

**PERCEPTIONS OF HIGHWAY
MAINTENANCE IN MONTANA IN
2002: THE RESULTS OF A
TELEPHONE SURVEY**

FINAL REPORT

**Prepared for the
STATE OF MONTANA
DEPARTMENT OF TRANSPORTATION
RESEARCH, DEVELOPMENT, &
TECHNOLOGY TRANSFER PROGRAM
in cooperation with the
U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION**

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November, 2002

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EXECUTIVE SUMMARY

Trained interviewers at the Computer Assisted Telephone Interviewing Laboratory at Montana State University, Billings completed 1,004 interviews with randomly selected adult residents of Montana between September October 17th and November 3rd, 2002 for the purposes of obtaining the perceptions the respondents held about the maintenance of interstate and state highways in Montana and comparing those perceptions to perceptions held by the respondents to a 2000 survey on the same topic.

For the purposes of the survey, highway maintenance was divided into eight categories: winter maintenance, maintaining a smooth highway surface, maintenance of roadsides, maintenance of signs, debris removal, rest stop maintenance, striping maintenance, and winter road conditions reports.

When respondents were asked to rate the current state of each of these activities on a 1 to 4 scale where 1 = poor, 2 = fair, 3 = good and 4 = excellent, signage was rated highest with a mean of 3.07, winter roadway information was rated second at 3.01, highway striping was third with a mean of 2.87, roadside maintenance fourth at 2.80, rest stop maintenance was fifth at 2.79, Winter maintenance was sixth at 2.76, debris removal was seventh at 2.76, and smoothness of road surfaces last at 2.55. The ratings of six of the eight maintenance activities showed a statistically significant increase from 2000 to 2002. The rating for winter roadway information increased significantly from 2.91 in 2000 to 3.01 in 2002; the rating for highway striping increased significantly from 2.70 in 2000 to 2.87 in 2002; the rating for roadside maintenance increased significantly from 2.72 in 2000 to 2.80 in 2002; the rating for rest stop maintenance increased significantly from 2.58 in 2000 to 2.79 in 2002; the rating for debris removal increased significant from 2.64 in 2000 to 2.75 in 2002; and the rating for surface smoothness increased significantly from 2.44 in 2000 to 2.55 in 2002.

When respondents were asked how important each of these activities were to them on a scale of 1 to 4 where 1 = not important, 2 = somewhat important, 3 = important, and 4 = very important, winter maintenance was rated most important with a mean importance rating of 3.69, followed by striping (3.60), winter roadway information (3.52), debris removal (3.46), surface smoothness (3.38), signage (3.31), rest stop maintenance (3.21), and roadside maintenance (3.00). The 2000 to 2002 increases in importance ratings of winter maintenance (3.58 in 2000 to 3.69 in 2002), highway striping (3.47 to 3.60), winter roadway information (3.22 to 3.52), debris removal (3.37 to 3.46), surface smoothness (3.29 to 3.38), and rest stop maintenance (3.07 to 3.21) were statistically significant.

When respondents were asked to think about the allocation of MDT resources and assign a resource priority of low (1), medium (2), moderately high (3), or very high (4) to each activity, winter maintenance received the highest resource priority rating (3.65) followed by winter roadway information (3.44), striping (3.42), debris removal (3.26), surface smoothness (3.11), signage (3.08), rest stop maintenance (3.04), and roadside maintenance (2.70). The increases from 2000 to 2002 in the priorities assigned to winter maintenance (3.54 in 2000 to 3.65 in 2002), winter roadway information (3.22 to 3.44), striping (3.27 to 3.42), debris removal (3.10 to 3.26), signage (2.92 to 3.08), and roadside maintenance (2.59 to 2.70) were statistically significant.

Finally, these ratings were combined into a composite variable for each of the maintenance activities. The composite variable provides an indication of the level of attention and resources the respondents believed each maintenance activity should receive from MDT. The values of the composite variables as well as the rating of the components of each variable are summarized in the following table.

**COMPOSITE VARIABLE MEAN BY RANK OF
RATING, IMPORTANCE, AND PRIORITY**

	Composite <u>Mean</u>	Rating <u>Rank</u>	Importance <u>Rank</u>	Priority <u>Rank</u>
Winter Maint	9.43	6	1	1
Striping	9.11	3	2	3
Debris Removal	8.94	7	4	4
Smoothness	8.90	8	5	5
Winter Road Info	8.38	2	3	2
Signage	8.25	1	6	6
Rest Stop Maint.	7.84	5	7	7
Roadside Maint.	7.83	4	8	8

According to the respondents, MDT should now pay attention and provide resources to maintenance activities on interstates and state highways in Montana in the following order: winter maintenance, highway striping, debris removal, surface smoothness, winter roadway information, highway signage, rest stop maintenance and roadside maintenance.

This represent a change from the order of composite variables resulting from the 2000 survey which was: winter maintenance, highway striping, surface smoothness, debris removal, signage, winter roadway information, roadside maintenance, and rest stop maintenance. The increase in the mean value of the Winter Maintenance composite variable from 9.10 in 2000 to 9.43 in 2002 was statistically significant as was the increase in mean value of the Debris Removal composite variable from 8.79 in 2000 to 8.94 in 2002, and the increase of the mean value of the Winter Roadway Information composite variable from 7.96 in 2000 to 8.38 in 2002.

For the first time in the 2002 survey, the respondents were asked to rate the importance of seven additional activities performed by state highway maintenance personnel: roadside delineators, crash barriers, traffic signals, sweeping, street lighting, noxious weed control and sidewalks. Respondents believed the most important of these additional maintenance activities were roadside delineators with a mean of 3.62 and crash barriers with a mean of 3.56, followed by traffic signals came next with a mean of 3.39, then sweeping and street lighting were next with means of 3.20 and 3.16. Noxious weed control and sidewalks were the least important of these additional maintenance activities with means of 2.90 and 2.48 respectively.

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INTRODUCTION

This report summarizes the procedures and findings of a telephone survey conducted for the Montana Department of Transportation (MDT) by the Computer Assisted Telephone Interviewing Laboratory at Montana State University, Billings. This survey was a replication of nearly identical surveys conducted in September of 2002, October of 1998 and September of 1996. The purposes of this survey were to determine the perceptions of the maintenance of state highways and interstates in Montana held by adult Montanans and to determine if those perceptions had changed in the last 2 years. The survey was conducted from October 17th to November 3rd, 2002.

The results of the 1996 survey are contained in *Perceptions of Highway Maintenance in Montana: The Results of a Telephone Survey*, the results of the 1998 study are contained in *Perceptions of Highway Maintenance in Montana in 1998: The Results of a Telephone Survey, Final Report*, and the results of the 2000 study are contained in *Perceptions of Highway Maintenance in Montana in 2000: The Results of a Telephone Survey, Final Report*.

METHODOLOGY

The survey was conducted by trained interviewers from the Computer Assisted Telephone Interviewing Laboratory (CATI Lab) at Montana State University, Billings. A random digit dialing sample was purchased from Genesys Sampling Systems (Ft. Washington, PA.) Telephone numbers were called back up to five times in an attempt to complete interviews. A total of 1004 interviews were completed requiring 8,828 telephone calls to 6,160 telephone numbers. Interviewers actually spoke to 1,816 eligible potential respondents and 1,004 or 55.3% of these potential respondents were successfully interviewed. Table One summarizes the disposition of all telephone calls.

Upon completion of all interviewing, the data was analyzed with the computer program Statistical Package for the Social Sciences (SPSS).

The results of the survey have a margin of error of about $\pm 3\%$ when generalized to the entire state. The MDT has divided the state in five administrative districts, and the margins of error within these districts vary from $\pm 6\%$ in the Missoula District to $\pm 10\%$ in the Glendive District (see Appendix One for map of districts).

TABLE ONE
DISPOSITION OF ALL TELEPHONE CALLS

Non Working Number	2,132	24.1%
No Answer	1,732	19.6%
Answering Machine	1,472	16.7%
Complete	1,004	11.8%
Refused	807	9.1%
Busy	552	6.2%
Call Back	413	4.7%
Non Residential Number	405	4.6%
Fax or Computer	255	2.9%
Wrong Category	33	0.4%
Hearing Problem	18	0.2%
Incompetent Respondent	5	0.1%
TOTAL	8,828	100.0%

FINDINGS

Who Are the Respondents

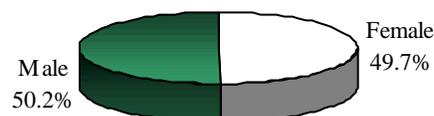
Demographic Characteristics

Figure One summarizes the basic characteristics of the 1,004 respondents. Figure One shows that about half the respondents were male and about half were female. The mean age of the respondents was 50.6; 20.7% of the respondents were thirty five years old or less, 37.4% were 56 or over and the remainder of 42.0% were between 36 and 55.

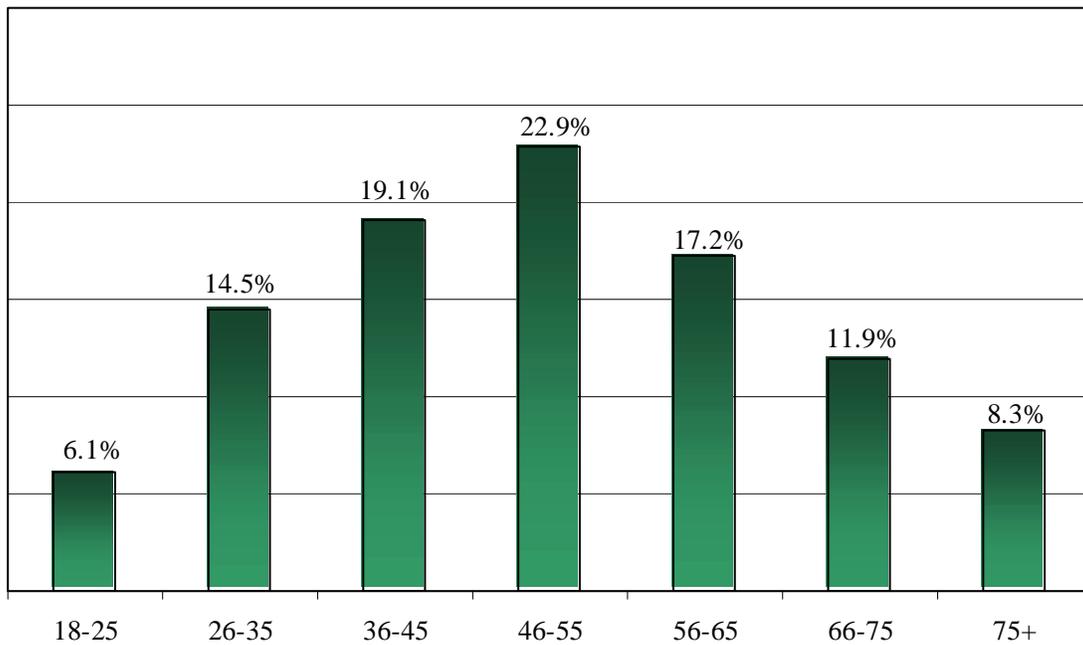
The mean educational attainment of the respondents was 13.8 years of education; 4.9% had not completed high school while 35.5% had completed just high school, 28.4% had completed some college and 30.9% had at least a college degree.

The mean length of time respondents had been in Montana was 34.1 years; 51.7% of the respondents reported they had lived in Montana over 30 years while 10.3% indicated they had been in Montana for 5 or less years.

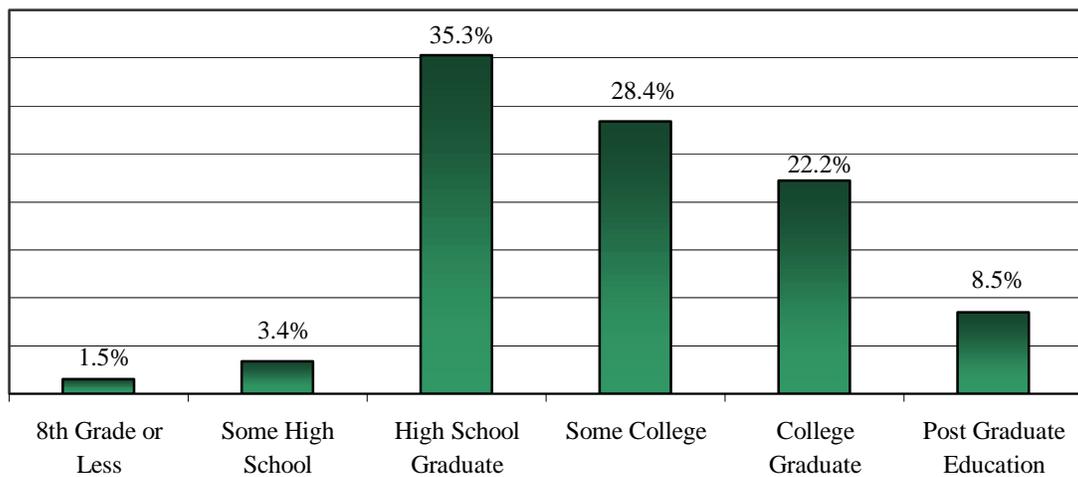
FIGURE 1
DEMOGRAPHIC CHARACTERISTICS OF THE
RESPONDENTS
Gender



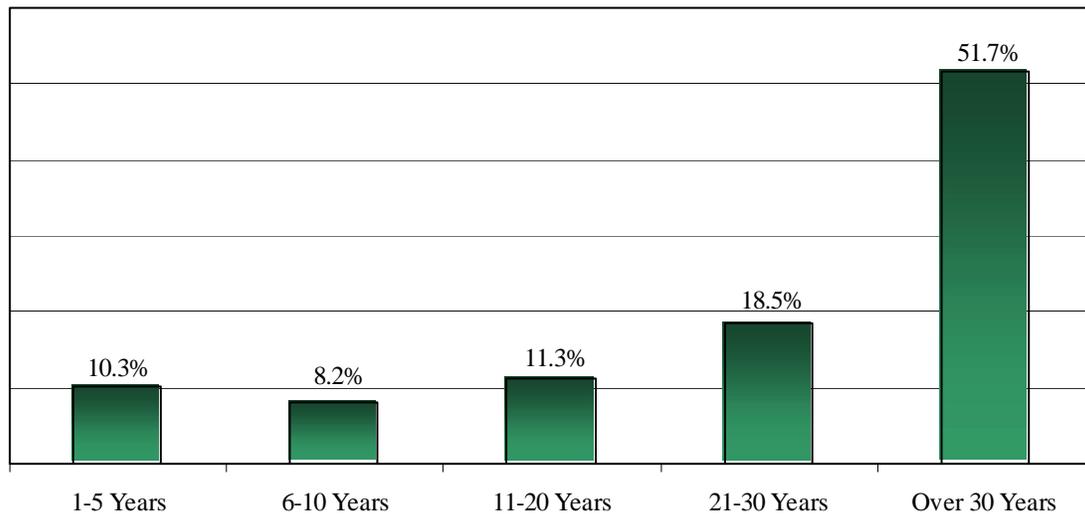
Age



Educational Attainment



Length of Montana Residence



There were no statistically significant differences between the 2000 respondents and the 2002 respondents with respect to sex, educational attainment or length of residence in Montana. However, the difference in age between the 2000 and 2002 respondents was statistically significant.

