Northern California / Southern Oregon Rural Intelligent Transportation Systems (ITS) Areawide Travel and Safety Improvement Project

Task 2.4

Traveler Needs Survey
Volume I

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Executive Summary

The geographic study area encompasses portions of Northern California and Southern Oregon and has diverse transportation needs and challenges. Despite the relative sparseness of the resident population, travel to and through the area is extensive. Furthermore, travelers throughout the area are more in need of information, perhaps, than those in urban areas due to the remoteness of the region.

The two-state area contains transportation links vital to the region's economy and commercial industry. Numerous primary and secondary routes serve commercial vehicles destined for urban centers throughout the West. Weather and geography add to the transportation challenges. Travelers throughout the Corridor must contend with diverse and rapidly changing weather conditions including snow, high winds, fog and heavy rain. The combination of varied driving conditions and abundant off-road, commercial and recreational traffic produces an immediate and expanding need for increased traffic safety measures and information dissemination techniques.

The Rural COATS Traveler Needs Survey was conducted as part of the Northern California / Southern Oregon Rural Intelligent Transportation Systems (ITS) Areawide Travel and Safety Improvement Program. The specific objectives of the Traveler Needs Survey were threefold. It was necessary to determine *what* information the rural traveler needs and wants, the *medium* through which information would be presented to the traveler and *where* the traveler would want this information presented. The survey's purpose was to identify and investigate the transportation and information needs of travelers in Northern California and Southern Oregon. In addition, the survey would investigate traveler acceptance of ITS applications and new user services throughout the study area. The results, along with other information, will allow decisions to be made as to what technologies could be applied to the roadway or in surrounding areas to help disseminate information to the traveler. A generalized summary of the results given in the body of this report are as follows.

The 1040 general traveler respondents are composed of forty-two percent (42%) California residents, twenty-five percent (25%) Oregon residents, and thirty-three percent (33%) residents of other states or countries. Sixty-three percent (63%) of respondents said they were familiar with the area. Sixty-four percent (64%) were male, while thirty-six percent (36%) were female. The majority of the respondents were between the ages of 45 – 64 (41%), with forty percent (40%) living in an urban area/city, thirty-eight percent (38%) living in a rural area/country, and twenty-two percent (22%) living in a suburban area. The majority of respondents were traveling for recreational purposes (56%), with the most frequent average miles traveled per day being 100 – 300 miles (40%). Forty-one percent (41%) were employed full-time, while thirty-six percent (36%) of respondents were retired. Twenty percent (20%) had completed high school, twenty-six percent (26%) had some college experience, twenty-four percent (24%) had a college degree, and most respondents had an annual household income between $40,000 - $79,000 (39%).

Survey respondents were asked about perceived transportation challenges in the study corridor, and concerns they might have with possible traveling situations. The majority of respondents expressed frequent concern for passing trucks and heavy vehicles, situations that were defined in terms of clearance and visibility issues. They also indicated that road conditions, such as ice, snow, rain or fog were frequent causes of concern. Occasional concern was expressed by respondents over driving through construction zones, have to avoid debris, objects or animals on the roadway, and driving on hills or curves. Similar feelings were reported when respondents were asked to consider the possibility of running off the roadway, or being provided with inadequate information from signs along their route.

Respondents were asked how they obtain tourist and traveler information while planning a trip. A majority indicated that travel magazines or newspaper travel sections were occasionally used to obtain information. Destination visitors bureaus or chambers of commerce, as well as television or radio advertisements were also used occasionally as sources of information when respondents were planning a trip in the Northern California/Southern Oregon corridor. Somewhat surprisingly, a majority of the study samples stated that they never use Kiosks or the Internet for trip planning purposes.

Travelers indicated it was important for them to know before they started their trip the following information: weather conditions; the best route to their destination; locations of traveler services (e.g. rest stops); distances to destinations; and locations of traffic delays, due to special events, road closures, construction zones and/or detours.

In keeping with the study's focus on advanced transportation technologies, respondents were asked several questions about such systems, and whether or not they would use these technologies. The majority of respondents indicated they would be very likely to use warning signs for speed, curves, and animal presence, which have the capability to change, based on conditions, if such signs were available. Respondents also stated that they would be likely to use a telephone number that would report an accident or incident, if available. A special radio channel to provide information on road conditions, accidents, and so forth, as well as changeable message signs, were additional devices or systems that respondents said they would be likely to use. Conversely, the majority reported they were not at all likely to use a small in-vehicle computer that could provide traveler information. Similar sentiments were expressed regarding the option of a local TV channel that would provide continuously updated tourist and traveler information.

In many instances statistically significant differences appeared between responses of California and Oregon residents when compared with those of residents of other states or countries. For example, California and Oregon residents expressed more concern when it came to encountering slow moving vehicles like snowplows, farm equipment or recreational vehicles on the roadway. California and Oregon residents also expressed more concern for passing trucks and other heavy vehicles.

Travelers familiar with the area expressed less concern for a potential lack of information from signs along the roadway than did those who were reportedly unfamiliar with the area. It seems possible that state maps, information centers, and so forth have become so efficient at providing necessary information that roadside signs are of less importance to travelers.

When asked about sources of information, California and Oregon residents were less likely to use State Departments of Tourism to gather traveler information. One would assume that California and Oregon residents would be more familiar with the roadways in the corridor than would residents of other states and, consequently, might be less apt to need or utilize an outside information source.

California residents placed greater importance on information related to the location of accidents or incidents. Likewise, respondents from California considered weather condition information to be of greater importance. Respondents from California and Oregon preferred that travel information be updated more frequently.

The California and Oregon respondents also indicated they would be more likely to use a telephone number to obtain road conditions updates, or to use a special radio channel for information regarding road conditions, accidents, incidents, and closures. California residents reported they would be more likely to use an in-vehicle device to help avoid collisions or running off the roadway. California and Oregon residents indicated they would be more willing to pay for the special services or devices described as advanced transportation technologies.

Understanding the information needs of travelers, as well as their willingness to use new ITS-related systems, was on of the objectives of the Northern California/Southern Oregon Rural ITS Areawide Travel and Safety Improvement Project. Ideally, regional data like the information obtained in this survey, along with other information, can be used by the California and Oregon Departments of Transportation and various other agencies to provide a safer, more enjoyable driving experience to traveler in the region.

Disclaimer Statement

The opinions, findings and conclusions expressed in this publication are those of the authors and not necessarily those of the California Department of Transportation, Oregon Department of Transportation or the Federal Highway Administration.

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Abstract

Rural travelers may be more in need of timely information than those in urban areas due to dramatic weather changes and the remoteness of their travel. The combination of varied driving conditions and abundant off-road, commercial and recreational traffic produces an immediate and expanding need for increased traffic safety measures and information dissemination. This report focuses on the design, administration and analysis of a Traveler Needs Survey, conducted as part of the Northern California / Southern Oregon Rural Intelligent Transportation Systems (ITS) Areawide Travel and Safety Improvement Project.

The specific objectives of the survey were threefold. It was important to determine *what* types of information the rural traveler needs and wants, *where* the traveler would like information presented, and through what *medium* the traveler would like to see the information presented. This survey information will be useful, in part, for decisions as to what technologies, if any, could be applied to the roadway and surrounding areas to bring information to the traveler. The assessment instrument addresses the following areas of inquiry: safety concerns, pre-trip information, en-route information, trip planning, sources of information, communication mediums, funding options and demographics.

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BACKGROUND

Northern California / Southern Oregon Rural Intelligent Transportation Systems (ITS) Areawide Travel and Safety Improvement Project

The geographic study area encompasses portions of Northern California and Southern Oregon and has diverse transportation needs and challenges. Despite the relative sparseness of the resident population, travel to and through the area is extensive. Furthermore, travelers throughout the area are more in need of information, perhaps, than those in urban areas due to the remoteness of the region.

The two-state area contains transportation links vital to the region's economy and commercial industry. Numerous primary and secondary routes serve commercial vehicles destined for urban centers throughout the West. Weather and geography add to the transportation challenges. Travelers throughout the Corridor must contend with diverse and rapidly changing weather conditions including snow, high winds, fog and heavy rain. The combination of varied driving conditions and abundant off-road, commercial and recreational traffic produces an immediate and expanding need for increased traffic safety measures and information dissemination techniques.

Purpose and Objectives of the Rural COATS Traveler Needs Survey

The Rural COATS Traveler Needs Survey was conducted as part of the Northern California / Southern Oregon Rural Intelligent Transportation Systems (ITS) Areawide Travel and Safety Improvement Program. The specific objectives of the Traveler Needs Survey were threefold. It was necessary to determine *what* information the rural traveler needs and wants, the *medium* through which information would be presented to the traveler and *where* the traveler would want this information presented. The purpose of the survey was to identify and investigate the transportation and information needs of travelers in Northern California and Southern Oregon. In addition, the survey would investigate traveler acceptance of ITS applications and new user services throughout the study area. The survey results will be useful, along with other information, in determining what technologies could be applied to the roadway or in surrounding areas to help disseminate information to the traveler.

Survey Methodology

Instrument Design

The design of the instrument, which would solicit responses from both familiar and unfamiliar travelers, was based upon two objectives. Each respondent should be able to (1) complete the survey within 6 – 8 minutes, and (2) easily understand all questions presented therein. To accomplish these objectives, the survey was kept to a maximum of fifty questions, including demographics. A photographic representation of each of the various technologies discussed in the survey was also constructed. The two individuals who administered the survey at each location were provided with these photographic

representations of the various technologies, as well as standardized explanations to be given to any respondent who requested additional information. In addition to clarifying the topic in question, the standardized explanations and photographic representations eliminated any potential bias that could have been introduced if answers to questions posed by respondents had varied by individual, location or time.

The survey instrument addressed perceived corridor challenges, tourist and traveler information, information sources and advanced technology, and sample demographics. Three methods of inquiry were used throughout the survey to generate responses. A majority of the questions were constructed using a four-point Likert scale, which attempts to measure the perceived importance or usefulness of the information source or service being discussed. Respondents were asked to select one of four values which they felt best represented their behavior, emotion or opinion regarding a particular topic. The ordinal nature of the scale allows conclusions to be drawn on a relative basis only; differences between response values cannot be quantified. In other words, one cannot assume equal intervals between the four points on the scale for all respondents.

Likert scales have been generally accepted as a valuable tool for measuring the relative importance or strength of opinion among various options and are, therefore, commonly used on public opinion polls. In this survey, the highest and lowest values on each scale were defined for the respondents. However, the extent to which individual interpretation of the four response options may have varied is unknown.

The remainder of the survey included both dichotomous (Yes-No) responses and multiple choice (3-to 6-variable) responses. Standardized response categories, as opposed to open-ended responses, eliminated any potential bias that might have resulted from coding errors. It also reduced the amount of time needed to complete the survey. However, the ability of the respondent to convey individual ideas or concerns is restricted with fixed response categories.

Instrument Testing and Revision

The survey instrument was based upon the design and the experience gained through a previous Rural Traveler Needs Survey, which was completed by the Western Transportation Institute as part of the Greater Yellowstone Rural ITS Priority Corridor Project. The structure remained similar to the previous work; however, the questions were designed and tailored to address, in varying degrees, concerns and needs as specified by the sponsoring agencies. These needs, as outlined in the scope of work, include: increased safety, improved emergency response, increased traveler information and trip enhancement, reduced congestion and increased economic activity. It was determined from the previous survey work that the optimal amount of time needed for completion of this type of survey is 6 – 8 minutes. This corresponds to a maximum of fifty questions, including demographics. The time constraint limited the depth to which any one area of the survey could be explored. Questions had to be prioritized based upon their expected benefit. The questions were also formatted so as not to introduce a

seasonal bias into the results, which was accomplished by describing general concepts rather than actual situations.

Initially, the Western Transportation Institute internally tested the instrument to obtain a rough, working estimate of the amount of time needed to complete the survey. This internal review was also used as a forum to obtain specific comments regarding question content, format and appropriateness. A second test was administered to a group of twenty individuals whose ages ranged from 16 to 75 years. This test was used to gain a valid time estimate and to assure ease of understanding and completion by respondents unfamiliar with the content. The photographic representations, as well as the standardized responses, were used during the second test. Based on the results of the second test, appropriate changes were made to the instrument. Through these changes, the preliminary draft of the survey instrument was completed and submitted for review to the California Department of Transportation, the Oregon Department of Transportation and related stakeholders. All review comments were analyzed and the appropriate changes made to the instrument. The revised draft of the instrument was then resubmitted to gain final approval, after which it was ready to be administered throughout the study area.

Statistics

The responses gathered through the administration of the survey were analyzed using various summary statistics, including percentages, frequencies and chi-square values. These results were used to determine what concerns and information needs travelers had when traveling through Northern California / Southern Oregon, as well as their willingness to accept and use ITS technology and new user services. Differences in responses, if any, were investigated between respondents in selected demographic categories.

Survey Site Locations

Survey administration was designed so as to involve all travelers, including both those who were familiar and those who were unfamiliar with the areas in question. This was accomplished by geographical distribution and administration of the survey throughout the study area to eliminate the possibility of bias towards a given region or particular type of traveler. It was determined that the survey would only be administered at rest stops and recreational areas in Northern California and Southern Oregon. This decision was based upon WTI's experience in administering surveys at *local* areas, such as convenience stores and restaurants. These types of administration locations yielded response rates substantially lower than those at rest stops and recreational areas, without a noticeable change in the demographic breakdown of familiar and unfamiliar travelers. Maps indicating rest stops and recreational areas in Northern California and Southern Oregon were obtained and a route was planned based on the budgetary and time constraints of the project. The selected route was felt to be representative of the study area as a whole and did not favor any one roadway or geographic location.

The routes and administration locations were submitted to the California Department of Transportation and the Oregon Department of Transportation for comment. Two additional sites were added to the routes at the request of both organizations. This brought the total number of administration locations to thirteen. Nine alternate locations were also selected and were to be utilized if responses were low at a given site or to compensate for unpredictable weather. The administration dates and locations are shown below. It was assumed that the thirteen sites would yield the desired sample size of 1000-1200 completed surveys. The following is a complete listing of the date and location of each administration. Also shown in this table are the labels given to each location; the labels help guide readers through the map on the following page. Multiple dates indicate that a site was aborted and the survey administrators moved on to either an alternate site, or the next site on the schedule.

Survey administration dates and locations

Label	Date	Location
A	6/8/98	Herber S. Miles rest area (CA)
B	6/9/98	Hillcrest rest area (CA)
C	6/9/98	O'Brien rest area (CA)
D	6/10/98	Weed Airport rest area (CA)
E	6/10/98	Grass Lake rest area (CA)
F	6/11/98	Midland rest area (OR)
G	6/12/98	Chandler Wayside (OR)
H	6/12/98	Beaver Marsh rest area (OR)
H	6/13/98	Beaver Marsh rest area (OR)
I	6/14/98	Cabin Creek rest area (OR)
J	6/15/98	Camas Valley rest area (OR)
K	6/15/98	Ophir rest area (OR)
K	6/16/98	Ophir rest area (OR)
L	6/17/98	Trinidad rest area (CA)
M	6/18/98	Salyer rest area (CA)
N	6/19/98	Lake Almanor rest area (CA)
O	6/20/98	Moss Cove rest area (CA)

Figure 1: Survey location map

SURVEY ADMINISTRATION

The same two individuals administered the survey at each location. These individuals had the responsibility of soliciting respondents and answering any questions that arose before, during or after the survey was completed. A total of 1040 responses were collected from the 14 locations throughout the study area. The maximum number of surveys obtained at any one location was 112. The minimum number of surveys obtained at any one location was 32, with an approximate average of 74 completed surveys per site. Eight sites were chosen at random to determine the survey response rate. The number of individuals asked to participate was recorded, as well as the number that declined to participate and their reasons for refusal. Approximately 45% of those asked to participate completed a survey. Twenty-five percent (25%) expressed an inability to participate due to a time constraint, and the remaining 27% simply would not agree to participate for whatever reason. Participants were given a state map of California, a state map of Oregon, and an Oregon Travel Planner. These materials seemed to be incentives for a small fraction of those participating. The majority of those who completed a survey indicated the maps were not their primary reason for participation, but the materials were appreciated. The 45% response rate was felt to be representative of the general motoring public and yielded sufficient data for the proposed statistical analysis.

SURVEY RESULTS AND ANALYSIS

Advanced statistical modeling techniques were used to determine significant relationships between general demographic and travel characteristic data, as well as various opinion-based responses related to perceived corridor challenges, sources and types of tourist and traveler information, and advanced technology and information sources. Specifically, statistically significant relationships were determined using ordered probability models and logistic models.

Before performing the modeling exercises, minor data transformations were necessary. Data that had multiple non-numeric choices (i.e., urban/rural/suburban or work/school/shopping) were transformed into singular indicator variables. Data that had multiple choices with a range of numerical values were transformed one of two ways: (1) average values for each range were determined and assigned so that a single variable resulted for all values or (2) an indicator variable was created for each range of values so that multiple variables resulted. For example, a single new variable, *avinc,* was created by determining the average values for each of the income ranges specified. Interpretation of this variable led to conclusions about how increasing or decreasing income levels likely affect the opinion-based response. Nothing definitive could be said about any particular income group using this variable. Alternatively, four indicator variables (*povinc, lowinc, midinc* and *highinc*) were created for each income range. This specification allowed conclusions to be drawn specifically about certain income groups.

Ordered Probit

Ordered data assumes a countable number of values and describes a choice of alternatives. The data can be numeric in integer form or can be translated into numerical form. The difference that distinguishes ordered data is that it assumes a ranking. For example, ordered data would result if a respondent were asked to indicate the frequency of an occurrence by choosing *never*, *sometimes* and *frequently*. An occurrence that takes place *frequently* happens more often than one that occurs *sometimes*, and one that happens *sometimes*, obviously occurs more often than one said to *never* occur. Thus, by the property of transitivity, a *frequent* occurrence takes place more often than one reported to *never* occur. Ordered data also results when a respondent is asked to rank an item on a scale (i.e., from 1 to 10).

Ordered probit models are widely accepted as a suitable model form for analyzing ordered data. Ordered probit models define an unobserved variable, z, such that:

$$z = \beta \mathbf{X} + \varepsilon$$

where

β is a vector of estimable regression parameters

$\mathbf{X}$ is a vector of measurable characteristics (e.g., demographics, travel characteristics) that define ranking and

ε is a random error or disturbance term.

In the ordered probit model, the disturbance term is assumed to be normally distributed (if assumed to have a standard logistic distribution, an ordered logit model would result). Using this equation,

$y = 0 \quad \text{if } z \le \mu_0$

$y = 1 \quad \text{if } \mu_0 < z \le \mu_1$

$y = 2 \quad \text{if } \mu_1 < z \le \mu_2$

:

$y = j \quad \text{if } z \ge \mu_{j-1}$

where

y is the actual or observed ranking and

μ is an estimable parameter that defines y.

