

511 Statistics Analysis for January 2003 to June 2004

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EXECUTIVE SUMMARY

The Montana Department of Transportation (MDT) deployed Montana's 511 system on January 8, 2003. The 511 system allows callers to select a road segment on a Montana, North Dakota, and South Dakota highways and listen to information regarding current road conditions, weather forecasts, and construction activities. Since the deployment, Montana has conducted several survey analyses of motorists' perceptions of the 511 system. All of these surveys provide MDT with qualitative information on what callers like or do not like and what enhancements they would like to see on the 511 system.

In order to understand in a quantitative nature, more about the 511 system, an analysis of the Montana 511 statistics as reported by Meridian Environmental Inc was completed. This report analyzed the data as recommended by the 511 National Deployment Coalition.

This analysis led to the following conclusions:

- From January 2003 to June 2004 there were more than half a million informational calls;
- The new 511 system is used more (90 percent more) than the previous system;
- Callers have accrued almost 25,000 hours of call time to the system;
- The peak usage occurs in the winter with multi-day storms having the greatest impact on the call volume;
- The peak usage tends to occur on Saturdays and in the morning hours;
- The average caller spends two and a half minutes on the phone and receives information on two roadway segments;
- Without the vendor that Montana uses and its ability to share phone lines, over 47,000 people would have received a busy signal;
- There have been over 175,000 individual callers to the system with the majority of callers using 511 once;
- Calls have originated from phones registered to residents of all 50 states, Washington D.C., 9 of the 13 Canadian provinces, and 2 U.S. territories;
- More than 90 percent of all calls are from Montanans and 17 percent of Montanans have tried 511; and
- More than eighty percent of the calls registered to Montanans came from landline phones.

1. INTRODUCTION

The Montana Department of Transportation (MDT) deployed Montana's 511 system on January 8, 2003. The 511 system allows callers to select a road segment on a Montana, North Dakota, and South Dakota highways and listen to information regarding current road conditions, weather forecasts, and construction activities. Since the deployment, Montana has conducted several analyses of motorists' perceptions of the 511 system. There was a pre-511 survey completed June 2002 (1), a post deployment survey completed April 2003 (2), and a maintenance survey that included questions about 511 completed October 2004 (3). All of these surveys provide MDT with information on the features callers like or do not like and the enhancements they would like to see on the 511 system. These analyses are qualitative in nature.

The purpose of this report is to provide MDT with quantitative information about use of the 511 system. The Western Transportation Institute at Montana State University conducted the analysis, using statistics compiled by Meridian Environmental Inc., the Montana 511 vendor. Researchers analyzed the types of data recommended by the 511 National Deployment Coalition (4) including:

- Calls per month (section 2.1);
- Peak call day (section 2.3);
- Peak call day count (section 2.3);
- Peak call day reason (section 2.3);
- Peak call hour (section 2.3);
- Peak call hour count (section 2.3);
- Peak call hour date (section 2.3);
- Peak call hour reason (section 2.3);
- Capacity Utilization (section 2.4);
- # of dropped calls (section 2.5);
- Average call length (section 2.6);
- Total minutes per month (section 2.6);
- Number of transactions per call (section 2.7);
- Repeat usage statistics (sections 3.1-3.3);
- % of wireless calls (section 3.4); and
- % of wireline calls (section 3.4).

2. CALL VOLUME ANALYSIS

2.1. Calls per Month

The total number of informational calls recorded by Meridian Environmental, Inc from January 2003 through June 2004 was 569006. (“Informational” calls are defined as those in which the caller stays on the line long enough to receive information from the system.)

As shown in Figure 1, the monthly call volumes are the highest in winter with the peak months being December 2003 with 105,507 informational calls and March 2003 with 89,328 informational calls.

