Western North Carolina Household Travel Survey

Final Report

Westat Authors:
Susan Swain, Westat Project Director
Anthony Fucci
Derek Jaworski
Joel Anders
Jonathan Massie

Date: October 16, 2013

Prepared for:

North Carolina Department of Transportation

French Broad River Metropolitan Planning Organization

Parsons Brinckerhoff

Prepared by:
Westat
1600 Research Boulevard
Rockville, Maryland 20850-3129
(301) 251-1500

Westat

Table of Contents

Table of Tables

List of Figures

1 Introduction

The French Broad River Metropolitan Planning Organization (FBRMPO) and the North Carolina Department of Transportation (NCDOT) contracted with Westat to conduct the 2013 Western North Carolina Household Travel Survey (WNC HTS). The study is designed to meet the regional transportation modeling data needs. The planning region is comprised of Buncombe, Haywood, Henderson, Madison, and Transylvania counties in North Carolina.

The survey data collection effort included interviews with 1,422 households between April and June of 2013. Westat conducted the WNC HTS using its GeoSurvey CATI/web system with TripBuilder™. This state of the art, web-based survey tool included the programmed survey, database, and call management scheduler.

In addition to the household survey, a visitors' survey was conducted with 70 respondents at six Recreational Vehicle (RV) parks in Haywood County during one week in July. The visitors' survey was conducted in-person by trained surveyors and a simple paper-based questionnaire.

Figure 1: Survey Study Area

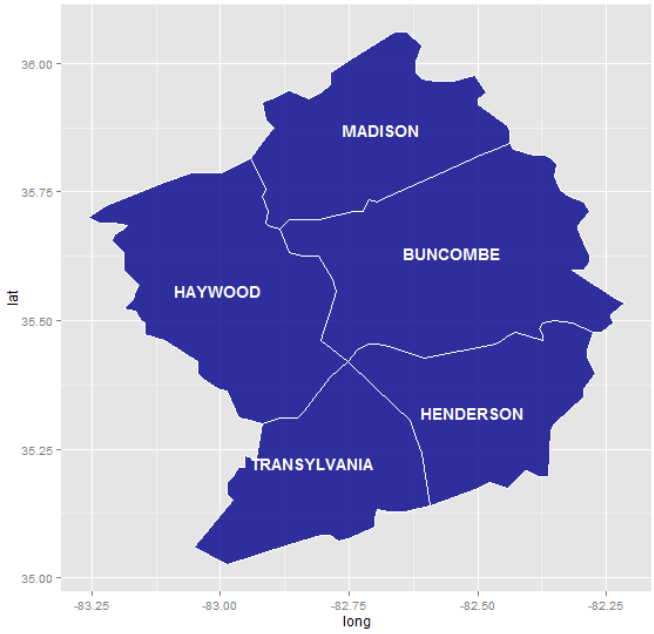


Table 1: Overall Completed Household Survey Summary by County

	Unweighted		Weighted	
County	Frequency	Percentage	Frequency	Percentage
Buncombe	876	62%	100,909	52%
Haywood	139	10%	26,659	14%
Henderson	254	18%	45,180	23%
Madison	57	4%	8,082	4%
Transylvania	96	7%	13,914	7%
Total	**1,422**	**100%**	**194,744**	**100%**

2 Survey Methodology

The WNC HTS design included a multi-mode survey approach to collect basic demographic and household level data as well as individual travel behavior over a 24-hour period for a sample of 1,300 households, along with a customized 'visitors' survey completed with 70 campers recruited from RV campgrounds located in Haywood County. This section describes the survey methodology used in the completion of the HTS. Section 4 will provide the details of the special population, RV Survey.

2.1 Sample Design

An address-based sample (ABS) frame was used to randomly select participants for this study. The sample frame was designed to provide a representative sample of households in the region. ABS frames reduce coverage bias associated with random-digit-dial samples that are affected by the increasing number of households that do not have landline telephone service. Additionally, the use of the ABS improves the likelihood of reaching harder-to-survey populations. The ABS was selected from the United States Postal Service (USPS) Computerized Delivery Sequence File. Selected addresses were matched for a telephone number. Approximately half of all sampled addresses had phone matches; the phone numbers returned in the matching process were used to contact non-responding sampled addresses during the recruitment process.

2.1.1 Sample Selection

The objective of the sample design was to obtain 1,300 total completed travel log households in the Western North Carolina region with targets for household size by workers, household size by vehicles, workers by vehicles, household size by income and workers by income.

The frame of addresses was stratified by county (Buncombe, Haywood, Henderson, Madison, and Transylvania). Two substrata were created within each county, except for Madison and Transylvania counties. For each county separately, we classify census tracts into two groups: those with a "high" density of characteristics of interest (0- and 1- vehicle households and fewer vehicles than workers households) and "low" density. Within each county, the first stratum consisted of addresses in Census tracts with a high percentage of households in which number of workers was greater than number of vehicles, and Census tracts with high percentages of 0-vehicle or 0-to-1-vehicle households. The second stratum consisted of the remaining Census tracts in the county. The threshold for determining whether a Census tract contains a high percentage of households meeting these criteria varied by county and is summarized in Table 1. These thresholds are based on the 5-year 2011 American Community Survey (ACS) data. Census tracts with values higher than the thresholds were included in the first stratum of each county.

Table 2. Thresholds for defining stratum 1 by county

County	% #Workers > #Vehicles HHs in Census Tract	% 0-1 Vehicle HHs in Census Tract	% 0 Vehicle HHs in Census Tract
Buncombe	7.5%	46.43%	12.81%
Haywood	3.35%	39.24%	3.78%
Henderson	6.58%	43.55%	9.50%
Madison	2.55%	25.42%	7.68%
Transylvania	5.69%	35.27%	10.41%

Income was not used as a stratification variable because it is highly correlated with the other characteristics (vehicle ownership, workers, and household size). The high density/low density cut point was empirically determined with the general rule of thumb: high-density stratum has roughly 25% of the population and at least 50% of the households of interest.

The sample sizes were determined for each stratum using an allocation scheme that yields the desired marginal sample sizes with smallest design effect. We started by oversampling stratum 1 by a factor of 2, which is the initial sampling rate for high density stratum. The oversampling rate was increased until the desired sample sizes were met. Stratum 1 was oversampled at a rate of 2.9. The sample allocation work was based on completes, and inflated to account for attrition due to nonresponse and postal non-deliverables (PNDs).

For example, in Buncombe county tracts where the percent of households with more workers than vehicles exceeds 7.5%, and the percent of households with 0-1 vehicles exceeds 46.43% or the percent of households with 0 vehicles exceeds 12.81% were assigned to stratum 1.

Table 3: Target and Actual Recruited Households by County

County	Actual	Recruitment Target	Percentage
Buncombe	931	954	98%
Haywood	146	277	53%
Henderson	271	462	59%
Madison	72	154	47%
Transylvania	103	154	67%
Total	**1523**	**2001**	**76%**

The actual number of addresses sampled was significantly higher than the expected number required to achieve the target 1,300 completed households. This is done to account for sample attrition due to nonresponse and ineligibility. The total number of addresses to be fielded was expected to be about 40,000, but 80,000 addresses were sampled from the region so that a reserve sample would be available in the event there is some departure from our response and attrition rate assumptions. A total of 53,523 addresses were used in the survey data collection.

The sample was allocated proportionally across the five counties in the study with a minimum sample size target set to 100 for each of Madison and Transylvania counties, to ensure sufficient representation for each county.

Within each explicit stratum, a random sample of addresses was selected. Each address was selected with equal probability within a sample stratum. The sample was split into five equal-sized samples, each of which were pre-assigned a specified weekday (Monday to Friday) travel day. To ensure that the five weekday subsamples are representative of the study area, we sorted the overall sample by county, stratum, census tract, block group, block, and street address and systematically assigned the sorted sample to the five subsamples.

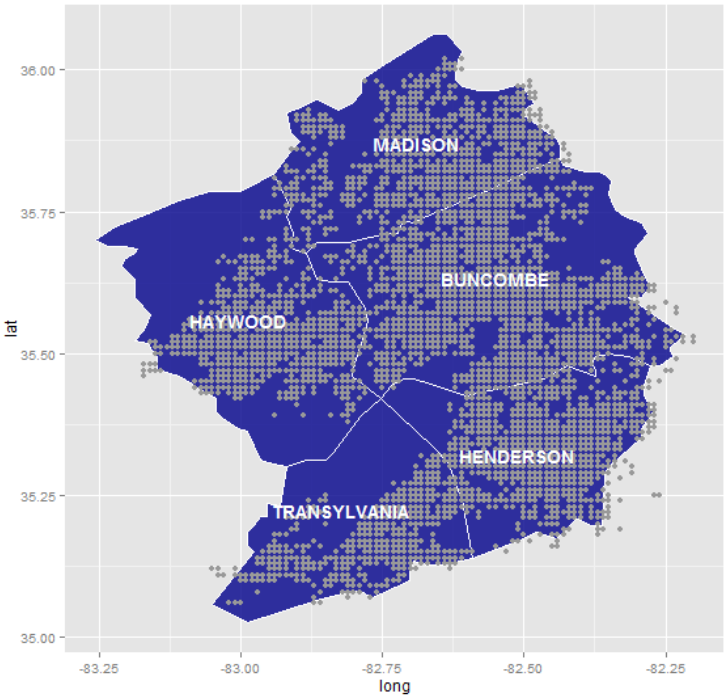
The sampling stratification was designed to provide the best opportunity to effectively and efficiently achieve the sample objectives. Results will be discussed in Section 2.6.

The WNC region, with its pleasant climate and proximity to warmer southern states like Florida, has become a popular summer residence for many attempting to escape the hotter sections of the nation. The original WNC HTS sample design included the systematic sampling of these "seasonal" households. However, the USPS Computerized Delivery Sequence File did not contain the data elements necessary to efficiently identify these households. In place of this systematic sampling procedure, we included a survey question to determine the number of months each surveyed household is occupied.

Table 4. Residency Status

	Unweighted		Weighted	
Responses	Frequency	Percentage	Frequency	Percentage
REFUSED	4	0.3%	666	0.3%
LESS THAN 1 MONTH	1	0.1%	104	0.1%
1-5 MONTHS	44	3.1%	5,628	2.9%
6 OR MORE MONTHS	1,373	96.6%	188,339	96.7%
Total	**1,422**	**100%**	**194,737**	**100%**

Figure 2: Sampled Household Locations



2.1.2 Sample Monitoring

Recruitment and retrieval results were monitored daily by county. Each sample release (also referred to as a mail group) was also monitored to assess sample yields. Sample releases were adjusted as needed to meet the study targets. Crosstabs of key interactions were reviewed weekly to track the household characteristics required for model development. These interactions included household size by number of workers, household size by number of vehicles, number workers by number of vehicles, household size by income and workers by income.

2.2 Branding and Public Outreach

Declining response rates and data quality are among the driving factors behind recent efforts to step up public outreach related to travel behavior survey research. One of the first steps taken for this study was to create a brand that would be used on all participant materials and the public website. It is important that the brand reflect the region and specifically transportation in the region. Branding is not just the image, but the study name as well. Western North Carolina Household Travel Survey was selected to represent the five county region in which the data collection occurred. Figure 3 is the final artwork for the WNC HTS.

Figure 3: Study Logo

The typical regional HTS is conducted during an abbreviated period in the spring or the fall. The limited data collection window provides a number of challenges, among them, is sample management. While estimates can be made, they are just that, estimates. Each region behaves differently and the multi-stage approach of HTSs leaves little time to adjust if observed response rates deviate from the assumptions used in the design phase of the study. So, in addition to branding, it is critical that the survey sponsors embark on a public awareness campaign. This aspect of the study could have been handled more effectively. As a result, the observed recruitment response rates fell short of the anticipated rates. By the time the sponsor engaged the media about the study, additional sample had been released for recruitment. The retrieval rates observed were higher than anticipated and the result was an additional 122 households included in the database.

2.3 Survey Design

The WNC HTS was designed to collect travel behavior data from 1,300 households in five counties in western North Carolina in the spring of 2013. The survey was designed as a mix mode study making use of web, telephone and mail contacts and response options. In addition to the HTS, a separate in-person, retrospective, visitor's survey was conducted.

2.3.1 Methodology

Each sampled address was mailed an invitation to participate letter (see Section 6.1.1) that encouraged them to self-recruit online. Up to two reminder postcards (see Section 6.1.2.2 and 6.1.2.2) were mailed, also encouraging the recipient to complete online. All materials mailed included a toll-free number for reaching the study team if they had questions or preferred to participate by phone.

Recruitment options of web or telephone were offered to each sampled household, allowing the respondent to select mode of participation that best suits them. Once recruited, participants were offered a third method of responding. In addition to web or telephone participation, respondents were provided the option of mailing back completed travel logs.

Participants were guided through the retrieval process through a series of communications delivered by mail, telephone, email, and text message. Each recruited household was sent a travel log package that included a letter thanking them for agreeing to participate and providing next steps. The package included individualized travel logs for each household member (5 years old or older) and a Business Reply Mail (BRM) envelope to be used if they decided to return their completed logs by mail.

A series of reminder contacts were implemented for recruited households. The method of delivery for all such reminders was based on participant preferences collected during the initial recruit interview and included telephone, email and text message. The first reminder was generated on the day prior to the assigned travel day. The next reminder came the day after the travel day and encouraged participants to report travel online. Other reminders were implemented at various intervals when travel was not reported within a specific time period.

Interviewer-assisted telephone support was used to supplement the data retrieval effort for those that preferred to complete by phone or did not complete online in a timely manner. Households were offered a $10 incentive to complete the survey online. Incentives were paid to completed households only, but were awarded as long as some portion of the survey was done online.

2.3.2 Instruments

The WNC HTS instrument was designed to collect key analytic data items required to support NCDOT and the FBRMPO transportation models in both the short- and long-term. The survey instrument collected the data items for each person of age 5 and older in the household, including the travel behavior data for a 24-hour period. Household travel surveys require much information be collected. While these data are important, it is critical that they be collected in a way that minimizes respondent burden.

The recruitment and retrieval surveys were supported through an integrated GeoSurvey / TripBuilder™ web-based software system that was used for both computer-assisted self-interviews (CASI) and computer-assisted telephone interviewing (CATI). The surveys completed by web or telephone completion methods used the same underlying questions, branching, format, and logic checks. The web-based recruitment and retrieval instruments were accessible to participants via the project specific public website. Each household was assigned a unique PIN allowing secure access to the recruitment and retrieval web questionnaires. Data supplied on travel logs received by mail were entered into this same database using the GeoSurvey / TripBuilder systems.