In the Traveler Needs Survey, several of the rank order questions lent themselves well to ordered probit analysis, particularly when asking the following:

- frequency of concern (i.e., never, occasionally, frequently and always);
- frequency of using various travel information sources (i.e., never, occasionally, frequently and always);
- level of importance (i.e., not at all important, somewhat important, important and very important);
- frequency of traveler information updates (i.e., as needed, once per day, once per hour and once per minute) and
- likelihood of use or payment for special services or devices to aid travel (i.e., not at all likely, somewhat unlikely, somewhat likely and very likely).

In each case, a resulting positive model coefficient increases z, which in turn increases the likely rank value selected by a respondent (i.e., a positive coefficient indicates a propensity to respond with a higher rank value). Conversely, a negative coefficient indicates a propensity to respond with lower rank values.

Respondents had the option of not responding to any question on the survey. Percentages are based on total responses obtained for each question, as opposed to the total number of survey respondents, thereby eliminating the need for an "unknown" or "no response" category for each question. It was observed that approximately ten percent of respondents did not answer the annual income question. The poorer response to this question is assumed to be due to personal reasons of the respondents. Also, if more than one option was selected for a question, all responses to that particular question were omitted from the statistical analysis. This was done to avoid biasing the results by choosing which option among several selected by the respondent was to be included. Failure to comply with written directions also resulted in omission of that particular response from the data analysis.

Demographic Breakdown

The following figures (Figures 2-12) graphically illustrate the data gathered in the demographic section of the Traveler Needs Survey. Frequencies and percentages for the demographic responses, (Questions 40-50) are located in Appendix B.

Figure 2: Residence

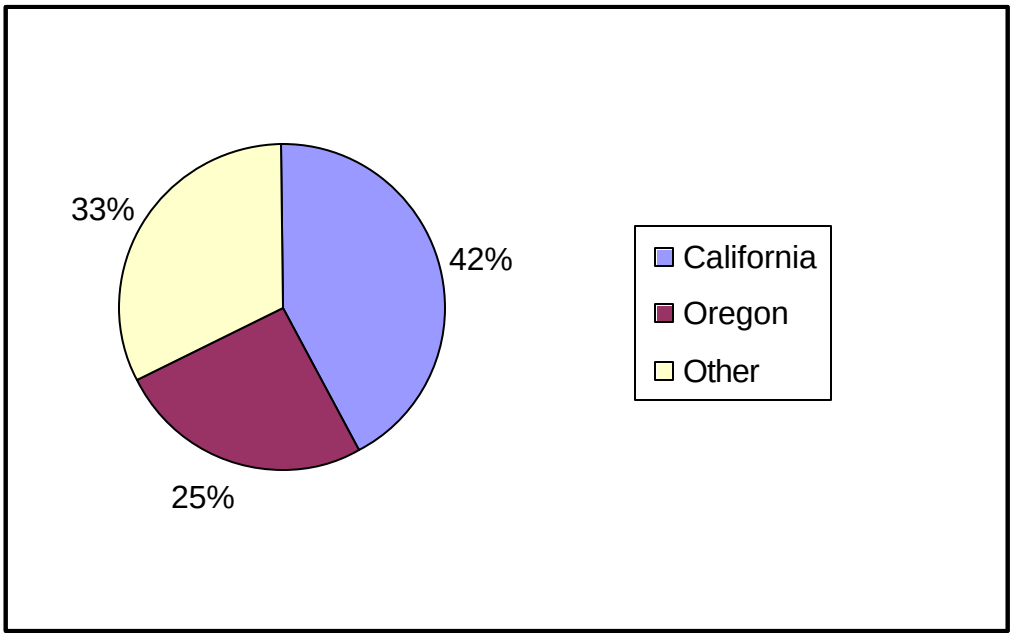


Figure 3: Familiarity with area

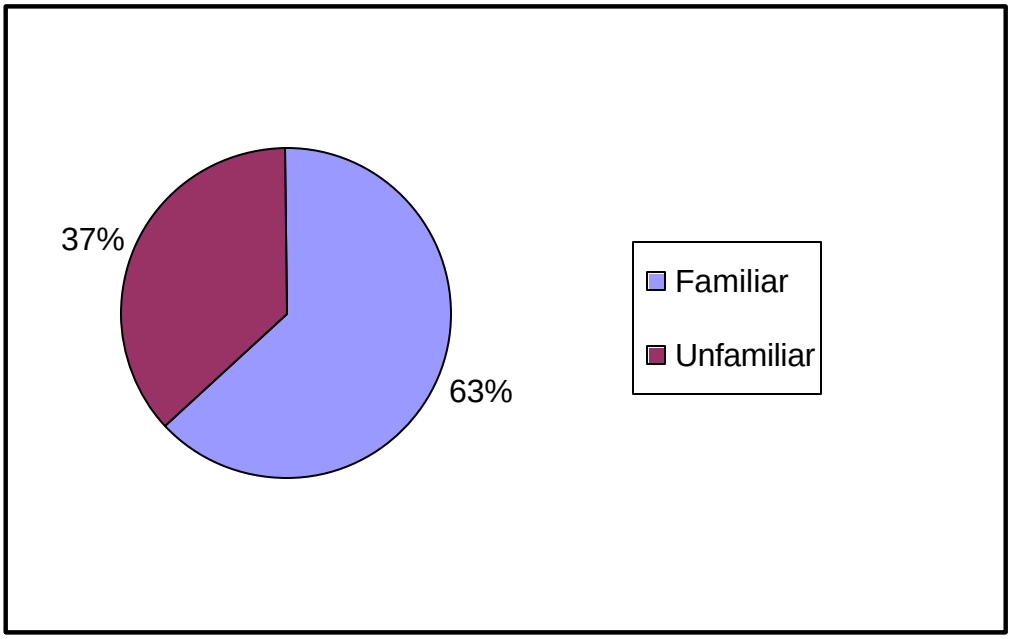


Figure 4: Gender

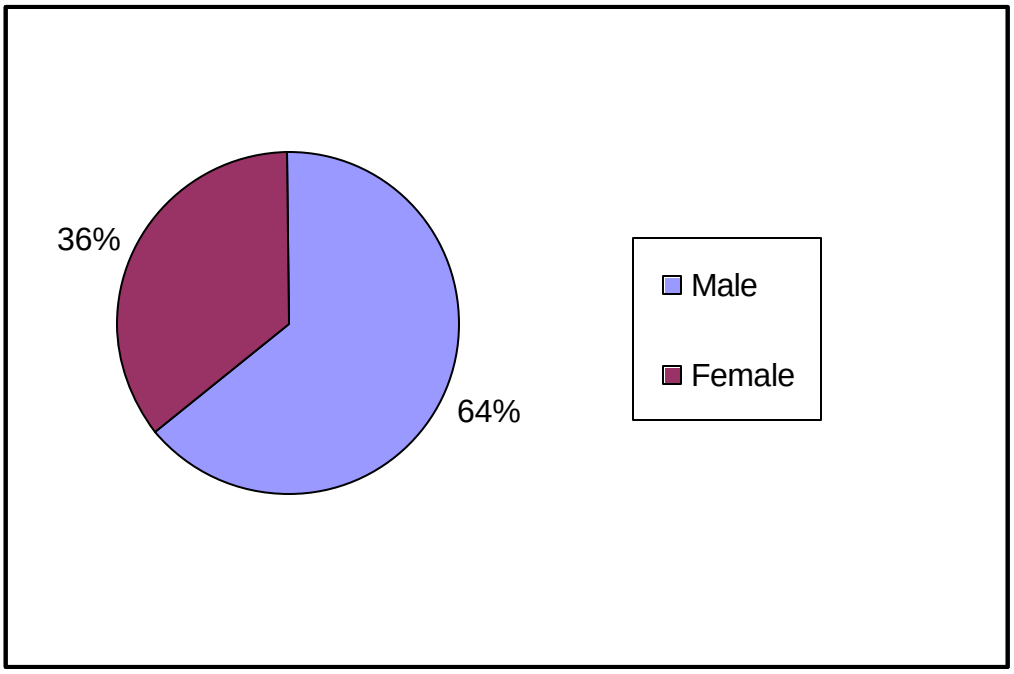


Figure 5: Age

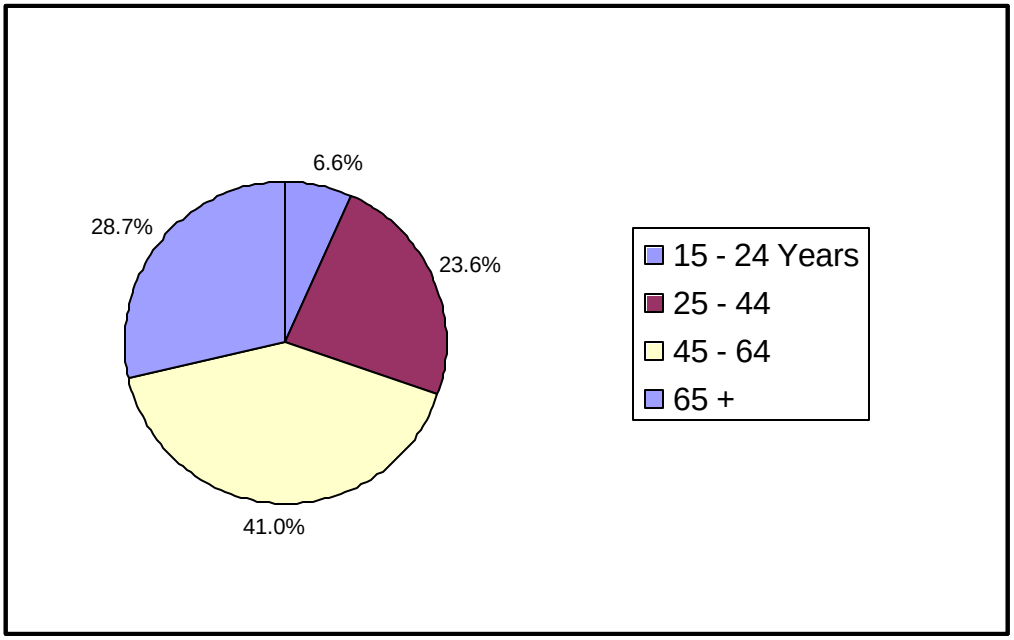


Figure 6: Live in

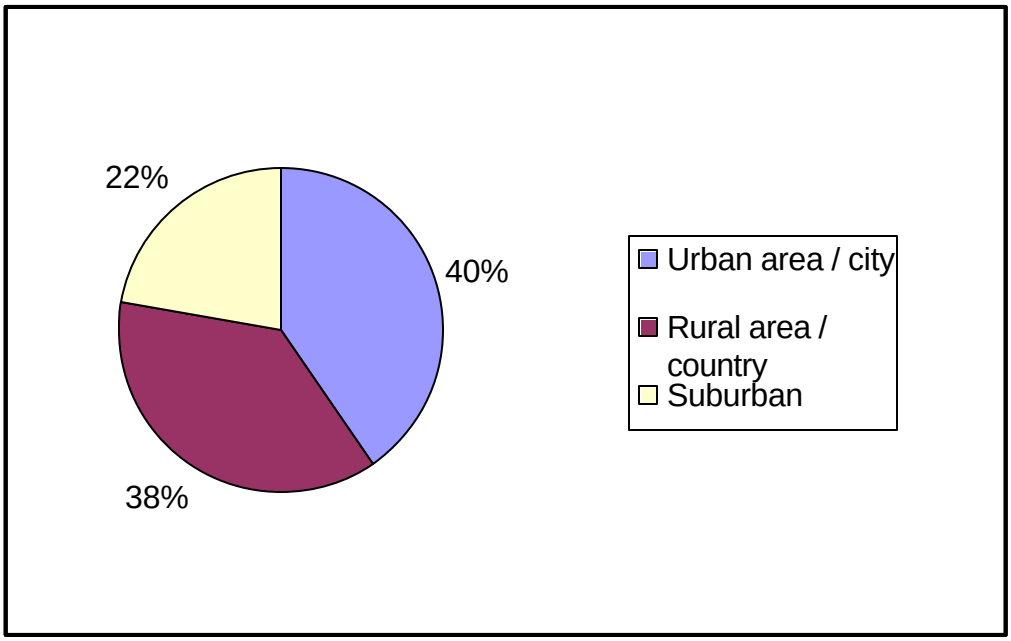


Figure 7: Type of vehicle normally driven in this area

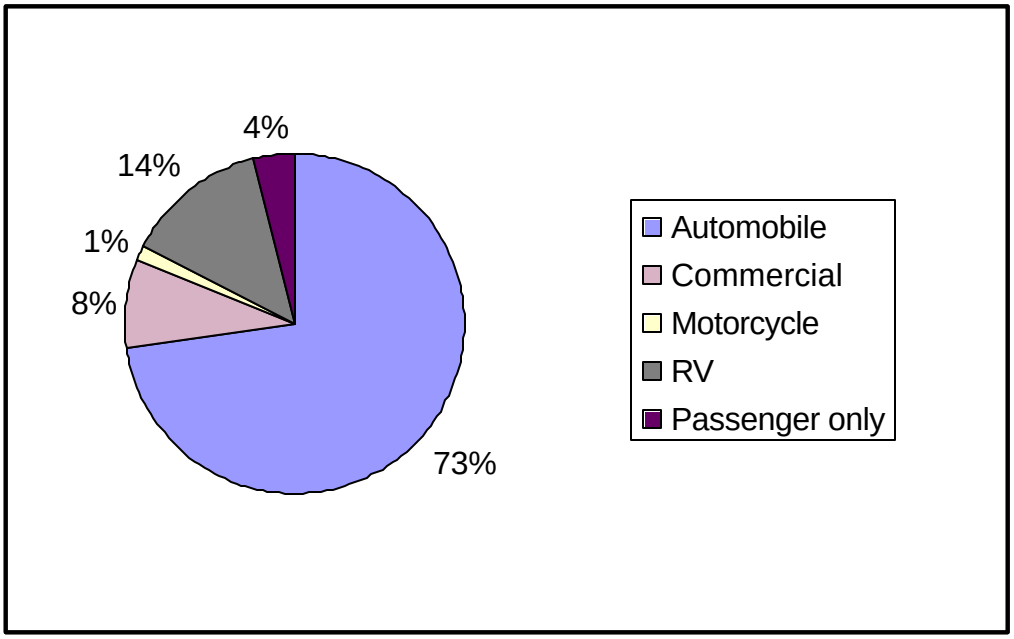


Figure 8: Majority of travel in this area is to travel to

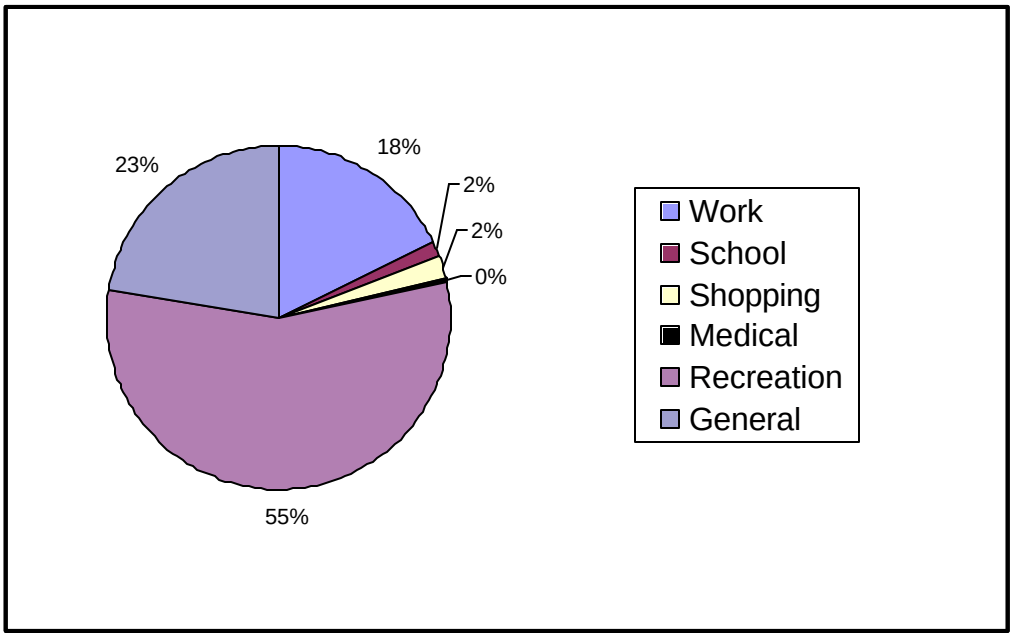


Figure 9: Average miles traveled per day for the trip purpose identified in figure 8

