

Montana 511 Deployment Plan

by

Jaime Eidswick
Research Associate

Western Transportation Institute
College of Engineering
Montana State University

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EXECUTIVE SUMMARY

Montana deployed the #SAFE system using the phone number 511 on January 8, 2003, becoming the ninth statewide system and the fourteenth overall system in the U.S. At the time of deployment, the system included road conditions, weather forecasts, emergency travel only restrictions, chain requirements, and construction information.

To guide future expansions and enhancements, MDT contracted with the Western Transportation Institute (WTI) at Montana State University to create a comprehensive 511 deployment plan. This plan identifies the 511 needs of the traveling public along with public and private agencies; prioritizes enhancements to be completed; provides guidelines for inclusion of new information so users within the state are guaranteed seamless usage when traveling; and provides a case study example.

Initial enhancements to the 511 system since deployment included:

- Addition of a timestamp;
- Locations are reported using landmarks instead of mileposts;
- Voice recognition activation;
- Voice recognition deactivation with activation option;
- Addition of an alert system;
- Menu restructure;
- Glacier National Park information;
- Additional routes; and
- Geo option (information for a region instead of a route segment).

Additional enhancement ideas were collected by interviewing MDT staff, surveying the general public, and holding stakeholder workshops for public and private agencies. These enhancement ideas were then ranked and recommendations for short-term and long-term 511 enhancements were made. Short-term enhancements include:

- New database;
- Information on rest areas;
- Incident and accident information;
- Quicker and easier access to information with less choices and quicker dialogue;
- Additional secondary and rural routes; and
- National park information.

Long-term enhancements include:

- Services available by exit;
- Shortest route between locations;
- Local points of interest in the area;

- Professional drivers and/or public reporting road conditions;
- Opportunity to transfer to other services;
- Snow plow and sanding activity;
- Driving directions;
- Phone numbers or access to non-emergency help;
- City information;
- Public transportation information;
- Hospital and clinic information;
- Information on current/special events by highway exit;
- Live person to talk to; and
- Option for obtaining information by origin and destination.

Guidelines, for keeping 511 in Montana consistent as these enhancements are deployed, were also created. These guidelines stem from the 511 Deployment Coalition, national ITS standards and technology guidelines, and the roles and responsibilities of MDT and other agencies.

A checklist was created to assist agencies interested in partnering with MDT on the 511 system. The steps include:

Step 1 – Fill out ‘Request to Add Information to MDT’s 511 System’ form shown in Appendix B.

Step 2 – MDT will review the request and decide if this information would be useful to the public, if not, the agency is told, if so, MDT will meet with the agency

Step 3 – Meet with MDT to discuss what information would be included and options for how to include the information.

Step 4 – If MDT and the partnering agency agree to an option for providing the information, then they complete a memorandum of understanding (MOU)/contract agreement.

Step 5 – Agency begins providing the information.

Step 6 – Periodically MDT checks the information to ensure that it is following the guidelines.

Step 7 – Yearly, the memorandum of understanding (MOU)/contract agreement is reviewed.

MDT successfully worked with Yellowstone and Glacier National Parks on a case study enhancement of 511. Through this project, the options for inclusion of another agency’s information onto Montana’s 511 system were identified. This partnership also allowed for the development of a Memorandum of Understanding/Contract Agreement that will be useful in the future as other agencies prepare to partner with MDT. Glacier information is currently being supplied on 511 and Yellowstone information will be available at the end of a research project to automate the inclusion of information on 511.

1. INTRODUCTION

Traveler information is a key responsibility of departments of transportation in rural states like Montana, due to weather patterns and the large numbers of tourists that travel the state year round enjoying national parks and recreational activities. To better inform travelers, the Montana Department of Transportation (MDT) decided to upgrade their legacy traveler information system.

Montana deployed the #SAFE system using the phone number 511 on January 8, 2003. At the time, it was the ninth statewide system and the fourteenth overall system deployed in the U.S. At the time of deployment, the system included road conditions, weather forecasts, emergency travel only restrictions, chain requirements, and construction information.

After a successful deployment, MDT continued to look for ways to improve or enhance the system. Several enhancements to the system have been completed to date based on comments received from the public, via calls left on the 511 system and surveys completed.

To guide future expansions and enhancements, MDT contracted with the Western Transportation Institute (WTI) at Montana State University to create a comprehensive 511 deployment plan. This plan identifies the 511 needs of the traveling public along with public and private agencies; prioritizes enhancements to be completed; provides guidelines for inclusion of new information so users within the state are guaranteed seamless usage when traveling; and provides a case study example.

2. METHODOLOGY

To create the 511 deployment plan, WTI identified the needs of different stakeholder groups, documented current 511 enhancements, and developed recommendations for deployment in the short and long term. The resulting deployment plan was organized into the sections described below.

2.1. Existing 511 System

This section describes in detail the current system and the information it provides.

2.2. Initial 511 Enhancements

Since 511 was deployed in January 2003, several enhancements have already been completed on the system and several others are in the planning stages. This section of the report discusses those enhancements.

2.3. Identify 511 Needs

To identify the needs of stakeholders, three distinct stakeholder groups were identified including: MDT staff, the traveling public, and public and private agencies that may use 511 or provide data for 511.

MDT staff members were interviewed to discuss what enhancements they believed would be beneficial to agency operations, also what enhancements they thought the public wanted. Responses from the traveling public were gathered through review of the March 2003 survey evaluating the 511 system. Within this evaluation, the public identified enhancements they believed were needed for the system. Lastly, to gather information from public and private agencies, stakeholder meetings were held to gather their input on the needs of the 511 system and potential partnership opportunities.

This section of the report discusses the needs of the specific stakeholders in greater detail.

2.4. Priorities

This section combines the enhancements suggested by the three stakeholder groups and ranks them in order of priority.

2.5. Recommendations for Deployment

Based on the needs of stakeholders and the current enhancements completed, this section outlines the recommendations for deployment and enhancement of the 511 system. Recommendations are prioritized by short-term and long-term.

2.6. Content Guidelines

Montana's 511 Deployment Plan contains guidelines to assist the different information service providers (cities, counties, private sources, state tourism, and MDT) in developing and presenting content to travelers. The guidelines are based on the 511 Deployment Coalition recommendations, as well as the requirements of MDT and other stakeholders.

2.7. Case Study

This section discusses the inclusion of Yellowstone and Glacier National Parks into the Montana 511 system. These agencies serve as a case study for how other agencies can partner with MDT to add information onto 511.

3. EXISTING 511 SYSTEM

Prior to the deployment of 511, the Montana Department of Transportation (MDT) had a legacy system for gaining road and weather conditions, including a statewide 800 number (800-226-ROAD), a cell phone number (*ROAD), and twelve local travel information numbers. The legacy 800 number was created prior to the availability of the Internet and cell phones. It was manually recorded, labor intensive, gave an overview of all roads, provided road conditions only, and was updated twice a day. When a motorist called the 800 number, they heard an eleven-minute recording on an answering machine that provided road conditions for the primary roads in the state. Therefore, motorists often had to listen to all the roads to get the information they wanted, and if they missed their road, they would need to start over at the beginning.