Travel day details were collected through the TripBuilder™ component of the software system, with an integrated online map that enables real-time geocoding to collect accurate travel details. Travel details were collected in two steps. The first step was the creation of a sequential list of visited places along with their basic attributes, including arrival and departure times, mode of travel, vehicle used, place type, location information, and travel companions. The second step collected additional place details, such as activity, transit fare, and parking details.

The following sections list the information that was verified, collected or derived about each completed household.

2.3.2.1 Household Data

Household level details were collected and reported for each household in the final dataset. Among the variables reported in the data are:

- Home address
- Residence type

- Owner/Renter status
- HH size
- HH income
- Number of vehicles
- Number of bicycles in working condition

2.3.2.2 Vehicle Data

Each household was asked the total number of vehicles owned, leased, or available for regular use by the current household members. In addition to motorized vehicles, each household was asked the total number of bicycles in working condition that were available for regular use. For each motorized vehicle reported, variables collected include:

- Make
- Model
- Year
- Body
- Fuel type
- Ownership status

2.3.2.3 Person Data

Specific questions were asked about each household member living in the home on the date the recruitment survey was completed. Key person level variables collected about household members include:

- Age
- Gender
- Relationship between all household members and the recruit survey respondent
- Disability status and type (if applicable)
- Licensed driver status (age eligible)
- Employment status (age eligible)
    - If employed, collected additional data items related to work
- Student status
    - If a student, collected additional data items related to school
- Highest level of education earned
- Race
- Ethnicity

2.3.2.4 Travel Day Trip Data

The travel day began at 3 a.m. on the assigned date of travel. Data were collected for each trip made by each household member (age five and older) throughout the day until 2:59 a.m. the day following the assigned travel date. Key trip related details collected include:

- Trip start and end locations
- Trip start and end times
- Mode of travel

- If household vehicle was used additional data items related to the vehicle and passengers were collected
- If transit was used, additional data items were collected about the trip

- Primary and secondary activity at each location (trip purpose)

2.4 Data Collection

The data collection was intended to begin recruitment in early April and end by May 31, 2013, but was delayed for a brief period due to contractual issues among the stakeholders. The first letters were mailed in mid-April and the first travel date was April 29, 2013. This delay, combined with lower than anticipated recruitment rates, required the field be extended into June. While the last travel date was June 17, 2013, the majority of the travel dates fell inside the original field period.

2.4.1 Recruitment Process

Recruitment began by mailing sampled addresses a letter of invitation to participate in the survey. The letter explained the purpose of the study and requested the recipient visit the project website to complete the survey. A unique PIN was supplied to each sampled address. Two reminder postcards were sent to each sampled address. The first reminder was sent seven days after the initial letter and the second seven days after the first.

Attempts to recruit sampled addresses into the study included mail and telephone contacts. Residents living at sampled addresses were given the option to self-recruit themselves online (Computer-Assisted-Self-Interview (CASI)) or by speaking with one of our interviewing staff over the phone (Computer-Assisted Telephone Interviewing (CATI)). The CASI and CATI surveys were administered as the same system. The only difference is whether the interview was administered by the participant or an interviewer. Most households completed the recruitment process online. If a household had not recruited and a telephone number was available, telephone interviewers attempted to recruit households by phone until the targeted recruitment goals had been met.

Table 5 shows the percentage of households recruited by each mode. Although an incentive was only offered for online participation, providing choices allowed the participants to select the mode of participation that best suited them

Overall, 88 percent of all participating households took advantage of the self-recruiting option.

Table 5: Recruitment Mode (CATI & Web)

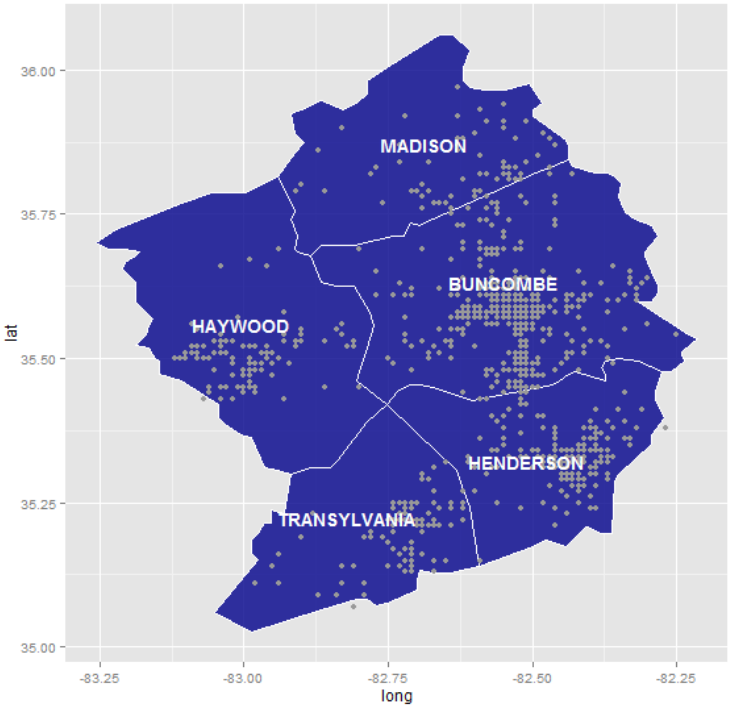
Household	Unweighted		Weighted	
Recruit Mode	Frequency	Percentage	Frequency	Percentage
CATI	165	12%	19,524	10%
Web	1,257	88%	175,220	90%
Total	**1,422**	**100%**	**194,744**	**100%**

The recruitment questionnaire collected general demographic information about each household including income, household size, type of housing, and information about vehicle ownership. This questionnaire also asked for demographic characteristics about each member of the household. At the conclusion of the

recruitment survey, households were assigned a travel date. Households were also asked to indicate their preferred mode of contact for future reminders, including phone calls, text messages, and emails. This information allowed us to tailor reminder and subsequent re-contact attempts to the participants preference.

Table 3 shows the participation results (actual and target) for recruited household. The targeted number of recruited households was based on the assumption that we would achieve a 65 percent retrieval response rate across the region.

Figure 4: Participant Household Locations – Recruited Households



2.4.1.1 Advance Mailing

The first mode of contact was an advance letter mailed to every sampled address, regardless of whether or not that household had a phone match. Included in the initial mailing was a letter, addressed to the county resident (e.g., Buncombe County Resident), on project branded letterhead and signed by Jan Davis from the FBRMPO. The letter informed the household about the purpose of the study and encouraged the recipient to join the study.

The invitation letter outlined what would be required for participation by providing the simple three-step directions for how to participate. The first step referred household members to the public website and provided them with a unique PIN number to access the recruitment survey online. By offering a $10 incentive for online participation only, households were encouraged to participate online. However, a phone number was also provided as an alternate option to completing via the web. The second step

explained the 24-hour travel diary completion. The final step informed participants that they would have to report their travel on our website. (See Appendix 6.1.1 for the advance letter.)

2.4.1.2 Reminder Contacts (Postcards)

All households that did not respond to the initial letter (by either recruiting on the web or calling to recruit by phone) were sent reminder postcards encouraging them to participate. The first postcard was mailed seven days after the initial letter. After 14 days, another reminder postcard was sent to all non-responding addresses. (See Appendix 6.1.2 for reminder postcards.)

2.4.1.3 Travel Date Assignment

When the sample was initially selected, all sampled addresses were randomly assigned to a day of the week (Monday-Friday). Specific travel dates were assigned at the time the household was recruited into the study. During recruitment, households were assigned the next available date that fell on the pre-assigned day of the week, beginning seven days after the recruitment date. Travel days were scheduled seven days after the recruitment interview to allow sufficient time for individualized travel logs to be prepared and mailed to each household. Table 6 shows the distribution of complete households by day of week. The balance across travel day is monitored throughout the data collection period. Typically, travel day distribution is fairly balanced. However, in this study Tuesdays are somewhat underreported, but not alarmingly so.

Table 6: Distribution of Complete Households by Day of Week

Household Travel Day	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Monday	301	21%	42,652	22%
Tuesday	250	18%	32,811	17%
Wednesday	275	19%	38,279	20%
Thursday	287	20%	37,955	19%
Friday	309	22%	43,047	22%
Total	**1,422**	**100%**	**194,744**	**100%**

2.4.1.4 Recruitment Confirmation (Web Only)

If a household recruited by web and elected to receive email and/or text messages, they received an automated recruitment confirmation message. This message confirmed that their recruitment survey data was received successfully and provided a phone number to reach a study team member if they had questions.

2.4.1.5 Diary Mailing

Once recruited, each household was mailed a packet to be used for the retrieval process. The mailing included a letter with more detailed instructions regarding participation in the study, and thanking them for agreeing to participate. Also included in the packet was an individualized travel log for each household member age 5 and older.

The detailed instructions asked household members to use the travel log (on the assigned travel day) as a tool to help each household member record all trips made beginning at 3 a.m. on that date and until 2:59 a.m. the following day. Instructions were also provided regarding how to report travel either online or

over the phone. Although the letter indicated households would only receive their incentive from reporting travel online, if households recruited or retrieved online they were mailed an incentive check. (See Appendices 6.1.3 and 6.1.4 for the diary letter and travel log)

2.4.1.6 Pre-Travel Day Reminder Contacts

During the recruitment interview, households were asked for their preferred contact method (phone, text or email). The day before the assigned travel day, each household was contacted by their proffered method to remind them about their travel day. If contacted by phone, we verified that all travel day materials had been received and ensured any questions were answered. Email reminders allowed participants to respond back with questions as well.

2.4.2 Retrieval Process

In total, there are 1,422 completed households in the five counties included in this report. A multi-mode retrieval approach was used to collect travel day data from recruited households. Households were incentivized to self-report their data online, while more traditional telephone data collection was also available.

Households were able to begin reporting their travel day trip and activity data either by web or telephone (CATI) beginning the day after the travel day. During the recruitment survey responding households were asked how they would prefer to complete the retrieval survey. Those preferring to complete by telephone with an interviewer we called the day after the travel day. Those preferring to complete by web were only called if the household had not reported their travel by the third day after the travel day. Retrieval percentages by survey mode are presented in Table 7.

Table 7: Retrieval Mode (CATI & Web)

Household Retrieval Mode	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
CATI	233	16%	30,824	16%
Mail	301	21%	35,986	18%
Web	888	62%	127,935	66%
Total	**1,422**	**100%**	**194,744**	**100%**

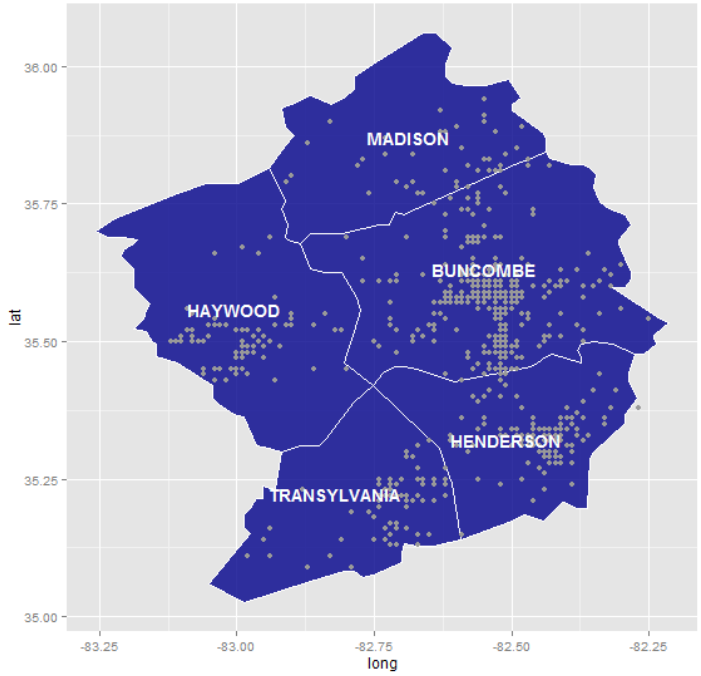
The retrieval questionnaire incorporated TripBuilder™ software that enabled web participants or telephone interviewers to collect all travel and activity details while geocoding all locations via the built-in Google Maps interface. The geocoding of home, workplace, and trip end locations was done within the TripBuilder™ instrument whether the survey was self- or interviewer administered. Table 8 shows the participation results (actual and target) for retrieved households by county.

Table 8. Target and Actual Retrieved Households by County

	Retrieval		
County	Actual	Target	Percentage
Buncombe	876	673	130%
Haywood	139	180	77%
Henderson	254	300	85%
Madison	57	54	106%
Transylvania	96	93	103%
Total	**1,422**	**1,300**	**109%**

Figure 5 shows how these households are distributed across the region.

Figure 5: Participant Household Locations – Retrieved Households



2.4.2.1 *Post-Travel Day Reminder Contacts*

Beginning the day after the travel date, contacts were made to either remind households to report their trip data online or to complete the survey by phone with a recruited household. Reminder prompts were sent as text messages or emails depending on the contact preference requested by each household.

2.4.3 Demographic Characteristics of Survey Participants

In Table 9 several unweighted demographic variables captured in the survey are compared to those same variables reported in the 2010 Census for the FBRMPO region. Consistent with most survey samples, many of the hard-to-survey populations are underrepresented (e.g., larger households, non-whites, Hispanics, and younger persons).

Table 9. Demographic Results Compared to 2010

Demographics		Retrieved Households	General Population Data
Total Households		1,422	194,311
Household Size	1	33.8%	29.50%
	2	46.3%	38.70%
	3	11.7%	14.90%
	4+	8.2%	16.90%
Household Vehicles	0	5.4%	6.3%
	1	38.7%	32.4%
	2	41.8%	39.4%
	3+	14.0%	21.9%
Residence Tenure	Rent	28.3%	28.6%
	Own	67.8%	71.4%
	Other	3.9%	-
Race	White	95.58%	89.60%
	African American	1.40%	4.50%
	Other	3.02%	5.90%
Hispanic	Yes	3.09%	6.10%
	No	96.91%	93.90%
Participant Gender	Male	46.0%	48.3%
	Female	54.0%	51.7%
Participant Age	<18 years old	12.9%	20.1%
	18 - 24	4.5%	7.9%
	25 - 54	38.3%	38.9%
	55 - 64	18.1%	14.2%
	65+	26.2%	18.9%

2.5 Survey Processing and Data Cleaning

2.5.1 Overview

Data processing and data cleaning were conducted on an on-going basis throughout the study. Data updates were made to variables that impacted data collection during the survey (e.g., the addition of a car that was not originally rostered) and at the conclusion of data collection for data that did not impact the flow of the survey (e.g., recoding race based on other specify responses).

