CHAPTER 3 - SURVEY PROCEDURES AND METHODOLOGY

3-A. OVERVIEW

WHO IS INCLUDED

The NPTS collected travel data from the civilian, non-institutionalized population of the United States. People living in college dormitories, nursing homes, other medical institutions, prisons, and on military bases were excluded from the sample.

There are a total of 42,033 households on the final 1995 NPTS dataset. Approximately half of the households are in the "national sample" and the other half represent the add-on areas of:

New York State
Commonwealth of Massachusetts
Oklahoma City, Oklahoma
Tulsa, Oklahoma, and
Seattle, Washington.

These areas purchased larger samples to support their planning needs. Interview data from all 42,033 households are included on the public use data file. For areas that conducted add-on surveys, the weights were adjusted downward so their inclusion does not skew the national estimates.

All household members age 5 or older were eligible to be interviewed. For children ages 5 through 13, an adult member of the household reported for them.

HOW THE DATA ARE COLLECTED

The NPTS was conducted as a telephone survey, using Computer-Assisted Telephone Interviewing (CATI) technology. The sample was a list-assisted telephone number sample.

Each household in the sample was assigned a specific 24-hour "Travel Day" and a 14-day "Travel Period" for which detailed data on all travel were collected.

The households were contacted by an advance letter, followed by a telephone contact. After the first telephone interview, the household interview, travel diaries were mailed to the household so that each household member could record their travel on the assigned Travel Day.

Residents of the sampled households were contacted by telephone as soon as possible after Travel Day to record their travel. A six-day window was established to obtain the travel day data.

Odometer readings from each household vehicle were also collected by telephone contacts at two points in time.

WHEN THE DATA ARE COLLECTED

The NPTS interviews were conducted from May 1995 through June 1996.

The survey is conducted over a 12-month period so that seasonal variations in travel are represented. The 1995 NPTS took 14 months, rather than 12, because the number of interviewers working on the project varied throughout the year. The weighting adjusts for the monthly differences in number of interviews.

Travel days were assigned to all seven days of the week, including holidays. The intent is to represent travel across an entire year.

GEOGRAPHIC COVERAGE

Interviews were conducted with households in all 50 States and the District of Columbia. A new sample of telephone numbers located throughout the United States was used every quarter to insure that all geographic areas were represented in all seasons.

The following section contains more information on the add-on areas.

3-B. SAMPLE DESIGN AND SELECTION

OVERVIEW

The 1995 NPTS sample was designed as a list-assisted telephone number sample. The sample design yields a representative national sample of all U.S. telephone households.

The national sample was increased within the planning areas of two States and three local transportation planning organizations, who purchased additional samples to provide data for their planning efforts. These areas are referred to as "add-ons".

The sampling frame was designed to cover all U.S. telephone households, both listed and unlisted. The sample was stratified by:

- geography (Census divisions),
- metropolitan area size,
- presence of subway/elevated rail transit systems, and
- two levels of telephone number density (low and high).

The target sample size for the 1995 NPTS included the:

- national sample of 21,120 completed households, and
- 20,895 additional households within the five add-on areas,

for a total planned sample size of 42,015 completed households.

See **Chapter 5-D** for a table showing the national and add-on components of the NPTS sample.

SAMPLING FRAME

The sampling frame was constructed using information listing all valid residential NPA/NXX (area code/telephone exchange) codes associated with the fifty states and the District of Columbia, obtained from Bell Communications Research (Bellcore). The sampling frame, which excluded some NPA/NXX codes used exclusively for nonresidential purposes, was created in February 1995 and updated in June and September, 1995 and in January, 1996.

The sampling frame also utilized counts of listed telephone numbers for each group of 100 consecutive number (100-block) within the NPA/NXX codes. This information on telephone number listings was developed by Donelly Marketing Systems and obtained from Nielsen Media Research (Nielsen).

STRATIFYING THE SAMPLE

To control sampling variation and increase coverage of transit trips, the sampling frame was stratified by:

- geography (Census division)
- metropolitan area status
- the presence of subway or elevated rail systems, and
- the density of listed telephone numbers.

Prior to stratification, each NPA/NXX code was assigned to the county (or county-equivalent) expected to contain the majority of its telephone households.

First, each block of 100 telephone numbers was assigned to one of the nine Census divisions, based on its county assignment. Within the nine Census divisions, counties were classified first by metropolitan area size, as follows:

1) in a consolidated metropolitan statistical area (CMSA) or metropolitan statistical area (MSA) of 1,250,000 population,
2) in a CMSA or MSA of less than 1,250,000 population, or
3) not in an MSA.

Next, the counties were stratified according to the presence or absence of subway/elevated rail transit systems.

