

# 2008 Missoula Long-Range Transportation Plan Survey Final Report

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Dr. Paul Polzin, Director of BBER, supervised all administrative aspects of this study and provided a supportive climate which made it a pleasure to conduct this study. Janet Stevens of BBER worked diligently to gather key information needed build the geographic variables used in this analysis.

Finally, I am most grateful to the BBER telephone survey supervisors and interviewers. Their dedication to careful research and persistence made this study a success.

John Baldrige  
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## Executive Summary

Missoula Valley residents' highest priorities when assessing 22 transportation system planning criteria were:

1. Improving safety at known high accident locations,
2. Minimizing the negative impacts of future transportation projects on natural features like rivers and wildlife habitat, and
3. Reducing traffic congestion in corridors that are currently congested.

People who live outside Missoula City but within the PM 2.5 area said the following are higher priorities than their City resident neighbors:

- Improving safety at known high accident locations,
- Reducing operations costs, and
- Widening roads for motor vehicle use.

Missoula City residents said the following were higher priorities than their neighbors who live outside the City:

- Adding and improving pedestrian facilities, and
- Adding and improving bicycle facilities.

Because the issues are so important, the survey examined four possible transportation system improvements in greater detail. Those possible improvements were:

- Improve bicycle or pedestrian facilities
- Increase or improve public transit
- Expand road capacity, and
- Improve safety for drivers, passengers, bicyclists, and pedestrians.

Residents said that expanding road capacity, improving safety, and improving public transit all would improve transportation in the Missoula Valley more than improving bicycle or pedestrian facilities.

There is a large difference between the views of Missoula City residents and residents of Missoula County who live outside the City on the question of which action would improve Valley transportation more: expanding road capacity or improving bicycle and pedestrian facilities. Two-thirds (67.5%) of County residents said expanding road capacity would improve transportation more than improving bicycle and pedestrian facilities. However, City residents were evenly split on the issue. 50.3% said expanding road capacity would result in more improvement, while 49.7% said improving bicycle and pedestrian facilities would improve the system more.

Missoula Valley residents displayed little change in 2008 when compared to 2000 in how they travelled to work. Missoula Valley residents' transportation mode choice in 2008 for all purposes resembles that of the United States as a whole. However, cold weather during survey administration may have been a confounding factor when examining modes like walking, bicycling, and motorcycle riding.

## **Methodology**

### **Introduction**

The Missoula City/County Office of Planning and Grants needed information about citizens' perceptions of priorities for transportation planning in the Missoula transportation planning area. This information is one important component that will be used to develop Missoula's long-range transportation plan. Bureau of Business and Economic Research (BBER) at The University of Montana-Missoula administered a survey of adult residents to gather this information.

### **Questionnaire Development**

The Bureau designed the questionnaire in coordination with the Missoula City/County Office of Planning and Grants (OPG) and their prime contractor for this project, Wilbur Smith and Associates. BBER used an iterative process to design the questionnaire. After developing a list of study topics with OPG the first draft was completed. OPG reviewed the first draft and directed changes as needed. This draft was then tested using five cognitive interviews.<sup>1</sup> Cognitive interviews are an intensive, 1-1.5 hour examination of the cognitive processes respondents use to answer each question. The interviews employ retrospective and concurrent think aloud strategies in which respondents are asked to "think aloud" their answers. Some respondents make errors that are caused by habits of mind or question wording when reporting attitudes and behavior. Cognitive interviewing examines the common thinking habits respondents use when recalling and reporting attitudes and behaviors. This gives questionnaire designers the opportunity to tailor questions to the way people think.

Following revision based on cognitive interview results and consultation with OPG the questionnaire was further refined through a full-scale field test. The field test was administered to a convenience sample of 35 adult respondents. The field test verified all survey systems, including the Computer-Assisted Telephone Interview (CATI) program, data capture, and data export functions. BBER monitored field test interviews and debriefed interviewers to determine whether the questionnaire needed further modification. OPG was the final approval authority for the questionnaire.

### **Sampling**

Sampling was conducted using a random-digit dial (RDD) process. The study population was all non-institutionalized adult (age 18 and older) residents of the Missoula County PM 2.5 area who live in households with land-line telephones (see Figure 1 on page 8). University of Montana students were included in the sample. This population should not be confused with all Missoula area residents since it excludes households without working land-line telephones and the institutional population.

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<sup>1</sup> Presser, Stanley, et. al. eds. 2004. *Methods for Testing and Evaluating Questionnaires*. New York: John Wiley & Sons. p. 24.

A randomized method of selecting one respondent within each household was also required to avoid a disproportionate number of females participating in telephone interviews. Respondents were selected within households using the Kish table method.<sup>2</sup> While this method is in theory equivalent to the “last birthday” method, BBER experience in Montana has discovered a tendency for the last birthday method to produce a greater proportion of female respondents (see also Groves and Lyberg, 1988).

The total sample size yielded 430 completed interviews. The simple random sampling method used in this survey yielded a sampling error rate of about +/- 5% for the overall sample. All data reported in this analysis are weighted by 2006 U.S. Census Bureau population sex and age estimates for Missoula County. Post-stratification weighting is a standard data preparation procedure that improves the accuracy of survey estimates.<sup>3</sup>

### **Survey Administration**

The questionnaire was administered using a Computer-Assisted Telephone Interviewing (CATI) process on January 22, 2008 through February 10, 2008. Bureau staff programmed and validated the CATI system prior to survey administration. The interviews were conducted in the dedicated telephone interview facility at BBER. This state of the art facility contains twelve sound insulated telephone interview stations plus viewing and monitoring capability for supervisors. The supervisor can visually observe each interviewer and monitor randomly selected telephone calls. Call monitoring is a vital quality control mechanism that reinforces data quality.

Each station is equipped with a telephone, headset, and computer, allowing CATI operation. The interviewers read the survey from the computer screen and directly entered the pre-coded responses into the computer, speeding the data capture process and minimizing the opportunity for errors.

The interviews were conducted using the Bureau cadre of trained and experienced telephone interviewers and shift supervisors. There are five interviewers with more than one year of experience, and several have been with the Bureau for ten years or longer. The shift supervisors are themselves seasoned interviewers with years of experience conducting surveys for a variety of organizations, including the US Bureau of the Census. New interviewers receive classroom and “on the job” training, and are closely monitored by the shift supervisors.

BBER documented case status in a manner that allowed calculation and reporting of a unit response rate using the American Association for Public Opinion Research (2006) standard definition (RR3).<sup>4</sup> The response rate for this survey was 51.7 percent. This response rate is typical for rigorously conducted RDD surveys.<sup>5</sup>

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2 Dillman, Don, A. 2000. *Mail and Internet Surveys: The Tailored Design Method*. 2<sup>nd</sup> edition. New York: John Wiley & Sons. p. 203.

3 Groves, Robert, M. et. al. 2004. *Survey Methodology*. New York: John Wiley & Sons. p. 326.

4 American Association for Public Opinion Research. 2006. *Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys*. 4<sup>th</sup> edition. Lexana, Kansas: AAPOR. p. 29. e = .15.

5 Groves, Robert, M. et. al. 2004. *Survey Methodology*. New York: John Wiley & Sons. pp. 184-187.

The table on this page summarizes the demographic characteristics of the survey respondents. 2008 Missoula Long-Range Transportation Plan Survey respondents are compared here to the 2006 U.S. Census Bureau's American Community Survey (ACS) respondents for Missoula County. While the 2008 transportation plan survey was sampled by random-digit dial and administered by telephone, the ACS is sampled by dwelling and administered by telephone and in person. This enables the ACS to sample households that do not have landline telephones. The methods used by the ACS are considered the "gold standard" in survey research.

2008 transportation plan survey respondents did not differ significantly in sex or age from the estimates produced for Missoula County by the 2006 ACS. Only one transportation plan survey income group, those with household incomes between \$20,000 and \$34,999, differed significantly from 2006 ACS estimates. Fewer persons with incomes at this level responded to the BBER transportation plan survey than to the 2006 ACS.

Significantly more homeowners (12.3%) and significantly fewer renters responded to the 2008 transportation plan survey when compared to the 2006 ACS. A likely cause for this undercoverage is that large proportions of Missoula-area renters live in cellular telephone (wireless) only households and were thus excluded from the 2008 transportation plan survey. Across the United States 28.2% of adult renters lived in cell-only households during the period January through June 2007.<sup>6</sup>

There is no definitive study that describes the proportion of Missoula-area renters who live in cell-only households. Given the broad availability of cell phone coverage and the number of university students in the Missoula area, it is unlikely that the Missoula-area proportion of people who live in cell-only households is lower than the national proportion. Post-stratification weighting by age and sex reduced the effect of renter undercoverage on the housing ownership variable by about one-half. However, it is possible that only by including a cell-only household sample in this survey would the remainder of this undercoverage be eliminated. Even though BBER expects the effect of this undercoverage on survey estimates to be small, users of these data should keep this undercoverage in mind.