County and Administrative District of Residence

Table Two summarizes the respondents' county of residence, which was obtained by converting telephone prefixes. It was not possible to place 2 telephone numbers into counties. Table Two shows all of Montana's 56 counties were represented by respondents. Fifteen percent of the respondents lived in Yellowstone County, 11.0% lived in Flathead County, 8.4% lived in Missoula County, 8.2% lived in Lewis and Clark County, 7.9% lived in Gallatin County, and 6.7% lived in Cascade County. Discrepancies between the percentages of the sample that reside in each county as compared with the percentage of the population of Montana in that county can be explained by a number of factors such as: differences in percentages of households with telephones, self selection biases that differ by county, and changes in actual population figures since the last measurement of such figures.

Figure Two shows that 30.4% of the respondents lived in District 1, Missoula; 17.2% lived in 2, Butte; 21.2% in District 3, Great Falls; 7.9% in District 4, Glendive; and 23.4% in District 5, Billings. A map showing the MDT Administrative Districts is included in this report as Appendix One.

This survey was conducted by county line, as close to the Administrative Districts as possible. However, some counties are split between administrative districts, please refer to Appendix One.

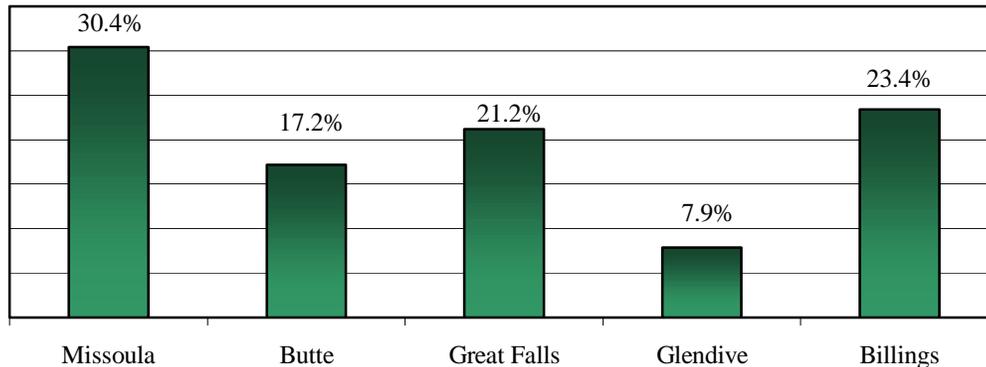
TABLE TWO
LOCATION OF RESPONDENTS' RESIDENCES

County of Location

Beaverhead	9	0.9%
Big Horn	13	1.3%
Blaine	7	0.9%
Broadwater	4	0.4%
Carbon	14	1.4%
Cascade	67	6.7%
Chouteau	3	0.3%
Custer	9	0.9%
Daniels	4	0.4%
Dawson	10	1.0%
Deer Lodge	9	0.9%
Fallon	4	0.4%
Fergus	16	1.6%
Flathead	110	11.0%
Gallatin	79	7.9%
Garfield	1	0.1%
Glacier	10	1.0%
Golden Valley	2	0.2%
Granite	2	0.2%
Hill	17	1.7%
Jefferson	8	0.8%
Judith Basin	3	0.3%
Lake	19	1.9%
Lewis and Clark	82	8.2%
Liberty	2	0.2%
Lincoln	32	3.2%
McCone	2	0.2%
Madison	7	0.7%
Meagher	3	0.3%
Mineral	6	0.6%
Missoula	84	8.4%
Musselshell	5	0.5%
Park	19	1.9%
Petroleum	2	0.2%
Phillips	4	0.4%
Pondera	9	0.9%
Powder River	2	0.2%
Powell	5	0.5%
Prairie	2	0.2%
Ravalli	35	3.5%
Richland	3	0.3%
Roosevelt	15	1.5 %

Rosebud	9	0.9%
Sanders	12	1.2%
Sheridan	4	0.4%
Silver Bow	34	3.4%
Stillwater	13	1.3%
Sweetgrass	7	0.7%
Teton	5	0.5%
Toole	10	1.0%
Treasure	1	0.1%
Valley	7	0.7%
Wheatland	5	0.5%
Wibaux	1	0.1%
Yellowstone	153	15.3%
Unknown	2	.2%
TOTAL	1004	100.0%

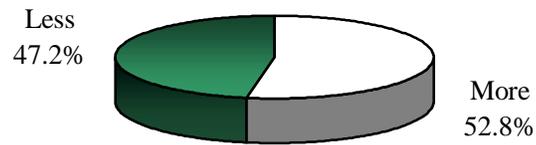
FIGURE 2
ADMINISTRATIVE DISTRICT



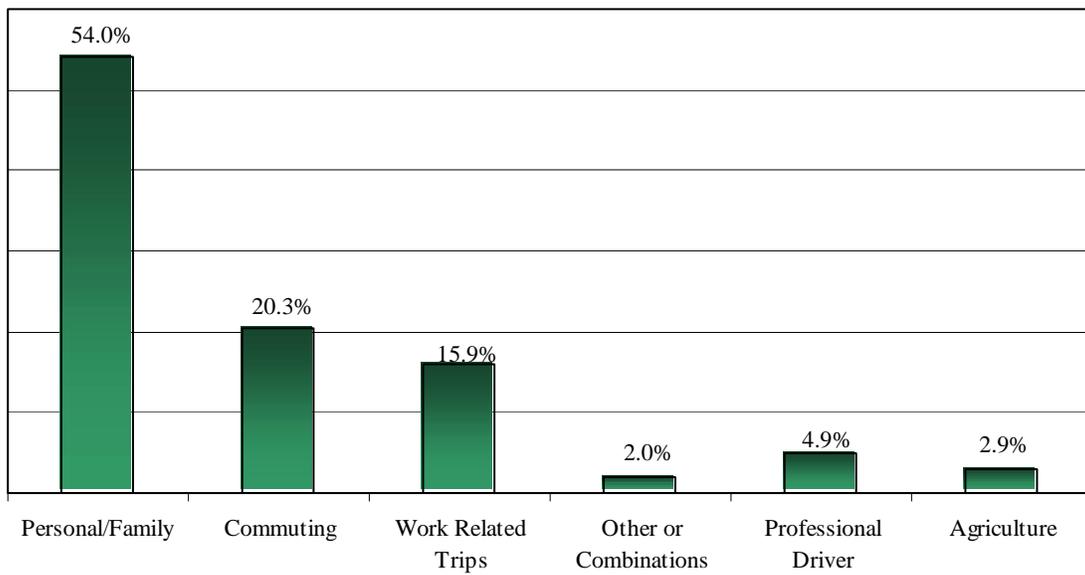
Travel Characteristics

The respondents were asked several questions about their vehicle travel patterns. Figure Three summarizes the results of these questions. Figure Three shows that 52.8% of the respondents indicated they drive more than 15,000 miles per year while 47.2% drove less than 15,000 miles. Figure Three shows the most common trips made by respondents were personal or family errands (54%), followed by commuting (20.3%) and then work related trips (15.9%). Figure Three also shows that 71.6% of the respondents had driven in other states in the last 12 months.

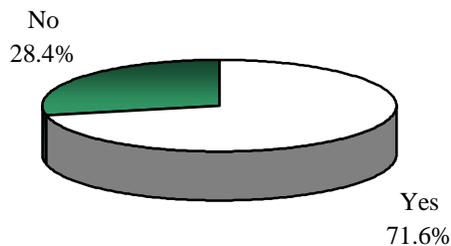
FIGURE 3
RESPONDENTS' TRAVEL CHARACTERISTICS
Drive More or Less Than 15,000 Miles Year



Typical Trip



Driven in Other States in Last Twelve Months

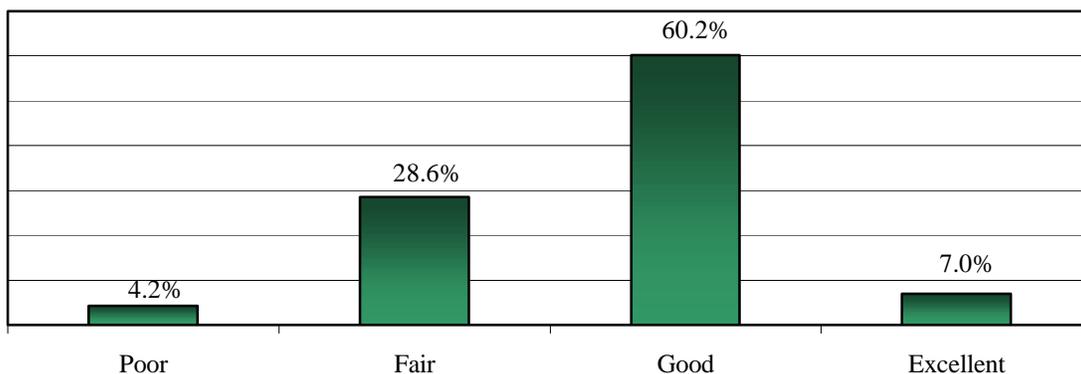


General Perception of Montana Highways and Interstates

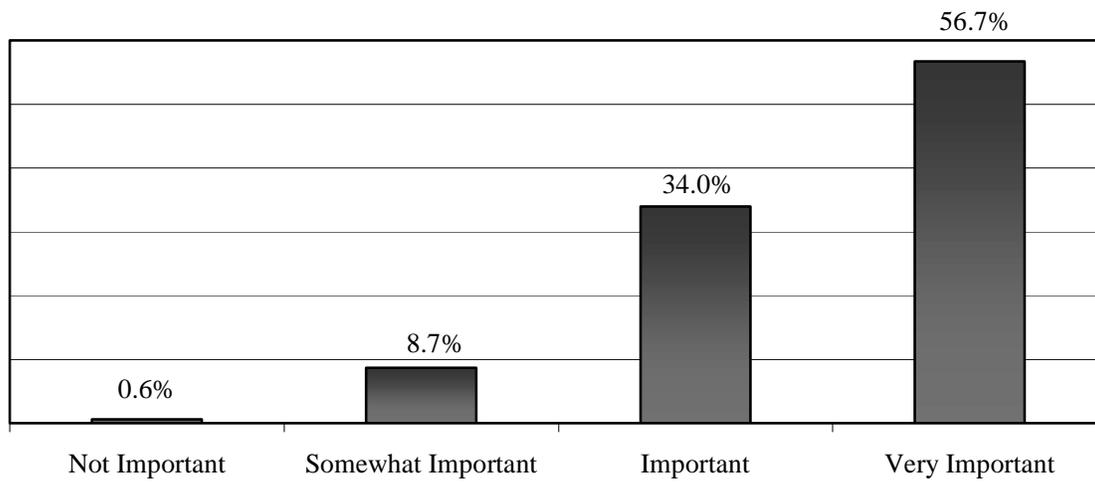
Rating of Montana Highway Maintenance

The respondents were asked to rate overall interstate and state highway maintenance in Montana using the responses poor, fair, good and excellent. Figure Four shows that 4.2% of the respondents rated overall maintenance as poor while 28.6% rated maintenance fair, 60.2% rated maintenance good and 7% rated maintenance excellent. The mean overall rating of maintenance on a 1 to 4 scale where 1 is poor, 2 is fair, 3 is good and 4 is excellent was 2.70.

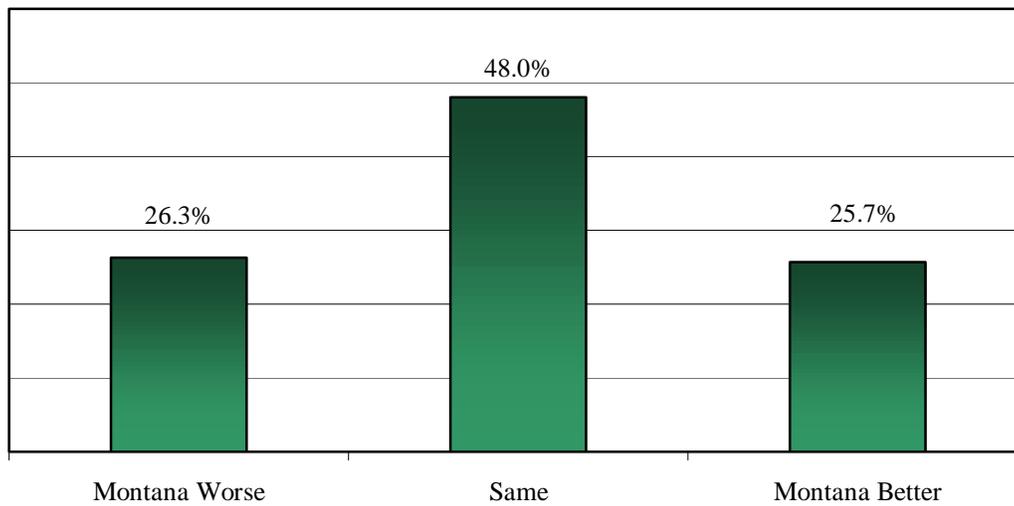
FIGURE 4
GENERAL PERCEPTIONS OF MONTANA ROADWAYS
 General Rating



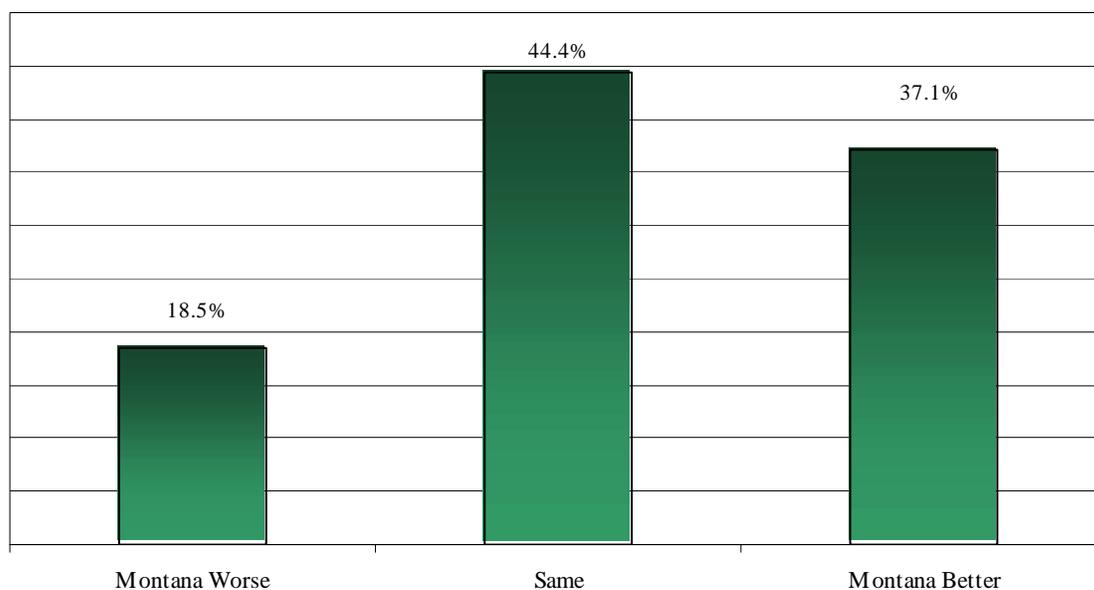
Importance of Highway Maintenance



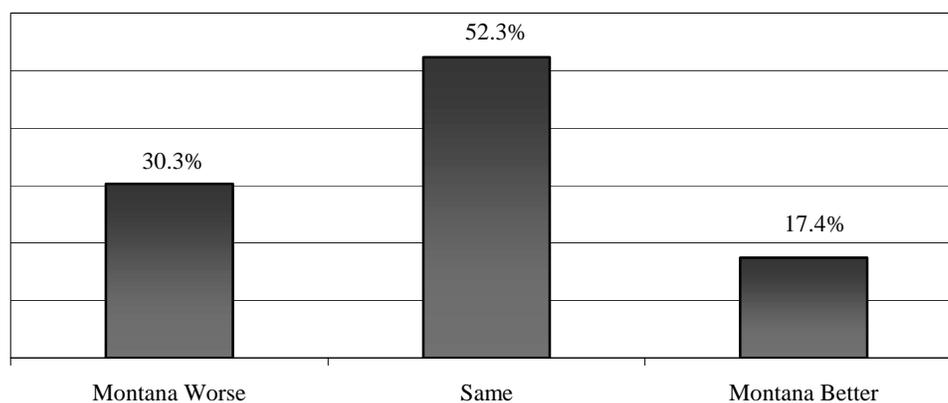
Comparison of Montana Highways with Highways in Other States



**Comparison of Montana Winter Maintenance
with Winter Maintenance in Other States**



**Comparison of Rest Area Maintenance in Montana
with Rest Area Maintenance in Other States**



Statistically Significant Relationships Between General Rating of Montana Highway
Maintenance and Demographic/Travel Variables

To further investigate the perceptions of the respondents, all rating questions were crosstabulated with Administrative District, sex, age, educational attainment, length of Montana residence, the respondent's typical trip, whether the respondent had driven more or less than 15,000 miles, and whether or not the respondent had driven in other states within the last 12 months. A statistically significant relationship was deemed to exist

when the probability of getting the observed outcome by chance was less than 5%. Only statistically significant relationships are reported in this report.

