

2017 DIRECT OBSERVATION SURVEY OF MOTORCYCLE HELMET USE IN MICHIGAN



**Prepared for:
Office of Highway Safety Planning
7150 Harris Drive
Dimondale, MI 48821**

**Prepared by:
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East Lansing, MI**

Date: September 26, 2017

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FINAL REPORT

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This material was developed through a project funded by the Michigan Office of Highway Safety Planning and the U.S. Department of Transportation.

Technical Report Documentation Page

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|--|---|--|-----------|
| 1. Report No. | 2. Government Accession No. | 3. Recipient's Catalog No. | |
| 4. Title and Subtitle 2017 Direct Observation Survey of Motorcycle Helmet Use in Michigan | | 5. Report Date September 26, 2017 | |
| | | 6. Performing Organization Code | |
| 7. Author(s) Timothy Gates, Steven Stapleton, Jacob Swanson, Alex Mullen | | 8. Performing Organization Report No. | |
| 9. Performing Organization Name and Address Michigan State University Department of Civil and Environmental Engineering 428 S. Shaw Lane East Lansing, MI 48824 | | 10. Work Unit No. (TRAIS) | |
| | | 11. Contract or Grant No. | |
| 12. Sponsoring Organization Name and Address Michigan Office of Highway Safety Planning 7150 Harris Dr. Dimondale, MI 48821 Michigan Department of Transportation Research Administration 8885 Ricks Rd. P.O. Box 30049 Lansing, Michigan 48909 | | 13. Type of Report and Period Covered Final Report May 2017 - September 2017 | |
| | | 14. Sponsoring Agency Code | |
| 15. Supplementary Notes | | | |
| 16. Abstract This report documents the results of the 2017 direct observation survey of motorcycle helmet use in Michigan. Helmet use by motorcycle drivers and passengers was observed at 152 locations throughout 63 Michigan counties during June, July, and August of 2017. In addition to helmet use information, data were collected for motorcycle type, as well as gender, age, and race of each observed rider, in addition to whether or not the motorcyclist was wearing high-visibility gear. The 2017 statewide helmet use rate for Michigan was 71.4 percent, while the usage rate for high-visibility gear was 3.6 percent. This rate is substantially lower than the 99.4 percent helmet use rate observed in 2006 when all riders were required by law to wear a helmet, but is not statistically lower than the 73.0 percent helmet use rate observed in 2013, which is the year following the repeal of the Michigan helmet law. Thus, while the repeal of the Michigan motorcycle helmet law in 2012 has substantially reduced motorcycle helmet use statewide, there is no evidence of further declines in helmet use beyond that which was observed the year following the repeal of the helmet law. Furthermore, motorcycle helmet use rate in Michigan remains 6.4 percentage points higher than the 65 percent helmet use rate (drivers only) observed nationwide in 2016. | | | |
| 17. Key Words Motorcycle helmet use, motorcycle helmet use rate, Michigan helmet law | | 18. Distribution Statement Unlimited | |
| 19. Security Classification (of this report) Unclassified. | 20. Security Classification (of this page) Unclassified. | 21. No. of Pages 32 | 22. Price |

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1.0 INTRODUCTION

According to the National Highway Traffic Safety Administration (NHTSA), 4,976 motorcyclists died and approximately 88,000 were injured in motor vehicle crashes in the United States in 2015, which is the most recent year that national-level fatal crash data are available [1]. Motorcyclist fatalities increased consistently from 2001 to 2008, peaking at 5,312. Since then, fatalities have leveled off, with annual fatalities ranging from 4,469 to 4,986 during the period from 2009-2015, which is shown in Figure 1.

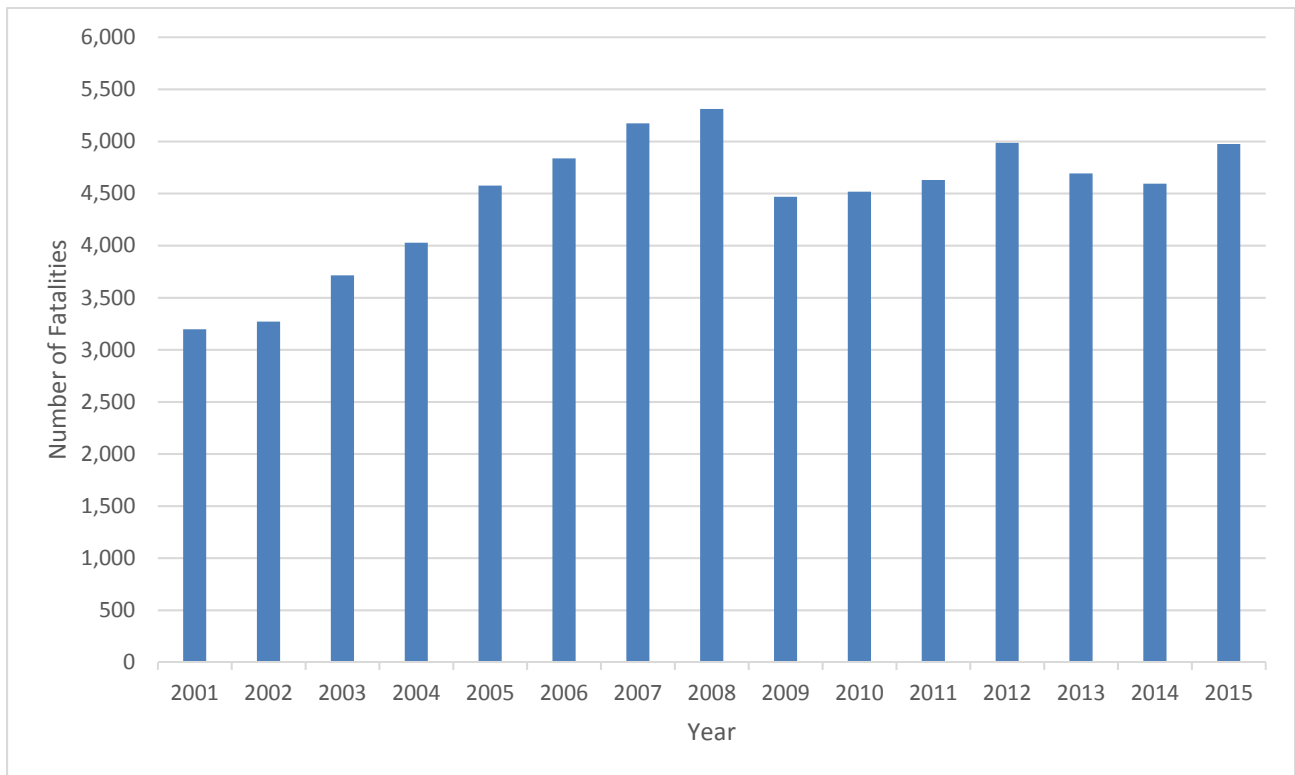


Figure 1. Motorcycle Fatalities in the United States, 2001-2015
[Source: NHTSA and Fatal Accident Reporting System (FARS)]

Figure 2 displays trend for total motorcycle crashes and fatal motorcycle crashes in Michigan from 2006 - 2016. During that 11-year period, while total motorcycle crashes have decreased, motorcycle fatalities have generally increased, peaking in 2016. Noteworthy in the upward trend in motorcycle fatalities is the change in the motorcycle helmet law in Michigan. Prior to April 1, 2012, Michigan had a universal helmet law in place, which required all motorcyclists to wear United States Department of Transportation (USDOT) approved helmets. The enactment of Michigan Senate Bill (SB) 291 on April 1, 2012, effectively repealed the motorcycle helmet use law, by allowing motorcyclists to ride without a helmet if they: (1) carry \$20,000 in additional medical insurance; (2) are at least 21 years of age; and (3) have at least two years of riding experience or have passed a safety training test. As of August 2017, 19 states and the District of Columbia have universal helmet laws in place, while Michigan is one of 28 states with a partial helmet law [2]. Most states in this category require riders who are 17 and younger to be helmeted, while some of the others

states require riders to be 20 years old and younger to be helmeted. Illinois, Iowa, and New Hampshire are the only states that have no laws mandating helmet use. In the most recent four-year period (2013 to 2016) since the motorcycle helmet law was repealed, total motorcycle crashes in Michigan have decreased by 10.4 percent, while fatal crashes involving motorcycles have increased by 10.7 percent compared to the four-year period prior to the repeal of the helmet law (2008 to 2011).