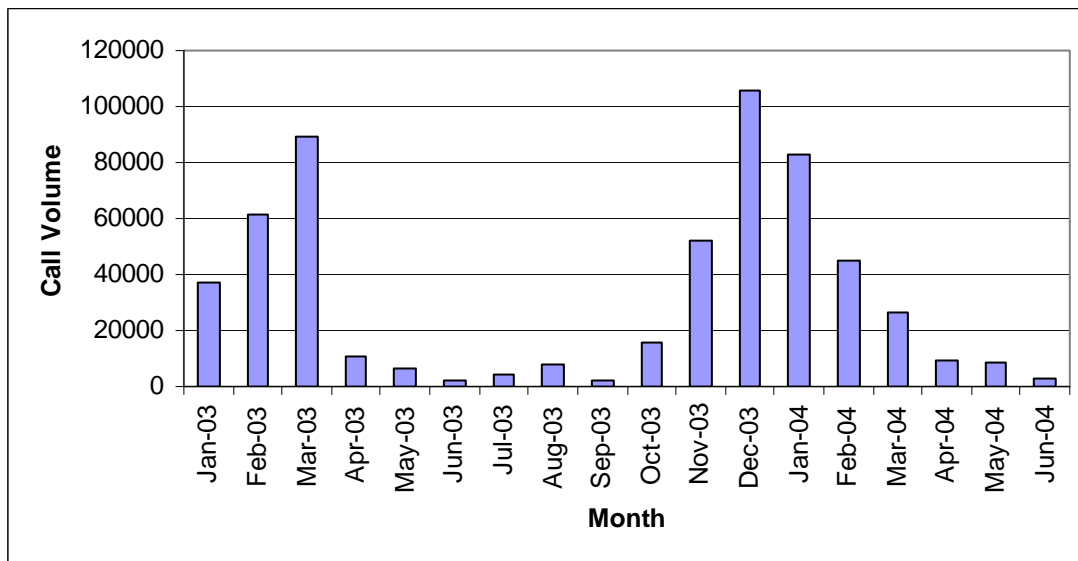


Figure 1: Calls per Month

2.2. Pre- versus Post-511

Prior to the deployment of the 511 system, MDT provided road and traveler information through an answering machine that could hold up to eleven minutes of information for the entire state. The total calls to the system prior to 511 for the year of 2002 were 207,790. The total number of informational calls to 511 in 2003 was 394,475 or a 90 percent increase in call volumes from 2002 to 2003. As can be seen in Figure 2, both the pre-511 and 511 system receive the most calls during the winter (i.e. November through March).

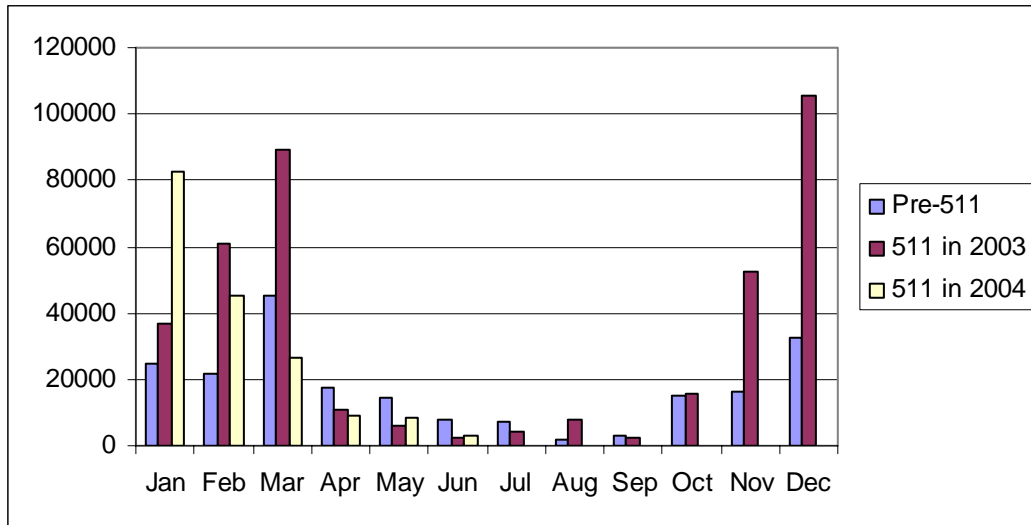


Figure 2: Comparison of Pre- and Post-511 Call Volumes by Month

2.3. Peak Calls

Peak days are Saturdays with the largest volume day being Saturday December 27, 2003 with 26,246 calls. The reason for the peaks is the occurrence of winter storms.

Peak hours are 7 to 9 am. The peak hour is 8 am with a total of 62,091 calls from January 2003 through June 2004 as shown in Figure 3. The average number of calls for 8 am is 115 as shown in Figure 4.