Special add-on strata were defined within the:

- State of New York,
- Commonwealth of Massachusetts
- Oklahoma City, Oklahoma planning area,
- Tulsa, Oklahoma planning area, and
- Puget Sound, Washington planning area.

These strata were needed to control allocation of the additional sample to subareas within New York and Massachusetts, as well as to effect the over-sampling necessary to obtain the desired sample size in each add-on area. A total of 70 major strata were defined, based on the stratification variables mentioned above.

Finally, within the 70 major strata, each 100-block was assigned to one of two density substrata:

1) low density - those 100-blocks containing zero residential listings, or
2) high density - those 100-blocks containing one or more residential listings.

Low density substrata were retained because they contain newly assigned telephone numbers and unlisted numbers.

SAMPLE ALLOCATION AND SELECTION

The sample size was allocated to the major strata in proportion to estimates of the total number of households, except for:

- 25 percent over-sampling in 11 large metropolitan areas with subway/elevated rail systems, designed to increase the number of transit trips in the sample, and

- additional over-sampling to obtain the increased sample

sizes contracted for in the add-on areas.

Due to the large add-on sample increases in New York and Massachusetts, the New York City and Boston metropolitan areas were over-sampled more than 25 percent.

The sample allocated to each major stratum was further allocated to the high- and low-density substrata within them. The high density substrata were sampled at a rate three times more heavily than the low density strata, in order to offset the higher costs of identifying and completing interviews within the low density strata.

The sample of telephone numbers allocated to substrata were then selected randomly with equal probabilities within substrata.

3-C. DATA COLLECTION PROCEDURES

OVERVIEW

The 1995 NPTS interviews were completed by the staff of RTI's Telephone Survey Unit. Each interviewer was thoroughly trained before beginning work on the survey.

A number of quality control measures were implemented during the data collection. Supervisors were present to observe interviewing and assist with problem cases at all times during interviewing. Numerous real-time edits were performed by the CATI system during the interview process. In addition, monitoring of interviews in progress was conducted by supervisors, NPTS project staff, and others throughout the data collection period. Periodic meetings were held with groups of interviewers to discuss issues in conducting the interviews and to document suggestions for resolving issues.

ADVANCE LETTER TO HOUSEHOLDS

Addresses were obtained for those selected telephone numbers which were listed (i.e., the number is published in the phone book). Advance letters from the Federal Highway Administrator were sent to households with listed phone numbers; no letters could be sent to households that had unlisted telephone numbers. Advance letter mailings were performed about once a month, using the phone numbers periodically added to the sample.

Approximately 70 percent of the households in the U.S. have listed numbers. About 10 percent of the advance letters could not

be delivered, so more than 60 percent of sample households probably received the letter. The primary purpose of the letter was to inform the prospective respondents that this was a legitimate survey, not a marketing or fundraising call.

Though it is not possible to measure the impact of the advance letter in the absence of a designed experiment, we believe it may have legitimized the survey with many respondents, resulting in greater participation in the survey.

Appendix F contains a copy of the advance letter to sample households.

TRAVEL DAY ASSIGNMENT

Travel characteristics are known to vary by season of the year and day-of-the week.

The 1995 NPTS had more seasonal variation than planned because the number of interviewers did not remain stable throughout the 14-month survey period. To correct for seasonal variations, an element of the sample weighting was developed to specifically address this issue. Each household and person weight was adjusted so that the weighted data reflect an equal number of household and person interviews for each month. See Control Totals in **Appendix A.**

The variation in travel by day of the week was balanced by assigning the travel days for one-seventh of the sample telephone numbers to each day of the week. When the calls to a sample phone number resulted in a completed household interview, the CATI system determined the household's travel day on the selected day of the week 12 to 18 days in the future, which allowed time for dairy mailings to reach the household. This proved reasonably effective in distributing the survey travel days to the seven days of the week.

TRAVEL DIARIES

Travel diaries were used in the 1995 NPTS because, in the pretest for this survey, they proved to be the most effective method to capture full reporting of personal travel. After the household interview, a packet of survey materials was mailed to each household. The packet contained:

- A travel diary for each household member age 5 and older - a label was affixed to each diary with the

first name of one household member.

- Two $1 bills were clipped to each diary.
- Instructions for filling out the travel diary, including a sample diary.
- A brightly colored 8 ½ x 11 reminder sheet identifying the household's travel day.
- A form identifying the make, model and year of each household vehicle, with spaces to enter the odometer readings and the dates they were taken.

Appendix F contains samples of the materials sent to respondents.