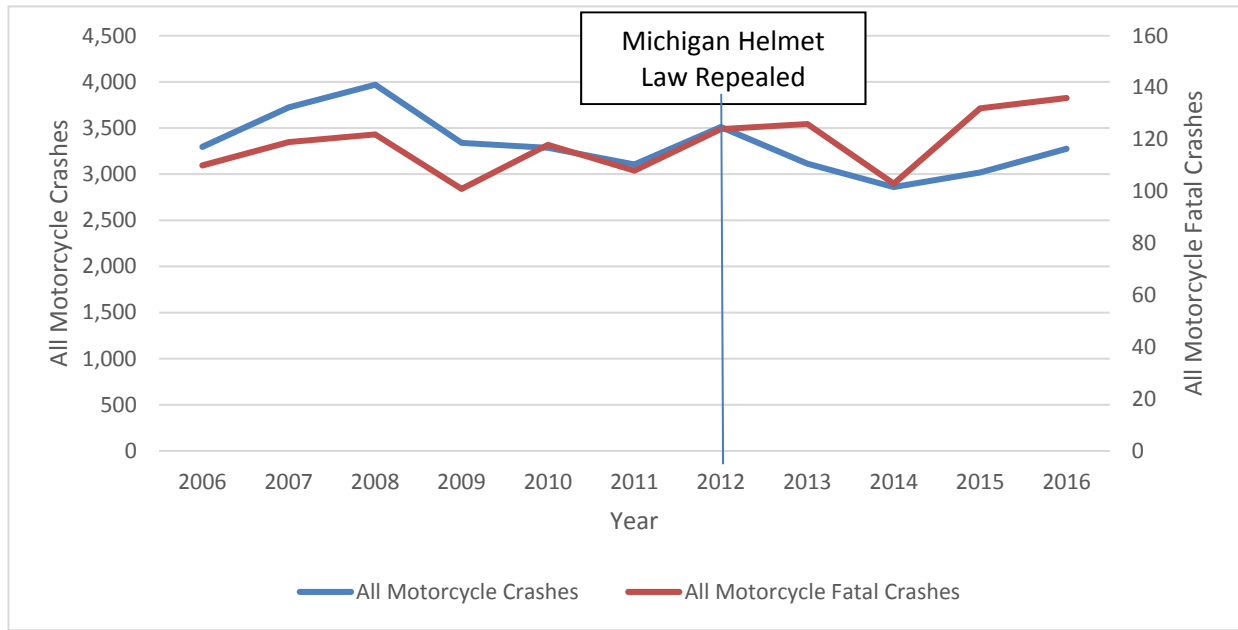


Figure 2. Motorcycle Fatal Crashes and All Motorcycle-Involved Crashes in Michigan, 2006-2016
[Source: Michigan Traffic Crash Facts, MI OHSP]

The national use of DOT-compliant helmets increased from 61 percent in 2015 to 65 percent in 2016 [3]. The helmet use among passengers also increased, but more considerably. Helmet use for passengers increased from 46 percent in 2015 to 53 percent in 2016. This helmet use survey was part of the National Occupant Protection Use Survey (NOPUS) conducted by the National Center for Statistics and Analysis (NCSA) of NHTSA. None of these changes were statistically significant.

The most recent motorcycle helmet use survey in the State of Michigan was conducted during the summer of 2013 through funding from the Michigan Office of Highway Safety Planning (OHSP) [4]. In the 2013 survey, a total of 1,252 motorcycle riders were observed and the overall usage rate among all riders was 73.0 percent. This survey also involved the collection of data on the use of high visibility gear. Only 5.6 percent of riders were found to wear high visibility gear.

Observations of motorcycle helmet use in Michigan performed prior to the 2012 helmet law indicated a very high compliance rate (99.4 percent in 2006) [5]. With the legislative repeal of Michigan’s helmet use law in 2012, the purpose of this study was to estimate the current statewide motorcycle helmet use rate and high visibility gear use rate. The results of this study will also be compared with prior helmet use statistics in

Michigan to allow for assessment of the changes in helmet use statistics over time. Further, these data may be used in combination with Michigan crash data to ascertain the safety and resultant economic impacts of this policy change.

The overall objective of this study was to estimate the statewide use rates of motorcycle helmets and high visibility gear by motorcyclists in Michigan. The specific objectives of this study were as follows:

- Select a methodology for collecting data from a representative sample of sites throughout the state, which would ensure 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.
- Observe and record motorcycle helmet use and high visibility gear use for each driver and passenger along with other characteristics, including motorcycle type, gender, age, and race.
- Summarize and cross-tabulate the observational data in a spreadsheet format indicating overall helmet use, overall high visibility gear use, helmet use by time of day and day of week, helmet use by type of motorcycle and type of roadway, and helmet use by various demographic characteristics.

2.0 METHODOLOGY

The observational survey for motorcycle helmet use was conducted in coordination with the 2017 statewide direct observation surveys of safety belt use. Additional observations were performed at designated locations with pole-mounted cameras, as well as through the use of dashboard cameras (“dash cams”). Since no specific guidelines are available for conducting motorcycle helmet use surveys, and because the motorcycle helmet use survey was conducted in conjunction with the statewide safety belt use surveys, the county sampling methodology largely followed the *Uniform Criteria for State Observational Surveys of Seat Belt Use* from Title 23, Part 1240.12 of the Code of Federal Regulations.

2.1 Design of Study

The study area was selected in accordance with the *Uniform Criteria for State Observational Surveys of Seat Belt Use* from Title 23, Part 1240.12 of the Code of Federal Regulations, which states that data shall be obtained from a sample of counties representing at least 85 percent of the passenger vehicle crash-related fatalities. To that end, data for fatal crashes involving motorcyclists for the five-year period of 2011-2015, was obtained from Michigan Traffic Crash Facts to determine the necessary counties needed to achieve the 85 percent motorcycle fatal crash representation statewide. This period was utilized as it represented the most recent time period available at the time the sampling was performed.

2.2 Data Collection Process

All motorcycles and mopeds were eligible for observation. The cover sheet and data collection form that were utilized during roadside observational surveys of motorcycles are shown in Appendix I. The cover sheet was designed to allow for documentation of descriptive site information, including: date, site location, site number, alternate site data, assigned traffic flow, number of lanes available and observed, start and end times for observations, and weather conditions. It should be noted that the cover sheet is universal and could be utilized for other observational studies such as direct observations of seat belt use. The observation form (Appendix I) was used during field observations to record the pertinent information about the motorcycle, driver, and passenger. An Excel version of this form was also utilized.

The driver of each motorcycle along with any passengers (if and when present) were observed for type of helmet use. In these surveys, both the rider and passenger were separately identified based on their gender, estimated age, and race. The rider age categories included those aged 16-29, 30-59, and 60 and over. The passenger age categories included those aged 0-15, 16-29, 30-59, and 60 and over. The rider and passenger races were categorized as white, black, other race, and unknown. The other race category consisted of those of Asian/Pacific Islander, and Native American, as well as Hispanic people of any race. The rider and passenger helmet use was classified as No Helmet, Full Helmet, Open Face (3/4) Helmet, or Half Shell Helmet. It should be noted that it was very difficult to discern demographic characteristics for riders wearing full helmets, as the rider's facial characteristics were typically obscured.

The observer also noted whether or not the rider and passenger had on some type of high visibility gear. High visibility gear consisted of florescent yellow, or orange colored helmets and/or apparel like vests, jackets, or pants that were florescent yellow or orange with a reflective strip. Motorcycles were categorized by type into ten groups: Standard, Touring, Cruiser, Chopper/Custom, Sport, Dual-purpose, Moped/Scooter, Trike, Other, or Unknown.

Three different survey methods were utilized to collect the data for motorcycle helmet use and high visibility gear use, which included:

- 1) Observations made concurrently with statewide direct observation safety belt surveys. These observations were recorded directly to the data collection form and were later transferred to an Excel spreadsheet.
- 2) Observations made during review of video from pole mounted high definition cameras that were temporarily installed at pre-selected stationary locations. Video review was performed by a trained member of the project team, and the relevant data for each observed motorcycle was recorded into an Excel spreadsheet.
- 3) Observations made during review of video from dashboard cameras (i.e., "dash cams"). Video review was performed by a trained member of the project team, and the relevant data for each observed motorcycle were recorded into an Excel spreadsheet.

2.3 Quality Control

The principal investigator and lead graduate student assistant from MSU served as the project QA/QC Monitors. Because the majority of the observations were recorded by video, this simplified the ability to verify the time, day, and location of each video recording, along with quality control checks for a random sample of observations from each data collector to ensure the accuracy with the scoring of the various attributes of the motorcycle, driver, and passenger (where present).

3.0 SELECTION OF OBSERVATION LOCATIONS

The motorcycle helmet observations were performed at 152 locations within 63 counties statewide, which represented 85.3 percent of statewide motorcycle fatal crashes and 85.4 percent of statewide motorcycle registrations. Both freeways and non-freeway roadway locations were included. The full list of locations, including the observation method and the roadway facility type, is provided in Appendix II. Note that because the vehicle was in motion during the dashboard video collection, the motorcycle data were aggregated by county, roadway facility type, and day of week for the dashboard camera videos.

3.1 Safety Belt Survey Sites

Motorcycle helmet surveys were conducted at roadside observation locations concurrently with the June 2017 statewide direct observation safety belt surveys. These roadside motorcycle surveys were only performed by observers who had received adequate training and were comfortable with performing the direct observation motorcycle surveys while concurrently performing the safety belt surveys. It should be noted that the primary data collection purpose at these sites was safety belt surveys, and therefore, most observers chose not to collect motorcycle related data, particularly at high traffic volume locations. Thus, observations made concurrently with the statewide direct observation safety belt surveys accounted for 11.3 percent of all motorcycle observations.

3.2 Pole-Mounted Camera Sites

Motorcycle data were also collected through a review of videos obtained from pole mounted cameras temporarily installed on the roadside. This method accounted for 51.7 percent of the motorcycle observations. These locations were selected using a variety of methods, which included roadways near statewide safety belt survey locations, sites that were used during the 2013 helmet use survey, and other freeway and non-freeway locations with adequate motorcycle volumes. The camera set-up, as well an example of field-of-view, can be seen in Figure 3.

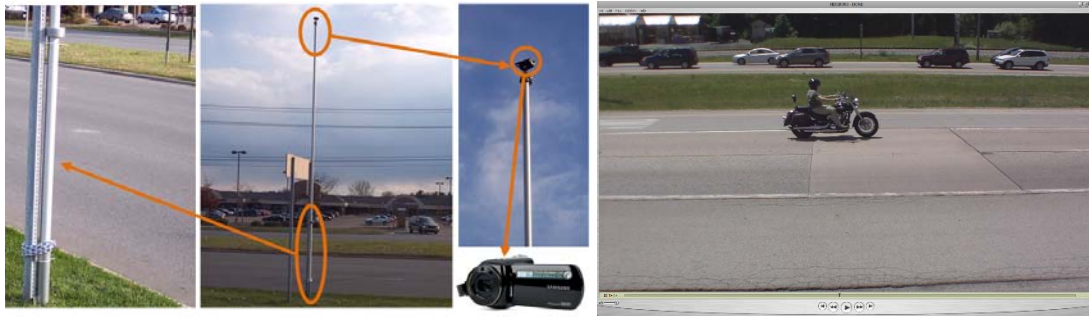


Figure 3. Typical Pole Mounted Video Camera Setup and Field of View

3.3 Dashboard Camera Sites

Members of the research team were also equipped with dash cams during the summer of 2017 (shown in Figure 4) to capture motorcycle observations while traveling to and from field work locations, as well as recording during employees' personal travel. This provided for two unique advantages over stationary camera setups: 1) a more geographically diverse sample of motorcycle observations was obtained, and 2) observations could be made during daily commuting and other non-project work periods, including periods that fell outside of the typical work-day period, such as early morning, evening, and weekend hours. Overall, 37.0 percent of observations were performed using dash cam.

