a passenger in an automobile, is one of the most effective ways of reducing injuries and fatalities on the nation's highways. Efforts have been made to increase the use of safety belts over three decades, yet according to the 2009 nationwide safety belt surveys, approximately 16 percent of drivers and front-seat passengers do not buckle up in an automobile, a 1 percent increase in usage rate compared to 2008 [1]. In Michigan, past statewide safety belt use studies indicate that the overall use by drivers and front-seat passengers has generally increased from 2001 to 2009. The past ten years' statewide safety restraint use experience is as follows:

| | | |
|------|---|-------|
| 2000 | - | 83.5% |
| 2001 | - | 82.3% |
| 2002 | - | 82.9% |
| 2003 | - | 84.8% |
| 2004 | - | 90.5% |
| 2005 | - | 92.9% |
| 2006 | - | 94.3% |
| 2007 | - | 93.7% |
| 2008 | - | 97.2% |
| 2009 | - | 97.9% |

The above data indicate that the safety belt use rate in Michigan is ahead of the national average and Michigan is one of sixteen states and territories with reported safety belt use rates greater than 90 percent [2]. It is important to recognize that Michigan is a "primary law" state, which means a motorist can be stopped and cited for the sole reason of not wearing a safety belt while driving or riding as a front-seat passenger. In "secondary law" states, motorists must be stopped for another traffic-related offense in order to be ticketed for not wearing a safety belt. The "primary law" states averaged a safety belt use rate of 88 percent as compared to the "secondary law" states, which only averaged 77 percent in 2009 [1].

The use of safety belts is the single most effective means of reducing fatal and non-fatal injuries in vehicular crashes. In 2008, 25,351 passenger vehicle occupants were killed in traffic crashes

in the USA. Among these fatalities, more than 55 percent of the occupants were unrestrained [3]. The National Highway Traffic Safety Administration (NHTSA) estimates that an 80 percent safety belt use rate saves more than 15,000 lives per year and an overall societal cost of 50 billion dollars in the country each year [4]. NHTSA estimated that 13,250 lives were saved in 2008 due to the use of safety belts [5] among passenger vehicle occupants over age 4.

Currently, airbag systems are a part of standard equipment in all vehicles. Vehicles equipped with airbags need the occupants to be restrained by safety belts in order to be effective in saving lives and reducing injuries in the event of a severe crash. Safety belts protect vehicle occupants in the following ways:

- Reduces the chance of being in contact with the interior of the vehicle,
- Prevents the occupants from ejection, and
- Prevents occupants from being too close to the deployed airbags, thus avoiding severe injuries from the airbags, ejection from the vehicle and vehicle interior contacts.

Past research indicates that the use of safety belts reduces the risk of fatal injury for the driver and front seat passengers by approximately 45 percent for passenger vehicles and 60 percent for light trucks. Moreover, the use of safety belts reduces the risk of moderate to critical injury by 50 percent for occupants of passenger vehicles and 65 percent for the occupants of light trucks [5]. Therefore, a small increase in safety belt use often results in a large overall savings to society.

The non-use of safety belts is a behavioral issue, so programs targeted to change driver behavior related to the use of safety belts often leaves a long lasting impact on the affected drivers and thus, continues to increase the safety belt use rate in the driving population. Various safety belt use improvement programs are often targeted to specific areas within a state. Knowing the areas within a state that have lower safety belt use rates may assist the program coordinators in OHSP to allocate enforcement funding to specific areas, which may result in higher rates of safety belt use. There are, of course, statewide initiatives, which are expected to impact the entire state.

The safety belt use data can be used for the following:

- To fulfill reporting requirements to NHTSA.
- To allocate statewide safety funding to specific program areas.
- To provide targeted funding to specific areas within the state where use rates are lower than the statewide average.
- To provide targeted programs for certain segments of the population.

1.1 Study Purpose and Objectives

The purpose of this study was to perform an annual observational survey at 192 intersections and interchanges to determine the percentage of drivers and front-seat passengers utilizing their safety belts.

The specific objectives of this study were as follows:

- Finalize the methodology for collecting data for a representative sample of sites throughout the State, which ensured reliable statewide statistics, in an economically feasible manner.
- Provide training to all staff conducting the observation surveys and conduct Quality Assurance/Quality Control (QA/QC) of the data collection efforts.
- Conduct the annual observational surveys of safety belt use around and during the Labor Day holiday.
- Summarize and cross-tabulate the observational data in a spreadsheet format indicating overall safety belt use, safety belt use by strata, safety belt use by time of day and day of week, and safety belt use by various demographic characteristics.

1.2 Study Area

The study area for the statewide observational survey included counties that represent at least 85 percent of the population in the State of Michigan.

2.0 METHODOLOGY

In order to develop targeted public awareness programs to increase safety belt use, one must know the distribution of safety belt use rates in various parts of the state and among various demographic groups, in addition to knowing the overall safety belt use rate in the state. It is, however, important to capture the statewide use rate following the sampling strategy and data collection procedure recommended by NHTSA. WSU-TRG performed such observational surveys in the state as a part of this project.

The site selection methodology for this study followed the procedure used in the Direct Observation of Safety Belt Use in Michigan surveys for the years 2005 to 2008. The uniform criteria, as presented in the Federal Register and the National Highway Traffic Safety Administration documents, were also examined carefully to ensure adherence to the nationwide standard. The methodology for the annual direct observation survey is similar to that used in the 2005 through 2008 evaluations, which followed NHTSA guidelines. NHTSA requires that the areas sampled throughout the state encompass 85 percent of the total statewide population. The areas selected for the 2005 to 2008 observation surveys included 32 counties in the State of Michigan that represented 87.07 percent of the state's population, based upon 2008 U.S. Bureau of Census Data estimates. The geographic locations of the counties included in the previous annual surveys are depicted in Figure 1. These counties were partitioned into four strata based upon historical safety belt use rates and vehicle miles of travel (VMT). The 2008 population estimates for these counties are shown in Table 1.

A system for partitioning the candidate counties into various strata, based on 2004 vehicle miles traveled (VMT) data, was developed and is shown in Table 2. The number of observation sites for each stratum is also shown in Table 2. Forty-eight (48) sites were observed for Stratum 1, 49 sites for Stratum 2, 54 sites for Stratum 3, and 41 sites for Stratum 4. The use of 192 sites allows for a precise estimate of safety belt use. A complete listing of the 192 sites is provided in Appendix I.

The reason for using the 2004 VMT data (Table 2) for determining basic strata composition is to allow comparison of safety belt use data for the past six years. It is, however, important to note that 2008 VMT data was used for the determination of weight factors.

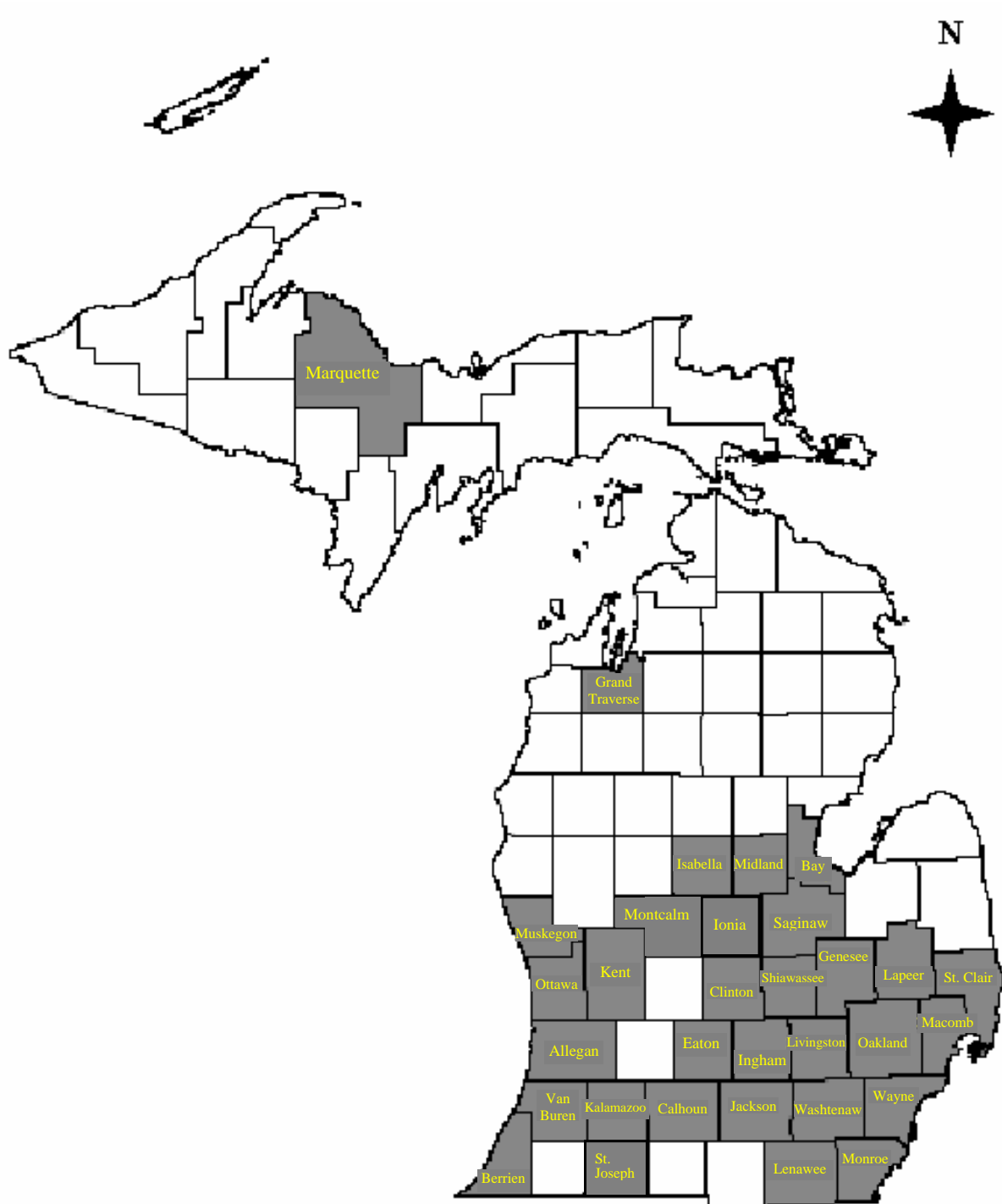


Figure 1. 32-County Statewide Sample for the Direct Observation Safety Belt Surveys

Table 1. Population Data for the Selected Counties in Michigan
[Source: U.S. Census Bureau 2008 Estimates]

| Name of County | Population | Percent of Statewide Population | Cumulative Percentage of Statewide Population | County Ranking by Population |
|--------------------------------|-------------------|--|--|-------------------------------------|
| Wayne | 1,949,929 | 19.49% | 19.49% | 1 |
| Oakland | 1,202,174 | 12.02% | 31.51% | 2 |
| Macomb | 830,663 | 8.30% | 39.81% | 3 |
| Kent | 605,213 | 6.05% | 45.86% | 4 |
| Genesee | 428,790 | 4.29% | 50.15% | 5 |
| Washtenaw | 347,376 | 3.47% | 53.62% | 6 |
| Ingham | 277,528 | 2.77% | 56.40% | 7 |
| Ottawa | 260,364 | 2.60% | 59.00% | 8 |
| Kalamazoo | 245,912 | 2.46% | 61.46% | 9 |
| Saginaw | 200,745 | 2.01% | 63.47% | 10 |
| Livingston | 182,575 | 1.83% | 65.29% | 11 |
| Muskegon | 174,344 | 1.74% | 67.03% | 12 |
| St. Clair | 168,894 | 1.69% | 68.72% | 13 |
| Jackson | 160,180 | 1.60% | 70.32% | 14 |
| Berrien | 159,481 | 1.59% | 71.92% | 15 |
| Monroe | 152,949 | 1.53% | 73.45% | 16 |
| Calhoun | 135,861 | 1.36% | 74.80% | 17 |
| Allegan | 112,975 | 1.13% | 75.93% | 18 |
| Bay | 107,495 | 1.07% | 77.01% | 19 |
| Eaton | 106,781 | 1.07% | 78.08% | 20 |
| Lenawee | 100,801 | 1.01% | 79.08% | 21 |
| Lapeer | 90,875 | 0.91% | 79.99% | 22 |
| Grand Traverse | 86,071 | 0.86% | 80.85% | 23 |
| Midland | 82,605 | 0.83% | 81.68% | 24 |
| Van Buren | 77,801 | 0.78% | 82.46% | 25 |
| Shiawassee | 70,880 | 0.71% | 83.16% | 26 |
| Clinton | 69,726 | 0.70% | 83.86% | 27 |
| Isabella | 66,778 | 0.67% | 84.53% | 28 |
| Marquette | 65,492 | 0.65% | 85.18% | 29 |
| Ionia | 63,833 | 0.64% | 85.82% | 30 |
| Montcalm | 62,971 | 0.63% | 86.45% | 31 |
| St. Joseph | 62,232 | 0.62% | 87.07% | 32 |
| State of Michigan Total | 10,003,422 | | | |