In June of 2001, MDT along with the Western Transportation Institute at Montana State University began researching a new system through which MDT could provide the public with traveler information. The application selected was Meridian Environmental Technology's Advanced Traveler and Weather Information System (ATWIS). The system, which focuses on road conditions; weather forecasts; and construction, was originally deployed in North and South Dakota with access to mobile phone users via the #SAFE (#7233) number. Prior to Montana deploying this system, the Federal Communications Commission, in July 2000, designated 511 as America's traveler information number with the hopes of replacing the over 300 traveler information system numbers across the country with one number.

Montana deployed the #SAFE system using the phone number 511 on January 8, 2003, becoming the ninth statewide system and the fourteenth overall system in the U.S. When 511 was implemented, MDT decided that the 800 number would still be in use, but would connect callers with the 511 system information, making the 800 number and 511 synonymous. The 800 number allowed motorists in other states to access the Montana 511 information toll free. It has also been decided that *ROAD will no longer exist as a number to gain travel information. The decision still facing MDT is what to do with the twelve local travel information numbers.

At deployment, the system included road conditions, weather forecasts, emergency travel only (ETO) restrictions, chain requirements, information about surrounding states, and construction information. The season for winter road condition information is October through April, and the season for construction information is April through October; however, this information is provided year round if applicable (i.e. if there is a construction project in March it will be reported). Highway-specific weather forecasts are provided year-round through the 511 vendor who used National Weather Service (NWS) data and Road Weather Information Systems (RWIS) as an input into their weather forecasting model.

The data is collected by MDT in their Road Conditions Reporting System and is uploaded to their FTP site every ten minutes where the 511 vendor, Meridian Environmental, downloads this information every ten minutes and updates the 511 system. The forecasts and information from North and South Dakota are also added to Montana's 511 system. Currently, only phone numbers for Wyoming and Idaho are provided as they do not have a 511 system yet. Identical information is also available via the Meridian website, www.safetravelusa.com.

4. INITIAL 511 ENHANCEMENTS

Since the deployment of Montana's 511 system on January 8, 2003, several enhancements to the system have been made. The enhancements include:

- Timestamp. At the time of deployment, 511 system users did not know when the last update was made to 511; therefore a time stamp was added to indicate the last update made to the system.
- Exceptions changed to be reported as landmarks not mileposts. When 511 was deployed, the road conditions would tell what the condition for the majority of a roadway segment was and then would list what sections within the major segment had exceptions. At first these exceptions were reported by mileposts, but people calling from home before a trip often did not know where the mileposts were located, therefore it was later changed to describe the locations by landmarks.
- Voice recognition activation. Voice recognition was enabled to allow users to speak their choices or dial them with a button.
- Voice recognition deactivation with activation option. The voice recognition system was interrupted very easily by background noise (e.g. a radio, a coffee pot banging around, etc) and did not work very well with wireless phones. To avoid caller frustration, the option was changed so that if a caller wants to use voice recognition, they must enable it at the beginning of a call, therefore people not wanting to use voice recognition will not have trouble with the system.
- Alert system. The alert system is a feature that was enabled allowing an alert to be played at the very beginning of the 511 message prior to menu options being provided. When the alert system is activated, a caller cannot interrupt the system until after this alert has been played. The alert system allows for manually recorded messages for AMBER (child abduction) alerts, homeland security, and general transportation needs (e.g. used in Montana for Beartooth Pass Closure due to mudslides and I-90 closures due to wildfires.)
- Menu restructure. In order to allow the Montana 511 system to be expandable and allow for information other than that reported for Montana roads, the menu needed to be restructured. The menu now has an additional layer providing options for highway conditions, tourism information, and information in other states. This will allow additional options to be added in the future without changing the entire menu structure again.
- Glacier National Park information. Quite similar to how the alert system works, Glacier information will be available under the tourism option. This information will be manually recorded daily by Glacier National Park staff and will include information such as construction information for Going-to-the-Sun Road.
- Additional routes. When this option is complete, several additional secondary routes will be available on 511.
- Geo option. This option will allow callers to receive information on all the roads in a region of the state. This will allow callers to get a general overview of a region, without having to manually choose each route to get the information.

Table 1 shows the date that each enhancement was completed as well as the associated costs.

Table 1: 511 Enhancements

Enhancement	Date	Cost
Timestamp	April 18, 2003	No cost
Exceptions Changed to be Reported as Landmarks not Mileposts	June 24, 2003	No cost
Voice Recognition Activation	October 14, 2003	\$5400
Voice Recognition Deactivation with Activation Option	February 29, 2004	No cost
Alert System	October 1, 2004	\$18,046
Menu Restructure	August 16, 2005	\$1500
Glacier National Park Information	September 2, 2005	\$1500
Additional Routes	Expected in 2005	No cost
Geo Option (same as local phone numbers)	Expected in 2005	\$8854

5. IDENTIFY 511 NEEDS

To identify what enhancements should be made to Montana's 511 system, the needs of three stakeholder groups were analyzed. These stakeholder groups include: MDT staff, the traveling public, and public and private agencies.

In order to compare and contrast enhancement ideas across the three stakeholder groups, enhancements were divided into five categories including: menu structure, weather information, general department of transportation information, general transportation information from other organizations, and tourism information.

5.1. Overview of MDT Staff Discussions

Enhancements recommended by MDT's Maintenance Division employees in charge of 511 include:

- New database. This database would be a single database (the legacy system has a separate database for winter and summer reporting) that would be able to accept point locations as well as segments for easy use with 511.

5.1.1. Menu Structure Suggestions

- Complete routes. Rather than choosing multiple segments on a route, this option would allow travelers to get all of the information along a route at one time. It is thought that this option will be most useful for commercial vehicle operators traveling across the state. Example routes include I-90, I-15, US-2, and MT-200.
- Origin-destination information. When traveling from one major Montana city to another, this option would allow a traveler to get information on all the routes from one city to the next at one time, rather than gathering information from 511 on different routes and segments. This option would assume that the traveler is taking the most obvious state routes and not back roads. Examples would be from Bozeman to Helena. This would give information on I-90 from Bozeman to Three Forks and US 287 from Three Forks to Helena.

5.1.2. General Department of Transportation Information Suggestions

- Incident information. This would provide callers with information on incidents that would close a lane or road and possibly detour information. Currently, the database that MDT uses for collecting this information has been updated to provide 511 with accurate information; however, this information is still not feeding to 511.

5.2. Overview of Post-511 Survey Results

In March of 2003 an evaluation of Montana's 511 system was conducted. Of the 3000 surveys distributed, 676 surveys were completed and returned with valid responses. This produced a return rate of 23 percent. Three of the questions (importance of features, location identification, and additional features requested) that were asked on the survey, shown in Appendix A, pertain to possible enhancements to Montana's 511 system and will be discussed in this document. The write-up for the entire survey can be found in the document entitled Post-511 Evaluation (1).

5.2.1. Importance of Features

One of the survey questions asked, “If you were to call a travel information phone number, how important are the following features?” The options that were provided included: winter road conditions on highways, construction information on highways, weather forecasts, accident information, public transit information, information about conditions on city roads, access to information in neighboring states, regional road condition and construction reports, hands-free voice activation, and opportunity to record comments and give feedback. The respondents were asked to rank each option from very important to very unimportant on a five-point scale. The results are shown in Figure 1.