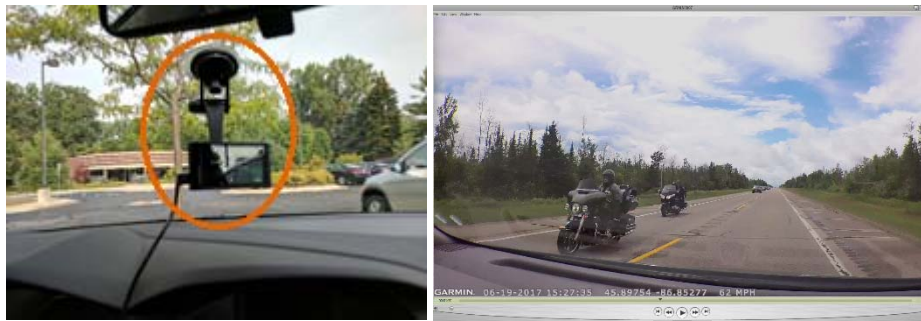


Figure 4. Typical Dash Cam Setup and Field of View

3.4 Data Collection Period

Motorcycle data collection began on June 2, 2017, and concluded on August 15, 2017. Motorcycle observational surveys conducted concurrently with statewide safety belt use surveys took place between June 7 and June 28, 2017. Additional data collection using the aforementioned video recording methods occurred throughout the summer at designated pole-mounted camera locations and through the use of dash-cams. The surveys were performed during daylight hours (6 AM - 9 PM) and across all days of the week.

4.0 OBSERVER TRAINING

Data collection was performed by MSU student staff, many of whom have participated in prior safety belt use surveys. The training program for data collectors was conducted at MSU, beginning approximately two weeks prior to the first data collection period and included both classroom and field exercises. 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.

As a part of the training program, each member of the data collection team received a training manual comprised of the information received during the training session, the schedule for data collection, and all necessary field supplies. The training manual included descriptive text, which was supplemented by photographs of different helmet types, motorcycle types, and high visibility gear.

At the conclusion of the classroom training, the data collectors conducted their first field practice for both direct roadside observation and camera installation procedures at locations near the MSU campus. QA/QC monitors were available during this period to respond to questions and offer assistance to data collectors as needed. The data collectors were also trained for video review using a uniform sample of videos containing motorcycle observations with known characteristics. Each motorcycle within the training videos had been previously assessed by the project team for all relevant observational characteristics, including helmet use and type, high visibility gear use and type, motorcycle type, gender, and age. The data collector's performance on the training videos was then scored by the QC monitor. This video review training process was repeated until all primary characteristics (i.e., helmet use, helmet type, motorcycle type, and high visibility use) for motorcycle riders included in the training videos were scored correctly.

5.0 WEIGHTED STATEWIDE HELMET USE CALCULATION

The motorcycle observational data was entered into a spreadsheet by the observer at the conclusion of the data collection activities and verified for accuracy. A rider was considered helmeted if he/she was wearing a full, open face (3/4), or half shell helmet. The weighted statewide helmet use rate and 95 percent confidence interval was then computed according to the following procedures.

The first step was to determine the helmet use rate for each site by dividing the total number of helmeted riders (drivers and passengers) by the total number of riders observed. All sites were then combined across each stratum to arrive at a stratum-level use rates and variance. The variance for each stratum was determined by the following equation [6]:

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

Where,

n_j = number of observation locations stratum j

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

r_i = helmet use rate for location i in stratum j

r_j = overall helmet use rate for stratum j

The statewide motorcycle helmet use rates were calculated by weighting the stratum-level helmet use rates by the number of motorcycle registrations per stratum. The weights were determined based on the motorcycle registrations by county for 2017, which were obtained by OHSP from the Michigan Secretary of State Registration Database. Table 1 provides a summary for the registrations by county and stratum for the 63 counties utilized in the 2017 motorcycle helmet survey. These 63 counties are depicted by gray shading in the map displayed in Figure 5. Note that Table 1 also includes motorcycle fatal crashes by county for the period of 2011-2015, which, as previously mentioned, were used to establish the sampling frame. The total number of motorcycle registrations for the 63 counties observed within the four strata is 207,103, which represents 85.4 percent of Michigan's statewide motorcycle registrations, and is consistent with the minimum 85 percent target representation for statewide direct observation restraint use surveys. The weights were assigned as follows:

- Stratum 1 weight = 0.209 (43,347 divided by 207,103).
- Stratum 2 weight = 0.247 (51,065 divided by 207,103).
- Stratum 3 weight = 0.329 (68,095 divided by 207,103).
- Stratum 4 weight = 0.215 (44,596 divided by 207,103).

The sum of the weight factors for all four strata equaled 1.00. The weight factors are then multiplied by the helmet use percentages for each stratum divided by the total number of drivers and passengers observed in each stratum. The final percentage in each stratum was added together to provide an overall weighted helmet use. The overall statewide variance was calculated using the following formula:

$$Variance_{TOTAL} = \frac{\sum_{\forall j} (w_j^2 Var_j)}{(\sum_{\forall j} w_j)^2}$$

Where,

Var_j = variance for stratum j.

w_j = motorcycle registration weight factor for stratum j.

The 95 percent confidence interval is equal to the weighted helmet use rate ±1.96 times the square root of the statewide variance expressed as a percent. The standard error of the estimate is equal to the square root of the statewide variance.

Table 1. 2017 Motorcycle Registrations and Motorcycle Fatal Crashes by County and Strata (Michigan Secretary of State Registration Database; Michigan Traffic Crash Facts Website)

| County Name | Registered Motorcycles | Percent Statewide | Motorcycle Fatal Crashes | Percent Statewide |
|------------------|------------------------|-------------------|--------------------------|-------------------|
| Stratum 1 | | | | |
| Ingham | 4,803 | 1.98 | 19 | 3.20 |
| Kalamazoo | 5,879 | 2.42 | 16 | 2.70 |
| Oakland | 25,923 | 10.69 | 37 | 6.24 |
| Washtenaw | 6,742 | 2.78 | 17 | 2.87 |
| Total | 43,347 | 17.87 | 89 | 15.01 |
| Stratum 2 | | | | |
| Allegan | 3,949 | 1.63 | 13 | 2.19 |
| Bay | 3,194 | 1.32 | 10 | 1.69 |
| Calhoun | 4,244 | 1.75 | 6 | 1.01 |
| Eaton | 3,261 | 1.34 | 7 | 1.18 |
| Grand Traverse | 2,369 | 0.98 | 7 | 1.18 |
| Jackson | 4,894 | 2.02 | 9 | 1.52 |
| Kent | 13,017 | 5.37 | 33 | 5.56 |
| Livingston | 6,393 | 2.64 | 20 | 3.37 |
| Midland | 2,606 | 1.07 | 2 | 0.34 |
| Ottawa | 7,138 | 2.94 | 10 | 1.69 |
| Total | 51,065 | 21.06 | 117 | 19.73 |

Table 1. (cont.)

| County Name | Registered Motorcycles | Percent Statewide | Motorcycle Fatal Crashes | Percent Statewide |
|---------------------|------------------------|-------------------|--------------------------|-------------------|
| Stratum 3 | | | | |
| Alger | 279 | 0.12 | 0 | 0.00 |
| Antrim | 887 | 0.37 | 1 | 0.17 |
| Baraga | 145 | 0.06 | 0 | 0.00 |
| Barry | 2,518 | 1.04 | 10 | 1.69 |
| Benzie | 617 | 0.25 | 1 | 0.17 |
| Berrien | 4,386 | 1.81 | 10 | 1.69 |
| Branch | 1,263 | 0.52 | 3 | 0.51 |
| Charlevoix | 965 | 0.40 | 0 | 0.00 |
| Cheboygan | 861 | 0.36 | 4 | 0.67 |
| Chippewa | 943 | 0.39 | 0 | 0.00 |
| Clare | 970 | 0.40 | 6 | 1.01 |
| Clinton | 2,052 | 0.85 | 4 | 0.67 |
| Crawford | 513 | 0.21 | 2 | 0.34 |
| Delta | 1,105 | 0.46 | 3 | 0.51 |
| Dickinson | 920 | 0.38 | 3 | 0.51 |
| Emmet | 1,029 | 0.42 | 0 | 0.00 |
| Genesee | 9,842 | 4.06 | 16 | 2.70 |
| Gladwin | 873 | 0.36 | 1 | 0.17 |
| Gogebic | 372 | 0.15 | 0 | 0.00 |
| Gratiot | 1,170 | 0.48 | 0 | 0.00 |
| Houghton | 720 | 0.30 | 2 | 0.34 |
| Ionia | 2,000 | 0.82 | 8 | 1.35 |
| Iron | 347 | 0.14 | 1 | 0.17 |
| Isabella | 1,306 | 0.54 | 3 | 0.51 |
| Kalkaska | 689 | 0.28 | 0 | 0.00 |
| Keweenaw | 66 | 0.03 | 0 | 0.00 |
| Luce | 127 | 0.05 | 0 | 0.00 |
| Mackinac | 316 | 0.13 | 1 | 0.17 |
| Manistee | 891 | 0.37 | 0 | 0.00 |
| Marquette | 1,709 | 0.70 | 4 | 0.67 |
| Mecosta | 1,023 | 0.42 | 4 | 0.67 |
| Menominee | 831 | 0.34 | 1 | 0.17 |
| Montcalm | 2,120 | 0.87 | 5 | 0.84 |
| Newaygo | 1,889 | 0.78 | 7 | 1.18 |
| Ontonagon | 200 | 0.08 | 2 | 0.34 |
| Osceola | 648 | 0.27 | 2 | 0.34 |
| Oscoda | 355 | 0.15 | 1 | 0.17 |
| Otsego | 770 | 0.32 | 2 | 0.34 |
| Presque Isle | 403 | 0.17 | 1 | 0.17 |
| Saginaw | 4,244 | 1.75 | 14 | 2.36 |
| St Clair | 5,293 | 2.18 | 18 | 3.04 |
| St Joseph | 2,355 | 0.97 | 4 | 0.67 |
| Sanilac | 1,500 | 0.62 | 1 | 0.17 |
| Schoolcraft | 314 | 0.13 | 1 | 0.17 |
| Shiawassee | 2,518 | 1.04 | 6 | 1.01 |
| Van Buren | 2,726 | 1.12 | 8 | 1.35 |
| Wexford | 1,025 | 0.42 | 1 | 0.17 |
| Total | 68,095 | 28.08 | 161 | 27.15 |
| Stratum 4 | | | | |
| Macomb | 18,025 | 7.43 | 42 | 7.08 |
| Wayne | 26,571 | 10.96 | 97 | 16.36 |
| Total | 44,596 | 18.39 | 139 | 23.44 |
| Total Strata | 207,103 | 85.40 | 506 | 85.33 |