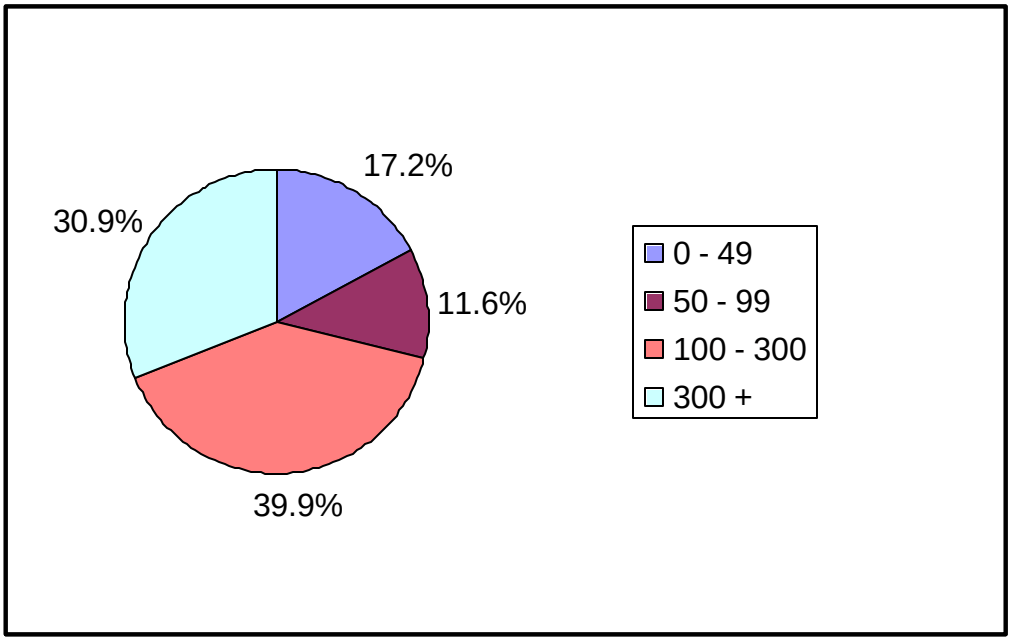


Figure 10: Employment

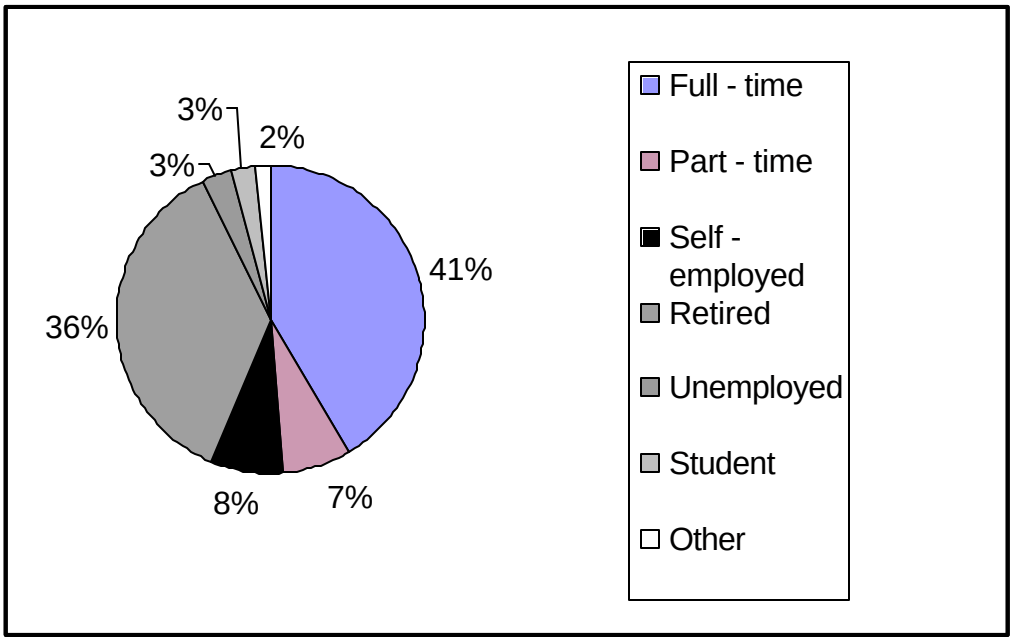


Figure 11: Education completed

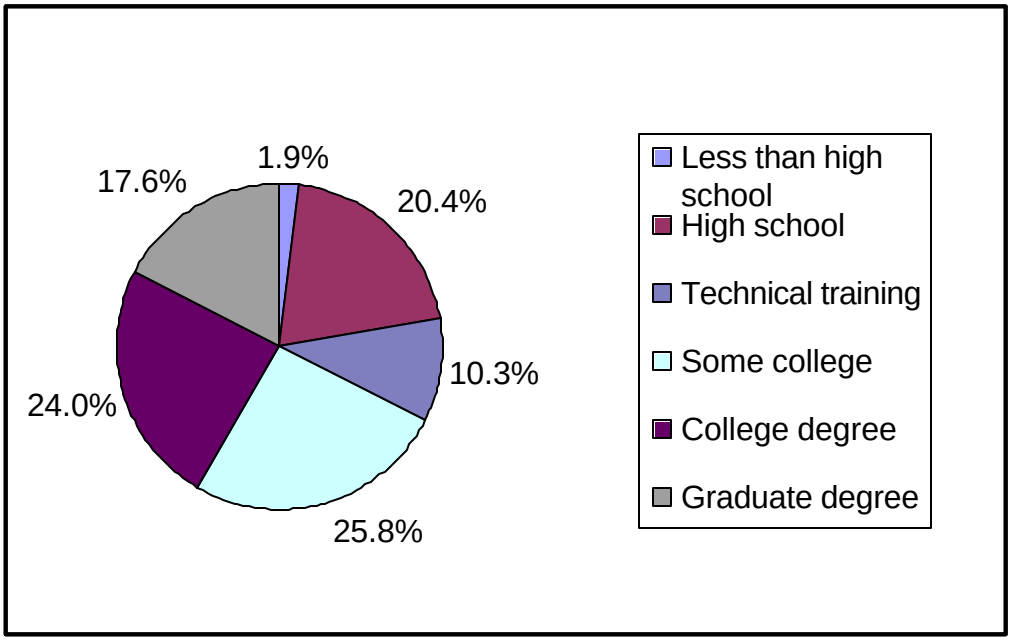
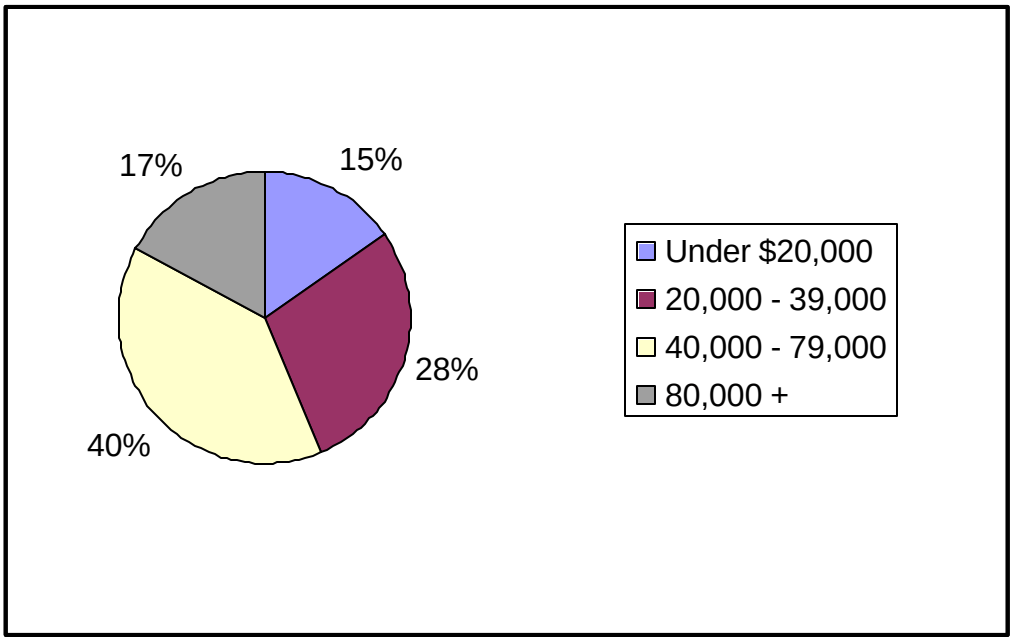


Figure 12: Income (per household)



Perceived Corridor Challenges

The first eight questions of the Traveler Needs Survey dealt with perceived transportation challenges throughout the Northern California / Southern Oregon Corridor. The mean values calculated for each question are based upon a four-point Likert scale. The actual survey used in the administration is provided in Appendix A. The following is the heading used for the first eight questions as it appears on the survey.

> When you are traveling in Northern California / Southern Oregon, how often are you concerned about the following. (**Circle one number per question)**

Responses are rank-ordered below, based on their mean values, starting with the most frequently expressed cause of concern:

- Passing trucks and other heavy vehicles(clearance/visibility) (Mean 2.48)
- Road conditions like ice, snow, rain or fog (2.40)
- Driving through construction zones (2.33)
- Debris, objects or animals on the roadway (2.18)
- Driving on hills or curves (2.14)
- Encountering slow moving vehicles like snowplows, farm equipment or R.V.'s (2.13)
- Lack of information from signs along the roadway (2.03)
- Running off the roadway (1.83)

Figures 13-20 graphically illustrate the percent of respondents in each of the four response categories as outlined on the Likert scale. Frequencies and percentages for the responses to Questions 1-8 are located in Appendix B.

Figure 13: Encountering slow moving vehicles like snowplows, farm equipment or RV's

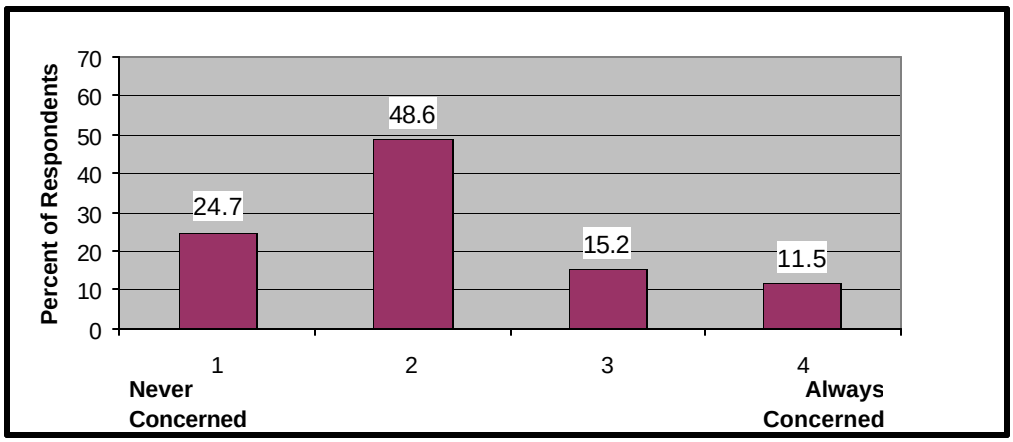


Figure 14: Running off the roadway

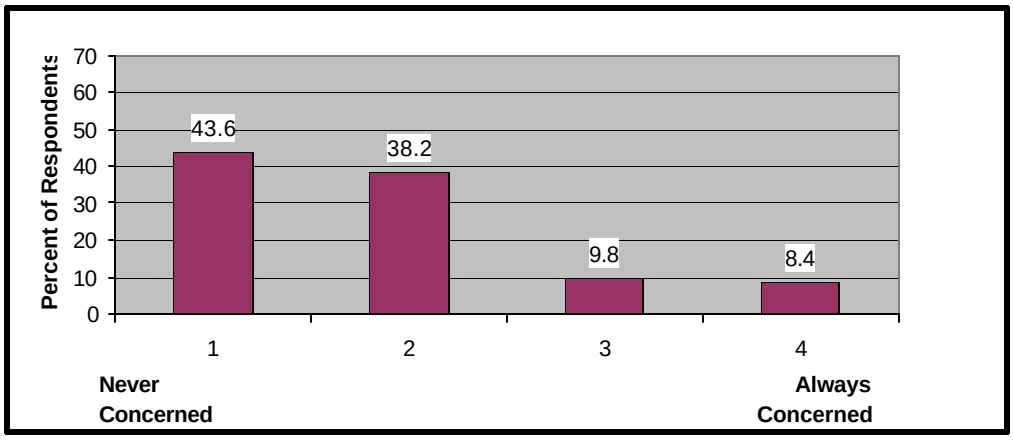


Figure 15: Lack of information from signs along the roadway

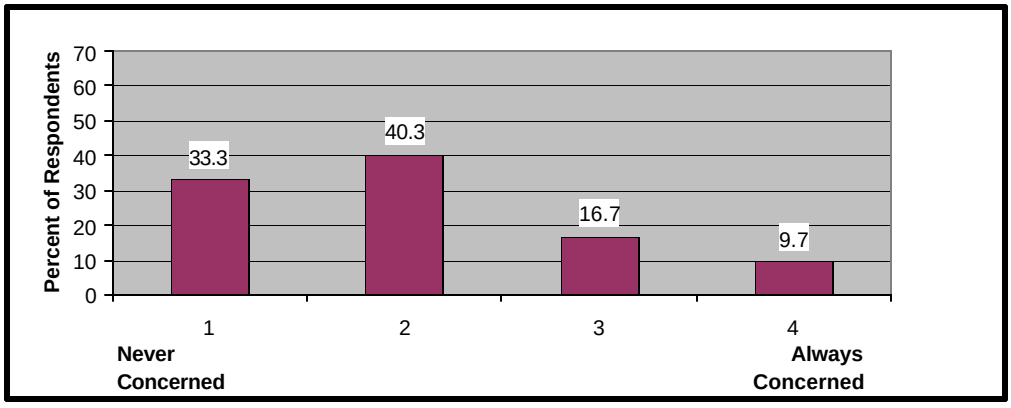


Figure 16: Debris, objects or animals on the roadway

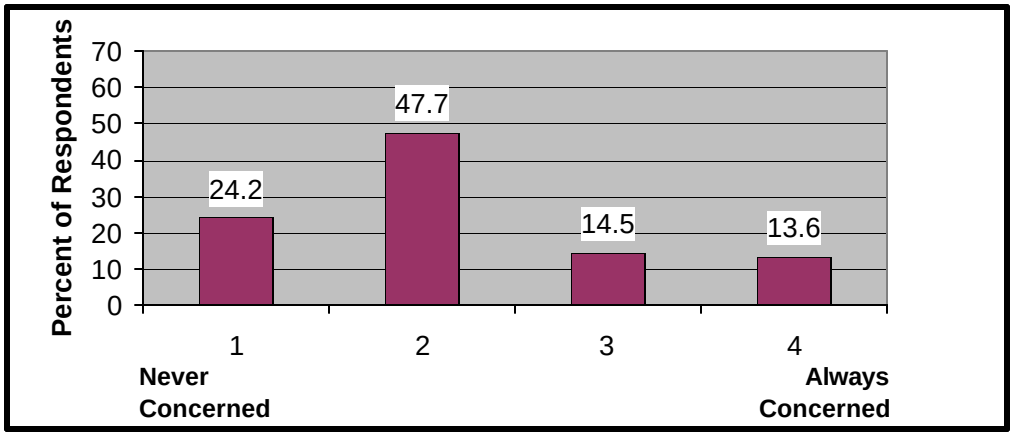


Figure 17: Passing trucks and other heavy vehicles (clearance / visibility)

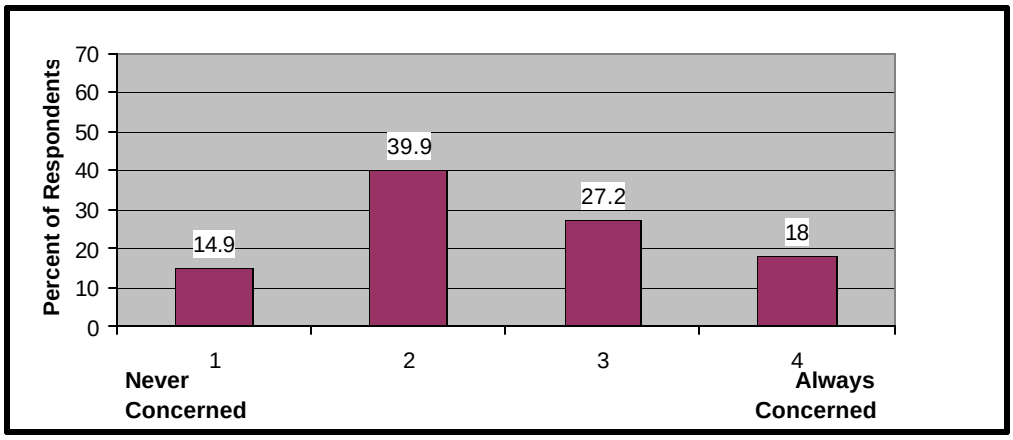


Figure 18: Driving on hill or curves

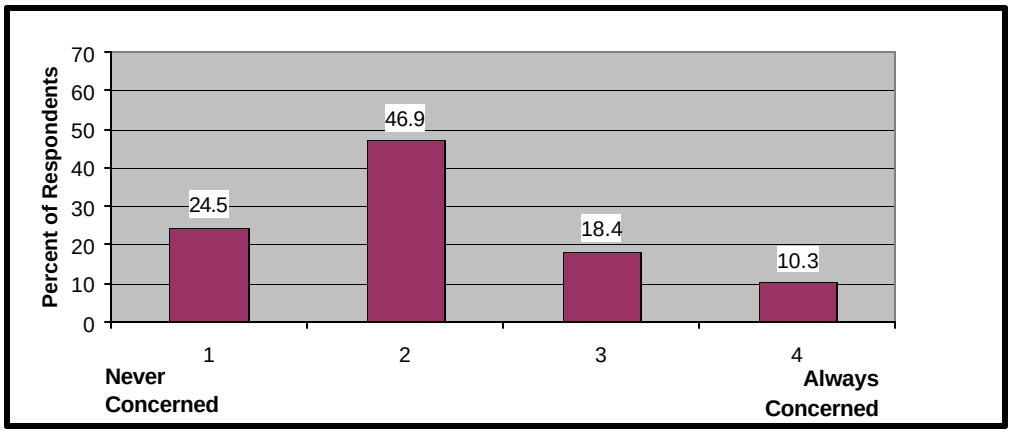


Figure 19: Road conditions like ice, snow, rain or fog

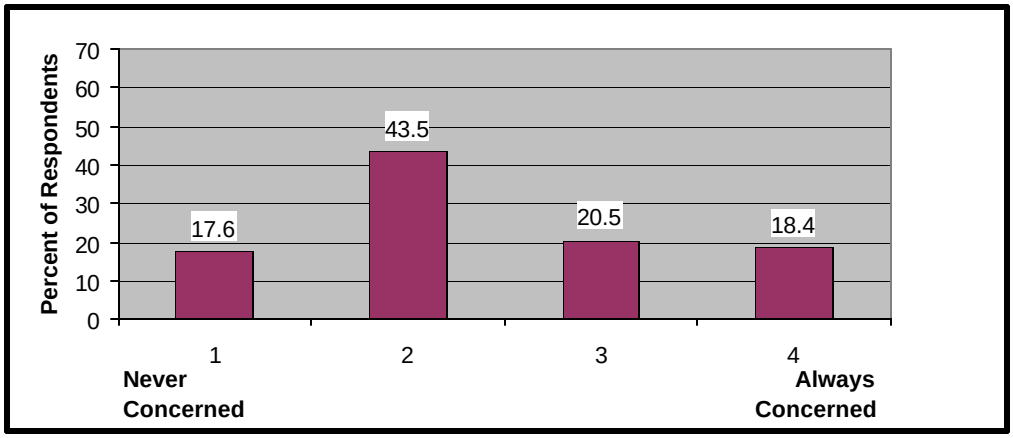
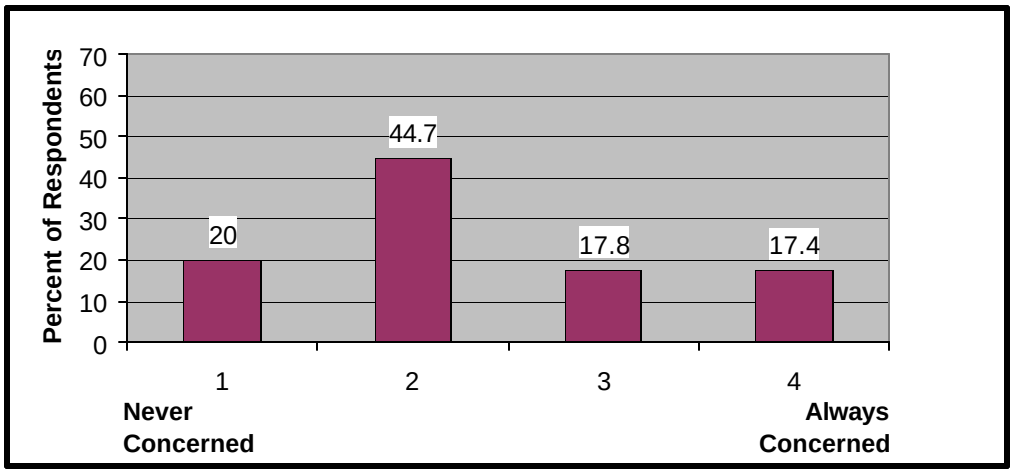


Figure 20: Driving through construction zones



Statistical Model Results for Perceived Corridor Challenges

In this Model Results section and the sections to follow, mention is given only to the demographics that were found to be statistically significant in effecting opinion-based survey responses. The demographics not mentioned were not found to be statistically significant. A 95% confidence level ($p \leq .05$) was used for this analysis. Thus, statistically significant differences in responses meant there was only five chances in one hundred that the variation across categories was due to something other than actual differences (e.g. biased samples) in the groups being analyzed.