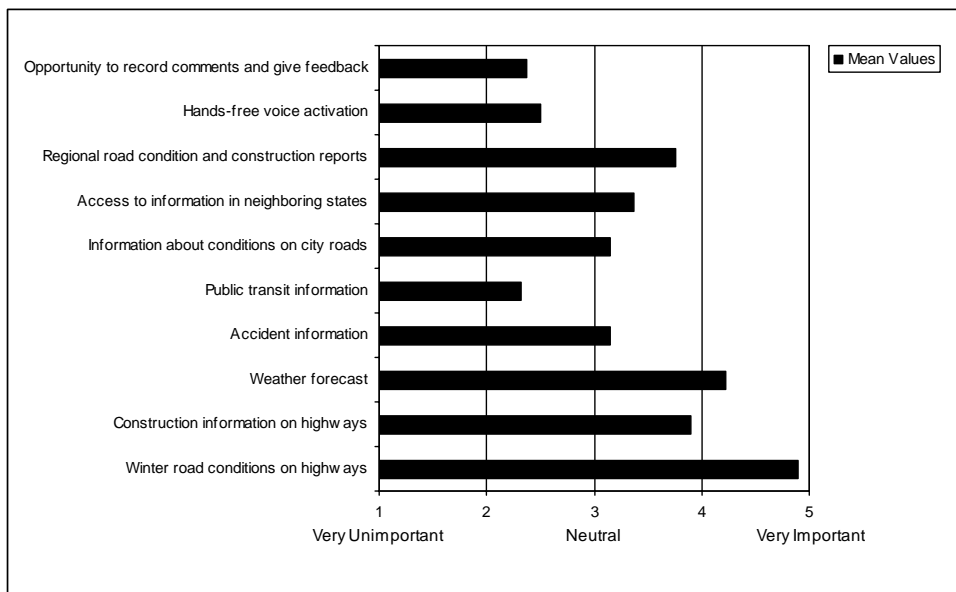


Figure 1: Mean Values of Features on Travel Information Phone Number

The information that respondents rated as the most important (with a mean between neutral, 3.0, and very important, 5.0) included: winter road conditions (4.89), weather forecasts (4.22), construction information (3.90), and accident information (3.15). MDT is currently providing all of this information, except accidents, in the 511 system. It is also important to note that MDT is providing the following: information on neighboring states (2.37), hands-free voice activation (1.45), and comment recording (1.30), all of which have means between very unimportant and neutral.

5.2.2. Location Identification

Another question in the survey included, “If it were necessary for you to identify your location to access travel information, which method would you prefer?” The options that were provided included: by highway number and mile marker, by highway number and names of communities you are between, by region, by community, by origin and destination, and other. The results for this question are shown in Figure 2.

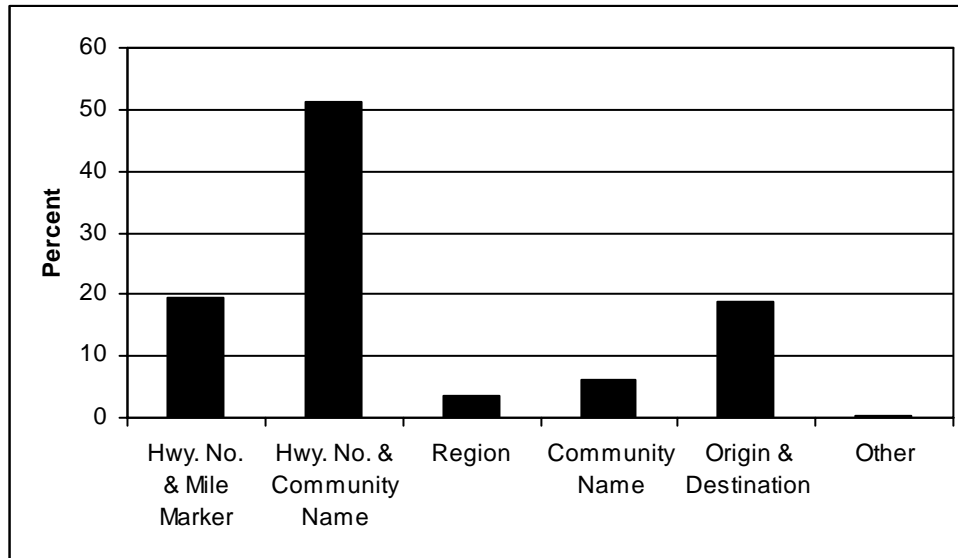


Figure 2: Travel Information Location Preference

More than 50% of respondents chose to have information provided to them by highway number and community name, which is how MDT is currently providing the information.

5.2.3. Additional Features Requested

The last question asked in the survey that pertains to 511 system enhancements was, “What other features would you like to see on a travel information phone system?” This question was left as an open-ended question for respondents to fill in their responses.

Of the 219 suggestions gathered from this question, sixteen responses indicated that the system did not need any changes, four indicated that the system should not be overloaded with information, and thirty-five responses indicated that the system should be updated more frequently to reflect accuracy of conditions. Fifty-one responses suggested enhancements that have already been accomplished and one hundred and thirteen new enhancements were suggested. The latter two are described in more detail below.

5.2.3.1. Suggestions That Have Been Implemented

- Regional information (10). The 511 system will soon allow callers to choose information by geographical region rather than by roadway. This will allow users to get a broad overview of conditions in a region;
- Weather information and road conditions (9). Since 511 “rolled out” on January 8, 2003, MDT has been providing road conditions and weather forecasts on the system;
- Timestamp (8). This was added April 18, 2003;
- Road closures (7). These are provided on the system for winter closures and emergency travel only by roadway. The new alert system also allows for road closures due to fires and major events to be reported at the beginning of the message. Road Closures due to incidents and accidents are currently not being reported on the system;

- Landmarks versus mile markers (5). Montana's 511 system was updated on June 24, 2003 to give information to users via landmarks rather than mile markers for road condition and forecast information. At this time, construction information is still reported via mile marker due to the database where this information is collected, but work is underway to update this system;
- Construction information (3). Provided on the system April through October;
- Conditions for neighboring states (3). Currently road conditions and weather forecasts for North Dakota (ND) and South Dakota (SD) roads are available on Montana's 511 system. This is possible because ND and SD have 511 systems and the same 511 vendor as Montana. Phone numbers to obtain information for Wyoming and Idaho are also provided on Montana's 511 system;
- Temperature (3). Temperature is reported as part of the weather forecast provided on 511;
- More phone lines (3). The 511 system has never given a caller a busy signal due to not having enough phone lines. Montana's system allows us to "borrow" phone lines from neighboring states when we are experiencing high call volumes so that no callers receive busy signals. Busy signals that are experienced are due to the system itself being down due to maintenance or due to the phone companies having an overload on their circuits;
- Options so you do not have to listen to entire message (3). 511 has given motorists this option. You no longer have to listen to an 11-minute recording of all the roads in the state. You can now choose the road you want and a specific segment, and therefore receive only the information you require;
- Free (1) and TTY number (1). Montana's 511 system is free to landline phone users; however, normal roaming and minute charges apply for cellular users. Montana's 511 system also has a TTY number for callers who are hearing impaired. This number is: (800)-335-7592;
- Chain requirements (1) and wind conditions (1). Chain requirements are posted on the 511 system as part of the road conditions, and wind speed is posted as part of the weather forecast;
- Ability to bypass the instructions (1). If you are a regular 511 user, Montana's system has been setup as an interruptible system, so you can press the numbers you need and get the information without listening to all of the options. The only time this will not work is if the Alert system has been activated. Therefore, if an AMBER Alert or fire is occurring, the system will make you listen to the entire alert before you can interrupt the 511 instructions;
- Voice activation (1). Voice activation was deployed on October 14, 2003. Due to many challenges with the voice activation, it was changed on February 29, 2004 to be an optional feature that the caller must turn on; and
- Repeat information (1). The 511 system allows you to press 1 to repeat road conditions and weather forecasts for a segment; in addition, it also tells you the name of the route and segment again before repeating the information.

