Task C: Sample Design

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Sample Design: National Sample (Task C)

1. Overview

The National Household Travel Survey for 2016 will be conducted at the National level and in 13 specific study areas (referred to as Add-on areas) listed in Table 1-1. As described in detail below, the design will use a two-stage survey process, with an address-based sampling (ABS) frame. The two-stage process will include a mailout/mail back recruitment stage, and a primarily web-based travel day retrieval with telephone option. The study will use multiple modes for reminders at key points and cash incentives at key stages.

Table 1-1 summarizes the target sample sizes (completed household retrievals) specified for each study area where a household retrieval is considered to be complete if all of the eligible household members, (i.e., persons age 5 and older) complete the retrieval survey. An enumeration of all household members will be conducted for participation in the survey.

Section 2 provides details of the ABS design for the National and Add-on samples. Section 3 discusses details of the sample design specific to each particular study area. Section 4 provides a preliminary overview of weighting and estimation procedures. The appendix includes tables that support the discussion of expected precision in section 2.4.

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1 The recruitment survey instrument will have space for up to nine household members. Respondents will be asked to provide information for any additional household members on a separate page.
Table 1-1  Study areas and target sample sizes

<table>
<thead>
<tr>
<th>Study Area</th>
<th>Sample Size¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>National</td>
<td>26,000</td>
</tr>
<tr>
<td>Arizona DOT</td>
<td>2,444</td>
</tr>
<tr>
<td>California DOT</td>
<td>24,000</td>
</tr>
<tr>
<td>Des Moines Area MPO</td>
<td>1,200</td>
</tr>
<tr>
<td>Georgia DOT</td>
<td>8,000</td>
</tr>
<tr>
<td>Indian Nations Council of Governments</td>
<td>1,000</td>
</tr>
<tr>
<td>Iowa Northland Regional Council of Governments</td>
<td>1,200</td>
</tr>
<tr>
<td>Maryland DOT</td>
<td>1,000</td>
</tr>
<tr>
<td>New York State DOT</td>
<td>15,851</td>
</tr>
<tr>
<td>North Carolina DOT</td>
<td>8,000</td>
</tr>
<tr>
<td>South Carolina DOT</td>
<td>6,500</td>
</tr>
<tr>
<td>Wisconsin DOT</td>
<td>11,000</td>
</tr>
<tr>
<td>Texas DOT</td>
<td>20,000</td>
</tr>
<tr>
<td>North Central Texas Council of Governments</td>
<td>2,917</td>
</tr>
<tr>
<td>TOTAL</td>
<td>129,112</td>
</tr>
</tbody>
</table>

¹These are households for which all of the household members ages 5 and older complete the retrieval survey.

2. The ABS Sample Design

The National and Add-on samples will be selected using a single, unified design with a single selection (i.e., the Add-on samples will be embedded in the National sample design). Using a single selection avoids the complexities and reduction in precision that would result from separate, independent selections for the National and Add-on samples. In another major design difference from both the 2001 and 2009 NHTS, the National and 13 Add-on areas for the 2016 NHTS will comprise a sample of addresses that will be selected from the ABS frame maintained by Marketing Systems Group (MSG). MSG has a decades-long history of providing sampling frames to Westat, including both random digit dial (RDD) and ABS sampling frames, and we have collaborated with them extensively on research and enhancements to their frames. MSG’s ABS frame originates from the U.S. Postal Service (USPS) Computerized Delivery Sequence file (CDS), and is updated on a monthly basis. Although several vendors license the CDS, Westat recognizes that MSG has taken great strides to evaluate and enhance the standard CDS-based list. One example is the work that MSG has done to augment simplified addresses (addresses with no specific street address, e.g., John Doe, Newtown, ST 12345). Section 2.2 discusses the coverage of the ABS frame.

Sampled addresses will be assigned a day of the week for which to log all travel. Section 2.5 below gives details on this assignment of travel days, for both the National sample and the Add-on areas.
2.1 Stratification of the ABS Sample

For the National study, because of the need to produce state-level estimates with adequate precision, state will be used for stratification. However, in order to support estimates for Add-on areas in states containing Add-ons, separate strata will be formed using the Add-on area(s) and the balance of the state. Thus the primary strata will consist of: (1) each Add-on area; (2) the balance of the state, for states with sub-state Add-ons; and (3) the state, for states without sub-state Add-ons. Additionally, the following four groups will be used to sub-stratify within each primary stratum:

- Counties in Metropolitan Statistical Areas (MSAs) of at least 1 million people and containing heavy rail for transit use (14 such MSAs exist in the U.S.);
- Counties in MSAs of at least 1 million people and not containing heavy rail for transit use;
- Counties in MSAs of less than 1 million people; and
- Counties not in MSAs.

The National sample size (specified in terms of responding households) will then be initially allocated among the strata according to the proportion of addresses falling in the stratum (determined by the counts of addresses from the ABS frame). A minimum allocation of 250 responding households per state will be used; states with initial allocations of fewer than 250 households will be increased to 250, and the remainder of the National sample will be re-allocated proportionally to the strata associated with the remaining states. For the Add-on areas, the Add-on sample size (as specified by memoranda of understanding (MOU) with the Add-on sponsor) will also be allocated among the four substrata above with potential additional substratification, with the allocation based on designated targets for each final substratum as specified in the Add-on MOU.

Once the sample of responding households has been allocated in the manner described above, these sample sizes will be inflated to account for expected losses due to ineligible addresses (an assumed rate of 11 percent of addresses, based on other National ABS mail studies conducted by Westat), non-response to the recruitment effort (an assumed non-response rate of 70 percent of eligible addresses), and non-response to the retrieval effort (an assumed non-response rate of 35 percent of recruited households). The departures from proportional allocation of responding households in the National sample and the supplementation of the sample for Add-ons will result in a sample of addresses selected with variable sampling rates. These variations in sampling rates will be properly accounted for in the computation of the survey weights, as discussed in section 4.
Within each substratum, the ABS frame will be sorted in a prescribed manner prior to sample selection. The sort used by MSG is geographic in nature, and addresses are sampled systematically using the geographic sort.

2.2 Coverage

Most studies of coverage of ABS frames have focused on in-person surveys that require locating the physical address in a specific geography (giving rise to problems with rural route addresses and PO boxes, as well as coverage issues resulting from geocoding errors). For a mail survey the household coverage rates are much higher, since the USPS delivers mail to almost all households, and households with mailing addresses that do not correspond to a physical location are covered. As reported by Iannacchione (2011), ABS frames that are derived from the USPS CDS file and its associated No-Stat file offer nearly complete coverage of households; however, since including the No-Stat file (a file of mostly inactive addresses) is estimated to increase the coverage by less than one percentage point (Shook-Sa et al.), the sampling frame for the 2016 NHTS will be derived from only the CDS file. Thus, the ABS sample used for the 2016 NHTS is expected to have substantially higher coverage than the 2009 NHTS landline RDD sample. (In 2009, about one-fourth of households did not have landline telephones, and it has been estimated that an additional 5 to 20 percent of landline households were excluded from landline RDD frames; see Blumberg and Luke (2009) for telephone service statistics, and Boyle et al. (2009), Fahimi, Kulp, and Brick (2009), Barron and Zhao (2010), and Barron et al. (2013) for discussion of landline RDD frame coverage of landline households.)

With the ABS approach, identifying targeted areas (e.g., states) that correspond to those for which estimates can be developed from the NHTS data is straightforward. Addresses are definitively linked to states, so state-level estimation is facilitated (unlike the situation with a random digit dial sample of telephone numbers such as that used for the 2009 NHTS). Geocoding and Geographic Information System (GIS) processing can be used to link addresses to counties in a highly reliable fashion. There can be some ambiguity for addresses that are P.O. Boxes or are listed as rural route addresses, since these addresses do not correspond to the physical location of the household. These types of addresses, while representing only a small proportion of a state’s population, will be handled appropriately in a routine manner with a set of well-defined rules. For example, for sampling purposes, when Add-on areas are defined based on county or census tract boundaries, P.O. Box and rural route addresses will be associated with the census tract associated with the centroid of the ZIP or ZIP +4 code, whichever is available. Thus, no important issues arise in the definition of areas with an ABS sample design that relies on mail for data collection.
2.3. **Two Part Sample Selection**

The ABS samples described in Section 2 will be selected in two parts. In each sampling stratum, half the target number of sampled addresses will be selected prior to the start of fieldwork; the other half will be selected approximately 6 months later. This will allow the sample to reflect updates to the ABS frame after the original selection, and will also allow adjustment to the sampling rates as needed (e.g., to account for response rates that differ from prior expectations).

Sample monitoring will be performed throughout the data collection period in order to identify and try to address any potentially significant issues with response. To the extent possible, we will try to minimize the variance in each half sample’s final yield, as an imbalance will mean that particular half of the year is over- or under-sampled, while still achieving the overall target annual yield.

2.4 **Expected Precision**

State and national level 2009 NHTS key estimates along with their standard errors, design effects and effective sample sizes were used in order to estimate the expected precision of estimates for the 2016 NHTS. For each estimate considered, the square root of the ratio of the 2009 NHTS effective sample size to the expected 2016 NHTS effective sample sizes was applied to the 2009 standard error to obtain an approximation of the expected standard error for the 2016 estimate. The final column of the table shows the ratio of the expected standard error of the 2016 estimate to the standard error of the 2009 estimate.

For this exercise, key estimates were taken from Tables 1, 3, and 5 of the Summary of Travel Trends Report from the 2009 NHTS\(^2\). From Table 1, they include:

- Total number of household vehicles;
- Total number of household vehicle miles traveled; and
- Total number of person miles traveled.

From Table 3, they include:

- Daily person trips per person;
- Daily person miles traveled per person;
- Daily vehicle trips per driver;
- Daily vehicle miles traveled per driver;
- Daily person trips per household;
- Daily person miles traveled per household;

- Daily vehicle trips per household;
- Daily vehicle miles traveled per household;
- Average person trip length (miles) per trip; and
- Average vehicle trip length (miles) per trip.