Statistically significant relationships were found between the respondents' general rating of highway maintenance and whether or not the respondent had driven in other states, whether or not the respondent had driven more or less than 15,000 miles in the last year, age, and educational attainment

- Respondents who had driven in other states rated general maintenance lower than respondents who had not driven in other states.
- Respondents who had driven more than 15,000 miles in the last year rated general maintenance lower than those who had driven less than 15,000 miles in the last year.
- The older a respondent, the higher they rated general maintenance.
- The higher the level of the respondent's education, the higher they generally rated highway maintenance.

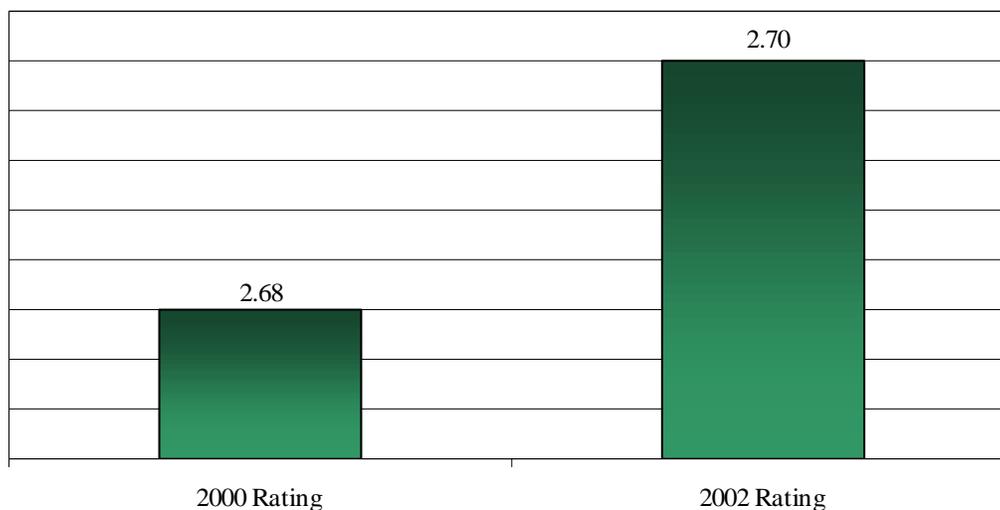
Comparison of 2000 and 2002 General Rating of Montana Highway Maintenance

Figure Five provides a comparison of the 2000 and 2002 General Rating of Montana Highway Maintenance. Figure Five shows a slight increase in the general rating from 2.68 in 2000 to 2.70 in 2002. This difference in rating was not statistically significant.

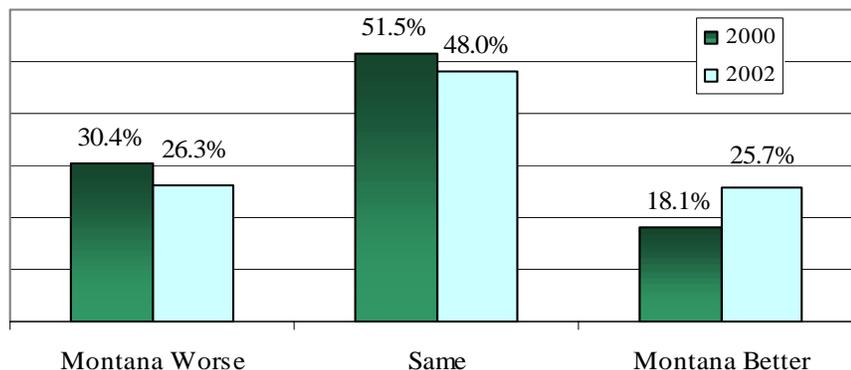
FIGURE 5

COMPARISON OF 2000 AND 2002 GENERAL RATING OF MONTANA HIGHWAY MAINTENANCE

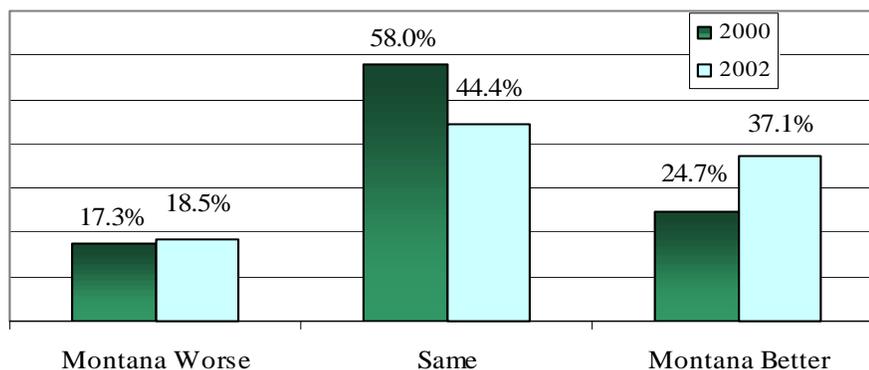
General Rating



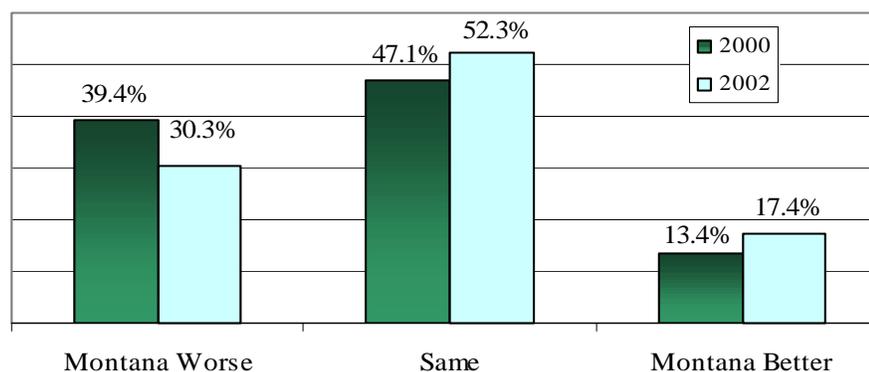
General Comparison With Other States



Winter Maintenance Comparison With Other States



Rest Area Maintenance Comparison With Other States



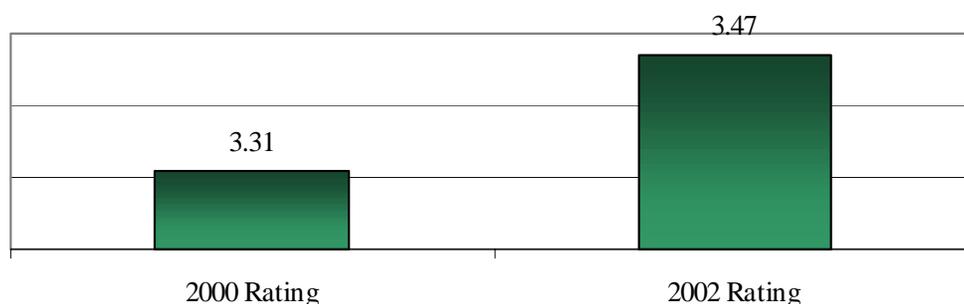
Respondents' Opinion of the Personal Importance of Highway Maintenance

The respondents were also asked generally how important highway maintenance was to them and asked to answer with not important, somewhat important, important or very important. Figure Four shows that 56.7% of the respondents said very important, and 34.0% said important, 8.7% said somewhat important, and 0.6% said not important

Statistically Significant Relationships Between Importance of Highway Maintenance and Demographic/Travel Variables

- Females rated the importance of highway maintenance higher than did males.
- Respondents who reported they drove more than 15,000 miles in the last year rated the importance of highway maintenance higher than did respondents driving less than 15,000.
- Respondents who reported they were professional drivers and respondents who said their typical trip was work related rated the importance of highway maintenance higher than did respondents who said their typical trip was commuting, family or personal, or agricultural.

FIGURE 6
COMPARISON OF 2000 AND 2002 IMPORTANCE
OF MONTANA HIGHWAY MAINTENANCE
General Rating



Comparison of 2000 and 2002 Importance of Montana Highway Maintenance Rating

Figure Six provides a comparison of the 2000 and 2002 Importance of Montana Highway Maintenance rating. Figure Six shows an increase in the rating of the importance of Montana highway maintenance from 3.31 in 2000 to 3.47 in 2002. This difference in rating was statistically significant.

General Comparison of Montana Highways with Highways in Other States

The respondents who had driven in other states in the last 12 months were asked to compare the general condition of Montana highways and interstates to those in the states they had driven. Figure Four shows that 48.0% of these respondents said the highways and interstates of Montana were about the same as those in the other states in which they had driven, 26.3% felt the roads in Montana were worse and 25.7% felt the roads in Montana were better.

Statistically Significant Relationships Between Comparison of Montana Highway Maintenance with Highway Maintenance in Other States and Administrative District

- Respondents in the Missoula and Billings districts were more likely than respondents in other administrative districts to believe general highway maintenance was worse in Montana than in other states. Respondents in the Butte district were more likely than respondents in other districts to believe Montana highway maintenance was better than in other states.

Statistically Significant Relationships Between Comparison of Montana Highway Maintenance with Highway Maintenance in Other States and Demographic/Travel Variables

- Respondents who reported they had driven more than 15,000 miles in the last year were more likely than those who had driven less than 15,000 to believe that general highway maintenance was worse in Montana than in other states while respondents who had driven less than 15,000 miles were more likely than those who had driven more than 15,000 miles in the last year to believe that general highway maintenance in Montana was better than general highway maintenance in other states.

Comparison of 2000 and 2002 Assessment of Montana Highway Maintenance Versus Highway Maintenance in Other States

- The 2002 respondents who had driven in other states were more likely than the 2000 respondents who had driven in other states to believe that general highway maintenance in Montana was better than highway maintenance in other states. The 2002 respondents were also less likely than the 2000 respondents to believe that highway maintenance in Montana was worse than in other states.

Comparison of Montana Winter Maintenance with Winter Maintenance in Other States

The respondents who had driven in other states in the last 12 months were also asked to compare winter maintenance in Montana to winter maintenance in other states Figure Four shows 44.4% of these respondents, who had an opinion, believed winter maintenance was about the same in Montana as in other states while 37.1% believed winter maintenance was better in Montana and 18.5% believed winter maintenance was worse in Montana.

Statistically Significant Relationships Between Comparison of Montana Highway Winter Maintenance with Highway Winter Maintenance in Other States and Administrative District

- Residents of the Missoula and Billings districts were more likely than residents in other districts to believe winter maintenance was worse in Montana than in other states while respondents living in the Glendive district were more likely than respondents living in other districts to say the winter maintenance in Montana was about the same in other states, and respondents living in the Butte district and the

Missoula district were more likely than respondents in other districts to believe that winter maintenance in Montana was better than in other states.

Statistically Significant Relationships Between Comparison of Winter Maintenance and Demographic/Travel Variables

- Respondents who said they were professional drivers were more likely than other respondents to believe that winter maintenance was worse in Montana than in other states, while respondents who said their typical trip was work related were more likely than other respondents to say winter maintenance in Montana was about the same as in other states, and respondents who said their typical trip was either commuting or personal or family related were more likely than other respondents to believe that winter maintenance in Montana was better than in other states.

Comparison of 2000 and 2002 Assessment of Montana Highway Winter Maintenance Versus Winter Maintenance in Other States

- The percentage of respondents saying Montana winter maintenance was better than winter maintenance in other states increased significantly from 2000 to 2002 (24.7% to 37.1%) while the percentage of respondents thinking winter maintenance in Montana and other states was about the same decreased significantly (58% to 44.4%).

Comparison of Montana Rest Area Maintenance and Rest Area Maintenance in Other States

The respondents who had driven in other states within the last 12 months were also asked to compare rest area maintenance in Montana with rest area maintenance in the other states in which they had driven. Figure Four shows that 52.3% of respondents who had an opinion felt rest area maintenance was about the same in Montana as in other states, while 30.3% said rest stop area maintenance was worse in Montana and 17.4% said it was better in Montana.

Statistically Significant Relationships Between Rest Area Maintenance Comparison and Demographic/Travel Variables

- Respondents who had lived in Montana from 6 to 20 years and over 30 years were more likely than those who lived in Montana less than 6 years or between 21 and 30 years to think rest stop maintenance was worse in Montana than in other states.

Comparison of 2000 and 2002 Assessment of Montana Rest Area Maintenance Versus Rest Area Maintenance in Other States

- The percentage of respondents believing rest area maintenance was worse in Montana than in other states decreased significantly from 2000 to 2002 (from 39.4% to 30.3%).

Respondents Rating of Eight Maintenance Activities

For the purposes of this survey, highway maintenance activities were divided into 8 categories: winter maintenance, maintaining a smooth highway surface, maintenance of roadsides, maintenance of signs, debris removal, rest stop maintenance, striping maintenance, and winter road condition reports. The respondents were asked to rate each of these activities with the responses poor, fair, good, very good and excellent. Table Three summarizes the results of that rating. The ordering of the activities in Table Three is provided by the mean score for each item on a 1 to 4 scale where 1 = poor, 2 = fair, 3 = good, and 4 = excellent.

Also reported in Table Three are the standard deviation (SD) of the distribution of rating for each activity and the standard error of the mean (SE) for the ratings of each activity. While it is not possible to indicate what constitutes a statistically significant difference between means because each mean represents a separate variable, the standard deviation and standard error of the ratings should assist in making any additional interpretations. The largest standard of error is 0.029 resulting in a 95% confidence interval of $\pm .057$. This means that if the difference between two means is greater than 0.11, each mean is outside of the 95% confidence interval of the other. Therefore a difference between means greater than 0.11 should be considered a real difference.

Table Three shows that the maintenance of highway signs is rated highest (3.07) followed by winter road information (3.01), striping (2.87), roadside maintenance (2.80), rest stop maintenance (2.79), winter maintenance (2.76), debris removal (2.75), and highway surface maintenance (2.55). These ratings show that the maintenance of signs is rated highest followed by winter road information, and then striping. Next, roadside maintenance, rest stop maintenance and winter maintenance and debris removal are rated fairly close together. Surface smoothness is rated lowest of the eight maintenance activities.