In general, when questioned about perceived corridor challenges, residents of California and Oregon were likely to have greater concern. Persons citing trip purposes related to work and shopping were also likely to have greater concern when encountering the various corridor challenges, while persons citing trip purposes related to school, medical care or recreation showed less concern.

Educational level was frequently a significant variable affecting concern levels related to corridor challenges. Persons with higher levels of education (i.e., some college, a college degree or a graduate degree) were likely to be less concerned, while persons with technical training were likely to have greater concern of potential driving hazards, in general.

Familiarity with the area, gender, age, residence characteristics (i.e., urban, rural, suburban), average miles driven per day and income seemed to have little effect on the level of concern expressed (although exceptions were noted). Significant relationships between the demographic and travel characteristic data and each of the perceived corridor challenges are provided below.

When asked their level of concern related to encountering slow moving vehicles like snowplows, farm equipment or recreational vehicles on the roadway, California and Oregon residents were likely to express greater concern. Persons reporting the majority of their travel in the area was for work and shopping were likely to show greater concern while persons traveling predominantly for medical care were likely to show less concern. Longer travel distances during these trips heightened concern (i.e., as the average distance traveled per day increased, so did the level of concern expressed). This difference in concern levels may be partially explained by trip frequency; frequent commuters to work or shopping may witness more hazards and hence, be more sensitive to area dangers than more infrequent travelers. This conjecture is supported when noting that drivers of recreational vehicles, presumably infrequent travelers to the area, were relatively less likely to be concerned about encountering slow moving vehicles. Those having completed some college or a graduate degree were less likely to be concerned with encountering slow moving vehicles on the roadway. An explanation for this relationship is not immediately intuitive. (See Table 1,Volume Two.) Ordered probit tables are provided in Volume Two of this report.

Residents of rural areas were likely to show greater concern related to running off the roadway as were persons predominantly making shopping trips to the area. Rural residents may have a heightened sensitivity to being stranded because of the characteristically low traffic volumes in rural areas. Those persons who have completed some college or obtained a college degree were likely to express lower levels of concern related to running off the road. Potentially related to higher education levels, higher income levels were also associated with lower levels of concern (i.e., as average income increased, concern level decreased). Drivers with higher income levels may be able to afford optional or supplemental travel devices, such as cellular telephones, that lessen the fear of running off the road and being stranded. (See Table 2, Volume Two.)

As expected, persons familiar with the area were less likely to be concerned about the lack of information from signs along the roadway. Unexpectedly, however, non-residents of California and Oregon, presumably unfamiliar with the area, were also less likely to be concerned. Persons reporting the majority of their travel in the area for school purposes were also less likely to be concerned, although the frequency of their trips through the area and the familiarity of the route to their destination easily explain this relationship. (See Table 3, Volume Two.)

When asked about their level of concern related to debris, objects or animals in the roadway, truck drivers were more likely to be concerned. This relationship is somewhat surprising given the comparatively large size of their vehicles. Past driving experience, time

constraints or some other concerns may possibly be sensitizing them to the hazard of debris or objects in the roadway. Persons traveling for recreational purposes were relatively less likely to be concerned, perhaps because of lessened time constraints or a lack of familiarity with the area and its dangers (i.e., frequent animal crossings). Part-time employees were less likely to be concerned while self-employed persons were more likely to be concerned. As with recreational travelers, part-time employees may have more relaxed time constraints, thereby lessening concerns should an incident or delay occur because of debris, objects or an animal in the roadway. Persons who had completed some college or obtained a graduate degree were likely to express lower levels of concern, while persons who had technical training were more likely to be concerned. Again, an explanation for this relationship is not readily apparent. (See Table 4, Volume Two.)

Residents of California and Oregon were more likely to be concerned when asked about passing trucks and other heavy vehicles. Also, persons who reported the majority of travel in the area for shopping were more likely to be concerned. Persons living in urban areas were less likely to be concerned about passing trucks and other heavy vehicles. Perhaps characteristically high traffic volumes, high lane density and narrow travel lanes have desensitized urban residents. Recreational vehicle drivers were also less concerned about passing trucks and other heavy vehicles, perhaps due to the relative similarity in vehicle size and weight. Again, those persons who had obtained a graduate degree were likely to express lower levels of concern, while persons who had technical training were more likely to be concerned. (See Table 5, Volume Two.)

Males and recreational vehicle drivers were less likely to be concerned about driving on hills or curves, while persons who most frequently shop in the area had a greater concern. No other variables were found to significantly in affect concern levels related to driving on hills and curves. (See Table 6, Volume Two.)

Recreational vehicle drivers were less likely to be concerned about adverse road conditions like ice, snow, rain or fog, while persons who most frequently shop in the area had a greater concern. Recreational vehicle drivers may have a lower concern level because of their more relaxed time constraints; delay for adverse weather conditions will not likely conflict with other duties (i.e., work). Retired persons were more likely to be concerned about driving in adverse weather conditions. Assuming that the *retired* state is indicative of older age, this relationship is likely explained by diminished eyesight or delayed reaction time as one ages, or driving experience that sensitizes them to the dangers of driving in adverse weather conditions. (See Table 7, Volume Two.)

When asked their level of concern when driving through construction zones, persons driving recreational vehicles and riding only as passengers were less likely to be concerned. The large size of most recreational vehicles may result in less intimidation when driving through such areas. Passengers may be less intimidated since they have no responsibility for maneuvering the vehicle through the construction zone. Self-employed persons and part-time employees were also less likely to be concerned. Reported level of concern escalated as the average miles traveled per day increased. Those persons who have obtained a graduate degree were likely to express lower levels of concern, while persons who had technical training were more likely to be concerned. (See Table 8, Volume Two.)

Sources of Tourist / Traveler Information

Questions 9-14 dealt with the frequency of use of various tourist and traveler information sources. The mean values calculated for each question are based upon a four-point scale and indicate the frequency of use. The following is the heading used for Questions 9-14 as it appears on the survey.

> When **planning** to take a trip in Northern California / Southern Oregon do you utilize the following information sources?

Tourist and traveler information sources were ranked in descending order of the means, beginning with the most frequently used source:

- Travel magazines or newspaper travel sections (Mean 2.18)
- Destination visitors bureau or chamber of commerce (1.85)
- Television / radio advertisements (1.75)
- State Departments of Tourism (1.69)
- The Internet (1.59)
- Kiosks, i.e. small computerized information centers (1.56)

Figures 21-26 graphically illustrate the percentage of respondents representing each of the four response categories. Frequencies and percentages for Questions 9-14 are provided in Appendix B.

Figure 21: Destination visitors bureau or chamber of commerce

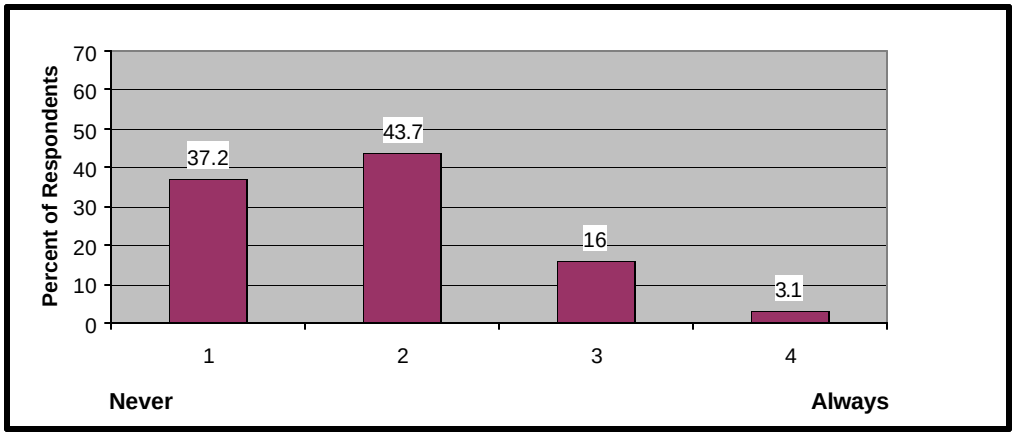


Figure 22: State Departments of Tourism

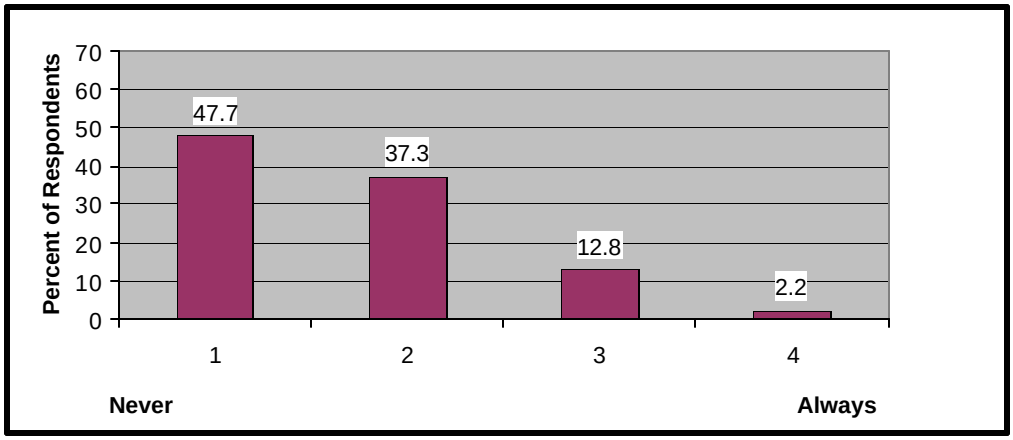


Figure 23: Television / radio advertisements

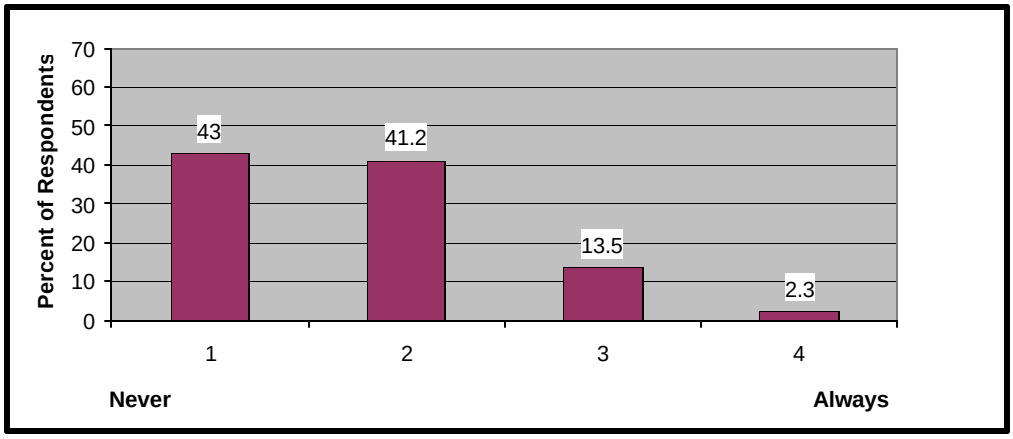


Figure 24: Kiosks, i.e. small computerized information centers

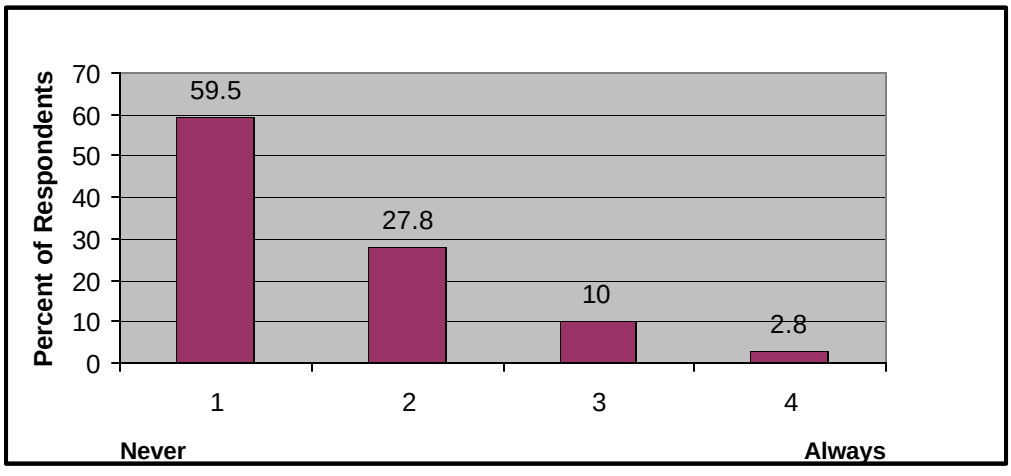


Figure 25: Travel magazine or newspaper travel sections

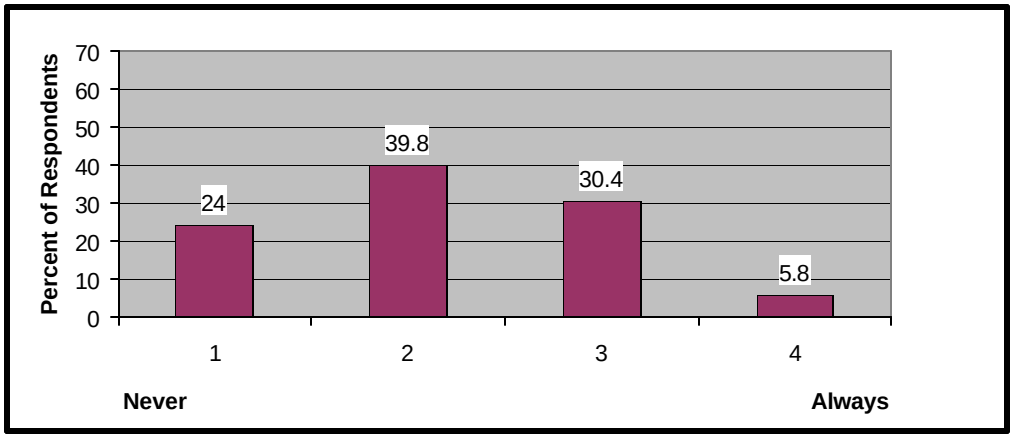
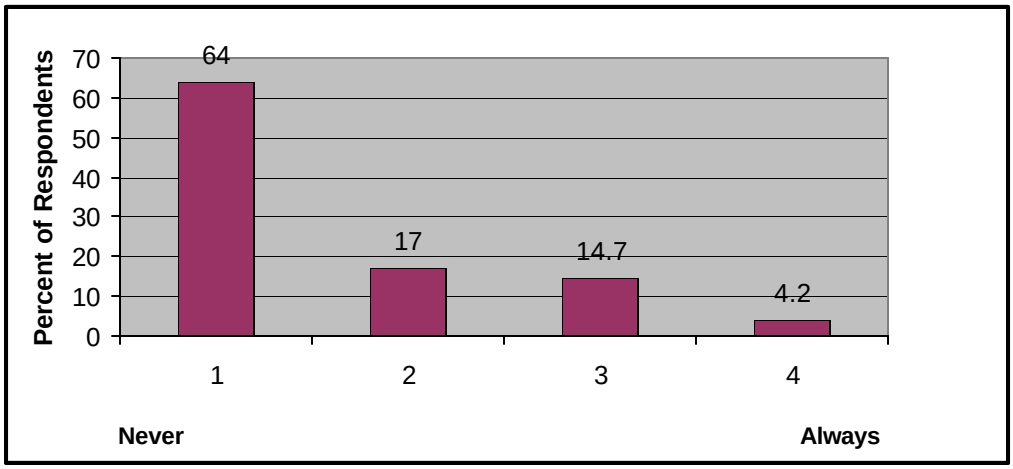


Figure 26: The Internet



Statistical Model Results for Sources of Tourist/Traveler Information

When asked to rate the frequency with which they utilize various types of information for planning a trip, the familiar travelers, males, and persons having no formal education beyond high school typically reported less frequent use. By comparison, urban residents used the various information sources relatively more often. Surprisingly, as the average number of miles traveled per day increased, the frequency of using various types of information sources decreased. It was suspected that the opposite would be true; longer daily driving distances typically would require additional planning and hence, would be assumed to require additional information.

Retired and unemployed individuals made more frequent use of information sources, perhaps because they have more time available for trip planning. Higher income levels were also associated with a higher frequency of information source use (i.e., as average income increased,

so did the frequency with which the information sources were used). Persons familiar with the area, males, and persons who reported driving longer distances per day (i.e., more than 300 miles per day) obtained information from a visitors bureau or chamber of commerce, less frequently. Urban residents and retired or unemployed individuals more frequently obtained travel information from the designated sources. These relationships likely stem from an increased availability of these information sources in urban areas and, perhaps, more spare time. Persons with technical training or a graduate degree also reportedly obtained information from these sources more often. (See Table 9, Volume Two.)

When asked the frequency with which they obtained travel information from State Departments of Tourism, retired persons and persons who frequently shop in the area indicated a higher frequency of use. Residents of California and Oregon less often used this information source. Perhaps residents who do not consider themselves to be "tourists" in their own states overlook this information source. Seemingly contrary to this notion, lengthier driving distances were associated with a low frequency of use for this information source (i.e., as the average numbers of miles traveled per day increased, the frequency of using State Departments of Tourism decreased). (See Table 10, Volume Two.)

Persons with a college or graduate degree less often obtained travel information from television or radio advertisements. It may be that college-educated individuals, either through their workplace or other options, have access to more responsive traveler information sources such as the Internet. No other variables were found to significantly affect the frequency of use for television or radio advertisements. (See Table 11, Volume Two.)

When asked to rate their frequency of kiosk use for trip planning, retired persons were found to more frequently use this option than all other respondents. Again, if we assume that *retirement* is indicative of older age, frequent kiosk use is surprising since it has been speculated that "fear of technology" would inhibit use of such systems by the elderly. High school graduates with no additional formal education had a lower frequency of kiosk use. Also, as the average number of miles traveled per day increased, the frequency of using kiosks decreased. Interpretation of these results should be tempered by the potentially limited availability of kiosks. (See Table 12, Volume Two.)