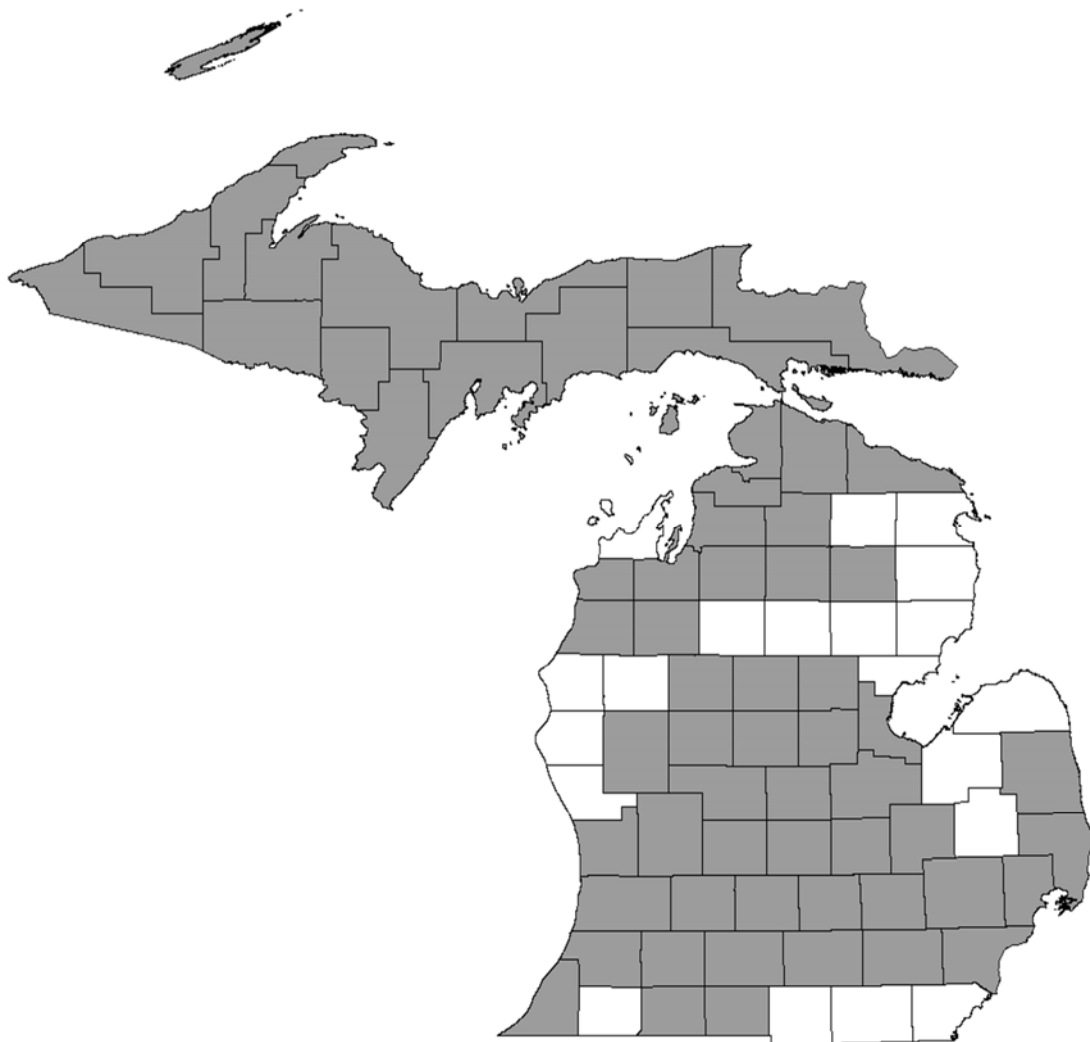


Figure 5. 63-Counties Included in the 2017 Direct Observation Motorcycle Helmet Use Survey

6.0 RESULTS AND CONCLUSIONS

The direct observation survey was performed between June 2, 2017 and August 15, 2017. During this period, a total of 2,033 riders were observed on 1,772 motorcycles at 152 observation sites throughout the state of Michigan. The observations were obtained based on a random probability-based sample occurring during daylight periods across all days of the week and within counties that collectively represent at least 85 percent of fatal motorcycle crashes and motorcycle registrations. This total sample was consequently utilized to calculate the statewide helmet use rate estimate.

6.1 Motorcycle Helmet Use Rates

The statewide helmet use rate (as determined through the random sampling scheme) is shown in Table 2. The statewide use rate was calculated based upon the procedures described in Section 5.2 “Weighted Statewide Helmet Use Calculations” of this report.

Table 2. 2017 Statewide Motorcycle Helmet Use Rate

| Observation Sample | Number of Observations | Motorcycle Helmet Use Rate* | Standard Error |
|---------------------|------------------------|-----------------------------|----------------|
| 63-County Statewide | 2,033 | 71.4% ± 2.9% | 1.5% |

* Weighted Motorcycle Helmet Usage ± 95% Confidence Interval

These results show that the statewide motorcycle helmet use rate is 71.4 percent. This rate represents a marked decrease from the 99.4 percent use rate observed during the 2006 survey, which was performed prior to the repeal of the Michigan helmet use law in 2012 [4]. This rate is also slightly (but not statistically) lower than the previous survey conducted in 2013, one year after the Michigan helmet use law was repealed, during which the helmet use rate was found to be 73.0 percent. Furthermore, the 71.4 percent helmet use rate observed is also similar to the helmet use rate among crash-involved motorcyclists, which was found to be 68.4 percent in 2016 [7].

A comparison of fatal motorcycle crashes for the most recent four-year periods before (2008-2011) and after (2013-2016) the repeal of the helmet law in 2012 shows a 10.7 percent increase (497 vs 449) in motorcycle fatal crashes in the period after the law was repealed. This is even more significant when considering that total motorcycle crashes have decreased by 10.4 percent between the two time periods. Thus, it appears that the repeal of the Michigan helmet use law has resulted in more severe injury outcomes during motorcycle crashes. This finding is supported by research on injury outcomes for motorcycle crashes [8].

In addition to providing statewide use rates, use rates were also compared with respect to demographics

and other pertinent characteristics in order to better understand factors that may contribute to differences in use rates. Tables 3 through 5 present use rates by select motorcycle and rider characteristics. These tables present aggregate, unweighted summaries that combine the helmet use data across all locations.

Table 3 shows a summary of the helmet types observed for each motorcycle type. These data show that helmet use was lowest among riders of mopeds at 25.7 percent. This result is expected as mopeds are only observed on low speed streets, typically near college campuses. Helmet use was highest among sport bike riders, who had a user rate of 93.8 percent. Overall, full helmets were more commonly observed (26.4 percent of all riders) than half shell helmets (18.3 percent) or open face helmets (20.3 percent). Full helmets were most frequently worn by riders on sport bikes, followed by those on dual-purpose motorcycles. Open face helmets were most prevalent among those on trike motorcycles. Half shells were worn most frequently by those on touring motorcycles and cruisers.

Table 3. 2017 Percent of Helmet Use by Helmet Type and Motorcycle Type

| Motorcycle Type | Number of Riders Observed | Helmet Type | | | | | Helmet Use Rate (percent) |
|-----------------|---------------------------|--------------|-----------------|--------------|-------------|--------------|---------------------------|
| | | Full Helmet | Open Face (3/4) | Half Shell | Unknown | No Helmet | |
| Touring | 1,018 | 15.3% | 24.3% | 21.9% | 8.5% | 30.0% | 70.0% |
| Cruiser | 505 | 18.2% | 18.6% | 22.8% | 8.5% | 31.9% | 68.1% |
| Sport | 194 | 87.1% | 2.1% | 0.0% | 4.6% | 6.2% | 93.8% |
| Standard | 141 | 53.2% | 13.5% | 12.8% | 2.8% | 17.7% | 82.3% |
| Trike | 96 | 20.8% | 42.7% | 13.5% | 5.2% | 17.7% | 82.3% |
| Moped | 35 | 14.3% | 5.7% | 5.7% | 0.0% | 74.3% | 25.7% |
| Dual | 20 | 60.0% | 20.0% | 0.0% | 5.0% | 15.0% | 85.0% |
| Unknown | 12 | 33.3% | 0.0% | 0.0% | 16.7% | 50.0% | 50.0% |
| Chopper | 11 | 36.4% | 9.1% | 9.1% | 0.0% | 45.5% | 54.5% |
| Other | 1 | 0.0% | 0.0% | 0.0% | 0.0% | 100.0% | 0.0% |
| Total | 2,033 | 26.4% | 20.3% | 18.3% | 7.4% | 27.6% | 72.4% |

Table 4 summarizes helmet use for riders by the day of the week, time of the day, and roadway type. Table 5 presents helmet use by various demographic characteristics, including gender, age race, and riding position.