2008 Missoula Long-Range Transportation Plan Survey Respondents (Weighted %)		
	2008 Survey	2006 ACS
Male	49.4	48.5
Female	50.6	51.5
Mean Age (adults 18 +)	42.2	43.5
2007 HH income (\$000):		
< 20	21	25.5
20 - 34*	13.9	21.5
35 - 49	18.1	14.8
50 - 74	20	19
75 - 99	13.2	8.7
100 +	13.9	10.5
Housing ownership:		
Own*	71.6	59.3
Rent*	28.4	40.7

\* The difference between the 2008 Transportation Plan Survey and 2006 American Community Survey estimates for Missoula County is significant at the .05 level.

<sup>6</sup> Blumberg SJ, Luke JV. Wireless substitution: Early release of estimates from the National Health Interview Survey, January – June 2007. National Center for Health Statistics. Available from <http://www.cdc.gov/nchs/nhis.htm>. December 10, 2007.

## **Data Set Preparation**

Following collection the data were inspected to insure no duplicate cases were included and to correct any interviewer miskeys. Appropriate data labels were added. Appropriate composite variables, post-stratification weights, and flags were also added to the data set to facilitate analysis. Missing values for the income and housing tenure items were imputed using the hot deck method to facilitate comparison with the 2006 ACS. SPSS 16.0.1 for Windows, released on November 17, 2007, including the Tables module, was used to conduct the analysis described in this report.

Since the geographic location of a respondent's home was considered a key analytical variable, and since location was also vital for calculation of the post-stratification weights, BBER undertook an intensive effort to validate the location of each respondent's residence. Responses to location questions were validated by using reverse telephone directories to code respondent home addresses and then assign the address a geo-code. In cases where a respondent's telephone number was unlisted, their report of the nearest intersection to their home was used to produce a geo-code. This process produced geographic variables that exceed the quality typically available in RDD telephone surveys, which rarely ask respondents to reveal their address.

## **Reading this Report**

The remainder of this report is divided into three sections. The first section is the main narrative of the report. Next, in Appendix A, is a set of detailed tabulations for questions included in the study. The third section, Appendix B, contains the final questionnaire.

The detailed tabulations in Appendix A are a very powerful tool for those interested in the results of this study. Each table includes the question language used, the percentage of each response option chosen, and the number of responses for each question. In addition, each table provides a detailed cross-tabulation of the percentage of responses by selected demographic characteristics.

Differences cited in the remainder of this report are significant at the 95 percent confidence level. This means that if the survey were replicated 100 times, the difference cited would be found in at least 95 of the replications. Differences were evaluated by calculating the confidence intervals around point estimates or by using tests of independence. The percentage of respondents who answered "Don't Know" to questions in this study was quite low overall, so for the sake of brevity "Don't Know" percentages are excluded from the main narrative. While instances in which response differences within demographic groups are cited in the main body of the report, the percentages of these differences are left to Appendix A, also for the sake of brevity.

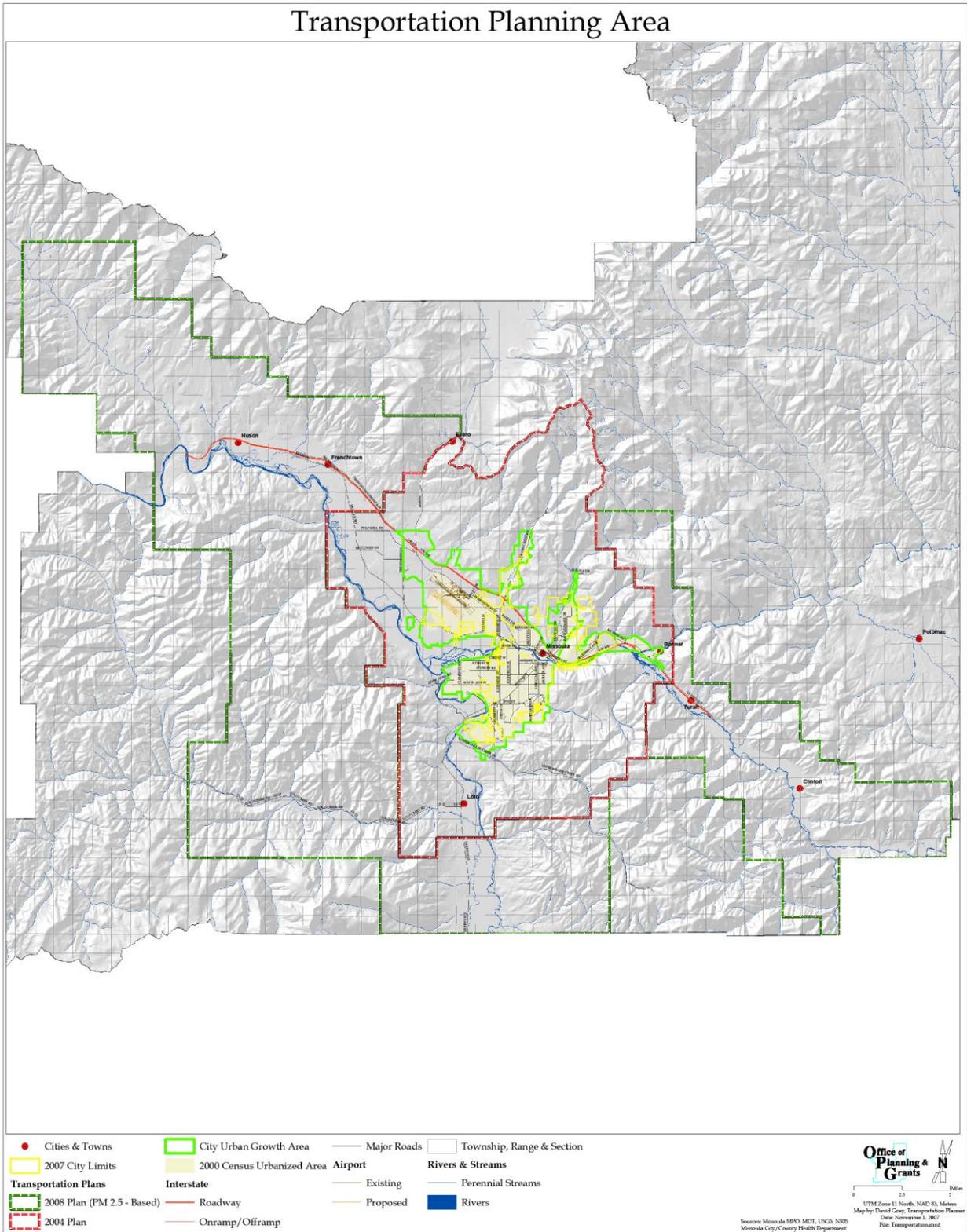


Figure 1

### Transportation System Planning Criteria: Public Priorities

One primary objective of this survey was to assess the public’s current views about transportation system planning criteria adopted in 2004. Residents were asked to rate the current priority of 22 Missoula-area planning criteria on the following scale:

#### Priority Rating Scale

<u>Scale label:</u>	<u>Scale value:</u>
Very high	5
Somewhat high	4
Middle	3
Somewhat low	2
Very low	1

The three highest mean priority ratings were given to:

1. Improving safety at known high accident locations,
2. Minimizing the negative impacts of future transportation projects on natural features like rivers and wildlife habitat, and
3. Reducing traffic congestion in corridors that are currently congested.

Each of these criteria was rated well above the “somewhat high” level (please see Figure 3 on the following page). In a statistical sense, each was rated a higher priority than all but three of the criteria examined.

These findings are consistent with other recent survey research conducted in western Montana. In 2007 a Montana Department of Transportation (MDT) survey found that two of the three transportation problems rated as most serious by residents of western Montana were traffic congestion and timely resolution of safety issues.<sup>7</sup> In 2005 a Missoula Office of Planning and Grants (OPG) survey found that traffic congestion was the second most serious growth-related problem faced by Missoula-area residents (see Figure 2). The 2005 OPG survey also reexamined the public’s perceptions about priorities of growth policy objectives. Protecting and enhancing the environment received nearly the highest priority rating of the growth policy objectives examined in 2005.<sup>8</sup>