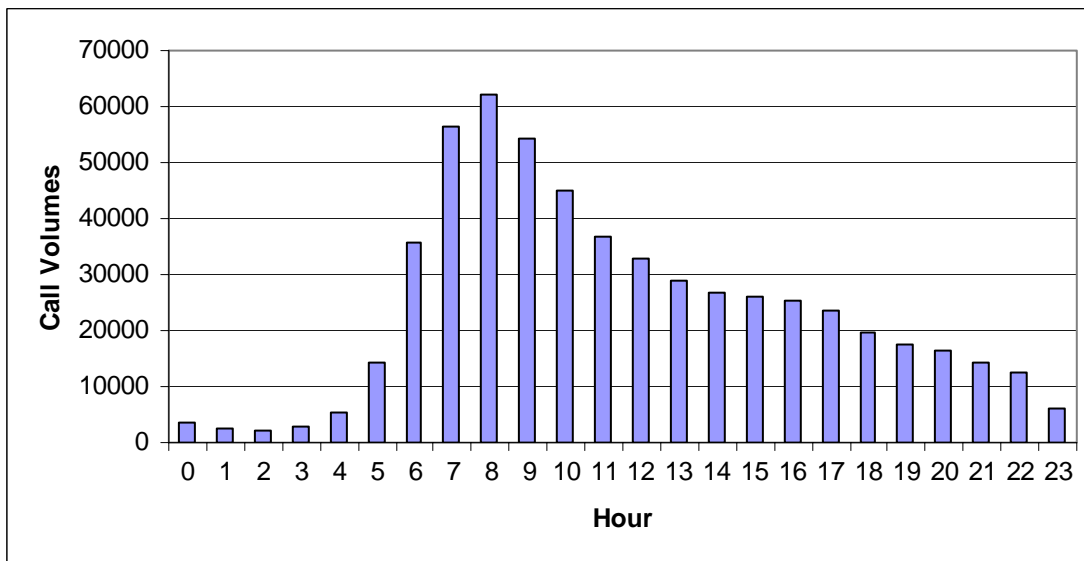


Figure 3: Total Hourly Call Volumes

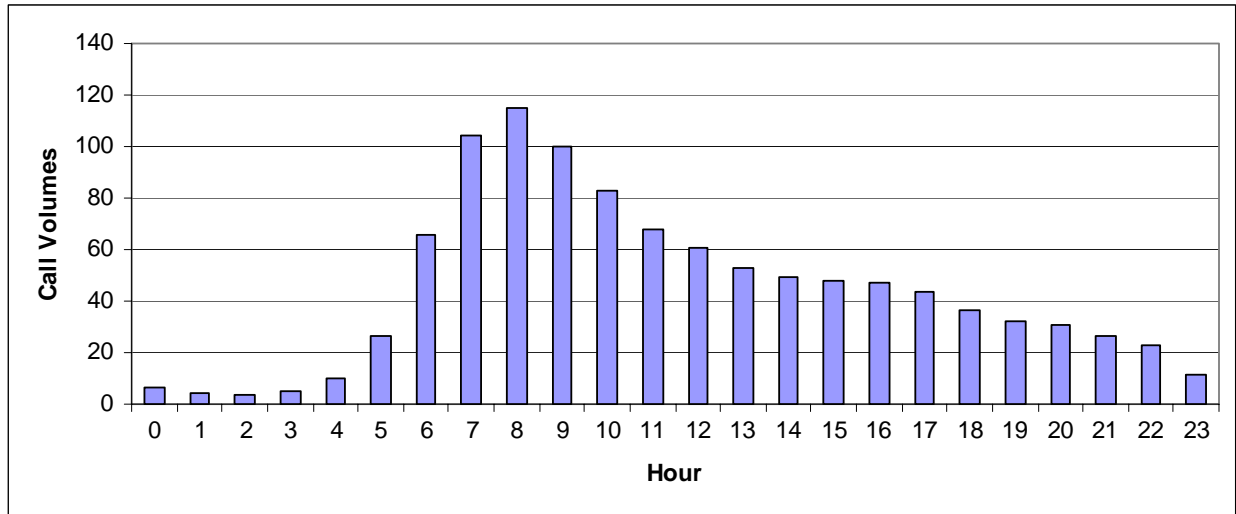


Figure 4: Average Hourly Call Volumes

2.4. Capacity Utilization

The Montana 511 system has 48 phone lines available to take calls. If all of these lines are being used, Montana “borrows” a phone line from one of the other Meridian states (i.e. North Dakota, South Dakota, Nebraska, or Kansas) to prevent callers from receiving a busy signal.

There have been 25 separate days where the number of calls coming into Montana’s phone lines was more than could be handled. A total of 47,273 calls (with a combined calling time of 1932 hours, 57 minutes, and 46 seconds) would have received busy signals, if not for the ability to share lines with other states. The greatest number of calls shared on a single day was 14,079, and the largest amount of time shared was 608 hours and 49 seconds. The majority of these sharing experiences occurred during multiple day winter storms: for example February 22 and 23, 2003; March 6-9, 2003; December 26-30, 2003; and January 2-4, 2004.

2.5. Dropped Calls

Although the number of informational calls to the system was 569,006, the total number of calls was 762,482. This number includes callers that hung up before receiving any information from 511 (i.e. dropped calls). Therefore, 25 percent of callers hung up before receiving any information.