The use of travel diaries represents a significant change in survey methods from earlier NPTSs. The purpose of the travel diary was to have respondents write down each place they went as they proceeded through the day in order to obtain a more complete reporting of travel and better reporting of trip characteristics, such as time of day the trip started, the trip duration, trip distance in miles, etc.

Travel diaries have long been successfully used in urban travel surveys. A methodological pretest conducted prior to the 1995 NPTS demonstrated that using travel diaries caused more complete reporting, particularly for incidental trips, such as stopping at a convenience store, which are the most difficult to capture in a household travel survey. In addition, the overall response rates for the diary method were comparable to the retrospective method used in earlier NPTSs, thus the diary method was chosen for the 1995 survey.

CALL-BACK PERIOD

There was a six-day call-back period for reporting Travel Day trips. Phone calls to collect the diary information from the household started the day after the travel day, and continued for the next five days. Any diary information not collected during this six-day window was lost for purposes of the survey. Even though the respondent may have recorded basic information on their trips in their diary, the details of travel on a particular day should ideally be captured within the first three days, and the time interval should not be allowed to exceed six-days. Note that approximately two-thirds of the 1995 NPTS trip and travel data were obtained within three days following the household's travel day.

RESPONSE INCENTIVES

A $2 incentive for each household member 5 and older was clipped to the diary for that person. Because respondents were being asked to fill out a travel diary, it was decided to give a small cash incentive. The literature on survey incentives is fairly clear in two respects:

- cash is the preferred incentive
- the incentive should be given in advance, rather than after the interview.

Thus, $2 in cash was sent with each travel diary.

HOUSEHOLD ROSTER OF TRIPS

The household roster of trips captured some trips that may otherwise have been overlooked. In "household rostering" the interviewer has the benefit of trip data from all household members who had already been interviewed.

For example, suppose person #1 took a trip and reported that persons #2 and #3 were with him. When persons #2 and #3 were interviewed, they were asked to confirm that they were on the trip with person #1. If they were, the trip characteristics were copied from person #1's record to person #2 and person #3. If person #2 or person #3 said they were not on the trip with person #1, this was accepted.

This system resulted in a number of benefits to the survey operations, including making the tedious travel day reporting easier and, of course, in aiding the memory of the respondent. The 1995 NPTS may be the first large-scale household travel survey that used the household rostering concept as part of a CATI (computer-aided telephone interview) survey.

PROXY INTERVIEW PROCEDURES

A proxy interview is one in which someone else in the household reports for the respondent. In the NPTS data collection, an adult household member always serves as the proxy for a child between the ages of 5 and 13. There are also a number of proxy interviews given by household adults for teens aged 14 through 17.

An issue with proxy interviews is under what circumstances to allow one household member to report for another respondent. In

NPTS, proxies for adult members of the household were allowed if:

- the respondent was not capable of being interviewed because of an impairment or a language barrier
- the interviewer was told that this respondent would not be available for the entire six-day recall period, or
- the interviewers have been attempting to reach the respondent for the first three days of the six-day call-back period, and have not been successful.

If the respondent filled out a travel diary for travel day, the proxy household member is asked to find the diary and use it when they served as a proxy for the respondent. Note that the conditions of each interview are a part of the datafile. Thus there is a variable for:

- whether the interview was with the respondent or a proxy (PROXY),
- if a travel diary was completed, and
- if so, who completed the diary, the respondent or another household member (DIARYCMP).

CONFIRMING ZERO TRIPS

When a respondent reports not going anywhere on travel day, that may really be a "soft refusal". The respondent may not want to report their travel, but may want to still appear to be cooperative. In previous NPTS surveys reports of zero trips were not questioned or confirmed. The 1995 NPTS still did not go as far as many of the US urban travel surveys in questioning a report of no trips on travel day, but a followup question was added: "Does that mean you stayed at the same place all day?" The rate of persons reporting zero trips dropped from approximately 25 percent in 1990 to 12 percent in 1995. This change was one of many things contributing to an increased level of trip reporting in the 1995 NPTS.

3-D. DATA EDITING

ONLINE EDITS

Several variables were edited in real-time during the NPTS interviews. The on-line edit checks notified the interviewers of a possible discrepancy and allowed them an opportunity to correct an entry or other errors. For example, the combination of trip

length and time reported in the travel day section were checked against pre-programmed miles per hour ranges for most modes of travel. Reported sample person ages in the person interview were checked for consistency with the ages and relationships reported by the household's reference person. Reported zip codes were checked against pre-entered lists of valid codes.

APPROACH TO POST-INTERVIEW EDITING

In surveys with complex questionnaires and procedures, such as the NPTS, the final dataset reflects certain approaches taken in the data collection and editing processes. For the 1995 NPTS, two approach issues may have had considerable impact on the resulting data.