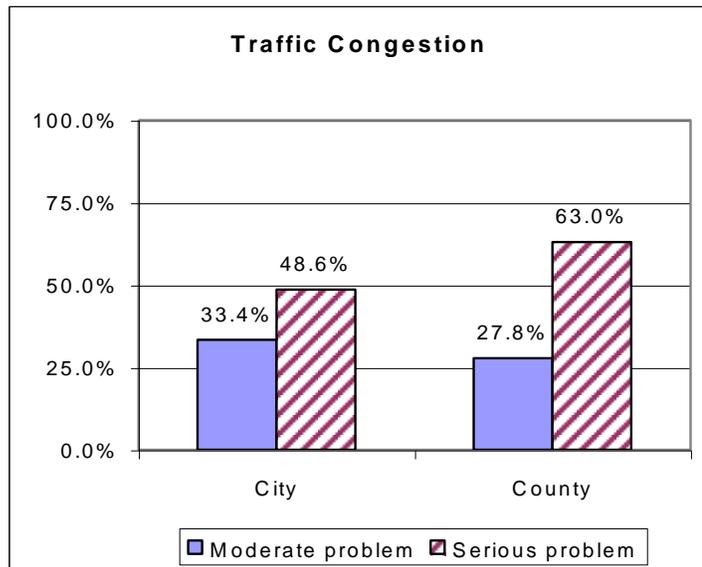


Figure 2: 2005 OPG Growth Policy Survey

7 Montana Department of Transportation TranPlan21 Public Involvement Survey, 2007.

8 Missoula Office of Planning and Grants Growth Policy Survey, 2005.

**Missoula Transportation System Planning Criteria: 2008 Public Priority Ratings**

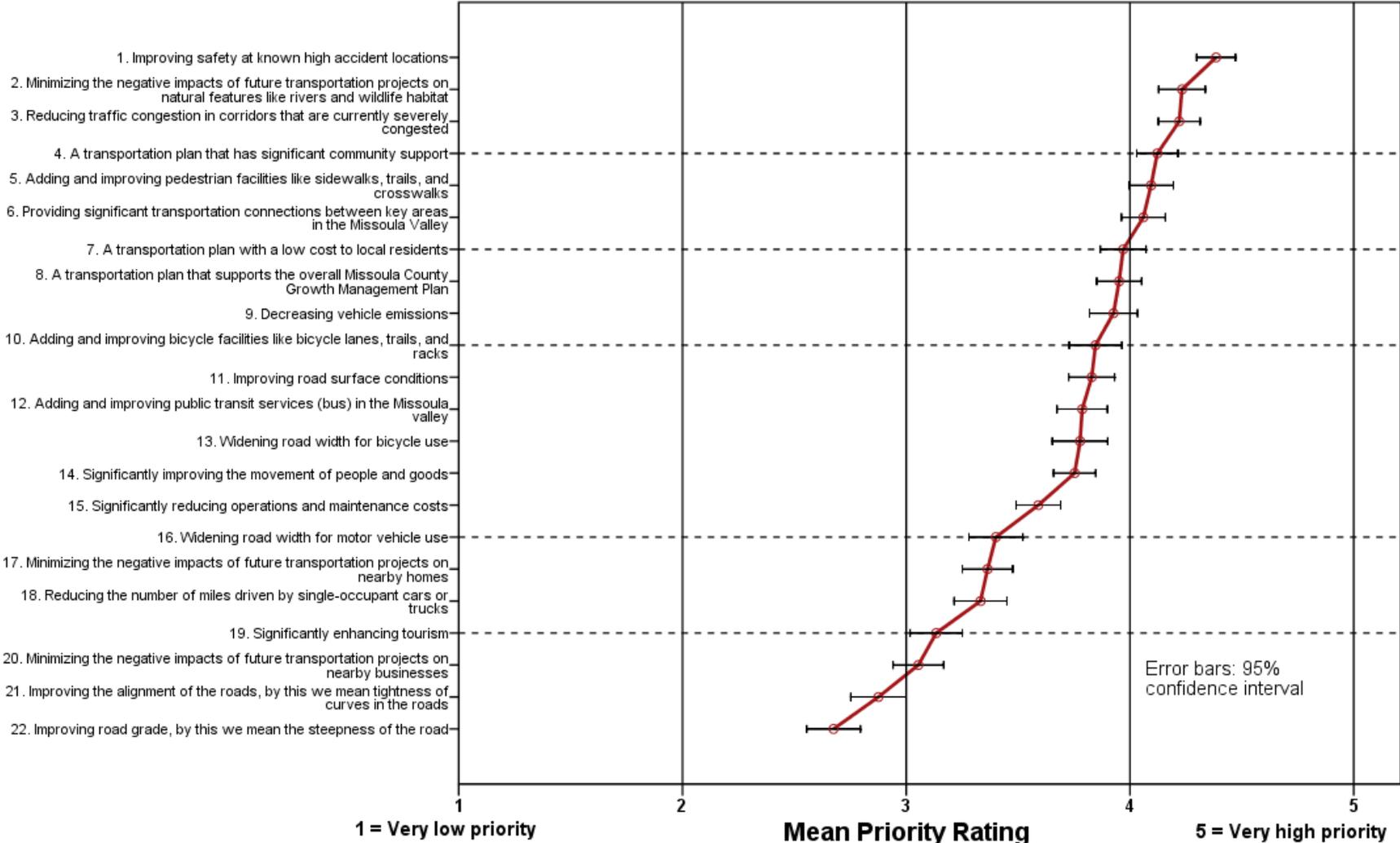


Figure 3

The three lowest mean priority ratings were given to:

- 20. Minimizing the negative impacts of future transportation projects on nearby businesses,
- 21. Improving the alignment of roads, and
- 22. Improving road grade (steepness).

These criteria were rated at or below the “middle” level. Eighteen of the criteria examined were rated as higher priorities than these three. There are no recent survey items against which these three may be compared.

A relatively low priority rating was also given to reducing the number of miles driven by single-occupant vehicles. Fifteen of the items examined received a higher priority rating. This rating is not surprising when one reviews other survey research on this topic in Montana. The 2008 transportation plan survey mean priority rating for this item (3.3) does not differ significantly from the mean western Montana priority rating (3.2) found in the 2007 MDT TranPlan 21 Survey. In fact, reducing single occupant vehicle use has been ranked lowest in priority across Montana in each of the six statewide surveys conducted by MDT since 1997. To provide additional context, Figure 4 below illustrates the trends in priority rankings among selected statewide transportation system improvement criteria from 1997 through 2007.<sup>9</sup>

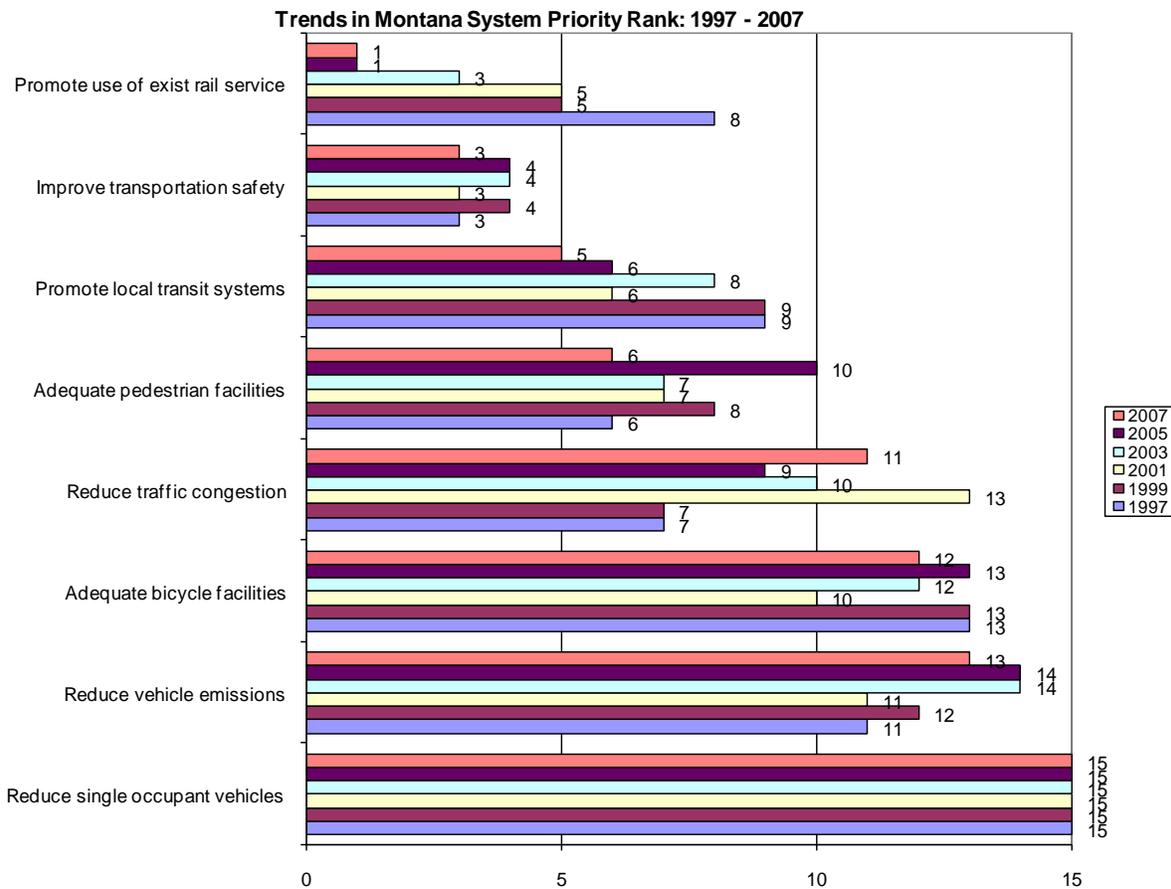


Figure 4: 1 = highest priority rank, 15 = lowest priority rank

<sup>9</sup> Montana Department of Transportation TranPlan21 Public Involvement Survey, 2007.