Table 2. 2004 Vehicle Miles of Travel by Stratum
[Source: Michigan Department of Transportation]

| | VMT (2004) (in Thousands) | Stratum VMT (in Thousands) | Percent of Total Strata VMT | Number of Sites |
|----------------------------|--------------------------------------|---------------------------------------|--|----------------------------|
| Stratum 1 | | | | |
| Ingham | 2,589,095 | 22,048,241 | 25.06% | 48 |
| Kalamazoo | 2,603,446 | | | |
| Oakland | 13,113,695 | | | |
| Washtenaw | 3,742,005 | | | |
| Total Stratum 1 VMT | | | | |
| Stratum 2 | | | | |
| Allegan | 1,234,491 | 23,439,396 | 26.64% | 49 |
| Bay | 1,325,042 | | | |
| Eaton | 1,189,516 | | | |
| Grand Traverse | 806,758 | | | |
| Jackson | 1,723,634 | | | |
| Kent | 5,773,450 | | | |
| Livingston | 1,954,324 | | | |
| Macomb | 6,527,891 | | | |
| Midland | 827,006 | | | |
| Ottawa | 2,077,284 | | | |
| Total Stratum 2 VMT | | | | |
| Stratum 3 | | | | |
| Berrien | 2,180,694 | 23,930,076 | 27.19% | 54 |
| Calhoun | 1,731,659 | | | |
| Clinton | 1,140,428 | | | |
| Genesee | 4,731,531 | | | |
| Ionia | 714,959 | | | |
| Isabella | 587,432 | | | |
| Lapeer | 892,081 | | | |
| Lenawee | 898,211 | | | |
| Marquette | 629,897 | | | |
| Monroe | 2,143,438 | | | |
| Montcalm | 589,027 | | | |
| Muskegon | 1,447,105 | | | |
| Saginaw | 2,259,369 | | | |
| Shiawassee | 779,541 | | | |
| St. Clair | 1,624,723 | | | |
| St. Joseph | 579,553 | | | |
| Van Buren | 1,000,428 | | | |
| Total Stratum 3 VMT | | | | |
| Stratum 4 | | | | |
| Wayne | 18,575,126 | 18,575,126 | 21.11% | 41 |
| Total Stratum 4 VMT | | | | |
| Total Strata VMT | | 87,992,839 | 100% | 192 |

The locations of the 192 observation sites were randomly selected from candidate intersections and limited access highway interchanges. The sites were randomly chosen using a method that ensured an equal probability for each location in each stratum being selected as a candidate study location. For the selection of the candidate locations, large scale (3/8 inch = 1 mile) road maps were obtained for each county. A computerized grid was overlaid on each county map at 0.5-mile intervals in the horizontal and vertical directions of the map. These squares represented a square area of 0.25 square miles. For the selection of the intersections, each grid on the county map was assigned two numbers representing an X and Y coordinate and was also assigned a number by stratum. For each stratum, a random number was chosen between one and the number of grids covering the stratum. Then two additional random numbers were selected representing the X and Y coordinates of the selected grid. Random coordinates were chosen until an intersection was found located at the grid coordinates. This process was repeated until the required number of intersection observation sites were selected for all four strata. In addition, alternative secondary intersections were also selected for each primary intersection. Secondary intersections were selected within a 16 square mile area from the primary intersection location. For the selection of observation sites along limited access highways, exit ramps were selected. This was done by sequentially numbering all the exit ramps on limited access highways located within each stratum. Random numbers were then selected between one and the number of ramps to determine which exit ramps would be considered as candidate observation locations. An alternate exit ramp was also selected for each candidate observation location.

Upon the selection of the sites, the direction of traffic flow, day of the week and time of day at each observation location was determined through a similar random sampling method ensuring equal probability. For each intersection, the direction of traffic flow for observation was also randomly selected. Random numbers between one and four were assigned for each primary and secondary intersection's direction of traffic movement. The selected random numbers represented "1" for eastbound, "2" for southbound, "3" for westbound and "4" for northbound. This process allowed a random selection of the direction of traffic flow as well as the roadway for inclusion in the observation study. In order to minimize the travel time and distance required to conduct this study, the observation sites were clustered into geographic regions upon final selection without compromising the randomness of the data.

3.0 OBSERVATIONAL STUDY DATA COLLECTION

For each selected observation site, a minimum of 50 vehicles were observed in at least a 50-minute time frame. If 50 observations were not completed in 50 minutes, the observer stayed longer at the same location and collected safety belt use data until 50 observations were captured at that site. These observations were appropriately reweighted, as explained in the Data Analysis Section of this report. The data collected for the 192 observation sites provided a representative sample for each day of the week and each hour of the day for the safety belt use characteristics of the state.

Only **non-moving** vehicles were observed at each site, due to the difficulty of accurately observing the safety belt use data while the target vehicle is moving. This included vehicles stopped at a stop sign or during a red light at a traffic signal. Since it is not possible to accurately observe all vehicles passing the observation site while collecting the safety belt use data, a 10-minute traffic count of all vehicles passing the observation point was the basis for estimating the total number of vehicles passing the observation site per unit of time. This data introduced a weighting factor for each observation site. The 10-minute count was collected in two 5-minute intervals; five minutes prior to the safety belt use observational period and five minutes following the observational period.

The driver of each vehicle and the passenger in the front right seat of the vehicle were observed for safety belt use, non-use and misuse. The driver belt observational categories included: Not Belted, Belted, Shoulder Belt Behind Back, and Should Belt Under Arm. The passenger belt categories were the same as the driver belt categories and also included the observation of child seats when present in the front passenger seat. In the surveys, both the driver and front-seat passenger were separately identified based upon their gender, estimated age and race. The driver age categories included 16-29, 30-59, and 60 and over. The passenger age categories included 0-3, 4-15, 16-29, 30-59, and 60 and over. The driver and passenger races were categorized as Caucasian, African American, Asian or Pacific Islander, Hispanic, and Native American. The vehicles were categorized into four groups: Passenger Vehicles, Sport Utility Vehicles, Vans or Minivans, and Pick-up Trucks. The vehicles were also identified as being Commercial or Non-commercial vehicles.

The data collected in the field were recorded and returned to the office; observations were manually recorded on survey forms and returned back to the office within 24 hours of the data collection. This manual method was chosen due to concerns with screen visibility of electronic data collection equipment under sunlight or rainy conditions. The WSU-TRG believes that the manual method also increases data accuracy and allows for verification at the time of data entry.

4.0 OBSERVER TRAINING

Members of the WSU-TRG staff participated in the data collection for this project. Each of these staff members has received or is pursuing an engineering degree and has been trained in general traffic data collection methods and procedures. For this project, each data collector received specific training composed of a day-long workshop, technical assistance, and field data collection exercises.

The reliability and repeatability studies were performed at various intersections near the Wayne State University campus, as well as additional locations in southeastern Michigan. These intersections represented various site characteristics that could be challenging for observational data collection. Over a period of several weeks, the group of observers were randomly divided into groups and assigned to collect safety belt observational data independently. They did not interact or consult with one another and did not necessarily observe the same exact vehicles. They were located physically apart to ensure the independence of their data collection.

The data was then summarized and compared among the observers in each group to determine the accuracy of their observations. Upon completion of the training for the data collection, each member of the data collection team received a training manual composed of the information received during the training session, the schedule of data collection and all necessary field supplies.

Two field supervisors monitored the performance of the field observers. The field data collectors submitted their observational data on a daily basis and it was immediately entered and compiled on computer spreadsheets at our WSU campus office.

During the actual wave of data collection, independent auditors were sent out to the field to covertly observe the data collectors. A few violations, such as collecting data for a shorter period

than the mandatory 50 minutes; arriving at a site before or after the specified start time; recording observations by staying inside the vehicle, etc. were noted. The sites where such inconsistencies were observed, the data collection effort were repeated with a different observer during the same day of the week and hour of the day. The random checks were conducted at least twice for each observer and at approximately 12% of the observational sites.

5.0 QUALITY CONTROL

The policies and procedures utilized during the conduct of each wave of direct observation surveys of safety belt use are based upon the *Uniform Criteria for State Observational Surveys of Seat Belt Use* from Title 23, Part 1240.12 of the Code of Federal Regulations. The study design for the Annual Survey is consistent with these criteria, which establish that observations should be conducted on specific dates and times and in particular directions of travel, all of which are determined randomly in advance of the studies. Further, the criteria state that policies should be in place in the event that observations cannot be made due to unanticipated events, such as road construction. In such situations, data collectors are instructed to observe at a pre-assigned alternate location. Policies must also be established for the case where traffic flow is too heavy to observe all vehicles or traffic is moving too quickly for observation. For this reason, the policy for our observational survey is that only vehicles that are stopped in the curb lane be observed to ensure the accuracy of the data. In most instances, high traffic volumes prohibit data collectors from observing all vehicles. Consequently, data collectors are instructed to randomly select vehicles for observation under such conditions until they reach a minimum of 50 vehicles and observe for a minimum period of 50 minutes.

6.0 DATA ANALYSIS

The data collected in the field was entered into a spreadsheet by a team member and verified for accuracy. Rates for safety belt use were determined for each survey stratum, county, location, etc., as well as the statewide average. A 95-percent confidence interval for the estimate of safety belt use was determined according to the NHTSA guidelines.

6.1 Weighted Safety Belt Use Calculations

A weighting procedure was performed when determining the belt use rates as described in the following sample calculations. First, the number of vehicles observed at each intersection was divided by the length of the observation period and then multiplied by a standard 50-minute observational period, to estimate the total number of vehicles that would be observed during a standard 50-minute period. The number of vehicles observed during the 10-minute volume count was then multiplied by 5 to estimate the total number of vehicles that passed the observation location during a standard 50-minute survey period. The total number of vehicles available for observation was then divided by the adjusted number of vehicles that were actually observed. The resulting calculation produced the volume weighting factor for that particular site. The total number of drivers and passengers belted and not belted were then multiplied by the weighting factor to obtain the total number of weighted drivers and passengers that were belted and not belted. The weighted overall safety belt use rate by stratum was then determined by dividing the total (weighted) number of belted drivers and passengers by the total (weighted) number of drivers and passengers. The following calculations further describe the procedure outlined above.

Montcalm County, Condensary and Crystal,

Survey length = 60 minutes

Number of vehicles observed in 60 minutes = 52 vehicles

10-minute volume count = 16 vehicles

Standard 50-minute observational frequency (Adjusted number of vehicles) =

$$\frac{\text{Number of Vehicles Observed}}{\text{Survey Length}} \times 50 \text{ minutes} = \frac{52 \text{ vehicles}}{60 \text{ minutes}} \times 50 \text{ minutes} = 43 \text{ vehicles in 50 minutes}$$

Total number of vehicles available for observation = 10-minute vehicle count x 5 =

16 vehicles x 5 intervals = 80 vehicles in 50 minutes

$$\text{Intersection volume weighting factor} = \frac{\text{Total Number of Vehicles}}{\text{Adjusted Number of Vehicles}} = \frac{80}{43} = 1.86$$

The variance for each stratum was determined by following Cochran's equation [6] as follows:

$$Variance_j = \frac{n_j}{n_j - 1} \sum_{i=1}^{n_j} \left[\left(\frac{g_{ij}}{\sum_{i=1}^{n_j} g_{ij}} \right)^2 (r_{ij} - r_j)^2 \right]$$

Where,

n_j = number of observation locations stratum j

g_{ij} = number of observations at location i in stratum j

r_{ij} = safety belt use rate for location i in stratum j

r_j = overall safety belt use rate for stratum j

6.2 Overall Statewide Safety Belt Use Calculations

The weighted safety belt use rate was calculated by summing up the strata safety belt use rates, each multiplied by a vehicle miles of travel weighting factor for that stratum, divided by the sum of the vehicle miles of travel weighting factor. The 2008 vehicle miles of travel from the Michigan Department of Transportation, as shown in Table 3 were used for these calculations. The four vehicle miles of travel totals were compared and Stratum 2 had the highest total, 24,142,891,000, and was assigned a weight factor of 1.0. The other three strata's weight factors were determined by dividing the vehicle miles of travel for that stratum by Stratum 2's vehicle miles of travel. Stratum 1 was assigned a weight factor equal to 0.910 (21,977,869,000 divided by 24,142,891,000). Stratum 3 was assigned a weight factor equal to 0.956 (23,072,925,000 divided by 24,142,891,000). Stratum 4 was assigned a weight factor equal to 0.763 (18,415,672,000 divided by 24,142,891,000). The sum of the weight factors for all four strata equaled 3.629.

Table 3. 2008 Vehicle Miles of Travel by Stratum
[Source: Michigan Department of Transportation]

| | VMT (2008) (in Thousands) | Total VMT (in Thousands) |
|----------------------------|--|---|
| Stratum 1 | | |
| Ingham | 2,434,971 | |
| Kalamazoo | 2,462,038 | |
| Oakland | 12,972,413 | |
| Washtenaw | 4,108,447 | |
| Total Stratum 1 VMT | | |
| Stratum 2 | | |
| Allegan | 1,300,760 | |
| Bay | 1,249,878 | |
| Eaton | 1,168,670 | |
| Grand Traverse | 769,354 | |
| Jackson | 1,566,231 | |
| Kent | 6,018,153 | |
| Livingston | 2,637,147 | |
| Macomb | 6,440,522 | |
| Midland | 760,668 | |
| Ottawa | 2,231,508 | |
| Total Stratum 2 VMT | | |
| Stratum 3 | | |
| Berrien | 2,016,812 | |
| Calhoun | 1,693,027 | |
| Clinton | 1,103,240 | |
| Genesee | 4,386,305 | |
| Ionia | 690,853 | |
| Isabella | 598,047 | |
| Lapeer | 948,077 | |
| Lenawee | 862,124 | |
| Marquette | 601,336 | |
| Monroe | 1,925,266 | |
| Montcalm | 564,106 | |
| Muskegon | 1,642,764 | |
| Saginaw | 2,159,184 | |
| Shiawassee | 790,323 | |
| St. Clair | 1,576,470 | |
| St. Joseph | 562,925 | |
| Van Buren | 952,066 | |
| Total Stratum 3 VMT | | 23,072,925 |
| Stratum 4 | | |
| Wayne | 18,415,672 | |
| Total Stratum 4 VMT | | |
| Total Strata VMT | | 87,609,357 |

The overall statewide variance was calculated using the following formula:

$$\text{Variance}_{\text{TOTAL}} = \frac{\sum w_j^2 \text{Var}_j}{(\sum w_j)^2}$$

Where, w_j = VMT weight factor for stratum j

The 95 percent confidence interval is equal to the weighted safety belt use rate plus/minus 1.96 (for the Z-test at $\alpha = 0.05$) multiplied by the standard error of the stratum's or statewide use rate. The relative error is equal to the standard error divided by the weighted statewide safety belt use rate and must be less than five percent according to NHTSA guidelines.