The first is the **reluctance to impute data.** If the respondent did not answer an item, we generally did not impute it, i.e., determine what the logical response would be given the response to other items. Carefully performed imputation has its place in many statistical surveys, however FHWA and RTI that imputation would be extremely limited in the NPTS data.

Second, we were **conservative in changing reported data**, unless it was clear that what was reported could not have happened. The classic example of this type of situation is the one-half hour walking trip, in which 500 miles were covered. In this type of situation we would look at the other trips of this respondent and the trips of any household members who were with him/her. Often that will clarify what should have been entered. If that effort was not successful, in this particular example it is most likely that miles would have been changed to "not reported."

PRELIMINARY EDITS

The first step in preparation for editing and cleaning the data was to extract the survey responses from the CATI data files. In doing this, it was also necessary to import data from problem sheets and supplemental trip files.

Problem sheets were completed by interviewers to indicate how to correct a problem they encountered during the interview, but were unable to correct because of CATI program limitations or respondent considerations. For example, the interviewer realized that she had entered an incorrect start time for trip number four when she was several trips further into the interview, and judged

that the interview would be lost if she asked the respondent to wait while she backed up to that trip and make the correction. In such cases the changes needed were recorded on a problem sheet , which was entered into the CATI system after the interview by supervisory staff.

SUPPLEMENTAL FILES

The main CATI program recorded trip data for up to 15 trips for each person interviewed. When a person took more than 15 trips on their travel day, data for the additional trips were recorded in a supplemental data file and the two files were subsequently merged.

HOUSEHOLD ROSTERING

Trip details recorded with the first household member reporting the trip were accessed and added to trip records for the other household members who reported being on the same trip.

DATA FILES

Next, the survey data was separated into several different data files:

Household file - data collected once for the household (one record per household).

Person file - data items collected once for each household member (one record for each completed person interview).

Vehicle file - data items related to the household's vehicles (one record for each household vehicle).

Travel day trip file - data items collected for each trip a person made on the household's travel day (one record for each trip each person made) .

Segmented trip file - additional data collected for each of the travel day trips that involved two or more trip segments, at least one of which involved public transit or Amtrak (one record for each segmented trip).

Travel period file - data items collected for each longer trip taken by each person interviewed during a 14-day period (one record for each travel period person trip).

USEABLE

A useable household was defined for the 1995 NPTS as one in

HOUSEHOLDS

which the household interview was completed, and person interviews were completed with at least 50 percent of the adult (age 18+) household members. The data were examined in order to determine which households met this "useable household" definition.

In order for the household interview to be considered complete the household respondent must have:

- provided the complete household roster information for the household members, and
- given an address for mailing the travel diaries to the household.

In order for a person interview to be considered complete:

- travel day trip data must have been obtained for at least the destination and start time for each of the person's travel day trips.

In other words, the person interview must have been completed at least through question G.17, the person's inventory of travel day trips.

Interview data for all households not meeting the 1995 NPTS definition of a "useable household" were removed from all data files at this point, prior to any further data editing and cleaning.

This definition of useable household also increased the data collection effort. For example, if a household was composed of three adults and two children, and interviews for only one adult and two children were completed by the sixth day after travel day, all of the work for that household was discarded. There were 16,243 households in the 1995 NPTS that were considered non-useable.

RECODING

Several coding and re-coding operations were necessary to put the data in the desired form, including:

- Examining all "other, specify" responses for all items in which the interviewer had marked this option and entered text describing a non-coded response category. In many cases, the "other, specify" responses could appropriately fit into one of the previously listed categories for the questionnaire item and these were corrected.
- In other cases, additional response categories which had

not been anticipated were reported with sufficient frequency to be added to the list of response options.

- Reported vehicle make and model information was edited for reasonableness and National Accident Sampling System (NASS) make and model codes were added to the data base.
- Standard codes were added to the data base to replace the "don't know" and "refused" responses, and to indicate items which were not applicable to this respondent or this trip, and thus were not asked due to skip patterns in the survey questionnaire.
- In the travel day section, trips with the purpose of "change transportation means" were edited and combined with adjacent trips. Interviewers had been instructed to use the "change means" trip purpose only for those cases in which respondents insisted that this was the only purpose of the trip, and they were unable to determine what the trip purpose should have been. These trips were later combined with the trips the person took before or after the change means trip.
- Segmented trips were defined for the 1995 NPTS as trips which involved a change of vehicle or means and at least one of the trip portions or segments must have been on public transit or Amtrak. If these conditions were met, and a change means trip was involved, that trip was converted to a segment of a segmented trip.