TABLE THREE
RATING OF MAINTENANCE ACTIVITIES

<u>Activity</u>	<u>Poor</u>	<u>Fair</u>	<u>Good</u>	<u>Excellent</u>	<u>N</u>	<u>Mean</u>	<u>SD</u>	<u>SE</u>
Signage	1.1%	10.5%	68.5%	19.9%	989	3.07	0.587	0.019
Information	4.0%	14.5%	57.5%	24.0%	843	3.01	0.739	0.025
Striping	5.0%	17.2%	63.6%	14.2%	999	2.87	0.706	0.022
Roadsides	6.4%	21.6%	58.0%	14.0%	991	2.80	0.755	0.024
Rest Stop Maint.	8.1%	21.5%	53.2%	17.1%	817	2.79	0.818	0.029
Winter Maint.	6.8%	25.0%	53.4%	14.8%	968	2.76	0.784	0.025
Debris Removal	7.1%	25.1%	53.7%	14.1%	1001	2.75	0.783	0.025
Surfaces	9.1%	31.7%	54.3%	4.9%	1000	2.55	0.727	0.023

Statistically Significant Relationships Between Rating of Maintenance Activities and Administrative District

- Respondents in the Glendive District rated striping higher than did respondents from other districts while respondents from the Missoula District rated striping lower than did respondents from other districts.

- Respondents in the Missoula district rated smoothness of highway surfaces significantly lower than did respondents in other districts.

Statistically Significant Relationships Between Rating of Signage
and Demographic/Travel Variables

- Females rated highway signage higher than did males.
- Respondents from 18 to 25 rated signage lower than did older respondents.

Statistically Significant Relationships Between Rating of Winter Roadway Information
and Demographic/Travel Variables

- Males rated winter roadway information higher than did females.
- Respondents who had driven in other states rated winter roadway information lower than did respondents who had not driven in other states.

Statistically Significant Relationships Between Rating of Highway Striping
and Demographic/Travel Variables

- No statistically significant relationships were found between the rating of highway striping and demographic/travel variables.

Statistically Significant Relationships Between Rating of Roadside Maintenance
and Demographic/Travel Variables

- Respondents with a highest level of education between 9th grade and 12th grade rated roadside maintenance lower than did respondents with less or more education.

Statistically Significant Relationships Between Rating of Rest Stop Maintenance
and Demographic/Travel Variables

- Respondents 25 or younger and 76 or older rated rest stop maintenance lower than did respondents between 26 and 75.

Statistically Significant Relationships Between Rating of Winter Maintenance
and Demographic/Travel Variables

- Respondents with and 8th grade or less education rated winter maintenance higher than did respondents with a higher level of education.

Statistically Significant Relationships Between Rating of Debris Removal
and Demographic/Travel Variables

- No statistically significant relationships were found between the rating of debris removal and demographic/travel variables.

Statistically Significant Relationships Between Rating of Surface Smoothness
and Demographic/Travel Variables

- Males rated surface smoothness higher than did females
- Respondents who had driven in other states rated surface smoothness lower than did respondents who had not driven in other states.
- Respondents who had driven more than 15,000 miles within the last 12 months rated surface smoothness lower than did respondents who had driven less than 15,000.
- Respondents 25 and younger rated surface smoothness lower than did older respondents while respondents over 65 rated surface smoothness higher than did younger respondents.

Comparison of 2000 and 2002 Ratings of the Eight Maintenance Activities

**FIGURE 7
COMPARISON OF 2000 AND 2002 RATINGS OF
MAINTENANCE ACTIVITIES**

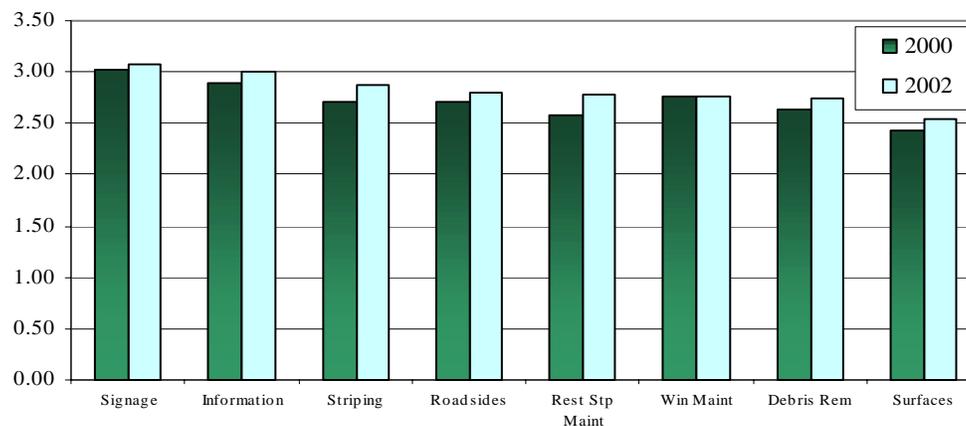


Figure Seven provides a comparison of 2000 and 2002 ratings of the eight maintenance activities. The ratings of six of the eight maintenance activities showed a statistically significant increase from 2000 to 2002. The rating for winter roadway information increased significantly from 2.91 in 2000 to 3.01 in 2002; the rating for highway striping increased significantly from 2.70 in 2000 to 2.87 in 2002; the rating for roadside maintenance increased significantly from 2.72 in 2000 to 2.80 in 2002; the rating for rest stop maintenance increased significantly from 2.58 in 2000 to 2.79 in 2002; the rating for debris removal increased significant from 2.64 in 2000 to 2.75 in 2002; and the rating for surface smoothness increased significantly from 2.44 in 2000 to 2.55 in 2002.

Importance of Highway Maintenance Activities to the Respondents

The respondents were asked how important each of the eight maintenance activities was to them. They were asked to respond with not important, somewhat important, important and very important. Table Four summarizes the respondents' perception of the importance of these different activities. The ordering of activities in Table Four is provided by the mean score of each activity on a 1 to 4 scale where 1 = not important, 2 = somewhat important, 3 = important and 4 = very important.

TABLE FOUR
IMPORTANCE OF MAINTENANCE ACTIVITIES

<u>Activity</u>	<u>Not</u> <u>Important</u>	<u>Smwhat</u> <u>Import.</u>	<u>Import.</u>	<u>Very</u> <u>Import.</u>	<u>N</u>	<u>Mean</u>	<u>SD</u>	<u>SE</u>
Winter Maint.	0.7%	4.8%	19.2%	75.3%	989	3.69	0.593	0.019
Striping	0.3%	4.4%	29.9%	65.4%	1002	3.60	0.588	0.019
Information	2.4%	7.1%	26.8%	63.6%	902	3.52	0.734	0.024
Debris Removal	1.4%	7.0%	35.5%	56.1%	1002	3.46	0.688	0.022
Surfaces	1.0%	9.0%	41.1%	48.9%	1004	3.38	0.689	0.022
Signage	2.1%	11.4%	39.8%	46.8%	1001	3.31	0.754	0.024
Rest Stop Maint.	3.3%	16.0%	37.6%	43.1%	877	3.21	0.826	0.028
Roadsides	5.6%	21.6%	39.6%	33.1%	994	3.00	0.879	0.028

Table Four shows that winter maintenance is the most important maintenance activity to respondents with a mean of 3.69 followed by striping (3.60), winter roadway information (3.52), debris removal (3.46), surfaces (3.38), signage (3.31), rest stop maintenance (3.21) and roadside maintenance (3.00). The standard deviation and standard error of the mean are presented for the importance ratings of each activity. The largest standard error is 0.028 with a resulting 95% confidence interval of ± 0.054 meaning that any difference between means greater than .11 can be considered a real difference. With this figure in mind, winter maintenance is clearly the most important to respondents followed by striping, and winter roadway information, and then debris removal, surface smoothness, signage, and rest stop maintenance. Roadside maintenance is clearly the least important of the eight maintenance activities.

Statistically Significant Relationships Between Importance of Maintenance Activities and Administrative District

- Respondents in the Glendive district rated the signage less important than did the respondents living in the other four districts..

Statistically Significant Relationships Between Importance of Winter Maintenance and Demographic/Travel Variables

- Winter maintenance was more important to females than to males
- Winter maintenance was more important to respondents who had driven more than 15,000 miles in the last year than it was to those who had not driven that far.

- Winter maintenance was more important to respondents who had been in Montana for more than 20 years than it was to respondents who had been in Montana for 20 or less years.
- Winter maintenance was more important to professional drivers and respondents who said their typical trip was work related than it was to respondents who said their typical trip was commuting, personal, or agriculturally related.

Statistically Significant Relationships Between Importance of Highway Striping and Demographic/Travel Variables

- Striping was more important to females than to males.
- Striping was more important to respondents between 66 and 75 than it was to older or younger respondents. Striping was less important to respondents between 18 and 25 than it was to older respondents.

Statistically Significant Relationships Between Importance of Winter Roadway Information and Demographic/Travel Variables

- Winter roadway information was more important to females than to males.

Statistically Significant Relationships Between Importance of Debris Removal and Demographic/Travel Variables

- Debris removal was more important to females than it was to males
- Debris removal was more important to respondents who had been in Montana for over 20 years than it was to respondents who had been in Montana for 20 or less years.

Statistically Significant Relationships Between Importance of Surface Smoothness and Demographic/Travel Variables

- Surface smoothness was more important to females than to males.
- Surface smoothness was more important to respondents between 66 and 75 than it was to younger or older respondents. Surface smoothness was less important to respondents between 18 and 25 than it was to older respondents.
- Smooth highway surfaces were more important to respondents who said their most frequent trip was work related, or personal, or to respondents who were professional drivers than it was to respondents who said their most frequent trip was commuting or agriculturally related.

Statistically Significant Relationships Between Importance of Highway Signage and Demographic/Travel Variables

- Highway signage was more important to female respondents than it was to male respondents.
- Highway signage was more important to respondents who had not driven in other states than it was to those who had driven in other states.

- Highway signage was more important to respondents over 66 than it was to younger respondents. Highway signage was less important to respondents between 18 and 25 than it was to older respondents.
- Highway signage was more important to respondents who had been in Montana for over 20 years than it was to respondents who had been in Montana for 20 or less years.
- Highway signage was more important to professional drivers than it was to respondents who said their typical trip was community, work related, personal, or agriculturally related. Signage was less important to respondents who said their typical trip was agriculturally related than it was to respondents saying their typical trip was not agriculturally related.

Statistically Significant Relationships Between Importance of Rest Stop Maintenance and Demographic/Travel Variables

- Rest stop maintenance was more important to females than to males

Statistically Significant Relationships Between Importance of Roadside Maintenance and Demographic/Travel Variables

- Roadside maintenance was more important to female respondents than to male respondents
- Roadside maintenance was more important to respondents who had not driven in other states than it was to those who had.
- Generally, the older the respondent, the more important was roadside maintenance.
- The higher a respondent's educational level, the less important roadside maintenance was to them.
- Roadside maintenance was more important to respondents who had been in Montana for over 30 years than it was for respondents who had been in Montana for less than time.

Comparison of 2000 and 2002 Importance Rating for Eight Maintenance Activities

**FIGURE 8
COMPARISON OF 2000 AND 2002 PERCEPTIONS OF
IMPORTANCE OF MAINTENANCE ACTIVITIES**

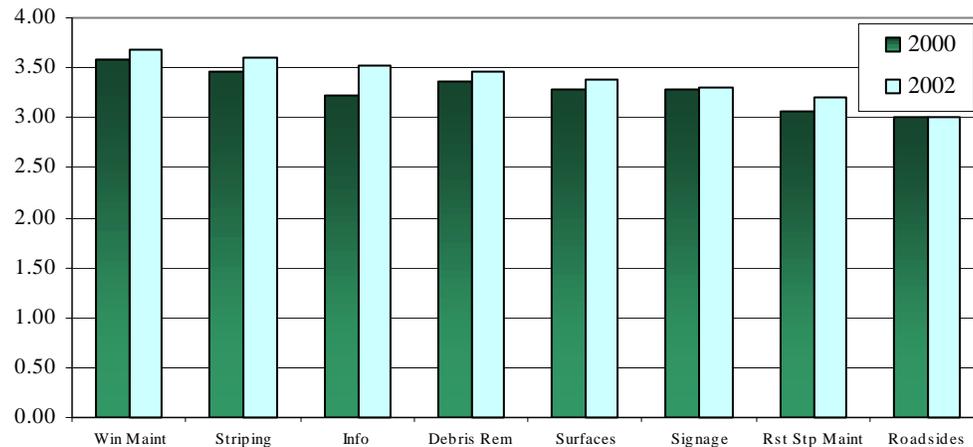


Figure Eight provides a comparison of the 2000 and 2002 importance ratings for the eight maintenance activities. The 2000 to 2002 increases in importance ratings of winter maintenance (3.58 in 2000 to 3.69 in 2002), highway striping (3.47 to 3.60), winter roadway information (3.22 to 3.52), debris removal (3.37 to 3.46), surface smoothness (3.29 to 3.38), and rest stop maintenance (3.07 to 3.21) were statistically significant. Importance ratings for signage and roadside maintenance did not change significantly from 2000 to 2002.

**Respondents' Perception of the Resource Priority
Which Should Be Attached to Each Maintenance Activity**

The respondents were asked to think about the allocation of Department of Transportation resources and assign a resource priority of low, medium, moderately high, or very high to each of the maintenance activities. Table Five summarizes the results of the respondents' assignment of resource priorities. The ordering of activities in Table Five is provided by the mean resource priority score for each item on a scale where 1 = low, 2 = medium, 3 = moderately high and 4 = high. As Table Five shows, respondents awarded the highest resource priority to winter maintenance (3.65). Information about winter road conditions (3.44) and highway striping (3.42) were next in terms of resource priorities. Debris removal (3.26) had the next highest priority rating. Smoothness of roadway surface (3.11), signage (3.08) and rest stop maintenance (3.04) were next in terms of priorities for resource allocation. Clearly in last place in terms of the allocation of resources was roadside maintenance (2.70). The standard deviation and standard error of the mean are presented for each activity's resource priority mean. The largest standard error is 0.028 producing a 95% confidence interval of ± 0.055 . Therefore a difference between means greater than 0.11 is a real difference. With this figure in mind, the

highest resource priority goes to winter maintenance followed by a tie between winter roadway information and striping, then debris removal, then a tie between surface smoothness, signage and rest stop maintenance, and finally roadsides.

**TABLE FIVE
RESOURCE PRIORITIES**

<u>Activity</u>	<u>Low</u>	<u>Medium</u>	Moderately	Very	<u>N</u>	<u>Mean</u>	<u>SD</u>	<u>SE</u>
			<u>High</u>	<u>High</u>				
Winter Maint.	0.3%	3.9%	26.6%	69.2%	997	3.65	0.570	0.018
Information	2.2%	9.4%	30.9%	57.6%	969	3.44	0.751	0.024
Striping	1.3%	8.4%	36.9%	53.4%	994	3.42	0.700	0.022
Debris Removal	2.3%	14.0%	39.2%	44.4%	999	3.26	0.781	0.025
Surface	1.8%	16.2%	51.2%	30.9%	995	3.11	0.729	0.023
Signage	4.5%	19.2%	40.1%	36.1%	994	3.08	0.858	0.027
Rest Stop Maint.	3.8%	22.4%	39.9%	33.8%	937	3.04	0.846	0.028
Roadsides	8.5%	29.9%	44.7%	16.9%	997	2.70	0.848	0.027

Statistically Significant Relationships Between Resource Priorities Assigned to Maintenance Activities and Administrative District

- Respondents living in the Glendive and Billings District assigned a lower priority to striping than did respondents living in the Missoula, Butte or Great Falls districts.

