Census Transportation Planning Products Research – Assessing the Utility of the 2006-2010 CTPP Five-Year Data

Information Gathering, User Survey and Peer Exchange

final report

prepared for
American Association of State Highway and Transportation Officials

prepared by
Cambridge Systematics, Inc.

with
Kevin Tierney
technical report

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1.0 Introduction

This Technical Report presents the findings of Task 1 and Task 2 of the study. The first task included a brief review of identified issues related to the 2006-2010 Census Transportation Planning Products (CTPP) dataset. Task 2 focused on the findings of data collection efforts that were designed to better understand the perspectives of CTPP users toward the five-year American Community Survey (ACS) based product. The third task included a set of data-driven case studies that enable a better assessment of the data product.

This report identifies and categorizes the ongoing uses of the CTPP and ACS five-year data. We present the insights about users’ experience with the dataset itself, available tools, and technical support by analyzing a web-based user survey.

The survey effort targeted individuals who recently had hands-on experience with the analysis and/or interpretation of the data or were otherwise involved in the planning and decision making process supported by CTPP data.

The key findings from the survey were then presented to a select group of representatives of the transportation data community in a peer exchange format and their feedback was collected. Finally, in-depth telephone interviews were held with members of the AASHTO CTPP Oversight Board to gather the perspective of additional expert users.

This report is divided into seven sections. Section 2 provides a brief background for the project and the approach. Section 3 presents the findings from the investigation of issues surfaced following the release of 2006-2010 CTPP data. Section 4 describes the user survey development and implementation. Section 5 details the expert perspective data collection efforts, including the peer exchange meeting and Oversight Board member interviews. Section 6 summarizes issue-specific findings from the survey and the data collection effort on experts’ perspectives. Finally, Section 7 provides an overview of the findings, outlines recommendations of Peer Exchange participants and Oversight Board members for future CTPP releases and tools, and identifies areas for further study.
2.0 Background

As the Census Bureau has moved to the ACS format, the survey sample size has shrunk dramatically when compared to the now discontinued Long Form.

Since 2005, ACS data summaries are published annually for national, statewide, and large geographic areas with a population of 65,000 and greater. Summaries for smaller geographic areas including individual Census Tracts, counties, and places are based on five-year accumulations of survey responses.

ACS data also include a measure of a margin of error (MOE) associated with each estimate. The range created by the MOE around the estimate indicates the level of precision in measuring that estimate with a 90-percent confidence level. The decennial Census long form data were also based on a sample and had associated MOEs, but the Census Bureau did not stress that users need to pay attention to them. Since the migration to ACS, the Census Bureau reports all their estimates with MOEs and strongly recommends that users incorporate this uncertainty into their analyses.

Comparing multi-year data from the ACS with one-year data from the Census Long Form became more challenging due to the need to incorporate MOEs and differences in the timeframe since data from a single point in time are compared with estimates averaged over three or five years.

The changes in the data collection methodology for Census journey-to-work data raise additional issues:

- Because of small sample sizes and low response rates, the five-year CTPP at small geographies has some quality issues.

- Aggregating zonal data and computing new measures using the existing estimates increases the amount of uncertainty which may have been typically overlooked.

- Due to confidentiality issues and regulations from the Census Bureau’s Disclosure Review Board (DRB), 180 of the 343 tables (53 percent) from 2006-2010 CTPP contain perturbed data that are disclosure proofed. If not for these perturbed data cells, the tables in which they reside might otherwise be redacted by the Census Bureau to protect respondents’ anonymity.

- It is anticipated that users would like to compare CTPP to another source of data to gain confidence and test consistency across these data sources. However, comparison data may also have issues that may reflect important differences in how they are produced.

- Due to differences in sample weighting techniques and the three-year 2006-2008 CTPP being the subset of the five-year 2006-2010 CTPP data, there should be special considerations when comparing statistics from these datasets, such as trend analysis. These considerations might easily be overlooked by analysts.

This study has been designed to assess the utility of the 2006-2010 CTPP data for the transportation community under the leadership of the American Association of State Highway and Transportation Officials (AASHTO). It will help us better understand the extent to which these issues are acknowledged and the types of remedies and solutions that are being implemented by the practitioners.

---

1 Starting from 2009, county totals were used as targets instead of sub-county totals.
We developed a research methodology that consisted of four consecutive steps, as shown in Figure 2.1. These steps are designed to gather information from various users with a varying degree of expertise and interest.

“Issue Monitoring” focused on identifying potential issues for practitioners and theoreticians. As a first step, a literature review was conducted and was supplemented by experiences of the data user community typically featured in the CTPP newsletter and in the issues presented to FHWA’s CTPP Support Staff. This step helped identify issues and solutions at the individual user or project level. The findings of this step are presented in the next section.

As part of the “Agency Survey”, we made use of the findings from the “Issue Monitoring” step to design the survey. The survey targeted individuals with a higher degree of knowledge at state and regional agencies who have more in-depth experience with CTPP and other relevant transportation data.

The “Peer Exchange” stage collected feedback and suggestions from a panel of experts by filtering the survey results through their knowledge and incorporating their own experience with the issues they face and strategies they use to deal with those issues. The peer exchange participants outlined a set of key practical issues, provided guidance to address them, and suggested future directions for the state of practice and research.

The CTPP Oversight Board interviews sought to address the same objectives with a set of expert CTPP users who have knowledge of the CTPP user experience and are familiar with the program administration.

During the "Utility Assessment" step which is described in the second report of this series, we synthesized the findings from these analyses. We documented the key issues related to CTPP data utilization, demonstrated the types of analyses that are successfully being performed with the data, and recommended steps to be taken in future CTPP data releases along with future research activities.

This report summarizes the outcomes of the “Issue Monitoring”, “Agency Survey”, and “Peer Exchange” activities that informed the “Utility Assessment” effort.
3.0 Information Gathering

In order to frame and categorize the ongoing uses of the CTPP and ACS data by the transportation community, a focused review of recently published media was conducted as a first step for the project. The findings of this effort are used in the following tasks to identify potential focus areas for data user surveys, peer exchange meetings, and in-depth interviews with CTPP Oversight Board members. The review included the CTPP listserv, CTPP newsletter, Transportation Research Board (TRB) documents, and agency project reports. In order to identify and scope the data issues, preliminary data analyses were also conducted and summarized. It should be noted that this effort covered the first few months following the release of 2006-2010 CTPP in late October 2013. Since the scan was performed, additional issues have arisen and it is possible that the importance of issues identified in this report may have changed somewhat during the study. The discussion in sections 4 through 6 and in the Task 3 report include more current CTPP uses and include additional potential issues.

Since the release of the data, some important issues have been identified by the data user community. Among these concerns are:

- Limitations of the disclosure-proofing data perturbation;
- Small area workplace allocation problems;
- Workplace geocoding issues; and
- Small sample size challenges.

These issues are discussed in the sections below.

3.1 Perturbed Data

Due to confidentiality issues and applicable regulations from the Census Bureau’s Disclosure Review Board (DRB), 180 (53 percent) of the 343 tables from 2006-2010 CTPP are based on perturbed (disclosure-proofed) data. It is the first time that the CTPP data tables are partially synthesized, rather than being directly derived from the surveyed data. In previous data releases, the cells with low representation were suppressed according to specific disclosure rules. The disclosure-proofed synthesized estimate weights are adjusted for workers and households. It is therefore beneficial to investigate the differences between the perturbed and actual surveyed data for both household and worker level tables and to document whether there are substantial differences in results across tables for different levels of detail.

3.1.1 Average Number of Vehicles

The number of vehicles per household is an important Census variable for transportation application studies, including travel demand models. There are several tables in the 2006-2010 CTPP that include this variable. If users are interested in the aggregate number of household vehicles, they can use Table B111103 – Aggregate Number of Vehicles Available in Households. The potential issue is that Table B111103 uses the privacy protected ACS microdata set, whose weights are adjusted for workers and not households.

Table 3.1 compares CTPP Table B111103 with unperturbed data drawn from CTPP Table A111102, a univariate distribution of Vehicles Available. The aggregate number of vehicles is derived from Table A111102 assuming an average of 4.3 vehicles in households with four-or-more-vehicles. In Table 3.1, we do not see substantial differences in the aggregate number of vehicles between the perturbed and surveyed data for the
U.S.; Washington State; King County, Washington; or Seattle, Washington. But these comparisons are limited to large geographies, and the data reliability in small geographies, such as Traffic Analysis Zones (TAZs), is not validated yet.

Table 3.1  Number of Vehicles Available

<table>
<thead>
<tr>
<th></th>
<th>One Vehicle</th>
<th>Two Vehicles</th>
<th>Three Vehicles</th>
<th>Four or More Vehicles</th>
<th>Aggregate Number of Vehicles (Derived from Table A111102 – unperturbed data)</th>
<th>Aggregate Number of Vehicles (Table B111103 – perturbed data)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>38,014,175</td>
<td>43,264,980</td>
<td>16,043,940</td>
<td>6,799,635</td>
<td>201,914,386</td>
<td>202,352,190</td>
</tr>
<tr>
<td>Washington State</td>
<td>795,675</td>
<td>982,505</td>
<td>423,665</td>
<td>207,790</td>
<td>4,925,177</td>
<td>4,955,455</td>
</tr>
<tr>
<td>King County, Washington</td>
<td>275,835</td>
<td>288,235</td>
<td>103,050</td>
<td>44,605</td>
<td>1,353,257</td>
<td>1,358,210</td>
</tr>
<tr>
<td>Seattle, Washington</td>
<td>120,780</td>
<td>85,895</td>
<td>22,720</td>
<td>7,655</td>
<td>393,647</td>
<td>394,655</td>
</tr>
</tbody>
</table>

Source: 2006-2010 CTPP Table A111102 and Table B111103.

3.2  Small Area Workplace Allocation Issues

For the standard ACS tabulations, the workplace allocation procedures at the Census Bureau impute only at the county- and place-level geographies. As a result, approximately 22 percent of worker records did not contain place of work (POW) tract and block information. For CTPP production, workplace block information is used to tabulate the TAZ-to-TAZ flows. Therefore, the POW extended allocation system was developed to improve workplace location data for 2006-2010 CTPP at the Census block level. With the implementation of this methodology, an additional 13.5 percent of POW blocks were imputed, with the remaining 9 percent of workplace addresses left uncoded.