LOGICAL EDITS

Various edit routines were implemented to check the consistency of the reported data and to identify reporting or entry errors. Actual responses for all variables were examined for reasonableness and consistency across items. Extreme values that were either impossible or unlikely were identified, and inconsistent data were corrected when possible. For example:

- Very long walking trips, very short airplane trips, and very long waiting times were examined to determine whether they were legitimate data or probable entry errors.
- Calendar dates outside the survey period were edited based on other reported or assigned dates for the household.
- Some extreme or inconsistent data values which could not be corrected were edited to missing

values

- Edit flag variables were added to the data base to identify key variables that had received logical edits
- The relationship between the reported time and distance for all trips was examined by mode. Obvious entry errors were corrected.
- Trips with impossible miles per hour (MPH) for the reported mode of travel (e.g., 20 MPH walk trips) were either corrected or edited by changing the reported time or distance to missing values.
- The travel party size, computed by adding the number of household members and non-household members reportedly on the trip was also edited, by mode for all trips. It appears that some respondents reported the total number of persons on the transportation means (e.g., airplane, bus or school bus trips) even though interviewers had been instructed to define the travel party as friends, relatives or other persons the respondent knew and who were traveling together. In a number of cases, the reported number of non-household members on the trips was edited to a missing value.
- Reporting vehicle odometer readings was apparently difficult for many respondents. Many cases were noted in which the two reported readings were impossible (second reading less than the first reading) or unlikely (over 100,000 driven in a few months). Many of these reporting or entry errors were obvious and were corrected (e.g., reporting the tenths of miles on one but not both odometer readings.)
- The reported miles specific vehicles were driven by a certain person during the year and the number of miles persons reported driving in all vehicles during a year were capped at maximum values of 115,000 miles per vehicle and 200,000 miles per driver.

3-E. SURVEY RESPONSE RATES

OVERVIEW

The 1995 NPTS data were collected during the period from May 1995 through July 1996. There were several stages of data collection. First, a sample of telephone numbers was screened to identify residential households. Second, an adult member of the

household was asked a series of questions about the persons and vehicles of the household. Following this household interview, the household was assigned a travel day for trip reporting. Then, travel diaries for each person 5 years and older were prepared and mailed to the household. Following the household's travel day, interviewers called to conduct the person interview for each eligible household member. During the person interviews, travel diary information was recorded in the computer, along with responses to a number of additional questionnaire items. A summary of the overall response rates, as well as the rates obtained at each stage of the survey process are documented in this section.

SUMMARY OF RESPONSE RATES

The 1995 NPTS response rates are summarized in Table 3-1, which includes the partial response rate experienced at each stage of the survey, and the overall response rate up to that point in the process. The table shows that 73.2 percent of the in-scope sample numbers completed the screening process. Household interviews were completed for 75.6 percent of the completed screening cases, or 55.3 percent of all in-scope sample cases. Over 93 percent of the completed household interview cases accepted the travel diaries, and sufficient person-level interviews were completed for 72.1 percent of these households to classify them as "useable" for the 1995 NPTS. Within the useable households, person level interviews were completed with 92.2 percent of the eligible persons. Table 3-1 shows that the overall response rates were 55.3 percent for household level data and 34.3 percent for person level data.

Table 3-1 - Summary of Overall Response Rates

	Rate	Rate	Calculation
Telephone Number Screening	73.2	73.2%	-------
Household Interview Rate	**75.6**	**55.3%**	73.2 x 75.6
Diary Acceptance Rate	93.3	51.6%	55.3 x 93.3
Useable Household Rate	72.1	37.2%	51.6 x 72.1
Person Interview Rate	**92.2**	**34.3%**	37.2 x 92.2

Another way of viewing the survey response rates, is with the

actual numbers of sample cases, as follows:

112,960 - telephone numbers in-scope
82,663 - households completing screening
58,276 - households accepting diary
42,033 - useable households, that contained:
103,466 - persons eligible
95,360 - persons interviewed.

TELEPHONE NUMBER SCREENING

Table 3-2 shows the results of telephone calls to screen the 160,048 sample telephone numbers.

- Most of the 27.4 percent of telephone numbers determined to be out-of-scope (i.e., non-residential) phone numbers were business and non-working numbers.
- Residential telephone numbers accounted for 65.8 percent of the sample numbers. While telephone number screening, questionnaire section A, was completed for 73.2 percent of them, Table 3-2 shows that there were substantial numbers of refusals and other non-interview cases.
- There were also 10,897 sample numbers, or 6.8 percent of the total sample, that the interviewers were unable to classify as residential or non-residential numbers.