The data were also analyzed and compared with studies from previous years to assess the progress of the safety belt campaign in the State of Michigan.

7.0 RESULTS AND CONCLUSIONS

7.1 Annual Direct Observation Survey (Safety Belt Use)

The Annual Direct Observational Survey was performed between Sunday, August 8th and Saturday, September 11th of 2010. During this observation period, a total of 16,344 occupants were observed at 192 observation sites randomly selected to represent statewide safety belt use.

The overall weighted statewide safety belt use rate, determined on a strata-basis, is shown in Table 4. The overall weighted statewide safety belt use rate was calculated based upon the procedure described in the "Overall Statewide Safety Belt Use Calculations" section in the Data Analysis section of the report. When the safety belt usage rates were calculated, belted occupants included all drivers and front-seat passengers who were belted appropriately. The "not belted" occupants included drivers and front-seat passengers who were not belted or who were wearing the belt either under their arm or behind their back.

Table 4. Statewide Weighted Safety Belt Use Rate for Drivers and Front-Seat Passengers

| Observational Wave | Safety Belt Use Rate | Standard Error | Relative Error |
|------------------------------------|-----------------------------|-----------------------|-----------------------|
| Annual Direct Observational Survey | 95.2% ± 1.3% | 0.6% | 0.7% |

The findings for the Annual Observational Survey for each stratum are shown in Table 5. It should be noted that the stratus-based estimate may not be directly comparable to data from previous years due to the removal of some study sites. Additional breakdowns of the safety belt use rates and standard error at a county level are provided in Appendix II. Complete details of the observations on an intersection level are provided in Appendix III.

Table 5. Weighted Safety Belt Use Rate for Drivers and Front-Seat Passengers by Stratum

| Stratum | Annual Direct Observational Survey | |
|----------------|---|-----------------------|
| | Safety Belt Usage Rate* | Standard Error |
| Stratum 1 | 96.7% ± 0.5% | 0.3% |
| Stratum 2 | 95.2% ± 0.5% | 0.3% |
| Stratum 3 | 94.1% ± 0.7% | 0.4% |
| Stratum 4 | 94.7% ± 1.0% | 0.5% |
| Total | 95.2% ± 1.3% | 0.6% |

* Weighted Safety Belt Usage ± 95% Confidence Band

Table 6 summarizes the descriptive statistics regarding the Annual Observation Survey for the vehicles, in terms of day of the week and time of the day.

Table 6. Statewide Descriptive Statistics

| Day of the Week | Annual Safety Belt Observations | | | |
|-----------------|---------------------------------|---------------------------------|--|--|
| | No. of Sites Observed | Percent of Sites in Day of Week | Actual Total No. of Observations (Occupants) | Percent of Observations in Day of Week (Occupants) |
| Sunday | 23 | 11.98% | 1,783 | 10.91% |
| Monday | 25 | 13.02% | 2,155 | 13.19% |
| Tuesday | 33 | 17.19% | 2,454 | 15.01% |
| Wednesday | 26 | 13.54% | 2,336 | 14.29% |
| Thursday | 31 | 16.15% | 2,806 | 17.17% |
| Friday | 27 | 14.06% | 2,507 | 15.34% |
| Saturday | 27 | 14.06% | 2,303 | 14.09% |
| Total | 192 | 100% | 16,344 | 100% |
| Time of the Day | Annual Safety Belt Observations | | | |
| | No. of Sites Observed | Percent of Sites in Time of Day | Actual Total No. of Observations (Occupants) | Percent of Observations in Time of Day (Occupants) |
| 7 am - 8 am | 15 | 7.81% | 994 | 6.08% |
| 8 am - 9 am | 13 | 6.77% | 901 | 5.51% |
| 9 am - 10 am | 13 | 6.77% | 1,037 | 6.35% |
| 10 am - 11 am | 19 | 9.90% | 1,553 | 9.50% |
| 11 am - 12 pm | 18 | 9.38% | 1,477 | 9.04% |
| 12 pm - 1 pm | 19 | 9.90% | 1,739 | 10.64% |
| 1 pm - 2 pm | 18 | 9.38% | 1,663 | 10.17% |
| 2 pm - 3 pm | 19 | 9.90% | 1,639 | 10.03% |
| 3 pm - 4 pm | 14 | 7.29% | 1,105 | 6.76% |
| 4 pm - 5 pm | 13 | 6.77% | 1,185 | 7.25% |
| 5 pm - 6 pm | 15 | 7.81% | 1,621 | 9.92% |
| 6 pm - 7 pm | 16 | 8.33% | 1,430 | 8.75% |
| Total | 192 | 100% | 16,344 | 100% |

The safety belt use rate can be described by the overall use rate, as well as by vehicle type and various demographics. Table 7 summarizes the safety belt use rate for the statewide survey by driver, front-seat passenger and total observations. It should be noted that the overall weighted safety belt use rates presented in Tables 7 through 18 vary from those provided in Tables 4 and 5. The overall statewide weighted safety belt use percentages provided in Tables 4 and 5 were calculated by weighting the safety belt use rates at each location by an intersection weighting factor and then by a strata-based VMT weighting factor (as described in Section 6.2 Overall Statewide Safety Belt Use Calculations). The weighted safety belt use rates provided in Tables 7 through 18 were calculated by utilizing only the intersection weighting factors (as described in Section 7.1 Weighted Safety Belt Use Calculations). As the data presented in Tables 7 through 18 are not aggregated at the strata or district level, VMT weighting factor is not applicable.

Table 7. Statewide Safety Belt Use Summary

| Driver Belt Use | Actual Total # of Obs. (Drivers Only) | Weighted Total # of Obs. (Drivers Only) | Weighted % of Restraint Use by Type (Drivers Only) |
|---------------------------|--|--|---|
| Not Belted | 616 | 2,383 | 4.39% |
| Belted | 12,196 | 51,765 | 95.28% |
| Belted Behind Back | 11 | 50 | 0.09% |
| Belted Under Arm | 31 | 131 | 0.24% |
| Total | 12,854 | 54,329 | 100% |
| Passenger Belt Use | Actual Total # of Obs. (Passengers Only) | Weighted Total # of Obs. (Passengers Only) | Weighted % of Restraint Use by Type (Passengers Only) |
| Not Belted | 152 | 519 | 3.55% |
| Belted | 3,298 | 13,971 | 95.62% |
| Belted Behind Back | 15 | 48 | 0.33% |
| Belted Under Arm | 25 | 73 | 0.50% |
| Total | 3,490 | 14,611 | 100% |
| Total Belt Use | Actual Total # of Obs. (Drivers & Passengers) | Weighted Total # of Obs. (Drivers & Passengers) | Weighted % of Restraint Use by Type (Drivers & Passengers) |
| Not Belted | 768 | 2,902 | 4.21% |
| Belted | 15,494 | 65,736 | 95.35% |
| Belted Behind Back | 26 | 98 | 0.14% |
| Belted Under Arm | 56 | 204 | 0.30% |
| Total | 16,344 | 68,940 | 100% |

Table 8 summarizes the statewide driver and front-seat passenger safety belt use rates by county. In Table 8, the counties are listed by stratum. Because of the relatively low number of sites and/or observations in many counties, the safety belt use rates listed may not be fully representative of each county. The use rates indicated are the weighted average of the observations taken in each county.

Table 8. Statewide Safety Belt Use Rates by Stratum and County

| Stratum 1 | Actual Total # of Obs. (Drivers & Passengers) | Weighted Total # of Obs. (Drivers & Passengers) | Weighted % of SBU (Drivers & Passengers) |
|-----------------------|--|--|---|
| Ingham County | 1,479 | 5,411 | 96.11% |
| Kalamazoo County | 735 | 3,133 | 95.54% |
| Oakland County | 967 | 7,646 | 97.48% |
| Washtenaw County | 1,010 | 5,519 | 97.01% |
| Total | 4,191 | 21,709 | 96.74% |
| Stratum 2 | Actual Total # of Obs. (Drivers & Passengers) | Weighted Total # of Obs. (Drivers & Passengers) | Weighted % of SBU (Drivers & Passengers) |
| Allegan County | 377 | 712 | 96.10% |
| Bay County | 279 | 350 | 92.88% |
| Eaton County | 468 | 2,200 | 94.76% |
| Grand Traverse County | 101 | 790 | 95.05% |
| Jackson County | 464 | 737 | 95.75% |
| Kent County | 773 | 3,187 | 94.88% |
| Livingston County | 541 | 1,724 | 96.93% |
| Macomb County | 494 | 2,515 | 94.66% |
| Midland County | 387 | 520 | 95.81% |
| Ottawa County | 209 | 290 | 95.60% |
| Total | 4,093 | 13,025 | 95.21% |

Table 8. Statewide Safety Belt Use Rates by District and County (Continued)

| Stratum 3 | Actual Total # of Obs. (Drivers & Passengers) | Weighted Total # of Obs. (Drivers & Passengers) | Weighted % of SBU (Drivers & Passengers) |
|-------------------|--|--|---|
| Berrien County | 304 | 496 | 95.47% |
| Calhoun County | 376 | 622 | 95.53% |
| Clinton County | 370 | 425 | 90.63% |
| Genesee County | 497 | 2285 | 94.59% |
| Ionia County | 231 | 309 | 93.30% |
| Isabella County | 86 | 63 | 86.05% |
| Lapeer County | 183 | 664 | 93.41% |
| Lenawee County | 266 | 435 | 96.53% |
| Marquette County | 170 | 890 | 94.25% |
| Monroe County | 505 | 1148 | 92.90% |
| Montcalm County | 205 | 462 | 94.06% |
| Muskegon County | 214 | 235 | 93.63% |
| Saginaw County | 90 | 424 | 94.44% |
| Shiawassee County | 202 | 197 | 94.17% |
| St. Clair County | 269 | 434 | 93.85% |
| St. Joseph County | 173 | 899 | 93.10% |
| Van Buren County | 387 | 787 | 95.37% |
| Total | 4,528 | 10,775 | 94.09% |
| Stratum 4 | Actual Total # of Obs. (Drivers & Passengers) | Weighted Total # of Obs. (Drivers & Passengers) | Weighted % of SBU (Drivers & Passengers) |
| Wayne County | 3,532 | 23,431 | 94.73% |
| Total | 3,532 | 23,431 | 94.73% |

Tables 9 through 13 summarize occupant safety belt use for drivers and front-seat passengers by vehicle type for the day of the week, time of the day, gender, age and race for the Annual Observation Survey.

Table 9. All Vehicles Statewide Summary

| Day of the Week | All Vehicles Safety Belt Use | | |
|-----------------|------------------------------|--------------------------|-------------------|
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Sunday | 1,783 | 6,549 | 95.8% |
| Monday | 2,155 | 8,903 | 94.6% |
| Tuesday | 2,454 | 12,532 | 95.9% |
| Wednesday | 2,336 | 8,539 | 93.9% |
| Thursday | 2,806 | 12,962 | 95.4% |
| Friday | 2,507 | 9,345 | 96.1% |
| Saturday | 2,303 | 10,110 | 95.6% |
| Total | 16,344 | 68,940 | 95.2% |
| Time of the Day | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| 7 am - 8 am | 994 | 2,875 | 94.6% |
| 8 am - 9 am | 901 | 2,299 | 96.0% |
| 9 am - 10 am | 1,037 | 3,760 | 95.2% |
| 10 am - 11 am | 1,553 | 8,261 | 96.7% |
| 11 am - 12 pm | 1,477 | 3,066 | 92.6% |
| 12 pm - 1 pm | 1,739 | 9,586 | 95.3% |
| 1 pm - 2 pm | 1,663 | 5,329 | 95.0% |
| 2 pm - 3 pm | 1,639 | 6,671 | 95.1% |
| 3 pm - 4 pm | 1,105 | 5,010 | 94.7% |
| 4 pm - 5 pm | 1,185 | 6,189 | 95.9% |
| 5 pm - 6 pm | 1,621 | 6,699 | 94.6% |
| 6 pm - 7 pm | 1,430 | 9,195 | 96.2% |
| Total | 16,344 | 68,940 | 95.2% |

Table 9. All Vehicles Statewide Summary (Continued)

| Vehicle Type | All Vehicles Safety Belt Use | | |
|---------------------------|------------------------------|--------------------------|-------------------|
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Passenger Cars | 7,838 | 34,810 | 95.9% |
| Sport Utility | 3,575 | 15,884 | 95.1% |
| Vans/Minivans | 2,101 | 8,938 | 96.1% |
| Pick-Up Trucks | 2,830 | 9,308 | 92.9% |
| Total | 16,344 | 68,940 | 95.2% |
| Gender | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Male | 8,592 | 35,556 | 94.2% |
| Female | 7,752 | 33,384 | 96.5% |
| Total | 16,344 | 68,940 | 95.2% |
| Age | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| 0-3 | 6 | 20 | 94.9% |
| 4-15 | 461 | 1,742 | 95.7% |
| 16-29 | 4,862 | 21,813 | 94.7% |
| 30-59 | 9,238 | 38,698 | 91.8% |
| 60+ | 1,777 | 6,667 | 96.7% |
| Total | 16,344 | 68,940 | 95.2% |
| Race | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Caucasian | 14,250 | 54,935 | 95.7% |
| African American | 1,719 | 12,028 | 93.6% |
| Asian or Pacific Islander | 195 | 1,303 | 96.9% |
| Hispanic | 165 | 624 | 97.0% |
| Native American | 15 | 50 | 100% |
| Total | 16,344 | 68,940 | 95.2% |