Data cleaning and quality assurance processes were conducted on a continuous basis during data collection and on a cumulative basis at its conclusion. A series of automated edits, range checks, consistency checks were performed through the survey instrument, and data preparation staff performed frequency reviews and problem resolution to monitor, correct, and update the data. Automated checks were run to evaluate the validity of reported trip data.

The following sections provide more details for each of the data quality checks used.

2.5.2 Logic Checks

Logic checks were programmed into the recruit and retrieval instruments to ensure that questions were answered as accurately as possible. These included requiring that certain questions be answered, even if the answer was 'don't know' or 'prefer not to answer' and forcing the data type (e.g., requiring a number for AGE). Data range checks were also conducted to ensure that the data fell within the expected range for a given question (e.g., 0-112 for AGE). There were also checks conducted to ensure that there was agreement across data tables for values such as number of household members, number of vehicles, etc.

2.5.3 Real-Time Geocoding

The TripBuilder™ software was used during the conduct of the retrieval survey (both web and telephone) to geocode all habitual locations and trip ends. Using a Google interface, participants or interviewers were able to geocode reported locations in real-time. When necessary, the participant or interviewer could use the Google search engine to locate a specific place (e.g., the CVS at a specific intersection), and then geocode the address. TripBuilder™ captured not only full address information, but also the matching X/Y coordinate.

2.5.4 Frequency Reviews

Frequency reviews were conducted at the beginning of data collection to ensure that all data were being captured as expected. The primary purpose of frequency checks was to validate skip patterns in the question sequence. Frequency reviews are also conducted in the middle and end of data collection and anytime a script edit was implemented to verify that the skip patterns were not affected and that all data were being captured.

2.5.5 Edit checks

Edit checks are performed on data collected as part of the recruit and retrieval interviews. A series of queries are run on the data to identify potential inconsistencies or errors in the data. Any households identified as having potential data issues are then reviewed by a data analyst. Edit checks are broken into two types; those checks which involve the trip data and those checks which do not involve the trip data.

2.5.5.1 Non-Trip Data Checks

All data checks that involved reported data not associated with trips were considered non-trip data checks. These checks included those run as part of the frequency review (described in section 2.5.4) and those checks which involve multiple variables, which are too complex to check using frequency reviews. Table 10 presents a list of the non-trip edit checks.

Table 10: Data Checks

Type of Check	Description of Check
Household	Home location geocoded without an address
Household	Home not named Home
Household	Home location is missing "full address"
Household	Home location is not geocoded
Household	Household's completion flag is not set
Household	Household size does not match the number of people.
Household	Number of vehicles does not match number of records in the vehicles file.
Household	Household locations with same coordinate do not have matching addresses
Person	Beginning and end of travel date not at the same location
Person	No travel case without reason
Person	Person Missing lifecycle information: AGE
Person	Person Missing lifecycle information: AGEB
Person	Person Flagged as completed without places associated with them
Person	Person Missing lifecycle information: Employment
Person	Person Missing lifecycle information: Schooling
Person	School location geocoded without address
Person	Volunteer location geocoded without address
Person	Work location geocoded without address
Place	Companion expected but missing
Place	Location geocoded without address
Place	Place arrival time before the previous place's departure time
Place	Place departure time is before its arrival time (left before arriving)
Place	Place where person did not leave vehicle for over 30 min of activity duration
Place	Place has a person number that does not exist
Place	Place does not have a location
Place	Place location is not geocoded
Place	A shared place has more than one driver in the party
Place	Place where multiple household members went but travelers disagree on number of companions
Place	Place with mode set to auto-passenger without party > 1
Place	Passenger, but no driver.
Place	Place is missing purpose information
Place	Place travel speed too fast for travel mode
Place	Place travel speed too slow for travel mode
Place	Transit trip too short (less than 5 min duration)
Place	Place is missing travel mode information
Place	Place travel time is too long (over 90 min)

2.5.5.2 Trip Data Checks

Trip processing system (TPS) checks were conducted on all households that participated in the retrieval portion of the study. These checks listed in Table 10 were performed at the household, person and place levels. Data analyst staff review these checks to determine whether interviewers and respondents are consistently recording complete and meaningful trip information. This information was used to identify households that required re-contacting to clarify trip details. These situations mostly come from participant data entry error (e.g., entry of an illogical tour). After the household trip records are updated, the case is re-processed to ensure the updates correct the originally reported data. Trip records must past this data edit step to be considered completed households.

2.5.6 Upcoding and Cleaning

After the data collection period was over the "Other specified" responses were evaluated to determine which records could be upcoded or cleaned. Often times participants don't take the time or effort to look over all of the options available for a given question or they don't see their answer and resort to typing their response in the "Other specified" field. The result is that many responses that could have been answered by selecting a response option from a list are answered in the "Other specified" text box. Upcoding is the process of looking though these answers and coding any that were not originally coded correctly by the participant. This is a common occurrence in the reporting of vehicles since the vehicle list is sometimes extensive. The upcoding process removes the other specified responses that were entered by the respondent and codes them with the corresponding answer from the response option list.

After upcoding all of the applicable responses, the next step is to clean up the remaining text. Cleaning the "Other specified" fields involves finding text that couldn't be upcoded but that can be combined with other responses to better group responses. These responses may have not originally been combined because of misspelling or different spacing and capitalizations. By combining these responses the resulting data is more easily readable and understandable. An example of this might be someone reporting that they are *Mexican American* and someone else reporting they are *from Mexico*. Both responses would be combined and reported at MEXICAN.

2.5.7 Derived Variables

Several of the variables in the data deliverable were derived using counts from participant responses. Due to the nature of the household travel survey data requirements it is somewhat common for there to be discrepancies between the data reported when the same data is requested in different questions. This typically happens when participants are unsure of an answer, confused by the question, have forgotten to report something. For these reasons derived variables are included to provide more accurate counts compared with the response to a specific survey question. One of the best examples of the need for a derived variable to correct for an inaccurate response is household size. A standard question asked of all survey respondents is "How many people live in your household?" The answer provided to this question does not always match the number of people enumerated during the rostering of household members. For example, respondents may or may not include themselves in the count, but when prompted at the household enumeration question do include themself. In the dataset, we provide a derived variable for household size that counts the total **enumerated** household members.

Derived variables are also provided to sum attributes of a household. For example, HHSTUD is the count of all household members that answered the STUDE question with a 1 or 2 (full-time or part-time

student). The result is an actual count of the number of students in a household. STUDE is also available in the data deliverable, so analysis can be conducted at the person level using the reported, rather than the derived household level data.

Another type of derived variable converts the data collected in multiple units (e.g., hours and minutes) into a single unit of analysis (e.g., minutes). Calculations can also be used to determine quantitative values such as number of non-household members on a trip. This number is derived by subtracting the number of household members (HHPARTY) reported on a trip from the total number reported (PARTY) being reported on the trip. A list of all of the derived variables included in the data deliverable can be found in Appendix 6.2.

2.6 Survey Response Rates

Response rates are calculated for both the recruitment and retrieval stages of the survey. The recent decline in survey response rates is well documented. The shift from RDD to ABS frames provides many benefits to targeted sampling and coverage bias, but only adds to the diminishing response rate issue. Approximately 50 percent of all sampled addresses are typically matched to a telephone number. Approximately 15 percent of those matches generally prove to be bad matches (e.g., not associated with the sampled address). Because more than half of the sampled households are only reachable by mail in the ABS sample design, passive refusals happen at a high rate. Response rates achieved from ABS frames are largely dependent on the salience of the study, the presentation of the recruitment materials, and public outreach campaigns.

In ABS's the recruitment rate is calculated by dividing responding households by eligible addresses.

Recruited Households / (Number Sampled Addresses – Postal Returns)

The retrieval rate is the percentage of household that completed the study after agreeing to participate. The Final Response Rate is the product of the recruitment and retrieval rates. Table 11 shows response rates by county for the WNC HTS. Observed recruitment rates were much lower than what was expected, and typically observed in other similar HTSs. Recruitment rates in other similar studies have recently been observed in the 10 to 14 percent range. The retrieval rates for the WNC HTS were somewhat higher than generally observed.

Table 11: Response Rates by County

County	Recruitment	Retrieval	Overall
Buncombe	3.4%	72.9%	2.5%
Haywood	2.1%	71.9%	1.5%
Henderson	2.3%	69.4%	1.6%
Madison	2.3%	65.3%	1.5%
Transylvania	3.4%	73.8%	2.5%

Standard in all voluntary survey data is some level of item non-response. The programming for the WNC HTS did not allow participants to skip questions, but because this was a voluntary survey, we were required to provide a means for participants to not provide information if desired. The item non-response

comes from answers of "don't know" and "prefer not to answer". Table 12 presents the non-response percentage for household income and home ownership. The observed non-response of these variables is consistent with other HTSs recently conducted by Westat. Table 13 presents several person level non-response items. The person non-response for age is off-set by a follow-up age range classification question asked when age was not reported.

Table 12: Household Variables Item Non-Response

	Unweighted		Weighted	
Non-response Items	Frequency	Percentage	Frequency	Percentage
Home Ownership	14	0.98%	1,594	0.82%
Household Income	218	15.33%	30,728	15.78%
Household Disability	15	1.05%	3,076	1.58%

Table 13: Person Variables Item Non-Response

Non-response Items	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Age	179	6.35%	34,758	7.66%
Age Range	36	1.28%	5,016	1.11%
Race	100	3.55%	15,835	3.49%
Employment	18	0.64%	4,383	0.97%
Volunteer	50	2.04%	7,703	2.10%
Days traveled to work per week	55	1.95%	8,235	1.81%
Flexible work schedule	31	1.10%	6,750	1.49%
Public transit access	176	7.16%	30,283	8.26%
Level of Education	53	1.99%	7,716	1.86%
Student Status	26	0.92%	8,668	1.91%

3 Weighting

Survey weights were developed for four types of analytic units associated with all households in the WNC HTS dataset – household weights, vehicle weights, person weights, and trip weights – to permit inference to the corresponding target populations. Household weights were assigned to responding households. Vehicle weights are assigned to each reported vehicle in a household and are the same as the household level weight. Person and trip weights were assigned to responding persons within responding households.

In addition to the survey weights, replicate weights were developed for each type of analytic unit associated to the travel study. The replicate weights are used to calculate the variances of survey estimates using the paired jackknife replication method. The methods used to derive these weights were aimed at reflecting the features of the sample design, so that when the jackknife variance estimation procedure is implemented, approximately unbiased estimates of sampling variance are obtained. In addition, the various weighting procedures were repeated on each set of replicate weights to appropriately reflect the impact of the weighting adjustments on the sampling variance of a survey estimate.

The overall steps in the weighting process for the travel study component were as follows.

1. Construction of base weights (the reciprocal of the probability of selection of each sampled address);
2. Adjustment for non-response at the household level for the screener (invitation to participate) and the main survey;
3. Adjustment of the household weights to achieve consistency with characteristics for the full population of households in the study area (achieved by raking the non-response adjusted weights to independent household level figures for the study area—raking can be thought of as multivariate post-stratification). This comprises the final household weight.
4. Construction of the vehicle weights;
5. Assignment of the final household weights to all responding persons within useable households;
6. Person-level raking. This comprises the final person weight.
7. Construction of the trip weights.

In this section of the report tables are displayed by key survey variables summarized to the five county WNC HTS region. Appendices 6.3 and 6.4 Additional Recruitment Frequency Tables contains an additional series of tables with variables not discussed in this section, but captured during the survey effort.

3.1 Household Base Weights

The household base weight reflects the probability of selection for a sampled household and is calculated simply as the reciprocal of its probability of selection.

3.1.1 Adjustment for Non-Response to the Recruitment and the Retrieval Interview

An adjustment for non-response was made to the weights of the study area recruitment and retrieval interview respondents to reflect those for whom a recruitment and retrieval interview was not obtained.

The adjustments for household nonresponse were made within adjustment cells defined by county and by sampling stratum (high density of key sample characteristics[1]/remaining households). A nonresponse adjustment factor was calculated for each cell as the ratio of the sum of household weights for all eligible households to the sum of the household weights for all screener responding households. The nonresponse adjustment factor was applied to the household weight of each recruitment and retrieval interview responding household. In this way, the weights of the responding households are "weighted up" to represent the full set of responding and nonresponding households in the adjustment cell.

3.1.2 Raking at the Household-Level

Raking adjustment procedures are used to improve the reliability of survey estimates and, to some extent, correct for the bias due to under coverage and/or non-response. Raking is a post-stratification adjustment procedure where survey weights are iteratively-adjusted to independent control totals for various demographic categories. The process has the effect of differentially adjusting the weights of the sampled households within groups of demographically similar households, so that the total sum of weights for the sampled households equals the corresponding independent control totals for all households.

The raking process has a number of "dimensions." The weights are adjusted to equal the totals within the cells for each dimension in an iterative process, until the process converges, and every dimension's cell totals equal the independent control totals. The dimensions at the household weighting level included the following:

- Household size
- Vehicles per household
- Workers per household
- Household income

The independent control total for Household size came from 2010 Decennial Census. Control totals for Vehicles per household and Workers per household came from the 2007-2011 5-year American Community Survey (ACS). They were adjusted to reflect 2010 Decennial Census distribution. In Table 14 through Table 21 the weighted and unweighted frequencies for a number of household level demographic variables (e.g., household size, number of workers, etc.) are presented. Only household income (Table 19) is impacted by item non-response.

[1] Within each county, the first stratum consisted of addresses in Census tracts with a high percentage of households in which number of workers is greater than number of vehicles, and Census tracts with high percentages of 0-vehicle or 0-to-1-vehicle households.