Statistically Significant Relationships Between Resource Priority Assigned to Winter Maintenance and Demographic/Travel Variables

- Females assigned a higher priority to winter maintenance than did males.
- Respondents who had driven in other states assigned a higher priority to winter maintenance than did respondents who had not driven in other states.

Statistically Significant Relationships Between Resource Priority Assigned to Winter Roadway Information and Demographic/Travel Variables

- Females assigned a higher resource priority to winter roadway information than did males.
- Respondents whose highest educational level was a high school graduate gave a higher priority to winter roadway information than did respondents with a higher or lower level of education. Respondents with an educational level of some high school provided a lower priority to winter roadway information than did respondents with a higher or lower level of education.
- Winter roadway information was given a higher priority by respondents indicating that their most frequent trips were commuting, work related or personal than it was by respondents saying they were professional drivers or that their most frequent trip was agriculturally related.

Statistically Significant Relationships Between Resource Priority Assigned to Roadway Striping and Demographic/Travel Variables

- Respondents over 66 assigned a higher priority to striping than did younger respondents and respondents 35 or younger assigned a lower priority to striping than did older respondents.

Statistically Significant Relationships Between Resource Priority Assigned to Debris Removal and Demographic/Travel Variables

- Debris removal was given a higher priority by female respondents than by male respondents.
- Respondents who had not driven in other states gave debris removal a higher priority than did respondents who had driven in other states.
- Respondents who had driven less than 15,000 miles in the last 12 months assigned a higher priority to debris removal than did respondents who had driven more than 15,000 miles.

Statistically Significant Relationships Between Resource Priority Assigned to Surface Smoothness and Demographic/Travel Variables

- No statistically significant relationships were found between the resource priority assigned to surface smoothness and any demographic or travel variable.

Statistically Significant Relationships Between Resource Priority Assigned to Signage and Demographic/Travel Variables

- Signage was assigned a higher priority by female respondents than by male respondents.
- Respondents who were high school graduates or had some college awarded signage a higher priority than did respondents with more or less education.
- Respondents who were professional drivers gave signage a higher priority than did respondents who said their most frequent trips were commuting, work related, personal or agriculturally related. Respondents who said their typical trip was agriculturally related assigned signage a lower priority than did respondents saying their typical trip was not agriculturally related.

Statistically Significant Relationships Between Resource Priority Assigned to Rest Stop Maintenance and Demographic/Travel Variables

- Females assigned a higher priority to rest stop maintenance than did males.
- Generally the lower the level of education of the respondent, the higher a priority rating they assigned to rest stop maintenance..
- Rest stop maintenance was assigned a higher priority by respondents who said their most frequent trip was personal than it was by respondents who said their most frequent trip was commuting, work related, agriculturally related or that they were professional drivers.

Statistically Significant Relationships Between Resource Priority Assigned Roadside Maintenance and Demographic/Travel Variables

- Roadside maintenance was given a higher priority by female respondents than by male respondents.
- Respondents who had not driven in other states in the last 12 months gave roadside maintenance a higher priority than those who had driven in other states.
- Respondents 66 and older assigned a higher priority to roadside maintenance than did younger respondents and respondents between 18 and 25 assigned a lower priority to roadside maintenance than did older respondents.
- Respondents who had been in Montana for 5 years or less assigned a lower priority to roadside maintenance than did respondents who had been in Montana longer.

Comparison of 2000 and 2002 Priorities Assigned to the Eight Maintenance Activities

**FIGURE 9
COMPARISON OF 2000 AND 2002 RESOURCE PRIORITIES**

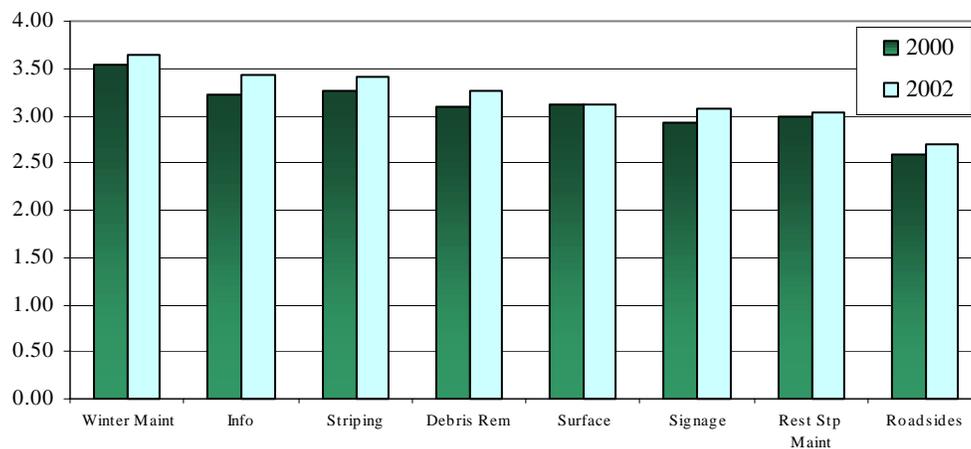


Figure Nine provides a comparison of the 2000 and 2002 assignment of priorities to the eight maintenance activities. The increases from 2000 to 2002 in the priorities assigned to winter maintenance (3.54 in 2000 to 3.65 in 2002), winter roadway information (3.22 to 3.44), striping (3.27 to 3.42), debris removal (3.10 to 3.26), signage (2.92 to 3.08), and roadside maintenance (2.59 to 2.70) were statistically significant. The 2000 to 2002 change for priorities assigned to road surfaces and rest stop maintenance were not statistically significant

Composite Variables for Each Maintenance Activity

To better understand the perceptions of the respondents toward each maintenance activity, a composite variable was constructed for each maintenance activity by combining the answers to the rating, importance, and resource priority questions. The first step in constructing these variables, was to reverse the values assigned to the responses to the rating of each maintenance activity. After reversal, an excellent rating = 1, a good rating = 2, a fair rating = 3, and a poor rating = 4. Then, the composite variable for each maintenance activity was created by adding this reversed value for rating, the score on the importance question (1 = not important, 2 = somewhat important, 3 = important and 4 = very important) and the score on the resource priority question (1 = low, 2 = medium, 3 = moderately high, and 4 = high).

If a respondent had answered all three of the questions about a maintenance activity, the scores on the composite variable for that activity would range from 3 to 12. If the value of the composite variable were a 3, it would indicate an excellent rating of the activity, an answer of not important on the importance question and of low priority on the resource priority question. A score of 12 would indicate a poor rating, very important and a high resource priority. A score of less than 3 is possible if the respondent did not answer each question about a particular maintenance activity.

The higher the score on this composite variable, the lower the rating, the more important the activity is considered, and the higher the resource priority assigned to the activity. Thus, the higher the score on the composite variable, the more attention respondents believe should be paid to the maintenance activity.

Table Six summarizes the values of the composite variable created for each maintenance activity. Each of the eight composite variables of Winter Maintenance, Surface Smoothness, Striping, Debris Removal, Winter Road Information, Signage, Rest Stop Maintenance and Roadside Maintenance occupies a column in Table Six. The ordering of columns in Table Six is based upon the mean score for each composite variable and ranges from Winter Maintenance with a mean score of 9.43 to Roadside Maintenance with a mean score of 7.83. The standard deviation and standard error of the mean are presented for each composite variable. The largest standard error is 0.072 producing a 95% confidence interval of ± 0.1411 . Therefore, a difference between means of greater than .282 represents a real difference. Winter Maintenance has by far the highest composite score followed by striping, then debris removal, surface smoothness, winter roadway information, and signage. Rest stop maintenance and roadside maintenance have essentially the composite variable score and these scores are clearly the lowest.

TABLE SIX
VALUES OF COMPOSITE VARIABLES

<u>Value</u>	<u>Winter</u> <u>Maint</u>	<u>Striping</u>	<u>Debris</u> <u>Removal</u>	<u>Surface</u> <u>Smooth</u>	<u>Wtr Rd</u> <u>Informat</u>	<u>Signage</u>	<u>Reststop</u> <u>Maint</u>	<u>Rd Side</u> <u>Maint</u>
1	0.0%	0.0%	0.0%	0.0%	0.6%	0.0%	0.9%	0.2%
2	0.0%	0.0%	0.0%	0.0%	1.2%	0.0%	1.6%	0.4%
3	0.2%	0.1%	0.2%	0.0%	3.4%	0.3%	4.5%	1.0%
4	1.1%	0.1%	0.1%	0.2%	3.7%	1.3%	2.9%	1.2%
5	0.6%	1.1%	1.6%	1.0%	2.2%	2.3%	2.9%	5.4%
6	1.5%	2.8%	3.4%	3.6%	3.4%	8.3%	7.2%	11.3%
7	4.3%	6.8%	8.8%	9.5%	7.9%	15.8%	16.7%	21.0%
8	12.0%	19.0%	21.9%	22.6%	16.4%	23.2%	20.8%	24.8%
9	27.9%	29.8%	28.8%	29.8%	30.4%	26.6%	20.5%	19.5%
10	31.8%	27.4%	21.6%	22.2%	22.7%	16.7%	14.1%	10.5%
11	15.9%	9.2%	10.6%	8.2%	5.9%	3.2%	5.2%	2.5%
12	4.7%	3.8%	3.1%	3.0%	2.2%	0.3%	2.6%	2.2%
N	1002	1004	1004	1004	976	1004	951	1003
Mean	9.43	9.11	8.94	8.90	8.38	8.25	7.84	7.83
SD	1.434	1.385	1.463	1.395	2.131	1.479	2.233	1.729
SE	0.045	0.044	0.046	0.044	0.068	0.048	0.072	0.055

In order to better explain the meaning of these composite variables as well as the respondents' perceptions of the eight maintenance activities, Table Seven shows the mean score of the composite variable for each activity as well as the relative position of each activity in the respondents' rating of how well each activity is currently being accomplished, the respondents' feeling on the importance each activity, and the resource priority assigned by the respondents to each maintenance activity.

The mean composite score for Winter Maintenance is the highest of all the composite variables because it is rated the most important maintenance activity by the respondents, is assigned the highest resource priority by the respondents, and is rated sixth by the respondents.

Striping ranks second in terms of mean composite variable score because it is second in importance and third in priority.

Debris removal rates third in terms of mean composite variable because it is fourth in importance and priority but seventh in rating.

Surface Smoothness is rated the next highest on the composite variable not so much because of its importance and resource priority, which fall in the middle of the rating for all maintenance activities, but because of the rating of the current condition of surface smoothness. Respondents rated Surface Smoothness last as compared with other maintenance activities.

Winter Roadway Information is rated fifth in terms of composite variable means, not because it is not given a high importance and resource priority value by the respondents, but because respondents currently rate it as being done well.

TABLE SEVEN
COMPOSITE VARIABLE MEAN BY RANK OF
RATING, IMPORTANCE, AND PRIORITY

	Composite <u>Mean</u>	Rating <u>Rank</u>	Importance <u>Rank</u>	Priority <u>Rank</u>
Winter Maint	9.43	6	1	1
Striping	9.11	3	2	3
Debris Removal	8.94	7	4	4
Smoothness	8.90	8	5	5
Winter Road Info	8.38	2	3	2
Signage	8.25	1	6	6
Rest Stop Maint.	7.84	5	7	7
Roadside Maint.	7.83	4	8	8

The Signage composite variable is sixth because it is ranked toward the bottom of the eight maintenance activities in terms of importance and priority and because the current condition of highways signs is rated higher than any other maintenance activity.

Rest Stop Maintenance is rated seventh in terms of composite variable means not because of the relatively low rating of its current condition but rather because it is rated next to last in importance, and third from the last in priority.

Roadside Maintenance is rated last because it is ranked dead last in terms of importance and resource priority.

Statistically Significant Relationships Between Composite Variables
and Administrative District

- The scores on the composite variable Striping were lower for respondents living in the Glendive Districts than they were for respondents living in other districts, while the scores on Striping were higher for respondents living in the Missoula District than for respondents in other districts.

Statistically Significant Relationships Between Scores on Winter Maintenance Composite
Variable and Demographic/Travel Variables

- Females had higher scores on the Winter Maintenance composite variable than did males.
- Respondents who reported driving more than 15,000 miles in the last 12 months scored higher on the Winter Maintenance composite variable than did respondents who drove less than 15,000 miles.
- Respondents over 65 scored lower on the Winter Maintenance composite variable than did younger respondents.
- Respondents with an 8th grade or less education scored lower on the winter composite variable than did respondents with a higher level of education,
- Respondents who had been in Montana for five or less years scored lower on the Winter Maintenance composite variable than did respondents who had been in Montana longer, and respondents who had been in Montana for between 6 and 20

years scored higher on the Winter Maintenance Composite variable than did respondents who had been in the state longer than 20 years.

- Respondents who said they were professional drivers and those who said their typical trip was work related scored higher on the Winter Maintenance composite variable than did respondents who indicated a different purpose for their typical trip.

Statistically Significant Relationships Between Scores on Striping Composite Variable and Demographic/Travel Variables

- No statistically significant relationships were found between respondents score on the Striping variable and any demographic or travel variable.

Statistically Significant Relationships Between Scores on Debris Removal Composite Variable and Demographic/Travel Variables

- Female respondents scored higher than male respondents on the Debris Removal composite variable.
- Respondents with a 8th grade education or less and respondents with a college degree scored lower on the Debris Removal composite variable than did respondents with other levels of education.
- Respondents who said their typical trip was commuting, work related, or personal and family related scored higher on the Debris Removal composite variable than did professional drivers or respondents who said their typical trip was agriculturally related.

Statistically Significant Relationships Between Scores on Surface Smoothness Composite Variable and Demographic/Travel Variables

- Females had higher scores on the Surface composite variables than did males.
- Respondents who had driven in other states in the last 12 months scored higher on the surface smoothness composite variable than did those who had not driven in other states.

Statistically Significant Relationships Between Scores on Winter Roadway Information Composite Variable and Demographic/Travel Variables

- Females scored higher on the Winter Roadway Information composite variable than did males.
- Respondents with educational attainments less than a high school diploma scored lower on the Winter Roadway Information composite variables than did respondents with a higher level of education. Respondents with post graduate education scored higher on the Winter Roadway Information Composite variable than did respondents with less education.
- Respondents who had been in Montana for 5 years or less scored lower on the Winter Roadway information than did respondents who had been in the state longer. Respondents who had been in Montana for between 11 and 30 years scored higher on

the Winter Roadway Information composite variable than did respondents who had been in Montana a longer or shorter time.

- Professional drivers and respondents whose most frequent trip was work related scored higher on the Winter Roadway information composite variable than did respondents whose most frequent trips were commuting, personal or agriculturally related, or respondents who said they were professional drivers.

Statistically Significant Relationships Between Scores on Signage Composite Variable and Demographic/Travel Variables

- Female respondents scored higher on the Signage composite variable than did males.
- Respondents with a high school diploma and those with some college scored higher on the Signage composite variable than did respondents with other levels of education attainment.
- Respondents who were professional drivers scored the highest on the Signage composite variable while those whose most frequent trip was agriculturally related scored the lowest.

Statistically Significant Relationships Between Scores on Rest Stop Maintenance Composite Variable and Demographic/Travel Variables

- Females scored higher on the Rest Stop Maintenance composite variable than did males.
- Respondents who had driven in other states in the last 12 months scored higher on the Rest Stop Maintenance composite variable than did respondents who had not driven in other states.