Table 10. Passenger Cars Statewide Summary

| Day of the Week | Passenger Cars Safety Belt Use | | |
|-----------------|--------------------------------|--------------------------|-------------------|
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Sunday | 875 | 3,492 | 96.7% |
| Monday | 1,014 | 4,357 | 95.0% |
| Tuesday | 1,202 | 6,591 | 95.7% |
| Wednesday | 1,116 | 4,238 | 94.5% |
| Thursday | 1,390 | 6,565 | 96.4% |
| Friday | 1,141 | 4,562 | 97.7% |
| Saturday | 1,100 | 5,005 | 95.35 |
| Total | 7,838 | 34,810 | 95.9% |
| Hour of the Day | Passenger Cars Safety Belt Use | | |
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| 7 am - 8 am | 479 | 1,420 | 98.3% |
| 8 am - 9 am | 404 | 1,068 | 98.6% |
| 9 am - 10 am | 489 | 1,915 | 95.2% |
| 10 am - 11 am | 757 | 4,225 | 97.8% |
| 11 am - 12 pm | 650 | 1,470 | 91.9% |
| 12 pm - 1 pm | 815 | 4,662 | 96.3% |
| 1 pm - 2 pm | 740 | 2,300 | 96.4% |
| 2 pm - 3 pm | 782 | 3,207 | 94.2% |
| 3 pm - 4 pm | 505 | 2,453 | 94.3% |
| 4 pm - 5 pm | 599 | 3,243 | 97.4% |
| 5 pm - 6 pm | 821 | 3,514 | 94.6% |
| 6 pm - 7 pm | 797 | 5,333 | 95.8% |
| Total | 7,838 | 34,810 | 95.9% |

Table 10. Passenger Cars Statewide Summary (Continued)

| Gender | Passenger Cars Safety Belt Use | | |
|---------------------------|--------------------------------|--------------------------|-------------------|
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Male | 3,754 | 16,651 | 95.2% |
| Female | 4,084 | 18,159 | 96.6% |
| Total | 7,838 | 34,810 | 95.9% |
| Age | Passenger Cars Safety Belt Use | | |
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| 0-3 | 1 | 1 | 100% |
| 4-15 | 174 | 665 | 96.5% |
| 16-29 | 2,763 | 12,759 | 95.3% |
| 30-59 | 3,943 | 17,722 | 96.5% |
| 60+ | 957 | 3,663 | 95.1% |
| Total | 7,838 | 34,810 | 95.9% |
| Race | Passenger Cars Safety Belt Use | | |
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Caucasian | 6,610 | 26,583 | 96.4% |
| African American | 1,052 | 7,345 | 94.3% |
| Asian or Pacific Islander | 111 | 680 | 96.6% |
| Hispanic | 56 | 171 | 92.7% |
| Native American | 9 | 31 | 100% |
| Total | 7,838 | 34,810 | 95.9% |

Table 11. Sport Utility Vehicles Statewide Summary

| Day of the Week | Sport Utility Vehicles Safety Belt Use | | |
|-----------------|--|--------------------------|-------------------|
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Sunday | 385 | 1,453 | 96.4% |
| Monday | 476 | 2,199 | 93.2% |
| Tuesday | 531 | 2,861 | 97.7% |
| Wednesday | 470 | 1,728 | 94.3% |
| Thursday | 612 | 2,947 | 94.6% |
| Friday | 551 | 2,143 | 93.4% |
| Saturday | 550 | 2,553 | 95.7% |
| Total | 3,575 | 15,884 | 95.1% |
| Hour of the Day | Sport Utility Vehicles Safety Belt Use | | |
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| 7 am - 8 am | 232 | 802 | 92.3% |
| 8 am - 9 am | 190 | 520 | 93.3% |
| 9 am - 10 am | 230 | 853 | 96.6% |
| 10 am - 11 am | 324 | 1,706 | 97.1% |
| 11 am - 12 pm | 362 | 712 | 94.5% |
| 12 pm - 1 pm | 381 | 2,384 | 93.9% |
| 1 pm - 2 pm | 348 | 1,183 | 96.8% |
| 2 pm - 3 pm | 367 | 1,558 | 95.8% |
| 3 pm - 4 pm | 242 | 1,129 | 93.0% |
| 4 pm - 5 pm | 257 | 1,486 | 97.3% |
| 5 pm - 6 pm | 364 | 1,717 | 94.8% |
| 6 pm - 7 pm | 278 | 1,834 | 94.3% |
| Total | 3,575 | 15,884 | 95.1% |

Table 11. Sport Utility Vehicles Statewide Summary (Continued)

| Gender | Sport Utility Vehicles Safety Belt Use | | |
|------------------------------|---|--------------------------------|----------------------|
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Male | 1,569 | 7,022 | 94.2% |
| Female | 2,006 | 8,862 | 95.8% |
| Total | 3,575 | 15,884 | 95.1% |
| Age | Sport Utility Vehicles Safety Belt Use | | |
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| 0-3 | 2 | 14 | 100% |
| 4-15 | 115 | 456 | 97.6% |
| 16-29 | 1,022 | 4,745 | 93.9% |
| 30-59 | 2,129 | 9,325 | 95.7% |
| 60+ | 307 | 1,344 | 94.6% |
| Total | 3,575 | 15,884 | 95.1% |
| Race | Sport Utility Vehicles Safety Belt Use | | |
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Caucasian | 3,140 | 12,798 | 95.6% |
| African American | 348 | 2,489 | 92.3% |
| Asian or Pacific Islander | 52 | 430 | 96.0% |
| Hispanic | 33 | 162 | 98.5% |
| Native American | 2 | 5 | 100% |
| Total | 3,575 | 15,884 | 95.1% |

Table 12. Vans/Minivans Statewide Summary

| Day of the Week | Vans/Minivans Safety Belt Use | | |
|-----------------|-------------------------------|--------------------------|-------------------|
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Sunday | 190 | 636 | 95.4% |
| Monday | 245 | 1,036 | 95.7% |
| Tuesday | 322 | 1,526 | 98.4% |
| Wednesday | 372 | 1,471 | 95.2% |
| Thursday | 331 | 1,531 | 94.1% |
| Friday | 363 | 1,377 | 96.8% |
| Saturday | 278 | 1,361 | 96.9% |
| Total | 2,101 | 8,938 | 96.1% |
| Hour of the Day | Vans/Minivans Safety Belt Use | | |
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| 7 am - 8 am | 89 | 269 | 84.9% |
| 8 am - 9 am | 135 | 313 | 97.4% |
| 9 am - 10 am | 147 | 561 | 98.3% |
| 10 am - 11 am | 193 | 1,031 | 95.2% |
| 11 am - 12 pm | 197 | 401 | 92.4% |
| 12 pm - 1 pm | 249 | 1,272 | 98.4% |
| 1 pm - 2 pm | 257 | 885 | 94.7% |
| 2 pm - 3 pm | 206 | 868 | 98.6% |
| 3 pm - 4 pm | 155 | 733 | 96.5% |
| 4 pm - 5 pm | 149 | 764 | 90.9% |
| 5 pm - 6 pm | 152 | 663 | 96.6% |
| 6 pm - 7 pm | 172 | 1,178 | 99.1% |
| Total | 2,101 | 8,938 | 96.1% |

Table 12. Vans/Minivans Statewide Summary (Continued)

| Gender | Vans/Minivans Safety Belt Use | | |
|---------------------------|-------------------------------|--------------------------|-------------------|
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Male | 1,014 | 4,399 | 94.4% |
| Female | 1,087 | 4,539 | 97.8% |
| Total | 2,101 | 8,938 | 96.1% |
| Age | Vans/Minivans Safety Belt Use | | |
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| 0-3 | 0 | 0 | N / A |
| 4-15 | 110 | 473 | 97.9% |
| 16-29 | 410 | 1,987 | 97.2% |
| 30-59 | 1,308 | 5,467 | 96.0% |
| 60+ | 273 | 1,011 | 93.8% |
| Total | 2,101 | 8,938 | 96.1% |
| Race | Vans/Minivans Safety Belt Use | | |
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Caucasian | 1,815 | 6,987 | 96.6% |
| African American | 216 | 1,571 | 93.2% |
| Asian or Pacific Islander | 28 | 178 | 100% |
| Hispanic | 38 | 188 | 98.7% |
| Native American | 4 | 14 | 100% |
| Total | 2,101 | 8,938 | 96.1% |

Table 13. Pick-up Trucks Statewide Summary

| Day of the Week | Pickup Trucks Safety Belt Use | | |
|-----------------|-------------------------------|--------------------------|-------------------|
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Sunday | 333 | 968 | 91.9% |
| Monday | 420 | 1,312 | 95.0% |
| Tuesday | 399 | 1,554 | 90.7% |
| Wednesday | 378 | 1,102 | 89.0% |
| Thursday | 473 | 1,918 | 94.3% |
| Friday | 452 | 1,263 | 94.0% |
| Saturday | 375 | 1,191 | 94.9% |
| Total | 2,830 | 9,308 | 92.9% |
| Hour of the Day | Pickup Trucks Safety Belt Use | | |
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| 7 am - 8 am | 194 | 385 | 92.6% |
| 8 am - 9 am | 172 | 399 | 91.5% |
| 9 am - 10 am | 171 | 431 | 88.4% |
| 10 am - 11 am | 279 | 1,298 | 93.8% |
| 11 am - 12 pm | 268 | 483 | 92.1% |
| 12 pm - 1 pm | 294 | 1,269 | 91.6% |
| 1 pm - 2 pm | 318 | 960 | 89.7% |
| 2 pm - 3 pm | 284 | 1,038 | 93.7% |
| 3 pm - 4 pm | 203 | 695 | 97.4% |
| 4 pm - 5 pm | 180 | 696 | 91.1% |
| 5 pm - 6 pm | 284 | 804 | 92.1% |
| 6 pm - 7 pm | 183 | 850 | 98.7% |
| Total | 2,830 | 9,308 | 92.9% |

Table 13. Pick-up Trucks Statewide Summary (Continued)

| Gender | Pickup Trucks Safety Belt Use | | |
|---------------------------|-------------------------------|--------------------------|-------------------|
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Male | 2,255 | 7,484 | 92.1% |
| Female | 575 | 1,824 | 96.2% |
| Total | 2,830 | 9,308 | 92.9% |
| Age | Pickup Trucks Safety Belt Use | | |
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| 0-3 | 3 | 5 | 66.4% |
| 4-15 | 62 | 149 | 90.7% |
| 16-29 | 667 | 2,322 | 92.7% |
| 30-59 | 1,858 | 6,184 | 93.0% |
| 60+ | 240 | 649 | 94.1% |
| Total | 2,830 | 9,308 | 92.9% |
| Race | Pickup Trucks Safety Belt Use | | |
| | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Caucasian | 2,685 | 8,567 | 92.9% |
| African American | 103 | 623 | 92.0% |
| Asian or Pacific Islander | 4 | 15 | 100% |
| Hispanic | 38 | 103 | 98.4% |
| Native American | 0 | 0 | N / A |
| Total | 2,830 | 9,308 | 92.9% |

Occupants of vans/minivans exhibited the highest use rate at 96.1 percent. Use among occupants of passenger cars and sport utility vehicles was equal to 95.9 and 95.1 percent respectively. Pick-up truck occupants had the lowest overall safety belt use rate at 92.9 percent. As compared to the 2009 Annual Observation Survey, all the vehicle types experienced a small decrease in the usage rate.

The safety belt use rates were relatively consistent among the different days of the week, except for Wednesday which experienced a lower safety belt usage rate of 93.9 percent. The late morning hour from 11:00 am to 12 noon experienced lower usage rates than all other times of the day. Again, female occupants had higher use rates than their male counterparts by 2.3 percent. The safety belt usage rate was the highest for front-seat occupants above the age of 60, followed by front-seat passengers between the ages of four and 15. In general, use was lower among African American occupants.

Table 14 summarizes occupant safety belt use rates by gender and age. Tables 15 through 18 present similar data, subdivided by vehicle type. Male pick-up truck occupants continue to have the lowest rates of safety belt use (92.1%), followed by male sport utility vehicle occupants (94.2%).