From Table 5, they include the average person trip length (miles) for:

- All purposes;
- To/from work;
- Work-related business;
- Shopping;
- Other family/personal errands;
- School/church;
- Social and recreational; and
- Other.

2.5. **Assignment of Travel Day**

The sample release process will control the balance of travel days by month. For the National sample, sampled addresses will be assigned a day of the week equally distributed across all days to ensure a balanced day of week distribution. This is a proven approach that has been used in all of our travel surveys. The following Add-on areas will also use this approach: California, Des Moines MPO, Iowa Northland Council of Governments, Maryland, and New York.

In the remaining Add-on areas, for Add-on sample cases only in the Add-on areas (i.e., not the National sample cases in the Add-on areas), weekend travel days (Saturday and Sunday) will be sampled at a rate of 7 percent each and weekdays (Monday through Friday) will be sampled at a rate of about 17 percent each. The areas include: Arizona, Georgia, Indian Nations Council of Governments, North Carolina, North Central Texas Council of Governments, South Carolina, Texas, and Wisconsin.

3. **The National Sample Design**

There will be a National sample with a target of 26,000 responding households. The National sample will have a total of 55 primary strata defined and described in Section 2: one for each Add-on area, one for the balance of the state (for each state with sub-state Add-ons), and one for each remaining state and the District of Columbia. Table 3-1 below presents the estimated sample sizes needed by stratum for the National sample to yield 26,000 completed household interviews. The assumptions given in the table are consistent with recent experience and include an estimated recruitment response rate of 30%, an estimated retrieval response rate of 65%.
defining responding households as those that complete retrieval interviews for all of the recruited household members ages 5 and older, and an expected residency rate of 89%.

Table 3-2 presents the estimated sample sizes aggregated to the primary strata described in section 2.1.

**Table 3-1 Expected sample sizes for the national sample by state**

<table>
<thead>
<tr>
<th>STATE</th>
<th>ABS 12/14 occupied housing units*</th>
<th>Retrieval completes assuming 65% response</th>
<th>Recruitment completes assuming 30% response</th>
<th>ABS address sample needed assuming 89% residency rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alabama</td>
<td>2,099,930</td>
<td>382</td>
<td>587</td>
<td>2,198</td>
</tr>
<tr>
<td>Alaska</td>
<td>245,754</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>Arizona</td>
<td>2,704,563</td>
<td>491</td>
<td>756</td>
<td>2,831</td>
</tr>
<tr>
<td>Arkansas</td>
<td>1,235,085</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>California</td>
<td>13,315,204</td>
<td>2,419</td>
<td>3,722</td>
<td>13,939</td>
</tr>
<tr>
<td>Colorado</td>
<td>2,104,380</td>
<td>382</td>
<td>588</td>
<td>2,203</td>
</tr>
<tr>
<td>Connecticut</td>
<td>1,459,660</td>
<td>265</td>
<td>408</td>
<td>1,528</td>
</tr>
<tr>
<td>Delaware</td>
<td>387,757</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>301,320</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>Florida</td>
<td>8,797,039</td>
<td>1,598</td>
<td>2,459</td>
<td>9,209</td>
</tr>
<tr>
<td>Georgia</td>
<td>3,959,849</td>
<td>719</td>
<td>1,107</td>
<td>4,145</td>
</tr>
<tr>
<td>Hawaii</td>
<td>466,121</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>Idaho</td>
<td>598,298</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>Illinois</td>
<td>5,176,017</td>
<td>940</td>
<td>1,447</td>
<td>5,419</td>
</tr>
<tr>
<td>Indiana</td>
<td>2,761,832</td>
<td>502</td>
<td>772</td>
<td>2,891</td>
</tr>
<tr>
<td>Iowa</td>
<td>1,252,609</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>Kansas</td>
<td>1,175,772</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>Kentucky</td>
<td>1,843,639</td>
<td>335</td>
<td>515</td>
<td>1,930</td>
</tr>
<tr>
<td>Louisiana</td>
<td>1,931,525</td>
<td>351</td>
<td>540</td>
<td>2,022</td>
</tr>
<tr>
<td>Maine</td>
<td>575,676</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>Maryland</td>
<td>2,349,233</td>
<td>427</td>
<td>657</td>
<td>2,459</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>2,774,255</td>
<td>504</td>
<td>775</td>
<td>2,904</td>
</tr>
<tr>
<td>Michigan</td>
<td>4,263,440</td>
<td>775</td>
<td>1,192</td>
<td>4,463</td>
</tr>
<tr>
<td>Minnesota</td>
<td>2,210,703</td>
<td>402</td>
<td>618</td>
<td>2,314</td>
</tr>
<tr>
<td>Mississippi</td>
<td>1,236,148</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>Missouri</td>
<td>2,575,052</td>
<td>468</td>
<td>720</td>
<td>2,696</td>
</tr>
<tr>
<td>Montana</td>
<td>389,691</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>Nebraska</td>
<td>743,212</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>Nevada</td>
<td>1,115,129</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>530,210</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>New Jersey</td>
<td>3,514,537</td>
<td>639</td>
<td>982</td>
<td>3,679</td>
</tr>
<tr>
<td>New Mexico</td>
<td>775,084</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>New York</td>
<td>7,798,454</td>
<td>1,417</td>
<td>2,180</td>
<td>8,164</td>
</tr>
<tr>
<td>North Carolina</td>
<td>4,130,585</td>
<td>750</td>
<td>1,155</td>
<td>4,324</td>
</tr>
<tr>
<td>North Dakota</td>
<td>286,886</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
<tr>
<td>Ohio</td>
<td>5,082,240</td>
<td>923</td>
<td>1,421</td>
<td>5,320</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>1,579,355</td>
<td>287</td>
<td>441</td>
<td>1,653</td>
</tr>
<tr>
<td>Oregon</td>
<td>1,576,258</td>
<td>286</td>
<td>441</td>
<td>1,650</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>5,425,758</td>
<td>986</td>
<td>1,517</td>
<td>5,680</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>458,760</td>
<td>250</td>
<td>385</td>
<td>1,441</td>
</tr>
</tbody>
</table>
Table 3-2  Expected sample sizes for the national sample by primary stratum

<table>
<thead>
<tr>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>Proportion</th>
<th>Stratum sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>31,070,705</td>
<td>24.4%</td>
<td>5,966</td>
</tr>
<tr>
<td>Counties within MSAs &gt; 1 million and not heavy rail</td>
<td>38,036,786</td>
<td>29.9%</td>
<td>7,157</td>
</tr>
<tr>
<td>Counties within MSAs &lt; 1 million</td>
<td>39,573,540</td>
<td>31.1%</td>
<td>8,509</td>
</tr>
<tr>
<td>Not in an MSA</td>
<td>18,435,015</td>
<td>14.5%</td>
<td>4,338</td>
</tr>
<tr>
<td>TOTAL</td>
<td>127,116,046</td>
<td></td>
<td>26,000</td>
</tr>
</tbody>
</table>

NOTE: The stratum sample size column indicates the expected number of completed household surveys.

3.1  Arizona DOT Study Area

The target number of completed household surveys is 2,444 for the Arizona Add-on area, with representation for the entire state. Maintaining the four main MSA/heavy rail sampling strata, twenty percent of the Add-on sample will be allocated to the three Sun Corridor counties, Maricopa, Pima, and Pinal, proportionally according to the number of households in each county. The remaining 80 percent of the Add-on sample will be allocated to the other 12 counties (not in the Sun corridor), proportional to the number of households in each county. A minimum Add-on sample size of 30 will be set for all counties and the remaining sample distributed within the Sun Corridor or not county groups. Table 3-3 shows the allocation of the National sample for Arizona within the main MSA/heavy rail sampling strata, the allocation for the Arizona DOT Add-on sample, and the total sample allocation.
### Table 3-3 Arizona national sample and add-on allocation

<table>
<thead>
<tr>
<th>County</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>National sample allocation</th>
<th>Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maricopa County</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>1,636,725</td>
<td>297</td>
<td>361</td>
<td>658</td>
</tr>
<tr>
<td>Pinal County</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>131,974</td>
<td>24</td>
<td>30</td>
<td>54</td>
</tr>
<tr>
<td>Cochise County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>52,369</td>
<td>10</td>
<td>205</td>
<td>215</td>
</tr>
<tr>
<td>Coconino County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>46,776</td>
<td>8</td>
<td>184</td>
<td>192</td>
</tr>
<tr>
<td>Mohave County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>99,046</td>
<td>18</td>
<td>388</td>
<td>406</td>
</tr>
<tr>
<td>Pima County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>442,472</td>
<td>80</td>
<td>98</td>
<td>178</td>
</tr>
<tr>
<td>Yavapai County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>96,328</td>
<td>17</td>
<td>378</td>
<td>395</td>
</tr>
<tr>
<td>Yuma County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>86,222</td>
<td>16</td>
<td>337</td>
<td>353</td>
</tr>
<tr>
<td>Apache County</td>
<td>Not in an MSA</td>
<td>13,131</td>
<td>2</td>
<td>52</td>
<td>54</td>
</tr>
<tr>
<td>Gila County</td>
<td>Not in an MSA</td>
<td>23,767</td>
<td>4</td>
<td>93</td>
<td>97</td>
</tr>
<tr>
<td>Graham County</td>
<td>Not in an MSA</td>
<td>11,727</td>
<td>2</td>
<td>46</td>
<td>48</td>
</tr>
<tr>
<td>Greenlee County</td>
<td>Not in an MSA</td>
<td>1,915</td>
<td>0</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>La Paz County</td>
<td>Not in an MSA</td>
<td>9,615</td>
<td>2</td>
<td>37</td>
<td>39</td>
</tr>
<tr>
<td>Navajo County</td>
<td>Not in an MSA</td>
<td>38,084</td>
<td>7</td>
<td>149</td>
<td>156</td>
</tr>
<tr>
<td>Santa Cruz County</td>
<td>Not in an MSA</td>
<td>14,412</td>
<td>3</td>
<td>56</td>
<td>59</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>2,704,563</td>
<td>491</td>
<td>2,444</td>
<td>2,935</td>
</tr>
</tbody>
</table>

**NOTE:** The total sample column indicates the expected number of completed household surveys.

### 3.2 California DOT Study Area

The target number of completed household surveys is 24,000 for the California Add-on area, with representation for the entire state. Households will be selected from each of eight county groups, proportional to the number of households in each group. These groups are further subdivided to maintain the structure of the four main MSA/heavy rail sampling strata that will be used for the National sample as well. These groups are:

- San Diego
- SCAG (divided into a), b), and c))
- Central Coast (divided into a) and b))
- San Joaquin Valley
- MTC (divided into a), b), and c))
- SACOG/TMPO (divided into a) and b))
- Sierra (divided into a) and b))
- North State (divided into a) and b))

The Add-on sample has been distributed among these substrata to ensure that 20 percent of the sample is coming from rural areas and the remaining 80 percent from non-rural areas. Table 3-4 shows the definitions of the California Add-on substrata and the corresponding National sample.
strata. Also shown are the allocation for the National sample within the main MSA/heavy rail sampling strata, the allocation for the Add-on substrata, and the total sample allocation.