For large geographies that are bigger than county and place, workplace coding is completed for 100 percent of workers. For smaller geographies, such as Transportation Analysis Districts (TADs), TAZs, and Tracts, about 92 percent of national workplace coding is completed. However, workers with missing workplace location information are not counted as part of the total number of workers for these smaller geographies. Therefore, due to incomplete workplace geocoding, the employment information in small areas may be inaccurate and inconsistent. For example, users may discover differences between the sum of the total number of workers across Tracts and TAZs for some workplace geographies and the corresponding single estimate for a larger area that contains those geographies (e.g., counties).

As an example, consider Barrow County, Georgia. The internal county flows for this county are 11,050 based on county-level estimates. Barrow County contains a total of two TADs. If county flows are pulled and aggregated using TAD to TAD, the flows estimates are 3,450 (1,845 + 180 + 445 + 980), resulting in a large difference (Figure 3.1). This example demonstrates that missing workers in small areas may severely impact the data utility for workplace estimates (Part 2) and travel flows (Part 3).
Figure 3.1 Differences in Workers for Small Area Workplace Geography - Barrow County, Georgia
3.3 Workplace Geocoding Issues

Another workplace geocoding issue with the ACS/2006-2010 CTPP data involves possible confusion with similarly named geography. Taking the example of Baltimore City and Baltimore County, Bureau of Economic Analysis (BEA) data show an overall decrease in employment in Baltimore city from 2000 to 2010, but Census 2000 and ACS 2010 data show an opposite trend. While in Baltimore County, BEA data show a substantial increase in employment from 2000 to 2010 while Census data only show a marginal increase (Figure 3.2). The Public Use Microdata Sample (PUMS) data trend closer to the BEA data instead of the Census data. It seems likely that some jobs in Baltimore County were mistakenly geocoded to Baltimore City. This issue has also been noticed in prior Census tabulations.

Figure 3.2 Employment Data for Baltimore County and Baltimore City

Source: This chart is provided by Baltimore Metropolitan Council (BMC)

As a spot check, the employment data for Fairfax County, Virginia and Fairfax City, Virginia were analyzed from three data sources:

- Census,
- Bureau of Labor Statistics (BLS), and

This analysis was intended to demonstrate if the Baltimore case is an isolated case, or if other similarly named areas have similar problems. The analysis was conducted for residence geography, and military employment data was not included. For LODES, only primary jobs were considered. Although the analysis identified differences among the data sources, the apparent geocoding issue noticed in the Baltimore County/City was not observed in Fairfax City/County, Virginia data (Table 3.2).
Table 3.2  Total Employment for Fairfax City and Fairfax County

<table>
<thead>
<tr>
<th>Measure</th>
<th>Data Source</th>
<th>Fairfax City, Virginia</th>
<th>Fairfax County, Virginia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Employment</td>
<td>2000 Census</td>
<td>11,775</td>
<td>522,870</td>
</tr>
<tr>
<td>Total Employment</td>
<td>2006-2010 CTPP</td>
<td>11,290</td>
<td>557,540</td>
</tr>
<tr>
<td>Total Employment</td>
<td>2000 BLS</td>
<td>12,265</td>
<td>538,545</td>
</tr>
<tr>
<td>Total Employment</td>
<td>2010 BLS</td>
<td>12,392</td>
<td>577,465</td>
</tr>
<tr>
<td>Total Employment</td>
<td>2002 LODES</td>
<td>9,325</td>
<td>385,404</td>
</tr>
<tr>
<td>Total Employment</td>
<td>2010 LODES</td>
<td>10,616</td>
<td>467,292</td>
</tr>
<tr>
<td>Change Census</td>
<td>Census</td>
<td>158</td>
<td>58,245</td>
</tr>
<tr>
<td>Change BLS</td>
<td>BLS</td>
<td>127</td>
<td>38,920</td>
</tr>
<tr>
<td>Change LODES</td>
<td>LODES</td>
<td>1,291</td>
<td>81,888</td>
</tr>
<tr>
<td>Percent Change Census</td>
<td>Census</td>
<td>1.34%</td>
<td>11.14%</td>
</tr>
<tr>
<td>Percent Change BLS</td>
<td>BLS</td>
<td>1.04%</td>
<td>7.23%</td>
</tr>
<tr>
<td>Percent Change LODES</td>
<td>LODES</td>
<td>13.84%</td>
<td>21.25%</td>
</tr>
</tbody>
</table>

3.4  Small Sample Size Issue

Because of the small ACS sample sizes and low response rates, the five-year CTPP at small geographies may have some quality issues. For many TAZs, it is possible to observe cases where the MOEs are larger than the estimate itself. Such large sampling errors affect the meaningfulness of these estimates from a theoretical point of view. As shown in Table 3.3, for the Washington, D.C. region, over 85 percent of TAZs in the 2006-2010 CTPP data are based on fewer than 100 sampled households.

Table 3.3  TAZs by Number of ACS Interviews - 2006-2010 for Washington, D.C. Region

<table>
<thead>
<tr>
<th>ACS Sampled Housing Units</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Cumulative Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>94</td>
<td>6.48%</td>
<td>6.48%</td>
</tr>
<tr>
<td>1 or 2</td>
<td>0</td>
<td>0.00%</td>
<td>6.48%</td>
</tr>
<tr>
<td>3-9</td>
<td>26</td>
<td>1.79%</td>
<td>8.27%</td>
</tr>
<tr>
<td>10-19</td>
<td>24</td>
<td>1.65%</td>
<td>9.92%</td>
</tr>
<tr>
<td>20-49</td>
<td>355</td>
<td>24.47%</td>
<td>34.39%</td>
</tr>
<tr>
<td>50-99</td>
<td>608</td>
<td>41.90%</td>
<td>76.29%</td>
</tr>
<tr>
<td>100-199</td>
<td>320</td>
<td>22.05%</td>
<td>98.34%</td>
</tr>
<tr>
<td>200-499</td>
<td>23</td>
<td>1.59%</td>
<td>99.93%</td>
</tr>
<tr>
<td>500 or more</td>
<td>1</td>
<td>0.07%</td>
<td>100.00%</td>
</tr>
<tr>
<td>Total</td>
<td>1,451</td>
<td>100.00%</td>
<td></td>
</tr>
</tbody>
</table>

Notes: Due to DRB rules, TAZs sampled with less than three households can not be identified. Washington, D.C. region counties include District of Columbia; Montgomery County, Maryland; Prince George’s County, Maryland; Arlington County, Virginia; Fairfax County, Virginia; Alexandria City, Virginia; Fairfax City, Virginia; and Falls Church City, Virginia.
Given the relatively small ACS sample, large MOEs are expected. Table 3.4 shows how often each cell in the Means of Transportation table has an MOE larger than the estimated value. The table also reveals that in many of these cases, the cell value was zero as expected (e.g., ferryboat and streetcar or trolley car) since these modes are currently unavailable in the Washington, D.C. region. Table 3.4 shows reasonably large sample sizes for common transportation modes, including drive-alone and subway, which confirms that the ACS provides appropriately large estimates in expected areas. However, uncommon transportation modes have very high percentages of cells with MOEs that are larger than the estimates. For instance, bicycle and walk respectively show that 94 percent and 75 percent of cells have an MOE larger than the estimates themselves making data interpretation problematic.

### Table 3.4 Percent of TAZs with Margins of Error Greater Than Cell Values for Means of Transportation to Work

<table>
<thead>
<tr>
<th>Means of Transportation</th>
<th>MOE Greater than Cell Value</th>
<th>Cells with Zero Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percent</td>
</tr>
<tr>
<td>Total Means of Transportation</td>
<td>110</td>
<td>7.6%</td>
</tr>
<tr>
<td>Car, Truck, or Van – Drove Alone</td>
<td>121</td>
<td>8.3%</td>
</tr>
<tr>
<td>Car, Truck, or Van – In a Two-Person Carpool</td>
<td>546</td>
<td>37.6%</td>
</tr>
<tr>
<td>Car, Truck, or Van – In a Three-Person Carpool</td>
<td>1,299</td>
<td>89.5%</td>
</tr>
<tr>
<td>Car, Truck, or Van – In a Four-Person Carpool</td>
<td>1,424</td>
<td>98.1%</td>
</tr>
<tr>
<td>Car, Truck, or Van – In a Five- or Six-Person Carpool</td>
<td>1,440</td>
<td>99.2%</td>
</tr>
<tr>
<td>Car, Truck, or Van – In a Seven-or-More-Person Carpool</td>
<td>1,449</td>
<td>99.9%</td>
</tr>
<tr>
<td>Bus or Trolley Bus</td>
<td>819</td>
<td>56.4%</td>
</tr>
<tr>
<td>Streetcar or Trolley Car</td>
<td>1,451</td>
<td>100.0%</td>
</tr>
<tr>
<td>Subway or Elevated</td>
<td>404</td>
<td>27.8%</td>
</tr>
<tr>
<td>Railroad</td>
<td>1,395</td>
<td>96.1%</td>
</tr>
<tr>
<td>Ferryboat</td>
<td>1,451</td>
<td>100.0%</td>
</tr>
<tr>
<td>Bicycle</td>
<td>1,360</td>
<td>93.7%</td>
</tr>
<tr>
<td>Walked</td>
<td>1,083</td>
<td>74.6%</td>
</tr>
<tr>
<td>Taxicab</td>
<td>1,444</td>
<td>99.5%</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>1,442</td>
<td>99.4%</td>
</tr>
<tr>
<td>Other Method</td>
<td>1,411</td>
<td>97.2%</td>
</tr>
<tr>
<td>Worked at Home</td>
<td>728</td>
<td>50.2%</td>
</tr>
</tbody>
</table>

Source: 2006-2010 CTPP Table A102106.

### 3.5 Tabulations and Geographies Requests

Early users of the 2006-2010 CTPP tables have identified the desire for a few enhancements to the CTPP tabulations:

- Place-to-County flows are frequently requested since they play an important role for the analysis of reverse commute patterns. Although Place-to-County flows are not available in 2006-2010 CTPP, those can be derived by aggregating 2006-2010 CTPP Place-to-TAZ flows.

- Employment Status by Sex by Age estimates are requested for both residence and workplace.
• Travel time by Race at the Residence level. Users identified that this table can be useful for Environmental Justice and Equity related transportation applications. For 2006-2010 CTPP, only the Travel Time by Minority Status table is included which provides only limited categories including “White alone, not Hispanic/Latino” and “Other”.

Other issues raised by data users included the following:

• Combining and aggregating zonal data and dealing with MOEs can be very challenging to users considering large MOEs for small geographies. In addition, it is quite common for users to compute new measures using the existing estimates. However, the impacts of MOEs on the precision of these newly derived measures may have been overlooked.