Table 3-2 - Telephone Number Screening Response Data

	Number	Percent
Out-of-Scope -Total	43,882	27.4%
Non-working number	15,393	9.6%
Beeper/pager	2,089	1.3%
Mobile phone	953	0.6%
Modem/fax	4,193	2.6%
Other nonresidential	1,204	0.8%
Business	19,270	12.0%
Group Quarters	483	0.3%
Determined later	297	0.2%
In-Scope - Total	105,269	65.8%
Completed Screening	**82,663**	**51.6%**

Answering Machine	4,938	3.1%
Refusal	12,233	7.6%
Language Barrier	1,315	0.8%
Other non-interview	2,393	1.5%
Trials exhausted	1,727	1.1%
Eligibility Unknown		
No Contact	10,897	6.8%
Total Sample Cases	160,048	100.0%

SCREENING RESPONSE RATE

The telephone number screening response rate calculation is illustrated in Table 3-3. The total of in-scope numbers was estimated by adding a portion of the numbers whose eligibility status was unknown to the number determined to be in-scope. More specifically, the 70.58 percent rate of in-scope numbers was applied to the 10,897 numbers whose scope could not be determined, which yielded 7,691 numbers that were presumed to be in scope. These were added to the 105,269 in-scope numbers, for an estimated total in-scope of 112,960 numbers. Of this total, 82,663 numbers, or 73.2 percent, completed eligible screening.

Table 3-3 - Screening Response Rate Calculation

	Number
Total Sample Cases	160,048
Telephone Number Screening:	
Out-of-Scope Numbers	43,882
In-Scope Numbers	105,269
Scope Determined	149,151
Percent In-Scope	70.58%
Scope not Determined	10,897
Presumed In-Scope	7,691
Estimated Total In-Scope	112,960
Completed Eligible Screenings	**82,663**
Screening Response Rate	**73.2%**

HOUSEHOLD

The interviewers attempted to complete both the household

INTERVIEW RATES

screening and the household interview on a single call whenever possible. Toward the end of the household interview, the respondents were told the travel day selected for the household, and they were asked to complete the travel diaries they would be receiving in the mail in a few days. They were also told that a monetary incentive of $2.00 per eligible person would be sent along with the diaries, as a token of appreciation for the time it takes to complete them.

As Table 3-4 shows, over 19 percent of the 82,663 households identified in the telephone number screening process refused to provide the household interview information. In total, household interviews were completed with 62,468 household respondents, or 75.6 %. In 4,192 of these, the household respondent either refused to verify their mailing address, if we knew it before the interview, or refused to provide the mailing address, if we didn't know it in advance. These cases are shown in Table 3-4 as completing the household interview, but refusing to accept the travel diaries.

Table 3-4 - Household Interview Response Data

	Number	Percent
Household Interviews:		
Completed - diary accepted	**58,276**	**70.5%**
Completed - diary refused	4,192	5.1%
Completed - total	**62,468**	**75.6%**
Refusal	16,039	19.4%
Language Barrier	704	0.9%
Other non-interview	888	1.1%
Trials exhausted	2,564	3.1%
Total	82,663	100.0%

PERSON INTERVIEW RATES

At the completion of the household interview, the household's travel day was assigned 12 to 18 days in the future. This allowed time to prepare and mail the diaries, and for the mail to be delivered to the household shortly before their travel day. Following the travel day, interviewers called to retrieve the diary information and complete the person interview for each eligible household member.

Table 3-5 shows that there were 146,317 eligible persons in the 58,276 households that completed the household interview and accepted the diary. Of these 146,317 people, person interviews were completed with 97,881 people or 66.9 percent. An additional 5.1 percent were refusals and 14.6 percent were for persons that could not be contacted despite repeated attempts during the six-day interviewing period. Table 3-5 also shows the breakdown of completed interviews by whether they were completed by the persons themselves or by proxy respondents. Note that the 1995 NPTS required proxy interviews for all eligibles 5 to 13 years of age; it allowed proxy interviews for eligibles who were 14 years and older.

Table 3-5 - Person Interview Response Data - All Households

	Number	Percent
Completed - self interviews	65,869	45.0%
Completed - proxy interviews	32,012	21.9%
Total Completed interviews	**97,881**	**66.9%**
Partial interview	776	0.5%
No Contact	21,366	14.6%
Refusal	7,433	5.1%
Language Barrier	0	0.0%
Incapable	594	0.4%
Deceased	47	0.0%
Other non-interview	496	0.3%
Trials exhausted	17,724	12.1%
Total	146,317	100.0%

USEABLE HOUSEHOLD RATE

The 1995 NPTS defined a useable household as one in which person interviews were completed with at least 50 percent of the household's eligible adults. Table 3-6 shows that 42,033, or 72.1 percent, of the 58,276 households that accepted the travel diaries met this requirement. Person interviews were completed for all eligible persons in the majority of the useable households. The 1995 NPTS data files contain the information collected from these 42,033 useable households.