Familiar travelers and males less frequently utilized travel magazines or newspaper travel sections, whereas urban residents and persons traveling for recreational purposes reported a higher frequency of use. As the average number of miles traveled per day increased, the frequency of using travel magazines or newspaper travel sections decreased. As income increased, however, the frequency of using these sources increased. (See Table 13, Volume Two.)

When asked the frequency with which they use the Internet to obtain travel information, persons between the ages of 15 and 44 reported a higher frequency of usage. This is likely a reflection of access to the Internet by this age group, either through work, school or home. Self-employed persons and high school graduates with no additional formal education had a lower frequency of Internet use. Surprisingly, as the average number of miles traveled per day increased, the frequency of using the Internet decreased. As income levels increased, however, the frequency of using the Internet for trip planning increased. (See Table 14, Volume Two.)

Tourist and Traveler Information

Respondents were asked in Questions 15-22 how important different types of tourist and traveler information were to them before they started a trip. The mean value for each question was based upon the four-point Likert scale and indicates the relative importance of the information. The following is the heading used for Questions 15-22 as it appears on the survey.

> How important are each of the following kinds of **INFORMATION** to you **before** you start a trip in Northern California / Southern Oregon. (**Circle one number per question**)

Various types of tourist and traveler information are ranked below in the order of their mean values, beginning with highest average score (i.e. the most important type of information to the traveler):

- Weather conditions (Mean 3.08)
- The best route to destination (3.06)
- Location of traveler services(rest stops) (2.94)
- Distance to destination (2.83)
- Location of traffic delays due to special events, road closures, construction zones and/or detours (2.83)
- Location of accidents or incidents (2.81)
- Tourist attractions(parks/recreation/historical) (2.64)
- Knowing trip-planning assistance is available from rest stops or other places along your route (2.62)

Figures 27-34 graphically illustrate the percentage of respondents represented by each category on the four-point Likert scale. Frequencies and percentages for these questions are provided in Appendix B. Order probit tables are located in Volume Two of this report.

Figure 27: Tourist attractions (parks/recreation/historical)

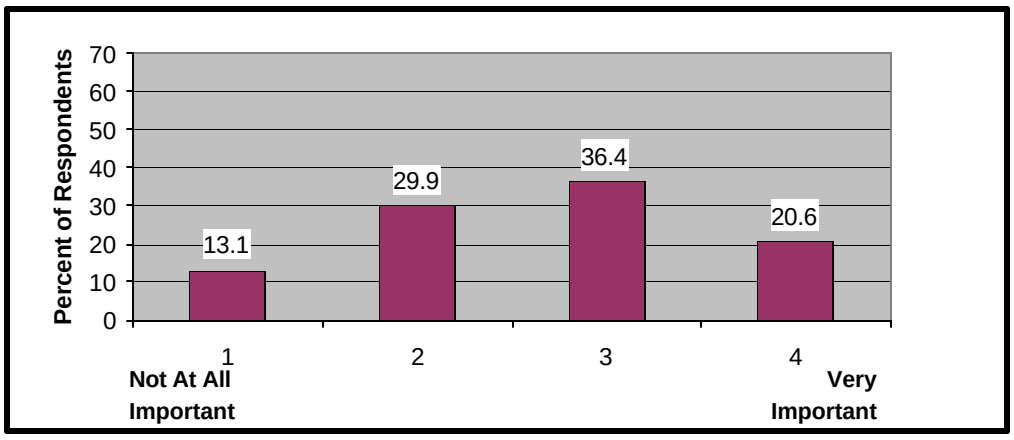


Figure 28: Distance to destination

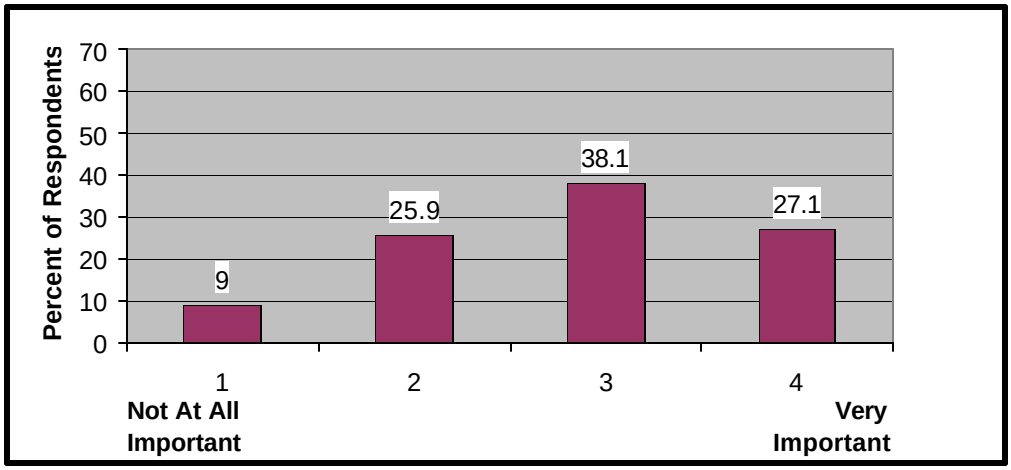


Figure 29: The best route to destination

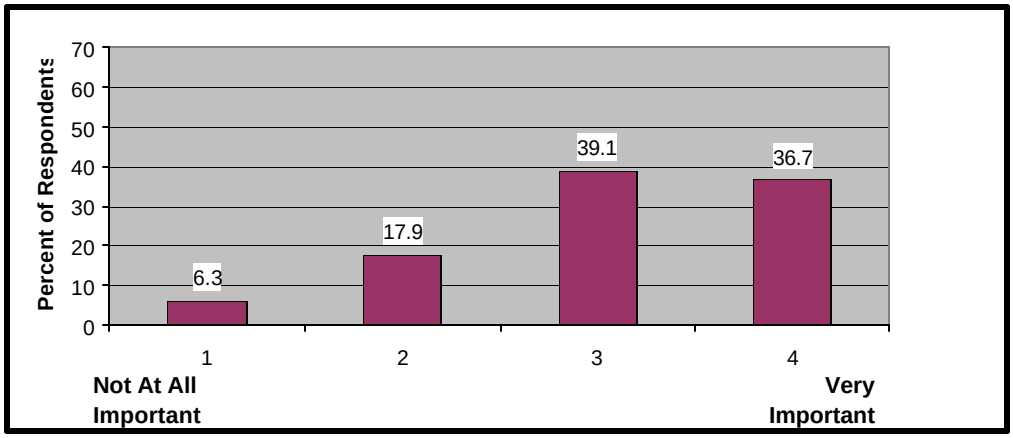


Figure 30: Location of traveler services (rest stops, visitor information centers, service stations, etc.)

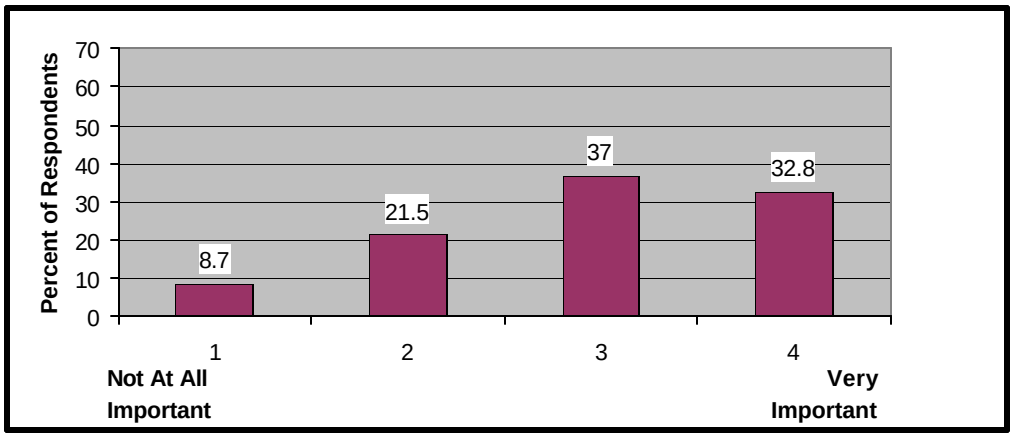


Figure 31: Locations of traffic delays due to special events, road closures, construction zones and/or detours

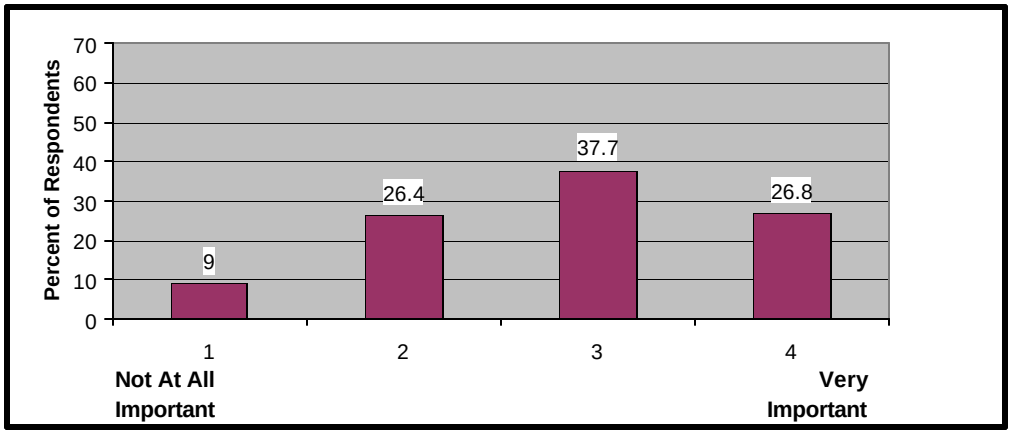


Figure 32: Locations of accidents or incidents

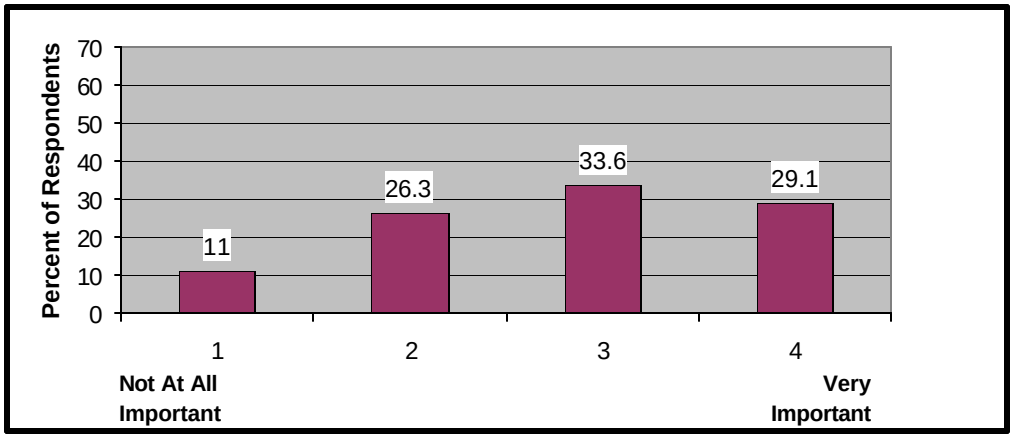


Figure 33: Weather conditions throughout your area of travel

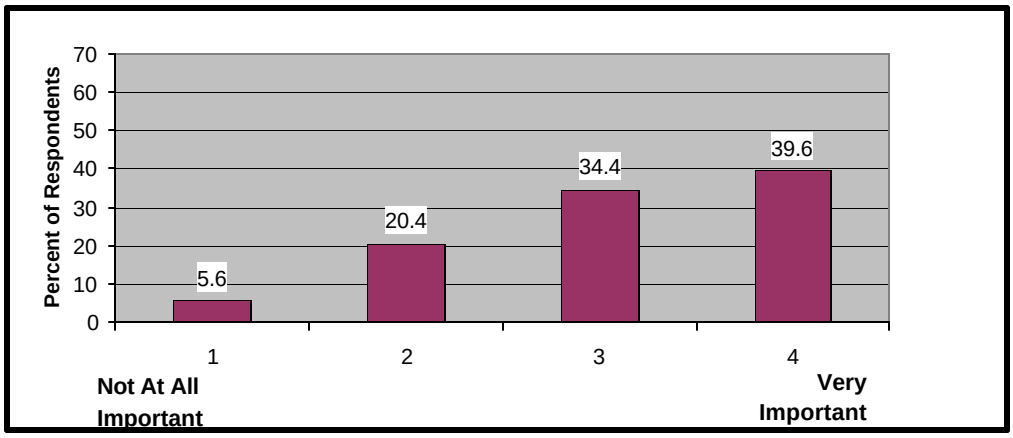
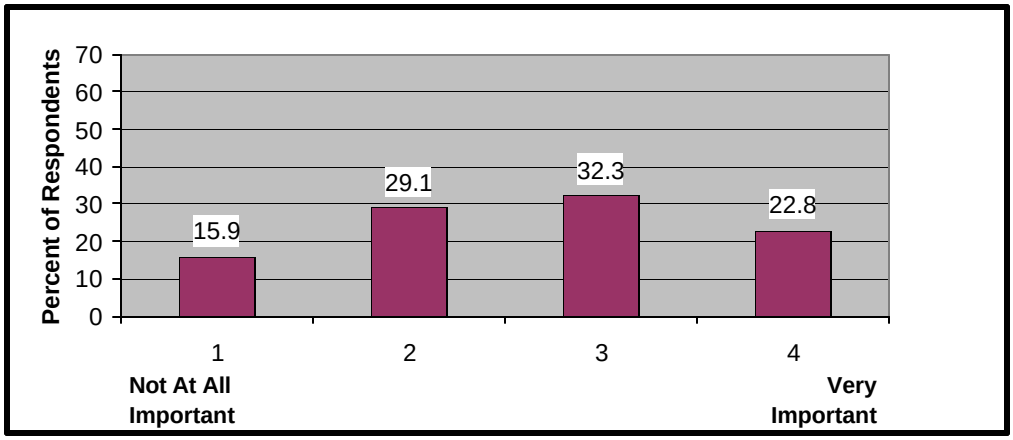


Figure 34: Knowing trip planning assistance is available from rest stops or other places along your route



Statistical Model Results for Tourist and Traveler Information

When asked to rate the importance of various types of travel-related information, California residents considered this information more important than Oregon Residents. Oregon residents and those familiar with the area placed less importance on information related to tourist attractions. Males, persons over the age of 65, persons traveling between 50 and 99 miles per day, and high school graduates with no additional formal education also placed less importance on information related to tourist attractions. (See Table 15, Volume Two.)

Not surprisingly, travelers familiar with the area, persons traveling for recreation or general purposes, and drivers of recreational vehicles placed less importance on distance to destination information. The flexible time schedules of recreational travelers and the frequency of stops en route (e.g., for sightseeing) likely explain their low interest in destination distance information. In addition, males, persons employed full- or part-time, and high school graduates with no additional formal education placed less importance on distance to destination information. As the average age of the respondent increased, so did the importance of information related to the destination distance. (See Table 16, Volume Two.)

When asked to rate the importance of information related to the best route to their destination, those familiar with the area, males, and persons between the ages of 25 to 44 placed less importance on this type of information. Also, drivers of all modes of automobiles, as well as passengers riding in vehicles, placed less importance on route information. Persons traveling predominantly for work placed a higher importance on this type of information, perhaps because of their increased sensitivity to time constraints. (See Table 17, Volume Two.)

Familiar travelers, because of their knowledge of the area, placed less importance on information related to traveler services (i.e., rest stops, service stations). Persons between the ages of 15 and 65, males, suburban residents, passengers, and self-employed individuals also placed less importance on information related to traveler services. Persons who travel predominantly in the area for work placed more importance on traveler service information and

this importance heightened as commute distance increased (as the distance traveled per day increased, so did the importance placed on this type of information). Persons who did not finish high school placed more importance on traveler service information, although an explanation for this relationship is elusive. (See Table 18, Volume Two.)

Familiar travelers, males, suburban residents, young persons (between the ages of 15 and 24), and persons traveling in the area predominantly for work, recreation or general purposes placed less importance on information related to travel delays. This is somewhat surprising given the time constraints associated with factors such as work. Persons who typically average more than 300 daily miles placed a greater importance on information related to travel delays. This relationship is likely skewed by responses from truck drivers who are very time-sensitive, although the *truck* indicator variable was not significant. (See Table 19, Volume Two.)

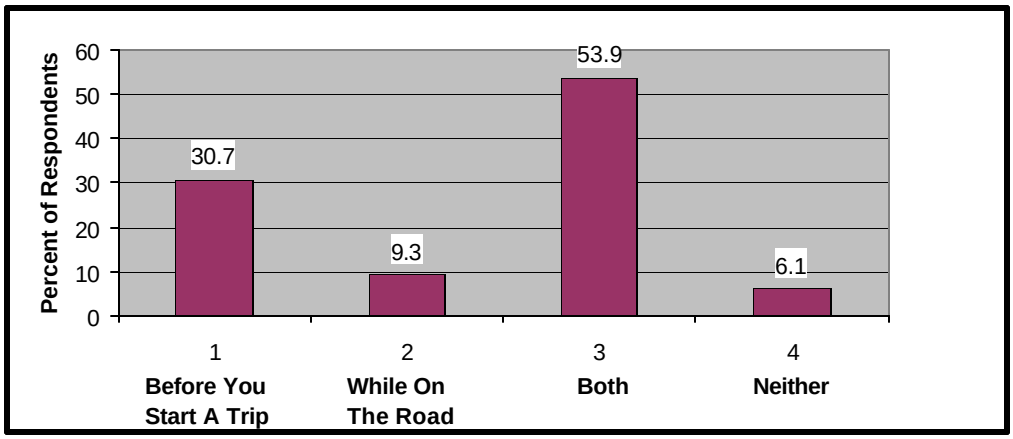
California residents placed greater importance than Oregon residents on information related to the location of accidents or incidents. Males, persons between the ages of 15 and 24, vehicle passengers, and persons traveling for recreation or general purposes placed less importance on this type of information. Again, if one assumes that persons traveling for recreation or general purposes have more flexible time schedules and are less sensitive to potential accident or incident related delays, these relationships make sense. (See Table 20, Volume Two.)

California residents rated weather condition information of greater importance than Oregon Residents. Familiar travelers, males, persons between the ages of 15 and 44, persons traveling predominantly for recreation or general purposes, and vehicle passengers placed less importance on weather condition information. Familiar travelers may have adapted to the adverse weather conditions in their locale, and hence, may be less sensitive to the potential dangers while, recreational travelers may simply be unaware of the hazards. Persons who are employed part-time or self-employed also placed less importance on this type of information. (See Table 21, Volume Two.)