2.6. Call Length/Total Call Time per Month

In one and a half years, the informational calls to 511 have accrued 24,805 hours 34 minutes and 44 seconds of call time. The average call lasts 2 minutes and 37 seconds.

As shown in Figure 5, the total minutes per month, like the call volumes, are highest in the winter. December 2003 was the month with the greatest total call times (5135 hours, 32 minutes, and 42 seconds). The peak day was December 27, 2003 with a call time total of 1280 hours, 33 minutes, and 54 seconds. The maximum call time per day ranges from one minute and 40 seconds to two hours, 12 minutes, and 36 seconds with an average maximum call time of 12 minutes and 02 seconds.

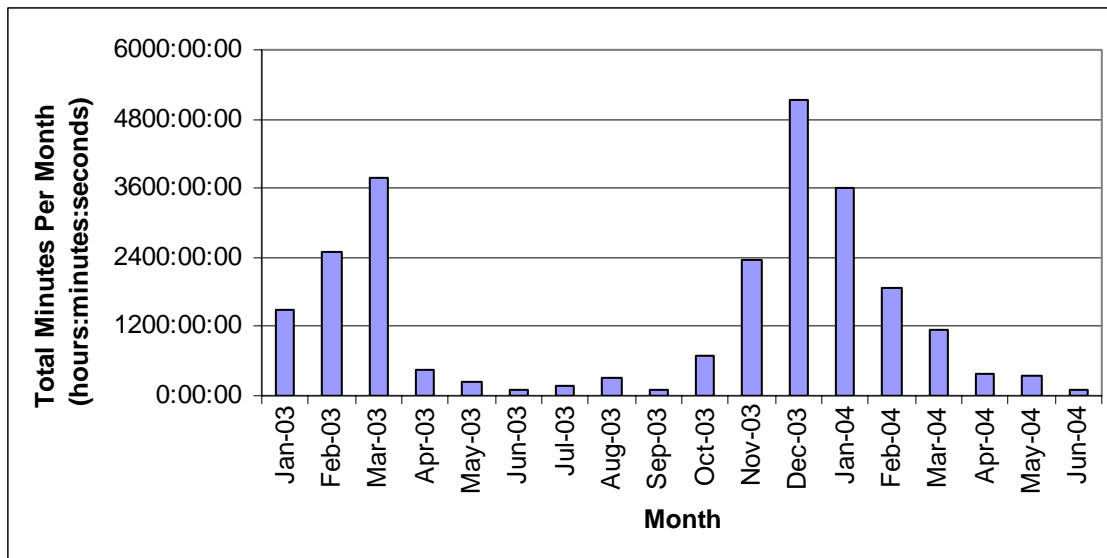


Figure 5: Total Minutes per Month

2.7. Category Chosen/Transactions

Although many 511 systems are set up in a way that the traveler can receive information in different categories (i.e. transit, tourism, road conditions, etc), Montana's system is set up so that the caller chooses a road segment and gets information on the weather, road conditions, and construction for that specific location. Therefore there is no way to know exactly, how many people obtained information on construction rather than weather. However, the Montana system can tell how many transactions occurred, i.e. the number of roadway segments chosen by a caller. Callers are allowed up to 8 transactions or roadway segments on the Montana system.

There were 1,013,111 total transactions for the 569,006 informational calls. The least number of transactions in a day was 19 on January 12, 2003 and the greatest number of transactions was 49,927 on December 27, 2003.

The number of transactions increases as the number of calls increase; therefore, there are more transactions in the winter than summer. The peak day for transactions is Saturday and the average number of transactions per call is two. The majority of callers (58 percent) only get information about one roadway segment (or have one transaction). As shown in Figure 6, 33 percent of all transactions made are callers only requesting one roadway segment.