Table 4. 2017 Statewide Motorcycle Helmet Use Summary by Day of Week, Time of Day, and Type of Roadway

| Day of the Week | Number of Riders Observed | Number of Riders Helmeted | Helmet Use Rate (percent) |
|------------------------|----------------------------------|----------------------------------|----------------------------------|
| Sunday | 341 | 235 | 68.9% |
| Monday | 129 | 92 | 71.3% |
| Tuesday | 261 | 203 | 77.8% |
| Wednesday | 166 | 134 | 80.7% |
| Thursday | 162 | 125 | 77.2% |
| Friday | 549 | 394 | 71.8% |
| Saturday | 425 | 289 | 68.0% |
| Total | 2,033 | 1,472 | 72.4% |
| Time of Day | Number of Riders Observed | Number of Riders Helmeted | Helmet Use Rate (percent) |
| 6-7am | 2 | 2 | 100.0% |
| 7-8am | 10 | 6 | 60.0% |
| 8-9am | 25 | 23 | 92.0% |
| 9-10am | 53 | 43 | 81.1% |
| 10-11am | 74 | 55 | 74.3% |
| 11-12pm | 30 | 24 | 80.0% |
| 12-1pm | 346 | 232 | 67.1% |
| 1-2pm | 340 | 255 | 75.0% |
| 2-3pm | 236 | 167 | 70.8% |
| 3-4pm | 231 | 170 | 73.6% |
| 4-5pm | 190 | 137 | 72.1% |
| 5-6pm | 225 | 167 | 74.2% |
| 6-7pm | 151 | 114 | 75.5% |
| 7-8pm | 98 | 63 | 64.3% |
| 8-9pm | 17 | 13 | 76.5% |
| 9-10pm | 5 | 1 | 20.0% |
| Total | 2,033 | 1,472 | 72.4% |
| Facility Type | Number of Riders Observed | Number of Riders Helmeted | Helmet Use Rate (percent) |
| Freeway | 537 | 415 | 77.3% |
| Non-freeway | 1,496 | 1,057 | 70.7% |
| Total | 2,033 | 1,472 | 72.4% |

Helmet use rates were highest on Wednesdays (80.7 percent) and lowest on Saturdays and Sundays (68.0 and 68.9 percent, respectively). This was an expected result, as recreational riding typically occurs more frequently on weekends. Afternoon periods tended to have lower helmet use rates than morning periods, but this result was not consistent. As expected, due to higher speeds and greater travel distances, helmet use was higher on freeways compared to non-freeways.

Table 5. 2017 Statewide Motorcycle Helmet Use Summary by Gender, Age, Race, and Riding Position

| Gender | Number of Riders Observed | Number of Riders Helmeted | Helmet Use Rate (percent) |
|------------------------|----------------------------------|----------------------------------|----------------------------------|
| Male | 1,389 | 918 | 66.1% |
| Female | 238 | 170 | 71.4% |
| Unknown | 406 | 384 | 94.6% |
| Total | 2,033 | 1,472 | 72.4% |
| Age | Number of Riders Observed | Number of Riders Helmeted | Helmet Use Rate (percent) |
| 0-15 | 11 | 6 | 54.5% |
| 16-29 | 277 | 187 | 67.5% |
| 30-59 | 983 | 601 | 61.1% |
| 60+ | 182 | 133 | 73.1% |
| Unknown | 580 | 545 | 94.0% |
| Total | 2,033 | 1,472 | 72.4% |
| Race | Number of Riders Observed | Number of Riders Helmeted | Helmet Use Rate (percent) |
| White | 1,498 | 985 | 65.8% |
| Black | 42 | 24 | 57.1% |
| Other | 12 | 5 | 41.7% |
| Unknown | 481 | 458 | 95.2% |
| Total | 2,033 | 1,472 | 72.4% |
| Riding Position | Number of Riders Observed | Number of Riders Helmeted | Helmet Use Rate (percent) |
| Driver | 1,772 | 1,279 | 72.2% |
| Passenger | 261 | 193 | 73.9% |
| Total | 2,033 | 1,472 | 72.4% |

Females (71.4 percent) had a higher use rate than males (66.1 percent). Riders ages 60 and older had the highest helmet use rate (73.1 percent), while riders ages 0-15 had the lowest use rates (54.5 percent), although this age group included only a small sample of riders. Motorcycle riders identified as black had a lower use rate (57.1 percent) than those identified as white (65.8 percent). Helmet use rates were relatively consistent between drivers and passengers. Please note that the relatively high number of riders in the “unknown” demographic categories was most often due to the difficulties associated with observing such information for riders wearing full helmets. As it is difficult to identify race, gender and age for motorcyclists wearing full protective gear, it is not surprising to see high helmet use rates for riders categorized as unknown. Thus, because of this downward bias in helmet use across the demographic categories, the helmet use statistics by gender, age, and race, should only be considered for relative comparisons between the various categories.

6.2 High-Visibility Gear Use

The helmet use survey also included an assessment of the utilization of high-visibility gear among riders, which is summarized in Table 6 based on motorcycle type, gender, age, race, and riding position. It should be noted that observers only assessed if the rider was wearing any type of high-visibility gear. The specific type of high-visibility gear that was worn was not recorded. It should be noted that one observer did not collect data regarding the use of high visibility gear while performing concurrent safety belt survey observations, which resulted in the lower number of observations for high visibility gear use compared to helmet use.

Table 6. 2017 Statewide High-Visibility Gear Use Summary by Motorcycle Type, Gender, Age, Race, and Riding Position

| Motorcycle Type | Number of Riders Observed | Number of Riders Wearing Hi-Vis. Equip. | Rate of High- Vis. Equip. Use (percent) |
|------------------------|----------------------------------|--|--|
| Standard | 130 | 4 | 3.1% |
| Touring | 950 | 29 | 3.1% |
| Cruiser | 472 | 15 | 3.2% |
| Chopper | 7 | 0 | 0.0% |
| Other | 1 | 0 | 0.0% |
| Sport | 181 | 13 | 7.2% |
| Dual | 20 | 0 | 0.0% |
| Moped | 34 | 0 | 0.0% |
| Trike | 96 | 8 | 8.3% |
| Unknown | 6 | 0 | 0.0% |
| Total | 1,897 | 69 | 3.6% |
| Gender | Number of Riders Observed | Number of Riders Wearing Hi-Vis. Equip. | Rate of High- Vis. Equip. Use (percent) |
| Male | 1,284 | 37 | 2.9% |
| Female | 213 | 7 | 3.3% |
| Unknown | 400 | 25 | 6.3% |
| Total | 1,897 | 69 | 3.6% |
| Age | Number of Riders Observed | Number of Riders Wearing Hi-Vis. Equip. | Rate of High- Vis. Equip. Use (percent) |
| 0-15 | 6 | 0 | 0.0% |
| 16-29 | 249 | 9 | 3.6% |
| 30-59 | 904 | 28 | 3.1% |
| 60+ | 176 | 2 | 1.1% |
| Unknown | 562 | 30 | 5.3% |
| Total | 1,897 | 69 | 3.6% |
| Race | Number of Riders Observed | Number of Riders Wearing Hi-Vis. Equip. | Rate of High- Vis. Equip. Use (percent) |
| White | 1,375 | 40 | 2.9% |
| Black | 41 | 1 | 2.4% |
| Other | 12 | 0 | 0.0% |
| Unknown | 469 | 28 | 6.0% |
| Total | 1,897 | 69 | 3.6% |
| Riding Position | Number of Riders Observed | Number of Riders Wearing Hi-Vis. Equip. | Rate of High- Vis. Equip. Use (percent) |
| Driver | 1,658 | 60 | 3.6% |
| Passenger | 239 | 9 | 3.8% |
| Total | 1,897 | 69 | 3.6% |

High-visibility gear was used by only 3.6 percent of riders. Sport and trike motorcycles had the highest percentage of riders wearing high-visibility gear at 7.2 percent and 8.3 percent, respectively. Female riders and riders aged 16-29 were observed to more frequently utilize high visibility gear.

Table 7 displays a summary of the helmet use rates based on the use of high-visibility gear. Not surprisingly, helmets were used at a much higher rate (84.1 percent) by users of high-visibility gear than riders not wearing high visibility gear (72.4 percent).

Table 7. 2017 Helmet Use by High-Visibility Gear Use

| Use of High-Visibility Gear | Number of Riders Observed | Number of Riders Helmeted | Helmet Use Rate (percent) |
|------------------------------------|----------------------------------|----------------------------------|----------------------------------|
| Used | 69 | 58 | 84.1% |
| Not Used | 1,828 | 1,324 | 72.4% |

6.3 Conclusions

The 2017 overall statewide helmet use rate among motorcycle riders in Michigan was 71.4 percent. This rate is substantially lower than the 99.4 percent helmet use rate observed in 2006 when all riders were required by law to wear a helmet [5], but is not statistically lower than the 73.0 percent helmet use rate observed in 2013, which is the year following the repeal of the Michigan helmet law [4]. Thus, while the repeal of the Michigan motorcycle helmet law in 2012 has substantially reduced motorcycle helmet use statewide, there is no evidence of further declines in helmet use beyond that which was observed the year following the repeal of the helmet law. Furthermore, motorcycle helmet use rate in Michigan remains 6.4 percentage points higher than the 65 percent helmet use rate (drivers only) observed in the nationwide NOPUS survey in 2016, although this gap is closing as nationwide helmet use has been increasing recently. The percentage of riders wearing high-visibility gear was 3.6 percent, which is a concern because non-helmeted riders were also less likely to wear such equipment, introducing additional risk for this group.