5.2.3.2. Menu Structure Suggestions

- Information collected from drivers on the roadway;
- A date stamp;
- Voice be slower, articulate, and clear diction;
- Live person to talk to;
- Information on additional states including: Idaho, Oregon, and Washington;
- Additional secondary and rural routes including: Mill Creek Pass between Anaconda and Big Hole, Germin’s Ranch near Marysville, and Highway 279;
- Be able to ask, “What are the road conditions between city x and city x” (i.e. Glasgow and Havre);
- A way to get information if you do not know highway number;
- The ability to enter a numerical code for highways (i.e. Enter 93 for hwy 93; or 931 for hwy 93 N and 932 for hwy 93 S) instead of having to listen to information that is not needed;
- An option to access more than one section of road, without having to start over. “Example” at end of report (list) would like more information on a another roadway, if so press x;
- Quicker and easier access to information with less choices and quicker dialogue;
- Easy and quick access without long messages and “for x, press 1, etc;”
- Make system compatible at moving from highway to highway (i.e. I-90 to US 287);
- When I’m looking at road reports I’m interested in specifics, i.e. road from Red Lodge – Helena, each portion – RL-Columbus-Interstate-Three Forks-Helena;
- The caller number you are; and
- The ability to “rewind” instead of listening to the entire message again.

5.2.3.3. Weather Information Suggestions

- The exceptions reports say the same things as the general report on road conditions; it is a waste of time to report them;
- Conditions on mountain passes in Montana (i.e. Monida, Lolo, etc.);
- Snow plow and sanding activity (i.e. when and how often);
- Future forecasts 24 hours in advance by area;
- Snowfall already received;
- High water/flood related information including washed out culverts;
- Fire information (i.e. especially if affecting State/National Parks);
- Visibility warnings; and

- Extended conditions as there is too little information given on a section of road currently.

5.2.3.4. General Department of Transportation Information Suggestions

- Border crossing status (i.e. open 24 hrs, etc.);
- Information on rest areas (i.e. hours and seasons of operation, facilities available);
- Time related information for problem conditions (i.e. fog on I-90 between X city and Three Forks, should lift by 9 a.m.);
- More detailed construction information (i.e. delay times and days/hours of active work);
- Recommended alternate routes, best route available during conditions; and
- Any information on major accidents on highways.

5.2.3.5. General Transportation Information from Other Organizations Suggestions

- City conditions;
- Animal hazards on road (i.e. wildlife and ranch animals);
- Information on whether the road is dirt or paved;
- Identify bad areas on highway;
- Street cleaner information;
- Global Positioning System (GPS) and compass information;
- Safe driving hint of the day such as defensive driving principles just to remind callers of things they learned in High School drivers education, but forgot;
- Radio stations in the area for where you are calling. This is for those people that do not have cell phones or if the cell phones are “not in service;”
- Instructions pertaining to what to do in case of emergency with a vehicle; and
- Phone numbers or access to tow trucks and non-emergency police/sheriffs.

5.2.3.6. Tourism Information Suggestions

- Interesting places to visit or a “hot spot” of the month;
- Basic points of interest in the area;
- River flow stages during peak runoff season;
- Ski reports;
- Notification of special events in communities along the route (i.e. College Rodeo);
- Where wildlife can be viewed from the highway; and

- Service information such as gas (i.e. where the best gas price is, self serve versus full serve stations and hours of operation), restaurants, lodging.

5.2.3.7. Enhancements Prioritized

Normally, ranking would occur by gathering all of the ideas and then letting respondents rank what they feel is most important. This is done so respondents get the chance to rank ideas that they may not have come up with on their own, but still feel are important. However, due to the fact that survey respondents on an anonymous survey cannot be contacted, the ranking for these enhancements is solely done based on how many times an enhancement was suggested. Table 2 shows the enhancements suggested in rank order. As can be seen, the top three options all relate to the menu structure of the 511 system.

Table 2: Public Survey Enhancement Prioritization

Category	Enhancement Description	Rank
Menu Structure	Quicker and easier access to information with less choices and quicker dialogue	6
Menu Structure	Live person to talk to	5
Menu Structure	Additional secondary and rural routes including: Mill Creek Pass between Anaconda and Big Hole, Germin's Ranch near Marysville, and Highway 279	5
Dept. Of Transportation	Information on rest areas (i.e. hours and seasons of operation, facilities available)	5
Menu Structure	A date stamp	4
Weather	Snow plow and sanding activity (i.e. when and how often)	4
Dept. Of Transportation	More detailed construction information (i.e. delay times and days/hours of active work)	4
Menu Structure	Voice be slower, articulate, and clear diction	3
Weather	Conditions on mountain passes in Montana (i.e. Monida, Lolo, etc.)	3
Weather	High water/flood related information including washed out culverts	3
Weather	Fire information (i.e. especially if affecting State/National Parks)	3
Dept. Of Transportation	Recommended alternate routes, best route available during conditions	3
Tourism	Basic points of interest in the area	3
Tourism	Notification of special events in communities along the route (i.e. College Rodeo)	3
Tourism	Service information such as gas (i.e. where the best gas price is, self serve versus full serve stations and hours of operation)	3
Tourism	Service information such as restaurants	3
Menu Structure	Information collected from drivers on the roadway	2
Menu Structure	Information on additional states including: Idaho, Oregon, and Washington	2
Menu Structure	An option to access more than one section of road, without having to start over. "Example" at end of report (list) would like more information on a another roadway, if so press x	2
Menu Structure	Easy and quick access without long messages and "for x, press 1,	2