Table 14: Household Size (Unweighted and Weighted)

Household Size	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
1	480	34%	57,803	30%
2	659	46%	75,980	39%
3	166	12%	31,299	16%
4+	117	8%	29,662	15%
Total	**1,422**	**100%**	**194,744**	**100%**

Table 15: Household Number of Vehicles (Unweighted and Weighted)

Household Vehicles	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
0	77	5%	10,202	5%
1	551	39%	67,004	34%
2	595	42%	80,420	41%
3	157	11%	27,012	14%
4+	42	3%	10,106	5%
Total	**1,422**	**100%**	**194,744**	**100%**

Table 16: Number of Household Workers (Unweighted and Weighted)

Household Workers	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
0	524	37%	64,399	33%
1	467	33%	72,745	37%
2	399	28%	52,717	27%
3+	32	2%	4,883	3%
Total	**1,422**	**100%**	**194,744**	**100%**

Table 17: Household Number of Students (Unweighted and Weighted)

Household Students	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
0	1,079	76%	138,690	71%
1	233	16%	34,071	17%
2	87	6%	16,447	8%
3+	23	2%	5,537	3%
Total	**1,422**	**100%**	**194,744**	**100%**

Table 18: Household Income (Unweighted and Weighted)

Household Income	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Less than $10,000	63	4%	13,502	7%
$10,000 – $19,999	115	8%	19,497	10%
$20,000 – $29,999	151	11%	22,383	11%
$30,000 – $49,999	276	19%	35,595	18%
$50,000 – $59,999	117	8%	15,139	8%
$60,000 – $74,999	155	11%	16,096	8%
$75,000 – $99,999	162	11%	20,046	10%
$100,000 – $149,999	113	8%	15,375	8%
$150,000 or More	52	4%	6,382	3%
Don't Know	17	1%	1,993	1%
Refused	201	14%	28,735	15%
Total	**1,422**	**100%**	**194,744**	**100%**

Table 19: Household Residence Type (Unweighted and Weighted)

Household Residence Type	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Single-family attached house	109	8%	11,672	6%
Single-family detached house	953	67%	142,010	73%
An apartment or condo	287	20%	27,551	14%
Mobile Home or Trailer	59	4%	12,753	7%
Boat	1	0%	87	0%
Some other type of housing	9	1%	316	0%
Don't know	2	0%	236	0%
Refused	2	0%	119	0%
Total	**1,422**	**100%**	**194,744**	**100%**

Table 20: Ownership of Household Residence (Unweighted and Weighted)

Household Residence Ownership	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Own/Buying	955	67%	134,895	69%
Rent	399	28%	52,170	27%
Occupied w/o payment of rent	25	2%	4,665	2%
Some other arrangement	29	2%	1,420	1%
Don't know	3	0%	363	0%
Refused	11	1%	1,231	1%
Total	**1,422**	**100%**	**194,744**	**100%**

Table 21: Number of Licensed Drivers in Household (Unweighted and Weighted)

Household Drivers	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
0	57	4%	7,790	4%
1	514	36%	63,736	33%
2	775	55%	108,148	56%
3	64	5%	13,315	7%
4+	12	1%	1,756	1%
Total	**1,422**	**100%**	**194,744**	**100%**

3.2 Vehicle Level Weights

Vehicle weight is equal to household level weights. Table 22 and Table 23 provide weighted and unweighted frequencies for vehicle age and fuel type. Fifty-eight percent of the vehicles in surveyed households are less than 10 years old and 93 percent are fueled by gasoline.

Table 22: Vehicle Age (Unweighted and Weighted)

Vehicle Age	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
0 – 4	577	24%	78,292	22%
5 – 9	810	34%	112,745	32%
10 – 14	572	24%	85,675	24%
15 – 19	271	11%	40,701	12%
20 +	162	7%	33,975	10%
NOT ASCERTAINED	2	0%	387	0%
Total	**2,394**	**100%**	**351,775**	**100%**

Table 23: Vehicle Fuel Type (Unweighted and Weighted)

Vehicle Fuel Type	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Biodiesel	6	0%	527	0%
Diesel	49	2%	9,958	3%
Flex Fuel	15	1%	3,161	1%
Gas	2,234	93%	329,896	94%
Hybrid	82	3%	6,960	2%
Plug-in Electric	4	0%	625	0%
Some other fuel	1	0%	18	0%
Don't know	1	0%	242	0%
NOT ASCERTAINED	2	0%	387	0%
Total	**2,394**	**100%**	**351,775**	**100%**

3.3 Person Level Weights

3.3.1 Adjustment of Initial Person Level Weights

The final household weight was assigned to each person in responding household in the sample. This weight represents the initial person level weight.

3.3.2 Raking at the Person-Level

For the same reasons raking was used at the household-level (improved reliability, reduction of potential bias, and to achieve consistency with known population counts), a simple raking/post-stratification procedure was used at the person-level as well. Survey weights of responding persons were adjusted so that the sum of the weights of the responding persons equaled the corresponding independent control total for the study area population. The dimensions at the person weighting level included the following:

- Sex
- Age
- Race/Ethnicity

The independent control totals came from 2009 – 2013 ACS data. Table 24 though Table 31 present the weighted and unweighted frequencies for a number of person level variables (e.g., gender, race, etc.). Female respondents made up 53 percent of the unweighted sample and 51 percent of the final weighted sample. The range of participant ages shows that 12 percent of the sample was youth, 57 percent between the ages of 18 and 64 and the final 25 percent were 65 and older. The weighting adjusted these percentages to 19, 56 and 17 percent respectively. Only 6 percent of the sample failed to report age. A small item non-response rate was found in other key person-level demographic variables. The majority of the sample identified as white (92 percent), non-Hispanic (95 percent), and having at least one job (97 percent).

Table 24: Participant Gender (Unweighted and Weighted)

Person Gender	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Male	1,280	45%	217,452	48%
Female	1,503	53%	231,692	51%
Refused	34	1%	4,707	1%
Total	**2,817**	**100%**	**453,850**	**100%**

Table 25: Participant Age Distribution (Unweighted and Weighted)

Person Age	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
0 – 4	116	4%	34,724	8%
5 – 17	223	8%	50,452	11%
18 – 24	118	4%	23,062	5%
25 – 29	177	6%	28,568	6%
30 – 34	171	6%	27,423	6%
35 – 39	155	6%	26,087	6%
40 – 44	163	6%	28,014	6%
45 – 49	169	6%	28,537	6%
50 – 54	176	6%	28,100	6%
55 – 59	199	7%	28,288	6%
60 – 64	279	10%	40,372	9%
65 – 69	273	10%	34,210	8%
70 – 74	156	6%	14,574	3%
75+	263	9%	26,682	6%
Don't know	3	0%	552	0%
Refused	176	6%	34,206	8%
Total	**2,817**	**100%**	**453,850**	**100%**

Table 26. Participant Age Range (Unweighted and Weighted)

Person Age Range	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
0 – 4	120	4%	37,139	8%
5 – 15	191	7%	42,343	9%
16 – 17	43	2%	10,293	2%
18 – 64	1,681	60%	274,291	60%
65 +	733	26%	82,167	18%
Refused	10	0%	2,397	1%
System Missing	39	1%	5,220	1%
Total	**2,817**	**100%**	**453,850**	**100%**

Table 27: Participant Race (Unweighted and Weighted)

Person Race	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
White	2,597	92%	400,020	88%
African American, Black	38	1%	15,667	3%
Asian	27	1%	2,796	1%
American Indian, Alaskan Native	15	1%	6,756	1%
Native Hawaiian or Pacific Islander	2	0%	318	0%
Some other race	38	1%	12,459	3%
Don't Know	15	1%	1,331	0%
Refused	85	3%	14,504	3%
Total	**2,817**	**100%**	**453,850**	**100%**

Table 28: Hispanic or Latino Households (Unweighted and Weighted)

Person Hispanic, Latino or Spanish origin	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
No	2,665	95%	416,220	92%
Yes	85	3%	25,474	6%
Don't know	5	0%	1,765	0%
Refused	62	2%	10,391	2%
Total	**2,817**	**100%**	**453,850**	**100%**

Table 29: Participant Number of Jobs (Unweighted and Weighted)

Person Jobs	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
0	8	1%	1,097	1%
1	1,148	83%	166,717	81%
2	148	11%	23,155	11%
3	26	2%	4,788	2%
4+	7	1%	781	0%
Don't Know	1	0%	69	0%
Refused	45	3%	10,438	5%
Total	**1,383**	**100%**	**207,044**	**100%**

Table 30: Participant Work Locations (Unweighted and Weighted)

Person Work Place	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Fixed	944	71%	135,886	69%
Home	149	11%	19,517	10%
Varies	225	17%	36,284	19%
Don't know	4	0%	1,640	1%
Refused	10	1%	2,292	1%
Total	**1,332**	**100%**	**195,619**	**100%**

Table 31: Educational Attainment (Unweighted and Weighted)

Person Educational Attainment	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Not a high school graduate	302	11%	74,229	18%
High School Graduate	272	10%	47,500	11%
Some College Credit but no Degree	389	15%	65,356	16%
Associate or Technical School Degree	260	10%	47,488	11%
Bachelor's or Undergraduate Degree	770	29%	106,379	26%
Graduate Degree	616	23%	65,009	16%
Some other degree	1	0%	379	0%
Don't know	11	0%	2,479	1%
Refused	42	2%	5,237	1%
NOT ASCERTAINED	1	0%	36	0%
Total	**2,664**	**100%**	**414,091**	**100%**

3.3.3 Trip Weights and Rates

Trip weights were generated by simply multiplying the final person weight by 260 to represent the number of trips on any given weekday within a year. These weights should be used to expand the data to the population.

Trip rates in Table 32 though Table 36 were calculated by dividing the sum of trips by the sum of the variable, either by household or person. The weighted trip rates are based on the variable weights (household weight, person weight). Results show that larger households make more trips per household than smaller households (Table 34), as do households with a greater number of workers in the household (Table 35).

Table 32: Household Trip Rates (Unweighted and Weighted)

Household Trip Rate	
Unweighted	Weighted
7.43	7.88

Table 33: Person Trip Rates (Unweighted and Weighted)

Person Trip Rate	
Unweighted	Weighted
3.95	3.89

Table 34: Trip Rates by Household Size (Unweighted and Weighted)

Household Size	Trip Rate	
	Unweighted	Weighted
1	4.45	4.23
2	7.79	7.9
3	10.14	9.4
4+	13.74	13.37

Table 35: Trip Rates by Number of Household Workers (Unweighted and Weighted)

Household Workers	Trip Rate	
	Unweighted	Weighted
0	6.05	5.9
1	6.67	7.25
2	9.55	10.4
3	14.11	16.65
4+	17.5	13.7

Table 36: Trip Rates by Household Income (Unweighted and Weighted)

Household Income	Trip Rate	
	Unweighted	Weighted
Less than $10,000	4.52	4.62
$10,000 – $19,999	5.1	5.19
$20,000 – $29,999	6.28	6.63
$30,000 – $49,999	7.1	7.52
$50,000 – $59,999	7.79	8.14
$60,000 – $74,999	8.68	9.14
$75,000 – $99,999	8.01	9.68
$100,000 – $149,999	9	9.68
$150,000 or More	8.63	12.16
Don't Know	4.65	3.78
Refused	8.36	8.95

In Table 37 through Table 41 unweighted and weighted frequencies for trip purpose and mode are shown. These tables use the trip weights and expand the data to represent the population. The most prevalent trip purposes are related to home and work, illustrated in Table 37. Auto travel is the largest mode choice for all trips and work related trips. Auto travel decreases for school related trips with 15 percent of these trips made by school bus. Table 41 presents the frequency of trips by day of week. The results show travel on Tuesday's is somewhat underreported and Friday's somewhat over-reported.

Table 37: Primary Trip Purpose (Unweighted and Weighted)

Trip Purpose (Primary)	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
ALL OTHER ACTIVITIES AT SCHOOL	29	0%	5,145	0%
ANY OTHER ACTIVITIES AT HOME	3,093	29%	459,001	29%
ATTEND MAJOR SPORTING EVENT	8	0%	608	0%
ATTENDING CLASS/STUDYING	236	2%	47,627	3%
CHANGE TRAVEL MODE/TRANSFER	230	2%	36,806	2%
CIVIC OR RELIGIOUS ACTIVITIES	127	1%	19,527	1%
DON'T KNOW	25	0%	4,351	0%
DRIVE THROUGH	169	2%	23,315	1%
DROP OFF PASSENGER FROM CAR	327	3%	72,084	4%
EAT MEAL OUT AT RESTAURANT/DINER	596	6%	82,646	5%
GROCERY/FOOD SHOPPING	733	7%	101,880	6%
HEALTH CARE	293	3%	35,809	2%
HOUSEHOLD ERRANDS	386	4%	58,867	4%
INDOOR/OUTDOOR RECREATION	436	4%	58,818	4%
LOOP TRIP	175	2%	22,787	1%
OTHER ROUTINE SHOPPING	568	5%	80,096	5%
OTHER WORK-RELATED ACTIVITIES AT WORK	56	1%	10,638	1%
OTHER, SPECIFY	1	0%	53	0%
PERSONAL BUSINESS	133	1%	24,840	2%
PICK UP PASSENGER FROM CAR	282	3%	49,092	3%
REFUSED	35	0%	4,071	0%
SERVICE PRIVATE VEHICLE	213	2%	31,272	2%
SHOPPING	13	0%	3,329	0%
SHOPPING FOR MAJOR PURCHASES	72	1%	12,992	1%
SOCIAL/VISIT FRIENDS/RELATIVES	466	4%	77,852	5%
VOLUNTEER WORK/ACTIVITIES	187	2%	24,156	2%
WORK RELATED	216	2%	36,374	2%
WORK/DOING MY JOB	1,270	12%	196,493	12%
WORKING AT HOME	184	2%	23,989	1%
Total	**10,559**	**100%**	**1,604,518**	**100%**

Table 38: All Trip Modes (Unweighted and Weighted)

Trip Travel Mode	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Walk	764	7%	94,294	6%
Bike	165	2%	17,823	1%
Auto/Van/Truck (as the driver)	7,648	72%	1,133,096	71%
Auto/Van/Truck (as a passenger)	1,667	16%	292,799	18%
Public Transit – Local Bus	90	1%	21,422	1%
Dial-a-ride/Paratransit	8	0%	393	0%
Taxi/Limo	6	0%	793	0%
School bus	97	1%	23,380	1%
Motorcycle/Moped	39	0%	9,085	1%
Private Shuttle/Bus	2	0%	56	0%
Carpool	31	0%	7,133	0%
Vanpool	4	0%	534	0%
Something else	38	0%	3,710	0%
Total	**10,559**	**100%**	**1,604,518**	**100%**

Table 39: Mode to Work (Unweighted and Weighted)

Trip Travel Mode to Work	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Walk	86	7%	10,394	5%
Bike	30	2%	2,834	1%
Auto/Van/Truck (as the driver)	1,075	85%	162,912	86%
Auto/Van/Truck (as a passenger)	58	5%	8,256	4%
Public Transit – Local Bus	8	1%	3,008	2%
Motorcycle/Moped	5	0%	1,143	1%
School bus	1	0%	477	0%
Carpool	3	0%	1,183	1%
Vanpool	1	0%	136	0%
Total	**1,267**	**100%**	**190,343**	**100%**

Table 40: Mode to School (Unweighted and Weighted)

Trip Travel Mode to School	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Walk	2	1%	326	1%
Auto/Van/Truck (as a passenger)	119	49%	25,907	56%
Auto/Van/Truck (as the driver)	70	29%	9,786	21%
Bike	4	2%	240	1%
Carpool	6	2%	1,593	3%
Motorcycle/Moped	2	1%	816	2%
Public Transit – Local Bus	3	1%	978	2%
School bus	36	15%	6,875	15%
Vanpool	1	0%	120	0%
Total	**243**	**100%**	**46,640**	**100%**

Table 41: Travel (# of Trips) by Day of Week (Unweighted and Weighted)

	Unweighted		Weighted	
Trips on Travel Day	Frequency	Percentage	Frequency	Percentage
Monday	2,101	20%	281,639	18%
Tuesday	1,784	17%	259,551	16%
Wednesday	2,164	20%	311,107	19%
Thursday	2,134	20%	347,360	22%
Friday	2,376	23%	404,862	25%
Total	**10,559**	**100%**	**1,604,518**	**100%**

3.4 Replicate Weights

In addition to the survey weight, a set of 100 replicate weights was calculated for each analytic sample units (household, vehicle, person, and trip). These replicate weights are used in calculating the sampling variance of estimates obtained from the data, using the paired jackknife repeated replication method. The method of deriving these weights was aimed at reflecting the features of the sample design appropriately for each sample, so that when the jackknife variance estimation procedure is implemented, approximately unbiased estimates of sampling variance are obtained. In addition, the various weighting procedures were repeated on each set of replicate weights to appropriately reflect the impact of the weighting adjustments on the sampling variance of a survey estimate.