Table 14. All Vehicles Statewide Demographic Summary

| Demographic Data | | | All Vehicles Safety Belt Use | | |
|------------------|-------|---------------------------|------------------------------|--------------------------|-------------------|
| Gender | Age | Race | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Male | 0-3 | Caucasian | 2 | 3 | 100% |
| | | Total | 2 | 3 | 100% |
| | 4-15 | Caucasian | 211 | 706 | 95.7% |
| | | African American | 28 | 194 | 95.1% |
| | | Asian or Pacific Islander | 2 | 30 | 100% |
| | | Hispanic | 2 | 6 | 100% |
| | | Total | 243 | 936 | 95.8% |
| | 16-29 | Caucasian | 2,061 | 8,292 | 93.8% |
| | | African American | 315 | 2,208 | 92.9% |
| | | Asian or Pacific Islander | 37 | 201 | 96.2% |
| | | Hispanic | 53 | 157 | 94.6% |
| | | Native American | 1 | 5 | 100% |
| | | Total | 2,467 | 10,863 | 93.7% |
| | 30-59 | Caucasian | 4,384 | 16,747 | 94.9% |
| | | African American | 483 | 3,156 | 93.1% |
| | | Asian or Pacific Islander | 65 | 377 | 93.1% |
| | | Hispanic | 62 | 225 | 98.9% |
| | | Native American | 1 | 2 | 100% |
| | | Total | 4,995 | 20,507 | 94.6% |
| | 60+ | Caucasian | 852 | 2,985 | 93.4% |
| | | African American | 31 | 253 | 92.0% |
| | | Asian or Pacific Islander | 2 | 9 | 100% |
| | | Total | 885 | 3,247 | 93.3% |
| | | TOTAL | 8,592 | 35,556 | 94.2% |

Table 14. All Vehicles Statewide Demographic Summary (Continued)

| Demographic Data | | | All Vehicles Safety Belt Use | | |
|------------------|---------------------------|---------------------------|------------------------------|--------------------------|-------------------|
| Gender | Age | Race | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Female | 0-3 | Caucasian | 4 | 16 | 90.2% |
| | | Total | 4 | 16 | 90.2% |
| | 4-15 | Caucasian | 192 | 598 | 98.2% |
| | | African American | 22 | 167 | 95.4% |
| | | Asian or Pacific Islander | 3 | 19 | 100% |
| | | Hispanic | 1 | 22 | 100% |
| | | Total | 218 | 806 | 97.7% |
| | | 16-29 | Caucasian | 1,979 | 7,954 |
| | African American | | 350 | 2,584 | 93.5% |
| | Asian or Pacific Islander | | 43 | 315 | 100% |
| | Hispanic | | 18 | 81 | 98.3% |
| | Native American | | 5 | 16 | 100% |
| | Total | | 2,395 | 10,950 | 96.0% |
| | 30-59 | Caucasian | 3,702 | 14,436 | 97.3% |
| | | African American | 464 | 3,263 | 95.0% |
| | | Asian or Pacific Islander | 42 | 339 | 98.1% |
| | | Hispanic | 28 | 132 | 95.0% |
| | | Native American | 7 | 22 | 100% |
| | | Total | 4,243 | 18,192 | 96.9% |
| | 60+ | Caucasian | 863 | 3,198 | 96.5% |
| | | African American | 26 | 203 | 86.7% |
| | | Asian or Pacific Islander | 1 | 14 | 100% |
| | | Hispanic | 1 | 1 | 100% |
| | | Native American | 1 | 5 | 100% |
| | | Total | 892 | 3,420 | 96.0% |
| | TOTAL | | | 7,752 | 33,384 |

Table 15. Passenger Cars Statewide Demographic Summary

| Demographic Data | | | Passenger Cars Safety Belt Use | | |
|------------------|--------------|---------------------------|--------------------------------|--------------------------|-------------------|
| Gender | Age | Race | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Male | 4-15 | Caucasian | 82 | 269 | 94.7% |
| | | African American | 16 | 110 | 100% |
| | | Total | 98 | 379 | 96.2% |
| | 16-29 | Caucasian | 1,066 | 4,503 | 94.8% |
| | | African American | 205 | 1,354 | 91.8% |
| | | Asian or Pacific Islander | 22 | 112 | 100% |
| | | Hispanic | 20 | 71 | 90.9% |
| | | Native American | 1 | 5 | 100% |
| | | Total | 1,314 | 6,045 | 94.2% |
| | 30-59 | Caucasian | 1,620 | 6,750 | 96.3% |
| | | African American | 244 | 1,561 | 96.1% |
| | | Asian or Pacific Islander | 39 | 227 | 92.7% |
| | | Hispanic | 17 | 42 | 98.1% |
| | | Native American | 1 | 2 | 100% |
| | | Total | 1,921 | 8,582 | 96.2% |
| | 60+ | Caucasian | 405 | 1,517 | 93.3% |
| | | African American | 15 | 123 | 90.3% |
| | | Asian or Pacific Islander | 1 | 5 | 100% |
| | | Total | 421 | 1,645 | 93.1% |
| | TOTAL | | | 3,754 | 16,651 |

Table 15. Passenger Cars Statewide Demographic Summary (Continued)

| Demographic Data | | | Passenger Cars Safety Belt Use | | |
|------------------|--------------|---------------------------|--------------------------------|--------------------------|-------------------|
| Gender | Age | Race | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Female | 0-3 | Caucasian | 1 | 1 | 100% |
| | | Total | 1 | 1 | 100% |
| | 4-15 | Caucasian | 62 | 177 | 99.4% |
| | | African American | 13 | 107 | 92.8% |
| | | Asian or Pacific Islander | 1 | 3 | 100% |
| | | Total | 76 | 287 | 96.9% |
| | 16-29 | Caucasian | 1,175 | 4,717 | 96.9% |
| | | African American | 237 | 1,753 | 94.1% |
| | | Asian or Pacific Islander | 27 | 207 | 100% |
| | | Hispanic | 9 | 34 | 95.9% |
| | | Native American | 1 | 2 | 100% |
| | | Total | 1,449 | 6,713 | 96.3% |
| | 30-59 | Caucasian | 1,679 | 6,727 | 97.5% |
| | | African American | 307 | 2,246 | 94.9% |
| | | Asian or Pacific Islander | 21 | 127 | 94.8% |
| | | Hispanic | 10 | 23 | 83.9% |
| | | Native American | 5 | 17 | 100% |
| | | Total | 2,022 | 9,140 | 96.8% |
| | 60+ | Caucasian | 520 | 1,922 | 97.1% |
| | | African American | 15 | 91 | 89.1% |
| | | Native American | 1 | 5 | 100% |
| | | Total | 536 | 2,018 | 96.7% |
| | TOTAL | | | 4,084 | 18,159 |

Table 16. Sport Utility Vehicles Statewide Demographic Summary

| Demographic Data | | | Passenger Cars Safety Belt Use | | |
|------------------|--------------|---------------------------|--------------------------------|--------------------------|-------------------|
| Gender | Age | Race | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Male | 4-15 | Caucasian | 47 | 170 | 100% |
| | | African American | 6 | 34 | 72.0% |
| | | Asian or Pacific Islander | 2 | 30 | 100% |
| | | Hispanic | 1 | 2 | 100% |
| | | Total | 56 | 236 | 95.9% |
| | 16-29 | Caucasian | 351 | 1,485 | 92.6% |
| | | African American | 51 | 386 | 94.0% |
| | | Asian or Pacific Islander | 9 | 71 | 89.3% |
| | | Hispanic | 7 | 11 | 89.5% |
| | | Total | 418 | 1,953 | 92.8% |
| | 30-59 | Caucasian | 831 | 3,392 | 95.0% |
| | | African American | 97 | 677 | 92.8% |
| | | Asian or Pacific Islander | 13 | 93 | 89.7% |
| | | Hispanic | 12 | 86 | 100% |
| | | Total | 953 | 4,248 | 94.6% |
| | 60+ | Caucasian | 132 | 498 | 95.9% |
| | | African American | 9 | 84 | 90.0% |
| | | Asian or Pacific Islander | 1 | 3 | 100% |
| | | Total | 142 | 585 | 95.1% |
| | TOTAL | | | 1,569 | 7,022 |

Table 16. Sport Utility Vehicles Statewide Demographic Summary (Continued)

| Demographic Data | | | Passenger Cars Safety Belt Use | | | |
|------------------|--------------|---------------------------|--------------------------------|--------------------------|-------------------|--------------|
| Gender | Age | Race | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU | |
| Female | 0-3 | Caucasian | 2 | 14 | 100% | |
| | | Total | 2 | 14 | 100% | |
| | 4-15 | Caucasian | 53 | 189 | 99.2% | |
| | | African American | 5 | 29 | 100% | |
| | | Asian or Pacific Islander | 1 | 2 | 100% | |
| | | Total | 59 | 220 | 99.3% | |
| | 16-29 | Caucasian | 510 | 2,076 | 95.6% | |
| | | African American | 77 | 622 | 90.7% | |
| | | Asian or Pacific Islander | 13 | 79 | 100% | |
| | | Hispanic | 4 | 16 | 100% | |
| | | Total | 604 | 2,793 | 94.6% | |
| | 30-59 | Caucasian | 1,057 | 4,284 | 97.0% | |
| | | African American | 96 | 590 | 92.8% | |
| | | Asian or Pacific Islander | 13 | 152 | 100% | |
| | | Hispanic | 8 | 45 | 97.4% | |
| | | Native American | 2 | 5 | 100% | |
| | | Total | 1,176 | 5,076 | 96.6% | |
| | 60+ | Caucasian | 157 | 691 | 94.0% | |
| | | African American | 7 | 67 | 96.9% | |
| | | Hispanic | 1 | 1 | 100% | |
| | | Total | 165 | 759 | 94.2% | |
| | TOTAL | | | 2,006 | 8,862 | 95.8% |

Table 17. Vans/Minivans Statewide Demographic Summary

| Demographic Data | | | Vans/Minivans Safety Belt Use | | | |
|------------------|-------|---------------------------|-------------------------------|--------------------------|-------------------|--------------|
| Gender | Age | Race | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU | |
| Male | 4-15 | Caucasian | 40 | 163 | 96.8% | |
| | | African American | 5 | 43 | 100% | |
| | | Hispanic | 1 | 4 | 100% | |
| | | Total | 46 | 210 | 97.5% | |
| | 16-29 | Caucasian | 142 | 622 | 97.3% | |
| | | African American | 38 | 295 | 93.4% | |
| | | Asian or Pacific Islander | 5 | 12 | 100% | |
| | | Hispanic | 12 | 45 | 98.2% | |
| | | Total | 197 | 974 | 96.2% | |
| | 30-59 | Caucasian | 522 | 2,029 | 95.0% | |
| | | African American | 79 | 553 | 88.3% | |
| | | Asian or Pacific Islander | 11 | 50 | 100% | |
| | | Hispanic | 12 | 30 | 100% | |
| | | Total | 624 | 2,662 | 93.7% | |
| | 60+ | Caucasian | 141 | 508 | 92.7% | |
| | | African American | 6 | 45 | 100% | |
| | | Total | 147 | 553 | 93.3% | |
| | | | TOTAL | 1,014 | 4,399 | 94.4% |

Table 17. Vans/Minivans Statewide Demographic Summary (Continued)

| Demographic Data | | | Vans/Minivans Safety Belt Use | | |
|------------------|-------|---------------------------|-------------------------------|--------------------------|-------------------|
| Gender | Age | Race | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU |
| Female | 4-15 | Caucasian | 59 | 200 | 97.6% |
| | | African American | 3 | 26 | 100% |
| | | Asian or Pacific Islander | 1 | 15 | 100% |
| | | Hispanic | 1 | 22 | 100% |
| | | Total | 64 | 263 | 98.2% |
| | 16-29 | Caucasian | 170 | 750 | 98.5% |
| | | African American | 31 | 189 | 95.9% |
| | | Asian or Pacific Islander | 3 | 29 | 100% |
| | | Hispanic | 5 | 31 | 100% |
| | | Native American | 4 | 14 | 100% |
| | | Total | 213 | 1,013 | 98.1% |
| | 30-59 | Caucasian | 620 | 2,316 | 97.9% |
| | | African American | 50 | 375 | 100% |
| | | Asian or Pacific Islander | 7 | 57 | 100% |
| | | Hispanic | 7 | 57 | 97.2% |
| | | Total | 684 | 2,805 | 98.2% |
| | 60+ | Caucasian | 121 | 400 | 97.2% |
| | | African American | 4 | 44 | 66.5% |
| | | Asian or Pacific Islander | 1 | 14 | 100% |
| | | Total | 126 | 458 | 94.3% |
| | | TOTAL | 1,087 | 4,539 | 97.8% |

Table 18. Pick-up Trucks Statewide Demographic Summary

| Demographic Data | | | Pick-up Trucks Safety Belt Use | | | |
|------------------|-------|---------------------------|--------------------------------|--------------------------|-------------------|--------------|
| Gender | Age | Race | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU | |
| Male | 0-3 | Caucasian | 2 | 3 | 100% | |
| | | Total | 2 | 3 | 100% | |
| | 4-15 | Caucasian | 42 | 105 | 90.0% | |
| | | African American | 1 | 6 | 100% | |
| | | Total | 43 | 111 | 90.6% | |
| | 16-29 | Caucasian | 502 | 1,683 | 91.0% | |
| | | African American | 21 | 173 | 98.2% | |
| | | Asian or Pacific Islander | 1 | 5 | 100% | |
| | | Hispanic | 14 | 30 | 100% | |
| | | Total | 538 | 1,891 | 91.8% | |
| | 30-59 | Caucasian | 1,411 | 4,575 | 92.5% | |
| | | African American | 63 | 366 | 88.6% | |
| | | Asian or Pacific Islander | 2 | 7 | 100% | |
| | | Hispanic | 21 | 67 | 97.6% | |
| | | Total | 1,497 | 5,015 | 92.3% | |
| | 60+ | Caucasian | 174 | 462 | 92.0% | |
| | | African American | 1 | 2 | 100% | |
| | | Total | 175 | 464 | 92.0% | |
| | | | TOTAL | 2,255 | 7,484 | 92.1% |

Table 18. Pick-up Trucks Statewide Demographic Summary (Continued)

| Demographic Data | | | All Vehicles Safety Belt Use | | | |
|------------------|--------------|---------------------------|------------------------------|--------------------------|-------------------|--------------|
| Gender | Age | Race | Actual Total # of Obs. | Weighted Total # of Obs. | Weighted % of SBU | |
| Female | 0-3 | Caucasian | 1 | 2 | 0.0% | |
| | | Total | 1 | 2 | 0.0% | |
| | 4-15 | Caucasian | 18 | 32 | 89.6% | |
| | | African American | 1 | 5 | 100% | |
| | | Total | 19 | 37 | 91.0% | |
| | 16-29 | Caucasian | 124 | 411 | 96.3% | |
| | | African American | 5 | 19 | 100% | |
| | | Total | 129 | 430 | 96.5% | |
| | 30-59 | Caucasian | 346 | 1,108 | 96.2% | |
| | | African American | 11 | 52 | 90.3% | |
| | | Asian or Pacific Islander | 1 | 3 | 100% | |
| | | Hispanic | 3 | 7 | 100% | |
| | | Total | 361 | 1,170 | 96.1% | |
| | 60+ | Caucasian | 65 | 185 | 99.1% | |
| | | Total | 65 | 185 | 99.1% | |
| | TOTAL | | | 575 | 1,824 | 96.2% |

7.2 Annual Direct Observation Survey (Electronic Device Use)

During the same data collection period a total of 974 drivers were observed to use cell phones for talking and/or texting while driving at the same 192 sites. The overall weighted cell phone use rates are shown in Table 19. The rates were calculated using a procedure similar to that described in the “Overall Statewide Safety Belt Calculations” section in the Data Analysis section of the report. Recently, Michigan House Bill 4394 was passed, prohibiting drivers from reading, writing and sending text messages while operating a motor vehicle. The legislation, which came into effect on July 1, 2010, is a primary law which means that a driver can be pulled over and ticketed solely for a text messaging related offense. This makes Michigan one of 30 states to have banned text messaging for all drivers. The statewide cell phone use rate was estimated at 7.8 percent, identical to the use rate from the June survey. This survey was conducted five weeks after enactment of the anti-texting legislation, a small increase in texting was observed, though this increase was not statistically significant.