• Few researchers in the transportation field have experience in working with multi-year averages such as average autos owned over a five-year period, or average mode to work stratified by average income. It is unclear to transportation planners whether these averages are meaningful or sufficiently sensitive to be applied for their studies. For example,
  • How would one calculate the number of vehicles for the future year taking 2006-2010 CTPP as the base data?
  • Assuming a straight line projection, how are multiple years treated in performing projections the CTPP data? For example, would CTPP data be considered from year 2008 (which is the mid-point year) or would they be considered from year 2010 (which is the end-year) for performing projections)?
4.0 Survey of CTPP Users and Potential Users

The web survey was conducted in September 2014 to shed light on the breadth of the CTPP and ACS data usage by planners at state departments of transportation (DOTs) and metropolitan planning organizations (MPOs). Potential survey respondents were contacted by e-mail and invited to go to a website to complete the survey.

Survey Sample

The web-based survey sample consisted of two elements. First, we sought to include all the members of the AASHTO's CTPP contact lists consisting of:

- MPO staff including executives, technical/modeling analysts, and data specialists involved in the last Census “TAZ-UP” program that helped to establish the Census transportation analysis zone (TAZ) geographic delineations; and
- State DOT staff specializing in Census data usage.

Because the contact lists were somewhat outdated, we reviewed and updated the lists. Alternate contacts within the same agencies were identified through web searches and added to the list.

Second, a convenience sample was used to extend the reach of the survey beyond the agency planners who were thought to have a high likelihood of CTPP use. General invitations to participate in the survey were posted to various email lists and planning organization mailing lists, including the following:

- CTPP listserv;
- Travel Model Improvement Program (TMIP) listserv;
- Association of Metropolitan Planning Organizations (AMPO);
- National Association of Regional Councils (NARC); and
- The AASHTO Standing Committee on Planning.

Because these general invitations were not directed to specific individuals, some people likely received multiple invitations. In addition, the survey implementation allowed potential respondents to share the survey link with other co-workers or out-of-agency colleagues. Finally, the general invitations most likely reached many individuals who have no knowledge or experience with CTPP data, and consequently, no interest in participating in the survey. Therefore, the convenience sample portion of the study does not allow for the scientific calculation of response or participation rates.

Survey Content

The survey content was developed incorporating the key findings in the “Issue Monitoring” step and covered a wide variety topics:
• Respondent’s degree of familiarity with CTPP data
• Reasons that non-users have for not using CTPP data
• Use of CTPP
  – Use of specific CTPP tables
  – Use of specific CTPP datasets
  – Types of analyses performed using CTPP data
• Characterization of the importance of CTPP Variables
• Use of CTPP related data products
• User perceptions of CTPP software
• User perceptions of CTPP software documentation
• CTPP Issues
  – Respondents’ key issues with CTPP
  – Margins of error
  – Multi-year data collection of ACS
  – Disclosure avoidance
• Additional contact information
  – Names and contact information for other knowledgeable CTPP users
  – Request to re-contact respondent to find out about specific CTPP uses and to be included in the Peer Exchange meeting

The respondent burden was estimated at about 12-15 minutes. The survey instrument is presented in Appendix A.

Survey Response

Table 4.1 shows the distribution of responses for the direct invitation portion of the web survey. We received at least one response from 25 percent of the MPOs and 37 percent of the State Departments of Transportation. On an individual basis, 15 percent of the MPO invitees and 25 percent of the State DOT invitees responded to the survey invitation. A total of 135 respondents participated in the survey based on the direct email invitations.

Based on the number of survey responses, we can calculate that the margin of error at the 90 percent confidence level to be plus or minus 6.5 percent for equal proportion estimates and less for other proportions.

A total of 67 responses were obtained in response to the general bulk invitations reaching a total of 202 survey respondents. Nearly 63 percent of the respondents (124 out of 202) had hands-on experience with CTPP and/or Census data, and the remaining 37 percent of the respondents was labeled as non-users.
As noted above, the convenience sample does not lend itself to similar response rate or statistical precision calculations as the direct email invitations because of the uncertainty regarding the universe of the survey population.

The email invitations were designed to elicit interest from potential CTPP users. As a result, there is a strong likelihood that the respondents were more prone to have had CTPP experience and knowledge than the transportation planning community as a whole. Consequently, we do not believe that the survey is a good measure of CTPP usage penetration or a representative reflection of the general transportation planning community.

Nevertheless, we do believe that the survey provides a useful picture of the CTPP-interested segment of the transportation planning community, and that the findings of this survey research provide a good representation of the perspectives of recent knowledgeable CTPP users.

The high level of familiarity and CTPP knowledge of respondents is exhibited in their responses to several of the survey questions. As Figure 4.1 shows, the survey respondents' self-assessment of Census ACS knowledge is high. Nearly 80 percent of the respondents agreed (either strongly agreed or somewhat agreed) that they have a good understanding of the Census ACS data collection processes.

As shown in Figure 4.2, nearly two-thirds of the survey respondents were involved with delineating traffic analysis zones for their regions or states.

Figure 4.3 demonstrates that the survey respondents were experienced with each of the CTPP general table types. Figure 4.4 shows that the survey respondents' experiences with CTPP data extend across the many recent (and not so recent) data products. We also note that there is much greater familiarity and use of the five-year instead of the three-year CTPP data most likely reflecting the greater desire for a finer degree of geographic detail and increased geographical coverage that is included in the five-year 2006-2010 CTPP data.

---

Table 4.1 Survey Outreach and Response via Direct Invitations

<table>
<thead>
<tr>
<th>Response</th>
<th>MPOs</th>
<th>State DOTs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agencies Sent Email Invitations</td>
<td>394</td>
<td>51</td>
<td>445</td>
</tr>
<tr>
<td>Agencies Receiving Email Invitations</td>
<td>382</td>
<td>46</td>
<td>428</td>
</tr>
<tr>
<td>Agencies With At Least One Response</td>
<td>95</td>
<td>17</td>
<td>112</td>
</tr>
<tr>
<td>Agency Response Rate</td>
<td>25%</td>
<td>37%</td>
<td>26%</td>
</tr>
<tr>
<td>Percent of Agencies With More than One Response</td>
<td>4%</td>
<td>9%</td>
<td>4%</td>
</tr>
<tr>
<td>Individuals Sent Email Invitations</td>
<td>772</td>
<td>103</td>
<td>875</td>
</tr>
<tr>
<td>Individuals Receiving Email Invitations</td>
<td>740</td>
<td>83</td>
<td>823</td>
</tr>
<tr>
<td>Individual Respondents</td>
<td>114</td>
<td>21</td>
<td>135</td>
</tr>
<tr>
<td>Individual Response Rate</td>
<td>15%</td>
<td>25%</td>
<td>16%</td>
</tr>
</tbody>
</table>

---

2 This observation was partly due to use of the contact list previously used for TAZ delineation efforts as part of the email campaign for the survey.
Figure 4.1  Respondents’ Understanding of ACS Data Collection Methods

Figure 4.2  Respondents’ Experience with TAZ Delineation
Figure 4.3  Respondents’ Usage of General CTPP Table Types

- Part 1 Tables – residence based: 91%
- Part 2 Tables – workplace based: 81%
- Part 3 Tables – worker home-to-work flows: 89%

Figure 4.4  Respondents’ Usage of the Different CTPP Data Products

- 2006-2010 ACS based 5-year CTPP: 100%
- 2006-2008 ACS based 3-year CTPP: 60%
- Year 2000 CTPP: 50%
- Year 1990 CTPP: 40%
- Year 1980 CTPP: 20%
5.0 CTPP Experts’ Perspectives

5.1 CTPP Peer Review Meeting

A selected sample of web survey respondents that were using the CTPP and ACS data, along with researchers identified in the literature search and CTPP users identified by AASHTO, were asked to participate in a half-day Peer Exchange to provide additional information and insights regarding ACS based CTPP data. The Peer Exchange Meeting was hosted by the Atlanta Regional Commission at their offices in Atlanta, Georgia on October 20, 2014. The participants\(^3\) included representatives from:

- 3 large MPOs
- 2 midsize MPOs
- 1 smaller MPO
- 2 transportation planning consulting firms
- 2 academic institutions
- 1 private sector data firm
- 1 CTPP software developer
- 2 AASHTO staff
- 2 members of the project team

The Peer Exchange was a guided discussion of the key CTPP issues identified in the “Issue Monitoring” phase of the research and further analyzed in the web-based survey (“Agency Survey”). The five key issues participants were asked to provide input on were as follows:

1. Is CTPP fulfilling an essential need of the data user community?
2. ACS Based CTPP Considerations:
   a. Content,
   b. Geographic Delineation,
   c. Multi-year Data Accumulation,
   d. Margin of Error, and
   e. Perturbation.
3. Is the AASHTO CTPP software effective for the data user community?
4. CTPP Compared to Other Data Sources.
5. Future CTPP Data Releases.

\(^3\) The full list of the participants is provided in Appendix B
To frame the discussion of these issues, the Peer Exchange participants were shown the results of the web survey questions related to specific issues. The Peer Exchange participants commented on the survey findings and provided their personal perspectives of the issues. The Peer Exchange participants were able to provide greater depth than the web survey respondents and to go into greater detail regarding ACS based CTPP products with a particular emphasis on future planning of CTPP data products.

The detailed discussions of the results of the survey and Peer Exchange participants’ input pertaining to each of the first three issues including detailed discussions on ACS based CTPP Considerations are presented in the next section. An overview of each of the five issues reflecting Peer Exchange participants’ collective views is presented in Section 6.

### 5.2 CTPP Oversight Board Member Interviews

To further gain an understanding of the perspectives of expert users, in-depth interviews were held with eight members of the AASHTO CTPP Oversight Board. These guided conversations with project team members and individual board members were held in November and December 2015. The discussions were loosely organized around the same issue themes as the Peer Exchange Meeting:

1. Is CTPP fulfilling an essential need of the data user community?
2. ACS Based CTPP Considerations:
   - Content,
   - Geographic Delineation,
   - Multi-year Data Accumulation,
   - Margin of Error, and
   - Perturbation.
3. Is the AASHTO CTPP software effective for the data user community?
4. CTPP Compared to Other Data Sources.
5. Future CTPP Data Releases.

As with the Peer Exchange, interview participants were provided with summary results of the previous data collection effort as a reference to spur conversation.

The Board Member interviews provided perspectives of people who have advanced knowledge of the CTPP data uses and products, as well as the challenges and issues of the CTPP program itself. The time gap between the Peer Exchange meeting and the Oversight Board interviews, while largely circumstantial, ended up being of benefit since new program issues regarding future Census table limitations arose during that time period.