Many software packages for personal computers exist for replication variance estimation methods. For example, WesVar, later versions of SAS, and STATA all have the capability of producing replication estimates. These software packages produce both the appropriate estimates and corresponding variance estimates for the estimates. WesVar, developed and distributed by Westat, is available for free.

4 Design of the Visitors Survey Instrument and Methodology

A separate visitor's survey was administered for campers staying at RV campgrounds during the month of July. Trained surveyors using a simple paper-based questionnaire conducted face-to-face interviews with seasonal visitors in four RV campgrounds located within the region. The survey instrument used for these seasonal visitors included a retrospective 24-hour survey (i.e., please tell me about the trips you made yesterday) conducted with one member of the camping 'party'. Both long-term and short-term campers were included in the survey.

4.1 Overview

As part of the Western North Carolina Household Travel Survey (WNC HTS), Westat conducted an in-person recreational vehicle (RV) visitor's survey in July 2013. The objective was to collect retrospective travel behavior data from one person living in the RV. The target sample size was 50 – 100 completed surveys.

A total of seven RV parks were selected from a list of 37 parks identified in Haywood County. The criteria for inclusion in the study included number of reported units (sites) being at least 50. This component of the WNC HTS was intended to be informative in nature, and not a probability sample from which any substantive conclusions should be drawn.

The study was conducted during the period of July 17 – 20, 2013 by two Westat project staff members who traveled to the region.

4.2 Sampling Rate, Visitor Type and Trip Summaries

Table 42 below lists the parks sampled for the study, the number of units expected at the park, the count of expected short- and long-term RV campers, the number of RVs that should be sampled and the sampling instructions for the interview team. Because long-term RV visitors to the region are expected to exhibit travel behaviors that are more consistent with full-time residents, the goal was to have the sample represent about 60 – 70 percent long-term RV campers.

Prior to visiting the site, the study team contacted each of the parks to inform them of the study and gain permission to be on site to interview the campers. During this call we confirmed the number of sites at each park and received an estimation of capacity during our visit. We assumed a 50 percent response rate and a 50 percent contact rate. From this data, we developed a sampling strategy that included selecting each unit in the parks that had predominately long-term visitors and every fifth in the other parks.

Table 42 – Sampled Parks and Selection Rates

Park Name	Units	short-term	long-term	# sampled RVs	Sample Instructions
Butch Teague	50	0	50	41	select everyone in the park
Creekwood Farm	50	50	0	10	select every 5th occupied RV
Cross Creek	53	27	26	10	select every 5th occupied RV
Pride Resorts	100	70	30	20	select every 5th occupied RV
Riverside	60	6	54	49	select everyone in the park
Stone Bridge	100	60	40	20	select every 5th occupied RV
Windgrey	60	6	54	49	select everyone in the park
Total	**473**	**219**	**254**	**200**	

Table 43 below lists the number of visits made to the RV parks, the number of units that were occupied on the day of the survey, the total number of completed interviews, and the percent of occupied units surveyed. Although each of the seven parks gave Westat permission to interview campers onsite, Riverside revoked that permission upon arrival.

Table 43 - Data Collection Summary

Campground	Number of Visits	Date(s)	Occupied Units	Total Completed Surveys	Percent of Occupied Units Surveyed
Butch Teague	2	7/17 & 7/19/2013	52	11	21.2%
Creekwood Farms	2	7/18/2013	61	5	8.2%
Cross Creek	1	7/18/2013	54	10	18.5%
Pride Resorts	2	7/18 & 7/20/2013	102	13	12.7%
Riverside	1	7/19/2013	N/A	N/A	N/A
Stone Bridge	2	7/19/2013	130	12	9.2%
Windgray	1	7/19/2013	65	19	29.2%
Totals			**464**	**70**	**15.1%**

Seventy interviews were completed across the six RV parks. These 70 interviews represented 15.1 percent of the occupied lots. In addition to the sampling rate employed, other factors contributed to this modest completion rate. While some invited to participate refused, the largest contributor to the non-interview rate was non-contact. The non-contact rate can be explained to two ways. One explanation is that the residents of many occupied sites were actively using the RV, but were out when we stopped to conduct the survey. Another explanation is that many campers were not actively using their RV. Many use these parks as vacation homes. They drop their RV off at the start of the season and return periodically throughout the RV camping season.

The visitor type breakdown for all of the respondents surveyed at each RV park is presented below. It should be noted that a short-term visitor was defined as a visitor to an RV park who stays less than 31 days (one month) at the RV park.

Table 44 – Visitor Type Summary by Campground

Campground	Total Completes	Short Term	% of Site	Long Term	% of Site	Indefinite Stay	% of Site
Butch Teague	11	6	54.5%	4	36.4%	1	9.1%
Creekwood Farms	5	3	60.0%	2	40.0%	0	0.0%
Cross Creek	10	0	0.0%	10	100.0%	0	0.0%
Pride	13	6	46.2%	6	46.2%	1	7.7%
Riverside	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Stone Bridge	12	8	66.7%	4	33.3%	0	0.0%
Winngray	19	2	10.5%	17	89.5%	0	0.0%
Total	**70**	**25**	**35.7%**	**43**	**61.4%**	**2**	**2.9%**

Of those surveyed, 61.4 percent intended to stay for at least one month, 35.7 percent planned to stay for less than a month and about 3percent were unsure how long they would stay at the RV park. In Table 45 a summary analysis of the trips that were collected through the RV survey is provided. On average, each RV park visitor took 2.6 trips on the day prior to being surveyed.

Table 45 - Trips Summary Table

Statistic	Value
Number of Places	252
Number of Trips	182
Number of Respondents	70
Average Number of Trips	2.6
Maximum Number of Trips	9
Minimum Number of Trips	0

5 Summary

The WNC HTS was a successful study, collecting travel behavior data from more than 1,400 households across the five-county region. While recruitment lagged behind anticipated rates, the retrieval response rates exceeded expectations, resulting in 9 percent more completed households than targeted. Three percent of all households participating in the survey were part-year residents – reporting that they lived at the sampled address for less than six months of the year.

The survey methodology provided sampled households two options for recruitment (web and phone) and three for participation that the retrieval stage (web, phone and mail back). The invitation letter encouraged self-report on our secure website. Nearly 90 percent of all recruited households took advantage of the opportunity to respond online. The majority of the travel day data was reported by respondents online (62 percent), 21 percent responded by mail and the remaining 16 percent reported their travel by phone.

A total of 10,559 trips were collected in the WNC survey. An examination of primary trip purpose shows that 17 percent of all reported trips were for shopping or household errands. Work related trips account for another 15 percent of all trips. Social activities, like visiting with friends or relatives, and participating in recreational activities each accounted for four percent of all reported trips. Eating a meal out was reported as the trip purpose for another six percent of all trips. The trip purpose of "any other activities at home" was reported 29 percent of the time; however, when reporting this statistic it is important to remember that most travel days start at home and typically report this purpose when place one is home. When analyzing trip purpose for the home location it is advisable to consider the location for place one.

The most popular trip mode in the survey across all trips was personal vehicle with 72 percent using an auto/van/truck as the driver and another 16 percent as the passenger. Reported mode to work was 90 percent personal vehicle. Walk and bicycle was reported as trip mode for nine percent of all trips and work trips.

The data collected through this survey effort provides transportation modelers a rich source of data needed to update the regional travel model for Western North Carolina.

6 Appendices

6.1 Participation Documents

6.1.1 Invitation Letter

Western North Carolina
HOUSEHOLD TRAVEL SURVEY

<BARCODE HHID> <HUMAN READABLE> <DATE>
<CITY> RESIDENT
<STREET ADDRESS>, <APT>
<CITY>, NC <ZIPCODE>- <ZIP4>

Dear Resident,

Western North Carolina is on the move, and we need your help to ensure that our transportation system keeps up with growing demands.

The French Broad River Metropolitan Planning Organization (FBRMPO) is working closely with the North Carolina Department of Transportation to help improve roads, public transit, sidewalks, and bicycle routes in our region. Our goal is to increase safety and reliability while keeping pace with our community's growth.

To help us better understand your transportation needs and experiences, we are working with Westat – a reputable and trusted national research firm – and are asking select households like yours to participate in a special study about daily travel in the Western North Carolina region. This study is voluntary and your personal information will be kept confidential as required by law.

Why should you participate? Good transportation facilities and services help the people in your household access jobs, schools, healthcare, and other important daily activities. To keep our region moving, we need data on how, when, where, and why people travel. This information helps leadership make important decisions about how and where to invest your federal and state transportation dollars.

What are we asking of you? Three simple steps:

1. Logon to www.wnctravelsurvey.com and complete the Household Questionnaire.
   Your household's PIN is <PIN>.
2. Record the travel of each member of your household for a 24-hour period in personalized travel diaries that we will send you.
3. Provide the travel diary information to us on the same website.

All households that complete these surveys online will receive a $10 thank you for your help. If you do not have internet access you are welcome to visit the French Broad River MPO offices where we will provide you with tools you need to complete the study online. Please contact MPO staff at mpo@landofsky.org or by calling 828-251-7444 to set up an in-person appointment.

If you would prefer to speak with one of our highly trained interviewers you can reach them toll-free at 1-866-436-7828. To learn more about this study, please visit www.wnctravelsurvey.com.

Thank you for your participation and for helping make our region a better place to live, work, and play – ***your input will really make a difference.***

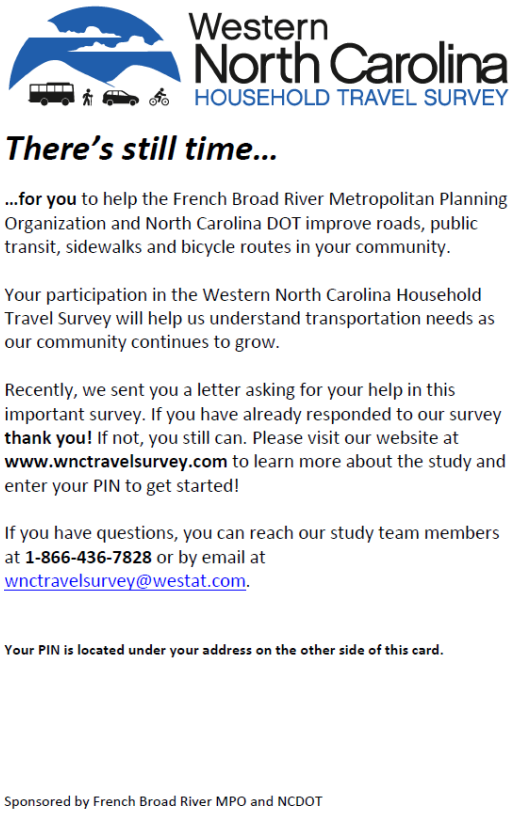
Signed,

Jan Davis, Chair, FBRMPO TAC

6.1.2 Reminder Postcards

6.1.2.1 Postcard #1

6.1.2.2 Postcard #2



6.1.3 Travel Log Letter

¶

John·Doe·
123·Main·St,·SE·Suite·310¶
Asheville,·NC·34567-1234·¶

May·31,·2013¶

Dear·John,·¶

Thank·you·for·participating·in·the·Western·North·Carolina·Household·Travel·Survey!·The·information·you·provide·will·help·ensure·that·future·transportation·projects·reflect·what·your·community·needs·and·that·transportation·funds·are·spent·wisely.·Remember·that·we·value·your·input,·no·matter·how·much·or·how·little·you·travel.·¶

Step·1:·Thank·you·for·completing·the·Household·Questionnaire·in·Step·1.·**Now,·it's·time·for·Step·2.**·¶

Step·2:·**Record·travel·information:**·¶

- Included·is·a·**Travel·Log**·for·each·person·in·your·household·aged·5·and·older.·Use·the·logs·to·record·the·places·you·visit·on·Monday,·June·3.·Travel·Logs·for·persons·younger·than·16·should·be·completed·by·an·adult·household·member.·¶

Step·3:·**Confirm·your·travel·information·with·us·online.**·¶

Please·have·your·Travel·Logs·handy·to·help·you·remember·the·details·of·your·travel.·¶

- Go·to·**www.wnctravelsurvey.com**·Click·"Report·Travel"·and·**enter·PIN#:·P9I8N7.**·Each·person·should·enter·his/her·own·travel·information.·An·adult·can·enter·information·for·anyone·under·age·16.·¶
- If·you·do·not·have·internet·access,·you·may·provide·your·household's·information·to·us·over·the·phone.·**Call**·toll-free·1-866-436-7828·to·provide·this·information·at·your·convenience.¶
- You·may·also·choose·to·fill·in·the·travel·logs·completely·and·return·them·using·the·enclosed,·postage·paid·envelope.·¶

If·you·complete·the·survey·online·(at·www.wnctravelsurvey.com),·we·will·send·you·a·check·for·$10·once·we·confirm·the·travel·information·for·all·household·members·has·been·reported.·You·can·expect·this·check·within·two·weeks·of·completing·the·survey.·¶