Category	Enhancement Description	Rank
	etc.”	
Weather	Future forecasts 24 hours in advance by area	2
Weather	Extended conditions as there is too little information given on a section of road currently	2
Dept. Of Transportation	Time related information for problem conditions (i.e. fog on I-90 between X city and Three Forks should lift by 9 a.m.)	2
Other Organizations	Animal hazards on road (i.e. wildlife and ranch animals)	2
Other Organizations	Global Positioning System (GPS) and compass information	2
Other Organizations	Phone numbers or access to tow trucks and non-emergency police/sheriffs	2
Tourism	Service information such as lodging	2
Menu Structure	Be able to ask, “What are the road conditions between city x and city x” (i.e. Glasgow and Havre)	1
Menu Structure	A way to get information if you do not know highway number	1
Menu Structure	The ability to enter a numerical code for highways (i.e. Enter 93 for hwy 93; or 931 for hwy 93 N and 932 for hwy 93 S) instead of having to listen to information that is not needed	1
Menu Structure	Make system compatible at moving from highway to highway (i.e. I-90 to US 287)	1
Menu Structure	When I’m looking at road reports I’m interested in specifics, i.e. road from Red Lodge – Helena, each portion – RL-Columbus-Interstate-Three Forks-Helena	1
Menu Structure	The caller number you are	1
Menu Structure	The ability to “rewind” instead of listening to the entire message again	1
Weather	The exceptions reports say the same things as the general report on road conditions it is a waste of time to report them	1
Weather	Snowfall already received	1
Weather	Visibility warnings	1
Dept. Of Transportation	Border crossing status (i.e. open 24 hrs, etc.)	1
Dept. Of Transportation	Any information on major accidents on highways	1
Other Organizations	City conditions	1
Other Organizations	Information on whether the road is dirt or paved	1
Other Organizations	Identify bad areas on highway	1
Other Organizations	Street cleaner information	1
Other	Safe driving hint of the day such as defensive driving principles just	1

Category	Enhancement Description	Rank
Organizations	to remind callers of things they learned in High School drivers education, but forgot	
Other Organizations	Radio stations in the area for where you are calling. This is for those people that do not have cell phones or if the cell phones are “not in service”	1
Other Organizations	Instructions pertaining to what to do in case of emergency with a vehicle	1
Tourism	Interesting places to visit or a “hot spot” of the month	1
Tourism	River flow stages during peak runoff season	1
Tourism	Ski reports	1
Tourism	Where wildlife can be viewed from the highway	1

5.3. Overview of Stakeholder Workshops

Stakeholder workshops were held for public and private agencies to discuss how 511 can help their organization/customers, partnership opportunities for providing information to the public, and future enhancements that should be considered for 511. Three workshops were held including a pilot in Bozeman, Montana for two agencies; a workshop in Bozeman, Montana for six agencies, and a workshop in Helena, Montana for five agencies.

5.3.1. 511 Users

In order to generate discussion on 511, participants were first asked who they thought users of 511 are. Answers included: travelers, commercial vehicle operators, and Galavan Users. Although they were not sure whether 511 was being used currently by the following organizations, they felt that 511 would be useful for emergency medical technicians (EMT) and Karst Stage bus drivers, because one driver could call and radio the information to other drivers. They felt that it would be helpful to know about specific road closures and road conditions (especially for the driver going through the canyon in the Bozeman area daily). The participants felt that school bus drivers would not call 511 for information because they can get it over the radio and that fleet drivers such as Galavan generally know the road conditions in Bozeman (i.e. city limits), but as they do not travel outside of Bozeman often, conditions in surrounding communities such as Three Forks and Manhattan would be useful.

5.3.2. Partnerships for 511 Information

Participants also discussed the possibility of other organizations providing road conditions and incidents to MDT for inclusion into 511. MDT mentioned that they need to be careful what organizations provide this information to ensure that it is reliable and accurate. It only takes one to two invalid pieces of information before callers stop using the system; therefore, MDT would not want to accept information from the general public unless it could be verified. Organizations that were suggested included:

- County road department;
- School bus drivers;
- Commercial vehicle operators;

- Transit providers such as Para transit;
- Post office mailmen; and
- Delivery companies such as UPS.

5.3.3. 511 System Characteristics

Lastly, participants were asked what characteristics they desired on a 511 system. Answers included:

- Ease of accessing information;
- Keep it short and simple (i.e. information and menus);
- Place road condition and weather information first, then provide other menu options;
- Frequent updates; and
- Clear voice.

5.3.4. 511 System Comparison

After an introduction to 511 and Montana's system, attendees were played eight examples of 511 systems including:

- South Dakota by Meridian Environmental Technologies;
- San Francisco, California by Nuance and PBS&J;
- Orlando, Florida by the National 511 Alliance;
- Massachusetts by Smart Routes;
- Minnesota by CARS and BeVocal;
- I-81 Corridor in Virginia by Virginia Tech Transportation Institute and Shentel Shenandoah Telecommunications;
- Utah by Tellme; and
- Arizona by Arizona Department of Transportation.

After the attendees listened to the eight examples, they were then asked to compare and contrast the different 511 systems. This exercise was completed so that the participants could see the variations in 511 systems and determine what they liked and did not like about the different systems. Examples of their opinions include:

- They felt that a parallel website for the information provided on 511 would be useful such as in Virginia;
- They liked the advertising on Virginia's system. Tourism is one of Montana's major moneymakers; and therefore attendees felt this should be included on Montana's 511 system as well. Plus it would help defer the cost of the system to MDT;
- They felt that callers should be given a choice to hear advertisements rather than forcing them listen to them;

- Some attendees felt that the menu options should be clean, simple, and accurate. They felt that Virginia's system had too many menu options;
- They felt there should not be music or quick changes in any of the menu systems;
- They preferred a single voice over mixed voices on the 511 systems. They felt that the mixing of a man's voice with a woman's voice on the Minnesota system was distracting;
- One attendee liked the sound of the Virginia voice;
- Another attendee felt that the voice is important so you can clearly understand the message and that it needs to be clear and concise and without an accent;
- Some attendees liked the voice recognition;
- They felt that the challenges with voice recognition such as incorrectly understanding accents and incorrect pronunciation should be addressed;
- One attendee felt that the mile marker option in the South Dakota example for obtaining information was good;
- Another attendee felt that a three-digit number would be much easier than the 800 number;
- They felt that it is important to get the information quickly; therefore the instructions should be provided quickly; and
- The voice sounds slow which is good because it is easy to catch and understand the information.

5.3.5. Pilot Workshop Enhancement Ideas

A pilot workshop was held December 3, 2002 from 11:00 am to 1:00 pm at the Western Transportation Institute (WTI) in Bozeman, Montana. There were nine attendees at this workshop including Western Transportation Researchers and Montana State University students.

Their suggestions for enhancements are listed below broken into six categories including: suggestions that have been implemented, menu structure, weather information, general department of transportation information, general transportation information from other organizations, and tourism information.

5.3.5.1. Suggestions That Have Been Implemented

- Chain requirements. These are posted on the 511 system as part of the road conditions; and
- Amber Alert. The Alert system was completed on October 1, 2004 and allows AMBER (child abduction) Alerts to be manually recorded on the 511 system.

5.3.5.2. Menu Structure Suggestions

- Opportunity to transfer to other services (tourism, transit, etc);
- Printable instructions for using 511 on a website so a caller does not need to listen to the instructions over the phone;

- Other languages as an option on the system;
- Option to obtain information by origin and destination (i.e. not highway number); and
- Option to choose a route by either its number or its alias such as “Main Street.”

5.3.5.3. Weather Information Suggestions

- Information on roads that have been plowed based on automatic vehicle location (AVL) data; and
- National weather service warnings.