The detailed discussions of the results of the survey, Peer Exchange participants’ input, and CTPP Oversight Board members’ perspectives pertaining to each of the first three issues including detailed discussions on ACS based CTPP Considerations are presented in the next section. An overview of each of the five issues reflecting Peer Exchange and Board interview participants’ collective views are presented in Section 6.
6.0 Research Findings

6.1 Need for CTPP

The first major issue that the survey and Peer Exchange sought to address was the need for CTPP data products.

6.1.1 Survey of CTPP Users and Potential Users

CTPP Data Usage

The survey tried to determine the overall usefulness of CTPP by asking the respondents who have not used the 2006-2010 ACS CTPP data why they had not done so. A series of six statements were presented to each respondent, and the respondents were asked to indicate their level of agreement with each. To reduce bias, respondents were randomly asked either the statement or its converse for each statement. For analysis purposes, the scales were flipped for the converse statements. Figure 6.1 summarizes the responses of the non-users.

Figure 6.1 Reasons for Not Using CTPP Data Tables

For this group of informed and interested non-users of the CTPP data products, the most important reasons for not having used the 2006-2010 ACS CTPP data products seem to be circumstantial. They have not yet used the CTPP, but expect to do so in the future or expect that others within their organization will use the CTPP themselves. A much smaller percentage of non-users strongly agreed with the statements suggesting that the ACS CTPP data have problems which limit their usefulness.

Users of CTPP data tables feel strongly that these data are valuable resources. During the survey, users of the 2006-2010 ACS CTPP data were asked about the need for CTPP vis-à-vis ACS tables obtained directly
from the Census Bureau. As Figure 6.2 shows, more than three quarters of the respondents felt that the CTPP data tables provide a great deal of value compared to the ACS tables.

**Figure 6.2  Assessment of the Value of CTPP and ACS Data Tables**

CTPP data table users were asked to provide information on how they use the CTPP data in their professional capacities. First, the respondents were asked to indicate which types of analyses they use the CTPP data to support. They chose from a list of common uses of CTPP that emerged from the review of the literature.

Figure 6.3 shows the results from this check-all-that-apply question. About three-fourths of the respondents’ organizations use CTPP data to support travel demand modeling. About half of the respondents’ organizations develop data profiles and summaries from CTPP data. Based on a follow-up question, we know that the large majority of these organizations make the data summaries or profiles based on CTPP data available to the public, either directly by publishing customized summaries online and in print or indirectly via technical reports available to the public.

The availability of detailed modal information in the CTPP enables more than 40 percent of respondents’ organizations to use the data to support transit planning, and almost 30 percent to analyze bicycle/pedestrian issues. The demographic tabulations and cross-tabulations within CTPP enable about one-third of the organizations to use CTPP to support environmental justice analyses and 20 percent to perform analyses involving race and ethnicity.
"Other" uses of CTPP data reported by individual respondents included the following:

- Commuter Studies,
- Commuting Trends,
- Corridor Studies,
- Description of workforce populations and commuting patterns,
- Estimating mode split, income of workers at place of work,
- Grant application for disability population, and Spanish-speaking population,
- Jobs housing balance,
- Journey to Work analysis, and employment locations,
- Land use modeling (TELUM),
- State and Regional Long Range Transportation Plans,
- Travel market analysis, and
- Determining statistics for MPO areas.

**CTPP Travel Demand Modeling Uses**

Since travel demand modeling was the most common use reported by the users, more specific uses of CTPP data for modeling purposes were highlighted. Figure 6.4 shows the different travel demand modeling uses that ACS-based CTPP data support.
Those respondents indicating that their organizations used CTPP to support travel demand modeling were asked to indicate the modeling uses (again allowing for multiple responses).

The CTPP's flow data enabled organizations to support work trip distribution modeling to a large degree, either in model calibration or validation.

In addition, many organizations use the CTPP tabulations and cross-tabulations to support household classification models. The CTPP data are also being used extensively to support home-to-work trip mode choice model calibration and validation. Almost one quarter of the organizations that use CTPP to support modeling efforts, use CTPP as part of the household or the population synthesis component of advanced activity based models.

“Other” modeling uses of CTPP data reported by individual respondents included:

- Calibration of auto ownership models.
- Validation of work location choice models.
- Control totals for Home Based Work trips.
- Employment and Household Demographics.
- Sketch level tool development and travel market analysis.
- Comparative data to the regional travel behavior inventory.
- Time of day distributions by small area.
- Mode split for transit oriented development and economic impact analysis.

**Most Recent CTPP Data Uses**

In addition to the multiple response questions about how CTPP data are used by organizations, we also asked respondents to describe their most recent usage of the ACS CTPP data in an open-response format. The responses were classified and are summarized in Figure 6.5.
The most common reported recent uses of CTPP data involved simply obtaining household, workplace, or home-to-work flow data to better understand a transportation market or to support specific planning analyses. To show the wide range of activities being performed with CTPP data, the open-ended responses are organized in Table 6.1 and grouped under the three categories shown in Figure 6.5.
<table>
<thead>
<tr>
<th>Analysis Class</th>
<th>Analysis Type</th>
<th>Detailed Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household Characteristics</td>
<td></td>
<td>- Analysis of neighborhood characteristics.</td>
</tr>
<tr>
<td>Household Characteristics</td>
<td></td>
<td>- “Analyzing race, poverty, population, and travel methods at a county level to analyze a roadway corridor. Paid specific attention to transportation disadvantaged.”</td>
</tr>
<tr>
<td>Household Characteristics</td>
<td></td>
<td>- Demographic profiles.</td>
</tr>
<tr>
<td>Household Characteristics</td>
<td></td>
<td>- Development of data profile and data summaries.</td>
</tr>
<tr>
<td>Household Characteristics</td>
<td></td>
<td>- “Used CTPP data to summarize self-employment by industry.”</td>
</tr>
<tr>
<td>Workplace Characteristics</td>
<td></td>
<td>- Daytime population for proposed shopping center.</td>
</tr>
<tr>
<td>Workplace Characteristics</td>
<td></td>
<td>- “I was assembling jobs by place of work by industry classification with an aim toward developing a GIS profile of clusters of employment by industry.”</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- All US county-to-county JTW.</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- Commuting Patterns (2 responses).</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- Regional County to County worker flow analysis (11 responses).</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- “Determined place specific mode splits; determined place to county work flows.”</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- “Developing a “travel shed profile” to understand commuting patterns to a downtown.”</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- “Establishing commuter flows and flows by commute time.”</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- “I was looking at who works in Hartford city, CT, and at the commuting patterns.”</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- Journey to work from Putnam County, WV to Charleston, WV and Huntington, WV.</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- Local TAZ to TAZ commute trips.</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- “Looking at work flow data for the urbanized areas. We also use the analysis to determine population of urbanized areas to input into the MPO formula. Modeling unit uses it for travel demand modeling statewide. Our Environmental Unit uses to supplement environmental and Environmental Justice data.”</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- Obtaining 2000 county-level means of transportation to work, by residence and workplace.</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- Place of work vs place of residence community analysis.</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- “We were looking at regional commuting patterns to understand the level of and growth in commuting into our central city across the last three CTPP datasets (2006-2010, 2000 and 1990).”</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- “We were searching for commuter flow data.”</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- Worker flow from 1 county to other counties within the region.</td>
</tr>
<tr>
<td>Household/Workplace/Worker Flow Analyses</td>
<td></td>
<td>- Worker flows from Residence Tract to Workplace Tract.</td>
</tr>
<tr>
<td>Analysis Class</td>
<td>Analysis Type</td>
<td>Detailed Descriptions</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Worker Flow</td>
<td>Characteristics (Mode/Market Flows)</td>
<td>• Analysis of travel markets; estimating markets for transit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bike to work flows from various City neighborhoods to CBD.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• “Describing mode shares, evaluating potential demand for park-and-ride facilities within corridors. General travel demand characteristics, understanding which places import or export workers.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Journey-to-work flows in our planning region for a transit plan update.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Mode share for incoming commuters from surrounding counties.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Mode split for downtowns in New Jersey for transit analysis. Also, income data for value of time, and flow data to Manhattan by MCD to see change since 2000 of mode share by origin.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Percent bicycles commuting to work.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• “Performed work trip analysis to an army base to determine residence clusters and set up a vanpool.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Transportation: Mode Choice for flows.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• “Will use it to support transit, bike-pedestrian, and roadway facility planning.”</td>
</tr>
<tr>
<td></td>
<td>Evaluation of CTPP data</td>
<td>• Download data.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• “I accessed the CTPP data to create a flow map for the purpose of demonstrating the software capabilities to data users in my agency.”</td>
</tr>
<tr>
<td></td>
<td>Support Intercity Analyses</td>
<td>• Analysis of intercity rail travel sheds, quantifying key worker flows as a surrogate of key travel markets for transit planning and assessing reasonableness of travel demand model outputs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Assessing employee count at the airports in the Chicago region.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Evaluation of viability of long distance commuter rail line from rural area into metropolitan area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Household size and vehicle availability by county and area.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• “I used the data in determining the number of vehicles per household.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• TAZ level statistics for a nine county region.</td>
</tr>
<tr>
<td>Support Planning</td>
<td>Reports/Analyses</td>
<td>• Analysis to prepare Long Range Transportation Plan.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Commuter data for an online application.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Economic corridor study.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Using the 2006-10 ‘5-year’ ACS tabulations to produce a report on the region relative to trip interchanges among the regions counties, mode choice, trip lengths and other such information available from the set. The report details the region's totals, the MPO-designated area, counties, two central cities and the CBDs. This report will help supplement an earlier report on CTPP for the region that looked at trends from 1970, 80, 90 and 2000.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• “I was giving a presentation to a city updating its Comprehensive Plan. I showed car ownership, mode-share of car versus transit, travel time to work, and mode of transit to work by residence location. All of this was helped by the CTPP data.”</td>
</tr>
<tr>
<td></td>
<td>Support Documents and Presentations</td>
<td>• Public participation for a new MPO.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Title VI Environmental Justice Document.</td>
</tr>
<tr>
<td>Analysis Class</td>
<td>Analysis Type</td>
<td>Detailed Descriptions</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Non-specific or Multiple Analyses</td>
<td><strong>Travel Demand Modeling</strong>&lt;br&gt;• For trip generation and distribution in a traditional four step travel demand model in Maryland.&lt;br&gt;• “I used the 2000 CTPP to calibrate and validate a multi-county travel demand model and also used it to refine the mode choice coefficients.”&lt;br&gt;• Traffic Model calibration.&lt;br&gt;• Update of the Northeast Florida Regional Travel Demand Model.&lt;br&gt;• Various analyses involve the CTPP data directly or as validation from other census products like ESRI Business Analyst, track and block data.</td>
</tr>
<tr>
<td></td>
<td>Household or Trip Generation Model</td>
<td>Calibration&lt;br&gt;• Correcting TAZ SE data.&lt;br&gt;• Cross class of household size by vehicles available - at TAZ level.&lt;br&gt;• Data were collected at the TAZ level for use in travel demand modeling on the following topics:&lt;br&gt;  - Single family and multi-family vehicle availability - Percent vacant single family and multi-family dwelling units&lt;br&gt;  - Percent vacant and vacant non-permanent single family and multi-family dwelling units.&lt;br&gt;• Download of TAZ-level data for regional travel demand model base year inputs &amp; forecasting.&lt;br&gt;• Estimating the percentage (and eventually number) of households in each TAZ cross-classified by household size, vehicle availability, and structure type.&lt;br&gt;• “Finalizing socio-economic data for our travel demand model -- the timing was too late for me to use the 2010 version as I needed the socio-economic data before the CTPP was released.”&lt;br&gt;• Population, and household data for use in forecasting. Race and environmental data for EJ studies.&lt;br&gt;• Seed tables for household classification.</td>
</tr>
<tr>
<td></td>
<td>Validation</td>
<td>Household or Trip Generation Model Validation&lt;br&gt;• Analysis of Workplace-Residence TAZs within counties for correspondence with Statewide Model, compress to counties or use county level CTPP data.&lt;br&gt;• Testing the distribution of population/household/employment data to TAZ’s from a County control total provided by a statewide population consortium.</td>
</tr>
<tr>
<td></td>
<td>Population Synthesis</td>
<td>Household synthesis.&lt;br&gt;• Population targets for California Statewide Model “Popsyn”.</td>
</tr>
</tbody>
</table>
|                                   | Modeling: Trip Distribution Model     | Calibration of CTPP flows to 2010 Census population data at the place of residence and internal employment data at the place of work.<br>• Cross classification JTW trip length distributions.
<table>
<thead>
<tr>
<th>Analysis Class</th>
<th>Analysis Type</th>
<th>Detailed Descriptions</th>
</tr>
</thead>
</table>
| Modeling: Trip Distribution Model Validation | | • Determine sector to sector work trip bias factors for gravity model.  
• Regional trip distribution.  
• “Comparing flows between Census and travel demand model.”  
• District level validation of trip distribution; PUMS data used extensively in model estimations.  
• Tabulate worker flows for comparison to workplace location models in an urban area.  
• Validation of travel demand model. Environmental Justice Race/Ethnicity analysis. County to County flows for residents and workers.  
• “We are developing trip length frequency distributions using the TAZ-level worker flows, as well as district-level worker flows to validate work location choice models.” |
Next, respondents were asked to indicate whether the CTPP provided the data they needed to complete the diverse analyses listed above the last time respondents accessed CTPP data. As Figure 6.6 indicates, 39 percent of respondents used the CTPP data to complete their analyses. Furthermore, for more than half of the respondents, CTPP data provided useful data but not everything that was needed to complete the analyses. CTPP data were not helpful at all for only four percent of the analysis efforts.