This·survey·is·being·conducted·by·Westat·on·behalf·of·the·French·Broad·River·Metropolitan·Planning·Organization·and·the·North·Carolina·Department·of·Transportation.··All·information·collected·will·be·held·in·confidence·according·to·law·and·used·only·in·combination·with·information·provided·from·other·participating·households.·¶

To·learn·more·about·this·study,·please·visit·www.wnctravelsurvey.com.·You·may·also·contact·French·Broad·River·MPO·staff·at·1-828-251-6622·or·mpo@landofsky.org.··For·more·information·about·the·FBRMPO,·visit·www.fbrmpo.org.¶

Thank·you·for·your·participation·and·for·helping·make·the·Western·North·Carolina·region·a·better·place·to·live,·work,·and·play—your·input·will·really·make·a·difference.·¶

¶

Sincerely,¶

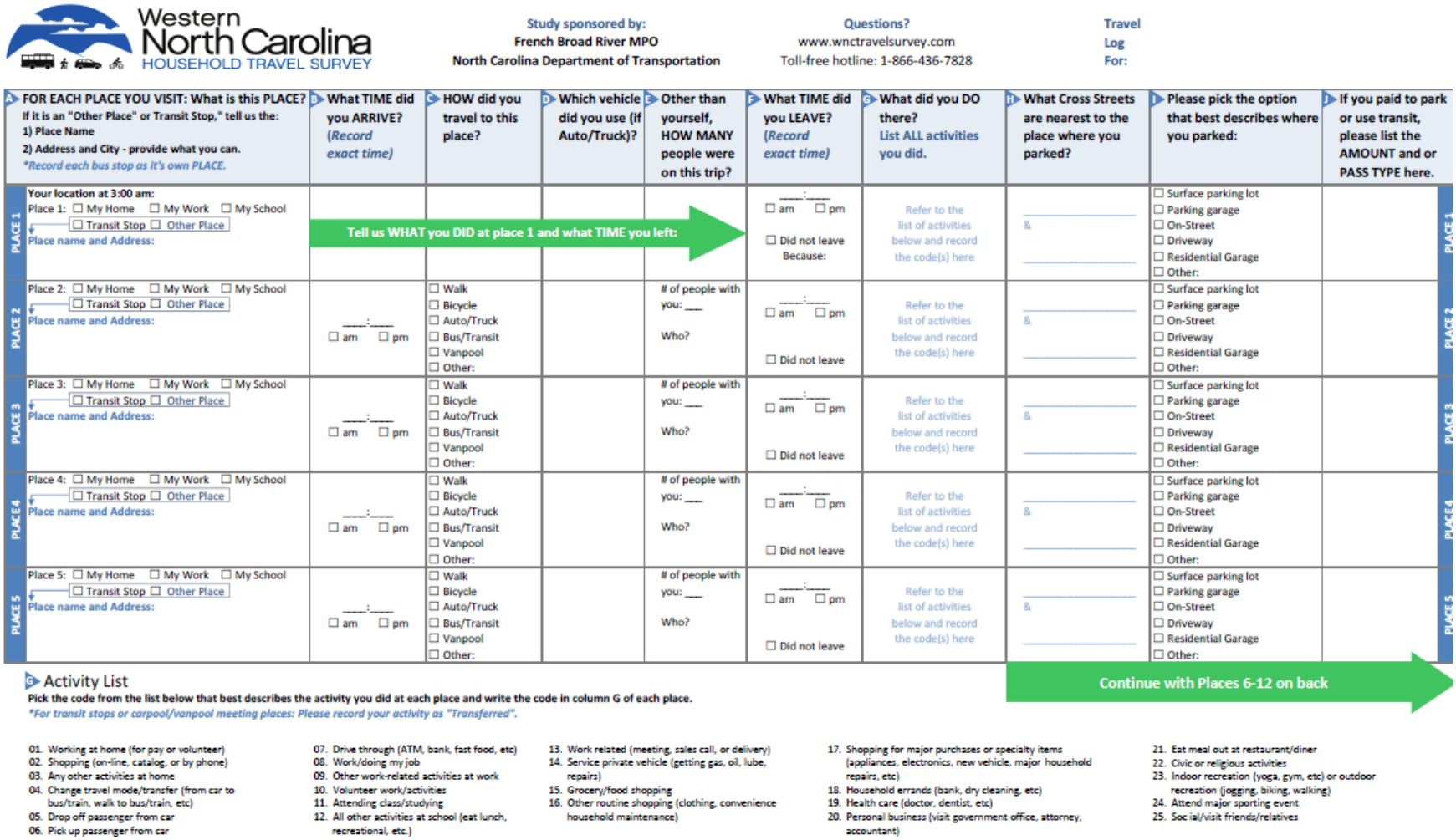
¶

Jan·Davis,·Chair¶

FBRMPO·TAC¶

6.1.4 Travel Logs

6.1.4.1 Participant Log



Western North Carolina HOUSEHOLD TRAVEL SURVEY

Study sponsored by:
French Broad River MPO
North Carolina Department of Transportation

Questions?
www.wnctravelsurvey.com
Toll-free hotline: 1-866-436-7828

Travel Log For:

A FOR EACH PLACE YOU VISIT: What is this PLACE? If it is an "Other Place" or Transit Stop," tell us the: 1) Place Name 2) Address and City - provide what you can. *Record each bus stop as it's own PLACE.	B What TIME did you ARRIVE? (Record exact time)	C HOW did you travel to this place?	D Which vehicle did you use (if Auto/Truck)?	E Other than yourself, HOW MANY people were on this trip?	F What TIME did you LEAVE? (Record exact time)	G What did you DO there? List ALL activities you did.	H What Cross Streets are nearest to the place where you parked?	I Please pick the option that best describes where you parked:	J If you paid to park or use transit, please list the AMOUNT and or PASS TYPE here.
PLACE 1 — Your location at 3:00 am: Place 1: ☐ My Home ☐ My Work ☐ My School ☐ Transit Stop ☐ Other Place — Place name and Address:	Tell us WHAT you DID at place 1 and what TIME you left:				____:____ ☐ am ☐ pm ☐ Did not leave Because:	Refer to the list of activities below and record the code(s) here	_____ & _____	☐ Surface parking lot ☐ Parking garage ☐ On-Street ☐ Driveway ☐ Residential Garage ☐ Other:	
PLACE 2 — Place 2: ☐ My Home ☐ My Work ☐ My School ☐ Transit Stop ☐ Other Place — Place name and Address:	____:____ ☐ am ☐ pm	☐ Walk ☐ Bicycle ☐ Auto/Truck ☐ Bus/Transit ☐ Vanpool ☐ Other:		# of people with you: ___ Who?	____:____ ☐ am ☐ pm ☐ Did not leave	Refer to the list of activities below and record the code(s) here	_____ & _____	☐ Surface parking lot ☐ Parking garage ☐ On-Street ☐ Driveway ☐ Residential Garage ☐ Other:	
PLACE 3 — Place 3: ☐ My Home ☐ My Work ☐ My School ☐ Transit Stop ☐ Other Place — Place name and Address:	____:____ ☐ am ☐ pm	☐ Walk ☐ Bicycle ☐ Auto/Truck ☐ Bus/Transit ☐ Vanpool ☐ Other:		# of people with you: ___ Who?	____:____ ☐ am ☐ pm ☐ Did not leave	Refer to the list of activities below and record the code(s) here	_____ & _____	☐ Surface parking lot ☐ Parking garage ☐ On-Street ☐ Driveway ☐ Residential Garage ☐ Other:	
PLACE 4 — Place 4: ☐ My Home ☐ My Work ☐ My School ☐ Transit Stop ☐ Other Place — Place name and Address:	____:____ ☐ am ☐ pm	☐ Walk ☐ Bicycle ☐ Auto/Truck ☐ Bus/Transit ☐ Vanpool ☐ Other:		# of people with you: ___ Who?	____:____ ☐ am ☐ pm ☐ Did not leave	Refer to the list of activities below and record the code(s) here	_____ & _____	☐ Surface parking lot ☐ Parking garage ☐ On-Street ☐ Driveway ☐ Residential Garage ☐ Other:	
PLACE 5 — Place 5: ☐ My Home ☐ My Work ☐ My School ☐ Transit Stop ☐ Other Place — Place name and Address:	____:____ ☐ am ☐ pm	☐ Walk ☐ Bicycle ☐ Auto/Truck ☐ Bus/Transit ☐ Vanpool ☐ Other:		# of people with you: ___ Who?	____:____ ☐ am ☐ pm ☐ Did not leave	Refer to the list of activities below and record the code(s) here	_____ & _____	☐ Surface parking lot ☐ Parking garage ☐ On-Street ☐ Driveway ☐ Residential Garage ☐ Other:	

Continue with Places 6-12 on back

G Activity List

Pick the code from the list below that best describes the activity you did at each place and write the code in column G of each place.

**For transit stops or carpool/vanpool meeting places: Please record your activity as "Transferred".*

01. Working at home (for pay or volunteer)
02. Shopping (on-line, catalog, or by phone)
03. Any other activities at home
04. Change travel mode/transfer (from car to bus/train, walk to bus/train, etc)
05. Drop off passenger from car
06. Pick up passenger from car
07. Drive through (ATM, bank, fast food, etc)
08. Work/doing my job
09. Other work-related activities at work
10. Volunteer work/activities
11. Attending class/studying
12. All other activities at school (eat lunch, recreational, etc.)
13. Work related (meeting, sales call, or delivery)
14. Service private vehicle (getting gas, oil, lube, repairs)
15. Grocery/food shopping
16. Other routine shopping (clothing, convenience household maintenance)
17. Shopping for major purchases or specialty items (appliances, electronics, new vehicle, major household repairs, etc)
18. Household errands (bank, dry cleaning, etc)
19. Health care (doctor, dentist, etc)
20. Personal business (visit government office, attorney, accountant)
21. Eat meal out at restaurant/diner
22. Civic or religious activities
23. Indoor recreation (yoga, gym, etc) or outdoor recreation (jogging, biking, walking)
24. Attend major sporting event
25. Soc ial/visit friends/relatives

6.1.4.2 Example Log

Western North Carolina HOUSEHOLD TRAVEL SURVEY

Study sponsored by:
French Broad River MPO
North Carolina Department of Transportation

Questions?
www.wnctravelsurvey.com
Toll-free hotline: 1-866-436-7828

Travel Log For:

A. FOR EACH PLACE YOU VISIT: What is this PLACE? If it is an "Other Place" or Transit Stop," tell us the: 1) Place Name 2) Address and City - provide what you can. *Record each bus stop as it's own PLACE.	B. What TIME did you ARRIVE? (Record exact time)	C. HOW did you travel to this place?	D. Which vehicle did you use (if Auto/Truck)?	E. Other than yourself, HOW MANY people were on this trip?	F. What TIME did you LEAVE? (Record exact time)	G. What did you DO there? List ALL activities you did.	H. What Cross Streets are nearest to the place where you parked?	I. Please pick the option that best describes where you parked:	J. If you paid to park or use transit, please list the AMOUNT and or PASS TYPE here.
PLACE 1 Your location at 3:00 am: Place 1: [X] My Home [ ] My Work [ ] My School [ ] Transit Stop [ ] Other Place Place name and Address:	Tell us WHAT you DID at place 1 and what TIME you left:				7 :30 [X] am [ ] pm [ ] Did not leave Because:	Refer to the list of activities below and record the code(s) here: 01, 02, 03	&	[ ] Surface parking lot [ ] Parking garage [ ] On-Street [ ] Driveway [ ] Residential Garage [ ] Other:	PLACE 1
PLACE 2 Place 2: [ ] My Home [ ] My Work [ ] My School [ ] Transit Stop [X] Other Place Place name and Address: Gas Station C Tunnel Rd + Pleasant Ridge	7 :41 [X] am [ ] pm	[ ] Walk [ ] Bicycle [X] Auto/Truck [ ] Bus/Transit [ ] Vanpool [ ] Other:	2010 Honda	# of people with you: 0 Who?	7 :46 [X] am [ ] pm [ ] Did not leave	Refer to the list of activities below and record the code(s) here: 14, 16	N/A &	[ ] Surface parking lot [ ] Parking garage [ ] On-Street [ ] Driveway [X] Residential Garage [ ] Other:	N/A PLACE 2
PLACE 3 Place 3: [ ] My Home [X] My Work [ ] My School [ ] Transit Stop [ ] Other Place Place name and Address:	8 :15 [X] am [ ] pm	[ ] Walk [ ] Bicycle [X] Auto/Truck [ ] Bus/Transit [ ] Vanpool [ ] Other:	2010 Honda	# of people with you: 0 Who?	5 :00 [ ] am [X] pm [ ] Did not leave	Refer to the list of activities below and record the code(s) here: 13	&	[ ] Surface parking lot [X] Parking garage [ ] On-Street [ ] Driveway [ ] Residential Garage [ ] Other:	$5.00 Daily PLACE 3
PLACE 4 Place 4: [ ] My Home [ ] My Work [ ] My School [ ] Transit Stop [X] Other Place Place name and Address: Carolina Grill	5 :30 [ ] am [X] pm	[ ] Walk [ ] Bicycle [X] Auto/Truck [ ] Bus/Transit [ ] Vanpool [ ] Other:	2010 Honda	# of people with you: 0 Who?	7 :00 [ ] am [X] pm [ ] Did not leave	Refer to the list of activities below and record the code(s) here: 21	Knight Rd & Tunnel Rd	[X] Surface parking lot [ ] Parking garage [ ] On-Street [ ] Driveway [ ] Residential Garage [ ] Other:	N/A PLACE 4
PLACE 5 Place 5: [X] My Home [ ] My Work [ ] My School [ ] Transit Stop [ ] Other Place Place name and Address:	7 :15 [ ] am [X] pm	[ ] Walk [ ] Bicycle [X] Auto/Truck [ ] Bus/Transit [ ] Vanpool [ ] Other:	2010 Honda	# of people with you: 0 Who?	: [ ] am [ ] pm [X] Did not leave	Refer to the list of activities below and record the code(s) here: 01, 02, 03	&	[ ] Surface parking lot [ ] Parking garage [ ] On-Street [ ] Driveway [ ] Residential Garage [ ] Other:	PLACE 5

Continue with Places 6-12 on back

G. Activity List

Pick the code from the list below that best describes the activity you did at each place and write the code in column G of each place.

*For transit stops or carpool/vanpool meeting places: Please record your activity as "Transferred".