Table 19. Statewide Weighted Cell Phone Use Rate for Drivers

| Use by Category | Use Rate | Standard Error | Relative Error |
|-------------------------------|--------------------|-----------------------|-----------------------|
| Talking – Handheld Device | 6.3% ± 0.6% | 0.3% | 0.1% |
| Talking – Hands-free Device | 0.3% ± 0.2% | 0.1% | 0.3% |
| Texting/ E-mailing | 1.2% ± 0.4% | 0.2% | 0.2% |
| Overall Cell Phone Use | 7.8% ± 0.8% | 0.4% | 0.1% |

Table 20 summarizes cell phone use for drivers in terms of day of the week, time of the day, vehicle type, gender, age and race. A higher use rate among female drivers was demonstrated through the direct observation surveys. The use rate is the lowest in the morning and increases steadily until mid-afternoon. The use rate then drops briefly before peaking between 5 and 6 PM. Cell phone use among drivers less than 30 years of age was 12.5 percent, in comparison to 7.2 percent among those between ages 30 and 59, and 2 percent of drivers age 60 and above. African American drivers tended to use cell phones more frequently which is consistent with national data [7].

Table 20. Cell Phone Use Statewide Summary

| Day of the Week | All Vehicles Cell Phone Use | | |
|-----------------|-----------------------------------|-------------------------------------|---|
| | Actual Total # of Obs. (Vehicles) | Weighted Total # of Obs. (Vehicles) | Weighted % of Cell Phone Use (Vehicles) |
| Sunday | 62 | 312 | 6.4% |
| Monday | 161 | 636 | 9.0% |
| Tuesday | 143 | 780 | 7.5% |
| Wednesday | 151 | 640 | 9.4% |
| Thursday | 200 | 934 | 8.8% |
| Friday | 146 | 575 | 8.0% |
| Saturday | 111 | 661 | 9.1% |
| Total | 974 | 4,538 | 7.8% |
| Time of the Day | All Vehicles Cell Phone Use | | |
| | Actual Total # of Obs. (Vehicles) | Weighted Total # of Obs. (Vehicles) | Weighted % of Cell Phone Use (Vehicles) |
| 7 am - 8 am | 53 | 141 | 5.6% |
| 8 am - 9 am | 30 | 91 | 4.7% |
| 9 am - 10 am | 58 | 270 | 8.6% |
| 10 am - 11 am | 79 | 536 | 8.2% |
| 11 am - 12 pm | 88 | 200 | 8.4% |
| 12 pm - 1 pm | 121 | 669 | 9.1% |
| 1 pm - 2 pm | 83 | 253 | 5.8% |
| 2 pm - 3 pm | 91 | 431 | 8.7% |
| 3 pm - 4 pm | 67 | 320 | 7.9% |
| 4 pm - 5 pm | 88 | 455 | 9.3% |
| 5 pm - 6 pm | 116 | 506 | 9.8% |
| 6 pm - 7 pm | 100 | 666 | 9.5% |
| Total | 974 | 4,538 | 7.8% |

Table 20. Cell Phone Use Statewide Summary (Continued)

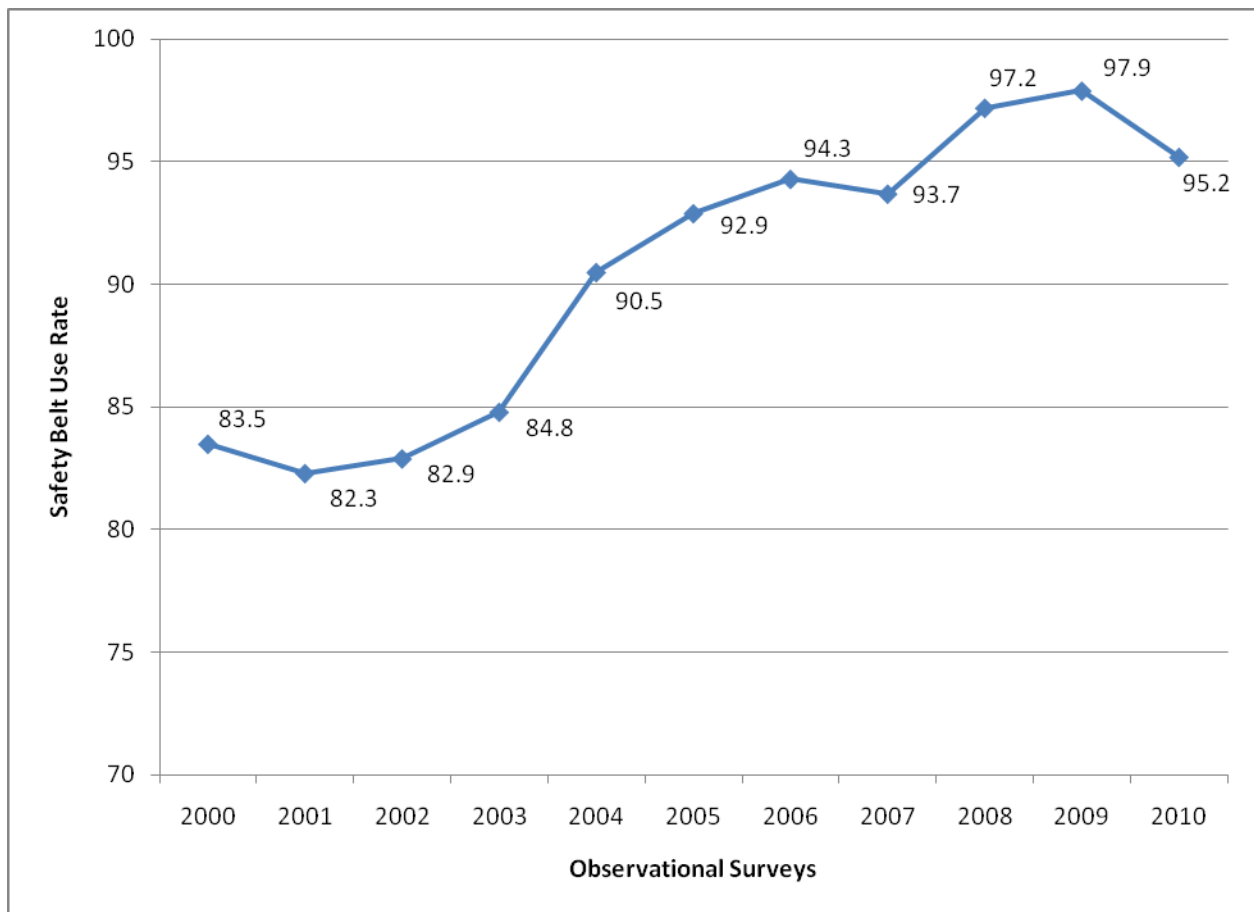
| Vehicle Type | All Vehicles Cell Phone Use | | |
|---------------------------|-----------------------------------|-------------------------------------|---|
| | Actual Total # of Obs. (Vehicles) | Weighted Total # of Obs. (Vehicles) | Weighted % of Cell Phone Use (Vehicles) |
| Passenger Cars | 482 | 2,341 | 8.5% |
| Sport Utility | 241 | 1,123 | 8.9% |
| Vans/ Minivans | 110 | 521 | 7.9% |
| Pick-Up Trucks | 141 | 553 | 7.3% |
| Total | 974 | 4,538 | 7.8% |
| Gender | All Vehicles Cell Phone Use | | |
| | Actual Total # of Obs. (Drivers) | Weighted Total # of Obs. (Drivers) | Weighted % of Cell Phone Use (Drivers) |
| Male | 428 | 1,853 | 6.1% |
| Female | 546 | 2,685 | 11.1% |
| Total | 974 | 4,538 | 7.8% |
| Age | All Vehicles Cell Phone Use | | |
| | Actual Total # of Obs. (Drivers) | Weighted Total # of Obs. (Drivers) | Weighted % of Cell Phone Use (Drivers) |
| 16-29 | 410 | 2,101 | 12.5% |
| 30-59 | 544 | 2,343 | 7.2% |
| 60+ | 20 | 94 | 2.0% |
| Total | 974 | 4,538 | 7.8% |
| Race | All Vehicles Cell Phone Use | | |
| | Actual Total # of Obs. (Drivers) | Weighted Total # of Obs. (Drivers) | Weighted % of Cell Phone Use (Drivers) |
| Caucasian | 810 | 3,334 | 7.6% |
| African American | 155 | 1,131 | 12.2% |
| Asian or Pacific Islander | 7 | 70 | 6.8% |
| Hispanic | 2 | 3 | 0.8% |
| Total | 974 | 4,538 | 7.8% |

7.3 Program Comparisons

Figure 2 summarizes the findings of the 2000 through 2010 Annual Observation Surveys. The 2010 Annual Survey resulted in a lower percentage of safety belt usage as compared to the same period in 2009.

Based upon these safety belt use rate trends, continued efforts in the media and with enforcement may reduce the variation between the surveys. Continued monitoring of the media and enforcement efforts will ensure that adequate behavioral modifications are maintained throughout the year.

Figure 2. 2000 through 2010 Safety Belt Use Rate Trends



7.4 Program Enhancements

As shown in the findings from the various observational surveys, males and pick-up truck drivers should be targeted in future campaigns. Continuing programs in urban areas should impact African American and Hispanic occupants while reaching a substantial portion of the state's population. This would indicate that continuing programs in urban centers may improve safety belt use rates.

The future potential of improving the safety belt use rate may yield a lower rate of increase. Future programs may focus on targeted areas where the safety belt use rates are still relatively low.

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**APPENDIX I – COMPLETE LISTING OF THE OBSERVATIONAL
SITES IN MICHIGAN**

| STRATUM 1 | |
|------------------|---------------------------------|
| County | Observation Locations |
| Ingham County | 1. Barnes and Eden |
| | 2. Cornell and M-43 |
| | 3. Hagadorn and Lake Lansing |
| | 4. Haslett and Zimmer |
| | 5. I-496 and Dunkel |
| | 6. M-106 and M-52 |
| | 7. M-43 and M-52 |
| | 8. M-43 and Putnam |
| | 9. Perry and Grand River |
| | 10. Michigan and Waverly |
| | 11. Onondaga and Oak Rd |
| | 12. Cavanaugh and Pennsylvania |
| | 13. US-127 and Cedar St |
| | 14. US-127 and Saginaw |
| Kalamazoo County | 1. G Ave and 33rd |
| | 2. G Ave and Riverview |
| | 3. H Ave and Sprinkle |
| | 4. M-43 and 9th |
| | 5. M-89 and 34th |
| | 6. M-89 and M-43 |
| | 7. Q Ave and 8th |
| | 8. Sprinkle and Centre |
| | 9. Sprinkle and Zylman |
| | 10. US-131 and U Ave |
| Oakland County | 1. 14 Mile and Main |
| | 2. 9 Mile and Greenfield |
| | 3. 9 Mile and Taft |
| | 4. Baldwin and Clarkston |
| | 5. Dixie and Davisburg |
| | 6. Grand River and Taft |
| | 7. Grange Hall and Holy |
| | 8. I-696 and Woodward |
| | 9. I-75 and Sashabaw |
| | 10. Northwestern and Middlebelt |
| | 11. Orchard Lake and I-696 |
| | 12. Snell and Rochester |
| | 13. Walton and Lapeer |