**Figure 6.6  Efficacy of CTPP in Supporting the Analyses Being Conducted**

Respondents that indicated that the CTPP data had not completely satisfied their needs were given the opportunity to explain the issues they faced. Thirty three respondents provided this information, and their responses were classified into the following categories:

- Questions About Data Accuracy – 7 respondents
- Questions About Geographic Accuracy of Data – 1 respondent
- Issues with Small Sample Sizes for Small Geographic Areas - 5 respondents
- Issues with Data Availability for Small Areas – 1 respondent
- Issues Related to Working with MOEs – 1 respondent
- Issues with Using Data Collected Over Multiple Years - 2 respondents
- Wanted Additional Cross-tabulations That Were Not Available - 8 respondents
- Wanted Additional/Different Modal Tabulations for Flow Data - 3 respondents
- Wanted Additional Geographic Options That Were Not Available – 1 respondent
- Wanted Data on Non-work Trip Purposes - 2 respondents
- Software issues - 2 respondents
Other Related Data Products

The CTPP data development process has enabled AASHTO to develop or to expand related data products. In addition to the many CTPP questions, the web survey also asked respondents about:

- AASHTO CTPP Data Profiles; and
- “Commuting In America.”

As shown in Figure 6.7, nearly half of the ACS CTPP data users have obtained AASHTO’s data profiles. As shown in Figure 6.8, slightly more than a quarter of the ACS CTPP data users have used “Commuting In America.”

Figure 6.7  Usage of AASHTO’s CTPP Data Profiles

![Pie chart showing the usage of AASHTO’s CTPP Data Profiles.]

- Did not Use
- Not Sure
- Used

Figure 6.8  Usage of “Commuting in America”

![Pie chart showing the usage of “Commuting in America.”]

- Did not Use
- Not Sure
- Used
Additional questions were asked of the “Commuting in America” users. Specifically, these respondents were asked to rate their level of agreement with four statements about “Commuting in America.” As shown in Figures 6.9 to 6.12, the respondents who have used “Commuting in America” have to a very large degree found it to be useful and helpful.

Figure 6.9 “Commuting in America” is a Valuable Reference

Figure 6.10 “Commuting in America” is a Source of Valuable Insights
Figure 6.11 “Commuting in America” is Interesting

Figure 6.12 “Commuting in America” is Accessible and Well-Organized
6.1.2 CTPP Peer Exchange

Similar to the survey respondents, the Peer Exchange participants also stated that they are using ACS-based CTPP to support a wide range of transportation planning analyses. Peer Exchange participants listed the following analyses:

- Model validation,
- Model calibration/development,
- Population synthesis,
- Survey sampling and expansion,
- Ad hoc planning queries,
- Transit and non-motorized planning,
- Land use modeling inputs, and
- Transportation Demand Management (TDM) strategy evaluation.

A few of the Peer Exchange participants pointed out specific types of analyses for which CTPP fulfills a unique data need. Specifically, CTPP provides:

- The only way for smaller and mid-size MPOs that do not have travel surveys (or that cannot afford one) to get trip distribution data, and
- Survey sampling/expansion and TDM analyses take advantage of unique three-way data tabulations provided by CTPP.

6.1.3 CTPP Oversight Board Interviews

The Oversight Board interview respondents have also used CTPP in a broad range of applications. These participants have had both direct hands-on experience with accessing and using CTPP data, as well as managerial oversight of other staff members who use the CTPP data. The respondents’ agencies use CTPP for many of the same purposes as the Peer Exchange participants. However, since these individuals tended to have more managerial responsibilities, their recent direct uses of CTPP tended to be more for ad hoc planning queries, descriptive analyses, and flow summaries. Although this audience included some individuals who are modelers, compared to the general CTPP users modelers were underrepresented in this group.
6.2 ACS Based CTPP Considerations: Data Content

Survey respondents and Peer Exchange participants provided their perceptions about the importance of the CTPP data elements. Specifically, the research questions were:

- Does CTPP content match user needs?
- Are there other data items that could be added?
- Are there opportunities to streamline or reduce the number of CTPP tables?

6.2.1 Survey of CTPP Users

The CTPP tabulations cover a very wide range of variables in the following categories:

- Household Level CTPP variables;
- Housing Unit Level CTPP variables;
- Person Level CTPP variables;
- Worker Level CTPP variables; and
- Mean and aggregate CTPP variables.

For each of the specific variables in these categories, survey respondents were asked to provide a rating of importance for supporting their CTPP based analyses on a five point scale:

- Essential (5 points);
- Very Important (4 points);
- Somewhat Important (3 points);
- Not Very Important (2 points); and
- Not At All Important (1 point).

The resulting average ratings by variable were compared to evaluate their relative importance. Table 6.2 shows the comparison of variables using three common measures derived by using the ratings provided by the users.

- “Top Box” indicates the percentage of respondents that described the variable as “Essential.”
- “Top 3 Boxes” indicates the percentage of respondents that described the variable at least as “somewhat important.”
- “Average” is the weighted average importance of variables based on assigning “Essential” as 5; “Very Important” as 4; down to “Not at all Important” as 1.
Table 6.2 Relative Importance of CTPP Variables Based on Respondent Ratings