Statistically Significant Relationships Between Scores on Roadside Maintenance Composite Variable and Demographic/Travel Variables

- Respondents who had not driven in other states in the last 12 months scored higher on the Roadside Maintenance composite variable than did respondents who had driven in other states.
- Respondents over 55 scored higher on the Roadside Maintenance composite variable than did younger respondents and respondents from 18 to 25 scored much lower on the Roadside Maintenance composite variable than did older respondents.
- Respondents with some high school or a high school diploma scored higher on the Roadside Maintenance composite variable than did respondents with a different level of education. Respondents with a college degree or post graduate education scored lower on the Roadside Maintenance composite variable than did respondents with a lower level of education.
- Respondents who had been in Montana for 5 or less years scored lower on the Roadside Information composite variable than did respondents who had been in the state longer.

Comparison of the 2000 and 2002 Composite Variable Means
for the Eight Maintenance Activities

**FIGURE 10
COMPARISON OF 2000 AND 2002 COMPOSITE
VARIABLE MEANS**

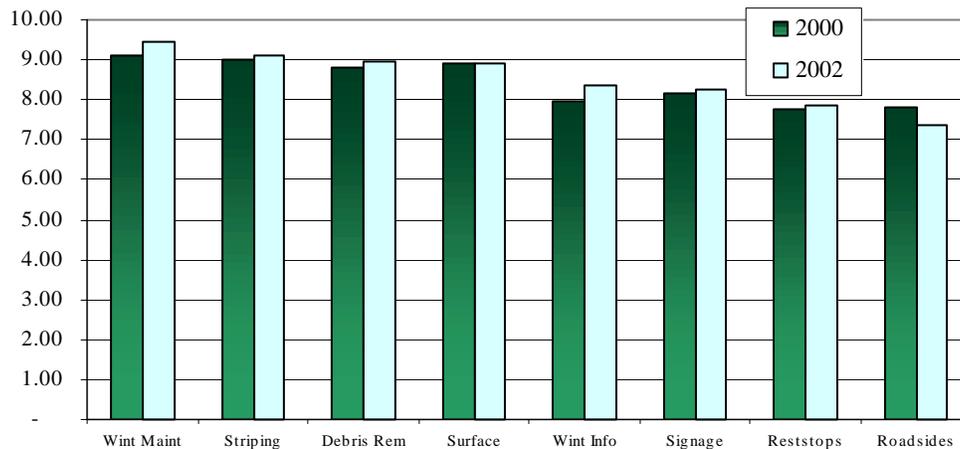


Figure Ten provides a comparison of the 2000 and 2002 composite variable means for the eight maintenance activities. The 2000 to 2002 change in three of the eight composite variables was statistically significant. The increase in the mean value of the Winter Maintenance composite variable from 9.10 in 2000 to 9.43 in 2002 was statistically significant as was the increase in mean value of the Debris Removal composite variable from 8.79 in 2000 to 8.94 in 2002, and the increase of the mean value of the Winter Roadway Information composite variable from 7.96 in 2000 to 8.38 in 2002. The 2000 to 2002 changes in the mean values of the composite variables for Striping, Surface Smoothness, Signage, Rest Stop Maintenance and Roadside Maintenance were not statistically significant.

**Respondent's Perception of the Importance of Seven Additional Activities
Performed by State Highway Maintenance Personnel**

For the first time in the 2002 survey, the respondents were asked to rate the importance of seven additional activities performed by state highway maintenance personnel: roadside delineators, crash barriers, traffic signals, sweeping, street lighting, noxious weed control and sidewalks. Table Eight summarizes the rating of these 7 additional maintenance activities. The ordering of activities in Table Eight is provided by the mean score of each activity on a 1 to 4 scale where 1 = not important, 2 = somewhat important, 3 = important and 4 = very important.

Table Eight shows the largest standard error is 0.033 with a resulting 95% confidence interval of ± 0.065 meaning that any difference between means greater than .13 can be considered a real difference. With this figure in mind, Table Eight shows the most important of these additional maintenance activities were roadside delineators with a mean of 3.62 and crash barriers with a mean of 3.56. Traffic signals came next with a

mean of 3.39. Then sweeping and street lighting were next with means of 3.20 and 3.16. Noxious weed control and sidewalks were the least important of these additional maintenance activities with means of 2.90 and 2.48 respectively.

TABLE EIGHT
IMPORTANCE OF SEVEN ADDITIONAL MAINTENANCE ACTIVITIES

<u>Activity</u>	<u>Not</u> <u>Important</u>	<u>Smwhat</u> <u>Import.</u>	<u>Import.</u>	<u>Very</u> <u>Import.</u>	<u>N</u>	<u>Mean</u>	<u>SD</u>	<u>SE</u>
Delineators	0.9%	7.9%	19.6%	71.6%	1000	3.62	0.670	0.021
Crash Barriers	1.2%	8.7%	22.9%	67.2%	989	3.56	0.702	0.022
Traffic Signals	1.8%	12.9%	29.3%	56.0%	997	3.39	0.779	0.025
Sweeping	3.7%	18.1%	33.1%	45.0%	999	3.20	0.862	0.027
Street Lighting	5.7%	18.8%	28.8%	46.7%	992	3.16	0.926	0.029
Nox Weed Ctrl	7.2%	18.7%	30.8%	33.3%	988	2.90	0.948	0.030
Sidwalks	19.6%	33.4%	26.2%	20.8%	976	2.48	1.029	0.033

Table Nine shows the respondent's perception of the importance of these additional maintenance activities combined with their perception of the importance of the eight maintenance activities discussed previously and found in Table Four. Table Nine shows that delineators ranks second to winter maintenance in a combined importance ranking and crash barriers would rank fourth behind striping. Noxious weed control and sidewalks are rated as less important than any of the original eight maintenance activities.

TABLE NINE
IMPORTANCE OF COMBINED ORIGINAL AND ADDITIONAL
MAINTENANCE ACTIVITIES

<u>Activity</u>	<u>Not</u> <u>Important</u>	<u>Smwhat</u> <u>Import.</u>	<u>Import.</u>	<u>Very</u> <u>Import.</u>	<u>N</u>	<u>Mean</u>	<u>SD</u>	<u>SE</u>
Winter Maint.	0.7%	4.8%	19.2%	75.3%	989	3.69	0.593	0.019
Delineators	0.9%	7.9%	19.6%	71.6%	1000	3.62	0.670	0.021
Striping	0.3%	4.4%	29.9%	65.4%	1002	3.60	0.588	0.019
Crash Barriers	1.2%	8.7%	22.9%	67.2%	989	3.56	0.702	0.022
Information	2.4%	7.1%	26.8%	63.6%	902	3.52	0.734	0.024
Debris Removal	1.4%	7.0%	35.5%	56.1%	1002	3.46	0.688	0.022
Traffic Signals	1.8%	12.9%	29.3%	56.0%	997	3.39	0.779	0.025
Surfaces	1.0%	9.0%	41.1%	48.9%	1004	3.38	0.689	0.022
Signage	2.1%	11.4%	39.8%	46.8%	1001	3.31	0.754	0.024
Rest Stop Maint.	3.3%	16.0%	37.6%	43.1%	877	3.21	0.826	0.028
Sweeping	3.7%	18.1%	33.1%	45.0%	999	3.20	0.862	0.027
Street Lighting	5.7%	18.8%	28.8%	46.7%	992	3.16	0.926	0.029
Roadsides	5.6%	21.6%	39.6%	33.1%	994	3.00	0.879	0.028
Nox Weed Ctrl	7.2%	18.7%	30.8%	33.3%	988	2.90	0.948	0.030
Sidwalks	19.6%	33.4%	26.2%	20.8%	976	2.48	1.029	0.033

Statistically Significant Relationships Between Importance of Additional Maintenance Activities and Administrative District

- Respondents in the Glendive district rated roadside delineators less important than did the respondents living in the other four districts..

Statistically Significant Relationships Between Importance of Roadside Delineators and Demographic/Travel Variables

- Roadside delineators were more important to females than to males.
- Roadside delineators were more important to respondents who had not driven in other states in the last 12 months than they were to respondents who had.
- Roadside delineators were less important to respondents 35 or younger than they were to respondents over 35.

Statistically Significant Relationships Between Importance of Crash Barriers and Demographic/Travel Variables

- Crash barriers were more important to females than to males.
- Crash barriers were more important to respondents who drove less than 15,000 miles per year than to respondents who drove more than 15,000 miles per year.
- Crash barriers were less important to respondents with college degrees than they were to respondents with more or less education.

Statistically Significant Relationships Between Importance of Traffic Signals and Demographic/Travel Variables

- Traffic signals were more important to females than to males.
- Traffic signals were more important to respondents 46 and older than it was to respondents 45 and younger.
- Traffic signals were more important to respondents who had not graduated from high school than they were to respondents with more education.

Statistically Significant Relationships Between Importance of Sweeping and Demographic/Travel Variables

- The lower the respondents level of education, the more important was sweeping.
- Sweeping was more important to respondents who said their typical trip was work related or personal/family than it was to respondents who said their typical trip was commuting, agricultural or who were professional drivers.

Statistically Significant Relationships Between Importance of Street Lighting and Demographic/Travel Variables

- Street lighting was more important to females than to males.
- Street lighting was more important to respondents who drove less than 15,000 miles per year than it was to respondents who had driven more than 15,000 per year.

Statistically Significant Relationships Between Importance of Noxious Weed Control and Demographic/Travel Variables

- Noxious weed control was more important to respondents between 36 and 75 than it was to respondents 35 and younger or respondents over 75.
- Noxious weed control was more important to respondents who had been in Montana for over 30 years than it was to respondents who had been in Montana for 30 or less years.
- Noxious weed control was much more important to respondents who said their typical trip was agriculturally related than it was to respondents with any other typical trip or professional drivers.

Statistically Significant Relationships Between Importance of Sidewalks and Demographic/Travel Variables

- Sidewalks were more important to females than to males
- Sidewalks were more important to respondents who had not driven in other states in the last 12 months than it was to respondents who had driven in other states.
- Sidewalks were more important to respondents who drove less than 15,000 miles per year than they were to respondents who drove more than 15,000 per year.
- Sidewalks were less important to respondents between 36 and 55 than they were to respondents 35 and younger or respondents 56 and older.
- Sidewalks were more important to respondents who said their typical trip was personal or family related than it they were to respondents with other types of typical trips or professional drivers.

Respondents Perception of How The Montana Department of Transportation Could Do Better in the Area of Highway Maintenance

The respondents were asked in the form of an open-ended question, what the Department of Transportation could do better in terms of maintenance. The responses were categorized and Table Ten presents a general summary of the categorized answers.

Table Ten shows the most common answer to the question of what the department could do better was winter maintenance followed by rest area maintenance, then surface smoothness, that the department is doing a good job now, construction, more lanes or wider roads, and debris removal.

When these answers are compared to the responses in 2000, the number of comments about rest area maintenance and surface smoothness has decreased in 2002.

TABLE TEN
WHAT COULD THE TRANSPORTATION DEPARTMENT DO BETTER IN
TERMS OF MAINTENANCE

Winter Maintenance	136	18.5%
Rest Area Maintenance	99	13.5%
Make Surfaces Smoother	77	10.5%
Doing a Good Job	55	7.5%
Construction	49	6.7%
More lanes/Wider Roads	47	6.4%
Debris Removal/Roadsides	45	6.1%
Striping	36	4.9%
Personnel Management	35	4.8%
Road Kill Removal	27	3.7%
Safety	21	2.9%
Signage	19	2.6%
Funding	19	2.6%
Information	17	2.3%
Trim Weeds	16	2.2%
Barriers/Reflectors/Guard Rails	14	1.9%
Speed Limits/Enforcement	4	0.5%
Other	18	2.4%
TOTAL	734	100.0%

**In What Maintenance Activities Does the Department of
Transportation Currently Do a Good Job**

The respondents were also asked in an open-ended question what maintenance activities done by the MDT met or exceeded the respondent's expectations. These answers were also categorized and Table Eleven summarizes the answers to this question.

Table Eleven shows that the most common answer to the question of what maintenance activities meet or exceed the respondents expectations is that generally a good job is being done followed by winter maintenance and then general maintenance.

When these answers are compared to the 2000 answers, the number of comments that the department is doing a good job increased dramatically and the number of comments about winter maintenance also increased.

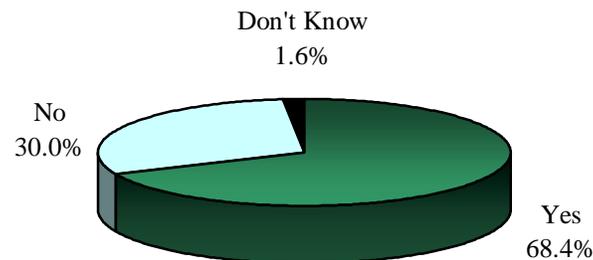
TABLE ELEVEN
MAINTENANCE ACTIVITIES THAT MEET OR EXCEED
RESPONDENTS' EXPECTATIONS

Doing a good job	216	34.4%
Winter Maintenance	153	24.4%
General Maintenance	70	11.2%
Surface Smoothness	38	6.1%
Debris/Road kill Removal	27	4.3%
Improving Roads	20	3.2%
Signage	17	2.7%
Roadside Maintenance	14	2.2%
Roadway Information	11	1.7%
Striping	11	1.7%
Weed Control	10	1.6%
Construction	9	1.4%
Rest Area Maintenance	8	1.3%
General Safety	6	1.0%
Prompt Repair	4	0.6%
Lighting	4	0.6%
Employees	4	0.6%
Barriers	2	0.3%
Are Improving	2	0.3%
Website	1	0.2%
TOTAL	627	100.0%

Willingness to Participate in a Follow Up Study

Finally, the respondents were asked if they would be willing to participate in a follow up study. Figure Eleven shows that 68.4% of the respondents indicated they would be willing to participate in a follow up study while 30.0% said they would not be and 1.6% said they did not know whether or not they would be interested in participating in a follow up study.

FIGURE 11
Willingness to Participate in Follow-up Study



The respondents who agreed to participate in a follow up study were then asked for their name, address and telephone number.

SUMMARY

Trained interviewers at the Computer Assisted Telephone Interviewing Laboratory at Montana State University, Billings completed 1,004 interviews with randomly selected adult residents of Montana between October 17th and November 3rd, 2002. The purposes of this telephone survey were to obtain the perceptions the respondents held about the maintenance of interstate and state highways in Montana, and to determine what if any changes have occurred in these perceptions since a similar telephone survey was conducted in the Fall of 2000.

The Respondents

About half the respondents were male and half were female. The mean age of the respondents was 50.6 with 20.7% of the respondents thirty five years old or less, 37.4% were 56 or over, and the remainder of 42.0% between 36 and 55. The mean educational attainment of the respondents was 13.8 years of education, 4.9% had not completed high school, 35.5% had completed just high school, 28.6% had completed some college, and 30.9% had at least a college degree.

The mean length of time respondents had been in Montana was 34.1 years and 51.7% of the respondents reported they had lived in Montana over 30 years, while 10.3% indicated they had been in Montana for 5 or less years.

About 30.5% of the respondents lived in the Missoula District, 17.2% lived in the Butte District, 21.2% in the Great Falls District, 7.9% in the Glendive District, and 23.4% in the Billings District. About 52.8% of the respondents indicated they drive more than 15,000 miles per year, while 47.2% drove less than 15,000 miles. The most common

trips made by respondents were personal or family errands (53.9%), followed by commuting (20.3%) and then work related trips (15.9%). Seventy-two percent of the respondents indicated they had driven in other states within the last 12 months.