When asked to rate the importance of knowing about trip-planning assistance at rest stops or other places, again, California residents placed more importance on this type of information than Oregon residents. Familiar travelers, males, persons between the ages of 15 and 44, persons traveling predominantly for recreation or general purposes, and persons who are employed part-time placed less importance on this type of information. Also, persons having obtained a college degree and persons with higher income levels were less likely to place importance on this type of information. (See Table 22, Volume Two.)

Question 23 was also included in the tourist and traveler information section. It asked respondents to indicate when they preferred to receive tourist and traveler information. The following figure (Figure 35) graphically illustrates the results.

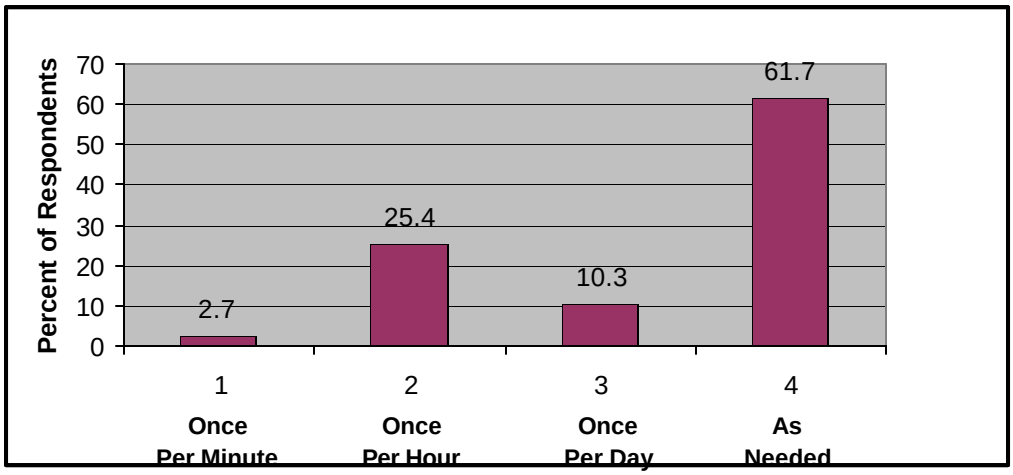
Figure 35: Do you prefer to get tourist and traveler information



Advanced Technology and Information Sources

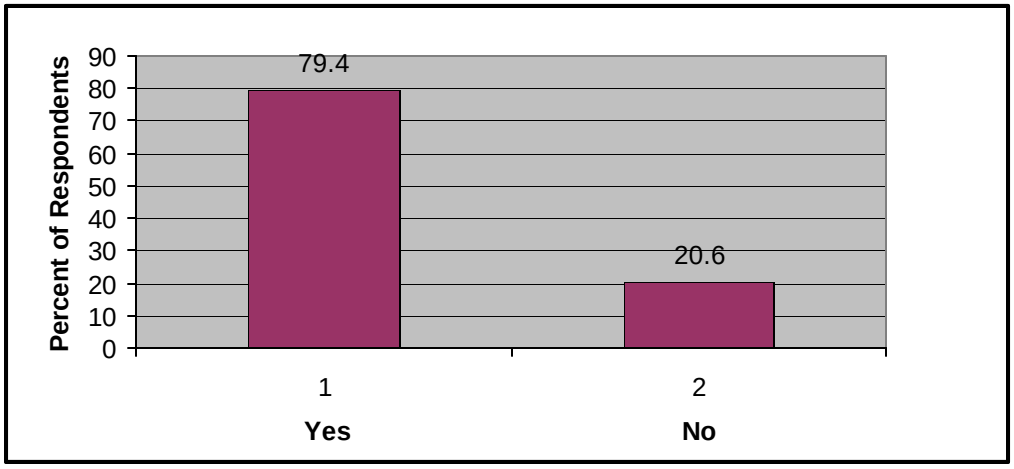
Question 24 attempted to assess the travelers' sense of "real-time" information. It asked the respondents to indicate how often they preferred to have traveler information updated and verified. Figure 36 graphically illustrates the results.

Figure 36: Do you prefer that traveler information be updated and verified



Question 25 asked travelers whether they were interested in a device that would alert police and emergency medical services if they should run off the road or be involved in a collision. Figure 37 graphically illustrates the results.

Figure 37: Suppose a device was available for your vehicle that would alert police and emergency medical services if you should run off the road or be involved in a collision. Would you be interested in having something like that installed in your vehicle



Respondents were asked in Questions 26-37 how likely they would be to use various devices and services to obtain traveler information or aid in driving. The mean value for each question was based upon a four-point Likert scale and indicates the relative likelihood of use of each device or service. The following is the heading used for questions 26-37 as it appears on the survey.

> If available, how likely would you be to use each of the following services or devices to aid in driving or obtain traveler or tourist information? (**Circle one number per question**)

The services and devices are ranked below, beginning with the highest mean value, indicating the option most likely to be used by the traveler:

- Warning signs for speed, curves and animal presence that change based on conditions (Mean 3.33)
- A telephone number to report an incident or accident (3.12)
- A special radio channel for road conditions, accidents, etc. (2.97)
- Changeable message signs (2.95)
- A telephone number for road conditions (2.81)
- A cellular phone (2.79)
- An in-vehicle device to enhance driving capabilities in low visibility situations (2.78)
- An in-vehicle device to help you avoid collisions or running off the roadway (2.75)
- A special radio channel for tourist information (2.70)
- Small computerized information centers – or kiosks – at convenient locations (2.52)
- A local TV channel with continuously updated tourist and traveler information (2.26)
- A small in-vehicle computer with traveler information (2.13)

Figures 38-49 graphically illustrate the percentage of respondents represented by each category on the four-point Likert scale. Frequencies and percentages provided in Appendix B of this report.

Figure 38: A telephone number for road conditions

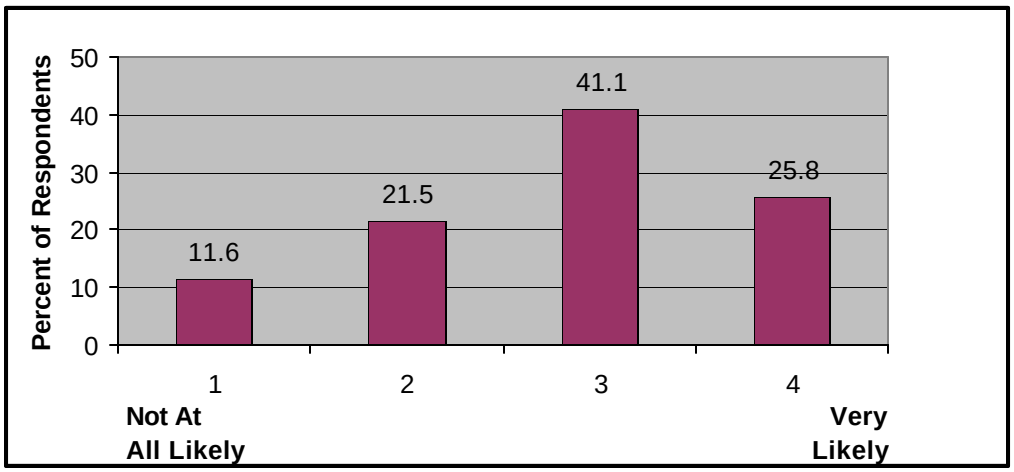


Figure 39: A telephone number to report an incident or accident

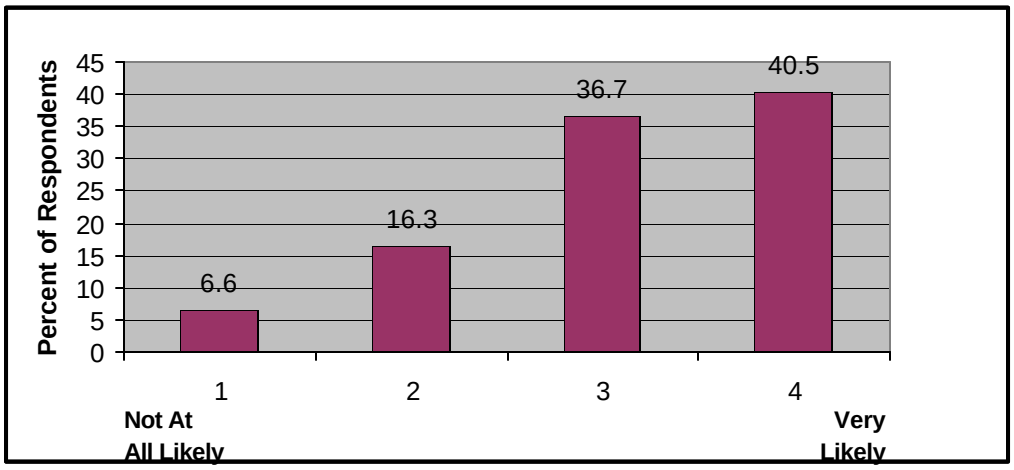


Figure 40: A special radio channel for tourist information

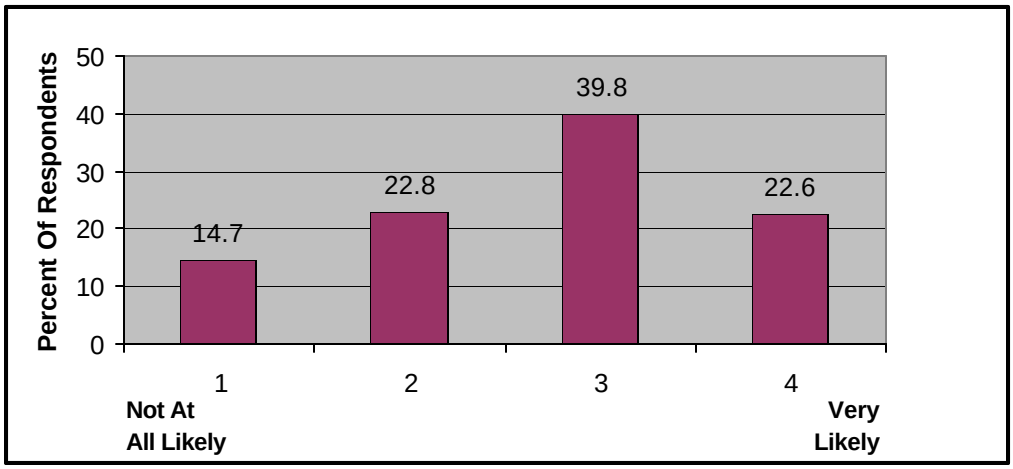


Figure 41: A special radio channel for road conditions, accidents, incidents, closures, etc.

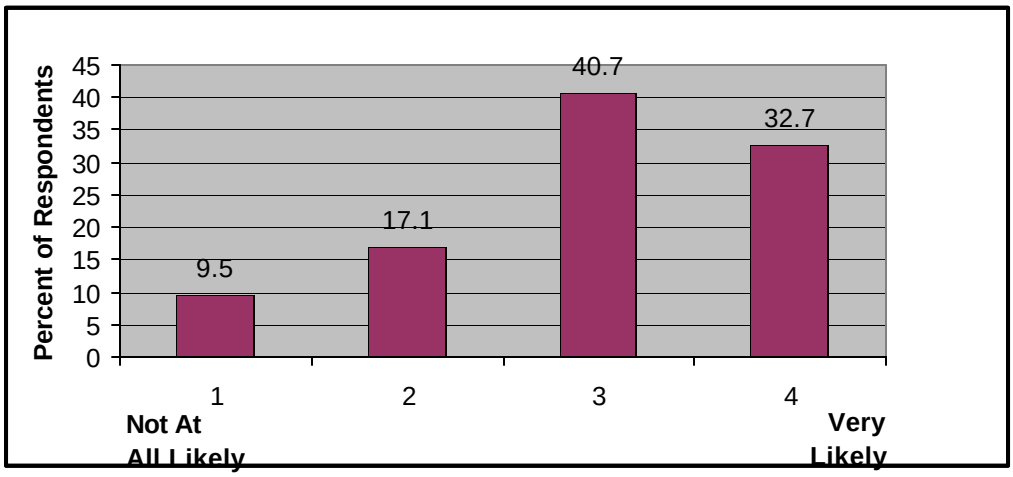


Figure 42: A local TV channel with continuously updated tourist and traveler information

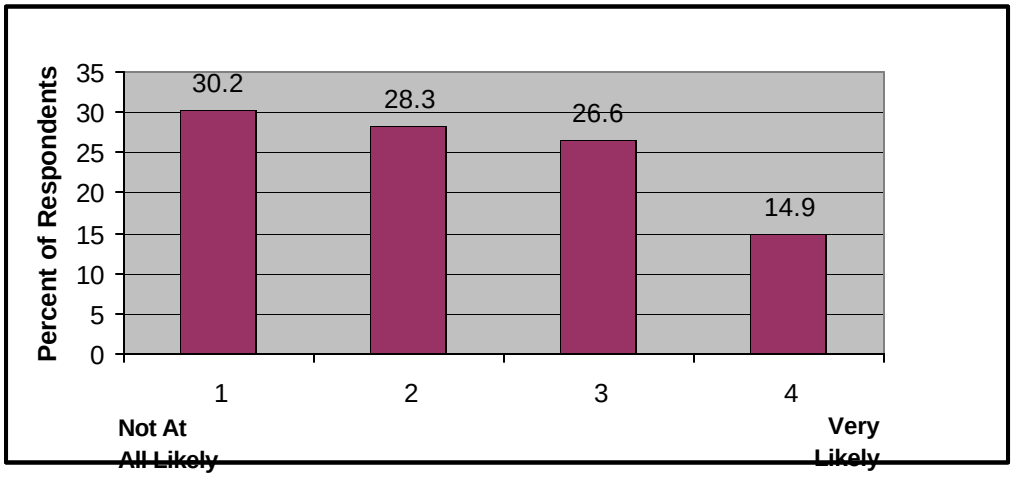


Figure 43: A small in-vehicle computer with traveler information

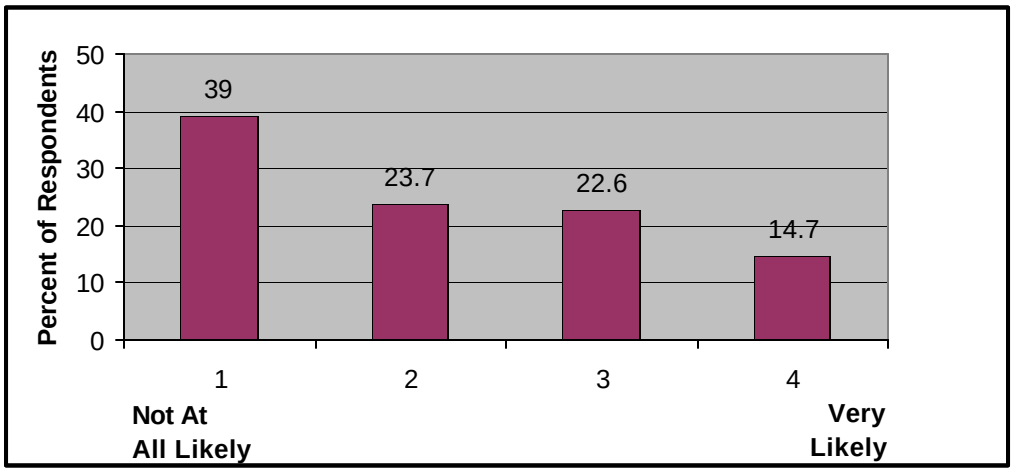


Figure 44: A cellular phone

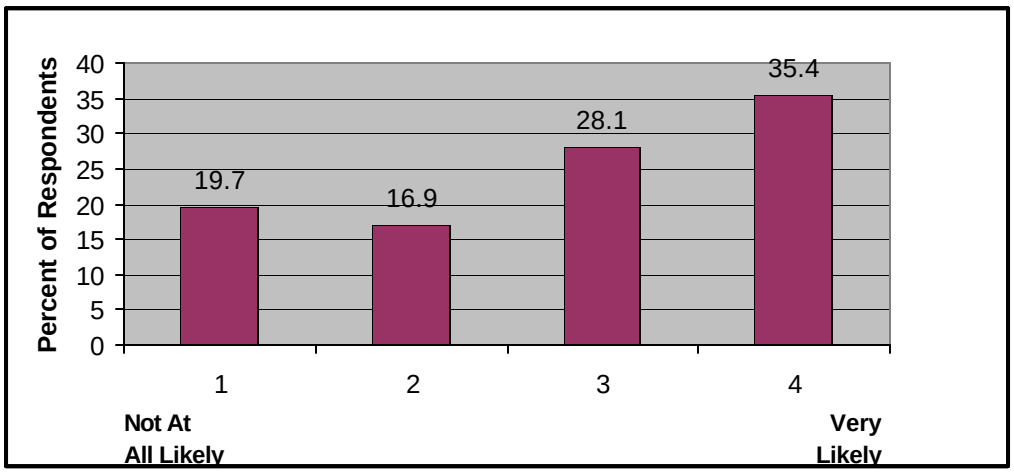


Figure 45: Changeable message signs

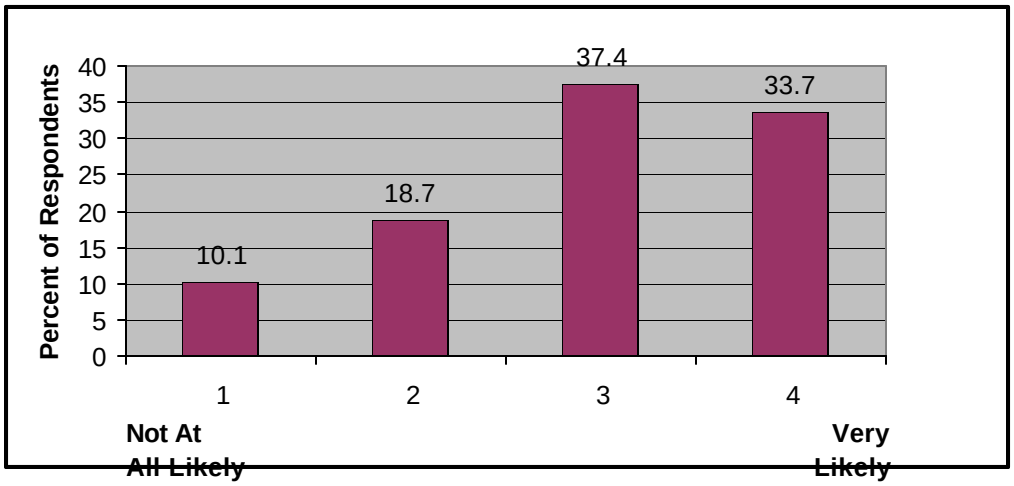


Figure 46: Warning signs for speed, curves and animal presence that change based on conditions