Based upon these findings, continued efforts are warranted to encourage the use of both motorcycle helmets and high-visibility gear. Such efforts may include educational campaigns targeted towards those groups that exhibited the lowest use rates. Given the strong support from empirical research, these campaigns should emphasize the documented safety benefits associated with the use of helmets and high-visibility gear.

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APPENDIX I – DATA COLLECTION COVER SHEET AND OBSERVATION FORM

DIRECT OBSERVATION SURVEY COVER SHEET

Date: _____ - _____ - 2017

Observers Name: _____

Survey Type:

| | | |
|-------------|------------------|-------------------|
| Safety Belt | CRD/Booster Seat | Motorcycle Helmet |
|-------------|------------------|-------------------|

Site Identification:

| |
|--|
| Site Location: _____ |
| Site Number: _____ |
| City _____ County: _____ Stratum _____ |

Alternate Site Information:

| | | |
|---|----|-----|
| Is this an alternate site? (Circle one) | No | Yes |
| If yes, please provide a reason for using an alternate site from the reserve list: _____ | | |

Site Description:

| |
|--|
| Assigned traffic flow: North South East West |
| Number of lanes observed: _____ |
| Total number of lanes in this direction: _____ |
| Weather Conditions: Clear Light Fog Light Rain |

Site Start and End Time (total obs. period must last EXACTLY 60 min):

| | |
|-------------------------|-----------------------|
| Start time: _____ am/pm | End time: _____ am/pm |
|-------------------------|-----------------------|

Sample Sizes

| |
|---|
| <u>Safety Bely Survey:</u> |
| 60 Minute Volume Count (for lanes being observed): _____ Vehicles |
| Number of Observations Recorded in 60 min: _____ Vehicles |
| <u>CRD/Booster Seat Survey:</u> |
| Total Number of Children Observed in 60 min: _____ Children |
| <u>Motorcycle Helmet Use Survey:</u> |
| Number of Observations Recorded in 60 min: _____ Motorcycles |

| MOTORCYCLE TYPE: | | | | | |
|--|--|---|--|--|---|
| <input type="checkbox"/> Standard | <input type="checkbox"/> Touring | <input type="checkbox"/> Cruiser | <input type="checkbox"/> Chopper/Custom | <input type="checkbox"/> Other | |
| <input type="checkbox"/> Sport | <input type="checkbox"/> Dual-Purpose | <input type="checkbox"/> Moped/Scooter | <input type="checkbox"/> Trike | <input type="checkbox"/> Unknown | |
| RIDER | | | PASSENGER | | |
| HIGH-VISIBILITY | HELMET USE: | | HIGH-VISIBILITY | HELMET USE: | |
| <input type="checkbox"/> No <input type="checkbox"/> Yes | <input type="checkbox"/> Full Helmet <input type="checkbox"/> Half Shell | <input type="checkbox"/> Open Face (3/4) <input type="checkbox"/> No Helmet | <input type="checkbox"/> No <input type="checkbox"/> Yes | <input type="checkbox"/> Full Helmet <input type="checkbox"/> Half Shell | <input type="checkbox"/> Open Face (3/4) Face <input type="checkbox"/> No Helmet |
| AGE: | GENDER: | RACE: | AGE: | GENDER: | RACE: |
| <input type="checkbox"/> 16-29 <input type="checkbox"/> 30-59 <input type="checkbox"/> 60+ <input type="checkbox"/> Unknown | <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unknown | <input type="checkbox"/> White <input type="checkbox"/> Black <input type="checkbox"/> Other Race <input type="checkbox"/> Unknown | <input type="checkbox"/> 16-29 <input type="checkbox"/> 30-59 <input type="checkbox"/> 60+ <input type="checkbox"/> Unknown | <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unknown | <input type="checkbox"/> White <input type="checkbox"/> Black <input type="checkbox"/> Other Race <input type="checkbox"/> Unknown |

| MOTORCYCLE TYPE: | | | | | |
|--|--|---|--|--|---|
| <input type="checkbox"/> Standard | <input type="checkbox"/> Touring | <input type="checkbox"/> Cruiser | <input type="checkbox"/> Chopper/Custom | <input type="checkbox"/> Other | |
| <input type="checkbox"/> Sport | <input type="checkbox"/> Dual-Purpose | <input type="checkbox"/> Moped/Scooter | <input type="checkbox"/> Trike | <input type="checkbox"/> Unknown | |
| RIDER | | | PASSENGER | | |
| HIGH-VISIBILITY | HELMET USE: | | HIGH-VISIBILITY | HELMET USE: | |
| <input type="checkbox"/> No <input type="checkbox"/> Yes | <input type="checkbox"/> Full Helmet <input type="checkbox"/> Half Shell | <input type="checkbox"/> Open Face (3/4) <input type="checkbox"/> No Helmet | <input type="checkbox"/> No <input type="checkbox"/> Yes | <input type="checkbox"/> Full Helmet <input type="checkbox"/> Half Shell | <input type="checkbox"/> Open Face (3/4) Face <input type="checkbox"/> No Helmet |
| AGE: | GENDER: | RACE: | AGE: | GENDER: | RACE: |
| <input type="checkbox"/> 16-29 <input type="checkbox"/> 30-59 <input type="checkbox"/> 60+ <input type="checkbox"/> Unknown | <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unknown | <input type="checkbox"/> White <input type="checkbox"/> Black <input type="checkbox"/> Other Race <input type="checkbox"/> Unknown | <input type="checkbox"/> 16-29 <input type="checkbox"/> 30-59 <input type="checkbox"/> 60+ <input type="checkbox"/> Unknown | <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unknown | <input type="checkbox"/> White <input type="checkbox"/> Black <input type="checkbox"/> Other Race <input type="checkbox"/> Unknown |

| MOTORCYCLE TYPE: | | | | | |
|--|--|---|--|--|---|
| <input type="checkbox"/> Standard | <input type="checkbox"/> Touring | <input type="checkbox"/> Cruiser | <input type="checkbox"/> Chopper/Custom | <input type="checkbox"/> Other | |
| <input type="checkbox"/> Sport | <input type="checkbox"/> Dual-Purpose | <input type="checkbox"/> Moped/Scooter | <input type="checkbox"/> Trike | <input type="checkbox"/> Unknown | |
| RIDER | | | PASSENGER | | |
| HIGH-VISIBILITY | HELMET USE: | | HIGH-VISIBILITY | HELMET USE: | |
| <input type="checkbox"/> No <input type="checkbox"/> Yes | <input type="checkbox"/> Full Helmet <input type="checkbox"/> Half Shell | <input type="checkbox"/> Open Face (3/4) <input type="checkbox"/> No Helmet | <input type="checkbox"/> No <input type="checkbox"/> Yes | <input type="checkbox"/> Full Helmet <input type="checkbox"/> Half Shell | <input type="checkbox"/> Open Face (3/4) Face <input type="checkbox"/> No Helmet |
| AGE: | GENDER: | RACE: | AGE: | GENDER: | RACE: |
| <input type="checkbox"/> 16-29 <input type="checkbox"/> 30-59 <input type="checkbox"/> 60+ <input type="checkbox"/> Unknown | <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unknown | <input type="checkbox"/> White <input type="checkbox"/> Black <input type="checkbox"/> Other Race <input type="checkbox"/> Unknown | <input type="checkbox"/> 16-29 <input type="checkbox"/> 30-59 <input type="checkbox"/> 60+ <input type="checkbox"/> Unknown | <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Unknown | <input type="checkbox"/> White <input type="checkbox"/> Black <input type="checkbox"/> Other Race <input type="checkbox"/> Unknown |