**Priority Ratings by Residence and Commuting Mode**

In addition to examining the priority ratings provided by all adults in the study area, exploring the ratings by specific respondent demographic characteristics is important. For the sake of brevity the main body of this report analyzes two characteristics: a) whether the respondent lives in Missoula City or outside the City, and b) the transportation mode respondents use to commute to work.

Only those planning criteria that exhibit differing priority ratings depending on a respondent's residence or commuting mode are discussed here. For additional demographic comparisons readers should see Appendix A: Detailed Tables.

People who live outside the City of Missoula but within the study area rated the following as higher priorities than people who live in the City of Missoula (see Table 2):

- Improving safety at known high accident locations,
- Reducing operations costs,
- Widening roads for motor vehicle use,
- Enhancing tourism, and
- Having a transportation plan that supports the overall growth management plan.

A. Difference between City and outside City significant at .05 level.  B. Difference between two or more commuting modes significant at .05 level.	Residence		Commute to work		
	Missoula City	Outside Missoula City	Drive alone	Carpool, transit, bike, walk, other	Not in workforce
	Mean	Mean	Mean	Mean	Mean
Improving safety at known high accident locations <sup>A,B</sup>	4.3	4.5	4.5	4.0	4.5
Minimizing the negative impacts of future transportation projects on natural features like rivers and wildlife habitat <sup>B</sup>	4.3	4.1	4.2	4.5	4.1
Adding and improving pedestrian facilities like sidewalks, trails, and crosswalks <sup>A</sup>	4.2	3.9	4.1	4.3	4.0
A transportation plan that supports the overall Missoula County Growth Management Plan <sup>A</sup>	3.9	4.1	4.0	3.8	4.0
A transportation plan with a low cost to local residents <sup>B</sup>	4.0	4.0	4.0	3.7	4.0
Adding and improving bicycle facilities like bicycle lanes, trails, and racks <sup>A,B</sup>	3.9	3.7	3.7	4.2	3.8
Significantly reducing operations and maintenance costs <sup>A,B</sup>	3.5	3.7	3.8	3.1	3.6
Widening road width for motor vehicle use <sup>A,B</sup>	3.3	3.6	3.5	2.9	3.5
Reducing the number of miles driven by single-occupant cars or trucks <sup>B</sup>	3.3	3.3	3.2	3.7	3.4
Significantly enhancing tourism <sup>A</sup>	3.0	3.3	3.3	2.9	3.0
Improving the alignment of the roads, by this we mean tightness of curves in the roads <sup>B</sup>	2.8	3.0	2.9	2.5	3.1

**Table 2**

Missoula City residents rated adding and improving both pedestrian and bicycle facilities a higher priority than people who live outside the City limits.

Adults who carpool, ride the bus, bike, or walk to work rated the following as higher priorities than those who drive alone to work or who are not currently in the workforce:

- Minimizing negative impacts on natural features,
- Adding and improving bicycle facilities, and
- Reducing the number of miles driven by single-occupant vehicles.

Conversely, study area residents who drive alone to work or who are not in the workforce rated the following as higher priorities compared to those who carpool, ride the bus, bike, or walk to work:

- Improving safety at known high accident locations,
- Having a plan with a low cost for local residents,
- Reducing operations costs,
- Widening roads for motor vehicle use, and
- Improving road alignment.

### Possible Transportation System Improvement Rankings

Missoula OPG chose to explore the public’s views on four important potential transportation system improvements in greater detail. Respondents were asked to rank four possible system improvements two at a time. In each comparison respondents chose which action would improve transportation in the Missoula Valley more. The head-to-head choice system was selected to minimize respondent burden in a telephone interview. Respondents only had to choose between two options in each question. The four possible system improvements were:

- Improve bicycle or pedestrian facilities
- Increase or improve public transit
- Expand road capacity
- Improve safety for drivers, passengers, bicyclists, and pedestrians.

The chart below summarizes the results of these comparisons using two methods: 1) tallying the absolute rankings when they were provided, and 2) tallying all possible choices including tied rankings and don’t know choices. Tied rankings are rankings where none of the options were chosen as superior (dominant) to all of the others.

Expand road capacity, increase or improve public transit, and improve safety for drivers,

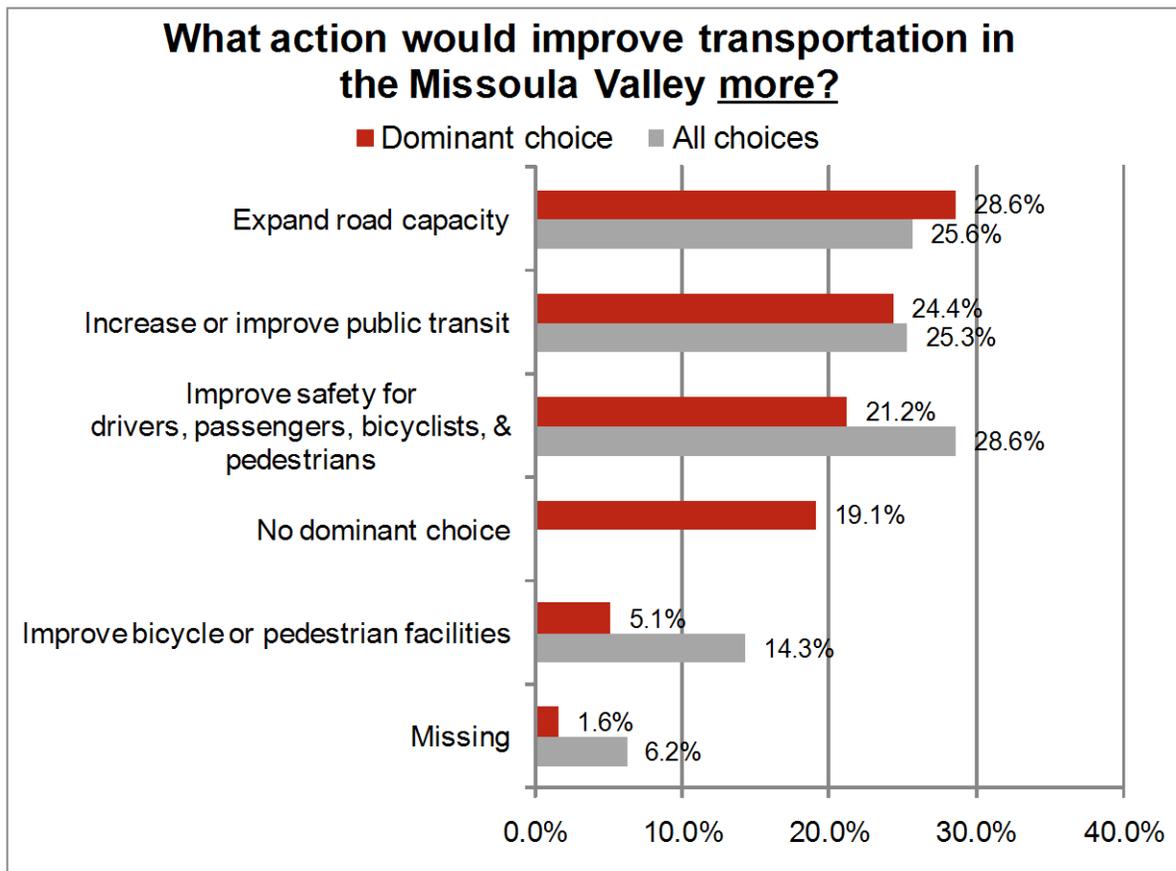


Figure 5

passengers, bicyclists, and pedestrians were statistically tied for the top ranking using either analysis method. Improve bicycle or pedestrian facilities was ranked below the other three options using either method (see Figure 5 above).

The first analysis method provides important information about the option that residents said would improve transportation more than the three others explored. Nearly eight in ten respondents (78.1%) thought of one of the options as superior to the other three (a dominant choice). Fewer than two in ten respondents (19.7%) did not think of a single option as superior and did not provide a dominant choice. In these cases respondents ranked two or three of the options as roughly equal. Very few respondents (1.6%) refused to provide any ranking.

The second method for analyzing these head-to-head choices ignores the powerful information about adults' dominant choice, but tallies all choices separately. This method does a better job incorporating tied rankings.

28.6% of residents said that expanding road capacity would improve transportation in the Missoula Valley more than improving public transit, improving safety, or improving bicycle or pedestrian facilities. 25.6% of residents chose expanding road capacity when counting across all 2,580 possible ranking choices.

24.4% of people said that increasing or improving public transit would improve transportation in the Missoula Valley more than expanding road capacity, improving safety, or improving bicycle or pedestrian facilities. 25.3% of people chose increasing or improving public transit when counting across all choices.

21.2% of adults said that improving safety for all users would improve transportation in the Missoula Valley more than expanding road capacity, improving public transit, or improving bicycle or pedestrian facilities. 28.6% chose improving safety for all users when counting across all choices.

5.1% of residents said that improving bicycle or pedestrian facilities would improve transportation in the Missoula Valley more than expanding road capacity, improving public transit, or improving safety. 14.3% chose improving bicycle or pedestrian facilities when counting across all possible ranking choices.