<table>
<thead>
<tr>
<th>CTPP Variable</th>
<th>Top Box</th>
<th>Top 3 Boxes</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population</td>
<td>61%</td>
<td>95%</td>
<td>4.38</td>
</tr>
<tr>
<td>Commute Means of Transportation</td>
<td>58%</td>
<td>95%</td>
<td>4.36</td>
</tr>
<tr>
<td>Household Vehicles</td>
<td>54%</td>
<td>93%</td>
<td>4.27</td>
</tr>
<tr>
<td>Commute Travel Time to Work</td>
<td>46%</td>
<td>91%</td>
<td>4.11</td>
</tr>
<tr>
<td>Workers in Household</td>
<td>46%</td>
<td>91%</td>
<td>4.08</td>
</tr>
<tr>
<td>Household Size</td>
<td>49%</td>
<td>88%</td>
<td>4.06</td>
</tr>
<tr>
<td>Mean Commuting Travel Time</td>
<td>33%</td>
<td>91%</td>
<td>3.90</td>
</tr>
<tr>
<td>Employment Status</td>
<td>33%</td>
<td>90%</td>
<td>3.91</td>
</tr>
<tr>
<td>Commute Time of Day Leaving Home</td>
<td>40%</td>
<td>88%</td>
<td>3.93</td>
</tr>
<tr>
<td>Household Income</td>
<td>38%</td>
<td>90%</td>
<td>3.88</td>
</tr>
<tr>
<td>Workers Per Car, Truck, or Van</td>
<td>41%</td>
<td>87%</td>
<td>3.90</td>
</tr>
<tr>
<td>Median Commuting Travel Time</td>
<td>33%</td>
<td>89%</td>
<td>3.87</td>
</tr>
<tr>
<td>Commute Time of Day Arriving At Work</td>
<td>40%</td>
<td>86%</td>
<td>3.89</td>
</tr>
<tr>
<td>Industry</td>
<td>31%</td>
<td>89%</td>
<td>3.86</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>31%</td>
<td>89%</td>
<td>3.80</td>
</tr>
<tr>
<td>Percent of Population in Sample</td>
<td>25%</td>
<td>86%</td>
<td>3.66</td>
</tr>
<tr>
<td>Age</td>
<td>29%</td>
<td>85%</td>
<td>3.58</td>
</tr>
<tr>
<td>Mean Household Income</td>
<td>25%</td>
<td>85%</td>
<td>3.63</td>
</tr>
<tr>
<td>Unweighted Sample Count</td>
<td>22%</td>
<td>86%</td>
<td>3.54</td>
</tr>
<tr>
<td>Poverty Status</td>
<td>26%</td>
<td>79%</td>
<td>3.56</td>
</tr>
<tr>
<td>Aggregate Commuting Travel Time</td>
<td>25%</td>
<td>81%</td>
<td>3.57</td>
</tr>
<tr>
<td>Number of Housing Units in Structure</td>
<td>27%</td>
<td>75%</td>
<td>3.38</td>
</tr>
<tr>
<td>Race, Ethnicity, Minority Status</td>
<td>24%</td>
<td>78%</td>
<td>3.40</td>
</tr>
<tr>
<td>Class of Worker</td>
<td>20%</td>
<td>81%</td>
<td>3.47</td>
</tr>
<tr>
<td>Occupation</td>
<td>14%</td>
<td>83%</td>
<td>3.42</td>
</tr>
<tr>
<td>Earnings</td>
<td>20%</td>
<td>79%</td>
<td>3.39</td>
</tr>
<tr>
<td>Aggregate Household Income</td>
<td>22%</td>
<td>75%</td>
<td>3.33</td>
</tr>
<tr>
<td>Vacancy Status</td>
<td>24%</td>
<td>74%</td>
<td>3.28</td>
</tr>
<tr>
<td>Presence of Children in Household</td>
<td>21%</td>
<td>75%</td>
<td>3.28</td>
</tr>
<tr>
<td>School Enrollment</td>
<td>21%</td>
<td>73%</td>
<td>3.28</td>
</tr>
<tr>
<td>Gender</td>
<td>18%</td>
<td>65%</td>
<td>3.07</td>
</tr>
<tr>
<td>Household Lifecycle</td>
<td>14%</td>
<td>69%</td>
<td>3.06</td>
</tr>
<tr>
<td>Work Hours Per Week</td>
<td>8%</td>
<td>73%</td>
<td>3.00</td>
</tr>
<tr>
<td>Tenure</td>
<td>6%</td>
<td>57%</td>
<td>2.76</td>
</tr>
<tr>
<td>Linguistic Isolation</td>
<td>7%</td>
<td>45%</td>
<td>2.54</td>
</tr>
</tbody>
</table>
The relative importance of the variables varies slightly for the three measures, but for the most part they are quite consistent. As shown in Figure 6.13, the six most essential variables to survey respondents are:

- Total Population;
- Commute Means of Transportation;
- Household Vehicles;
- Commute Travel Time to Work;
- Workers In Household; and
- Household Size.

**Figure 6.13 Importance Ratings of Six Most Essential CTPP Variables**
The five variables seen as the least important by survey respondents are shown in Figure 6.14 and include:

- Tenure;
- Linguistic Isolation;
- Language Spoken at Home;
- Length of US Residence; and
- Telephone Availability.

**Figure 6.14 Importance Ratings of Five Least Important CTPP Variables**

Respondents were also asked if there are other Census topic areas that were not included in CTPP which would be useful to their work. Not surprisingly, after being asked about such a long list of variables, most respondents did not have others to add, and many of those who did have other variable ideas did not restrict themselves to Census variables. The following suggestions were made:

- Worker flows by disability status.
- More 3-way tabulations - essential in developing travel survey sample universe estimates.
- International worker flows (Flows from residences in San Diego to workplaces in Mexico).
- Presence of computer and internet access.
- Employment classifications at more detailed geographic delineations, such as TAZ or Census block.
- Second jobs (this variable is not currently in the Census).
• Persons with another job/multiple employment.
• Distance and tolls.
• “It’s not collected by census, but distance to work would be helpful”.
• “Is work trip multi-modal and if so, which modes? Which modes are used by zero-vehicle HHs?”
• Commodity flows.
• Hotel and Motel Number of Rooms (and Occupancy).
• Availability of free parking, employer-subsidized transportation.

6.2.2 CTPP Peer Exchange

The Peer Exchange participants reviewed the survey respondents’ variable prioritization and brainstormed about opportunities to add new CTPP variables and tables. The Peer Exchange participants acknowledged that, like the survey respondents, most of their “wish list” items would require additional data or different data collection by the Census Bureau, so are probably infeasible. Participants discussed the value of two items:

• Nonwork travel; and
• Different delineation of workplace (multiple job holders, more relevant definition of part-time and full-time).

The Peer Exchange participants did note that it would be feasible to develop more three-way residence and workplace tabulations for CTPP without requiring changes in data collection. They also noted that there was the possibility to provide added-value tabulations such as home to work trip distances through the implementation of post processing.

Finally, the Peer Exchange participants noted that there has been some past success with transportation question wording changes and new ACS tabulations. So, many of the participants suggested that an important element of the CTPP process going forward should be to maintain a good working relationship with the Census Bureau to enable future changes as needed.

The Peer Exchange participants supported the idea of dropping from CTPP the three or four least valuable data items identified by survey respondents provided that ACS Standard Tabulations provided similar data. In addition, the participants recommended against engaging in a user outreach effort to seek permission to drop variables. The Peer Exchange participants felt that users should be required to make a truly compelling case to keep the data items in question.

6.2.3 CTPP Oversight Board Interviews

The Oversight Board interview respondents felt that the CTPP provides users with valuable and unique data items. The Part 1 – residence based tables and the Part 2 – workplace based tables were felt to be a complement to ACS tables. These tables offer valuable input for specific demographic and employment analyses and household composition and trip generation modeling. The Part 3 – Journey-to-work flow tables were felt to be a unique resource that is valuable for travel model validation, regional transportation summaries, and for project level analyses. One respondent summarized the feelings of many by saying, “CTPP is a good resource for providing a basic picture of commuting trends.”
Unlike the survey and the Peer Exchange, the discussion with the Oversight Board about CTPP content was colored by the Census Bureau’s recent mandate to significantly reduce the number of CTPP tables for the next five-year tabulation. Because this process was underway, respondents discussed the process of selecting the tables to be dropped, rather than specific tables. In general, respondents felt that reductions in tables could be made without greatly impacting the overall value of the CTPP, and that the essential tables for both large and small geographic delineations were being preserved, along with the most important flow information. Respondents were generally less concerned with the volume of available tables than with the data quality of the tables or with the timely release of the data.

On the other hand, a few Oversight Board interview respondents raised a concern that table cuts could have unforeseen consequences. One of the benefits of CTPP has been that it held information for which planners might not have an immediately identifiable need, but that could arise in an unforeseen project or through a public or political request. The smaller CTPP will be less flexible than previous iterations of CTPP.
6.3 ACS Based CTPP Considerations: Geographic Delineation

The CTPP Assessment gathered data on the geographic delineation of the CTPP data. Specifically,

- At what geographic delineation do CTPP data need to be produced?
- Is state/local definition of TAZs (and TADs) worth the substantial effort?

6.3.1 Survey of CTPP Users

Survey respondents use a range of geographic delineations in their CTPP analyses, but as shown in Figure 6.15, the three most widely used delineations are:

- Traffic analysis zones;
- Census Tract; and
- County.

About 70 percent of CTPP users rely on TAZs for at least some of their analyses. Based on this usage and the numerous comments in open ended questions, small area data were seen as essential by the survey respondents. The high participation in previous TAZ delineation efforts by survey respondents may also indicate a willingness by many of the respondents to participate in regular geographic delineation efforts.

Figure 6.15 CTPP Geographic Delineations Used by Web Survey Respondents
6.3.2 CTPP Peer Exchange

Peer Exchange participants agreed with survey respondents that small area (TAZ level) data are essential for travel flow analyses. However, the participants were not opposed to the idea of having demographic/socioeconomic tabulations available at a more aggregate geography while providing travel flow data at the most detailed geographic level possible.

User TAZ definition was important to participants as Census boundaries are often not helpful for transportation planning and because comparisons with previous definitions is often needed. However, participants were comfortable with not updating the TAZ delineation for every five-year CTPP release.

6.3.3 CTPP Oversight Board Interviews

Unlike the general CTPP user population, the Oversight Board interview respondents generally expressed reservations about using the CTPP data at the TAZ level. Most of their agencies had used TAZ level data for analyses, but these users raised concerns with Census TAZ-to-travel demand model TAZ inconsistencies and with the higher margins of error at these detailed geographic delineations.

Most of the Oversight Board interview respondents felt that tract level data were very important, because the geographic definitions were large enough to support the sampled data and detailed enough to support regional analyses and some project-level analyses. County level data were valuable in larger multi-county regions to provide useful summaries of general commuting trends, but were of little value in smaller regions. One respondent suggested that block group level data might be more effective than TAZ level data, because of the slightly larger sizes and the consistency with other Census data.

As with the general user population, Oversight Board interview respondents have not used the TAD geographic delineation very much. One respondent suggested the reasons for this low usage are that the TADs were not well defined by many local users, who failed to recognize the potential to use TADs as meaningful aggregations of TAZs such as demand model superzones. It was also noted that the TAD geography is very difficult to use within the CTPP software, as users need to know TAD codes without the capability to search. The TAD geographic layer was felt to be more valuable to accompany a three-year data accumulation, but as the Census has discontinued the three year ACS, the TAD geography is less useful.
6.4 ACS Based CTPP Considerations: Multi-Year Data Accumulation

One of the most important new concepts for the ACS based CTPP is the need to rely on data accumulated across five years to make small area estimates. The research is looking at:

- How has the use of multi-year data affected CTPP usage?
- Does the multi-year data collection period invalidate any types of analyses?

6.4.1 Survey of CTPP Users

In the survey, we measured the level of agreement that respondents felt toward three statements related to the multiyear accumulation of ACS and CTPP data.

In the first statement, survey respondents were asked whether they agree that the continuous ACS data collection effort provides improved data quality. Data collection efficiencies and the relative permanence of data collection staff should at least in theory improve the overall quality of the ACS data being collected compared to previous one time efforts, such as the long form data collection.

As shown in Figure 6.16, most of the survey respondents who have been using the five-year CTPP “somewhat agree” with the premise, but support for this statement is relatively weak. Only 14 percent of respondents strongly agree with the statement while the percentage strongly disagreeing is 12 percent. Thirty-seven percent of respondents do somewhat agree with the statement, so the overall response does lean toward agreement.