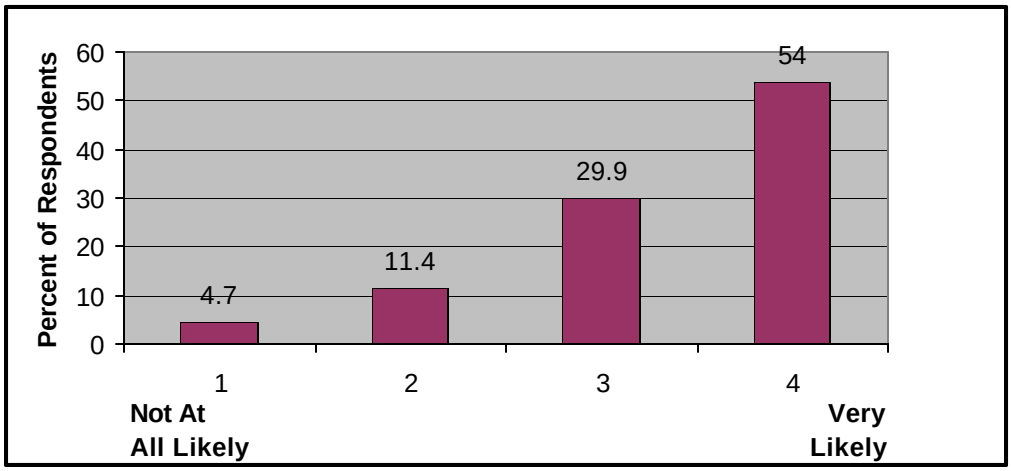


Figure 47: An in-vehicle device to enhance driving capabilities in low-visibility situations

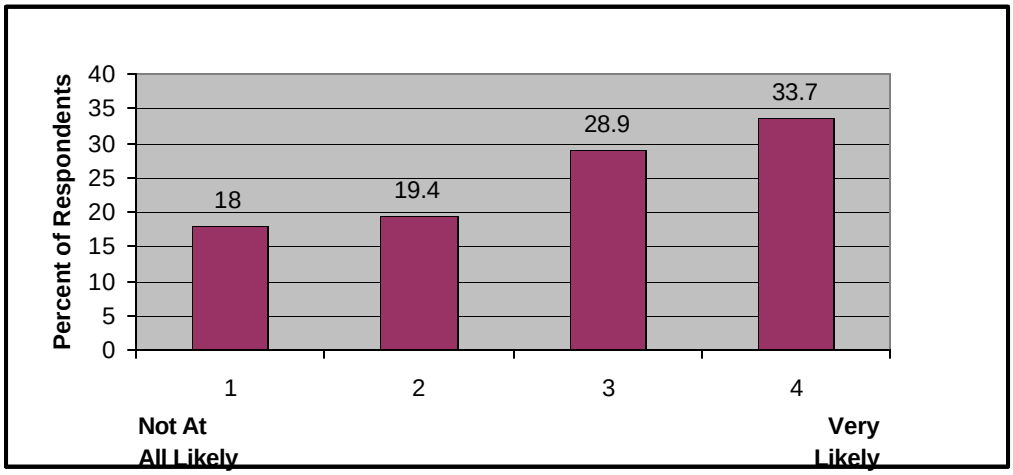


Figure 48: Small computerized information centers – or kiosks – at convenient locations

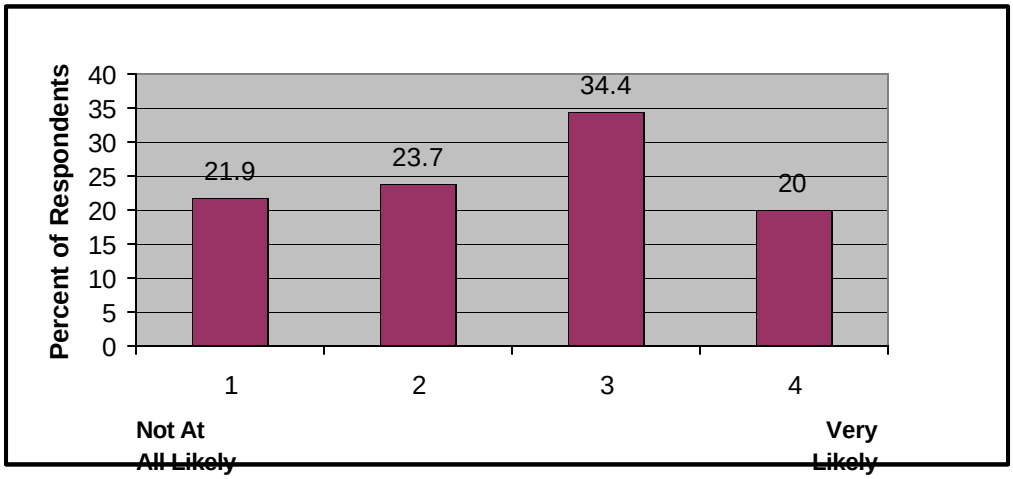
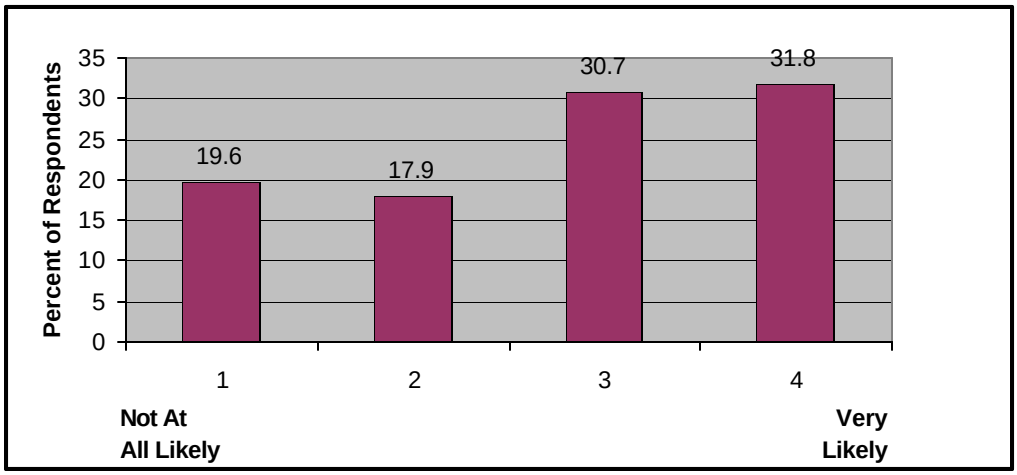


Figure 49: An in-vehicle device to help you avoid collisions or running off the roadway



Statistical Model Results for Advanced Technology and Information Sources

Persons who did not finish high school preferred travel information to be updated less frequently (i.e., as needed, once per day) while California and Oregon residents, males, persons over the age of 25, persons traveling for school, recreation or general purposes preferred travel information to be updated more frequently (i.e., once per minute, once per hour). (See Table 24, Volume Two.)

When asked about their likelihood of using various travel-related services or devices, in general, residents of California and Oregon were more likely to use the services or devices, while males, automobile drivers, vehicle passengers, recreational or general travelers, retired persons, and college graduates were less likely to use these services or devices. In some cases, as age and miles driven per day increased, so did the likelihood of using these devices and services. Residents of California and Oregon were more likely to use a telephone number to obtain road conditions, as were truck drivers. California and Oregon residents presumably have easy access to the telephone before leaving their home or their work place. Truck drivers also have relatively easy access to telephones (at truck stops) and are likely to be more sensitive to delays resulting from adverse road conditions. Males, young persons (between the ages of 15 and 24), recreational or general travelers, and college graduates were less likely to use this service for obtaining travel information. (See Table 26, Volume Two.)

When asked whether they would use a telephone number to report an accident or incident, persons traveling longer distances per day and unemployed persons were more likely to use this service. Males, persons between the ages of 15 and 65, vehicle passengers, and college graduates were less likely to use such a service although none of these relationships are intuitively obvious. (See Table 27, Volume Two.)

When asked about using a special radio channel for tourist information, males, young persons between the ages of 15 and 24, persons employed part-time, and college graduates all were less likely to use such service for obtaining travel information. Perhaps these groups have

access to alternative information sources (i.e., the Internet) which supplant use of the radio as an information source. No other variables were found to significantly affect the likelihood of use. (See Table 28, Volume Two.)

Residents of California were more likely to use a special radio channel for road conditions, accidents, incidents, closures, etc. Also, persons with technical training and older persons were more likely to use this information service (i.e., as average age increased, the likelihood of use also increased). Males, vehicle passengers and college graduates were less likely to use this information service; again, possibly reflecting the use of alternate information sources. (See Table 29, Volume Two.)

When asked whether they would use a TV channel with continuously updated tourist and travel information, full-time workers and persons with household incomes exceeding $80,000 were likely to use this service or device. Males, young persons (age 15 to 24), recreational vehicle drivers, persons completing high school, some college, a college degree or a graduate degree, and persons with a household income of $20,000 to $39,000 were less likely to use this service or device. (See Table 30, Volume Two.)

Automobile drivers and persons who predominantly travel in the area for shopping, recreation or general purposes were not likely to use an in-vehicle computer to obtain travel-related information. Also, persons with incomes ranging between $20,000 to $79,000 were not likely to use an in-vehicle computer. Perhaps the perceived high cost attached to such a system would inhibit its use by lower income groups. No other variables were significant in affecting the likelihood of use. (See Table 31, Volume Two.)

Residents of California and Oregon were more likely to use a cellular telephone for obtaining travel-related information. Urban residents, automobile drivers and retired persons were less likely to use this service or device. (See Table 32, Volume Two.)

Persons driving longer daily distances were more likely to use dynamic warning signs for travel information. Familiar travelers, vehicle passengers and college graduates were less likely to use warning signs for travel information. (See Table 34, Volume Two.)

When asked whether they would use an in-vehicle device that enhances driving capabilities in low visibility conditions, persons traveling predominantly for work were more likely to use this device, while males were not. No other variables were found to be significant in affecting the likelihood of use for this device. (See Table 35, Volume Two.)

Automobile drivers, recreational travelers, retired persons, and college graduates were all less likely to use kiosks for obtaining travel-related information. Note that the relationship here between retired persons and predicted kiosk use conflicts with earlier findings related to retired persons and reported kiosk use for trip planning purposes. Earlier findings indicated that retired persons had a higher frequency of kiosk use while these findings suggest that retired persons were less likely to use kiosks. No other variables were found to be significant. (See Table 36, Volume Two.)

Residents of California were likely to use an in-vehicle device to help avoid collisions or running off the roadway. Recreational travelers or college graduates were not apt to make use of such technology. (See Table 37,Volume Two.)

When use of the special services or devices was qualified to reflect recognition of direct benefit, urban and rural residents, recreational travelers, high school and college graduates were still less likely to use any one of the services or devices. No other variables were significant. (See Table 38, Volume Two.)

When asked their willingness to pay for the special services or devices, California and Oregon residents, older persons, persons who travel predominantly for work, and persons with higher incomes would be more likely to pay for the service or device. Males, urban and rural residents, and self-employed persons would be less likely to pay for any one of the services or devices. (See Table 39, Volume Two.)

Questions 38 and 39 were also included in the advanced technology and information section. The intent of these two questions was to obtain an understanding of the respondents' willingness to use and pay for these new types of services and devices. Figures 50 and 51 graphically illustrate the results.

Figure 50: If you could recognize a direct benefit on your driving experience, how likely would you be to USE the special services or devices discussed above

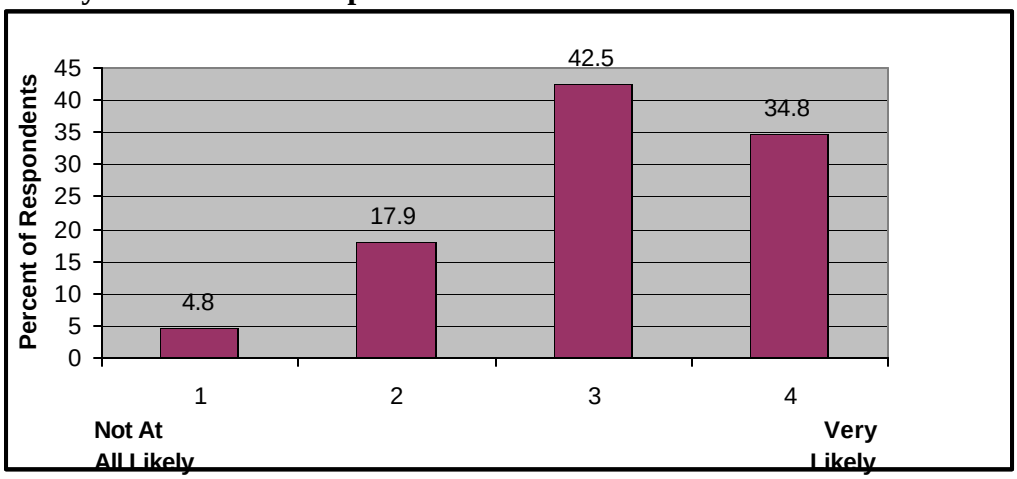
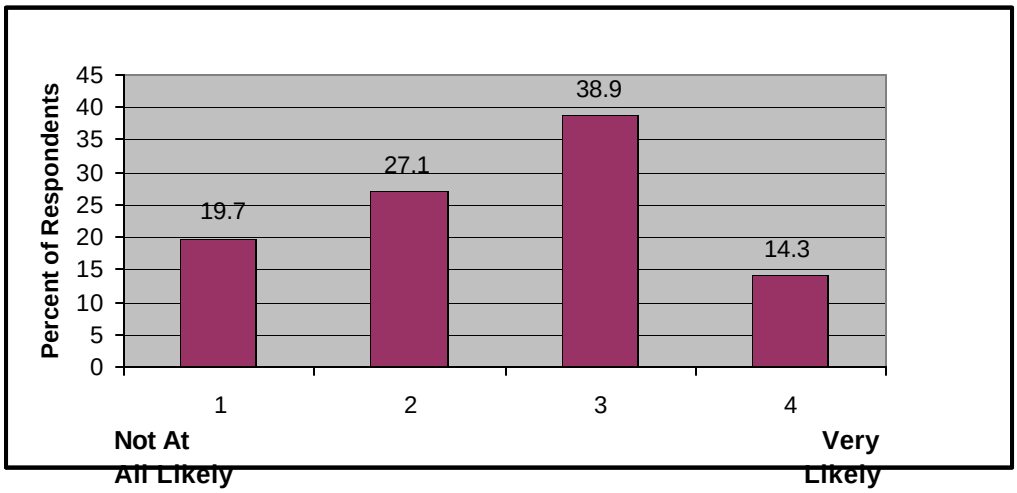


Figure 51: If you could recognize a direct benefit on your driving experience, how likely would you be to PAY FOR the special services or devices discussed above



COMPARATIVE ANALYSIS

The following is a comparative analysis between the findings of the Northern California / Southern Oregon Traveler Needs Survey and the Greater Yellowstone Traveler Needs Survey (1). These results are important in that they provide insight into the differences and similarities of travelers in different regions of the country. A brief discussion of statistically significant similarities and differences in results between the two surveys is provided in the paragraphs to follow.

Passing trucks and other heavy vehicles, and road conditions like ice, snow, rain or fog were found to be important to the rural traveler in the Greater Yellowstone area. The same concerns were expressed by travelers in the Northern California / Southern Oregon region. Driving through construction zones, and debris, objects or animals on the roadway were also concerns shared by travelers in both regions. Although the surveys were administered in different areas of the country, similarities (such as weather conditions, terrain, and population) exist between these two regions. This may explain why respondents answered similarly on questions pertaining to rural areas and the issues encountered in remote locations.

From the Greater Yellowstone survey, it was found that the best route to destination and road condition problems due to weather were important pre-trip information. The survey conducted in the Northern California / Southern Oregon region also found the most important pre-trip information to be weather conditions, and the best route to destination. The facilities found to be important for receiving pre-trip information from both surveys were travel magazines or travel sections in newspapers. The Internet was ranked near the bottom of the scale in both surveys as a means to receive pre-trip information, while both surveys also showed that small in-vehicle computers with traveler information were not means by which travelers would like to receive information. Differences appeared between the two surveys in the area of pre-trip information, specifically, destination visitors bureaus or chambers of commerce seemed to be more important facilities for receiving information in the Northern California / Southern Oregon region than in the Greater Yellowstone area. However, drawing conclusions about the differences is complicated by the fact that the response scales offered to the respondents in the two surveys differed on some of the pre-trip information questions.

Significant differences were also noted in some of the demographic characteristics. For instance, in the Greater Yellowstone survey almost 2/3 of the respondents were tourists or from states outside of the corridor. Conversely the Northern California / Southern Oregon survey had approximately the same percentage of respondents resided within the California / Oregon corridor. This difference can most likely be attributed to Yellowstone National Park being within the Greater Yellowstone corridor. Males comprised 56% of the Greater Yellowstone survey, compared to 64% of the Northern California / Southern Oregon survey. The Greater Yellowstone survey had approximately 15% of the respondents between the ages of 64 – 85 years; this survey had almost 30% of the respondents in that age group. Forty-two percent (42%) of the respondents from the Greater Yellowstone survey were traveling for recreational purposes, while 55% of the respondents from the Northern California / Southern Oregon survey were traveling for recreational purposes. Fifty-six percent (56%) of the Greater Yellowstone survey respondents were employed full-time, compared to 41% of the respondents from this survey who were employed full-time.

CONCLUSIONS

Understanding the information needs of travelers, as well as their willingness to use new ITS-related systems, was one of the objectives of the Northern California / Southern Oregon Rural ITS Areawide Travel and Safety Improvement Project. Ideally, regional data like the information obtained in this survey, along with other data, can be used by the California and Oregon Departments of Transportation and various other agencies to provide a safer, more enjoyable driving experience to traveler in the region. The following paragraphs offer a generalized summary of the results reported in the body of this report.

Survey respondents were asked about perceived transportation challenges in the study corridor, and concerns they might have with possible traveling situations. The majority of respondents expressed frequent concern for passing trucks and heavy vehicles, situations that were defined in terms of clearance and visibility issues. They also indicated that road conditions, such as ice, snow, rain or fog were frequent causes of concern. Occasional concern was expressed by respondents over driving through construction zones, having to avoid debris, objects or animals on the roadway, and driving on hills or curves. Similar feelings were reported when respondents were asked to consider the possibility of running off the roadway, or being provided with inadequate information from signs along their route.

Respondents were asked how they obtain tourist and traveler information while planning a trip. A majority indicated that travel magazines or newspaper travel sections were occasionally used to obtain information. Destination visitors bureaus or chambers of commerce, as well as television or radio advertisements were also used occasionally as sources of information when respondents were planning a trip in the Northern California / Southern Oregon corridor. Somewhat surprisingly, a majority of the study sample stated that they never use Kiosks or the Internet for trip planning purposes.

Travelers indicated it was important for them to know before they started their trip the following information: weather conditions; the best route to their destination; locations of traveler services (e.g. rest stops); distances to destinations; and locations of traffic delays, due to special events, road closures, construction zones and/or detours.