Table 3-6 - Useable Household Response Data

Person Interview Results:	Number of Households	Percent of Households
All persons completed	35,914	61.6%
Enough persons completed	6,119	10.5%
Total Useable households	**42,033**	**72.1%**
Too few persons completed	16,243	27.9%
Total households accepting dairies	58,276	100.0%

PERSONS IN USEABLE HOUSEHOLDS

Table 3-7 shows the person response rate information within 1995 NPTS useable households. Data for each of the 95,360 responding persons in useable households is included in the 1995 NPTS data files, and accounts for nearly all of the 97,881 (see Table 3-5) person interviews completed in the 1995 NPTS survey.

Note that the proxy interviews include persons age 5 through 13 where the interview must be by proxy, and 14 through 17 year-olds who have a high incidence of proxy interviews.

Table 3-7 - Person Response Rate Within Useable Households

	Number	Percent
Completed - self interviews	63,646	61.5%
Completed - proxy interviews	31,714	30.7%
Total Completed interviews	**95,360**	**92.2%**
Not Completed	8,106	7.8%
Total Eligible Persons in Useable Households	103,466	100.%

3-F. CONFIDENTIALITY ASSURANCE

CONFIDENTIALITY MEASURES

The following measures were taken in producing this public use data set to assure respondent confidentiality:

- All direct identifiers, such as telephone numbers, zip codes, county codes, names of individuals, and addresses were removed from the files.
- Metropolitan Statistical Areas (MSAs) of less than 1 million population and states with less than 2 million population are not specifically identified on the datafile.
- Other geographic variables were examined to prevent identification of geographic areas with less than 50,000 population (1990 Census). These variables included the MSA size code, Census division, and the specifically-identified MSAs and states.
- The data files contain a number of population and workforce variable estimates at Census Tract and Block Group levels. These variables will help describe the area of the sample members' household and work locations. The values published for these variables were rounded and/or placed into intervals to lessen the likelihood of users identifying specific areas from these variables.
- The specific dates of travel day and travel period trips were removed from the file.
- Data values for certain other variables were coded into intervals or suppressed, and some data distributions were capped. For example, detailed year/make/model information for antique and classic autos could compromise respondent confidentiality if fully revealed. In the public use files, rare make and model codes were re-coded as "other" makes and models. The year data for 1919 to 1969 model vehicles was re-coded into intervals.

3-G. WEIGHT CALCULATIONS

WEIGHTS

The purpose of weighting in NPTS is to expand the sample data to estimates for the U.S. population. There are four different NPTS weights that are used to compute different kinds of population estimates. The methods used to calculate each of the four weights are discussed in the sections which follow.

HOUSEHOLD WEIGHTS

With the NPTS list-assisted sample design, all in-sample households have a known, nonzero probability of selection. The

unadjusted household weight is simply the reciprocal of the household's selection probability.

Since household telephone numbers were selected with equal probabilities within each sample stratum, the initial household sampling weights are computed simply as the ratio of the number of sampling units (telephone numbers) in the sampling frame for a stratum to the number of sample telephone numbers released for calling.

The initial sampling weights were adjusted for multiplicities arising from households that had more than one residential telephone number in the sampling frame, i.e., more than one chance of being in the sample.

Then the household weights were adjusted to sum to 98,990,000, an estimate of the number of U.S. households in 1995, to correct for non-responding households. Note that the estimated number of households includes those with and without telephones.

The household weights were then adjusted to equal marginal totals for the important variables listed below, to correct for non-response and non-coverage, and to reduce non-response bias. The basic concept is to adjust the sampling weights of the survey respondents so that they sum to known external totals, e.g., Census totals. A method of iterative proportional fitting was used to adjust the household weights simultaneously so the sums agreed closely with the following marginal controls:

- Equal weight totals for each of the 12 months of the year.
- Geographic areas - estimated total households in the four Census regions plus sub-regions associated with the add-on areas (39 total areas).
- U.S. level Current Population Estimates of the numbers of Black and non-Black households.
- U.S. level Current Population Estimates of the numbers of Hispanic and non-Hispanic households.
- Five categories of MSA population sizes.
- Four household size categories (1, 2, 3, 4 or more persons).

The adjusted household weights are appropriate for use in weighting all NPTS household variable data and vehicle variable data, since information on vehicles was collected at the household level. This variable is WTHHFIN.