Table 3-4  California national sample and add-on allocation

<table>
<thead>
<tr>
<th>Substratum</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>National sample allocation</th>
<th>Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: San Diego</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>1,147,361</td>
<td>208</td>
<td>2,434</td>
<td>2,642</td>
</tr>
<tr>
<td>2: SCAG (a)</td>
<td>Counties within MSAs &gt;1 million and heavy rail</td>
<td>4,471,168</td>
<td>812</td>
<td>2,606</td>
<td>3,418</td>
</tr>
<tr>
<td>2: SCAG (b)</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>1,420,384</td>
<td>258</td>
<td>827</td>
<td>1,085</td>
</tr>
<tr>
<td>2: SCAG (c)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>329,404</td>
<td>60</td>
<td>192</td>
<td>252</td>
</tr>
<tr>
<td>3: Central Coast (a)</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>16,487</td>
<td>3</td>
<td>100</td>
<td>103</td>
</tr>
<tr>
<td>3: Central Coast (b)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>487,770</td>
<td>89</td>
<td>2,978</td>
<td>3,067</td>
</tr>
<tr>
<td>4: San Joaquin Valley</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>1,302,386</td>
<td>237</td>
<td>3,197</td>
<td>3,434</td>
</tr>
<tr>
<td>5: MTC (a)</td>
<td>Counties within MSAs &gt;1 million and heavy rail</td>
<td>1,736,355</td>
<td>315</td>
<td>1,667</td>
<td>1,982</td>
</tr>
<tr>
<td>5: MTC (b)</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>640,892</td>
<td>116</td>
<td>615</td>
<td>731</td>
</tr>
<tr>
<td>5: MTC (c)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>400,579</td>
<td>73</td>
<td>384</td>
<td>457</td>
</tr>
<tr>
<td>6: SACOG/TMPO (a)</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>838,119</td>
<td>152</td>
<td>3,553</td>
<td>3,705</td>
</tr>
<tr>
<td>6: SACOG/TMPO (b)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>58,372</td>
<td>11</td>
<td>247</td>
<td>258</td>
</tr>
<tr>
<td>7: Sierra (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>91,307</td>
<td>17</td>
<td>952</td>
<td>969</td>
</tr>
<tr>
<td>7: Sierra (b)</td>
<td>Not in an MSA</td>
<td>107,825</td>
<td>20</td>
<td>1,125</td>
<td>1,145</td>
</tr>
<tr>
<td>8: North State (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>72,005</td>
<td>13</td>
<td>843</td>
<td>856</td>
</tr>
<tr>
<td>8: North State (b)</td>
<td>Not in an MSA</td>
<td>194,790</td>
<td>35</td>
<td>2,279</td>
<td>2,314</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>13,315,204</td>
<td>2,419</td>
<td>24,000</td>
<td>26,419</td>
</tr>
</tbody>
</table>

NOTE: The total sample column indicates the expected number of completed household surveys.

### 3.3 Des Moines MPO Study Area

The target number of completed household surveys is 1,200 for the Des Moines MPO Add-on area, covering portions of four counties including Dallas, Madison, Polk, and Warren. Shape files were provided by the Des Moines MPO for the exact area to be covered. These files were mapped to Census block boundaries, covering or partially covering a total of 10,750 blocks. Five blocks were dropped due to the block’s area within the MPO boundary being less than 1 percent. An additional 33 blocks were dropped at the instruction of the MPO due to less than 60 percent of their areas being contained within the designated area. Three of the blocks with less than 60 percent of their area covered were retained at the MPO’s instruction, due to having larger populations. The sample
of 1,200 will be distributed proportionally to the number of occupied housing units within each of the four county areas in those 10,712 Census blocks.

Table 3-5 shows the allocation of the National sample for Iowa for the four counties in the Des Moines MPO and the rest of Iowa, the allocation for the Des Moines MPO Add-on sample, and the total sample allocation.

Table 3-5. Des Moines MPO national sample and add-on allocation

<table>
<thead>
<tr>
<th>County</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>ABS 12/14 occupied HUs for included Census blocks</th>
<th>National sample allocation</th>
<th>Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dallas</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>29,066</td>
<td>19,259</td>
<td>6</td>
<td>108</td>
<td>114</td>
</tr>
<tr>
<td>Madison</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>5,914</td>
<td>79</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Polk</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>190,344</td>
<td>187,949</td>
<td>38</td>
<td>1,053</td>
<td>1,091</td>
</tr>
<tr>
<td>Warren</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>18,097</td>
<td>6,833</td>
<td>4</td>
<td>38</td>
<td>42</td>
</tr>
<tr>
<td>Rest of Iowa</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>497,062</td>
<td>99</td>
<td>0</td>
<td>99</td>
<td>99</td>
</tr>
<tr>
<td>Rest of Iowa</td>
<td>Not in an MSA</td>
<td>512,126</td>
<td>102</td>
<td>0</td>
<td>102</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>1,252,609</td>
<td>250</td>
<td>1,200</td>
<td>1,450</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: The total sample column indicates the expected number of completed household surveys.

3.4 Georgia DOT Study Area

The target number of completed household surveys is 8,000 for the Georgia Add-on area, covering 14 of the 16 MPOs in the state. The Chattanooga and Atlanta MPOs will be excluded as a specific MPO strata but will be included in the “other counties in the state” stratum. The Columbus MPO is also covered by Russell and Lee Counties in Alabama, and the Augusta MPO is covered by Aiken and Edgefield Counties in South Carolina.

Two groups of counties will be defined: one containing all counties in the 14 MPOs of interest and one containing all other counties in Georgia. Maintaining the bounds of the four main study strata, sixty-four percent of the sample of households will be allocated proportionally by county to the first group (n=5,120) and the remaining sample will be allocated proportionally by county to the second group (n=2,880). Table 3-6 shows the allocation of the National sample for Georgia, the allocation for the 14 MPOs of interest for the Add-on sample, and the total sample allocation.
### Table 3-6  Georgia national sample and add-on allocation

<table>
<thead>
<tr>
<th>Substrata defined by GA Add-on: MPOs</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>National sample allocation*</th>
<th>Add-on allocation*</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albany</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>51,455</td>
<td>9</td>
<td>235</td>
<td>245</td>
</tr>
<tr>
<td>Athens</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>81,223</td>
<td>15</td>
<td>371</td>
<td>386</td>
</tr>
<tr>
<td>Augusta</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>137,832</td>
<td>25</td>
<td>630</td>
<td>655</td>
</tr>
<tr>
<td>Brunswick</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>38,306</td>
<td>7</td>
<td>175</td>
<td>182</td>
</tr>
<tr>
<td>Cartersville</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>38,559</td>
<td>7</td>
<td>176</td>
<td>183</td>
</tr>
<tr>
<td>Columbus*</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>101,217</td>
<td>18</td>
<td>885</td>
<td>904</td>
</tr>
<tr>
<td>Dalton</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>53,274</td>
<td>10</td>
<td>244</td>
<td>253</td>
</tr>
<tr>
<td>Gainesville (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>66,740</td>
<td>12</td>
<td>305</td>
<td>317</td>
</tr>
<tr>
<td>Gainesville (b)</td>
<td>Not in an MSA</td>
<td>22,851</td>
<td>4</td>
<td>104</td>
<td>109</td>
</tr>
<tr>
<td>Hinesville</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>29,478</td>
<td>5</td>
<td>135</td>
<td>140</td>
</tr>
<tr>
<td>Macon</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>91,113</td>
<td>17</td>
<td>417</td>
<td>433</td>
</tr>
<tr>
<td>Rome</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>39,831</td>
<td>7</td>
<td>182</td>
<td>189</td>
</tr>
<tr>
<td>Savannah</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>152,793</td>
<td>28</td>
<td>699</td>
<td>726</td>
</tr>
<tr>
<td>Valdosta</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>51,596</td>
<td>9</td>
<td>236</td>
<td>245</td>
</tr>
<tr>
<td>Warner Robins</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>71,164</td>
<td>13</td>
<td>325</td>
<td>338</td>
</tr>
<tr>
<td>All other areas (a)</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>2,143,587</td>
<td>389</td>
<td>2,105</td>
<td>2,494</td>
</tr>
<tr>
<td>All other areas (b)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>124,329</td>
<td>23</td>
<td>122</td>
<td>145</td>
</tr>
<tr>
<td>All other areas (c)</td>
<td>Not in an MSA</td>
<td>664,501</td>
<td>121</td>
<td>653</td>
<td>773</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>3,959,849</td>
<td>719</td>
<td>8,000</td>
<td>8,719</td>
</tr>
</tbody>
</table>

**NOTE:** The total sample column indicates the expected number of completed household surveys.

*The Columbus MPO contains two counties from Alabama. The National sample allocation total for this MPO includes only Georgia county estimates. The Add-on allocation total for this MPO includes the AL county estimates and the GA county estimates, but the surveys are only being collected in the GA counties.