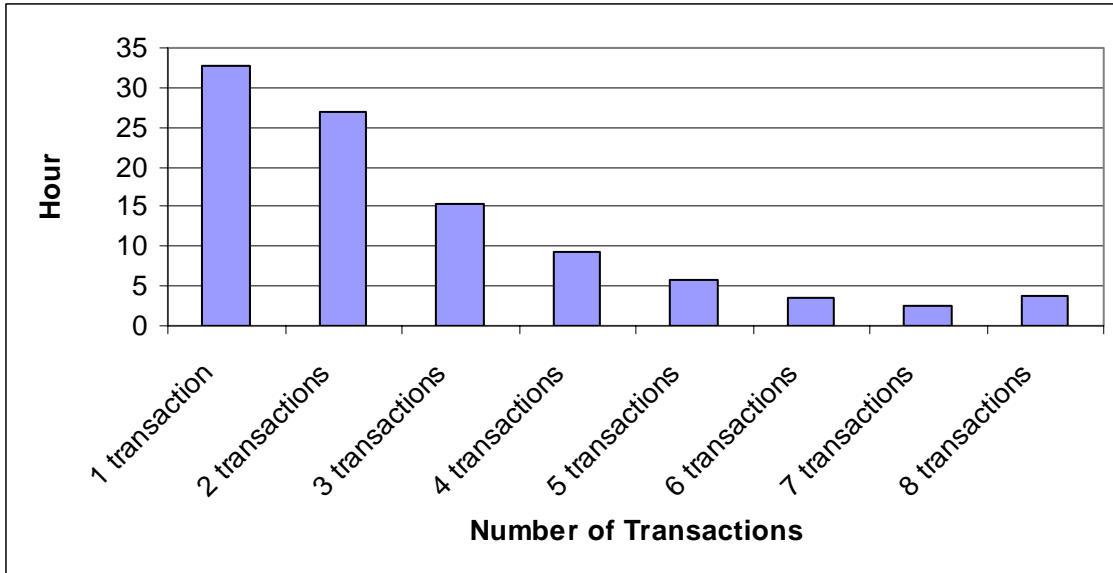


Figure 6: Number of Segments (Transactions) chosen per call as a Percent of Total Transactions

3. REPEAT USAGE STATISTICS

Phone numbers for callers to the 511 system were collected from the phone bills and were analyzed for January 2003 through June 2004. As this information is confidential, the actual phone numbers will not show up in this report.

3.1. Number of Times Users Have Called 511

In the year and a half of data analyzed, the total number of phone calls recorded was 756,732¹. Of these phone calls, 175,876 unique phone numbers or people called 511. A comparison between the number of total calls per month and the number of individual callers is shown in Figure 7. As can be seen in this graph, the calling trends are similar for both total call volumes and unique call volumes. It can also be seen that callers who use the system more than once a month tend to do so more in the winter months, with the peak month being December 2003 with an average call per phone number of 3.4.

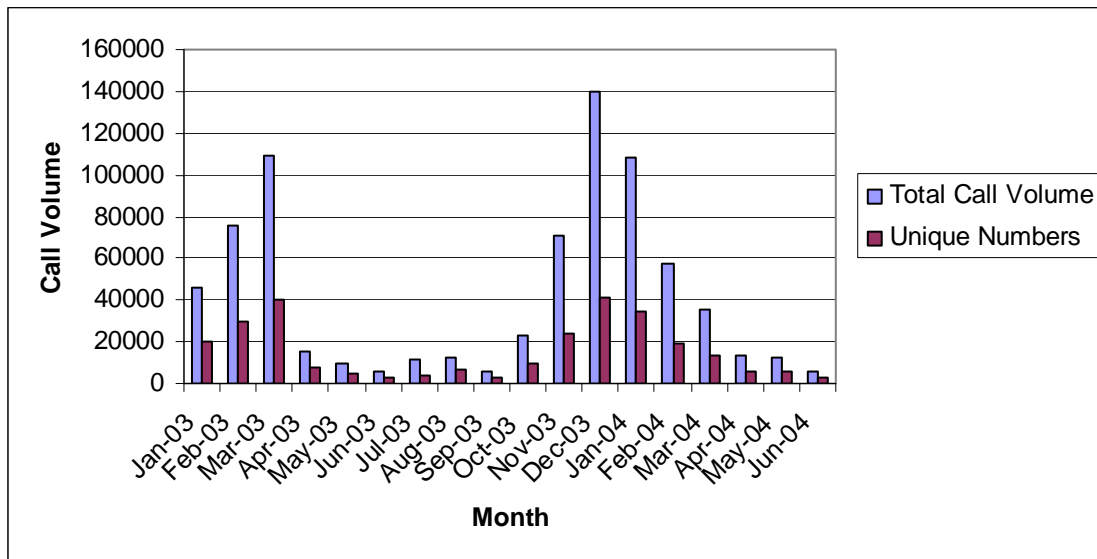


Figure 7: Total Calls versus Unique Numbers/Callers

The minimum number of times a person called 511 was once and the maximum number of times a person called 511 was 48,180². The average number of times a person called 511 was 4.3. As shown in Figure 8, most callers (43 percent) have only used 511 once, while 20 percent have called twice, 11 percent have called three times, and 26 percent have called more than three times.

¹ Note that this total number is different than what was reported in the previous section. That is because the phone company only charges/counts for calls that were a certain length, but the Meridian system counts all calls.

² This is a significant amount of calls (i.e. approx. 88 times/day) and must have been an automated system dialing the 511 system.