APPENDIX II - 2017 MICHIGAN MOTORCYCLE OBSERVATION SITES AND HELMET USE DATA

| Stratum | County | Type of Observation | Facility Type | Observation Site | Actual Total # of Obs | Actual Helmeted # of Obs | % Helmet Use |
|---------|----------------|---------------------|---------------|--|-----------------------|--------------------------|--------------|
| 3 | Alger | Dash Cam | Non-freeway | Alger Non-freeway Weekday | 29 | 28 | 96.55% |
| 2 | Allegan | Concurrent | Non-freeway | US-31 and Cental Ave | 1 | 0 | 0.00% |
| 2 | Allegan | Dash Cam | Freeway | Allegan Freeway Weekend | 4 | 3 | 75.00% |
| 2 | Allegan | Dash Cam | Non-freeway | Allegan Non-freeway Weekday | 1 | 0 | 0.00% |
| 3 | Antrim | Dash Cam | Non-freeway | Antrim Non-freeway Weekday | 1 | 1 | 100.00% |
| 3 | Baraga | Concurrent | Non-freeway | US-41 & M-38 | 3 | 3 | 100.00% |
| 3 | Baraga | Dash Cam | Non-freeway | Baraga Non-freeway Weekday | 2 | 2 | 100.00% |
| 3 | Barry | Concurrent | Non-freeway | M-37 (W State St) & M-43 (S Broadway St) | 2 | 2 | 100.00% |
| 2 | Bay | Dash Cam | Non-freeway | Bay Non-freeway Weekday | 1 | 0 | 0.00% |
| 3 | Benzie | Dash Cam | Non-freeway | Benzie Non-freeway Weekday | 9 | 8 | 88.89% |
| 3 | Benzie | Dash Cam | Non-freeway | Benzie Non-freeway Weekend | 6 | 6 | 100.00% |
| 3 | Berrien | Concurrent | Non-freeway | I-94 and Sawyer Rd | 1 | 1 | 100.00% |
| 3 | Berrien | Concurrent | Non-freeway | I-196 and Hagar Shore Rd | 4 | 2 | 50.00% |
| 3 | Branch | Concurrent | Non-freeway | I-69 and Chicago St | 3 | 2 | 66.67% |
| 2 | Calhoun | Concurrent | Non-freeway | I- 69 and M 60 E | 1 | 1 | 100.00% |
| 2 | Calhoun | Concurrent | Non-freeway | W Dickman Rd and Hill Brady Rd N | 1 | 1 | 100.00% |
| 2 | Calhoun | Concurrent | Non-freeway | M-66 and E Burr Oak Rd | 22 | 10 | 45.45% |
| 2 | Calhoun | Dash Cam | Non-freeway | Calhoun Non-freeway Weekday | 1 | 0 | 0.00% |
| 3 | Charlevoix | Dash Cam | Non-freeway | Charlevoix Non-freeway Weekday | 3 | 2 | 66.67% |
| 3 | Cheboygan | Dash Cam | Freeway | Cheboygan Freeway Weekday | 19 | 7 | 36.84% |
| 3 | Chippewa | Dash Cam | Non-freeway | Chippewa Non-freeway Weekday | 23 | 16 | 69.57% |
| 3 | Clare | Dash Cam | Freeway | Clare Freeway Weekday | 2 | 1 | 50.00% |
| 3 | Clare | Dash Cam | Freeway | Clare Freeway Weekend | 1 | 1 | 100.00% |
| 3 | Clare | Dash Cam | Non-freeway | Clare Non-freeway Weekday | 5 | 3 | 60.00% |
| 3 | Clare | Dash Cam | Non-freeway | Clare Non-freeway Weekend | 4 | 2 | 50.00% |
| 3 | Clinton | Pole-Mount | Freeway | I-69 and Chandler Road | 63 | 53 | 84.13% |
| 3 | Clinton | Dash Cam | Freeway | Clinton Freeway Weekday | 15 | 10 | 66.67% |
| 3 | Clinton | Dash Cam | Freeway | Clinton Freeway Weekend | 1 | 1 | 100.00% |
| 3 | Clinton | Dash Cam | Non-freeway | Clinton Non-freeway Weekday | 8 | 6 | 75.00% |
| 3 | Clinton | Dash Cam | Non-freeway | Clinton Non-freeway Weekend | 5 | 5 | 100.00% |
| 3 | Crawford | Pole-Mount | Non-freeway | M-72 and Staley Lake/Louies Landing | 8 | 8 | 100.00% |
| 3 | Crawford | Dash Cam | Non-freeway | Crawford Non-freeway Weekday | 1 | 1 | 100.00% |
| 3 | Delta | Dash Cam | Non-freeway | Delta Non-freeway Weekday | 3 | 3 | 100.00% |
| 3 | Dickinson | Dash Cam | Non-freeway | Dickinson Non-freeway Weekday | 1 | 1 | 100.00% |
| 2 | Eaton | Pole-Mount | Non-freeway | M-99 and S Waverly Rd | 10 | 6 | 60.00% |
| 2 | Eaton | Pole-Mount | Non-freeway | EB M-43 and M-100 | 28 | 22 | 78.57% |
| 2 | Eaton | Dash Cam | Freeway | Eaton Freeway Weekday | 2 | 2 | 100.00% |
| 2 | Eaton | Dash Cam | Non-freeway | Eaton Non-freeway Weekday | 19 | 10 | 52.63% |
| 3 | Emmet | Dash Cam | Non-freeway | Emmet Non-freeway Weekday | 5 | 4 | 80.00% |
| 3 | Genesee | Dash Cam | Non-freeway | Genesee Non-freeway Weekday | 17 | 8 | 47.06% |
| 3 | Gladwin | Dash Cam | Non-freeway | Gladwin Non-freeway Weekday | 5 | 5 | 100.00% |
| 3 | Gogebic | Dash Cam | Non-freeway | Gogebic Non-freeway Weekday | 24 | 23 | 95.83% |
| 2 | Grand Traverse | Dash Cam | Non-freeway | Grand Traverse Non-freeway Weekday | 2 | 0 | 0.00% |
| 2 | Grand Traverse | Dash Cam | Non-freeway | Grand Traverse Non-freeway Weekend | 4 | 1 | 25.00% |
| 3 | Gratiot | Concurrent | Non-freeway | M-46 (W Washington St) & N Main St | 1 | 1 | 100.00% |
| 3 | Gratiot | Dash Cam | Freeway | Gratiot Freeway Weekday | 8 | 8 | 100.00% |
| 3 | Gratiot | Dash Cam | Non-freeway | Gratiot Non-freeway Weekday | 1 | 1 | 100.00% |
| 3 | Gratiot | Dash Cam | Non-freeway | Gratiot Non-freeway Weekend | 3 | 3 | 100.00% |

| Stratum | County | Type of Observation | Facility Type | Observation Site | Actual Total # of Obs | Actual Helmeted # of Obs | % Helmet Use |
|---------|------------|---------------------|---------------|--|-----------------------|--------------------------|--------------|
| 3 | Houghton | Dash Cam | Non-freeway | Houghton Non-freeway Weekday | 36 | 28 | 77.78% |
| 1 | Ingham | Pole-Mount | Freeway | US-127 and Dunckel Road | 96 | 83 | 86.46% |
| 1 | Ingham | Pole-Mount | Freeway | I-96 and College Road | 67 | 51 | 76.12% |
| 1 | Ingham | Pole-Mount | Non-freeway | Collins and Technology Rd | 3 | 2 | 66.67% |
| 1 | Ingham | Dash Cam | Freeway | Ingham Freeway Weekday | 9 | 9 | 100.00% |
| 1 | Ingham | Dash Cam | Freeway | Ingham Freeway Weekend | 1 | 1 | 100.00% |
| 1 | Ingham | Dash Cam | Non-freeway | Ingham Non-freeway Weekday | 61 | 46 | 75.41% |
| 1 | Ingham | Dash Cam | Non-freeway | Ingham Non-freeway Weekend | 12 | 8 | 66.67% |
| 3 | Ionia | Dash Cam | Freeway | Ionia Freeway Weekend | 3 | 3 | 100.00% |
| 3 | Iron | Concurrent | Non-freeway | N 4th Ave (M-189) & US-2 | 2 | 0 | 0.00% |
| 3 | Iron | Dash Cam | Non-freeway | Iron Non-freeway Weekday | 6 | 6 | 100.00% |
| 3 | Isabella | Dash Cam | Freeway | Isabella Freeway Weekday | 5 | 5 | 100.00% |
| 3 | Isabella | Dash Cam | Non-freeway | Isabella Non-freeway Weekend | 2 | 2 | 100.00% |
| 2 | Jackson | Concurrent | Non-freeway | M-50 and US-127 | 2 | 0 | 0.00% |
| 2 | Jackson | Concurrent | Non-freeway | US-127 Bus (Cooper St) and Washington St | 1 | 0 | 0.00% |
| 2 | Jackson | Dash Cam | Non-freeway | Jackson Non-freeway Weekend | 1 | 0 | 0.00% |
| 1 | Kalamazoo | Concurrent | Non-freeway | M-96 (E Michigan Ave) and 35th St N | 3 | 3 | 100.00% |
| 1 | Kalamazoo | Concurrent | Non-freeway | I-94 Bus (W Kalamazoo Ave) and N Rose St | 1 | 1 | 100.00% |
| 1 | Kalamazoo | Concurrent | Non-freeway | M-43 and Solon St | 7 | 3 | 42.86% |
| 1 | Kalamazoo | Concurrent | Non-freeway | US-131 and W Centre Ave | 1 | 0 | 0.00% |
| 1 | Kalamazoo | Concurrent | Non-freeway | I-94 Bus (E Michigan Ave) and N Edwards St | 4 | 2 | 50.00% |
| 1 | Kalamazoo | Concurrent | Non-freeway | I-94 and Portage Rd. | 4 | 2 | 50.00% |
| 1 | Kalamazoo | Dash Cam | Non-freeway | Kalamazoo Non-freeway Weekday | 2 | 0 | 0.00% |
| 3 | Kalkaska | Dash Cam | Non-freeway | Kalkaska Non-freeway Weekday | 2 | 1 | 50.00% |
| 2 | Kent | Pole-Mount | Non-freeway | Wilson Ave SW and Hall St SW | 55 | 33 | 60.00% |
| 2 | Kent | Dash Cam | Freeway | Kent Freeway Weekend | 5 | 5 | 100.00% |
| 2 | Kent | Dash Cam | Non-freeway | Kent Non-freeway Weekend | 1 | 0 | 0.00% |
| 3 | Keweenaw | Concurrent | Non-freeway | US-41 and Bumbletown Rd | 8 | 5 | 62.50% |
| 2 | Livingston | Dash Cam | Freeway | Livingston Freeway Weekday | 2 | 0 | 0.00% |
| 2 | Livingston | Dash Cam | Freeway | Livingston Freeway Weekend | 9 | 5 | 55.56% |
| 2 | Livingston | Dash Cam | Non-freeway | Livingston Non-freeway Weekday | 7 | 7 | 100.00% |
| 3 | Luce | Dash Cam | Non-freeway | Luce Non-freeway Weekday | 16 | 11 | 68.75% |
| 3 | Mackinac | Dash Cam | Non-freeway | Mackinac Non-freeway Weekday | 42 | 34 | 80.95% |
| 4 | Macomb | Pole-Mount | Non-freeway | Van Dyke and M-53 (Van Dyke Fwy) | 39 | 28 | 71.79% |
| 4 | Macomb | Pole-Mount | Non-freeway | M-59 (Hall Rd) and Romeo Plank Rd | 19 | 7 | 36.84% |
| 3 | Manistee | Dash Cam | Non-freeway | Manistee Non-freeway Weekday | 16 | 10 | 62.50% |
| 3 | Marquette | Dash Cam | Non-freeway | Marquette Non-freeway Weekend | 1 | 1 | 100.00% |
| 3 | Mecosta | Dash Cam | Non-freeway | Mecosta Non-freeway Weekend | 1 | 0 | 0.00% |
| 3 | Menominee | Concurrent | Non-freeway | US-2 & US-41 | 1 | 1 | 100.00% |
| 3 | Menominee | Dash Cam | Non-freeway | Menominee Non-freeway Weekday | 4 | 2 | 50.00% |
| 2 | Midland | Concurrent | Non-freeway | M-20 (Isabella Rd) and S Meridian Rd | 11 | 7 | 63.64% |
| 2 | Midland | Dash Cam | Non-freeway | Midland Non-freeway Weekday | 14 | 12 | 85.71% |
| 3 | Montcalm | Dash Cam | Non-freeway | Montcalm Non-freeway Weekday | 11 | 7 | 63.64% |
| 3 | Newaygo | Concurrent | Non-freeway | M-20 and N Evergreen Dr | 2 | 2 | 100.00% |
| 3 | Newaygo | Concurrent | Non-freeway | M-37 (Evergreen Dr) and Wilcox Ave | 10 | 7 | 70.00% |
| 3 | Newaygo | Concurrent | Non-freeway | M-37 (Evergreen Dr) and Curve St | 2 | 2 | 100.00% |
| 3 | Newaygo | Concurrent | Non-freeway | M-82 and Mason Dr | 1 | 0 | 0.00% |
| 3 | Newaygo | Dash Cam | Non-freeway | Newaygo Non-freeway Weekday | 11 | 5 | 45.45% |
| 1 | Oakland | Pole-Mount | Non-freeway | M-1 (Woodward Ave) and I-696 | 18 | 14 | 77.78% |