### 3.5  Indian Nations Council of Governments Study Area

The target number of completed household surveys is 1,000 for the Indian Nations Council of Governments Add-on area, covering portions of five counties in Oklahoma including Creek, Osage, Rogers, Tulsa, and Wagoner. Shape files were provided by the study area for the exact area to be covered. These files were mapped to Census block boundaries, covering or partially covering a total of 21,803 blocks. Seven blocks were dropped due to the block’s area within the MPO boundary being less than 1 percent. One additional block was dropped due to less than 60 percent of its area being contained within the designated area. The sample of 1,000 will be distributed as follows to households in the 21,795 Census blocks within the five county areas as follows:

- Creek County: 12 percent
- Osage County: 10 percent
- Rogers County: 16 percent
- Tulsa County: 50 percent
- Wagoner County: 12 percent

Table 3-7 shows the allocation of the National sample for INCOG for the five included counties and the rest of Oklahoma, the allocation for the INCOG MPO Add-on sample, and the total sample allocation.

### Table 3-7. Indian Nations Council of Governments (Oklahoma) national sample and add-on allocation

<table>
<thead>
<tr>
<th>County</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>ABS 12/14 occupied HUs for included Census blocks</th>
<th>National sample allocation</th>
<th>Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creek</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>26,570</td>
<td>15,732</td>
<td>5</td>
<td>120</td>
<td>125</td>
</tr>
<tr>
<td>Osage</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>17,148</td>
<td>9,291</td>
<td>3</td>
<td>100</td>
<td>103</td>
</tr>
<tr>
<td>Rogers</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>34,038</td>
<td>23,012</td>
<td>6</td>
<td>160</td>
<td>166</td>
</tr>
<tr>
<td>Tulsa</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>278,896</td>
<td>278,896</td>
<td>51</td>
<td>500</td>
<td>551</td>
</tr>
<tr>
<td>Wagoner</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>28,858</td>
<td>20,581</td>
<td>5</td>
<td>120</td>
<td>125</td>
</tr>
<tr>
<td>Rest of Oklahoma</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>557,801</td>
<td></td>
<td>101</td>
<td>0</td>
<td>101</td>
</tr>
<tr>
<td>Rest of Oklahoma</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>108,617</td>
<td></td>
<td>20</td>
<td>0</td>
<td>20</td>
</tr>
<tr>
<td>Rest of Oklahoma</td>
<td>Not in an MSA</td>
<td>527,427</td>
<td></td>
<td>96</td>
<td>0</td>
<td>96</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>1,579,355</td>
<td></td>
<td>287</td>
<td>1,000</td>
<td>1,287</td>
</tr>
</tbody>
</table>

**NOTE:** The total sample column indicates the expected number of completed household surveys.

### 3.6 Iowa Northland Regional Council of Governments Study Area

The target number of completed household surveys is 1,200 for the Iowa Northland Regional Council of Governments Add-on area, covering a portion of Black Hawk County. Shape files were provided by the INRCOG for the exact Black Hawk MPO area to be covered. These files were mapped to Census block boundaries, covering or partially covering a total of 3,724 blocks. Thirty-six blocks were dropped due to less than 60 percent of their area being contained within the designated MPO. The sample of 1,200 will be distributed proportional to the size of the places designated by the Add-on area in the remaining 3,688 blocks. Table 3-8 shows the allocation of the National sample for INRCOG for the Add-on places and the rest of Iowa, the allocation for the INRCOG Add-on sample, and the total sample allocation.
Table 3-8. Iowa Northland Regional Council of Governments national sample and add-on allocation

<table>
<thead>
<tr>
<th>Place</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>National sample allocation</th>
<th>Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cedar Falls</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>16,144</td>
<td>3</td>
<td>370</td>
<td>373</td>
</tr>
<tr>
<td>Elk Run Heights</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>449</td>
<td>0</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Evansdale</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>2,107</td>
<td>0</td>
<td>48</td>
<td>49</td>
</tr>
<tr>
<td>Gilbertville</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>410</td>
<td>0</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Hudson</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>562</td>
<td>0</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>Raymond</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>150</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Waterloo</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>31,105</td>
<td>6</td>
<td>712</td>
<td>719</td>
</tr>
<tr>
<td>Rest of Black Hawk in MPO</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>1,463</td>
<td>0</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>Rest of Black Hawk not in MPO</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>4,032</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Rest of Iowa</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>684,061</td>
<td>137</td>
<td>0</td>
<td>137</td>
</tr>
<tr>
<td>Rest of Iowa</td>
<td>Not in an MSA</td>
<td>512,126</td>
<td>102</td>
<td>0</td>
<td>102</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>1,252,609</td>
<td>250</td>
<td>1,200</td>
<td>1,450</td>
</tr>
</tbody>
</table>

NOTE: The total sample column indicates the expected number of completed household surveys.

3.7 Maryland DOT Study Area

The target number of completed household surveys is 1,000 for the Maryland Add-on area, with representation for the entire state. Households will be selected from each of three substrata: Central MD, Eastern Shore, and Western MD. Twenty percent of the sample will be allocated to the Western MD and Central MD substrata, and the remaining 60 percent will be allocated to the Eastern Shore substratum. The three substrata have been split where necessary to maintain the four main MSA/heavy rail sampling strata that will be used for the National Sample. (Note: Maryland does not contain any counties with more than 1 million people and no heavy rail.)

Table 3-9 shows the definitions of the Maryland Add-on substrata and the corresponding National sample strata. Also shown are the allocation for the National sample within the main MSA/heavy rail sampling strata, the allocation for the Add-on substrata, and the total sample allocation.
Table 3-9  Maryland national sample and add-on allocation

<table>
<thead>
<tr>
<th>Substrata defined by MD Add-on</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>National sample allocation</th>
<th>Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central MD (a)</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>2,007,631</td>
<td>365</td>
<td>196</td>
<td>561</td>
</tr>
<tr>
<td>Central MD (b)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>38,790</td>
<td>7</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>Eastern Shore (a)</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>59,376</td>
<td>11</td>
<td>181</td>
<td>192</td>
</tr>
<tr>
<td>Eastern Shore (b)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>86,016</td>
<td>16</td>
<td>262</td>
<td>278</td>
</tr>
<tr>
<td>Eastern Shore (c)</td>
<td>Not in an MSA</td>
<td>51,623</td>
<td>9</td>
<td>157</td>
<td>166</td>
</tr>
<tr>
<td>Western MD (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>92,930</td>
<td>17</td>
<td>176</td>
<td>193</td>
</tr>
<tr>
<td>Western MD (b)</td>
<td>Not in an MSA</td>
<td>12,867</td>
<td>2</td>
<td>24</td>
<td>26</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>2,349,233</td>
<td>427</td>
<td>1,000</td>
<td>1,427</td>
</tr>
</tbody>
</table>

NOTE: The total sample column indicates the expected number of completed household surveys.

3.8  New York State DOT Study Area

The target number of completed household surveys is 15,851 for the New York Add-on area, with representation for the entire state. The four main MSA/heavy rail strata will be used to allocate the sample, proportionally to the number of households in each stratum for the National sample, and as specified by the New York DOT for the Add-on area. The allocation for the National sample, the Add-on area allocation, and the total sample allocation are given in table 3-10.3

Table 3-10  New York national sample and add-on allocation

<table>
<thead>
<tr>
<th>County</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>National sample allocation</th>
<th>Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronx County</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>499,129</td>
<td>90</td>
<td>279</td>
<td>369</td>
</tr>
<tr>
<td>Dutchess County</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>112,161</td>
<td>20</td>
<td>800</td>
<td>820</td>
</tr>
<tr>
<td>Kings County</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>996,134</td>
<td>181</td>
<td>165</td>
<td>346</td>
</tr>
<tr>
<td>Nassau County</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>457,911</td>
<td>83</td>
<td>363</td>
<td>446</td>
</tr>
<tr>
<td>New York County</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>877,262</td>
<td>159</td>
<td>269</td>
<td>428</td>
</tr>
</tbody>
</table>