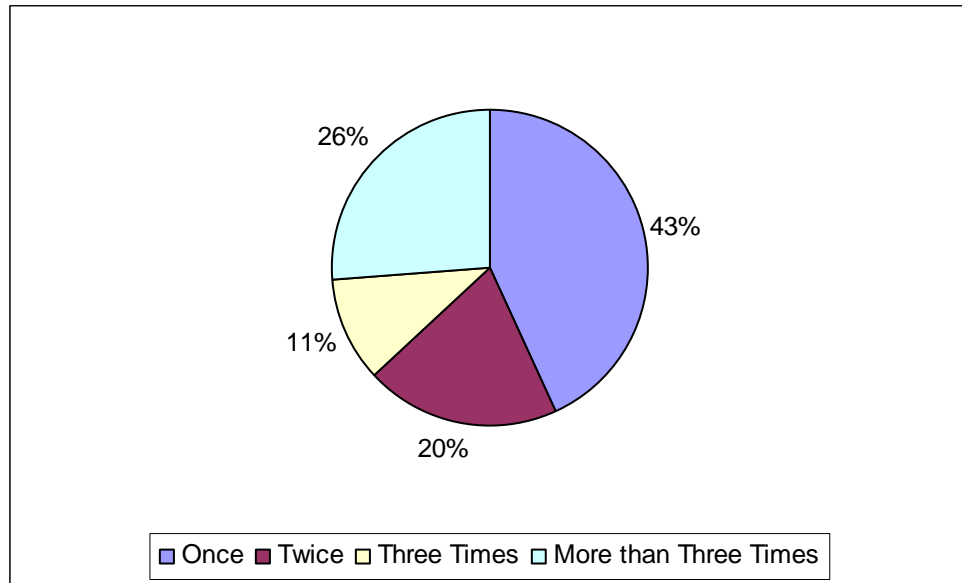


Figure 8: Number of Times Users Have Called 511

3.2. In-state versus Out-of-State Calls

Calls to the 511 system have come from phone numbers registered in all 50 states, 9 of the 13 Canadian Provinces (Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland, Nova Scotia, Ontario, Saskatchewan, and Quebec), the District of Columbia, and 2 U.S. Territories (Guam, and Puerto Rico). As can be seen in Figure 9, the majority (ninety-nine percent) of all calls have come from the United States.

Ninety-two percent of all calls are Montanans, leaving only nine percent of calls from tourists. The calls from tourists most frequently originate from phones registered to the following locations: Washington (21 percent), Idaho (18 percent), Wyoming (14 percent), Alberta, Canada (7 percent), North Dakota (8 percent), and Utah (6 percent). Therefore, the majority of out-of-state calls are coming from residents of western states/provinces near Montana.

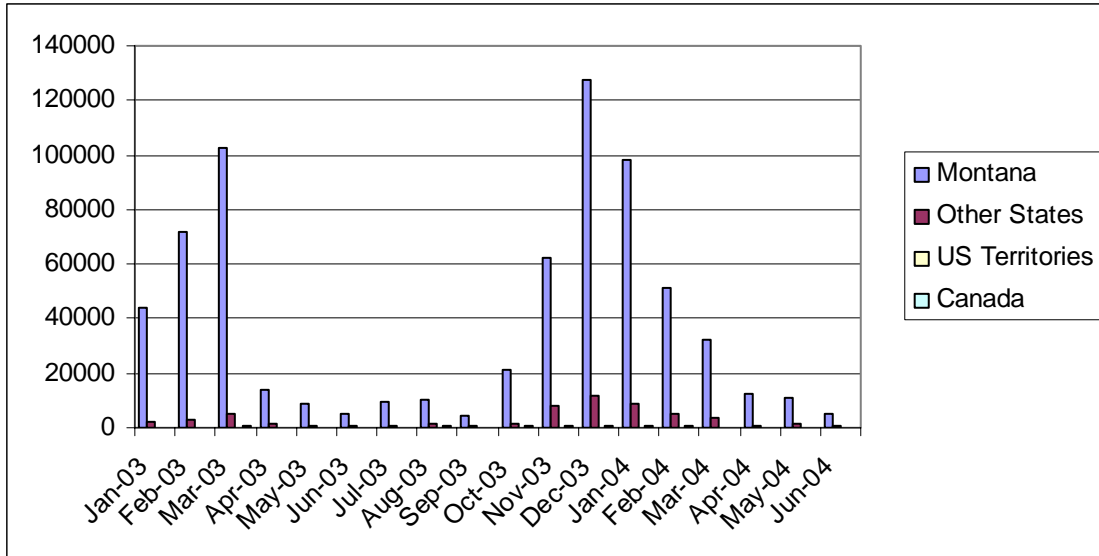


Figure 9: Callers by Location

3.3. Calls within Montana

Of the 756,732 calls to the 511 system, 691,679 have been from phones registered to Montana residents. There have been 152,756 unique callers (phone numbers) to the 511 system or 17 percent of the population. There have been callers from 234 different towns or cities in Montana. As can be seen in Figure 10, the majority of callers (45 percent) are from cities and towns (228 different ones) other than the six with the greatest populations. As shown in Figure 10, of the six largest cities in Montana, the call volume rank and population rank of Billings, Missoula, Great Falls, and Bozeman match; however, although Butte is the fourth largest city it had the sixth largest call volume and Helena had the fourth largest call volumes although it is the sixth largest city.