19.1% of respondents did not choose one potential action that would improve transportation in the Missoula Valley more than the other three possible choices, but made choices that implied that two or three possible options were tied in rank.

1.6% of respondents chose not to answer any of these items. 6.2% of all the possible choices went unanswered or received a Don't Know response.

**Possible Improvement Action Rankings by Residence and Commuting Mode**

Examining the improvement action head-to-head rankings by specific respondent demographic characteristics provides useful information.

A larger percentage of people who live outside the City of Missoula but within the study area said the following actions would improve transportation in the Missoula Valley more than did people who live in the City of Missoula (see Table 3):

- Expanding road capacity when compared with improving safety,
- Expanding road capacity when compared with improving bicycle or pedestrian facilities, and
- Expanding road capacity when compared with improving public transit.

**Demographic differences in, “Which action would improve transportation in the Missoula Valley more?”**

A. Difference between City and outside City significant at .05 level.  B. Difference between two or more commuting modes significant at .05 level.		Residence		Commute to work		
		Missoula City	Outside Missoula City	Drive alone	Carpool, transit, bike, walk, other	Not in workforce
		Column %	Column %	Column %	Column %	Column %
Expanding capacity vs safety <sup>A</sup>	Expanding capacity	35.6%	55.3%	46.2%	32.7%	41.9%
	Improving safety	64.4%	44.7%	53.8%	67.3%	58.1%
Expanding capacity vs bike-ped <sup>A,B</sup>	Bike-ped	49.7%	32.5%	38.1%	67.7%	36.3%
	Expanding capacity	50.3%	67.5%	61.9%	32.3%	63.7%
Public transit vs expanding capacity <sup>A</sup>	Public transit	51.0%	38.6%	43.8%	56.0%	45.5%
	Expanding capacity	49.0%	61.4%	56.2%	44.0%	54.5%
Bike-ped vs safety <sup>B</sup>	Bike-ped	24.5%	20.6%	19.0%	38.2%	19.6%
	Improving safety	75.5%	79.4%	81.0%	61.8%	80.4%

**Table 3**

A larger proportion of Missoula City residents said the following actions would improve transportation in the Missoula Valley more than did people who live in outside the City of Missoula:

- Improving safety when compared to expanding road capacity,
- Improving bicycle or pedestrian facilities when compared to expanding road capacity, and
- Improving public transit when compared to expanding road capacity.

A bigger fraction of adults who carpool, ride the bus, bike, or walk to work said the following would improve transportation in the Missoula Valley more than did those who drive alone to work or who are not currently in the workforce:

- Improving bicycle or pedestrian facilities when compared with expanding road capacity, and
- Improving bicycle or pedestrian facilities when compared with improving safety.

Conversely, a larger proportion of study area residents who drive alone to work or who are not in the workforce said the following would improve transportation in the Missoula Valley more than did those who carpool, ride the bus, bike, or walk to work:

- Expanding road capacity when compared to improving bicycle or pedestrian facilities, and
- Improving safety when compared to improving bicycle or pedestrian facilities.

As the analysis above indicates, there are significant demographic differences between people in the Missoula Valley who support improving bicycle and pedestrian facilities and those who favor expanding road capacity. Figure 6 graphically illustrates these demographic contrasts. Two-thirds of people (67.5%) who live outside Missoula City but within the study area favor expanding road capacity over improving bicycle and pedestrian facilities. Missoula City residents are evenly split on the issue. On the other hand, two-thirds of people who carpool, ride the bus, bike, or walk to work (67.7%) support improving bicycle and pedestrian facilities over expanding road capacity. Just over one-third of people who drive alone to work or are out of the workforce agree.

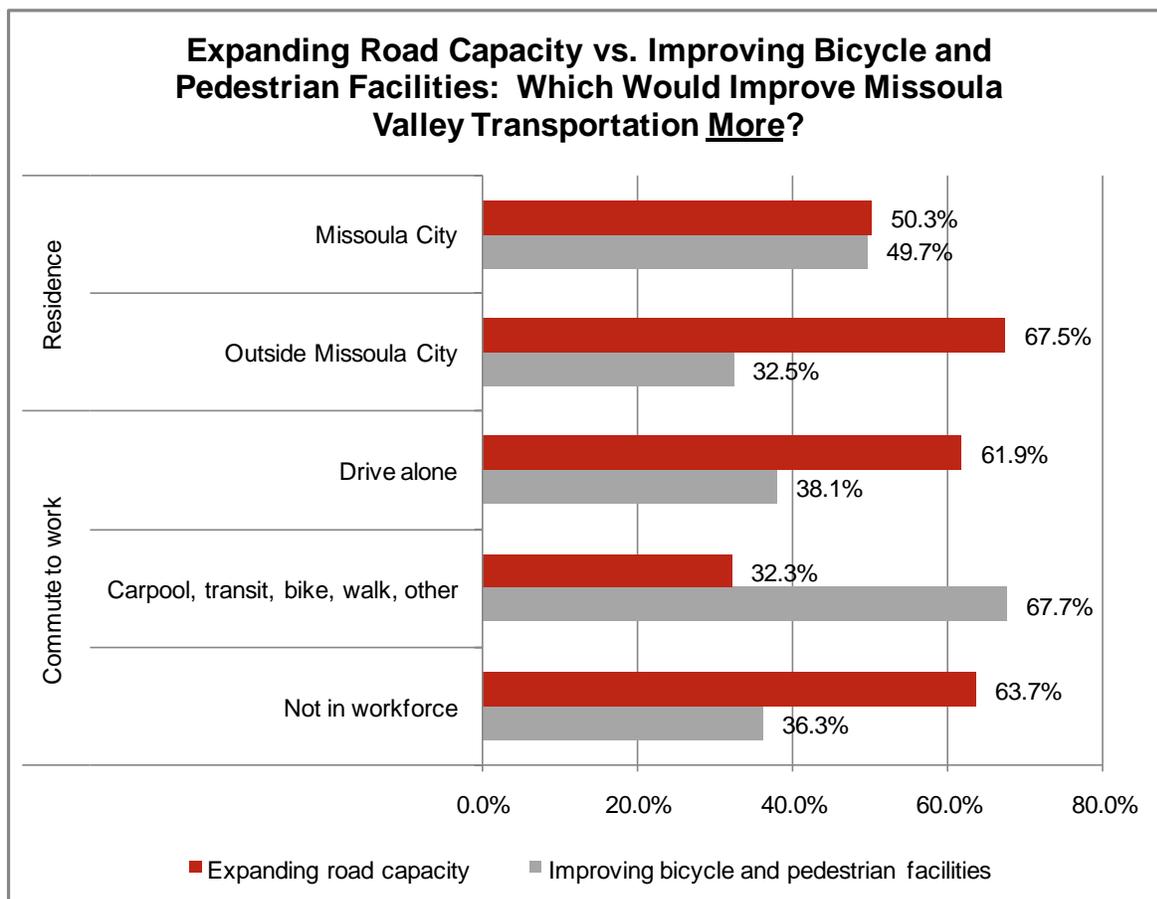


Figure 6

## Summarizing Observations

In summarizing the combined findings of the planning priority rating questions and the head-to-head system improvement questions, readers should remember that three factors play a large role in shaping residents' views about the Missoula Valley transportation system. Those factors are:

- Safety,
- Traffic congestion, and
- Environmental issues.

Many respondents view expanding road capacity as a way to reduce traffic congestion and improve safety. The people who think this do not often, when reporting their first conclusions that come to mind in a telephone interview, see adding or improving bicycle or pedestrian facilities as a way to reduce traffic congestion. Quite a few of these people may even regard bicyclists and pedestrians as possible hazards. A large portion of these people live outside the City of Missoula, or drive alone to work, or are retired.

Another aspect to keep in mind is that many respondents thought of the phrase, "expand road capacity," in a broad sense. They thought of it as including adding roads and bridges, and doing other things that would increase capacity (vaguely defined) in addition to widening roads. This point is based on personal observations by the author and by interviewers of incidental conversations between interviewers and respondents during pre-testing and final data collection.

Finally, readers should be very careful when attempting to enforce pre-conceived ideas of logical consistency on citizens' responses. The fact that Missoula Valley residents say that reducing traffic congestion is a relatively high priority but reducing miles driven by single-occupant vehicles is a relatively low priority may seem frustratingly inconsistent to some. However, it reflects the real state of public opinion at the time the survey was administered. Deciding why this is so or whether this ostensible inconsistency is feasible or ethical as a policy matter falls outside the scope of this analysis.

## Transportation Mode Use in the Missoula Valley

The 2008 Missoula Long-Range Transportation Plan Survey explored the transportation modes used by study area residents for two reasons. First, a current snapshot of the proportions and demographic characteristics of the population that use particular transportation modes is useful in its own right to transportation planners, public officials, and others. Second, a thorough examination of the public's attitudes toward transportation system priorities explores those attitudes by people's transportation mode choices.

The paragraphs that follow present estimates of the proportions of study area residents who use various transportation modes and examine the demographic characteristics of mode users. Demographic analysis is offered, in the interest of conciseness, only for those mode uses that exhibit a significant difference in proportions depending on a respondent's residence. Commuting to work is examined in greater detail. For additional demographic comparisons readers should see Appendix A: Detailed Tables.