3 The original table in this document incorrectly reflected a total add-on sample of 15,718 HH, which did not match the actual purchase of 15,851 HH as was correctly indicated in the text above. This table was updated by the editors to reflect the final distribution of the 15,851 HH purchased as documented by NYSDOT. Westat sampled using the outdated 15,718 distribution, which resulted in four counties being improperly sampled (Saratoga, Schenectady, St. Lawrence, and Seneca). The error was caused by multiple simultaneous factors and has been confirmed to only impact this portion of the sample.
<table>
<thead>
<tr>
<th>County</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>National sample allocation</th>
<th>Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange County</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>135,030</td>
<td>25</td>
<td>767</td>
<td>792</td>
</tr>
<tr>
<td>Putnam County</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>36,046</td>
<td>7</td>
<td>733</td>
<td>740</td>
</tr>
<tr>
<td>Queens County</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>829,143</td>
<td>151</td>
<td>226</td>
<td>377</td>
</tr>
<tr>
<td>Richmond County</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>172,663</td>
<td>31</td>
<td>589</td>
<td>620</td>
</tr>
<tr>
<td>Rockland County</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>102,742</td>
<td>19</td>
<td>773</td>
<td>792</td>
</tr>
<tr>
<td>Suffolk County</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>529,440</td>
<td>96</td>
<td>355</td>
<td>451</td>
</tr>
<tr>
<td>Westchester County</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>365,069</td>
<td>66</td>
<td>381</td>
<td>447</td>
</tr>
<tr>
<td>Erie County</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>414,237</td>
<td>75</td>
<td>468</td>
<td>543</td>
</tr>
<tr>
<td>Livingston County</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>25,167</td>
<td>5</td>
<td>56</td>
<td>61</td>
</tr>
<tr>
<td>Monroe County</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>328,367</td>
<td>60</td>
<td>418</td>
<td>478</td>
</tr>
<tr>
<td>Niagara County</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>98,504</td>
<td>18</td>
<td>135</td>
<td>153</td>
</tr>
<tr>
<td>Ontario County</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>47,729</td>
<td>9</td>
<td>82</td>
<td>91</td>
</tr>
<tr>
<td>Orleans County</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>16,415</td>
<td>3</td>
<td>53</td>
<td>56</td>
</tr>
<tr>
<td>Wayne County</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>38,561</td>
<td>7</td>
<td>70</td>
<td>77</td>
</tr>
<tr>
<td>Yates County</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>10,485</td>
<td>2</td>
<td>25</td>
<td>27</td>
</tr>
<tr>
<td>Albany County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>134,372</td>
<td>24</td>
<td>416</td>
<td>440</td>
</tr>
<tr>
<td>Broome County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>86,523</td>
<td>16</td>
<td>504</td>
<td>520</td>
</tr>
<tr>
<td>Chemung County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>37,647</td>
<td>6</td>
<td>750</td>
<td>756</td>
</tr>
<tr>
<td>Herkimer County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>26,016</td>
<td>5</td>
<td>168</td>
<td>173</td>
</tr>
<tr>
<td>Jefferson County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>47,457</td>
<td>9</td>
<td>473</td>
<td>482</td>
</tr>
<tr>
<td>Madison County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>27,116</td>
<td>5</td>
<td>80</td>
<td>85</td>
</tr>
<tr>
<td>County</td>
<td>National sample stratum</td>
<td>ABS 12/14 occupied housing units</td>
<td>National sample allocation</td>
<td>Add-on allocation</td>
<td>TOTAL sample</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------------</td>
<td>----------------------------------</td>
<td>-----------------------------</td>
<td>-------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Oneida County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>95,936</td>
<td>17</td>
<td>567</td>
<td>584</td>
</tr>
<tr>
<td>Onondaga County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>203,411</td>
<td>37</td>
<td>737</td>
<td>774</td>
</tr>
<tr>
<td>Oswego County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>48,093</td>
<td>9</td>
<td>142</td>
<td>151</td>
</tr>
<tr>
<td>Rensselaer County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>67,449</td>
<td>12</td>
<td>213</td>
<td>225</td>
</tr>
<tr>
<td>Saratoga County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>67,373</td>
<td>18</td>
<td>745</td>
<td>763</td>
</tr>
<tr>
<td>Schenectady County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>11,233</td>
<td>12</td>
<td>215</td>
<td>227</td>
</tr>
<tr>
<td>Schoharie County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>8,078</td>
<td>2</td>
<td>35</td>
<td>37</td>
</tr>
<tr>
<td>Tioga County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>20,589</td>
<td>4</td>
<td>138</td>
<td>142</td>
</tr>
<tr>
<td>Tompkins County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>42,499</td>
<td>8</td>
<td>779</td>
<td>787</td>
</tr>
<tr>
<td>Ulster County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>73,272</td>
<td>13</td>
<td>762</td>
<td>775</td>
</tr>
<tr>
<td>Warren County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>29,128</td>
<td>5</td>
<td>268</td>
<td>273</td>
</tr>
<tr>
<td>Washington County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>25,040</td>
<td>5</td>
<td>205</td>
<td>210</td>
</tr>
<tr>
<td>Allegany County</td>
<td>Not in an MSA</td>
<td>18,415</td>
<td>3</td>
<td>68</td>
<td>71</td>
</tr>
<tr>
<td>Cattaraugus County</td>
<td>Not in an MSA</td>
<td>35,232</td>
<td>6</td>
<td>108</td>
<td>114</td>
</tr>
<tr>
<td>Cayuga County</td>
<td>Not in an MSA</td>
<td>30,743</td>
<td>6</td>
<td>110</td>
<td>116</td>
</tr>
<tr>
<td>Chautauqua County</td>
<td>Not in an MSA</td>
<td>60,456</td>
<td>11</td>
<td>172</td>
<td>183</td>
</tr>
<tr>
<td>Chenango County</td>
<td>Not in an MSA</td>
<td>19,279</td>
<td>4</td>
<td>50</td>
<td>54</td>
</tr>
<tr>
<td>Clinton County</td>
<td>Not in an MSA</td>
<td>31,250</td>
<td>6</td>
<td>92</td>
<td>98</td>
</tr>
<tr>
<td>Columbia County</td>
<td>Not in an MSA</td>
<td>25,624</td>
<td>5</td>
<td>65</td>
<td>70</td>
</tr>
<tr>
<td>Cortland County</td>
<td>Not in an MSA</td>
<td>18,507</td>
<td>4</td>
<td>61</td>
<td>65</td>
</tr>
<tr>
<td>Delaware County</td>
<td>Not in an MSA</td>
<td>20,149</td>
<td>4</td>
<td>49</td>
<td>53</td>
</tr>
<tr>
<td>Essex County</td>
<td>Not in an MSA</td>
<td>15,008</td>
<td>3</td>
<td>38</td>
<td>41</td>
</tr>
<tr>
<td>Franklin County</td>
<td>Not in an MSA</td>
<td>19,586</td>
<td>4</td>
<td>56</td>
<td>60</td>
</tr>
<tr>
<td>Fulton County</td>
<td>Not in an MSA</td>
<td>23,679</td>
<td>4</td>
<td>63</td>
<td>67</td>
</tr>
<tr>
<td>Genesee County</td>
<td>Not in an MSA</td>
<td>23,599</td>
<td>4</td>
<td>55</td>
<td>59</td>
</tr>
<tr>
<td>Greene County</td>
<td>Not in an MSA</td>
<td>18,808</td>
<td>3</td>
<td>62</td>
<td>65</td>
</tr>
</tbody>
</table>
Table 3-10 New York national sample and add-on allocation (Cont.)

<table>
<thead>
<tr>
<th>County</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>National sample allocation</th>
<th>Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamilton County</td>
<td>Not in an MSA</td>
<td>1,087</td>
<td>0</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Lewis County</td>
<td>Not in an MSA</td>
<td>9,108</td>
<td>2</td>
<td>42</td>
<td>44</td>
</tr>
<tr>
<td>Montgomery County</td>
<td>Not in an MSA</td>
<td>20,998</td>
<td>4</td>
<td>35</td>
<td>39</td>
</tr>
<tr>
<td>Otsego County</td>
<td>Not in an MSA</td>
<td>22,116</td>
<td>4</td>
<td>94</td>
<td>98</td>
</tr>
<tr>
<td>Schuyler County</td>
<td>Not in an MSA</td>
<td>14,090</td>
<td>1</td>
<td>24</td>
<td>25</td>
</tr>
<tr>
<td>Seneca County</td>
<td>Not in an MSA</td>
<td>44,274</td>
<td>3</td>
<td>25</td>
<td>28</td>
</tr>
<tr>
<td>St. Lawrence County</td>
<td>Not in an MSA</td>
<td>96,401</td>
<td>8</td>
<td>141</td>
<td>149</td>
</tr>
<tr>
<td>Steuben County</td>
<td>Not in an MSA</td>
<td>42,009</td>
<td>8</td>
<td>121</td>
<td>129</td>
</tr>
<tr>
<td>Sullivan County</td>
<td>Not in an MSA</td>
<td>29,046</td>
<td>5</td>
<td>76</td>
<td>81</td>
</tr>
<tr>
<td>Wyoming County</td>
<td>Not in an MSA</td>
<td>15,563</td>
<td>3</td>
<td>32</td>
<td>35</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>7,798,454</strong></td>
<td><strong>1,417</strong></td>
<td><strong>15,851</strong></td>
<td><strong>17,268</strong></td>
</tr>
</tbody>
</table>

NOTE: The total sample column indicates the expected number of completed household surveys.

3.9 North Carolina DOT Study Area

The target number of completed household surveys is 8,000 for the North Carolina Add-on area, with representation for the entire state. Households will be selected from each of 18 substrata. The NC DOT originally specified ten substrata, some of which had to be split to account for the hard boundaries of the four primary sampling strata. These splits are designated by (a), (b), or (c), following the original substratum description, resulting in a total of 18 substrata. The Triangle (c), Triad, and both Central Non-MPO (a) and (b) substrata all contain block-level portions of several counties. The other substrata contain full counties. The allocation for the National sample, the Add-on area allocation, and the total sample allocation are given in table 3-11.

Table 3-11 North Carolina national sample and add-on allocation

<table>
<thead>
<tr>
<th>Substrata defined by NC Add-on</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>National sample allocation</th>
<th>Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Triangle (a)</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>489,808</td>
<td>89</td>
<td>336</td>
<td>425</td>
</tr>
<tr>
<td>1: Triangle (b)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>231,517</td>
<td>42</td>
<td>159</td>
<td>201</td>
</tr>
<tr>
<td>1: Triangle (c)</td>
<td>Not in an MSA</td>
<td>6,615</td>
<td>1</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>2: Triad</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>541,666</td>
<td>98</td>
<td>500</td>
<td>598</td>
</tr>
<tr>
<td>3: Metrolina (a)</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>818,072</td>
<td>149</td>
<td>461</td>
<td>610</td>
</tr>
<tr>
<td>3: Metrolina (b)</td>
<td>Not in an MSA</td>
<td>68,668</td>
<td>12</td>
<td>39</td>
<td>51</td>
</tr>
<tr>
<td>4: MPO Group 1</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>266,000</td>
<td>48</td>
<td>1,200</td>
<td>1,248</td>
</tr>
<tr>
<td>5: MPO Group 2</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>274,318</td>
<td>62</td>
<td>700</td>
<td>762</td>
</tr>
<tr>
<td>6: MPO Group 3</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>203,866</td>
<td>3</td>
<td>900</td>
<td>903</td>
</tr>
</tbody>
</table>
Table 3-11 North Carolina national sample and add-on allocation (Cont.)