01. Working at home (for pay or volunteer)
02. Shopping (on-line, catalog, or by phone)
03. Any other activities at home
04. Change travel mode/transfer (from car to bus/train, walk to bus/train, etc)
05. Drop off passenger from car
06. Pick up passenger from car
07. Drive through (ATM, bank, fast food, etc)
08. Work/doing my job
09. Other work-related activities at work
10. Volunteer work/activities
11. Attending class/studying
12. All other activities at school (eat lunch, recreational, etc.)
13. Work related (meeting, sales call, or delivery)
14. Service private vehicle (getting gas, oil, lube, repairs)
15. Grocery/food shopping
16. Other routine shopping (clothing, convenience household maintenance)
17. Shopping for major purchases or specialty items (appliances, electronics, new vehicle, major household repairs, etc)
18. Household errands (bank, dry cleaning, etc)
19. Health care (doctor, dentist, etc)
20. Personal business (visit government office, attorney, accountant)
21. Eat meal out at restaurant/diner
22. Civic or religious activities
23. Indoor recreation (yoga, gym, etc) or outdoor recreation (jogging, biking, walking)
24. Attend major sporting event
25. Soc ial/visit friends/relatives

6.2 List of Derived Variables

HOUSEHOLD TABLE

- HHSIZX: Actual count of number of household members.
- HHSTUD: Count of the number of students in each household (STUDE = 1 or 2).
- HHWORKER: Count of the number of workers in each household (EMPLY = 1).
- HHLICDRV: Count of the license holders in each household (LIC = 1).
- HHCHILD: Count of the number of children in each household (AGE = 1 or AAGE = 2).
- HHTRIPS: Count of total number of trips taken by household on travel day
- LIFCYCLE: Classification of each household using the number of children, adults and retired members. Each household is classified into one of the 10 categories below.
    - 01 = Household has one adult, no children and no retired persons.
    - 02 = Household has 2 or more adults, no children and no retired persons.
    - 03 = Household has one adult and the youngest child is 0 to 5 years old.
    - 04 = Household has 2 or more adults and the youngest child is 0 to 5 years old.
    - 05 = Household has one adult and the youngest child is 6 to 15 years old.
    - 06 = Household has 2 or more adults and the youngest child is 6 to 15 years old.
    - 07 = Household has one adult and the youngest child is 16 to 21 years old.
    - 08 = Household has 2 or more adults and the youngest child is 16 to 21 years old.
    - 09 = Household has one retired adult and no children.
    - 10 = Household has 2 or more adults; at least one is retired and no children.

PERSON TABLE

- WSTRT: Conversion of the participant's work start time to military time
- WEND: Conversion of the participant's work end time to military time

VEHICLE TABLE

- HHVEHX: Count of the number of vehicles rostered in each household.

TRIP TABLE

- NONHHMTP: Count of non-household members on trip.

6.3 Additional Recruitment Frequency Tables

Table 46: Number of Children in Household by County

Household Children	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Buncombe				
0	727	83%	73,090	72%
1	91	10%	16,158	16%
2	49	6%	7,640	8%
3	9	1%	4,021	4%
4+	0	0%	0	0%
	876	**62%**	**100,909**	**52%**
Haywood				
0	115	83%	20,155	76%
1	16	12%	4,302	16%
2	4	3%	1,238	5%
3	3	2%	790	3%
4+	1	1%	174	1%
	139	**10%**	**26,659**	**14%**
Henderson				
0	219	86%	34,642	77%
1	11	4%	2,882	6%
2	14	6%	5,728	13%
3	7	3%	1,635	4%
4+	3	1%	294	1%
	254	**18%**	**45,180**	**23%**
Madison				
0	43	75%	5,849	72%
1	8	14%	1,310	16%
2	4	7%	600	7%
3	1	2%	224	3%
4+	1	2%	100	1%
	57	**4%**	**8,082**	**4%**
Transylvania				
0	84	88%	10,909	78%
1	8	8%	2,120	15%
2	4	4%	885	6%
3	0	0%	0	0%
4+	0	0%	0	0%
	96	**7%**	**13,914**	**7%**
Total	**1,422**	**100%**	**194,744**	**100%**

Table 47: Participant Disability Status by County

Household Disability	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Buncombe				
Yes	71	8%	8,734	9%
No	798	91%	91,416	91%
Don't Know	0	0%	0	0%
Refused	7	1%	759	1%
	876	**62%**	**100,909**	**52%**
Haywood				
Yes	16	12%	4,414	17%
No	122	88%	21,807	82%
Don't Know	0	0%	0	0%
Refused	1	1%	437	2%
	139	**10%**	**26,659**	**14%**
Henderson				
Yes	14	6%	3,776	8%
No	234	92%	39,747	88%
Don't Know	0	0%	0	0%
Refused	6	2%	1,656	4%
	254	**18%**	**45,180**	**23%**
Madison				
Yes	5	9%	704	9%
No	51	89%	7,154	89%
Don't Know	1	2%	224	3%
Refused	0	0%	0	0%
	57	**4%**	**8,082**	**4%**
Transylvania				
Yes	1	1%	130	1%
No	95	99%	13,784	99%
Don't Know	0	0%	0	0%
Refused	0	0%	0	0%
	96	**7%**	**13,914**	**7%**
Total	**1,422**	**100%**	**194,744**	**100%**

Table 48: Participant Employment Status by County

Person Employment Status	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Buncombe				
Worker	918	62%	114,940	60%
Retired	341	23%	32,154	17%
Homemaker	42	3%	8,100	4%
Unemployed, but looking for work	40	3%	8,551	4%
Unemployed, not seeking employment	17	1%	3,865	2%
Student	54	4%	12,412	7%
Something else	28	2%	3,909	2%
NOT ASCERTAINED	45	3%	6,229	3%
	1,485	**60%**	**190,159**	**52%**
Haywood				
Worker	133	53%	25,154	52%
Retired	82	33%	12,940	27%
Homemaker	12	5%	3,970	8%
Unemployed, but looking for work	5	2%	2,508	5%
Unemployed, not seeking employment	2	1%	334	1%
Student	1	0%	173	0%
Something else	5	2%	1,661	3%
NOT ASCERTAINED	12	5%	2,090	4%
	252	**10%**	**48,830**	**13%**
Henderson				
Worker	227	51%	46,516	56%
Retired	149	33%	22,891	27%
Homemaker	23	5%	4,568	5%
Unemployed, but looking for work	4	1%	638	1%
Unemployed, not seeking employment	4	1%	2,281	3%
Student	6	1%	2,174	3%
Something else	19	4%	3,632	4%
NOT ASCERTAINED	14	3%	622	1%
	446	**18%**	**83,322**	**23%**
Madison				
Worker	61	53%	8,916	52%
Retired	23	20%	2,968	17%
Homemaker	8	7%	1,564	9%
Unemployed, but looking for work	5	4%	880	5%
Unemployed, not seeking employment	1	1%	296	2%
Student	6	5%	980	6%
Something else	8	7%	1,289	7%
NOT ASCERTAINED	3	3%	316	2%
	115	**5%**	**17,208**	**5%**
Transylvania				
Worker	61	38%	13,139	48%
Retired	77	48%	9,443	35%
Homemaker	4	3%	811	3%
Unemployed, but looking for work	3	2%	1,242	5%
Unemployed, not seeking employment	3	2%	688	3%
Student	1	1%	248	1%

Person Employment Status	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Something else	1	1%	146	1%
NOT ASCERTAINED	9	6%	1,513	6%
	159	6%	27,231	7%
Total	2,457	100%	366,751	100%

Table 49: Participant Volunteer Status by County

Person Volunteer Status	Unweighted		Weighted	
	Frequency	Percentage	Frequency	Percentage
Buncombe				
Yes	446	30%	49,637	26%
No	1,010	68%	136,168	72%
Don't know	11	1%	2,495	1%
Refused	18	1%	1,859	1%
	1,485	60%	190,159	52%
Haywood				
Yes	60	24%	10,944	22%
No	186	74%	36,406	75%
Don't know	3	1%	350	1%
NOT ASCERTAINED	1	0%	36	0%
Refused	2	1%	1,094	2%
	252	10%	48,830	13%
Henderson				
Yes	147	33%	22,715	27%
No	290	65%	59,913	72%
Don't know	2	0%	122	0%
Refused	7	2%	572	1%
	446	18%	83,322	23%
Madison				
Yes	32	28%	4,333	25%
No	79	69%	12,371	72%
Don't know	1	1%	145	1%
Refused	3	3%	359	2%
	115	5%	17,208	5%
Transylvania				
Yes	73	46%	11,938	44%
No	83	52%	14,587	54%
Refused	3	2%	706	3%
	159	6%	27,231	7%
Total	2,457	100%	366,751	100%

6.4 Additional Retrieval Frequency Tables

Table 50: Total Persons Traveling on Trip by County

	Unweighted		Weighted	
Trip Party Size	Frequency	Percentage	Frequency	Percentage
Buncombe				
1	4,204	65%	511,757	60%
2	1,746	27%	227,455	27%
3	342	5%	69,031	8%
4	150	2%	24,850	3%
5+	72	1%	15,060	2%
	6,514	62%	848,154	53%
Haywood				
1	561	53%	88,777	52%
2	364	35%	61,625	36%
3	53	5%	9,090	5%
4	55	5%	8,422	5%
5+	20	2%	3,118	2%
	1,053	10%	171,032	11%
Henderson				
1	1,145	61%	196,676	50%
2	528	28%	140,371	36%
3	120	6%	27,513	7%
4	45	2%	23,797	6%
5+	34	2%	4,756	1%
	1,872	18%	393,111	25%
Madison				
1	250	61%	35,182	58%
2	110	27%	17,331	28%
3	36	9%	5,279	9%
4	5	1%	1,172	2%
5+	11	3%	1,971	3%
	412	4%	60,935	4%
Transylvania				
1	369	52%	59,998	46%
2	257	36%	47,527	36%
3	69	10%	19,843	15%
4	7	1%	3,411	3%
5+	6	1%	507	0%
	708	7%	131,286	8%
Total	10,559	100%	1,604,518	100%

Table 51: Household Members Traveling on Trip by County

	Unweighted		Weighted	
Trip Household Members	Frequency	Percentage	Frequency	Percentage
Buncombe				
1	4,872	75%	596,489	70%
2	1,370	21%	188,455	22%
3	198	3%	42,272	5%
4	62	1%	18,168	2%
5+	12	0%	2,771	0%
	6,514	**62%**	**848,154**	**53%**
Haywood				
1	659	63%	105,343	62%
2	319	30%	51,453	30%
3	38	4%	8,182	5%
4	27	3%	4,325	3%
5+	10	1%	1,729	1%
	1,053	**10%**	**171,032**	**11%**
Henderson				
1	1,312	70%	261,582	67%
2	439	23%	90,987	23%
3	79	4%	19,577	5%
4	26	1%	19,149	5%
5+	16	1%	1,816	0%
	1,872	**18%**	**393,111**	**25%**
Madison				
1	265	64%	36,973	61%
2	115	28%	18,727	31%
3	24	6%	3,275	5%
4	8	2%	1,960	3%
5+	0	0%	0	0%
	412	**4%**	**60,935**	**4%**
Transylvania				
1	426	60%	71,829	55%
2	251	35%	51,146	39%
3	25	4%	5,657	4%
4	6	1%	2,654	2%
5+	0	0%	0	0%
	708	**7%**	**131,286**	**8%**
Total	**10,559**	**100%**	**1,604,518**	**100%**

Table 52: Non- Household Members Traveling on Trip by County

	Unweighted		Weighted	
Trip Non-household Members	Frequency	Percentage	Frequency	Percentage
Buncombe				
0	5,733	88%	742,673	88%
1	545	8%	73,283	9%
2	124	2%	15,623	2%
3	55	1%	4,392	1%
4	7	0%	1,298	0%
5+	50	1%	10,883	1%
	6,514	**62%**	**848,154**	**53%**
Haywood				
0	905	86%	147,095	86%
1	110	10%	19,323	11%
2	21	2%	2,808	2%
3	7	1%	417	0%
4	0	0%	0	0%
5+	10	1%	1,389	1%
	1,053	**10%**	**171,032**	**11%**
Henderson				
0	1,656	88%	319,213	81%
1	157	8%	61,015	16%
2	36	2%	9,960	3%
3	9	0%	439	0%
4	0	0%	0	0%
5+	14	1%	2,485	1%
	1,872	**18%**	**393,111**	**25%**
Madison				
0	380	92%	55,865	92%
1	19	5%	2,871	5%
2	5	1%	1,016	2%
3	0	0%	0	0%
4	4	1%	716	1%
5+	4	1%	467	1%
	412	**4%**	**60,935**	**4%**
Transylvania				
0	622	88%	108,024	82%
1	58	8%	18,735	14%
2	21	3%	3,263	2%
3	7	1%	1,264	1%
4	0	0%	0	0%
5+	0	0%	0	0%
	708	**7%**	**131,286**	**8%**
Total	**10,559**	**100%**	**1,604,518**	**100%**

Table 53: Reason for No Trips on Travel Day (TD) by County

Person No Travel Reason	Unweighted Frequency	Unweighted Percentage	Weighted Frequency	Weighted Percentage
Buncombe				
Personally Sick	13	7%	1,571	6%
Vacation or Personal Day	32	18%	5,281	21%
Caretaking Sick Kids	3	2%	1,402	5%
Caretaking Sick Other	2	1%	96	0%
Home-bound Elderly or Disabled	24	13%	1,932	8%
Worked at home for pay	19	11%	2,263	9%
Not Schedule to Work	27	15%	3,141	12%
Worked Around Home (Not For Pay)	32	18%	8,038	31%
Out of Area	16	9%	1,083	4%
Don't know	9	5%	650	3%
Refused	3	2%	193	1%
	180	**53%**	**25,648**	**43%**
Haywood				
Personally Sick	3	8%	607	4%
Vacation or Personal Day	7	19%	4,490	30%
Home-bound Elderly or Disabled	4	11%	2,161	14%
Worked at home for pay	2	6%	292	2%
Not Schedule to Work	2	6%	967	6%
Worked Around Home (Not For Pay)	10	28%	3,984	27%
Out of Area	5	14%	1,681	11%
Don't know	2	6%	236	2%
NOT ASCERTAINED	1	3%	489	3%
	36	**11%**	**14,906**	**25%**
Henderson				
Personally Sick	7	10%	424	4%
Vacation or Personal Day	11	15%	1,589	13%
Home-bound Elderly or Disabled	15	21%	2,130	18%
Worked at home for pay	8	11%	1,974	17%
Not Schedule to Work	4	5%	284	2%
Worked Around Home (Not For Pay)	19	26%	3,516	30%
Out of Area	2	3%	644	5%
No Transportation Available	1	1%	815	7%
Other	4	5%	346	3%
Don't know	1	1%	23	0%
Refused	1	1%	73	1%
	73	**21%**	**11,817**	**20%**
Transylvania				
Personally Sick	1	4%	102	3%
Vacation or Personal Day	3	13%	477	14%
Home-bound Elderly or Disabled	3	13%	654	19%
Worked at home for pay	2	9%	208	6%
Not Schedule to Work	2	9%	169	5%
Worked Around Home (Not For Pay)	9	39%	1,190	35%
Out of Area	1	4%	192	6%
Don't know	1	4%	130	4%
Refused	1	4%	248	7%