5.3.5.4. General Department of Transportation Information Suggestions

- Mileage, directions and estimated travel time similar to those found on the internet;
- Alternate/shortest route between locations according to distance, time, construction, accidents, and weather;
- Border Information (i.e. hours of operation, paperwork needed, and pet restrictions);
- Driving directions;
- Accident information;
- Messages from dynamic message signs (DMS);
- Traffic density information/reports;
- Rest areas locations and hours/months of operation;
- Kiosk locations;
- Congestion information;
- Surface condition information; and
- Rural travel time estimation.

5.3.5.5. General Transportation Information from Other Organizations Suggestions

- Service stations to call for situations such as tow truck or flat tire;
- Phone number to call for Para transit services;
- Taxi service information;
- Animal movement affecting roadway;
- Transit information;
- Airport location, closures, plane delays, and flight number changes;
- Hospital locations;
- Public parking locations and availability;

- Visitor center information (i.e. locations and hours/months of operation); and
- City information.

5.3.5.6. Tourism Information Suggestions

- Lodging information when 511 is reporting really severe weather or closures;
- Information on current events by highway exit including access/parking, the time that gates open, price, and road closures due to event;
- National Park information (i.e. entrance fees, pet restrictions, parking availability, camping/lodging availability, transit information, and general information);
- Out of state fishing and hunting license purchasing information;
- Seasonal advisories about bears and hunting;
- Snow reports for Bridger and Big Sky;
- Hotel information and availability including exit numbers;
- Gas stations information and exit numbers;
- Next service station is X miles information; and
- Restaurant information.

5.3.5.7. Information Prioritized

Desired information to include in the MT 511 system was selected in the group discussion as listed above. Each attendee present was then allocated five dots to place next to their preferred choice/choices. The results listed below show the information as prioritized. Options with an 'NR' in the rank indicate that although this was an option discussed, it was 'Not Ranked' or did not receive any dots when attendees were allowed to prioritize their options.

The prioritization for these enhancements is shown in Table 3. As can be seen, the top ranked items were associated with the menu structure and information provided by the department of transportation.

Table 3: Pilot Workshop Enhancement Prioritization

Category	Enhancement Description	Rank
Menu Structure	Opportunity to transfer to other services (tourism, transit, etc)	7
Dept. of Transportation	Alternate/shortest route between locations according to distance, time, construction, accidents, and weather	6
Dept. of Transportation	Driving directions	6
Weather	National weather service warnings	4
Dept. of Transportation	Accident Information	3
Weather	Information on roads that have been plowed based on AVL data	2
Other Organizations	Animal movement affecting roadway	2
Other Organizations	Public parking locations and availability	2
Other Organizations	City information	2
Dept. of Transportation	Messages from Dynamic Message Signs	1
Dept. of Transportation	Border Information (i.e. hours of operation, paperwork needed, and pet restrictions)	1
Dept. of Transportation	Rural travel time estimation	1
Other Organizations	Hospital locations	1
Other Organizations	Visitor center information (i.e. locations and hours/months of operation)	1
Other Organizations	Transit information	1
Tourism	National Park information (i.e. entrance fees, pet restrictions, parking availability, camping/lodging availability, transit information, and general information)	1
Menu Structure	Printable instructions for using 511 on a website so a caller does not need to listen to the instructions over the phone	NR
Menu Structure	Other languages as an option on the system	NR
Menu Structure	Option to obtain information by origin and destination (i.e. not highway number)	NR
Menu Structure	Option to choose a route by either its number or its alias such as "Main Street"	NR
Dept. of Transportation	Mileage, directions and estimated travel time similar to those found on the internet	NR
Dept. of Transportation	Traffic density information/reports	NR
Dept. of Transportation	Rest areas locations and hours/months of operation	NR
Dept. of Transportation	Kiosk locations	NR
Dept. of Transportation	Congestion information	NR
Dept. of Transportation	Surface condition information	NR
Other Organizations	Service stations to call for situations such as tow truck or flat tire	NR
Other Organizations	Phone number to call for Para transit services	NR

Category	Enhancement Description	Rank
Other Organizations	Taxi service information	NR
Other Organizations	Airport location, closures, plane delays, and flight number changes	NR
Tourism	Lodging information when 511 is reporting really severe weather or closures;	NR
Tourism	Information on current events by highway exit including access/parking, the time that gates open, price, and road closures due to event	NR
Tourism	Out of state fishing and hunting license purchasing information	NR
Tourism	Seasonal advisories about bears and hunting	NR
Tourism	Snow reports for Bridger and Big Sky	NR
Tourism	Hotel information and availability including exit numbers	NR
Tourism	Gas stations information and exit numbers	NR
Tourism	Next service station is X miles information	NR
Tourism	Restaurant information	NR

5.3.6. Bozeman Workshop Enhancement Ideas

A second workshop was held December 4, 2002 from 1:30 to 3:30 pm at the Comfort Inn in Bozeman, Montana. There were nine attendees including the following agencies:

- MDT Headquarters,
- MDT Bozeman Division,
- Gallatin County Roads,
- TeleSystem Services,
- Galavan, and
- Karst Stage.

Their suggestions for enhancements are listed below broken into six categories including: suggestions that have been implemented, menu structure, weather information, general department of transportation information, general transportation information from other organizations, and tourism information.

5.3.6.1. Suggestions That Have Been Implemented

- Regional information (8). The 511 system will soon allow callers to choose information by geographical region rather than by roadway. This will allow users to get a broad overview of conditions in a region;
- Weather information and road conditions. Since 511 “rolled out” on January 8, 2003, MDT has been providing road conditions and weather forecasts on the system;
- Time of updates. This was added April 18, 2003;

- Construction information. This is provided on the system April through October each year;
- Comment recording. The ability for callers to record comments on the system's usefulness or to ask questions has been in effect since the system deployed on January 8, 2003; and
- Road closures. These are provided on the system for winter closures and emergency travel only by roadway. The new alert system also allows for road closures due to fires and major events to be reported at the beginning of the message. Road Closures due to incidents and accidents are currently not being reported on the system.

5.3.6.2. Menu Structure Suggestions

- Ability to access information via mile marker as well as named segments;
- General public reporting road conditions; and
- Professional drivers reporting road conditions.

5.3.6.3. General Department of Transportation Information Suggestions

- Rest Area Information; and
- Detours.

5.3.6.4. General Transportation Information from Other Organizations Suggestions

- Construction information or phone numbers for obtaining this information for cities;
- Phone numbers for tow trucks;
- Phone number to check on school closures (although these only occur when temperature 20 degrees below zero and buses do not run);
- Phone number for city road information;
- Hospital Information;
- Public transportation information; and
- Para Transit Service information.

5.3.6.5. Tourism Information Suggestions

- Information on attractions in the area;
- National Park information;
- Services such as gas stations; and
- Food and lodging services.

5.3.6.6. Information Prioritized

The enhancements were then prioritized in the same way as in the pilot workshop.

The prioritization for these enhancements is shown in Table 4. As can be seen, the top ranked items were associated with the menu structure and information provided by the department of transportation.