<table>
<thead>
<tr>
<th>Substrata defined by NC Add-on</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>National sample allocation</th>
<th>Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>7: Eastern Non-MPO (a)</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>14,500</td>
<td>5</td>
<td>51</td>
<td>56</td>
</tr>
<tr>
<td>7: Eastern Non-MPO (b)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>30,660</td>
<td>7</td>
<td>108</td>
<td>115</td>
</tr>
<tr>
<td>7: Eastern Non-MPO (c)</td>
<td>Not in an MSA</td>
<td>310,294</td>
<td>61</td>
<td>1,091</td>
<td>1,153</td>
</tr>
<tr>
<td>8: Central Non-MPO (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>127,274</td>
<td>18</td>
<td>411</td>
<td>429</td>
</tr>
<tr>
<td>8: Central Non-MPO (b)</td>
<td>Not in an MSA</td>
<td>259,835</td>
<td>45</td>
<td>839</td>
<td>884</td>
</tr>
<tr>
<td>9: Western Non-MPO (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>29,380</td>
<td>4</td>
<td>52</td>
<td>56</td>
</tr>
<tr>
<td>9: Western Non-MPO (b)</td>
<td>Not in an MSA</td>
<td>240,724</td>
<td>74</td>
<td>848</td>
<td>921</td>
</tr>
<tr>
<td>10: FBRMPO (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>202,833</td>
<td>28</td>
<td>288</td>
<td>316</td>
</tr>
<tr>
<td>10: FBRMPO (b)</td>
<td>Not in an MSA</td>
<td>14,555</td>
<td>3</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>4,130,585</td>
<td>750</td>
<td>8,000</td>
<td>8,750</td>
</tr>
</tbody>
</table>

NOTE: The total sample column indicates the expected number of completed household surveys.

3.10 South Carolina DOT Study Area

The target number of completed household surveys is 6,500 for the South Carolina Add-on area, covering substrata defined by rural and non-rural components of several Councils of Government (COGs) and MPOs. Sample sizes within each area were specifically defined by the Add-on area. Shape files were provided by the SCDOT for the exact areas to be covered. These files were mapped to Census block boundaries, such that the entire state was partitioned into the requested substrata. Some of the substrata had to be split further to account for the hard boundaries of the four primary sampling strata. These splits are designated by (a) or (b), following the original substratum description, resulting in a total of 31 substrata. The allocation for the National sample, the Add-on area allocation, and the total sample allocation are given in table 3-12.

Table 3-12 South Carolina national sample and add-on allocation

<table>
<thead>
<tr>
<th>Substrata defined by SC Add-on: MPOs</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>National sample allocation</th>
<th>Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: ACOG Rural (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>32,882</td>
<td>6</td>
<td>79</td>
<td>85</td>
</tr>
<tr>
<td>1: ACOG Rural (b)</td>
<td>Not in an MSA</td>
<td>58,017</td>
<td>11</td>
<td>139</td>
<td>150</td>
</tr>
<tr>
<td>2: ACOG MPO</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>341,526</td>
<td>62</td>
<td>72</td>
<td>134</td>
</tr>
</tbody>
</table>
Table 3-12 South Carolina national sample and add-on allocation (Cont.)

<table>
<thead>
<tr>
<th>Substrata defined by SC Add-on: MPOs</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>National sample allocation</th>
<th>Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>3: ANATS</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>81,632</td>
<td>15</td>
<td>500</td>
<td>515</td>
</tr>
<tr>
<td>4: BCDCOG</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>27,156</td>
<td>5</td>
<td>200</td>
<td>205</td>
</tr>
<tr>
<td>5: CHATS</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>275,797</td>
<td>50</td>
<td>1,000</td>
<td>1,050</td>
</tr>
<tr>
<td>6: CRCP Rural (a)</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>54,857</td>
<td>10</td>
<td>158</td>
<td>168</td>
</tr>
<tr>
<td>6: CRCP Rural (b)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>12,682</td>
<td>2</td>
<td>37</td>
<td>39</td>
</tr>
<tr>
<td>7: CRCP MPO</td>
<td>Counties within MSAs &gt; 1 million</td>
<td>90,170</td>
<td>16</td>
<td>65</td>
<td>81</td>
</tr>
<tr>
<td>8: CMRCP (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>23,428</td>
<td>4</td>
<td>118</td>
<td>122</td>
</tr>
<tr>
<td>8: CMRCP (b)</td>
<td>Not in an MSA</td>
<td>16,510</td>
<td>3</td>
<td>83</td>
<td>86</td>
</tr>
<tr>
<td>9: COATS (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>287,801</td>
<td>52</td>
<td>1,200</td>
<td>1,252</td>
</tr>
<tr>
<td>9: COATS (b)</td>
<td>Not in an MSA</td>
<td>68</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10: LCOG Rural (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>11,820</td>
<td>2</td>
<td>75</td>
<td>77</td>
</tr>
<tr>
<td>10: LCOG Rural (b)</td>
<td>Not in an MSA</td>
<td>22,914</td>
<td>4</td>
<td>146</td>
<td>150</td>
</tr>
<tr>
<td>11: LCOG MPO</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>79,705</td>
<td>14</td>
<td>39</td>
<td>53</td>
</tr>
<tr>
<td>12: LSCOG (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>5,388</td>
<td>1</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>12: LSCOG (b)</td>
<td>Not in an MSA</td>
<td>54,242</td>
<td>10</td>
<td>182</td>
<td>192</td>
</tr>
<tr>
<td>13: PDRCOG (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>31,583</td>
<td>6</td>
<td>84</td>
<td>90</td>
</tr>
<tr>
<td>13: PDRCOG (b)</td>
<td>Not in an MSA</td>
<td>54,495</td>
<td>10</td>
<td>145</td>
<td>155</td>
</tr>
<tr>
<td>14: FLATS</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>52,785</td>
<td>10</td>
<td>470</td>
<td>480</td>
</tr>
<tr>
<td>15: SLCOG Rural (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>14,183</td>
<td>3</td>
<td>45</td>
<td>48</td>
</tr>
<tr>
<td>15: SLCOG Rural (b)</td>
<td>Not in an MSA</td>
<td>20,929</td>
<td>4</td>
<td>65</td>
<td>69</td>
</tr>
<tr>
<td>16: SLCOG MPO</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>38,577</td>
<td>7</td>
<td>120</td>
<td>127</td>
</tr>
<tr>
<td>17: USCOC (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>35,009</td>
<td>6</td>
<td>90</td>
<td>96</td>
</tr>
<tr>
<td>17: USCOC (b)</td>
<td>Not in an MSA</td>
<td>42,877</td>
<td>8</td>
<td>110</td>
<td>118</td>
</tr>
<tr>
<td>18: WRPDC Rural (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>22,689</td>
<td>4</td>
<td>30</td>
<td>34</td>
</tr>
<tr>
<td>18: WRPDC Rural (b)</td>
<td>Not in an MSA</td>
<td>21,765</td>
<td>4</td>
<td>30</td>
<td>34</td>
</tr>
</tbody>
</table>
Table 3-12  South Carolina national sample and add-on allocation (Cont.)

<table>
<thead>
<tr>
<th>Substrata defined by SC Add-on: MPOs</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>National sample allocation</th>
<th>Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>19: WRPDC MPO (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>131,036</td>
<td>24</td>
<td>174</td>
<td>198</td>
</tr>
<tr>
<td>19: WRPDC MPO (b)</td>
<td>Not in an MSA</td>
<td>19,862</td>
<td>4</td>
<td>26</td>
<td>30</td>
</tr>
<tr>
<td>20: ARTS</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>81,964</td>
<td>15</td>
<td>1,000</td>
<td>1,015</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>2,044,349</td>
<td>371</td>
<td>6,500</td>
<td>6,871</td>
</tr>
</tbody>
</table>

NOTE: The total sample column indicates the expected number of completed household surveys.

3.11 Wisconsin DOT Study Area

The target number of completed household surveys is 11,000 for the Wisconsin Add-on area, with representation for the entire state. Households will be selected from each of 16 substrata. The Wisconsin DOT originally specified nine substrata, some of which had to be split to account for the hard boundaries of the four primary sampling strata. These splits are designated by (a), (b), (c), or (d) following the original substratum description, resulting in a total of 16 substrata. The allocations for the National sample, the final substrata, and the total sample are given in table 3-13.

Table 3-13  Wisconsin national sample and add-on allocation

<table>
<thead>
<tr>
<th>Substrata defined by WI Add-on</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>National sample allocation</th>
<th>Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Croix County</td>
<td>Counties within MSAs &gt; 1 million and not heavy rail</td>
<td>33,574</td>
<td>6</td>
<td>150</td>
<td>156</td>
</tr>
<tr>
<td>Eau Claire MPO</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>67,891</td>
<td>12</td>
<td>304</td>
<td>316</td>
</tr>
<tr>
<td>Wausau, Stevens Point, and Wisconsin Rapids (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>57,050</td>
<td>10</td>
<td>255</td>
<td>266</td>
</tr>
<tr>
<td>Wausau, Stevens Point, and Wisconsin Rapids (b)</td>
<td>Not in an MSA</td>
<td>64,382</td>
<td>12</td>
<td>288</td>
<td>300</td>
</tr>
<tr>
<td>Northeast Region (a)</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>395,350</td>
<td>72</td>
<td>1,769</td>
<td>1,841</td>
</tr>
<tr>
<td>Northeast Region (b)</td>
<td>Not in an MSA</td>
<td>91,517</td>
<td>17</td>
<td>410</td>
<td>426</td>
</tr>
<tr>
<td>Dane County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>226,080</td>
<td>41</td>
<td>1,012</td>
<td>1,053</td>
</tr>
<tr>
<td>La Crosse County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>50,414</td>
<td>9</td>
<td>226</td>
<td>235</td>
</tr>
<tr>
<td>Rock County</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>67,682</td>
<td>12</td>
<td>303</td>
<td>315</td>
</tr>
<tr>
<td>Southeast Region (a)</td>
<td>Counties within MSAs &gt; 1 million and heavy rail</td>
<td>68,557</td>
<td>12</td>
<td>307</td>
<td>319</td>
</tr>
</tbody>
</table>
### Table 3-14 Texas national sample, Texas DOT add-on allocation, and NCTCOG add-on allocation