General Perception of Highway Maintenance

When asked to rate overall highway maintenance, 4.2% of the respondents rated overall maintenance as poor while 28.6% said fair, 60.2% said good and 7% said excellent. Respondents driving less than 15,000 miles per year rated general maintenance higher than did respondents driving over 15,000 miles per year, and respondents who had driven in other states in the last 12 months rated general maintenance lower than did respondents who had not driven in other states. The older the respondent and the higher the respondent's level of education, the higher they rated general highway maintenance. There was a slight increase in the mean rating, on a 1 to 4 scale labeled as poor, fair, good and excellent, of overall highway maintenance from 2.68 in 2000 to 2.70 in 2002. This increase was not statistically significant

When asked to rate the importance of highway maintenance to them, 56.7% of the respondents said very important, 34.0% said important, 8.7% said somewhat important, and 0.6% not important. General highway maintenance was more important to female than to male respondents, to respondents who drove more as compared to less than 15,000 miles per year, and respondents who reported they were professional drivers and said their typical trip was work related as compared to those who said their typical trip was commuting, family or personal, or agricultural.

On a 1 to 4 scale labeled as not important, somewhat important, important and very important, the mean importance rating for general highway maintenance increased significantly from 3.31 in 2000 to 3.47 in 2002.

Comparison of Highway Maintenance in Montana with Other States

Forty-eight percent of the respondents who had driven in other states within the last 12 months said the highways and interstates of Montana were about the same as the highways and interstates in the other states in which they had driven, while 26.3% felt the roads in Montana were worse and 25.7% felt the roads in Montana were better. Respondents in the Missoula and Billings districts were more likely than respondents in other districts to believe general highway maintenance was worse in Montana than in other states while respondents in the Butte district were more likely to think Montana highway maintenance was better than in other states. The 2002 respondents who had driven in other states were more likely than the 2000 respondents who had driven in other states to believe that general highway maintenance in Montana was better than highway maintenance in other states. The 2002 respondents were also less likely than the 2000 respondents to believe that highway maintenance in Montana was worse than in other states.

About 44% of the respondents who had driven in other states and who had an opinion believed winter maintenance was about the same in Montana as in other states, while 37.1% believed winter maintenance was better in Montana and 18.5% believed winter

maintenance was worse in Montana. Residents of the Missoula and Billings districts were more likely than respondents living in other districts to believe that winter maintenance was worse in Montana than in other states. The percentage of respondents saying Montana winter maintenance was better than winter maintenance in other states increased significantly from 2000 to 2002 while the percentage of respondents thinking winter maintenance in Montana and other states was about the same decreased significantly.

About 52% of the respondents who had driven in other states in the last 12 months and who had an opinion, felt rest area maintenance was about the same in Montana as in other states, while 30.3% said rest stop area maintenance was worse in Montana and 17.4% said it was better in Montana. Respondents who had lived in Montana from 6 to 20 years and over 30 years were more likely than those who lived in Montana less than 6 years or between 21 and 30 years to think rest stop maintenance was worse in Montana than in other states. The percentage of respondents believing rest area maintenance was worse in Montana than in other states decreased significantly from 2000 to 2002.

Respondent Perception of the Eight Maintenance Activities

For the purposes of this survey, highway maintenance activities were divided into 8 categories: winter maintenance, maintaining a smooth highway surface, maintenance of roadsides, maintenance of signs, debris removal, rest stop maintenance, striping maintenance, and winter road condition reports. The respondents were asked three different questions about each of these eight maintenance activities. First they were asked how good a job the Montana Department of Transportation (MDT) was doing with each of the eight maintenance activities and to respond with poor, fair, good, or excellent. Then they were asked how important each of the maintenance activities were to them and to respond with not important, somewhat important, important, or very important. Finally, the respondents were asked to think of the allocation of resources to each of the maintenance activities by the MDT and assign a resource priority of low, medium, moderately high, or very high to each of the eight maintenance activities.

A composite variable was then constructed for each of the maintenance activities by combining the answers to the three different questions asked about that activity. To construct these variables, the first step was to reverse the values assigned to the responses to the rating of each maintenance activity. After reversal, an excellent rating = 1, a good rating = 2, a fair rating = 3, and a poor rating = 4. Then the composite variable for each maintenance activity was created by adding this reversed value for rating, the score on the importance question (1 = not important, 2 = somewhat important, 3 = important and 4 = very important), and the score on the resource priority question (1 = low, 2 = medium, 3 = moderately high, and 4 = high).

If a respondent had answered all three of the questions about a maintenance activity, the range of scores on the composite variable for that activity would be from 3 to 12. If the value of the composite variable were a 3, it would indicate an excellent rating of the activity, an answer of not important on the importance question and of low priority on the resource priority question. A score of 12 would indicate a poor rating, very important and a high resource priority. A score of less than 3 is possible if the respondent did not answer each question about a particular maintenance activity.

The higher the score on this composite variable, the lower the rating, the more important the activity is considered, and the higher the resource priority assigned to the activity. Thus, the higher the score on the composite variable, the more attention respondents believe should be paid to the maintenance activity.

The overall mean scores for each of the composite variables are: Winter Maintenance, 9.43; Highway Striping, 9.11; Debris Removal, 8.94; Smoothness of Surface, 8.90; Winter Roadway Information, 8.38; Highway Signage, 8.25; Rest Stop Maintenance, 7.84; and Roadside Maintenance, 7.83. In 2000 the mean scores on the composite variables were: Winter Maintenance 9.10; Highway Striping, 8.99, Smoothness of Surface, 8.92; Debris Removal, 8.79; Highway Signage, 8.14; Winter Roadway Information, 7.96; Roadside Maintenance, 7.79; and Rest Stop Maintenance, 7.76.

The 2000 to 2002 change in three of the eight composite variables was statistically significant. The increase in the mean value of the Winter Maintenance composite variable from 9.10 in 2000 to 9.43 in 2002 was statistically significant as was the increase in mean value of the Debris Removal composite variable from 8.79 in 2000 to 8.94 in 2002, and the increase of the mean value of the Winter Roadway Information composite variable from 7.96 in 2000 to 8.38 in 2002.

Further comparison of the 2000 and the 2002 means of composite variables shows only several changes in order from 2000 to 2002. The composite variable for debris removal climbed from fourth place in 2000 to third place in 2002 while the composite variable for surface smoothness dropped from third place in 2000 to fourth place in 2002. The composite variable for signage dropped from fifth place in 2000 to sixth place in 2002 while the winter roadway information composite variable climbed from sixth place in 2000 to fifth place in 2002. The composite variable for rest stop maintenance was eighth in 2000 and climbed to seventh in 2002 while roadside maintenance went from seventh in 2000 to eighth in 2002.

Winter Maintenance

The mean composite score for Winter Maintenance is the highest of all the composite variables because it is rated the most important maintenance activity by the respondents, is assigned the highest resource priority by the respondents, and is rated sixth by the respondents. The value of the composite variable for winter maintenance increased significantly from 2000 to 2002.

Females had higher scores on the Winter Maintenance composite variable than did males. Respondents who reported driving more than 15,000 miles in the last 12 months scored higher on the Winter Maintenance composite variable than did respondents who drove less than 15,000 miles. Respondents over 65 scored lower on the Winter Maintenance composite variable than did younger respondents. Respondents with an 8th grade or less education scored lower on the winter composite variable than did respondents with a higher level of education. Respondents who had been in Montana for five or less years scored lower on the Winter Maintenance composite variable than did respondents who had been in Montana longer, and respondents who had been in Montana for between 6 and 20 years scored higher on the Winter Maintenance Composite variable than did respondents who had been in the state longer than 20 years. Respondents who said they were professional drivers and those who said their typical trip was work related

scored higher on the Winter Maintenance composite variable than did respondents who indicated a different purpose for their typical trip.

The percentage of respondents believing that winter maintenance in Montana is better than in other states increased significantly from 2000 to 2002. The respondent's perception of the importance of winter maintenance and the resource priority assigned to winter maintenance all increased significantly from 2000 to 2002. The respondent's rating of winter maintenance did not change significantly from 2000 to 2002.

Highway Striping

Striping ranks second in terms of mean composite variable score because it is second in importance and third in priority.

The respondent's rating of striping, the respondent's perception of the importance of striping, and the resource priority assigned to striping all increased significantly from 2000 to 2002.

Debris Removal

Debris removal rates third in terms of mean composite variable because it is fourth in importance and priority but seventh in rating. The mean value of the composite variable for Debris Removal increased significantly from 8.79 in 2000 to 8.94 in 2002.

Female respondents scored higher than male respondents on the Debris Removal composite variable. Respondents with a 8th grade education or less and respondents with a college degree scored lower on the Debris Removal composite variable than did respondents with other levels of education. Respondents who said their typical trip was commuting, work related, or personal and family related scored higher on the Debris Removal composite variable than did professional drivers or respondents who said their typical trip was agriculturally related.

The respondent's rating of debris removal, the respondent's perception of the importance of debris removal, and the resource priority assigned to debris removal all increased significantly from 2000 to 2002.

Highway Surface Smoothness

Surface Smoothness is rated the next highest on the composite variable not so much because of its importance and resource priority, which fall in the middle of the rating for all maintenance activities, but because of the rating of the current condition of surface smoothness. Respondents rated Surface Smoothness last as compared with other maintenance activities.

Females had higher scores on the Surface composite variables than did males. Respondents who had driven in other states in the last 12 months scored higher on the surface smoothness composite variable than did those who had not driven in other states.

The respondent's rating of surface smoothness and the respondent's perception of the importance of surface smoothness increased significantly from 2000 to 2002. The

resource priority assigned to surface smoothness did not change significantly from 2000 to 2002.

Winter Roadway Information

Winter Roadway Information is rated fifth in terms of composite variable means, not because it is not given a high importance and resource priority value by the respondents, but because respondents currently rate it as being done well. The composite variable for winter roadway information increased significantly from 2000 to 2002.

Females scored higher on the Winter Roadway Information composite variable than did males. Respondents with educational attainments less than a high school diploma scored lower on the Winter Roadway Information composite variables than did respondents with a higher level of education. Respondents with post graduate education scored higher on the Winter Roadway Information Composite variable than did respondents with less education. Respondents who had been in Montana for 5 years or less scored lower on the Winter Roadway information than did respondents who had been in the state longer. Respondents who had been in Montana for between 11 and 30 years scored higher on the Winter Roadway Information composite variable than did respondents who had been in Montana a longer or shorter time. Professional drivers and respondents whose most frequent trip was work related scored higher on the Winter Roadway information composite variable than did respondents whose most frequent trips were commuting, personal or agriculturally related, or respondents who said they were professional drivers.

The respondent's rating of winter roadway information, the respondent's perception of the importance of winter roadway information, and the resource priority assigned to winter roadway information increased significantly from 2000 to 2002.

Highway Signage

The Signage composite variable is sixth because it is ranked toward the bottom of the eight maintenance activities in terms of importance and priority and because the current condition of highways signs is rated higher than any other maintenance activity.

Female respondents scored higher on the Signage composite variable than did males. Respondents with a high school diploma and those with some college scored higher on the Signage composite variable than did respondents with other levels of education attainment. Respondents who were professional drivers scored the highest on the Signage composite variable while those whose most frequent trip was agriculturally related scored the lowest.

The resource priority assigned to signage increased significantly from 2000 to 2002, but the respondent's ratings of signage and the respondent's perception of the importance assigned to signage did not change significantly from 2000 to 2002.

Rest Stop Maintenance

Rest Stop Maintenance is rated seventh in terms of composite variable means not because of the relatively low rating of its current condition but rather because it is rated next to last in importance, and third from the last in priority.

Females scored higher on the Rest Stop Maintenance composite variable than did males. Respondents who had driven in other states in the last 12 months scored higher on the Rest Stop Maintenance composite variable than did respondents who had not driven in other states.

The percentage of respondents believing that rest stop maintenance was worse in Montana than in other states decreased significantly from 2000 to 2002. The respondent's rating for rest stop maintenance and the respondent's perception of the importance of rest stop maintenance increased significantly from 2000 to 2002. The resource priority assigned to rest stop maintenance did not change significantly from 2000 to 2002.

Roadside Maintenance

Roadside Maintenance is rated last because it is ranked dead last in terms of importance and resource priority.

Respondents who had not driven in other states in the last 12 months scored higher on the Roadside Maintenance composite variable than did respondents who had driven in other states. Respondents over 55 scored higher on the Roadside Maintenance composite variable than did younger respondents and respondents from 18 to 25 scored much lower on the Roadside Maintenance composite variable than did older respondents. Respondents with some high school or a high school diploma scored higher on the Roadside Maintenance composite variable than did respondents with a different level of education. Respondents with a college degree or post graduate education scored lower on the Roadside Maintenance composite variable than did respondents with a lower level of education. Respondents who had been in Montana for 5 or less years scored lower on the Roadside Information composite variable than did respondents who had been in the state longer.

The respondent's rating of roadside maintenance increased significantly from 2000 to 2002 but the respondent's perception of the importance of roadside maintenance and the resource priority assigned to roadside maintenance did not change significantly from 2000 to 2002.

Importance of Additional Maintenance Activities

In 2002, for the first time, the respondents were asked how important they thought seven additional maintenance activities were. The most important of these additional maintenance activities to respondents were roadside delineators with a mean of 3.62 and crash barriers with a mean of 3.56. Traffic signals came next with a mean of 3.39. Then Sweeping and street lighting were next with means of 3.20 and 3.16, respectively. Noxious weed control and sidewalks were the least important of these additional maintenance activities with means of 2.90 and 2.48 respectively.

2000 to 2002 Differences

The following statistically significant differences were observed when comparing 2000 and 2002 data:

- The rating of importance of Montana highway maintenance decreased from 3.31 in 2000 to 3.47 in 2002.
- The percentage of respondents who had driven in other states who thought winter maintenance in Montana was better than in other states increased from 24.7% in 2000 to 37.1% in 2002.
- The percentage of respondents who had driven in others states who thought rest stop maintenance was worse in Montana than in other states decreased from 39.4% in 2000 to 30.3% in 2002.
- The rating for winter roadway information increased from 2.91 in 2000 to 3.01 in 2002.
- The rating for Highway Striping increased from 2.70 in 2000 to 2.87 in 2002.
- The rating for Roadside Maintenance increased from 2.72 in 2000 to 2.80 in 2002.
- The rating for Rest Stop Maintenance increased from 2.58 in 2000 to 2.79 in 2002.
- The rating for Debris Removal increased from 2.64 in 2000 to 2.75 in 2002.
- The rating for Surface Smoothness increased from 2.44 in 2000 to 2.55 in 2002.
- The importance of Winter Maintenance increased from 3.58 in 2000 to 3.69 in 2002.
- The importance of Highway Striping increased from 3.47 in 2000 to 3.60 in 2002.
- The importance of Winter Roadway Information increased from 3.22 in 2000 to 3.52 in 2002.
- The importance of Debris Removal increased from 3.37 in 2000 to 3.46 in 2002.
- The importance of surface smoothness increased significantly from 3.29 in 2000 to 3.38 in 2002.
- The importance of Rest Stop Maintenance increased from 3.07 in 2000 to 3.21 in 2002.
- The resource priority assigned to winter maintenance increased from 3.54 in 2000 to 3.65 in 2002.
- The resource priority for Winter Roadway Information increased from 3.22 in 2000 to 3.44 in 2002.
- The resource priority assigned to Highway Striping increased from 3.27 in 2000 to 3.42 in 2002.
- The resource priority assigned to Debris Removal increased from 3.10 in 2000 to 3.26 in 2002.
- The resource priority assigned to Signage increased from 2.92 in 2000 to 3.08 in 2002.
- The resource priority assigned to Roadside Maintenance increased from 2.59 in 2000 to 2.70 in 2002.
- The composite variable for Winter Maintenance increased from 9.10 in 2000 to 9.43 in 2002
- The composite variable for Debris Removal increased from 8.79 in 2000 to 8.94 in 2002.
- The composite variable for Winter Roadway Information increased from 7.96 in 2000 to 8.38 in 2002.