Table 4: Bozeman Workshop Enhancement Prioritization

Category	Enhancement Description	Rank
Menu Structure	Professional drivers reporting road conditions	5
Dept. of Transportation	Rest area information	5
Tourism	National Park information	4
Dept. of Transportation	Detours	3
Tourism	Information on attractions in the area	2
Other Organizations	Phone number for city road information	2
Menu Structure	General public reporting road conditions	1
Other Organizations	Hospital information	1
Other Organizations	Public transportation information	1
Other Organizations	Para Transit service information	1
Tourism	Services such as gas stations	1
Menu Structure	Ability to access information via mile marker as well as named segments	NR
Other Organization	Construction information or phone numbers for obtaining this information for cities	NR
Other Organization	Phone numbers for tow trucks	NR
Other Organization	Phone number to check on school closures (although these only occur when temperature 20 degrees below zero and buses do not run)	NR
Tourism	Food and lodging services	NR

5.3.7. Helena Workshop Enhancement Ideas

A third workshop was held February 28, 2003 from 10:00 am to 12:30 pm at MDT Headquarters in Helena, Montana. There were eight attendees including representation from the following organizations:

- MDT Headquarters,
- Montana Emergency medical Services,
- TeleSystem Services,
- Ft. Peck Tribes, and
- AAA.

Their suggestions for enhancements are listed below broken into six categories including: suggestions that have been implemented, menu structure, weather information, general department of transportation information, general transportation information from other organizations, and tourism information.

5.3.7.1. Suggestions That Have Been Implemented

- Road closures. These are provided on the system for winter closures and emergency travel only by roadway. The new alert system also allows for road closures due to fires and major events to be reported at the beginning of the message. Road Closures due to incidents and accidents are currently not being reported on the system.

5.3.7.2. Menu Structure Suggestions

- Identification of routes by origin, destination, and town/city;
- Ability to transfer to other systems (hotels, other 511, chamber of commerce, etc.);
- Provide a map with road numbers because most people do not know all the highway/road numbers they are traveling on; and
- Provide a map with mile markers so callers can see the locations that the system is talking about.

5.3.7.3. Weather Information Suggestions

- Wildfire information;
- Mountain pass reports; and
- Warnings about where snow plows are and are heading.

5.3.7.4. General Department of Transportation Information Suggestions

- Rest area information;
- Driving distances;
- Bicycle information (i.e. routes, maps, bike tours, and roads to avoid while on bikes);
- Shoulder widths;
- Alternate routes;
- Traffic congestion/volume information; and
- Incident and accident information.

5.3.7.5. General Transportation Information from Other Organizations Suggestions

- Location of clinics and hospitals;
- Public transportation information including inner-city bus stops;
- Greyhound;
- Amtrak;
- Phone number for tow truck service; and
- Airport info.

5.3.7.6. Tourism Information Suggestions

- Lodging information;
- Local information and points of interest;
- Services available by exit;
- Local tourism information;
- History of the Native American reservations;
- Ability to transfer to AAA; and
- Special events.

5.3.8. Information Prioritized

The enhancement ideas were then prioritized again as done in the past meetings. The prioritization is shown in Table 5. As shown, the top priorities were additional information reported by the department of transportation and tourism information.

Table 5: Helena Workshop Enhancement Prioritization

Category	Enhancement Description	Rank
Dept. of Transportation	Incident and accident information	4
Dept. of Transportation	Bicycle information (i.e. routes, maps, bike tours, and roads to avoid while on bikes)	4
Tourism	Services available by exit	4
Dept. of Transportation	Rest area information	3
Dept. of Transportation	Driving distances	3
Other Organizations	Locations of clinics and hospitals	3
Tourism	Lodging information	2
Tourism	Local information and points of interest	2
Tourism	Local tourism information	2
Other Organizations	Public transportation information including inner-city bus stops	2
Other Organizations	Phone number for tow truck service	2
Dept. of Transportation	Alternate routes	2
Tourism	Ability to transfer to AAA	1
Tourism	History of the Native American reservations;	1
Tourism	Special events	1
Menu Structure	Identification of routes by origin, destination, and town/city	1
Menu Structure	Ability to transfer to other systems (hotels, other 511, chamber of commerce, etc.)	1
Weather	Wildfire information	1
Dept. of Transportation	Traffic congestion/volume information	1
Menu Structure	Provide a map with road numbers because most people do not know all the highway/road numbers they are traveling on	NR
Menu Structure	Provide a map with mile markers so callers can see the locations that the system is talking about.	NR
Weather	Mountain pass reports	NR
Weather	Warnings about where snow plows are and are heading	NR
Dept. of Transportation	Shoulder widths	NR
Other Organizations	Greyhound	NR
Other Organizations	Amtrak	NR
Other Organizations	Airport Information	NR

6. PRIORITIES

In this section, the enhancements identified by MDT staff, in the public survey and each of the workshops were combined, sorted, and ranked. The rank was obtained by adding the ranks from each of the previous tables (i.e. Table 2, Table 3, Table 4, and Table 5) and staff recommendations, even though the ranks for these tables were obtained differently. The enhancements that were mentioned in the workshops, but not ranked, received a rank of one for this combination table. This was to ensure that all enhancements had a score for this final table.

The final ranking for all enhancements are shown in Table 6.

Table 6: Enhancements Ranked by Priority

Category	Enhancement Description	Rank
Tourism	Service available by exit including gas, food, and lodging	21
Dept. of Transportation	Detour/Alternate/shortest route between locations according to distance, time, construction, accidents, and weather	14
Dept. Of Transportation	Information on rest areas (i.e. hours and seasons of operation, facilities available)	14
Tourism	Local points of interest in the area	10
Dept. of Transportation	Incident and accident information	9
Menu Structure	Opportunity to transfer to other services (tourism, transit, etc)	8
Menu Structure	Quicker and easier access to information with less choices and quicker dialogue	8
Menu Structure	Professional drivers and/or public reporting road conditions	8
Weather	Snow plow and sanding activity (i.e. when and how often)	7
Dept. of Transportation	Driving directions	6
Other Organizations	Phone numbers or access to tow trucks, non-emergency police/sheriffs, and service stations for flat tire	6
Other Organizations	City information including construction and road conditions	6
Other Organizations	Public transportation information including inner-city bus stops and Para transit services	6
Menu Structure	Live person to talk to	5
Menu Structure	Additional secondary and rural routes including: Mill Creek Pass between Anaconda and Big Hole, Germin's Ranch near Marysville, and Highway 279	5
Other Organizations	Hospital and clinic information and locations	5
Tourism	National Park information (i.e. entrance fees, pet restrictions, parking availability, camping/lodging availability, transit information, and general information)	5
Tourism	Information on current/special events by highway exit including access/parking, the time that gates open, price, and road closures due to event	5
Menu Structure	Option to obtain information by origin and destination (i.e. not highway number)	5
Menu Structure	A date stamp	4
Weather	Fire information (i.e. especially if affecting State/National	4