In keeping with the study's focus on advanced transportation technologies, respondents were asked several questions about such systems, and whether or not they would use these technologies. The majority of respondents indicated they would be very likely to use warning signs for speed, curves, and animal presence, which have the capability to change, based on conditions, if such signs were available. Respondents also stated that they would be likely to use a telephone number that would report an accident or incident, if available. A special radio channel to provide information on road conditions, accidents, and so forth, as well as changeable message signs, were additional devices or systems that respondents said they would be likely to use. Conversely, the majority reported they were not at all likely to use a small in-vehicle computer that could provide traveler information. Similar sentiments were expressed regarding the option of a local TV channel that would provide continuously updated tourist and traveler information.

In many instances, statistically significant differences appeared between responses of California and Oregon residents when compared with those of residents of other states or

countries. For example, California and Oregon residents expressed more concern when it came to encountering slow moving vehicles like snowplows, farm equipment or recreational vehicles on the roadway. California and Oregon residents also expressed more concern for passing trucks and other heavy vehicles.

Travelers familiar with the area expressed less concern for a potential lack of information from signs along the roadway than did those who were reportedly unfamiliar with the area. Contrary to this finding, non-residents of California and Oregon indicated less concern for a lack of information along the roadway. The somewhat counterintuitive latter finding could mean that state maps, information centers, and so forth have become so efficient at providing necessary information that roadside signs are of less importance to travelers.

When asked about sources of information, California and Oregon residents were less likely to use State Departments of Tourism to gather traveler information. One would assume that California and Oregon residents would be more familiar with the roadways in the corridor than would residents of other states and, consequently, might be less apt to need or utilize an outside information source.

California residents placed greater importance on information related to the location of accidents or incidents. Likewise, respondents from California considered weather condition information to be of greater importance. Respondents from California and Oregon preferred that travel information be updated more frequently.

The California and Oregon respondents also indicated they would be more likely to use a telephone number to obtain road conditions updates, or to use a special radio channel for information regarding road conditions, accidents, incidents, and closures. California residents reported they would be more likely to use an in-vehicle device to help avoid collisions or running off the roadway. California and Oregon residents indicated they would be more willing to pay for the special services or devices described as advanced transportation technologies.

Reference

1. Western Transportation Institute. "Greater Yellowstone Rural ITS Priority Corridor Traveler Needs Survey," prepared for the State of Montana Department of Transportation and the Federal Highway Administration, September, 1997.

Appendix A: Traveler Needs Survey

The traveler needs survey included in this appendix is presented as administered.

PERCEIVED CORRIDOR CHALLENGES

When you are traveling in Northern California / Southern Oregon, how often are you concerned about the following? (**Circle one number per question**)

	NEVER CONCERNED	OCCASIONALY CONCERNED	FREQUENTLY CONCERNED	ALWAYS CONCERNED
Encountering slow moving vehicles like snowplows, farm equipment or RV's……..	**1**	**2**	**3**	**4**
Running off the roadway…….	**1**	**2**	**3**	**4**
Lack of information from signs along the roadway……	**1**	**2**	**3**	**4**
Debris, objects or animals on the roadway…….…..	**1**	**2**	**3**	**4**
Passing trucks and other heavy vehicles (clearance/visibility)...	**1**	**2**	**3**	**4**
Driving on hills or curves……	**1**	**2**	**3**	**4**
Road conditions like ice, snow, rain or fog……..	**1**	**2**	**3**	**4**
Driving through construction zones.……...	**1**	**2**	**3**	**4**

SOURCES OF TOURIST/TRAVELER INFORMATION

When **planning** to take a trip in Northern California / Southern Oregon do you utilize the following information sources?

	NEVER	OCCASIONALLY	FREQUENTLY	ALWAYS
Destination visitors bureau or chamber of commerce……	**1**	**2**	**3**	**4**
State Departments of Tourism……	**1**	**2**	**3**	**4**
Television / radio advertisements……..	**1**	**2**	**3**	**4**
Kiosks, i.e. small computerized information centers…….……	**1**	**2**	**3**	**4**
Travel magazines or newspaper travel sections…….	**1**	**2**	**3**	**4**
The Internet……	**1**	**2**	**3**	**4**

TOURIST AND TRAVELER INFORMATION

How important are each of the following kinds of **INFORMATION** to you **before** you start a trip in Northern California / Southern Oregon. (**Circle one number per question**)

	NOT AT ALL IMPORTANT	SOMEWHAT IMPORTANT	IMPORTANT	VERY IMPORTANT
Tourist attractions (parks/recreation/historical).....	**1**	**2**	**3**	**4**
Distance to destination…….……..	**1**	**2**	**3**	**4**
The best route to destination……..	**1**	**2**	**3**	**4**
Location of traveler services (rest stops, visitor information centers, service stations, etc.)…..…….	**1**	**2**	**3**	**4**
Locations of traffic delays due to special events, road closures, construction zones and/or detours……..……..	**1**	**2**	**3**	**4**
Locations of accidents or incidents……..…..	**1**	**2**	**3**	**4**
Weather conditions throughout your area of travel……	**1**	**2**	**3**	**4**
Knowing trip-planning assistance is available from rest stops or other places along your route.....….	**1**	**2**	**3**	**4**

Do you prefer to get tourist and traveler information

Before you start a trip…….. **1**
While on the road**……** 2
Both……. **3**
Neither……. **4**

ADVANCED TECHNOLOGY AND INFORMATION SOURCES

Do you prefer that traveler information be updated and verified (**Circle one**)

Once per minute…… **1**
Once per hour……..…… **2**
Once per day.....…… **3**
As needed……. **4**

Suppose an attachment was available for your vehicle that would alert police and emergency medical services if you should run off the road or be involved in a collision. Would you be interested in having something like that installed in your car or truck? (**Circle one**)

Yes…… **1**
No……. **2**

If available, how likely would you be to use each of the following services or devices to aid in driving or obtain traveler or tourist information? (**Circle one number per question**)

	NOT AT ALL LIKELY	SOMEWHAT UNLIKELY	SOMEWHAT LIKELY	VERY LIKELY
A telephone number for road conditions……	**1**	**2**	**3**	**4**
A telephone number to report an incident or accident……..…..	**1**	**2**	**3**	**4**
A special radio channel for tourist information……..	**1**	**2**	**3**	**4**
A special radio channel for road conditions, accidents, incidents, closures, etc……	**1**	**2**	**3**	**4**
A local TV channel with continuously updated tourist and traveler information……	**1**	**2**	**3**	**4**
A small in-vehicle computer with traveler information……..	**1**	**2**	**3**	**4**
A cellular phone…….…….....…….....	**1**	**2**	**3**	**4**
Changeable message signs……..	**1**	**2**	**3**	**4**
Warning signs for speed, curves and animal presence that change based on conditions……	**1**	**2**	**3**	**4**
An in-vehicle device to enhance driving capabilities in low-visibility situations…….	**1**	**2**	**3**	**4**
Small computerized information centers – **or kiosks** – at convenient locations……	**1**	**2**	**3**	**4**
An in-vehicle device to help you avoid collisions or running off the roadway……..	**1**	**2**	**3**	**4**

If you could recognize a direct benefit on your driving experience, how likely would you be to **USE** the special services or devices discussed above? (**Circle one**)

Not at all likely…… **1**
Somewhat unlikely……... **2**
Somewhat likely……... **3**
Very likely……. **4**

If you could recognize a direct benefit on your driving experience, how likely would you be to **PAY FOR** the special services or devices discussed above? (**Circle one**)

Not at all likely…… **1**
Somewhat unlikely……... **2**
Somewhat likely……... **3**
Very likely……. **4**

DEMOGRAPHICS (Circle one number per question)

The following information is needed to ensure that your travel needs are properly represented in this survey. It will be used for the purposes of this survey only.

Residence	California	**1**
	Oregon	**2**
	Other	**3**
Familiarity with area	Familiar	**1**
	Unfamiliar	**2**
Gender	Male	**1**
	Female	**2**
Age	15 – 24 Years	**1**
	25 – 44	**2**
	45 – 64	**3**
	65 +	**4**
Live in	Urban area / city	**1**
	Rural area / country	**2**
	Suburban	**3**
Type of vehicle normally driven in this area	Automobile	**1**
	Commercial (Truck, Bus)	**2**
	Motorcycle	**3**
	RV	**4**
	Passenger only	**5**
Majority of vehicle travel in this area is to travel to	Work	**1**
	School	**2**
	Shopping	**3**
	Medical	**4**
	Recreation	**5**
	General	**6**
Average miles traveled per day for the trips *purpose* circled above	0 – 49	**1**
	50 – 99	**2**
	100 – 300	**3**
	300 +	**4**
Employment	Full – time	**1**
	Part – time	**2**
	Self – employed	**3**
	Retired	**4**
	Unemployed	**5**
	Student	**6**
	Other	**7**
Education completed	Less than high school	**1**
	Technical training	**2**
	High school	**3**
	Some college	**4**
	College degree	**5**
	Graduate degree	**6**
Income (per household)	Under $20,000	**1**
	20,000 – 39,000	**2**
	40,000 – 79,000	**3**
	80,000 +	**4**

Appendix B: Frequencies and Percentages by Question

The frequencies and percentages of response are listed within this appendix in the order the questions were presented within the survey.

Table 1: Encountering slow moving vehicles like snowplows, farm equipment, or R.V.'s

	Frequency	Percent
Never concerned	254	24.7
Occasionally concerned	501	48.6
Frequently concerned	157	15.2
Always concerned	118	11.5

Table 2: Running off the roadway

	Frequency	Percent
Never concerned	446	43.6
Occasionally concerned	390	38.2
Frequently concerned	100	9.8
Always concerned	86	8.4

Table 3: Lack of information from signs along the roadway

	Frequency	Percent
Never concerned	340	33.3
Occasionally concerned	412	40.3
Frequently concerned	171	16.7
Always concerned	99	9.7

Table 4: Debris, objects or animals on the roadway

	Frequency	Percent
Never concerned	249	24.2
Occasionally concerned	490	47.4
Frequently concerned	149	14.5
Always concerned	140	13.6

Table 5: Passing trucks and other heavy vehicles (clearance/visibility)

	Frequency	Percent
Never concerned	154	14.9
Occasionally concerned	413	39.9
Frequently concerned	281	27.2
Always concerned	186	17.9

Table 6: Driving on hills or curves

	Frequency	Percent
Never concerned	253	24.5
Occasionally concerned	484	46.9
Frequently concerned	190	18.4
Always concerned	106	10.3

Table 7: Road conditions like ice, snow, rain or fog

	Frequency	Percent
Never concerned	181	17.6
Occasionally concerned	449	43.5
Frequently concerned	211	20.5
Always concerned	190	18.4

Table 8: Driving through construction zones

	Frequency	Percent
Never concerned	207	20.0
Occasionally concerned	462	44.7
Frequently concerned	184	17.8
Always concerned	180	17.4

Table 9: Destination visitors bureau or chamber of commerce

	Frequency	Percent
Never	318	37.2
Occasionally	448	43.7
Frequently	164	16.0
Always	32	3.1

Table 10: State Departments of Tourism

	Frequency	Percent
Never	485	47.7
Occasionally	379	37.3
Frequently	130	12.8
Always	22	2.2

Table 11: Television / Radio advertisements

	Frequency	Percent
Never	439	43.0
Occasionally	421	41.2
Frequently	138	13.5
Always	24	2.3

Table 12: Kiosks, i.e. small computerized information centers

	Frequency	Percent
Never	602	59.5
Occasionally	281	27.8
Frequently	101	10.0
Always	28	2.8

Table 13: Travel magazines or newspaper travel sections

	Frequency	Percent
Never	246	24.0
Occasionally	408	39.8
Frequently	312	30.4
Always	60	5.8

Table 14: The Internet

	Frequency	Percent
Never	648	64.0
Occasionally	172	17.0
Frequently	149	14.7
Always	43	4.2

Table 15: Tourist attractions (parks/recreation/historical)

	Frequency	Percent
Not at all important	129	13.1
Somewhat important	294	29.9
Important	357	36.4
Very important	202	20.6

Table 16: Distance to destination

	Frequency	Percent
Not at all important	88	9.0
Somewhat important	254	25.9
Important	374	38.1
Very important	266	27.1

Table 17: The best route to destination

	Frequency	Percent
Not at all important	61	6.3
Somewhat important	174	17.9
Important	380	39.1
Very important	356	36.7

Table 18: Location of traveler services (rest stops, visitor information centers, service stations, etc.)

	Frequency	Percent
Not at all important	86	8.7
Somewhat important	213	21.5
Important	366	37.0
Very important	324	32.8

Table 19: Location of traffic delays due to special events, road closures, construction zones and/or detours

	Frequency	Percent
Not at all important	89	9.0
Somewhat important	261	26.4
Important	372	37.7
Very important	265	26.8

Table 20: Location of accidents or incidents

	Frequency	Percent
Not at all important	108	11.0
Somewhat important	258	26.3
Important	330	33.6
Very important	285	29.1

Table 21: Weather conditions throughout your area of travel

	Frequency	Percent
Not at all important	55	5.6
Somewhat important	201	20.4
Important	340	34.4
Very important	391	39.6

Table 22: Knowing trip-planning assistance is available from rest stops or other places along your route

	Frequency	Percent
Not at all important	156	15.9
Somewhat important	286	29.1
Important	318	32.3
Very important	224	22.8

Table 23: Do you prefer to get tourist and traveler information

	Frequency	Percent
Before you start your trip	302	30.7
While on the road	92	9.3
Both	530	53.9
Neither	60	6.1

Table 24: Do you prefer that traveler information be updated and verified

	Frequency	Percent
Once per minute	26	2.7
Once per hour	248	25.4
Once per day	101	10.3
As needed	603	61.7

Table 25: Suppose a device were available for your vehicle that would alert police and emergency medical services if you should run off the road or be involved n a collision. Would you be interested in having something like that installed in your vehicle?

	Frequency	Percent
Yes	769	79.4
No	199	20.6

Table 26: A telephone number for road conditions

	Frequency	Percent
Not at all likely	117	11.6
Somewhat unlikely	217	21.5
Somewhat likely	415	41.1
Very likely	260	25.8

Table 27: A telephone number to report an accident or incident

	Frequency	Percent
Not at all likely	66	6.6
Somewhat unlikely	163	16.3
Somewhat likely	367	36.7
Very likely	405	40.5

Table 28: A special radio channel for tourist information

	Frequency	Percent
Not at all likely	148	14.7
Somewhat unlikely	229	22.8
Somewhat likely	400	39.8
Very likely	227	22.6

Table 29: A special radio channel for road conditions, accidents, incidents, closures, etc.

	Frequency	Percent
Not at all likely	96	9.5
Somewhat unlikely	173	17.1
Somewhat likely	411	40.7
Very likely	330	32.7

Table 30: A local TV channel with continuously updated tourist and traveler information

	Frequency	Percent
Not at all likely	304	30.2
Somewhat unlikely	285	28.3
Somewhat likely	268	26.6
Very likely	150	14.9

Table 31: A small in-vehicle computer with traveler information

	Frequency	Percent
Not at all likely	391	39.0
Somewhat unlikely	238	23.7
Somewhat likely	227	22.6
Very likely	147	14.7

Table 32: A cellular phone

	Frequency	Percent
Not at all likely	198	19.7
Somewhat unlikely	170	16.9
Somewhat likely	283	28.1
Very likely	356	35.4

Table 33: Changeable message signs

	Frequency	Percent
Not at all likely	101	10.1
Somewhat unlikely	186	18.7
Somewhat likely	373	37.4
Very likely	336	33.7

Table 34: Warning signs for speed, curves and animal presence that change based on conditions

	Frequency	Percent
Not at all likely	47	4.7
Somewhat unlikely	115	11.4
Somewhat likely	301	29.9
Very likely	543	54.0

Table 35: An in-vehicle device to enhance driving capabilities in low visibility situations

	Frequency	Percent
Not at all likely	181	18.0
Somewhat unlikely	195	19.4
Somewhat likely	291	28.9
Very likely	339	33.7

Table 36: Small computerized information centers – or Kiosks – at convenient locations

	Frequency	Percent
Not at all likely	221	21.9
Somewhat unlikely	239	23.7
Somewhat likely	346	34.4
Very likely	201	20.0

Table 37: An in-vehicle device to help you avoid collisions or running off the roadway

	Frequency	Percent
Not at all likely	197	19.6
Somewhat unlikely	180	17.9
Somewhat likely	309	30.7
Very likely	320	31.8

Table 38: If you could recognize a direct benefit on your driving experience, how likely would you be to use the special services or devices discussed above?

	Frequency	Percent
Not at all likely	48	4.8
Somewhat unlikely	180	17.9
Somewhat likely	428	42.5
Very likely	350	34.8

Table 39: If you could recognize a direct benefit on your driving experience, how likely would you be to pay for the special services or devices discussed above?

	Frequency	Percent
Not at all likely	47	4.7
Somewhat unlikely	115	11.4
Somewhat likely	301	29.9
Very likely	543	54.0

Table 40: Residence

	Frequency	Percent
California	413	42.0
Oregon	248	25.2
Other	322	32.8

Table 41: Familiarity with area

	Frequency	Percent
Familiar	615	62.7
Unfamiliar	366	37.3

Table 42: Gender

	Frequency	Percent
Male	616	64.0
Female	346	36.0

Table 43: Age

	Frequency	Percent
15 – 24 years	65	6.6
25 – 44	232	23.6
45 - 64	402	41.0
65 +	282	28.7

Table 44: Live in

	Frequency	Percent
Urban area / city	393	40.4
Rural area / country	366	37.6
Suburban	214	22.0

Table 45: Type of vehicle normally driven in this area

	Frequency	Percent
Automobile	712	72.7
Commercial (truck, bus)	81	8.3
Motorcycle	14	1.4
RV	133	13.6
Passenger only	39	4.0

Table 46: Majority of vehicle travel in this area is to travel to

	Frequency	Percent
Work	173	17.7
School	14	1.4
Shopping	21	2.2
Medical	4	0.4
Recreation	543	55.6
General	221	22.6

Table 47: Average miles traveled per day

	Frequency	Percent
0 – 49	168	17.2
50 – 99	114	11.7
100 – 300	391	40.1
300 +	303	31.0

Table 48: Employment

	Frequency	Percent
Full – time	407	41.3
Part – time	71	7.2
Self – employed	77	7.8
Retired	358	36.3
Unemployed	30	3.0
Student	25	2.5
Other	17	1.7

Table 49: Education completed

	Frequency	Percent
Less than high school	19	1.9
High school	200	20.4
Technical training	101	10.3
Some college	253	25.8
College degree	235	24.0
Graduate degree	173	17.6

Table 50: Income (per household)

	Frequency	Percent
Under $20,000	141	15.3
20,000 – 39,000	260	25.0
40,000 – 79,000	361	39.2
80,000 +	158	17.2