### Commuting to Work

The proportions of Missoula Valley residents who commute to work using the available modes of transportation have only changed slightly since 2000 (see Figure 7 below.) In addition, there have been no statistically significant changes in commuting mode use since 2006. The close similarity between the U.S. Census Bureau and 2008 transportation plan survey commuting estimates lends considerable credibility to the 2008 survey.

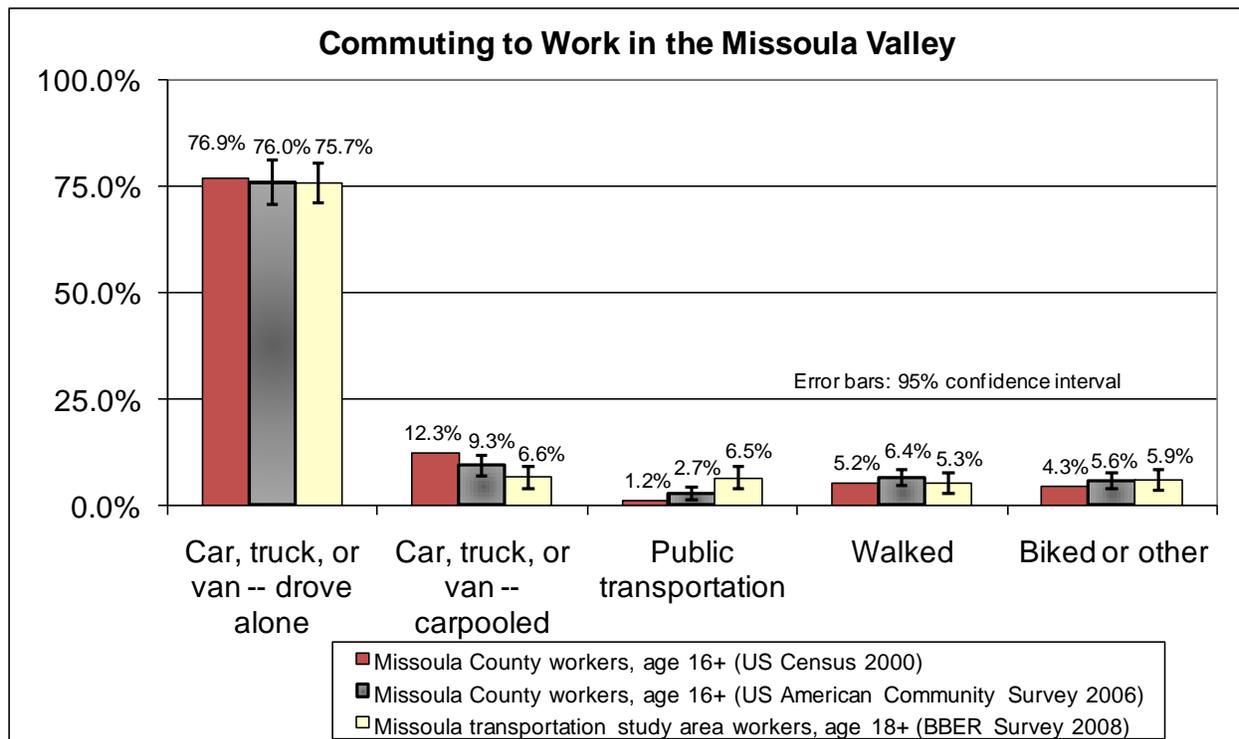


Figure 7

Three-fourths of Missoula Valley residents who were in the workforce in January 2008 (75.7%) typically commuted to work alone in a car, truck, or van. This fraction does not differ significantly from that found by the 2000 Census or the 2006 American Community Survey (ACS).<sup>10</sup>

6.6% of Missoula-area workers said that they typically carpooled to work in 2008. This proportion does not differ in a statistically significant way from the 2006 proportion (9.3%) but is lower than the 12.3% who reported carpooling in 2000. This apparently declining trend is also found in the national data. Across the United States the fraction of workers carpooling declined from its 1980 level of 19.7% to 13.4% in 1990. It dropped again in 2000 to 12.2%, and fell to 10.7% in 2006.<sup>11</sup>

However, this survey does not provide strong enough evidence to categorically determine that a drop in carpooling to work has occurred in the Missoula Valley. The study area for the 2008 transportation plan survey does not include all of Missoula County and thus may have excluded some carpoolers who were counted in the U.S. Census Bureau's Missoula County estimates. In addition, 2008 renters were somewhat more likely to carpool to work in the Missoula Valley (8.6%) than were homeowners (3.5%). Since this survey underestimated the proportion of renters in the study area, it may also have underestimated the proportion of carpoolers. The combined effect of these two factors is likely to be small and in no way precludes careful use of this estimate.

6.5% of Missoula Valley workers said that they most often rode public transit (the bus) to work in January 2008. This fraction is not statistically different from the 2006 fraction (2.7%) but is higher than the 1.2% who rode the bus to work in 2000. This ostensible increase in bus ridership is consistent with Mountain Line ridership counts. According to information provided by Mountain Line, total Missoula Valley bus ridership increased by 5.2% when the 2007 calendar year is compared with the 2000 calendar year.<sup>12</sup>

While this study may have to a small extent overestimated an apparent decline in carpooling to work, it may also have slightly underestimated an increase in riding the bus to work. The accuracy of this survey's estimate of bus ridership to work is not significantly affected by the study area since Mountain Line does not operate outside the study area. Nevertheless, 2008 Missoula Valley renters were again more likely to ride the bus to work (11.2%) than were homeowners (2.5%). The effect of renter undercoverage on the bus ridership variable is also likely to be small and in no way precludes careful use of the estimate.

5.3% of Missoula residents typically walked to work in 2008, and 5.9% typically rode a bicycle or other transportation mode. The 2008 estimates for walking and bicycling to work fall within the margin of sampling error for the U.S. Census Bureau estimates found in 2000 and 2006.

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10 Sources: 2000 Census Transportation Planning Package (CTPP) Table 2-002 for Missoula County; 2006 American Community Survey, Table B08301, Means of Transportation to Work - Universe: Workers 16 Years and Over who Live in Missoula County.

11 Sources: 1980 U.S. Census of Population General Social and Economic Characteristics, U.S. Summary; 1990 U.S. Census of Population STF3C, 2000 U.S. Census of Population, Journey to Work: 2000, C2KBR-35 published March 2004; 2006 U.S. American Community Survey, Table B08301, Means of Transportation to Work - Universe: Workers 16 Years and Over who Live in the United States.

12 Mountain Line Monthly Ridership History, Mountain Line spreadsheet transmitted by Laurie Belcher on March 4, 2008.

### Commuting to Work by Residence, Age, and Income

People who live outside the City of Missoula but in the study area were more likely to drive alone to work (89.0%) than were people who live in the City of Missoula (68.8%) (see Table 4). Conversely, Missoula City residents were more likely than their out-of-town neighbors to carpool, ride the bus, walk, or bike to work. In fact, the fraction of people who live outside Missoula City and rode the bus to work is not significantly different from zero.

**Demographic Differences in Commuting to Work**

* Difference between two or more sub-groups significant at the .05 level.		Commuting to work in the Missoula Valley				
		Car, truck, van - drove alone	Car, truck, van - carpooled	Public transportation	Walked	Biked or other
		Row %	Row %	Row %	Row %	Row %
Residence*	Missoula City	68.8%	7.5%	9.6%	6.6%	7.5%
	Outside Missoula City	89.0%	4.9%	.6%	2.9%	2.7%
Age*	18-29	65.2%	14.2%	12.5%	3.8%	4.3%
	30-44	80.5%	1.9%	2.9%	6.2%	8.5%
	45-59	82.0%	3.2%	2.7%	5.8%	6.3%
	60+	86.5%	.0%	5.8%	7.7%	.0%

Table 4

The Missoula Valley’s youngest adult residents were less likely to drive to work alone when compared with their older colleagues. 65.2% of people age 18-29 drove to work alone, while between 80% and 87% of older persons drove alone (see Figure 8 below). The Valley’s oldest employees drive, take public transit, or walk to work.