<table>
<thead>
<tr>
<th>Place</th>
<th>National sample stratum</th>
<th>ABS 12/14 occupied housing units</th>
<th>National sample allocation</th>
<th>TXDOT Add-on allocation</th>
<th>NCTCOG Add-on allocation</th>
<th>TOTAL sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collin</td>
<td>Counties within MSAs &gt; 1 million and not heavy rail</td>
<td>325,795</td>
<td>59</td>
<td>648</td>
<td>365</td>
<td>1,072</td>
</tr>
<tr>
<td>Dallas</td>
<td>Counties within MSAs &gt; 1 million and not heavy rail</td>
<td>954,979</td>
<td>173</td>
<td>1,899</td>
<td>1,069</td>
<td>3,142</td>
</tr>
<tr>
<td>Denton</td>
<td>Counties within MSAs &gt; 1 million and not heavy rail</td>
<td>277,877</td>
<td>50</td>
<td>553</td>
<td>311</td>
<td>914</td>
</tr>
<tr>
<td>Ellis</td>
<td>Counties within MSAs &gt; 1 million and not heavy rail</td>
<td>55,197</td>
<td>10</td>
<td>110</td>
<td>62</td>
<td>182</td>
</tr>
<tr>
<td>Hood</td>
<td>Counties within MSAs &gt; 1 million and not heavy rail</td>
<td>23,949</td>
<td>4</td>
<td>48</td>
<td>27</td>
<td>79</td>
</tr>
<tr>
<td>County</td>
<td>Counties within MSAs &gt; 1 million and not heavy rail</td>
<td>34,869</td>
<td>6</td>
<td>69</td>
<td>39</td>
<td>115</td>
</tr>
<tr>
<td>------------</td>
<td>---------------------------------------------------</td>
<td>--------</td>
<td>---</td>
<td>----</td>
<td>----</td>
<td>-----</td>
</tr>
<tr>
<td>Johnson</td>
<td>Counts within MSAs &gt; 1 million and not heavy rail</td>
<td>56,789</td>
<td>10</td>
<td>113</td>
<td>64</td>
<td>187</td>
</tr>
<tr>
<td>Kaufman</td>
<td>Counts within MSAs &gt; 1 million and not heavy rail</td>
<td>39,692</td>
<td>7</td>
<td>79</td>
<td>44</td>
<td>131</td>
</tr>
<tr>
<td>Parker</td>
<td>Counts within MSAs &gt; 1 million and not heavy rail</td>
<td>47,414</td>
<td>9</td>
<td>94</td>
<td>53</td>
<td>156</td>
</tr>
<tr>
<td>Rockwall</td>
<td>Counts within MSAs &gt; 1 million and not heavy rail</td>
<td>30,932</td>
<td>6</td>
<td>62</td>
<td>35</td>
<td>102</td>
</tr>
<tr>
<td>Tarrant</td>
<td>Counts within MSAs &gt; 1 million and not heavy rail</td>
<td>736,253</td>
<td>134</td>
<td>1,464</td>
<td>824</td>
<td>2,422</td>
</tr>
<tr>
<td>Wise</td>
<td>Counts within MSAs &gt; 1 million and not heavy rail</td>
<td>21,518</td>
<td>4</td>
<td>43</td>
<td>24</td>
<td>71</td>
</tr>
<tr>
<td>Rest of Texas</td>
<td>Counties within MSAs &gt; 1 million and not heavy rail</td>
<td>4,044,041</td>
<td>735</td>
<td>8,041</td>
<td>0</td>
<td>8,776</td>
</tr>
<tr>
<td>Rest of Texas</td>
<td>Counties within MSAs &lt; 1 million</td>
<td>2,297,085</td>
<td>417</td>
<td>4,568</td>
<td>0</td>
<td>4,985</td>
</tr>
<tr>
<td>Rest of Texas</td>
<td>Not in an MSA</td>
<td>1,111,630</td>
<td>202</td>
<td>2,210</td>
<td>0</td>
<td>2,412</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>10,058,020</td>
<td>1,827</td>
<td>20,000</td>
<td>2,917</td>
<td>24,744</td>
</tr>
</tbody>
</table>

**NOTE:** The total sample column indicates the expected number of completed household surveys.

### 4. Weighting, Estimation, and Variance Estimation

Estimates will be generated at the National level and for each specified Add-on area separately. In general, the estimation procedure consists of taking appropriately weighted totals or averages of the sample data. These weights are designed to provide approximately unbiased estimators at the National level, the state level, and for each Add-on area. Several stages of non-response adjustment and poststratification will be done to reduce sampling error and bias. Separate sets of weights will be generated for the Add-on areas and for the National sample. The primary set of household weights is for completed households. Households are defined as completed when a retrieval survey is completed for all eligible persons age 5 and older in the household. Vehicle-level weights, person-level weights and travel-day trip-level weights will also be produced. The household-level weights are designed to represent all households in the study area. The vehicle-level weights are designed to represent all vehicles in the study area. The person-level weights are designed to represent all persons in the study area. The travel-day trip-level weights are designed to represent all trips in the designated time period in the study area.
An overview of the weighting methodology is given in the following sections. Additional details will be provided in the final weighting plan to be prepared at the conclusion of the study.

4.1 Initial Household Weight

Since addresses will be sampled simultaneously (i.e., in a single selection) for the National study and the Add-on areas, the base weight for all sampled addresses is simply the reciprocal of the probability of selection of each address. Weighting each sample unit by its base weight results in the traditional Horvitz-Thompson estimator, which is unbiased across all possible samples (see for example Cochran, 1977, Section 9A.7). The sampling rate for the address sample may vary considerably across strata.

4.2 Adjustments for Non-response

Non-response unfortunately is a major and continuously growing problem with every survey. Extensive work will be done to analyze non-response, and the potential for bias, and build in adjustments based on this analysis. Part of this analysis will be a non-response analysis similar to that done for NHTS 2009. This analysis will be commenced before the end of the study based on three quarters of data, and then revised with the final results. This will allow us to have the analysis completed in time to inform our non-response adjustment process.

The non-response adjustments are based on a paradigm generally used in survey research (see for example Oh and Scheuren, 1983). Under this paradigm, non-response is treated as a subsampling process within carefully specified non-response-adjustment cells. The non-response-adjustment cells are specified to be heterogeneous in response propensity (the probability of responding) across cells, and homogeneous in response propensity within cells, and the variables considered in forming the cells are variables associated with key survey outcomes. The non-response bias analysis to be conducted will inform this cell selection process by finding characteristics which are related to response propensity (propensity to be successfully contacted, propensity to cooperate at the recruitment level, propensity to cooperate at the retrieval interview level). The final non-response adjustments are equal to the inverse of the base-weighted response rates within the selected non-response cells.

For each of the two phases of non-response, the final selection of non-response cells will utilize a categorical search algorithm. The algorithm efficiently captures the complex interaction of factors associated with response propensity. These non-response cells will nest within the primary strata utilized in sample selection. The cells will not be smaller than 30 sample units, as

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4 It should be noted that this sampling rate is the ‘final’ sampling rate, including any reserve samples finally included with the original sample.
cells with limited numbers of sample units generate unreliable (highly variable) non-response adjustments. In addition, cells with very low weighted response rates will be collapsed with other cells to avoid extreme weighting adjustments which can increase variability to a greater extent.

Non-response adjustment will be done separately for non-response to the recruitment phase (recruitment non-response) and the retrieval phase (retrieval survey non-response among recruited households). In particular, the final non-response adjustments for recruitment non-response will include an adjustment reflecting estimated percentages of eligible addresses (i.e., addresses corresponding to households) among those with unknown eligibility status\(^5\).

The variables considered in forming the cells for recruitment non-response include those available from the American Community Survey (ACS) at the tract level and data available from the ABS frame. The following are examples of variables that may be included in the weighting process:

- Type of location (central city, urban fringe, towns, rural)
- Whether or not a telephone number could be matched to the address;
- Tract-level percent Black, White, Hispanic, Asian;
- Tract-level median household income;
- Tract-level median years of education;
- Tract-level percent owner occupied housing;
- Tract-level percent college graduates;
- Tract-level percent in age groups (25-34, 35-64, 65 and over);

For the retrieval phase non-response-adjustment cells, we can also include information from the recruitment questionnaire, such as household size, race/ethnicity, age, gender, and level of education of the reference person, home ownership, location, home type, and number of vehicles in household.

### 4.3 Non-response Bias Analysis

Non-response may bias survey estimates if the characteristics of respondents differ from those of non-respondents. Traditionally, the size of the bias has been viewed as a deterministic function of the extent and size of the response difference and the response rate (see, for example, Sarndal\& Lundström, 2005, for discussion). More recently, the emphasis has shifted toward a stochastic perspective that characterizes non-response bias by examining the relationship between the key variable and the response propensity (Groves et al., 2007; Montaquila et al., 2007). Adjustments to the survey weights (discussed in section 4.2) aim to reduce bias due to

\(^5\) This needs to be estimated as we do not know whether postmaster returned mail is coming from eligible households or not, and can only estimate a percentage of eligibility for these outcomes.
non-response. However, even with such adjustments, it is important to have a plan to evaluate the potential for non-response bias.

A variety of methods are available to assess non-response bias. Previous research has suggested that each of these methods has strengths and weaknesses, thus a multi-method approach is recommended for a comprehensive evaluation of non-response bias. With respect to non-response, the largest concern for the NHTS is non-response in the recruitment phase. The recruitment phase is the phase that historically has yielded the bulk of the non-response, and that is expected to be the case for the 2016 survey as well, even with the shift to a mail-based ABS approach. The ABS approach affords the opportunity to link in covariates at both aggregate (e.g., tract-level characteristics from the American Community Survey) and address-level, for use in non-response adjustment and in bias analyses.

The recruitment survey will contain several variables (e.g., number of household members) that may be associated with non-response to the retrieval phase and are associated with key survey outcome variables. Having this rich set of variables will be very useful for non-response adjustment and non-response bias analysis at the retrieval phase. Our non-response bias analysis will incorporate techniques from a variety of approaches to study non-response at both the recruitment and retrieval phases.

4.4 Adjustments for Under- and Overcoverage

Nationally, ABS frames have been estimated to yield very high coverage (estimated at around 97-98 percent) when the survey mode(s) permit the inclusion of virtually all types of mailable household addresses, as is the case with mail as the primary mode for recruitment in the 2016 NHTS. The potential for undercoverage on the ABS frame lies mostly with housing units that cannot be associated with a mailable address. However, for sub-National estimates (e.g., estimates for Add-on areas), under- or over-coverage may occur due to households being linked to the wrong areas, either due to geocoding error or due to having a P.O. Box address located in an area that is different from their area of residence. It is possible to adjust for under- or overcoverage through a poststratification weighting process called “raking,” where the weights are iteratively adjusted to independent control totals\(^6\) for various demographic categories. The process has the effect of differentially adjusting the weights of the sampled households within groups of demographically similar households, so that the total sum of weights for the sampled households equals the corresponding independent control totals for all households (including those not covered by the ABS sample).