CONCLUSIONS AND IMPLEMENTATION

All statistically significant differences between 2000 and 2002 responses were in a positive direction. The ratings of six out of eight of the maintenance activities rated increased significantly. The respondent's perception of the importance of six out of the eight maintenance activities increased significantly. The resource priorities assigned to six out of the eight maintenance activities increased significantly. In the open ended questions, the number of positive comments increased and number of negative comments decreased between 2000 and 2002.

According to the respondents to this survey, the Montana Department of Transportation should now pay attention and provide resources to maintenance activities on interstate and state highways in Montana in the following order:

- Winter Maintenance
- Highway Striping
- Debris Removal
- Surface Smoothness
- Winter Roadway Information
- Highway Signage
- Rest Stop Maintenance
- Roadside Maintenance

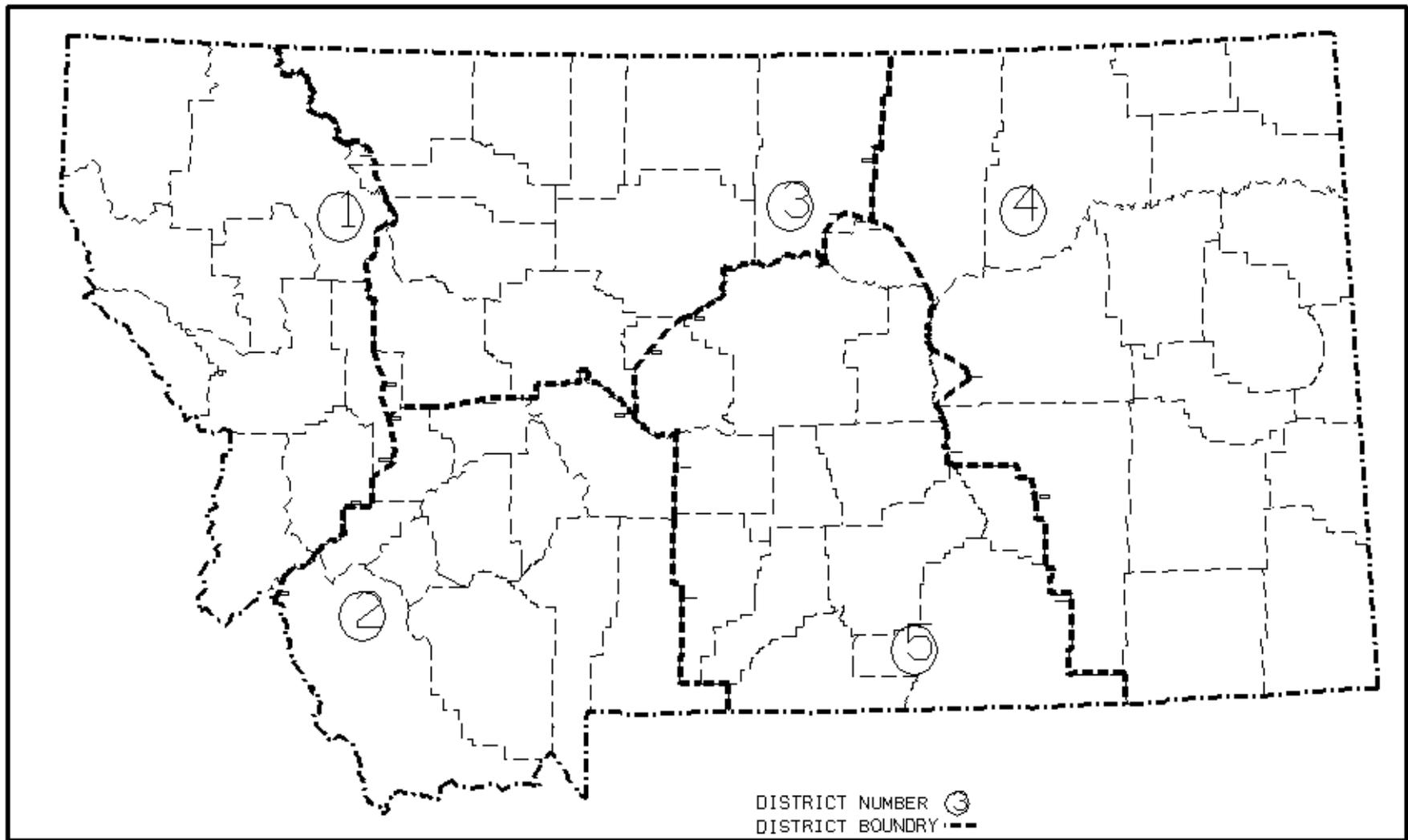
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APPENDIX ONE:
MAP SHOWING MDT ADMINISTRATIVE DISTRICTS AND
MONTANA COUNTIES



**APPENDIX TWO:
TRANSPORTATION SURVEY QUESTIONS**

Question Hello

Hello, my name is _____ and I am calling from Montana State University, Billings. We are conducting a survey on attitudes and opinions of highway maintenance for the Montana Department of Transportation. The Department of Transportation wants the opinions of citizens of Montana about the condition of our roadways. Your participation in this survey will assist the department in establishing future priorities and enable the maintenance program to better use available resources. In order to interview the right person, I need to speak to the member of your household who is at home, over 18, and has had the most recent birthday. Would that be you? CTRL-END OR 3 DIGITS

Question Instruct

Before I ask the first question, let me explain that this survey deals only with maintenance of highways. Maintenance includes such things as maintaining the established roadway surface, snow and ice removal, removal of debris and litter, maintaining roadsides, repairing signs, re-painting roadway stripes and rest area maintenance. This survey does not deal with the construction of new highways nor construction of new rest stops. This survey only deals with interstates and state highways in Montana. We are not asking you about city streets or county roads, just interstates and state highways. Also, we are only interested in opinions based on your experiences with interstates and state highways in Montana in the last two years. Finally, your household was randomly selected by a computer and all your answers will remain anonymous. PRESS ANY KEY TO CONTINUE

Question RateAll

How would you rate overall interstate and state highway maintenance in Montana?

1. Poor
2. Fair
3. Good
4. Excellent
5. DK or NR

Question ImpAll

How important would you say interstate and state highway maintenance in Montana is to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK or NR

Question RateWint

How would you rate winter maintenance of interstates and state highways in Montana? By winter maintenance, I mean snow and ice control including plowing, sanding, de-icing, and preventing drifting.

1. Poor
2. Fair
3. Good
4. Excellent
5. DK or NR

Question ImpWint

How important would you say interstate and state highway winter maintenance is to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK or NR

Question RateSurf

How would you rate the surface of Montana's interstates and state highways. In making this rating, consider ride quality which is affected by potholes, ruts, bumps, cracks, etc.

1. Poor
2. Fair
3. Good
4. Excellent
5. DK or NR

Question ImpSurf

How important is the smoothness of Montana's interstates and state highways to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK or NR

Question RateSide

How would you rate the management of interstate and state highway roadsides in Montana? Roadside management includes mowing shoulders and eliminating unwanted vegetation.

1. Poor
2. Fair
3. Good
4. Excellent
5. DK or NR

Question ImpSide

How important is interstate and state highway roadside management in Montana to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK or NR

Question RateSign

How would you rate the condition of interstate and state highway signs in Montana?

1. Poor
2. Fair
3. Good
4. Excellent
5. DK or NR

Question ImpSign

How important is the condition of interstate and state highway signs to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK or NR

Question RateRemv

How would you rate the removal of debris such as litter, roadkill, and fallen rocks, on Montana's interstates and state highways?

1. Poor
2. Fair
3. Good
4. Excellent
5. DK or NR

Question ImpRemv

How important is the removal of debris on interstates and state highways in Montana to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK or NR

Question RateRest

How would you rate the maintenance of rest areas on Montana interstates and state highways. Rest area maintenance includes cleaning rest areas and keeping rest areas in working order.

1. Poor
2. Fair
3. Good
4. Excellent
5. DK or NR

Question ImpRest

How important is interstate and state highway rest area maintenance to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK or NR

Question RateStrp

How would you rate the condition of striping (lines) on Montana's interstates and state highways? Striping and lines include the middle lines, no-passing lines, left turn lanes, and shoulder lines.

1. Poor
2. Fair
3. Good
4. Excellent
5. DK or NR

Question ImpStrp

How important is interstate and state highway striping to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK or NR

Question RateInfo

How would you rate winter roadway information and the way it is provided by the Montana Department of Transportation? Roadway information is provided by a statewide 800 telephone number, highway advisory radio, and changeable message signs.

1. Poor
2. Fair
3. Good
4. Excellent
5. DK or NR

Question ImpInfo

How important is up to date winter interstate and state highway information to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK or NR

Question PriWint

Now I am going to go back through the list of maintenance activities. This time, I want you to think about allocation of resources to each of the activities. For each activity, please tell me if you think it warrants a low, medium, moderately high, or very high resource priority when deciding how state highway maintenance resources should be utilized. Remember, we are only dealing with interstates and state maintained roadways.

What resource priority should be placed on interstate and state highway winter maintenance in Montana?

1. Low
2. Medium
3. Moderately High
4. Very High
5. DK or NR

Question PriSurf

What resource priority should be placed on smooth pavement on interstates and state highways in Montana?

1. Low
2. Medium
3. Moderately High
4. Very High
5. DK or NR

Question PriSide

What resource priority should be placed on interstate and state highway roadside management in Montana?

1. Low
2. Medium
3. Moderately High
4. Very High
5. DK or NR

Question PriSign

What resource priority should be placed on repairing and replacing signs on interstates and state highways in Montana?

1. Low
2. Medium
3. Moderately High
4. Very High
5. DK or NR

Question PriRemv

What resource priority should be placed on debris removal on interstates and state highways in Montana?

1. Low
2. Medium
3. Moderately High
4. Very High
5. DK or NR

Question PriRest

What resource priority should be placed on rest area cleanliness and maintenance on interstates and state highways in Montana?

1. Low
2. Medium
3. Moderately High
4. Very High
5. DK or NR

Question PriStrp

What resource priority should be placed on roadway striping on interstates and state highways in Montana?

1. Low
2. Medium
3. Moderately High
4. Very High
5. DK or NR

Question PriInfo

What resource priority should be placed providing accurate and up to date information about the current condition of state maintained highways in Montana?

1. Low
2. Medium
3. Moderately High
4. Very High
5. DK or NR

Question Signals

I have asked you questions about some of the major activities the Montana Department of Transportation performs to maintain the Interstate and State Highway systems. As you are probably aware, there are many other activities performed by state highway maintenance personnel. I would now like you to rate the importance of several other highway maintenance activities.

How important are highway traffic signals to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK-NR

Question Barriers

Crash barriers are those devices designed to absorb impact energy during a crash. Protective Barriers are those devices designed to keep traffic away from dangerous areas such as guardrails and concrete barriers. How important are crash barriers and protective barriers to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK-NR

Question NoxWeeds

How important is noxious weed control along highway right-of-ways to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK-NR

Question Lighting

How important is highway lighting to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK-NR

Question Sweeping

Sweeping is the act of removing excess dirt, rocks and sanding materials from the roadway surface. How important is sweeping to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK-NR

Question Delin

Roadside delineators are light reflective devices mounted along the roadside which are used to guide motorists. That is, they are the posts with a white reflective button at the edge of the road. How important are roadside delineators to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK-NR

Question Sidewalk

How important is sidewalk and pathway maintenance to you?

1. Not Important
2. Somewhat Important
3. Important
4. Very Important
5. DK-NR

Question OthState

Just a couple of more questions about interstate and state highway maintenance.

Have you driven on roadways in states other than Montana in the last 12 months?

1. Yes
2. No
3. DK or NR

Question GenComp

How would you compare general roadway conditions of Montana's state maintained roadways with the general roadway conditions of state maintained roadways in other states? IF THEY SAY THEY HAVE BEEN IN MORE THAN ONE STATE, ASK FOR A GENERAL COMPARISON. IF THEY CANNOT DO THAT, HAVE THEM COMPARE WITH THE STATE THEY DROVE IN MOST RECENTLY.

1. Montana roadways worse
2. About the same
3. Montana better
4. DK or NR

Question WintComp

How would you compare winter maintenance of Montana's state maintained roadways with winter maintenance of state maintained highways in other states?

1. Montana winter maintenance worse
2. About the same
3. Montana better
4. DK or NR

Question RestComp

How would you compare rest area cleanliness and maintenance in Montana with rest area cleanliness and maintenance in other states?

1. Montana rest areas worse
2. About the same
3. Montana better
4. DK or NR

Question Better

The Department of Transportation is striving to improve maintenance operations. In your opinion what could the department do better?

TYPE IN ANSWER AND THEN CLICK THE NEXT BUTTON. YOU HAVE 3 LINES.

Question GoodNow

What is the department doing that meets or exceeds your expectations?

TYPE IN RESPONSE AND THEN CLICK THE NEXT BUTTON. YOU HAVE 3 LINES.

Question Trips

As you probably know different types of people have different types of opinions. The following questions are for statistical purposes only.

Which of the following types of trips would you say is most typical of your driving?

1. Commuting to and from work
2. Work related trips, that is trips that are made as a part of work activities.
3. Personal and family errands or trips
4. Agriculture related trips
5. Professional driving
6. Other
7. DK or NR

Question HowFar

Would you say you drive more or less than 15,000 miles per year?

1. More
2. Less
3. DK or NR

Question Age

How old are you?

TYPE IN THEIR AGE AND PRESS ENTER USE 100 FOR 100 OR OLDER AND 101 FOR DK OR NR.

Question Educ

What is the highest level of education you have completed?

TYPE IN ANSWER AND PRESS ENTER. 12 IS HIGH SCHOOL GRADUATE, 16 IS COLLEGE GRADUATE, 18 IS MASTERS DEGREE AND 20 IS DOCTORATE. USE 21 FOR DK OR NR

Question InMT

How long have you lived in Montana?

TYPE IN THEIR ANSWER AND PRESS ENTER USE 100 FOR 100 OR MORE AND 101 FOR DK OR NR.

Question Sex

RESPONDENTS SEX (DO NOT ASK)

1. MALE
2. FEMALE
3. CANNOT TELL

Question Followup

The Montana Department of Transportation may make changes in the way it allocates resources based on the results of this study. Would you be willing to participate in a follow up study so that we can see if your opinions of highway maintenance change in the next two years?

1. Yes
2. No
3. DK or NR

Question Address

In order to include you in the follow up study, I will need your name, address and telephone number.

ENTER NAME ON ONE LINE; STREET ADDRESS ON THE NEXT LINE; CITY, STATE, AND ZIP CODE ON THE THIRD LINE; AND TELEPHONE NUMBER ON THE FOURTH LINE. PLEASE USE APPROPRIATE CAPITALIZATION AND SPELLING. YOU HAVE AN EXTRA LINE FOR ANY STRANGE THINGS IN THE ADDRESS.

Question Bye

That was the last question. Thank you very much for taking the time to answer these questions. Good bye and have a nice day (or evening).

Montana Department of Transportation

Montana Department of Transportation web site: www.mdt.state.mt.us

This survey and all preceding surveys are available at:
<http://www.mdt.state.mt.us/departments/maintenance>

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100 copies of this publication were produced at an estimated cost of \$ per copy for a total of \$, which includes the cost of printing and binding and \$0.00 for distribution.