| | |
|-----------------------|---------------------------------|
| Washtenaw County | 1. Austin and Schneider |
| | 2. Dixboro and Pontiac |
| | 3. Earhart and Geddes |
| | 4. I-94 and Huron |
| | 5. I-94 and Jackson |
| | 6. Main and Ann Arbor-Saline |
| | 7. Maple and Miller |
| | 8. Mast and North Territorial |
| | 9. Mooreville and Saline Milan |
| | 10. Mooreville and Stoney Creek |
| | 11. State and I-94 |
| STRATUM 2 | |
| County | Observation Locations |
| Allegan County | 1. 30th and 128th |
| | 2. M-89 and Main |
| | 3. M-89 and US-131 |
| | 4. US-131 and 135th |
| Bay County | 1. Anderson and Garfield |
| | 2. Munger and M-15 |
| | 3. Pinconning and I-75 |
| Eaton County | 1. Ainger and Battle Creek |
| | 2. Kalamo and Battle Creek |
| | 3. M-43 and Canal |
| | 4. M-43 and M-50 |
| | 5. Royston and Island Hwy |
| | 6. Cochran and Lawrence |
| | 7. Willow and Nixon |
| Grand Traverse County | 1. M-72 and US-31 |
| Jackson County | 1. Elm and Seymour |
| | 2. Michigan and Grass Lake |
| | 3. Page and US-127 |
| | 4. US-127 and Michigan |
| | 5. Wolf Lake and Cady |
| Kent County | 1. 10 Mile and Meyers Lake |
| | 2. 10 Mile and US-131 |
| | 3. 14 Mile and Northland |
| | 4. 4 Mile and Walker |
| | 5. M-11 and M-45 |
| | 6. Myers Lake and 17 Mile |
| | 7. Sparta and Ball Creek |
| | 8. US-131 and 68th |
| | 9. US 131 and 84th |

| | |
|-------------------|------------------------------------|
| Livingston County | 1. Howell and M-36 |
| | 2. I-96 and Kensington |
| | 3. M-36 and Dexter |
| | 4. Old US-23 and M-59 |
| | 5. Pleasant Valley and Grand River |
| | 6. US-23 and Clyde |
| Macomb County | 1. 23 Mile and Mound |
| | 2. 26 Mile and Romeo Plank |
| | 3. 34 Mile and Van Dyke |
| | 4. Card and 22 Mile |
| | 5. I-696 and Groesbeck |
| | 6. Martin and Jefferson |
| | 7. Moravian and Harrington |
| Midland County | 1. M-30 and Shaffer |
| | 2. M-20 and Homer |
| | 3. Poseyville and Ashby |
| | 4. Redstone and 11 Mile |
| | 5. Redstone and Coleman |
| Ottawa County | 1. Port Sheldon and 96th |
| | 2. Lake Michigan and US-31 |
| STRATUM 3 | |
| County | Observation Locations |
| Berrien | 1. I-94 and M-139 |
| | 2. Lakeside and Union pier |
| | 3. Nickerson and Pipestone |
| Calhoun | 1. B Dr and Beadle Lake |
| | 2. I-94 and Beckley |
| | 3. Michigan and 15 Mile |
| | 4. Michigan and Evanston |
| Clinton | 1. Hyde and Welling |
| | 2. M-21 and Lansing |
| | 3. Main and Westphalia |
| | 4. Shepardsville and M-21 |
| | 5. Webster and Clark |
| Genesee | 1. Beacher and Elms |
| | 2. Court and Chavez |
| | 3. Flushing and Bellenger |
| | 4. Grand Blanc and Duffield |
| | 5. M-57 and Belsay |
| | 6. Mt. Morris and I-75 |

| | |
|------------|------------------------------|
| Ionia | 1. Bridge and State |
| | 2. Cross and Main |
| | 3. I-96 and Nash |
| Isabella | 1. Winn and Blanchard |
| Lapeer | 1. M-24 and Daley |
| | 2. Otter Lake and M-24 |
| Lenawee | 1. Clinton Macon and Macon |
| | 2. M-50 and Pentecost Hwy |
| | 3. US-12 and Brooklyn |
| Marquette | 1. M-95 and US-41 |
| | 2. Washington and McClellan |
| Monroe | 1. Dunbar and Hull |
| | 2. Ostrander and Plank |
| | 3. Tecumseh and Ann Arbor |
| | 4. US-23 and Anthony |
| | 5. US-23 and M-50 |
| | 6. US-23 and Plank |
| Montcalm | 1. Condensary and Crystal |
| | 2. M-91 and Sidney |
| | 3. Main and Sidney |
| Muskegon | 1. Ravenna Hts. and Blackmer |
| | 2. Ravenna Hts. and Maple Rd |
| | 3. Ravenna Hts. and Moorland |
| Saginaw | 1. Saginaw and Belle |
| Shiawassee | 1. Grand River and Lansing |
| | 2. Juddville and Chipman |
| | 3. M-52 and I-69 |
| St. Clair | 1. I-69 and Water |
| | 2. M-19 and Bordman |
| | 3. M-29 and Palms |
| St. Joseph | 1. Banker and Klinger |
| | 2. US-131 and Millard |
| Van Buren | 1. CR-380 and CR-681 |
| | 2. CR-681 and CR-384 |
| | 3. I-196 and Phoenix |
| | 4. M-51 and Phelps |

| STRATUM 4 | |
|------------------|--------------------------------|
| County | Observation Locations |
| Wayne County | 1. 7-Mile and Van Dyke |
| | 2. 8 Mile and Grand River |
| | 3. 8 Mile and Randolph |
| | 4. 8 Mile and M-10 |
| | 5. Annapolis and Wayne |
| | 6. Ecorse and Haggerty |
| | 7. Ecorse and Monroe |
| | 8. Eureka and Telegraph |
| | 9. Farmington and Plymouth |
| | 10. Ford and Sheldon |
| | 11. Fort and Goddard |
| | 12. Geddes and Canton Center |
| | 13. Huron River and Haggerty |
| | 14. Huron and Rawsonville |
| | 15. Huron and Hannan |
| | 16. I-75 and Northline |
| | 17. I-75 and Southfield |
| | 18. I-96 and Schaefer |
| | 19. I-96 and Middlebelt |
| | 20. Jefferson and Randolph |
| | 21. M-10 and Greenfield |
| | 22. Main and Sumpter |
| | 23. McNichols and Evergreen |
| | 24. Michigan and Greenfield |
| | 25. Middlebelt and Eureka |
| | 26. Northline and Telegraph |
| | 27. Outer Drive and Rotunda |
| | 28. Palmer and Lilley |
| | 29. Plymouth and Greenfield |
| | 30. Schaefer and Grand River |
| | 31. Sumpter and Oakville Waltz |
| | 32. Van Dyke and McNichols |
| | 33. Van Horn and Inkster |
| | 34. Vernier and I-94 |
| | 35. Vernier and Lake Shore |
| | 36. Vernier and Mack |
| | 37. Waltz and Willow |
| | 38. Warren and Southfield |
| | 39. Wayne and Wick |
| | 40. Willis and Rawsonville |
| | 41. Woodward and Warren |

APPENDIX II – STATEWIDE SAFETY BELT USE RATES BY COUNTY

| Stratum and County | Annual Safety Belt Use Rate | |
|-----------------------|-----------------------------|----------------|
| | Safety Belt Usage Rate* | Standard Error |
| Stratum 1 | | |
| Ingham County | 96.1% ± 0.64% | 0.33% |
| Kalamazoo County | 95.5 ± 1.82% | 0.93% |
| Oakland County | 97.5 ± 0.73% | 0.37% |
| Washtenaw County | 97.0 ± 1.24% | 0.63% |
| Stratum 2 | | |
| Allegan County | 96.1 ± 1.56% | 0.80% |
| Bay County | 92.9 ± 4.07% | 2.08% |
| Eaton County | 94.8 ± 1.42% | 0.72% |
| Grand Traverse County | 95.0 ± N/A | N/A |
| Jackson County | 95.8 ± 1.36% | 0.69% |
| Kent County | 94.9 ± 0.35% | 0.18% |
| Livingston County | 96.9 ± 1.96% | 1.00% |
| Macomb County | 94.7 ± 1.14% | 0.58% |
| Midland County | 95.8 ± 1.72% | 0.88% |
| Ottawa County | 95.6 ± 0.77% | 0.39% |
| Stratum 3 | | |
| Berrien County | 95.5 ± 1.01% | 0.51% |
| Calhoun County | 95.5 ± 3.73% | 1.90% |
| Clinton County | 90.6 ± 4.93% | 2.52% |
| Genesee County | 94.6 ± 2.20% | 1.12% |
| Ionia County | 93.3 ± 5.12% | 2.61% |
| Isabella County | 86.0 ± N/A | N/A |
| Lapeer County | 93.4 ± 0.19% | 0.10% |
| Lenawee County | 96.5 ± 0.23% | 0.12% |
| Marquette County | 94.3 ± 0.80% | 0.41% |
| Monroe County | 92.9 ± 1.53% | 0.78% |
| Montcalm County | 94.1 ± 5.28% | 2.69% |
| Muskegon County | 93.6 ± 2.19% | 1.12% |
| Saginaw County | 94.4 ± N/A | N/A |
| Shiawassee County | 94.2 ± 0.37% | 0.19% |
| St. Clair County | 93.8 ± 1.60% | 0.82% |
| St. Joseph County | 93.1 ± 0.02% | 0.01% |
| Van Buren County | 95.4 ± 1.39% | 0.71% |
| Stratum 4 | | |
| Wayne County | 94.7 ± 1.04% | 0.53% |

* Weighted Safety Belt Usage ± 95% Confidence Band

** Only one location in each of Grand Traverse, Isabella and Saginaw Counties is included in the sample.

APPENDIX III – STATEWIDE SAFETY BELT USAGE BY INTERSECTION

| All Vehicles Safety Belt Use by Drivers and Passengers | | | | |
|--|-------------------------------|------------------------|---------------------------------|--------------------------|
| Stratum, County and Intersection | Annual Safety Belt Survey | | | |
| | Actual Total # of Belted Obs. | Actual Total # of Obs. | Weighted Total # of Belted Obs. | Weighted Total # of Obs. |
| Stratum 1 | | | | |
| <i>Ingham County</i> | | | | |
| Barnes and Eden | 55 | 58 | 38 | 40 |
| Cornell and M-43 | 70 | 71 | 500 | 507 |
| Hagadorn and Lake Lansing | 100 | 105 | 253 | 266 |
| Haslett and Zimmer | 99 | 103 | 163 | 170 |
| I-496 and Dunkel | 82 | 84 | 349 | 358 |
| M-106 and M-52 | 109 | 115 | 114 | 120 |
| M-43 and M-52 | 131 | 136 | 269 | 280 |
| M-43 and Putnam | 96 | 101 | 565 | 594 |
| Perry and Grand River | 86 | 88 | 81 | 83 |
| Michigan and Waverly | 127 | 134 | 268 | 282 |
| Onondaga and Oak Rd | 59 | 68 | 58 | 67 |
| Cavanaugh and Pennsylvania | 172 | 179 | 645 | 671 |
| US-127 and Cedar St | 153 | 159 | 263 | 273 |
| US-127 and Saginaw | 75 | 78 | 1634 | 1,700 |
| Total | 1,414 | 1,479 | 5,200 | 5,411 |
| <i>Kalamazoo County</i> | | | | |
| G Ave and 33rd | 67 | 71 | 186 | 197 |
| G Ave and Riverview | 74 | 76 | 182 | 187 |
| H Ave and Sprinkle | 74 | 79 | 162 | 173 |
| M-43 and 9th | 70 | 72 | 412 | 424 |
| M-89 and 34th | 67 | 71 | 51 | 54 |
| M-89 and M-43 | 62 | 68 | 441 | 484 |
| Q Ave and 8th | 89 | 94 | 321 | 339 |
| Sprinkle and Centre | 52 | 55 | 77 | 82 |
| Sprinkle and Zylman | 77 | 79 | 356 | 365 |
| US-131 and U Ave | 68 | 70 | 805 | 829 |
| Total | 700 | 735 | 2,993 | 3,133 |

| | | | | |
|-----------------------------|------------|--------------|--------------|--------------|
| <i>Oakland County</i> | | | | |
| 14 Mile and Main | 85 | 87 | 1,153 | 1,180 |
| 9 Mile and Greenfield | 102 | 105 | 1,510 | 1,554 |
| 9 Mile and Taft | 81 | 84 | 152 | 158 |
| Baldwin and Clarkston | 83 | 85 | 255 | 261 |
| Dixie and Davisburg | 57 | 60 | 172 | 181 |
| Grand River and Taft | 76 | 76 | 507 | 507 |
| Grange Hall and Holy | 57 | 58 | 125 | 127 |
| I-696 and Woodward | 68 | 72 | 640 | 678 |
| I-75 and Sashabaw | 68 | 70 | 694 | 715 |
| Northwestern and Middlebelt | 71 | 72 | 432 | 439 |
| Orchard Lake and I-696 | 78 | 80 | 978 | 1,003 |
| Snell and Rochester | 59 | 60 | 540 | 549 |
| Walton and Lapeer | 58 | 58 | 296 | 296 |
| Total | 943 | 967 | 7,453 | 7,646 |
| <i>Washtenaw County</i> | | | | |
| Austin and Schneider | 109 | 114 | 227 | 238 |
| Dixboro and Pontiac | 78 | 80 | 296 | 303 |
| Earhart and Geddes | 76 | 79 | 141 | 146 |
| I-94 and Huron | 79 | 81 | 869 | 891 |
| I-94 and Jackson | 119 | 126 | 644 | 681 |
| Main and Ann Arbor-Saline | 64 | 65 | 1,484 | 1,507 |
| Maple and Miller | 62 | 66 | 388 | 413 |
| Mast and North Territorial | 61 | 64 | 86 | 90 |
| Mooreville and Saline Milan | 81 | 84 | 112 | 116 |
| Mooreville and Stoney Creek | 184 | 191 | 297 | 308 |
| State and I-94 | 59 | 60 | 813 | 826 |
| Total | 972 | 1,010 | 5,355 | 5,519 |
| Stratum 2 | | | | |
| <i>Allegan County</i> | | | | |
| 30th and 128th | 56 | 59 | 33 | 35 |
| M-89 and Main | 73 | 75 | 324 | 333 |
| M-89 and US-131 | 140 | 147 | 167 | 175 |
| US-131 and 135th | 91 | 96 | 160 | 169 |
| Total | 360 | 377 | 684 | 712 |