The raking process has a number of “dimensions.” The weights are adjusted to equal the totals within the cells for each dimension in an iterative process, until the process converges, and every

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\(^6\) The independent control totals for households and persons will come from the most recent American Community Survey.
dimension’s cell totals equal the independent control totals\(^7\). The dimensions at the household weighting level will include geography, race/ethnic percentages, household size, and household ownership (renter or owner). The dimensions for person-level weighting will also include sex, age categories, and personal race/ethnicity.

Raking to socioeconomic Census control totals is standard practice for large-scale surveys. This survey in particular also includes dimensions such as day of the week and month of the year. Each day of the week will be one level, and pairs of months of the year (Jan-Feb, Mar-Apr, etc.) will be levels. This helps ensure that each day is represented at its correct traffic level and each pair of months is represented at its correct traffic level, so that for example weekends or the winter are not over or under represented in the estimator. These control totals will be applied to the travel-day weights.

The raking procedure will be done for the National sample (either “stand-alone” or combined with the Add-on samples), and will also be done for each Add-on area separately. The procedure for each Add-on will be done entirely within the particular Add-on area to avoid altering the weights to satisfy a constraint across areas. The raking procedure for each Add-on area will have fewer dimensions and levels than the National sample as the samples in the Add-on areas are smaller than the full National sample plus the Add-on areas.

4.5 Variance Estimation

Variance estimation will be done by the generation of jackknife replicate weights (see, for example, Wolter, 2007, Section 4 for a general discussion of the jackknife method). For each jackknife replicate in each primary stratum a portion of the sample is deleted, with the remaining sample in the stratum reweighted\(^8\), to generate a replicate estimate of the characteristic of interest. The squared differences between the replicate estimates and the full-sample estimates provide a consistent estimator of the variance\(^9\). For the Add-on studies, the jackknife strata will generally be the same as the sampling strata. There should be enough jackknife replicates to estimate variance reliably (with enough precision), but not so many that the data set acquires too many fields. Usually 100 jackknife replicates is a good balance. The “portion of the sample” deleted will roughly correspond to 10 interviewed households, or roughly 35 sampled households. For example, an Add-on stratum with a target of 600 interviewed households will roughly have 60 replicate weights. Of course, samples of size larger than 1,000 interviewed households will require more than 100 replicate weights by this criterion, but our maximum for

\(^7\) In some cases, the process may not converge if there are ‘irreconcilable contradictions’ between adjusting for the various dimensions. This may happen if the cross-cells across dimension levels have too small a sample size. If convergence does not occur, then levels will be collapsed within dimensions, or dimensions could be dropped all together.

\(^8\) By increasing the weights by a factor \(n_s/(n_s - 1)\), where \(n_s\) is the number of replicates for the stratum.

\(^9\) The sum of squares needs to be multiplied by the factor \((n_s - 1)/n_s\)
operational reasons is 100. In this case we will combine sample portions so that the final replicate count is no larger than 100\(^{10}\). If the optimal replicate set is less than 100, then 100 replicate weights will be produced so that all of the delivery files have the same number of replicate weights (the extra replicate weights in this case will all be equal to the final weight, contributing zero sums of squares).

References


\(^{10}\) The combinations introduce unwanted cross-product terms (with expected value 0), which introduce no bias but do reduce the precision of the variance estimator.


## Appendix A

Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\)

<table>
<thead>
<tr>
<th>National</th>
<th>Sample size 2009</th>
<th>Estimate 2009*</th>
<th>s.e. 2009*</th>
<th>Sample size 20162016</th>
<th>Exp s.e. 20162016*</th>
<th>Ratio: se(20162016)/se(2009)</th>
</tr>
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<tbody>
<tr>
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<td>465</td>
<td>129,112</td>
<td>501</td>
<td>1.08</td>
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<td>2,245,112</td>
<td>28,306</td>
<td>637,308</td>
<td>30,525</td>
<td></td>
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<td>3,732,791</td>
<td>71,269</td>
<td>987,688</td>
<td>76,858</td>
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<td>0.02</td>
<td>265,613</td>
<td>0.02</td>
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<td>0.75</td>
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<td>0.02</td>
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<td>0.02</td>
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<tr>
<td>Daily VMT Per Driver</td>
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<td>0.39</td>
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<td>0.05</td>
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<td>0.06</td>
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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

<table>
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<tr>
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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\)

(Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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<tr>
<td>Per Trip</td>
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<td>2,007</td>
<td>0.97</td>
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<tr>
<td>Average vehicle trip length (miles)</td>
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<tr>
<td>Per Trip</td>
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\(^1\) These ratios do not account for additional sampling variability introduced by the replicate weights.
Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Vehiles</td>
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<td>3,999</td>
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<td>2,935</td>
<td>71</td>
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<td>Average person trip length (miles) Per Trip</td>
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<td>1.46</td>
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<tr>
<td>Average vehicle trip length (miles) Per Trip</td>
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<td>14,549</td>
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Task C: Sample Design
Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state) \(^1\) (Cont.)

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<tbody>
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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state) \(^1\) (Cont.)

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<th>CO</th>
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<th>Estimate 2009</th>
<th>s.e. 2009</th>
<th>Sample size 2016</th>
<th>Exp s.e. 2016</th>
<th>Ratio: (\frac{\text{se}(2016)}{\text{se}(2009)})</th>
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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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<th>Estimate 2009</th>
<th>s.e. 2009</th>
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<th>Exp s.e. 2016</th>
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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\)  
(Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)¹ (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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\(^1\) Thresholds were applied to reduce NA entries.
Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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\(^1\) Note: The ratios of expected standard errors are computed for national and by state estimates.
Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

<table>
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<td>4,875</td>
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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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<tr>
<th>MT</th>
<th>Sample size 2009</th>
<th>Estimate 2009</th>
<th>s.e. 2009</th>
<th>Sample size 2016</th>
<th>Exp s.e. 2016</th>
<th>Ratio: (\text{se}(2016)/\text{se}(2009))</th>
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<td>1,336</td>
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<td>Person Miles of Travel</td>
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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\)

(Cont.)

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<th>NC</th>
<th>Sample size 2009</th>
<th>Estimate 2009</th>
<th>s.e. 2009</th>
<th>Sample size 2016</th>
<th>Exp s.e. 2016</th>
<th>Ratio: (\frac{\text{se(2016)}}{\text{se(2009)}})</th>
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<td>8,750</td>
<td>25</td>
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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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<th>NE</th>
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<th>Estimate 2009</th>
<th>s.e. 2009</th>
<th>Sample size 2016</th>
<th>Exp s.e. 2016</th>
<th>Ratio: (\frac{se(2016)}{se(2009)})</th>
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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\)

(Cont.)

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<th>Estimate 2009</th>
<th>s.e. 2009</th>
<th>Sample size 2016</th>
<th>Exp s.e. 2016</th>
<th>Ratio: (\text{se(2016)}/\text{se(2009)})</th>
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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state) \(^1\)

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Task C: Sample Design
Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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\(^1\) Ratios provided are a measure of standard error derivation between the 2009 and 2016 surveys.
Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\)

(Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\)  
(Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state) \(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state) \(^1\)  
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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\)

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<td>24,742</td>
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<td>3,053</td>
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<tr>
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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state) \(^1\) (Cont.)

<table>
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<tr>
<th>UT</th>
<th>Sample size 2009</th>
<th>Estimate 2009</th>
<th>s.e. 2009</th>
<th>Sample size 2016</th>
<th>Exp s.e. 2016</th>
<th>Ratio: $\frac{\text{se}(2016)}{\text{se}(2009)}$</th>
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<td>120</td>
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<td>2,648</td>
<td>3.45</td>
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\(^1\) Includes national and state-level estimates.
Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state) ¹

<table>
<thead>
<tr>
<th>VA</th>
<th>Sample size 2009</th>
<th>Estimate 2009</th>
<th>s.e. 2009</th>
<th>Sample size 2016</th>
<th>Exp s.e. 2016</th>
<th>Ratio: ( \text{se(2016)}/\text{se(2009)} )</th>
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<td>2,988</td>
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<td>11,323</td>
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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)²

(Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\(^1\) (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)\textsuperscript{1} (Cont.)

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Table 1. Key statistics involved in computing ratios of expected standard errors of NHTS 2016 estimates to standard errors of NHTS 2009 estimates, for key estimates (national and by state)¹ (Cont.)

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Table 2. Average Annual PMT, Person Trips and Trip Length by Trip Purpose.

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Table 2. Average Annual PMT, Person Trips and Trip Length by Trip Purpose (Cont.).

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*Task C: Sample Design*
Table 2. Average Annual PMT, Person Trips and Trip Length by Trip Purpose (Cont.)

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Table 2. Average Annual PMT, Person Trips and Trip Length by Trip Purpose (Cont.).

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Table 2. Average Annual PMT, Person Trips and Trip Length by Trip Purpose (Cont.)

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Table 2. Average Annual PMT, Person Trips and Trip Length by Trip Purpose (Cont.)

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Table 2. Average Annual PMT, Person Trips and Trip Length by Trip Purpose (Cont.)

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Table 2. Average Annual PMT, Person Trips and Trip Length by Trip Purpose (Cont.)

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Table 2. Average Annual PMT, Person Trips and Trip Length by Trip Purpose (Cont.)

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Table 2. Average Annual PMT, Person Trips and Trip Length by Trip Purpose (Cont.)

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Table 2. Average Annual PMT, Person Trips and Trip Length by Trip Purpose (Cont.)

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Table 2. Average Annual PMT, Person Trips and Trip Length by Trip Purpose (Cont.)

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Table 2. Average Annual PMT, Person Trips and Trip Length by Trip Purpose (Cont.)

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Table 2. Average Annual PMT, Person Trips and Trip Length by Trip Purpose (Cont.)

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<td>502</td>
<td>0.87</td>
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