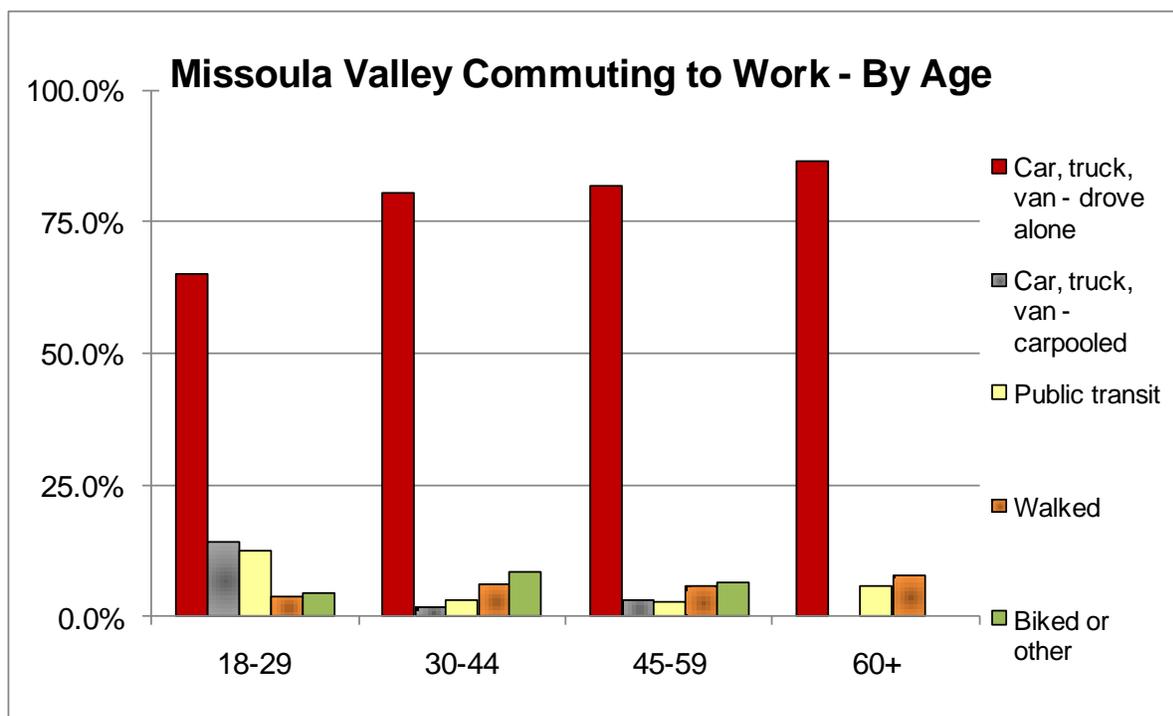


Figure 8

Examining modes of travel to work in the Missoula Valley by household income reveals intriguing patterns (see Figure 8 below) with the exception of driving alone which was relatively common across all income groups.

Carpooling appears to be a middle-income activity. A large proportion of carpoolers had household incomes between \$35,000 and \$74,999. People who walk to work were more likely to live in lower income households, with most having incomes under \$34,999. Residents who bicycle or ride the bus to work exhibit a distinctly different income distribution. Those who rode the bus to work were likely to belong either in the low income group (under \$20,000) or an upper middle-income group (\$75,000 - \$99,999). Bicyclers displayed a similar, bi-modal pattern. Bicyclers tended to belong either to the low income group or the high income group (\$100,000+).

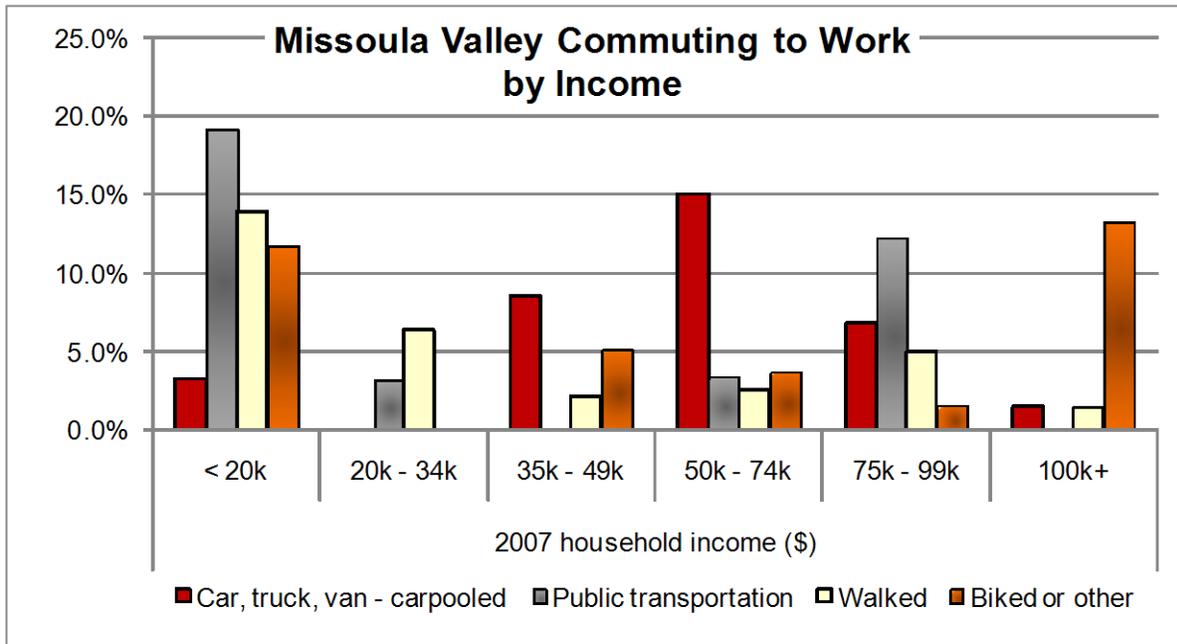


Figure 9

## All-Purpose Transportation Mode Use

Residents' transportation mode use for all purposes is compared here with that found by the U.S. Department of Transportation's (DOT) Omnibus Survey (see Table 5).<sup>13</sup> The Omnibus Survey was administered monthly by telephone to a nationally representative sample of 1,000 respondents and was discontinued after October 2003. Both the 2008 transportation plan survey and the 2003 Omnibus Survey ask respondents to report past month mode use. The January 2003 Omnibus Survey is cited here in an attempt to partially control for seasonal effects on mode use estimates. In addition, 2008 survey past year estimates are provided for three modes (walking, bicycling, and motorcycling) that are likely to be affected most by the season in which the survey was administered.

Only two estimates of Missoula Valley mode use differed significantly in January 2008 from the January 2003 national estimates. This similarity in the estimates drawn from both surveys lends credibility to the 2008 Missoula Long-Range Transportation Survey.

All-Purpose Transportation Mode Use in the Missoula Valley		
Frequency of Common Transportation Mode Use in the Missoula Valley for All Purposes: Mode and Period of Use (Last Month or Last Year)		
* Difference between January 2008 BBER survey and January 2003 U.S. DOT survey significant at the .05 level.	January 2008 Survey	January 2003 U.S. Omnibus Survey
1. During the last 30 days, did you drive or ride in any <u>personal vehicle</u> ? (Examples of personal vehicles include a car, van, SUV, pickup truck, RV.)*	98.6%	94.3%
2. During the last year, that is, from January 2007 through today, did you <u>walk, run, or jog</u> at least one time outside for 10 minutes or more? (such as to work, to a store or to a park)	83.0%	NA
3. During the last year, that is, from January 2007 through today, did you ride a <u>bicycle</u> ? Please do not include stationary bicycles.	61.6%	NA
4. During the last 30 days, did you <u>walk, run, or jog</u> at least one time outside for 10 minutes or more? (such as to work, to a store or to a park)	60.1%	61.2%
5. During the last year, that is, from January 2007 through today, did you drive or ride on a <u>motorcycle</u> , a motorized scooter, motorized bicycle, moped or all-terrain vehicle?	25.0%	NA
6. During the last 30 days, did you <u>fly</u> on a commercial airline?*	16.0%	7.9%
7. During the last 30 days, did you ride on any <u>public transit</u> within the Missoula valley? Examples of public transit include a Mountain Line bus or a University of Montana Park and Ride bus.	13.8%	13.2%
8. During the last 30 days, did you drive or ride in an organized <u>carpool</u> or vanpool?	11.1%	7.6%
9. During the last 30 days, did you ride a <u>bicycle</u> ? Please do not include stationary bicycles.	8.5%	10.4%
10. During the last 30 days, did you use a <u>taxi</u> or limousine service?	7.2%	11.5% <sup>@</sup>
11. During the last 30 days, did you drive or ride on a <u>motorcycle</u> , a motorized scooter, motorized bicycle, moped or all-terrain vehicle?	5.6%	7.0%
12. During the last 30 days, did you use a <u>shuttle</u> such as an airport, hotel, rental car shuttle or other shuttle, not including a medical shuttle?	4.6%	7.0% <sup>@</sup>
13. During the last 30 days, did you ride on a <u>charter or tour bus</u> line?	1.4%	1.2%
14. During the last 30 days, did you ride on a <u>city-to-city bus</u> , such as Greyhound?	1.3%	0.9%
15. During the last 30 days, did you ride on a <u>city-to-city train</u> , such as AMTRAK?	1.3%	2.4%

Table 5

13 Bureau of Transportation Statistics, U.S. Department of Transportation. Omnibus Household Survey, February 2003, available at: [http://www.bts.gov/programs/omnibus\\_surveys/household\\_survey/2003/february/entire.pdf](http://www.bts.gov/programs/omnibus_surveys/household_survey/2003/february/entire.pdf).

@ The taxi and airport shuttle questions were asked in the September 2003 Omnibus Survey.