NOTE: It is NOT appropriate to summarize travel day or travel period travel at the household level and then weight the estimate by the household weight. Travel data was collected at the person level, and a derivation of the person weight, such as the trip weight, must be used to obtain accurate estimates of travel day and travel period data. This is primarily because the person weight and the trip weights have been adjusted to account for non-interviewed persons within an interviewed household.

PERSON WEIGHTS

Since there was no sub-sampling of age-eligible persons within NPTS sample households, the household weights would also be appropriate for weighting the person data if data for 100 percent of the eligible persons within sample households had been obtained. Since that was not the case, the person weights were adjusted to compensate for person-level non-response in the 1995 NPTS. The sum of all person weights was adjusted to equal 241,675,000, an estimate of the number of U.S. residents in 1995 five years and older. Post-stratification weight adjustments were also made to adjust the person weights to the following external known totals:

- Equal weight totals for each of the 12 months of the year.
- Geographic areas - estimated total persons in the four Census regions plus sub-regions associated with the add-on areas (39 total areas).
- U.S. level Current Population Estimates of the numbers of Black and non-Black persons.
- U.S. level Current Population Estimates of the numbers of Hispanic and non-Hispanic persons.
- Ten categories of U.S. level age by gender populations (males and females each by the following ages: 5 - 17 years; 18 - 34; 35 - 44, 45 - 64, and 65 years and older).

The adjusted person weight , variable WTPERFIN, should be used to weight all person-level data from the 1995 NPTS survey. Person weights form the basis of the travel day and travel period weights, since person weights are adjusted to account for non-interviewed persons within an interviewed household.

TRAVEL FILE WEIGHTS

The two trip-level weights are simple functions of the adjusted person weights. There is no adjustment to be made for trip-level non-response, since the trip data had to be obtained in order for the person to be treated as a responding person. Each person's

travel-day trip weight, variable WTTRDFIN, was calculated by multiplying the final person weight, WTPERFIN, times 365 to expand the person's travel day to an annual total. This weight is appropriate for weighting data from the travel day trip file and the segmented travel day trip file. The travel period weight, variable WTTRPFIN, for a person was calculated by dividing their travel day weight by 14, to reflect the 14-day travel period.

3-H. SURVEY METHOD AND PROCEDURE CHANGES

1995 NPTS CHANGES

In many ways the 1995 NPTS represents a significant change in survey methods and procedures from earlier NPTSs. These survey changes, which are listed in Exhibit 3.1, have had a significant impact on the results of the survey. The greatest impacts are most likely from:

1. Use of a written diary to help remember travel on a specific day. In the pretest conducted in 1994 for the 1995 NPTS, a written diary was compared to the retrospective, or recall, method. The diary method averaged 0.5 trips more per person per day than the retrospective method. (Reference: PlanTrans, Draft report on NPTS Pretest Methods, Spring 1997)

2. The household roster of trips, that maintained a list of trips that household members already interviewed had been on with, or accompanied by, this respondent.

3. The $2.00 incentive that was sent with each travel diary. This may have made the respondents feel obligated to record and report all of their travel.

4. Use of an advance letter to notify potential respondents that they would be recruited for the survey. We believe that the advance letter added legitimacy to the telephone recruitment, which contributed to higher quality data. The effect of the advance letter cannot be measured quantitatively.

5. Confirmation of "no travel" to distinguish from "soft refusals." The proportion of persons who said they made no trips on the assigned travel day was approximately 12

percent in 1995 , compared to about 25 percent in 1990.

Exhibit 3.1 - Changes in the 1995 NPTS Survey Methodology and Their Probable Impacts

TOPIC	FROM	TO	PROBABLE IMPACTS
Respondent Contact	No advance letters	Advance letters	Improved response Legitimizes the survey with respondents
	No incentive	Incentive ($2/person)	Improved respondent cooperation rates, may have increased trip reporting
Trip reporting	Recall	Travel Diary	More trips reported More shorter, incidental trips More trips for family & personal business and social & recreational purposes
	All trips for each person collected independently	Household rostering of trips	Include trips that may have been forgotten More consistent trip data Lower respondent burden More coherent picture of household tripmaking
	Did not specifically confirm zero trips	Specifically confirmed zero trips	More accurate count of persons who made no trips on their travel day
	Proxy from memory	Proxy from diary	More trips reported More accurate reporting of trip characteristics
	Trip definition	Clearer trip definition	Easier for respondent to report trips Interviewers more attuned to pick up incidental trips
	On-line edits	Additional on-line edits	More coherent trip reporting Improved data quality
Completed household definition	At least one person completed the travel day trip section	At least 50% of the adults completed the travel day trip section	A more accurate representation of travel by the household unit