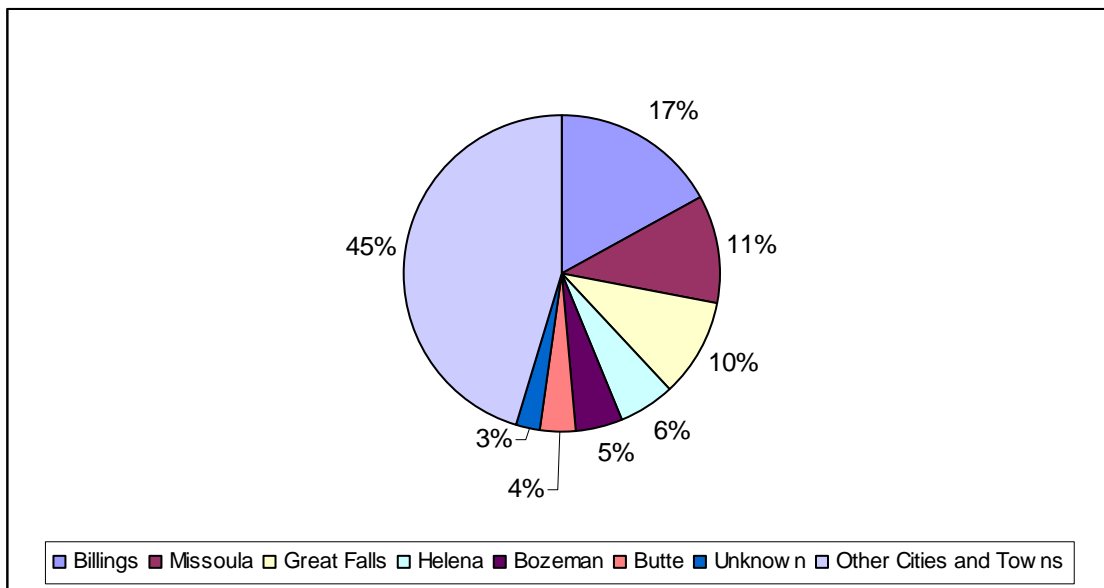


Figure 10: Locations of In-state Calls

Table 1: Rank of Call Volumes versus Population Rank

City	Call Volume Rank	Population Rank
Billings	1	1
Missoula	2	2
Great Falls	3	3
Butte	6	4
Bozeman	5	5
Helena	4	6

Of the ten Montana maintenance divisions, the most calls came from Billings (21 percent), Missoula (15 percent), Butte (14 percent), Great Falls (12 percent), and Bozeman (10 percent) as shown in Figure 11.