Person No Travel Reason	Unweighted Frequency	Unweighted Percentage	Weighted Frequency	Weighted Percentage
	23	**7%**	**3,369**	**6%**
Madison				
Personally Sick	1	4%	98	2%
Vacation or Personal Day	7	25%	1,156	26%
Home-bound Elderly or Disabled	2	7%	297	7%
Not Schedule to Work	1	4%	128	3%
Worked Around Home (Not For Pay)	8	29%	1,246	28%
No Transportation Available	5	18%	1,082	24%
Other	4	14%	436	10%
	28	**8%**	**4,443**	**7%**
Total	**340**	**100%**	**60,183**	**100%**

6.5 Crosstabs for Key Sample Management Variables

Table 54: Workers by HH Size by County

Household Size	# of Household Workers	Unweighted Frequency	Unweighted Percentage	Weighted Frequency	Weighted Percentage
Buncombe					
1	0	146	46%	15,801	49%
	1	171	54%	16,149	51%
		317	**36%**	**31,950**	**32%**
2	0	128	33%	11,016	30%
	1	94	24%	12,268	33%
	2	166	43%	13,520	37%
		388	**44%**	**36,804**	**36%**
3	0	6	6%	1,553	10%
	1	27	26%	5,227	33%
	2	61	60%	7,933	50%
	3	8	8%	1,144	7%
		102	**12%**	**15,857**	**16%**
4+	0	2	3%	324	2%
	1	17	25%	6,808	42%
	2	43	62%	7,420	46%
	3	5	7%	1,653	10%
	4+	2	3%	93	1%
		69	**8%**	**16,298**	**16%**
		876	**62%**	**100,909**	**52%**
Haywood					
1	0	20	50%	4,358	61%
	1	20	50%	2,794	39%
		40	**29%**	**7,152**	**27%**
2	0	31	44%	4,562	40%
	1	16	23%	3,448	30%
	2	24	34%	3,297	29%
		71	**51%**	**11,307**	**42%**
3	0	3	17%	560	12%

Household Size	# of Household Workers	Unweighted		Weighted	
		Frequency	Percentage	Frequency	Percentage
	1	5	28%	1,833	38%
	2	8	44%	2,068	43%
	3	2	11%	352	7%
		18	**13%**	**4,813**	**18%**
4+	0	3	30%	1,331	39%
	1	2	20%	890	26%
	2	1	10%	557	16%
	3	3	30%	363	11%
	4+	1	10%	246	7%
		10	**7%**	**3,387**	**13%**
		139	**10%**	**26,659**	**14%**
Henderson					
1	0	48	63%	7,811	61%
	1	28	37%	4,996	39%
		76	**30%**	**12,807**	**28%**
2	0	63	48%	7,191	39%
	1	24	18%	5,899	32%
	2	44	34%	5,228	29%
		131	**52%**	**18,318**	**41%**
3	1	7	33%	1,864	30%
	2	11	52%	4,123	67%
	3	3	14%	155	3%
		21	**8%**	**6,142**	**14%**
4+	1	11	42%	3,855	49%
	2	10	38%	3,527	45%
	3	4	15%	402	5%
	4+	1	4%	129	2%
		26	**10%**	**7,914**	**18%**
		254	**18%**	**45,180**	**23%**
Madison					
1	0	6	55%	1,029	63%
	1	5	45%	605	37%
		11	**19%**	**1,634**	**20%**
2	0	5	19%	826	23%
	1	13	50%	1,664	45%
	2	8	31%	1,174	32%
		26	**46%**	**3,664**	**45%**
3	0	3	23%	365	21%
	1	4	31%	629	36%
	2	5	38%	654	38%
	3	1	8%	86	5%
		13	**23%**	**1,734**	**21%**
4+	0	3	43%	574	55%
	1	1	14%	100	9%
	2	3	43%	376	36%
		7	**12%**	**1,050**	**13%**
		57	**4%**	**8,082**	**4%**
Transylvania					

Household Size	# of Household Workers	Unweighted		Weighted	
		Frequency	Percentage	Frequency	Percentage
1	0	24	67%	2,618	61%
	1	12	33%	1,642	39%
		36	**38%**	**4,260**	**31%**
2	0	32	74%	4,311	73%
	1	5	12%	708	12%
	2	6	14%	868	15%
		43	**45%**	**5,887**	**42%**
3	0	1	8%	167	6%
	1	4	33%	1,200	44%
	2	6	50%	1,255	46%
	3	1	8%	130	5%
		12	**13%**	**2,753**	**20%**
4+	1	1	20%	167	17%
	2	3	60%	717	71%
	3	1	20%	130	13%
		5	**5%**	**1,014**	**7%**
		96	**7%**	**13,914**	**7%**
Total		**1,422**	**100%**	**194,744**	**100%**

Table 55: Vehicles by HH Size by County

Household Size	# of Household Vehicles	Unweighted		Weighted	
		Frequency	Percentage	Frequency	Percentage
Buncombe					
1	0	38	12%	4,313	13%
	1	257	81%	23,424	73%
	2	21	7%	3,553	11%
	4	1	0%	660	2%
		317	**36%**	**31,950**	**32%**
2	0	12	3%	1,094	3%
	1	72	19%	9,334	25%
	2	250	64%	19,096	52%
	3	45	12%	5,340	15%
	4	7	2%	1,375	4%
	5+	2	1%	564	2%
		388	**44%**	**36,804**	**36%**
3	0	2	2%	222	1%
	1	22	22%	3,021	19%
	2	47	46%	6,664	42%
	3	26	25%	4,402	28%
	4	4	4%	1,279	8%
	5+	1	1%	269	2%
		102	**12%**	**15,857**	**16%**
4+	1	5	7%	1,034	6%
	2	43	62%	8,584	53%
	3	15	22%	5,338	33%
	4	5	7%	1,212	7%
	5+	1	1%	130	1%

Household Size	# of Household Vehicles	Unweighted		Weighted	
		Frequency	Percentage	Frequency	Percentage
		69	**8%**	**16,298**	**16%**
		876	**62%**	**100,909**	**52%**
Haywood					
1	0	3	8%	223	3%
	1	32	80%	6,181	86%
	2	5	13%	749	10%
		40	**29%**	**7,152**	**27%**
2	0	5	7%	1,117	10%
	1	11	15%	2,252	20%
	2	38	54%	5,348	47%
	3	12	17%	1,861	16%
	4	2	3%	311	3%
	5+	3	4%	418	4%
		71	**51%**	**11,307**	**42%**
3	0	1	6%	174	4%
	1	3	17%	800	17%
	2	7	39%	2,569	53%
	3	6	33%	1,094	23%
	4	1	6%	176	4%
		18	**13%**	**4,813**	**18%**
4+	1	5	50%	1,459	43%
	2	3	30%	790	23%
	4	1	10%	1,007	30%
	5+	1	10%	131	4%
		10	**7%**	**3,387**	**13%**
		139	**10%**	**26,659**	**14%**
Henderson					
1	0	10	13%	2,390	19%
	1	57	75%	7,724	60%
	2	9	12%	2,693	21%
		76	**30%**	**12,807**	**28%**
2	0	4	3%	439	2%
	1	36	27%	4,296	23%
	2	69	53%	10,283	56%
	3	20	15%	3,045	17%
	4	1	1%	205	1%
	5+	1	1%	50	0%
		131	**52%**	**18,318**	**41%**
3	1	2	10%	153	2%
	2	15	71%	4,471	73%
	3	3	14%	1,475	24%
	4	1	5%	43	1%
		21	**8%**	**6,142**	**14%**
4+	1	2	8%	232	3%
	2	16	62%	5,953	75%
	3	5	19%	465	6%
	4	2	8%	1,133	14%
	5+	1	4%	129	2%

Household Size	# of Household Vehicles	Unweighted		Weighted	
		Frequency	Percentage	Frequency	Percentage
		26	**10%**	**7,914**	**18%**
		254	**18%**	**45,180**	**23%**
Madison					
1	1	8	73%	1,269	78%
	2	3	27%	365	22%
		11	**19%**	**1,634**	**20%**
2	0	1	4%	143	4%
	1	1	4%	252	7%
	2	18	69%	2,540	69%
	3	4	15%	418	11%
	4	1	4%	112	3%
	5+	1	4%	199	5%
		26	**46%**	**3,664**	**45%**
3	1	3	23%	405	23%
	2	4	31%	589	34%
	3	3	23%	378	22%
	4	3	23%	362	21%
		13	**23%**	**1,734**	**21%**
4+	2	2	29%	350	33%
	3	4	57%	600	57%
	4	1	14%	100	9%
		7	**12%**	**1,050**	**13%**
		57	**4%**	**8,082**	**4%**
Transylvania					
1	1	28	78%	3,284	77%
	2	7	19%	923	22%
	3	1	3%	53	1%
		36	**38%**	**4,260**	**31%**
2	0	1	2%	88	1%
	1	6	14%	1,240	21%
	2	30	70%	3,545	60%
	3	6	14%	1,015	17%
		43	**45%**	**5,887**	**42%**
3	1	1	8%	643	23%
	2	4	33%	687	25%
	3	6	50%	1,182	43%
	4	1	8%	241	9%
		12	**13%**	**2,753**	**20%**
4+	2	4	80%	668	66%
	3	1	20%	346	34%
		5	**5%**	**1,014**	**7%**
		96	**7%**	**13,914**	**7%**
Total		**1,422**	**100%**	**194,744**	**100%**

Table 56: Vehicles by Workers by County

Household Vehicles	# of Household Workers	Unweighted		Weighted	
		Frequency	Percentage	Frequency	Percentage
Buncombe					
0	0	34	65%	4,164	74%
	1	14	27%	1,164	21%
	2	4	8%	301	5%
		52	**6%**	**5,629**	**6%**
1	0	140	39%	13,678	37%
	1	184	52%	19,761	54%
	2	30	8%	2,912	8%
	3	2	1%	463	1%
		356	**41%**	**36,814**	**36%**
2	0	93	26%	8,224	22%
	1	87	24%	13,259	35%
	2	177	49%	15,369	41%
	3	3	1%	1,019	3%
	4+	1	0%	26	0%
		361	**41%**	**37,897**	**38%**
3	0	13	15%	1,727	11%
	1	14	16%	3,620	24%
	2	52	60%	8,696	58%
	3	6	7%	969	6%
	4+	1	1%	67	0%
		86	**10%**	**15,080**	**15%**
4+	0	2	10%	902	16%
	1	10	48%	2,646	48%
	2	7	33%	1,594	29%
	3	2	10%	346	6%
		21	**2%**	**5,489**	**5%**
		876	**62%**	**100,909**	**52%**
Haywood					
0	0	3	33%	342	23%
	1	5	56%	784	52%
	2	1	11%	388	26%
		9	**6%**	**1,514**	**6%**
1	0	25	49%	5,661	53%
	1	21	41%	4,144	39%
	2	3	6%	492	5%
	3	1	2%	149	1%
	4+	1	2%	246	2%
		51	**37%**	**10,692**	**40%**
2	0	22	42%	2,559	27%
	1	13	25%	3,528	37%
	2	17	32%	3,286	35%
	3	1	2%	83	1%
		53	**38%**	**9,455**	**35%**
3	0	4	22%	785	27%

Household Vehicles	# of Household Workers	Unweighted		Weighted	
		Frequency	Percentage	Frequency	Percentage
	1	3	17%	339	11%
	2	10	56%	1,655	56%
	3	1	6%	176	6%
		18	**13%**	**2,955**	**11%**
4+	0	3	38%	1,464	72%
	1	1	13%	171	8%
	2	2	25%	101	5%
	3	2	25%	307	15%
		8	**6%**	**2,043**	**8%**
		139	**10%**	**26,659**	**14%**
Henderson					
0	0	12	86%	2,538	90%
	1	2	14%	291	10%
		14	**6%**	**2,829**	**6%**
1	0	59	61%	5,689	46%
	1	31	32%	6,231	50%
	2	7	7%	485	4%
		97	**38%**	**12,405**	**27%**
2	0	34	31%	6,213	27%
	1	30	28%	7,725	33%
	2	42	39%	9,300	40%
	3	3	3%	161	1%
		109	**43%**	**23,400**	**52%**
3	0	5	18%	357	7%
	1	6	21%	1,815	36%
	2	13	46%	2,417	48%
	3	4	14%	396	8%
		28	**11%**	**4,985**	**11%**
4+	0	1	17%	205	13%
	1	1	17%	551	35%
	2	3	50%	675	43%
	4+	1	17%	129	8%
		6	**2%**	**1,560**	**3%**
		254	**18%**	**45,180**	**23%**
Madison					
0	1	1	100%	143	100%
		1	**2%**	**143**	**2%**
1	0	7	58%	1,311	68%
	1	5	42%	615	32%
		12	**21%**	**1,926**	**24%**
2	0	9	33%	1,259	33%
	1	13	48%	1,819	47%
	2	5	19%	766	20%
		27	**47%**	**3,844**	**48%**
3	0	1	9%	224	16%
	1	3	27%	309	22%
	2	7	64%	863	62%
		11	**19%**	**1,396**	**17%**

Household Vehicles	# of Household Workers	Unweighted		Weighted	
		Frequency	Percentage	Frequency	Percentage
4+	1	1	17%	112	15%
	2	4	67%	574	74%
	3	1	17%	86	11%
		6	**11%**	**773**	**10%**
		57	**4%**	**8,082**	**4%**
Transylvania					
0	0	1	100%	88	100%
		1	**1%**	**88**	**1%**
1	0	23	66%	3,026	59%
	1	11	31%	2,041	39%
	2	1	3%	100	2%
		35	**36%**	**5,167**	**37%**
2	0	29	64%	3,512	60%
	1	9	20%	1,379	24%
	2	5	11%	672	12%
	3	2	4%	260	4%
		45	**47%**	**5,823**	**42%**
3	0	4	29%	471	18%
	1	2	14%	297	11%
	2	8	57%	1,827	70%
		14	**15%**	**2,596**	**19%**
4+	2	1	100%	241	100%
		1	**1%**	**241**	**2%**
		96	**7%**	**13,914**	**7%**
Total		**1,422**	**100%**	**194,744**	**100%**