Figure 6.16 Improved Data Quality by Collecting Data Continuously

As shown in Figure 6.17, about half the survey respondents indicated agreement with the statement that the multi-year accumulation of data makes analyses more difficult (19 percent strongly agree and 31 percent somewhat agree). About a quarter of the respondents are neutral and a quarter of the respondents disagree.
Figure 6.17 Increased Analysis Complexity due to Continuous Data Collection

Figure 6.18 shows the level of agreement with the statement that respondents treat multi-year accumulated data the same way as point estimate data for their analyses. More than half of respondents agreed that they generally make this simplification (19 percent strongly agree and 36 percent somewhat agree).

Figure 6.18 Multiyear Data Accumulation Issues: Data Analyses

6.4.2 CTPP Peer Exchange

The Peer Exchange participants were for the most part more concerned about the effects of the multi-year accumulation than the web survey respondents. Many of the participants were concerned that five-year data collection period is problematic for regions that are rapidly changing.
The Peer Exchange participants proposed research to test potential problems introduced by multi-year data accumulation, and they suggested the development of additional guidance related to this issue for CTPP data users.

On the other hand, the Peer Exchange participants did see several positive aspects of the potential for more frequent CTPP data releases, including:

- Increased frequency of data releases is a welcomed development;
- Previous CTPP releases based on decennial Census were mistimed with model update schedule;
- More current data improves the ability to perform valid analyses; and
- Participants saw value in future three-year and/or in one-year products for benchmarking purposes and regional trend analyses.

### 6.4.3 CTPP Oversight Board Interviews

One of the Oversight Board interview respondents succinctly stated, “we know we are stuck with ACS CTPP.” These users felt that ACS and CTPP data usefulness is diminished because of the need to aggregate data across years, rather than having it for a specific point in time, but that they are resigned to use the available data as best as they can. Many of the common uses of CTPP data, such as travel model validation, have been developed under the expectation that the data represent a single snapshot in time. Users will need to adjust to the longer data collection period, and learn to recognize how larger changes within the period of the data collection might affect estimates.

Respondents were interested in having CTPP data releases be as frequent as possible. A few respondents pointed to the existing and upcoming needs for annually based performance measures as an example of why frequent data could be important going forward. However, these expert users understood well why there needed to be accumulation of five years of data at the current ACS sampling rates to achieve reasonable estimates for small area geography. They felt that a five-year frequency represented an improvement over the previous decennial based products, and that it should be continued. Three year data products would be well-received, but the Oversight Board interview respondents recognized that the costs of developing these and the geographic specificity limits make them less feasible at this time. One year products were felt to be an “overkill” and to require too much aggregation of geography to be valuable.

Some respondents were open to the idea of receiving five-year data products that overlap with each other in order to have the freshest data possible. One respondent said that, “frequency is more important than the range of data it is tabulated over. An annual ten-year table would be better than a five-year table that you can only get every five years.” Others cited the decennial Census based experience and the idea that the data are usually used as “snapshots in time” and did not think that overlapping data periods were necessary or desirable. A number of Oversight Board interview respondents pointed out that the cost of more frequent releases makes them substantially less attractive.

Several Oversight Board interview respondents pointed out that just as important as CTPP frequency is the currency of the data. Minimizing the amount of time between the covered ACS data collection period and the data and product release was felt to be essential.
6.5 ACS Based CTPP Considerations: Margins of error

The CTPP Assessment Research is seeking to answer the following questions regarding the inclusion of margin-of-error estimates in CTPP tabulations and in analyses based on these data:

- How does the consideration of margins of error affect CTPP data usefulness?
- Do the higher margins of error invalidate any types of analyses?

6.5.1 Survey of CTPP Users

Similar to the data accumulation issue, the web survey sought information from respondents about their attitudes toward margins of error through a series of level of agreement statements. The statements focused on understanding the concept of margins-of-error, whether margins of error analyses help users understand the limitations of the data, and whether they make the analyses more difficult. The distributions of the ratings to these statements are summarized in Figure 6.19.

**Figure 6.19 Attitudes Towards Understanding and Handling Margins of error**

Survey respondents were asked whether they would agree that they understood the margins of error concepts and calculations. There was a high level of agreement with this statement as shown in Figure 5.19; more than 87 percent of respondents said they understood the margins of error concept.

In addition, there was also a high level of agreement with the statement “the margins of error reporting helps data users understand the limitations of the Census ACS estimates”. Half of the respondents strongly agreed with the statement, and another 42 percent somewhat agreed with it.

However, the users were split on the question of whether the accounting for margins-of-error is making the analysis more difficult. About 40 percent of survey respondents agreed with the statement. A similar percentage of respondents disagreed with it to some degree.

While almost 90 percent of the users claimed they understand the concept of margins of error and its computation, roughly half of survey respondents agreed that they generally use the CTPP estimates without
accounting for margins of error. This observation can partly explain the reason behind the overall neutral reaction to the question about complications due to accounting for margins of error. Many users are not dealing with such complications adequately since they do not account for the impact of margins of error at all. Another view of this finding is that some users are taking analytical risks, probably knowingly, in their analysis. Only 20 percent of respondents feel strongly that they address impacts of margins of error in reporting their analyses.

6.5.2 CTPP Peer Exchange

One Peer Exchange participant noted that,

“…we want data at small geography so we are accepting wide margins of error whether we like it or not!”

In their analyses, participants pay attention to and are concerned by the generally large margins of error that accompany small area estimates. Like the web survey respondents, CTPP estimates are often considered as the best estimate available regardless of the size of the margins of error which are often not considered in quantitative analyses.

Peer Exchange participants expressed the need for guidance on the presentation of data with margins of error, specifically in the areas of:

- Graphical presentation, and
- Obtaining policymaker acceptance of high and low estimates.

In addition, Peer Exchange participants are seeking guidance from the Census Bureau on how the aggregation of geographic areas and the mathematical manipulation of the estimates affect margins of error estimates.

Finally, another concern raised by Peer Exchange participants was that if CTPP data are used as inputs (albeit indirectly) for performance based planning, the planning community will need guidance regarding acceptable margins of error.

6.5.3 CTPP Oversight Board Interviews

The Oversight Board interview respondents greatly appreciated the easy access to margins of error in the CTPP data. As one respondent said, “ignorance is not bliss” when it comes to understanding these data. Generally, the margins of error have been used by Oversight Board interview respondents qualitatively to evaluate the reasonableness of the CTPP estimates, to identify the need to use more aggregate geographic delineations, and in some cases to determine whether the estimates should not be used at all. They allow users to be more aware of the data limitations and to understand that these data are planning-level estimates, and not engineering figures.

Quantitative analyses of the data incorporating the margins of error were felt to be laudable, but as one respondent noted, “When you’re cramped for time, you just need to get your estimates.” Oversight Board interview respondents were generally familiar with several tools to help include margins of error in calculations and mapping, but the use of these tools was limited. The respondents felt training on these tools and their techniques could be helpful for CTPP users.
6.6 ACS Based CTPP Considerations: Data Perturbation

In order to avoid data suppression for small area tabulations, several of the CTPP data tables rely on specially treated synthetic estimates. The research questions related to this process include:

- Does the data perturbation affect CTPP data usefulness?
- Does the need for disclosure-proofing invalidate any types of analyses?

6.6.1 Survey of CTPP Users

The survey included a series of statements to gauge users’ level of understanding of the perturbation process and their perceptions. The statements sought how much users understood the general methods used for disclosure proofing, how they feel about having the disclosure proofed tables (B tables) in lieu of tables with suppressed values, whether having both unmodified (A tables) and modified (B tables) was confusing, and how they use the disclosure proofed tables (B tables). The ratings are summarized in Figure 6.20.

**Figure 6.20 Attitudinal Statements on Understanding and Handling Perturbed Data**

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>Neutral</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I understand the general methods used for disclosure proofing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Having the disclosure proofed tables (B tables) is preferable to having tables with suppressed values</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Having both unmodified (A tables) and modified (B tables) is confusing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I use the disclosure proofed tables (B tables) without reservation</td>
<td></td>
<td></td>
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The survey respondents seemed to have some understanding of the general methods of disclosure proofing, but not a strong one. While only 13 percent of respondents strongly agree that they understand the disclosure proofing, most CTPP users somewhat agree or are neutral about the statement. Only 6 percent of respondents indicated they had little understanding of the methods.

As shown in Figure 6.20, despite the challenges of dealing with disclosure proofing, almost none of the survey respondents prefer CTPP data with suppressed values to CTPP data with disclosure proofed tabulations.

The overall attitude to having alternative tables (some modified, some unmodified) seems neutral but a slightly higher percentage of respondents agree with this statement.
We observe a high level of uncertainty about maintaining the disclosure proofed tables. Almost half the respondents are neutral (or are not sure) about their level of comfort with using the disclosure proofed data.

### 6.6.2 CTPP Peer Exchange

One Peer Exchange participant summarized the group’s views on the disclosure proofed data well:

> “Users would rather have perturbed data than no data at all, but we are not sure how much the data perturbation changes the underlying results. We are trusting that the perturbation approach is valid”.

However, rather than providing a detailed documentation of the perturbation, the Peer Exchange participants would like to see simple results of comparisons between raw and disclosure proofed data.

### 6.6.3 CTPP Oversight Board Interviews

Almost all of the Oversight Board interview respondents were of the mind that having perturbed data for smaller geographic delineations was preferable to not having the data. Provided that the perturbation methods are tested and those doing the perturbation are familiar with how to do it, there appears to be a level of comfort with it. For the most part, Oversight Board interview respondents have been using the perturbed “B” tables without hesitation. They have been applying the same level of scrutiny of the general reasonableness of estimates to the “A” tables and the “B” tables. “When you’re looking at any data set you need to ask yourself if it seems reasonable. It is more important to see if it looks reasonable than to do detailed analyses.”

There was one notable exception. One of the Oversight Board interview respondents, who has had personal experience with developing perturbed data from household travel surveys has no plans to use the “B” tables. The general ineffectiveness of the perturbation methods on the survey data has led this respondent to question the validity of these methods. Instead, this respondent uses higher geography estimates for any regional analyses. The clear labeling of the “A” and “B” tables enables this process to happen.
6.7 CTPP Data Access Software

The primary means of dissemination of CTPP data is the CTPP Data Access Software which is available online (http://data5.ctpp.transportation.org/ctpp/Browse/browsetables.aspx) along with detailed documentation and supporting training materials.

The research questions pertaining to the usefulness of the software focused on the following:

- Level of satisfaction with the capability and performance of the software; and
- Level of satisfaction with documentation and training materials.