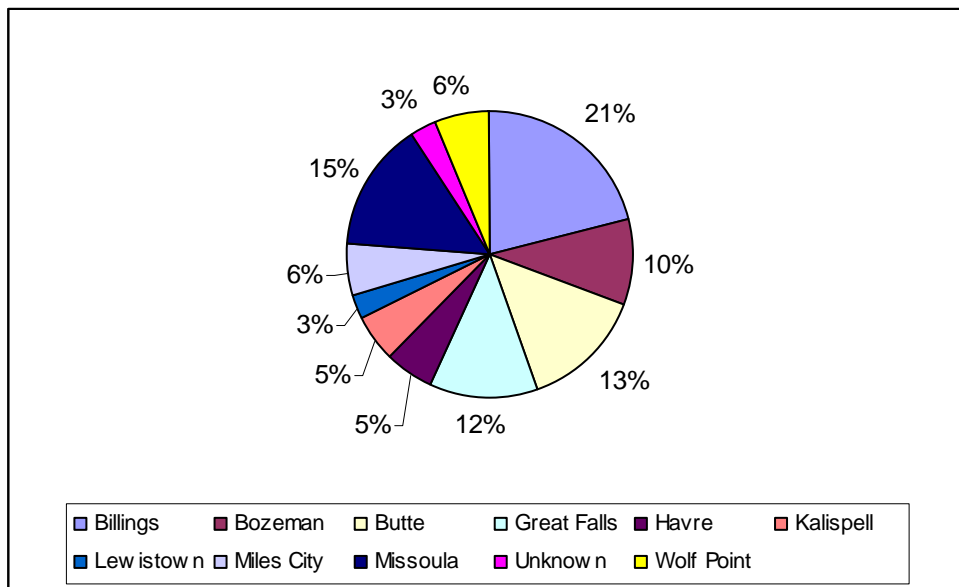


Figure 11: Breakdown of Calls per Maintenance Division

	Call Volume Rank	Population Rank	Rank when Normalized by Population
Billings	1	1	5
Missoula	2	2	9
Butte	3	4	6
Great Falls	4	5	4
Bozeman	5	6	8
Wolf Point	6	8	1
Miles City	6	9	2
Havre	8	7	7
Kalispell	8	3	10
Lewistown	10	10	3

Table 2: Call Volume Rank by Maintenance Division

3.4. Wireless versus Landline

This analysis was done on the Montana calls only, therefore 691,679 calls. As can be seen in Figure 12, eighty three percent of the call were made using landline services, while fourteen percent were made using wireless phones and three percent were unknown. There were seven different wireless companies used in Montana with the largest number of calls coming from Verizon Wireless (55 percent) and Western Wireless (32 percent). There were twenty four separate landline companies, with the majority of the calls coming from Qwest subscribers (35 percent).

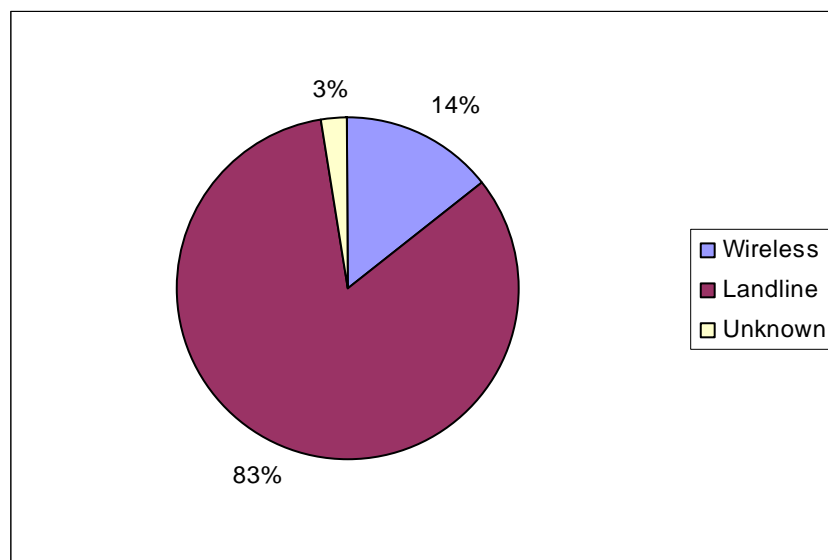


Figure 12: Wireless versus Landline Callers in Montana

4. CONCLUSIONS

This analysis led to the following conclusions:

- From January 2003 to June 2004 there were more than half a million informational calls;
- The new 511 system is used more (90 percent more) than the previous system;
- Callers have accrued almost 25,000 hours of call time to the system;
- The peak usage occurs in the winter with multi-day storms having the greatest impact on the call volume;
- The peak usage tends to occur on Saturdays and in the morning hours;
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- Without the vendor that Montana uses and their ability to share phone lines, over 47,000 people would have received a busy signal;
- There have been over 175,000 individual callers to the system with the majority of callers using 511 once;
- Calls have originated from phones registered to residents of all 50 states, Washington D.C., 9 of the 13 Canadian provinces, and 2 U.S. territories;
- More than 90 percent of all calls are from Montanans, and 17 percent of Montanans have tried 511; and
- More than eighty percent of the calls registered to Montanans came from landline phones.

5. REFERENCES

- 1 Wachutka, Y., J. Eidswick, and L. Ballard. "Greater Yellowstone Regional Traveler Weather Information System Pre-511 Evaluation Summary Version 1.0." Western Transportation Institute October 31, 2002.
- 2 Kalinowski, A. and J. Eidswick. "Greater Yellowstone Regional Traveler Weather Information System 511 Evaluation Summary" Western Transportation Institute August 2004.
- 3 Floyd, J. "Perceptions of Highway Maintenance in Montana in 2004: The results of a Telephone Survey Final Report." Montana State University, Billings. November, 2004.
- 4 Costello, P. "511 Deployment Coalition Performance Measures." www.deploy511.org/docs/511-coalperformmont.ppt. January 2003.