| | | | | |
|------------------------------|------------|------------|--------------|--------------|
| <i>Bay County</i> | | | | |
| Anderson and Garfield | 94 | 103 | 74 | 81 |
| Munger and M-15 | 79 | 89 | 73 | 83 |
| Pinconning and I-75 | 83 | 87 | 178 | 186 |
| Total | 256 | 279 | 325 | 350 |
| <i>Eaton County</i> | | | | |
| Ainger and Battle Creek | 51 | 56 | 34 | 38 |
| Kalamo and Battle Creek | 67 | 78 | 106 | 123 |
| M-43 and Canal | 60 | 63 | 1,350 | 1,418 |
| M-43 and M-50 | 62 | 66 | 111 | 118 |
| Royston and Island Hwy | 54 | 58 | 22 | 23 |
| Cochran and Lawrence | 83 | 86 | 415 | 430 |
| Willow and Nixon | 57 | 61 | 47 | 50 |
| Total | 434 | 468 | 2,084 | 2,200 |
| <i>Grand Traverse County</i> | | | | |
| M-72 and US-31 | 96 | 101 | 750 | 790 |
| Total | 96 | 101 | 750 | 790 |
| <i>Jackson County</i> | | | | |
| Elm and Seymour | 99 | 100 | 178 | 180 |
| Michigan and Grass Lake | 77 | 83 | 196 | 211 |
| Page and US-127 | 136 | 140 | 222 | 229 |
| US-127 and Michigan | 72 | 78 | 68 | 73 |
| Wolf Lake and Cady | 60 | 63 | 42 | 44 |
| Total | 444 | 464 | 706 | 737 |
| <i>Kent County</i> | | | | |
| 10 Mile and Meyers Lake | 80 | 85 | 99 | 105 |
| 10 Mile and US-131 | 68 | 72 | 365 | 387 |
| 14 Mile and Northland | 82 | 86 | 491 | 515 |
| 4 Mile and Walker | 105 | 110 | 241 | 252 |
| M-11 and M-45 | 72 | 76 | 923 | 975 |
| Myers Lake and 17 Mile | 64 | 70 | 77 | 84 |
| Sparta and Ball Creek | 69 | 72 | 83 | 87 |
| US-131 and 68th | 83 | 87 | 434 | 455 |
| US 131 and 84th | 109 | 115 | 311 | 328 |
| Total | 732 | 773 | 3,023 | 3,187 |

| <i>Livingston County</i> | | | | |
|---------------------------------|------------|------------|--------------|--------------|
| Howell and M-36 | 78 | 82 | 138 | 145 |
| I-96 and Kensington | 75 | 75 | 156 | 156 |
| M-36 and Dexter | 72 | 72 | 386 | 386 |
| Old US-23 and M-59 | 69 | 72 | 654 | 683 |
| Pleasant Valley and Grand River | 106 | 112 | 124 | 131 |
| US-23 and Clyde | 122 | 128 | 213 | 223 |
| Total | 522 | 541 | 1,671 | 1,724 |
| <i>Macomb County</i> | | | | |
| 23 Mile and Mound | 60 | 63 | 371 | 389 |
| 26 Mile and Romeo Plank | 71 | 76 | 193 | 206 |
| 34 Mile and Van Dyke | 59 | 61 | 71 | 73 |
| Card and 22 Mile | 69 | 72 | 515 | 537 |
| I-696 and Groesbeck | 88 | 94 | 953 | 1,018 |
| Martin and Jefferson | 51 | 54 | 36 | 38 |
| Moravian and Harrington | 71 | 74 | 243 | 253 |
| Total | 469 | 494 | 2,381 | 2,515 |
| <i>Midland County</i> | | | | |
| M-30 and Shaffer | 101 | 104 | 151 | 155 |
| M-20 and Homer | 69 | 71 | 66 | 68 |
| Poseyville and Ashby | 75 | 78 | 116 | 121 |
| Redstone and 11 Mile | 57 | 62 | 81 | 88 |
| Redstone and Coleman | 69 | 72 | 85 | 89 |
| Total | 371 | 387 | 498 | 520 |
| <i>Ottawa County</i> | | | | |
| Port Sheldon and 96th | 101 | 106 | 170 | 179 |
| Lake Michigan and US-31 | 99 | 103 | 107 | 112 |
| Total | 200 | 209 | 278 | 290 |

| Stratum 3 | | | | |
|--------------------------|------------|------------|--------------|--------------|
| <i>Berrien County</i> | | | | |
| I-94 and M-139 | 138 | 144 | 331 | 345 |
| Lakeside and Union pier | 77 | 80 | 52 | 54 |
| Nickerson and Pipestone | 75 | 80 | 91 | 97 |
| Total | 290 | 304 | 473 | 496 |
| <i>Calhoun County</i> | | | | |
| B Dr and Beadle Lake | 88 | 89 | 247 | 249 |
| I-94 and Beckley | 115 | 123 | 212 | 227 |
| Michigan and 15 Mile | 64 | 67 | 46 | 48 |
| Michigan and Evanston | 89 | 97 | 90 | 98 |
| Total | 356 | 376 | 595 | 622 |
| <i>Clinton County</i> | | | | |
| Hyde and Welling | 56 | 68 | 80 | 97 |
| M-21 and Lansing | 102 | 113 | 128 | 141 |
| Main and Westphalia | 61 | 64 | 87 | 91 |
| Shepardsville and M-21 | 65 | 68 | 35 | 36 |
| Webster and Clark | 54 | 57 | 56 | 60 |
| Total | 338 | 370 | 386 | 425 |
| <i>Genesee County</i> | | | | |
| Beacher and Elms | 67 | 71 | 85 | 90 |
| Court and Chavez | 98 | 103 | 760 | 799 |
| Flushing and Bellenger | 63 | 70 | 394 | 438 |
| Grand Blanc and Duffield | 57 | 60 | 76 | 80 |
| M-57 and Belsay | 104 | 108 | 548 | 569 |
| Mt. Morris and I-75 | 82 | 85 | 298 | 309 |
| Total | 471 | 497 | 2,161 | 2,285 |
| <i>Ionia County</i> | | | | |
| Bridge and State | 87 | 91 | 137 | 144 |
| Cross and Main | 62 | 70 | 100 | 112 |
| I-96 and Nash | 68 | 70 | 51 | 53 |
| Total | 217 | 231 | 288 | 309 |

| | | | | |
|--------------------------|------------|------------|--------------|--------------|
| <i>Isabella County</i> | | | | |
| Winn and Blanchard | 74 | 86 | 54 | 63 |
| Total | 74 | 86 | 54 | 63 |
| <i>Lapeer County</i> | | | | |
| M-24 and Daley | 87 | 93 | 221 | 236 |
| Otter Lake and M-24 | 84 | 90 | 400 | 428 |
| Total | 171 | 183 | 620 | 664 |
| <i>Lenawee County</i> | | | | |
| Clinton Macon and Macon | 108 | 112 | 281 | 292 |
| M-50 and Pentecost Hwy | 67 | 69 | 58 | 60 |
| US-12 and Brooklyn | 82 | 85 | 81 | 84 |
| Total | 257 | 266 | 420 | 435 |
| <i>Marquette County</i> | | | | |
| M-95 and US-41 | 67 | 69 | 55 | 57 |
| Washington and McClellan | 95 | 101 | 783 | 833 |
| Total | 162 | 170 | 838 | 890 |
| <i>Monroe County</i> | | | | |
| Dunbar and Hull | 57 | 59 | 61 | 64 |
| Ostrander and Plank | 94 | 99 | 112 | 118 |
| Tecumseh and Ann Arbor | 66 | 72 | 503 | 549 |
| US-23 and Anthony | 98 | 104 | 179 | 190 |
| US-23 and M-50 | 81 | 88 | 168 | 183 |
| US-23 and Plank | 79 | 83 | 43 | 45 |
| Total | 475 | 505 | 1,066 | 1,148 |
| <i>Montcalm County</i> | | | | |
| Condensary and Crystal | 59 | 68 | 28 | 32 |
| M-91 and Sidney | 77 | 80 | 358 | 371 |
| Main and Sidney | 48 | 57 | 50 | 59 |
| Total | 184 | 205 | 435 | 462 |

| | | | | |
|---------------------------|------------|------------|------------|------------|
| <i>Muskegon County</i> | | | | |
| Ravenna Hts. and Blackmer | 54 | 60 | 33 | 36 |
| Ravenna Hts. and Maple Rd | 91 | 96 | 133 | 140 |
| Ravenna Hts. and Moorland | 54 | 58 | 54 | 58 |
| Total | 199 | 214 | 220 | 235 |
| <i>Saginaw County</i> | | | | |
| Saginaw and Belle | 85 | 90 | 401 | 424 |
| Total | 85 | 90 | 401 | 424 |
| <i>St. Clair County</i> | | | | |
| I-69 and Water | 110 | 119 | 141 | 153 |
| M-19 and Bordman | 64 | 67 | 111 | 116 |
| M-29 and Palms | 78 | 83 | 156 | 166 |
| Total | 252 | 269 | 408 | 434 |
| <i>St. Joseph County</i> | | | | |
| Banker and Klinger | 80 | 86 | 81 | 87 |
| US-131 and Millard | 81 | 87 | 756 | 812 |
| Total | 161 | 173 | 837 | 899 |
| <i>Shiawassee County</i> | | | | |
| Grand River and Lansing | 67 | 71 | 78 | 83 |
| Juddville and Chipman | 57 | 61 | 32 | 35 |
| M-52 and I-69 | 66 | 70 | 75 | 79 |
| Total | 190 | 202 | 185 | 197 |
| <i>Van Buren County</i> | | | | |
| CR-380 and CR-681 | 76 | 80 | 60 | 63 |
| CR-681 and CR-384 | 71 | 75 | 57 | 60 |
| I-196 and Phoenix | 137 | 142 | 324 | 336 |
| M-51 and Phelps | 85 | 90 | 310 | 329 |
| Total | 369 | 387 | 751 | 787 |

| Stratum 4 | | | | |
|--------------------------|-----|-----|-------|-------|
| <i>Wayne County</i> | | | | |
| 7-Mile and Van Dyke | 71 | 76 | 545 | 584 |
| 8 Mile and Grand River | 98 | 111 | 579 | 656 |
| 8 Mile and Randolph | 74 | 76 | 476 | 489 |
| 8 Mile and M-10 | 82 | 86 | 261 | 274 |
| Annapolis and Wayne | 68 | 74 | 656 | 714 |
| Ecorse and Haggerty | 72 | 74 | 496 | 509 |
| Ecorse and Monroe | 96 | 101 | 531 | 559 |
| Eureka and Telegraph | 85 | 89 | 1,416 | 1,482 |
| Farmington and Plymouth | 126 | 131 | 630 | 655 |
| Ford and Sheldon | 80 | 85 | 1,188 | 1,262 |
| Fort and Goddard | 63 | 63 | 523 | 523 |
| Geddes and Canton Center | 79 | 80 | 402 | 408 |
| Huron River and Haggerty | 106 | 113 | 178 | 190 |
| Huron and Rawsonville | 82 | 91 | 283 | 314 |
| Huron and Hannan | 71 | 75 | 239 | 252 |
| I-75 and Northline | 71 | 73 | 1,058 | 1,088 |
| I-75 and Southfield | 74 | 74 | 1,059 | 1,059 |
| I-96 and Schaefer | 86 | 95 | 300 | 331 |
| I-96 and Middlebelt | 93 | 94 | 1,224 | 1,237 |
| Jefferson and Randolph | 76 | 81 | 982 | 1046 |
| M-10 and Greenfield | 92 | 98 | 678 | 722 |
| Main and Sumpter | 64 | 69 | 336 | 363 |
| McNichols and Evergreen | 52 | 64 | 279 | 344 |
| Michigan and Greenfield | 58 | 63 | 338 | 367 |

| <i>Wayne County (Continued)</i> | | | | |
|---------------------------------|--------------|--------------|---------------|---------------|
| Middlebelt and Eureka | 123 | 131 | 519 | 552 |
| Northline and Telegraph | 110 | 117 | 711 | 756 |
| Outer Drive and Rotunda | 58 | 59 | 185 | 188 |
| Palmer and Lilley | 61 | 61 | 168 | 168 |
| Plymouth and Greenfield | 62 | 67 | 257 | 278 |
| Schaefer and Grand River | 73 | 77 | 438 | 462 |
| Sumpter and Oakville Waltz | 54 | 58 | 52 | 55 |
| Van Dyke and McNichols | 89 | 96 | 445 | 480 |
| Van Horn and Inkster | 185 | 193 | 290 | 302 |
| Vernier and I-94 | 101 | 108 | 1,503 | 1,607 |
| Vernier and Lake Shore | 56 | 58 | 291 | 301 |
| Vernier and Mack | 69 | 72 | 662 | 690 |
| Waltz and Willow | 85 | 94 | 111 | 122 |
| Warren and Southfield | 99 | 108 | 829 | 905 |
| Wayne and Wick | 57 | 58 | 223 | 227 |
| Willis and Rawsonville | 69 | 76 | 178 | 197 |
| Woodward and Warren | 60 | 63 | 678 | 712 |
| Total | 3,330 | 3,532 | 22,196 | 23,431 |