Almost all Missoula Valley residents (98.6%) rode in a personal vehicle like a car, pickup truck, or van in January 2008. This fraction is slightly higher than the national fraction (94.3%) found in January 2003. It may be that the proportion of people who used a personal vehicle in the Missoula Valley has increased since January 2003. However, since there are no January 2003 data for Missoula County one cannot conclude this categorically. It is also possible that residents of the Missoula Valley were more likely to report personal vehicle use in 2003 and 2008 when compared to people nationwide.

16% of people who live in the Missoula Valley said that they flew during January 2008. This proportion is somewhat higher than the January 2003 national proportion (7.9%). This finding is consistent with U.S. Department of Transportation data that report an increase in the number of persons boarding flights at Missoula's Bell Field in 2007 over 2003.<sup>14</sup> However, whether the January 2008 proportion of persons flying in the Missoula Valley is higher than the 2008 national proportion is unknown.

The January 2008 Missoula Valley proportions of persons who reported using the remaining common transportation modes were not statistically different from the January 2003 national proportions. However, the lower proportion of Missoula Valley residents reporting taxi use (7.2%) is significant at the 90% confidence level when compared to the national proportion (11.5%).

Comparing the rates of January bicycling and walking in the Missoula Valley to January estimates for the nation as a whole finds point estimates that are lower in the Missoula Valley. These differences are not statistically significant. However, it is likely that walking and bicycling rates are more affected by weather in the Missoula Valley than in large portions of the United States, particularly the south. If this is true, then walking and bicycling rates in the Missoula Valley may actually exceed those found nationwide.

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14 Bureau of Transportation Statistics, U.S. Department of Transportation. World-wide web table: Air Carriers: T-100 Domestic Market (All Carriers) - Monthly On-Flight Market Passengers Enplaned by Origin (MSO), as of April 2, 2008.

**All-Purpose Use of Selected Transportation Modes by Residence**

The following common transportation modes were examined by the respondent’s residence:

- Personal vehicle,
- Walking,
- Commercial flying,
- Public transit,
- Carpooling, and
- Bicycling.

Three of these modes - public transit, commercial flying, and carpooling – demonstrated differences in use by the location of the respondent’s residence (see Table 6). Missoula City residents were significantly more likely (19.2%) to use public transit for any purpose than were study area residents who live outside the City (4%). City residents were also more likely to fly on a commercial airplane and participate in a carpool than were residents who live beyond the Missoula City limits.

**Residence Differences in All-Purpose Use of Selected Transportation Modes**

* Difference between City and outside City significant at .05 level.	Residence	
	Missoula City	Outside Missoula City
	Column %	Column %
During the last 30 days, did you ride on any public transit within the Missoula Valley?*	Yes 19.2%	4.0%
During the last 30 days, did you fly on a commercial airline?*	Yes 18.8%	11.0%
During the last 30 days, did you drive or ride in an organized carpool or vanpool?*	Yes 14.2%	5.7%

**Table 6**

**Trip Purpose for Selected Mode Use in the Missoula Valley**

Missoula Valley residents most often rode their bicycles for recreation and to commute to work (see Figure 9). As expected, the proportion of bicyclers riding in January 2008 for recreation and exercise was lower than it was during the rest of the previous year when weather was warmer. About three-fifths of January riders in the Missoula Valley did so to commute or to run errands, while over an entire year three-fifths of riders did so for recreation or exercise.

A majority of adults in the Missoula Valley walked, jogged, or ran for exercise (see Figure 10). About three-fourths of residents who walked, jogged, or ran did so for exercise or recreation. When compared to bicycle riders, walkers and runners were less likely to walk or run for utilitarian reasons like errands or commuting to work. Also, it appears that Missoula's canines do their part encourage some area residents to walk, jog, or run.

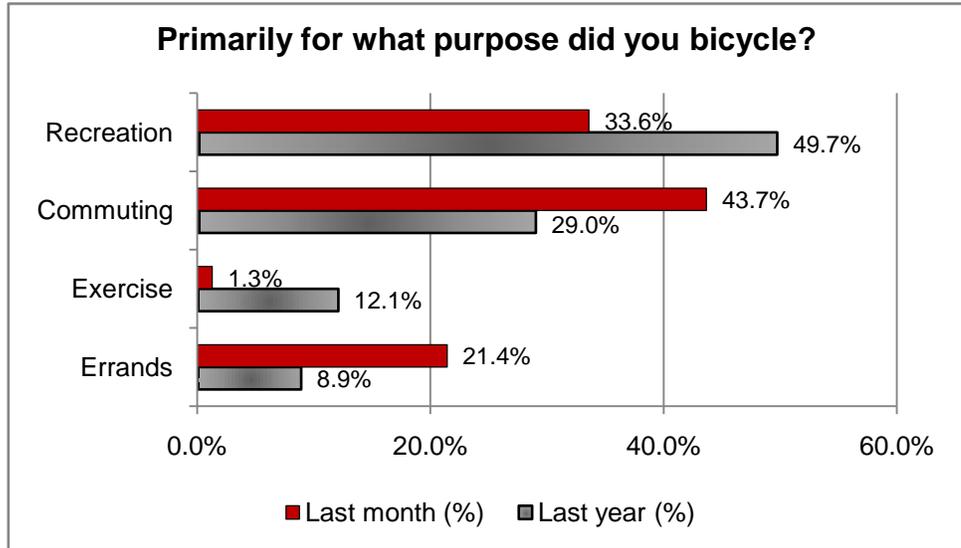


Figure 10

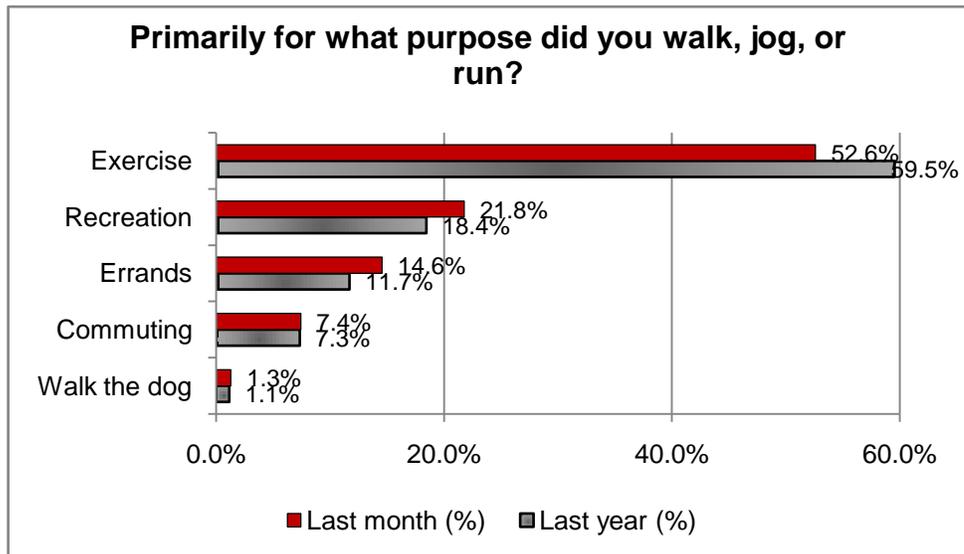


Figure 11

One-third of public transit riders rode the bus to work in January 2008 (see Figure 11). Another one-third of riders rode the bus to The University of Montana or another educational institution. Social activities or personal business, medical services, and shopping rounded out the top five trip purposes for public transit trips in January 2008.

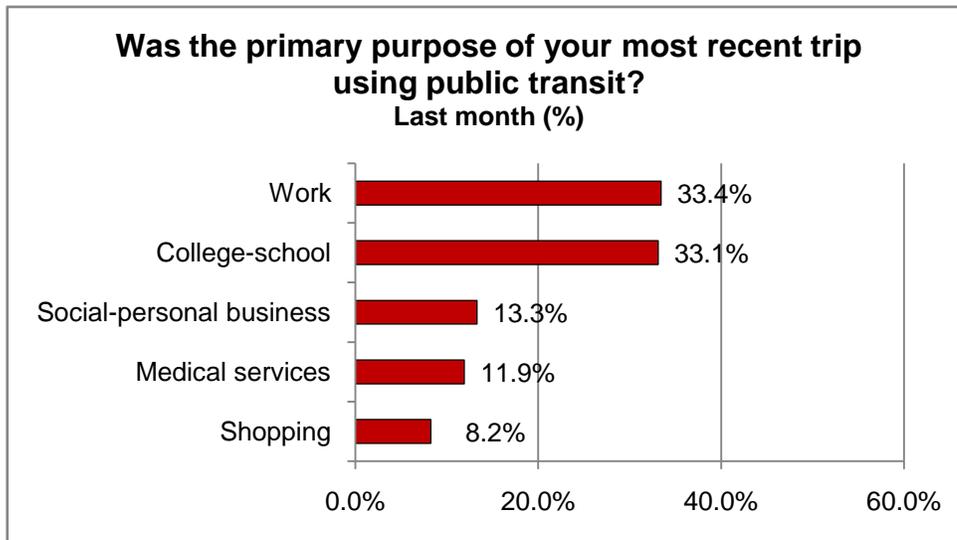


Figure 12