6.7.1 Survey of CTPP Users

In Figure 6.21, we see that only about one quarter of the survey respondents are regular users of the CTPP software (at least monthly). This is not surprising due to the nature of the CTPP data uses. The data fulfill specific data needs of analysts and are not suitable for the full range of analyses individual users are likely to be conducting. More than half the survey respondents used the CTPP software a few times over the previous few months. We would expect that these infrequent use levels have implications on the training/documentation needs and on the limits of software complexity.

Figure 6.21 CTPP Software Usage Frequency

Even though more than a quarter of users use the software regularly (more than once per month), only 8 percent view themselves as experts as shown in Figure 6.22. More than half of the respondents described themselves as skilled users. One third of the respondents view themselves as novice users. Only one respondent classified himself/herself as “a totally clueless user.”
The survey included a set of statements gauging the respondents’ attitudes towards the effectiveness of the software, its functionality, ease of use, and quality of its documentation. The ratings for these statements are summarized in Figure 6.23.

**Figure 6.23 Attitudinal Statements about the CTPP Data Access Software**

Despite the lower confidence level of users, most CTPP software users still find great value in the software. As Figure 6.23 illustrates, nearly three out of four survey respondents agree (somewhat or strongly) that the CTPP software is an effective means to obtain Census transportation data.

A sizeable portion of the respondents believe that the software has all the features that they need but the magnitude of the “Neutral” and “Somewhat Disagree” responses points to room for improvement.
Respondents were mixed in their assessment of the software’s ease-of-use and documentation quality indicating a need for improvement as well.

AASHTO has developed a wide range of training media to help users with the CTPP software. As shown in Figure 6.24, all of the various training mechanisms are used by a significant number of users. Webinars are the most popular options, probably because they provide an opportunity to interact with the instructor(s).

**Figure 6.24  CTPP Software Training Resources**

Figure 6.25 shows that despite some of the specific challenges of learning and using the CTPP software, the software users do recognize the overall value of the software. More than two-thirds of respondents agree that the software outputs justify the effort they put into using it, while less than 20 percent of respondents feel the opposite.

**Figure 6.25  CTPP Software Issues: Worth the Effort**
6.7.2 CTPP Peer Exchange

The CTPP Peer Exchange participants, AASHTO staff, and the representative of the CTPP Software development team held a productive discussion about potential CTPP software improvements. The “wish-list” of software features includes:

- Automated Programming Interface (API) capability.
- Census Bureau’s ACS API was viewed as a reasonable model.
- Keyword search capability to allow users to identify table IDs.
- Improved geographic aggregation, particularly map-based capabilities.
- Improved flow data visualization.
- More output formats to enable easier export to other software such as TransCAD.
- Specific ease-of-use/intuitiveness issues with software.
- Longer term software improvements.
- Participants expressed desire for access to microdata, although they understood the low likelihood of getting this kind of access.
- Migration of CTPP to be a one-stop software to obtain current data, along with other related data (Longitudinal Employer Household Dynamics Origin Destination Employment Statistics (LODES), travel surveys, private source data, local agency employment and school data).
- Coordination with the Census Bureau to get CTPP tables on American Fact Finder.

6.7.3 CTPP Oversight Board Interviews

Compared to the Peer Exchange group (and many survey respondents) Oversight Board interview respondents were less frequent hands-on users of the CTPP extraction software. This is because they often were directing others within their agencies to perform the CTPP based analyses and because some of them generally worked with SAS or a similar package on the full datasets available via ftp. The Oversight Board interview respondents were nevertheless quite familiar with the software and with the CTPP training media through their obligations on the advisory board.

The consensus opinion of this group regarding the software is that it is quite powerful and flexible for users who have developed a level of comfort with it, but that there is a steep learning curve. There are many built-in functions that planners can use to improve their analyses, but the software requires a significant time investment to get over the initially intimidating interface. It tends to be difficult for infrequent users, similar to the Census ACS Fact Finder tool. Respondents with previous experience with older CTPP tools commented on how much better the current tool is in comparison to the previous ones. However, Oversight Board interview respondents are concerned that the initial challenge of using the software limits the number of casual users who are seeking to find simple facts from the data.

One improvement suggestion in this regard is to recognize that the software could be designed to have different user experiences for frequent, more advanced users than for those who simply need a few pieces of data on an infrequent basis.
This group found the great diversity of training opportunities to be very appealing. The respondents who had attended the in-person classes generally found them to be the most effective means of training, and some of the respondents pointed out the “marketing” value of these classes. The e-learning tools were quite helpful to respondents, as well.

One concern regarding training that was raised by a few Oversight Board interview respondents is that the training is very focused on how to use the CTPP software, without providing much context. Some Oversight Board interview respondents suggested that training be offered on what the CTPP data could be used for and how, so instead of only providing instructions on how to access the data that might be needed for model validation, training should be offered on how the data would then be used. It was acknowledged that other non-AASHTO training mechanisms might be required to accomplish this type of training, but getting the CTPP information into these training efforts would be a good way to ensure potential users are aware of CTPP and that they could use it as a source.

A second training initiative cited by several Oversight Board interview respondents is to develop training materials that would help users to integrate CTPP with other data sources and that would help users to understand the differing data collection and manipulation techniques that are used in CTPP and in other planning datasets.
7.0 Recommendations

The Peer Exchange participants produced the following recommendations based on the expected future needs of users of ACS-based CTPP:

- Software improvement suggestions,
- Streamlining by reducing the number of variables,
- Greater availability of documentation of the program's table development activities,
- Long term expansion of CTPP to include access to other data sources and guidance on how to relate to or combine CTPP data with other sources, and
- Research project ideas that are described below.

Several specific research tracks were identified by the Peer Exchange participants based both on the outcomes of the Peer Exchange and the web survey:

- Compare CTPP data and alternative sources for model validation.
- Study one-year ACS data to examine the magnitude and importance of changes in socioeconomics in the five-year CTPP data collection period.
- Develop guidance and/or summary of practice on how to combine CTPP and other data sources, possibly including:
  - LODES,
  - National Household Travel Survey (NHTS),
  - Regional and statewide travel surveys,
  - Private source employment data,
  - Private source cellphone data, and
  - Local agency employment and school data.
- Extend ongoing research in combining CTPP and NHTS data.
- Evaluate effects of household-based and person-based perturbation.

Oversight Board interview respondents were generally optimistic that CTPP could continue to provide users with extremely valuable data into the future. The first immediate challenge for CTPP is to maintain the CTPP’s utility for users as the table reductions are made. Some respondents actually saw the reduced number of tables as possibly leading to a more streamlined and effective tool for planners. However, it will be imperative that CTPP remain a “stable, reasonably comparable source from a large random sample of population” to maintain its core utility.

Oversight Board interview respondents cited the increasing importance of integrating CTPP and other common transportation planning datasets. The CTPP program can help this happen in several possible ways, including the provision of training on how to integrate CTPP and other datasets, the development of tools to enable users to perform these integration steps more easily, and/or the inclusion of other datasets in the CTPP program itself. The Oversight Board interview respondents recognized advantages and disadvantages to
these different strategies, but they were largely in agreement that future CTPP releases should address data integration opportunities to a larger extent.

Oversight Board interview respondents are all using a range of datasets for their commuting analyses and modeling. CTPP serves as one important element, among many. The challenge these planners are facing is how best to integrate the data sources, including those that provide overlapping, but sometimes contradictory estimates such as LEHD, employment data, and cell phone probe data. Oversight Board interview respondents generally understand how the different data sources are collected and assembled, but there is a concern that the broader population has not immersed itself into these details as much as needed.

One unfortunate outcome of this has been that the different data sources are sometimes in competition with one another. For instance, planners are choosing to use LEHD data and not CTPP data because of the LEHD’s more detailed geographic granularity, but are not accounting for the weaknesses in LEHD’s government employment data or headquarters/branch geocoding issues. Likewise, there is a growing use of cellphone probe data as a means to estimate journey-to-work flows without much consideration to the algorithms used to identify home and work locations. The Oversight Board interview respondents endorse the idea of using the different available data sources in conjunction with each other to develop improved estimates, rather than selecting just one data source.

In addition, Oversight Board interview respondents felt that there was an opportunity, and a need, to provide future CTPP users with additional guidance on how to use and interpret the CTPP data. For instance, a respondent cited the need for improved understanding of how to use multi-year estimates in travel demand model validation, which has traditionally relied on specific point-in-time data. Another respondent suggested that users could use guidance on the best ways to apply the CTPP data to develop descriptive analyses to support transit studies, environmental justice analyses, and bicycle/pedestrian planning efforts.

A few Oversight Board interview respondents suggested that the CTPP program (and the Census Bureau) would benefit from research into likely future trends in commuting. Since the Census Bureau will need many years to make changes to capture innovations and commuting market advances, the transportation community should be seeking to prepare the Bureau for future trends that may be important (perhaps, such as automated vehicles and ride hailing services). In addition, research into the changing nature of the home-to-work commute could lead to the need for further changes far down the road.
APPENDIX A

USER SURVEY INSTRUMENT
APPENDIX B

PEER EXCHANGE DETAILS
B.1 Peer Exchange Participants

1. Penelope Weinberger, AASHTO
2. Matt Hardy, AASHTO
3. Guy Rousseau, Atlanta Regional Commission, Atlanta, GA
4. Dmitry Messen, Houston-Galveston Area Council, Houston, TX
5. Maribeth Todd, Oregon Metro, Portland, OR
6. Harun Rashid, Berkeley-Charleston-Dorchester Council of Governments, Charleston, SC
7. Jonathan Lupton, Metroplan, Little Rock, AR
8. Kara Greathouse, Regional Intergovernmental Council, South Charleston, WV
9. Stacey Bricka, Texas A&M Transportation Institute,
10. Giovanni Circella, Georgia Institute of Technology
11. Chris Bonyun, Beyond 2020
12. Josie Kressner, Transport Foundry
13. Krishnan Viswanathan, CDM Smith
14. Rhett Fussell, Parsons Brinkerhoff
15. Cemal Ayvalik, Cambridge Systematics – Project Team
16. Kevin F. Tierney, Independent Consultant – Project Team
B.2 Research Ideas Proposed in Peer Exchange

- Comparison of CTPP data and alternative sources for model validation. Can other data sources provide the same or better means to validate/calibrate models as 5-year CTPP typically does?

- Use of one year ACS data to study magnitude and importance of changes in socioeconomics in the five-year CTPP data collection period.

- Develop guidance and/or summary of practice on how to combine CTPP and other data sources, recognizing that Census microdata are generally unavailable.

- Extend ongoing research in combining CTPP and NHTS data.

- Evaluation of the effects of household-based and person-based perturbation for future.