| Stratum | County | Type of Observation | Facility Type | Observation Site | Actual Total # of Obs | Actual Helmeted # of Obs | % Helmet Use |
|---------|--------------|---------------------|---------------|--|-----------------------|--------------------------|--------------|
| 1 | Oakland | Pole-Mount | Non-freeway | M-59 (Highland Rd) and Lakena St | 68 | 53 | 77.94% |
| 1 | Oakland | Pole-Mount | Freeway | I-75 and Stephenson Hwy | 74 | 61 | 82.43% |
| 1 | Oakland | Concurrent | Non-freeway | I-96 and Milford Rd | 2 | 1 | 50.00% |
| 1 | Oakland | Concurrent | Non-freeway | M-59 and Hickory Ridge Rd | 18 | 15 | 83.33% |
| 1 | Oakland | Concurrent | Non-freeway | M-5 and W 13 Mile Rd | 20 | 12 | 60.00% |
| 1 | Oakland | Concurrent | Non-freeway | I-696 and Orchard Lake Rd | 12 | 12 | 100.00% |
| 1 | Oakland | Concurrent | Non-freeway | M-1 (Woodward Ave) and W 12 Mile Rd | 15 | 10 | 66.67% |
| 1 | Oakland | Dash Cam | Freeway | Oakland Freeway Weekday | 1 | 1 | 100.00% |
| 1 | Oakland | Dash Cam | Freeway | Oakland Freeway Weekend | 2 | 2 | 100.00% |
| 1 | Oakland | Dash Cam | Non-freeway | Oakland Non-freeway Weekday | 1 | 0 | 0.00% |
| 1 | Oakland | Dash Cam | Non-freeway | Oakland Non-freeway Weekend | 1 | 0 | 0.00% |
| 3 | Ontonagon | Concurrent | Non-freeway | M-28 and US-45 | 2 | 2 | 100.00% |
| 3 | Ontonagon | Dash Cam | Non-freeway | Ontonagon Non-freeway Weekday | 7 | 7 | 100.00% |
| 3 | Osceola | Dash Cam | Non-freeway | Osceola Non-freeway Weekday | 16 | 10 | 62.50% |
| 3 | Oscoda | Pole-Mount | Non-freeway | M-72 and 14th St | 7 | 7 | 100.00% |
| 3 | Otsego | Dash Cam | Non-freeway | Otsego Non-freeway Weekday | 1 | 1 | 100.00% |
| 2 | Ottawa | Pole-Mount | Non-freeway | US-31 (W Olive Rd) and M-45 | 46 | 35 | 76.09% |
| 2 | Ottawa | Dash Cam | Freeway | Ottawa Freeway Weekend | 6 | 5 | 83.33% |
| 2 | Ottawa | Dash Cam | Non-freeway | Ottawa Non-freeway Weekend | 1 | 0 | 0.00% |
| 3 | Presque Isle | Concurrent | Non-freeway | M 33 & Washington Ave | 7 | 2 | 28.57% |
| 3 | Presque Isle | Dash Cam | Non-freeway | Presque Isle Non-freeway Weekday | 7 | 7 | 100.00% |
| 3 | Saginaw | Concurrent | Non-freeway | M-83 (Gera Rd) and E Holland Rd | 2 | 2 | 100.00% |
| 3 | Saginaw | Concurrent | Non-freeway | M-81 and W Vassar Rd/M-15 | 2 | 2 | 100.00% |
| 3 | Saginaw | Dash Cam | Non-freeway | Saginaw Non-freeway Weekday | 11 | 8 | 72.73% |
| 3 | Sanilac | Concurrent | Non-freeway | M-53 and W Marlette Rd | 1 | 1 | 100.00% |
| 3 | Sanilac | Concurrent | Non-freeway | M-19 and Maple Valley St. | 4 | 3 | 75.00% |
| 3 | Sanilac | Concurrent | Non-freeway | M-19 (S Elk St) and E Sanilac Rd | 4 | 2 | 50.00% |
| 3 | Schoolcraft | Dash Cam | Non-freeway | Schoolcraft Non-freeway Weekday | 58 | 49 | 84.48% |
| 3 | Shiawassee | Dash Cam | Non-freeway | Shiawassee Non-freeway Weekday | 4 | 3 | 75.00% |
| 3 | St. Clair | Concurrent | Non-freeway | M-29 and Bethuy Rd | 4 | 4 | 100.00% |
| 3 | St. Clair | Concurrent | Non-freeway | I- 94 and Fred W Moore Highway | 1 | 1 | 100.00% |
| 3 | St. Clair | Concurrent | Non-freeway | I- 94 and Gratiot Rd | 3 | 3 | 100.00% |
| 3 | St. Clair | Concurrent | Non-freeway | I- 94 and Gratiot Rd | 2 | 2 | 100.00% |
| 3 | St. Clair | Concurrent | Non-freeway | I-94 Bus (Gratiot Blvd) and Huron Blvd | 5 | 5 | 100.00% |
| 3 | St. Clair | Concurrent | Non-freeway | M-136 (Beard Rd) and North Rd | 3 | 1 | 33.33% |
| 3 | St. Joseph | Concurrent | Non-freeway | US-12 and M-62 | 1 | 0 | 0.00% |
| 3 | St. Joseph | Concurrent | Non-freeway | US-131 and N Washington St | 1 | 1 | 100.00% |
| 3 | St. Joseph | Concurrent | Non-freeway | M-66 and S Centerville Rd | 11 | 4 | 36.36% |
| 3 | Van Buren | Concurrent | Non-freeway | M-43 and M 40 | 8 | 5 | 62.50% |
| 3 | Van Buren | Concurrent | Non-freeway | I-196 and 32nd Ave | 2 | 0 | 0.00% |
| 3 | Van Buren | Dash Cam | Non-freeway | Van Buren Non-freeway Weekday | 8 | 1 | 12.50% |
| 3 | Van Buren | Dash Cam | Non-freeway | Van Buren Non-freeway Weekend | 7 | 5 | 71.43% |
| 1 | Washtenaw | Pole-Mount | Non-freeway | Carpenter Rd and E Arkona Rd | 10 | 7 | 70.00% |
| 1 | Washtenaw | Pole-Mount | Non-freeway | S State St and I-94 | 12 | 11 | 91.67% |
| 4 | Wayne | Pole-Mount | Freeway | I-275 and Plymouth Road | 42 | 35 | 83.33% |
| 4 | Wayne | Pole-Mount | Freeway | M-14 and Schoolcraft Road | 23 | 19 | 82.61% |
| 4 | Wayne | Pole-Mount | Freeway | I-94 and Morton Taylor Road | 54 | 28 | 51.85% |
| 4 | Wayne | Pole-Mount | Non-freeway | Hines Drive and Stark Road | 309 | 211 | 68.28% |
| 4 | Wayne | Dash Cam | Freeway | Wayne Freeway Weekday | 7 | 5 | 71.43% |

| Stratum | County | Type of Observation | Facility Type | Observation Site | Actual Total # of Obs | Actual Helmeted # of Obs | % Helmet Use |
|---------|---------|---------------------|---------------|-----------------------------|-----------------------|--------------------------|--------------|
| 4 | Wayne | Dash Cam | Freeway | Wayne Freeway Weekend | 13 | 10 | 76.92% |
| 4 | Wayne | Dash Cam | Non-freeway | Wayne Non-freeway Weekday | 33 | 20 | 60.61% |
| 4 | Wayne | Dash Cam | Non-freeway | Wayne Non-freeway Weekend | 33 | 22 | 66.67% |
| 3 | Wexford | Dash Cam | Freeway | Wexford Freeway Weekday | 3 | 1 | 33.33% |
| 3 | Wexford | Dash Cam | Non-freeway | Wexford Non-freeway Weekday | 14 | 10 | 71.43% |
| 3 | Wexford | Dash Cam | Non-freeway | Wexford Non-freeway Weekend | 4 | 3 | 75.00% |