Category	Enhancement Description	Rank
	Parks)	
Weather	National weather service warnings	4
Weather	Conditions on mountain passes in Montana (i.e. Monida, Lolo, etc.)	4
Dept. Of Transportation	More detailed construction information (i.e. delay times and days/hours of active work)	4
Dept. of Transportation	Bicycle information (i.e. routes, maps, bike tours, and roads to avoid while on bikes)	4
Other Organizations	Animal hazards on road (i.e. wildlife and ranch animals)	4
Menu Structure	Voice be slower, articulate, and clear diction	3
Menu Structure	Printable instructions for using 511 on a website so a caller does not need to listen to the instructions over the phone or a map with road numbers and mileposts	3
Weather	High water/flood related information including washed out culverts	3
Dept. of Transportation	Traffic congestion/volume information	3
Dept. of Transportation	Driving distances	3
Menu Structure	Information on additional states including: Idaho, Oregon, and Washington	2
Menu Structure	An option to access more then one section of road, without having to start over. "Example" at end of report (list) would like more information on a another roadway, if so press x	2
Weather	Future forecasts 24 hours in advance by area	2
Weather	Extended conditions as there is too little information given on a section of road currently	2
Dept. Of Transportation	Time related information for problem conditions (i.e. fog on I-90 between X city and Three Forks should lift by 9 a.m.)	2
Dept. of Transportation	Border Information (i.e. hours of operation, paperwork needed, and pet restrictions)	2
Dept. of Transportation	Rural travel time estimation	2
Other Organizations	Global Positioning System (GPS) and compass information	2
Other Organizations	Airport information (i.e. location, closures, plane delays, and flight number changes)	2
Other Organizations	Public parking locations and availability	2
Tourism	Ski/snow reports for ski areas	2
Menu Structure	A way to get information if you do not know highway number	1
Menu Structure	The ability to enter a numerical code for highways (i.e. Enter 93 for hwy 93; or 931 for hwy 93 N and 932 for hwy 93 S) instead of having to listen to information that is not needed	1
Menu Structure	Option to choose a route by either its number or its alias such as "Main Street"	1
Menu Structure	Ability to access information via mile marker as well as	1

Category	Enhancement Description	Rank
	named segments	
Menu Structure	Make system compatible at moving from highway to highway (i.e. I-90 to US 287)	1
Menu Structure	The caller number you are	1
Menu Structure	The ability to “rewind” instead of listening to the entire message again	1
Menu Structure	Other languages as an option on the system	1
Menu Structure	Complete routes	1
Weather	The exceptions reports say the same things as the general report on road conditions it is a waste of time to report them	1
Weather	Snowfall already received	1
Weather	Visibility warnings	1
Dept. of Transportation	Messages from Dynamic Message Signs	1
Dept. of Transportation	Kiosk locations	1
Dept. of Transportation	Surface condition information	1
Dept. of Transportation	Shoulder widths	1
Other Organizations	Information on whether the road is dirt or paved	1
Other Organizations	Identify bad areas on highway	1
Other Organizations	Street cleaner information	1
Other Organizations	Safe driving hint of the day such as defensive driving principles just to remind callers of things they learned in High School drivers education, but forgot	1
Other Organizations	Radio stations in the area for where you are calling. This is for those people that do not have cell phones or if the cell phones are “not in service”	1
Other Organizations	Instructions pertaining to what to do in case of emergency with a vehicle	1
Other Organizations	Visitor center information (i.e. locations and hours/months of operation)	1
Other Organizations	Taxi service information	1
Other Organization	Phone number to check on school closures (although these only occur when temperature 20 degrees below zero and buses do not run)	1
Other Organizations	Greyhound	1
Other Organizations	Amtrak	1
Tourism	River flow stages during peak runoff season	1
Tourism	Where wildlife can be viewed from the highway	1
Tourism	Ability to transfer to AAA	1
Tourism	History of the Native American reservations;	1
Tourism	Out of state fishing and hunting license purchasing information	1
Tourism	Seasonal advisories about bears and hunting	1
	New Database	1

7. RECOMMENDATIONS FOR DEPLOYMENT

The recommendations for deployment are taken from Table 6. Any request with a rank of five or more is discussed below. The recommendations are broken into short and long-term deployments. Short-term deployments are anything that can possibly be accomplished in the short-term (i.e. next one to two years). Most of these recommendations include enhancements that are already underway or would be relatively simple to implement from a technology standpoint. Long-term deployments include requests that may take more time and effort to implement. Note that the top requests are not necessarily in the short-term deployment list, because the classification of each deployment was determined by ease of implementation and not how many requests were made for it.

7.1. Recommendations for Short-term Deployment

- New database. There was only one request for this feature. Although there was only one request for this, it was made by MDT staff members who understand its importance to 511 operations. A new database would allow for information to be input easier and would allow more types of information to be accessible for 511. A research project is currently underway to create requirements for a new database and to make a recommendation for either creating a new system or buying an off-the-shelf product.
- Information on rest areas. There were fourteen requests for this information. Information desired included location, hours and seasons of operation, and facilities/amenities available. As this information is currently available in the MDT database that is feeding the 511 system, the deployment of this information is feasible.
- Incident and accident information. There were nine requests for this information. Again, this information can be distributed to 511 via the current MDT database. Road reporters would need to be trained to input this information on a consistent basis for it to be accurate when provided to the public. This information should be relatively easy to provide on 511.
- Quicker and easier access to information with less choices and quicker dialogue. There were eight requests for this menu change. The new menu structure deployed in August 2005 will take care of a portion of this request for easier access and the geo reports scheduled for deployment in September 2005 should make information quicker to access, therefore leaving quicker dialogue. The summer 2005 #SAFE coalition meeting included a discussion on possibly hiring a new “voice of #SAFE.” In this case, a radio personality would be chosen to speak the choices for 511. This would not only provide a voice without an accent, but could also allow the dialogue to move quicker.
- Additional secondary and rural routes. There were five requests for additional routes to be included on 511 with the following roads specifically mentioned: Mill Creek Pass between Anaconda and Big Hole, Germin’s Ranch near Marysville, and Highway 279. The addition of more roads in September 2005 should address this request.
- National park information. There were five requests for this information. Information requested includes: entrance fee information, pet restrictions, parking availability, camping/lodging availability, transit information, and general park information. Glacier National Park information will be available in a limited form starting in August of 2005.

There are also plans to provide Yellowstone and Glacier information in a more broad and automated way in the next few years.

7.2. Recommendations for Long-term Deployment

- Service available by exit. There were twenty-one requests for this information. Requests for service information included gas stations, restaurants, and lodging. This information would be important for someone unfamiliar with the area especially in the instance where an incident is forcing them to detour to a new roadway or exit the highway altogether. Virginia's 511 system provides this information to callers and uses it to help subsidize the system by charging the services/companies that are advertised.
- Shortest route between locations. There were fourteen requests for this information. The information requested was to provide the shortest route between origin and a given destination. This could be calculated according to distance and time taking into consideration construction, accidents, and weather. The challenge with providing this information is that it may be difficult to relay over the phone if the caller does not have a map or a print out of the information available.
- Local points of interest in the area. There were ten requests for this information. Information requested included local points of interest such as historic points, museums, state and national parks, etc. This information could be provided by Travel Montana and local communities.
- Professional drivers and/or public reporting road conditions. There were eight requests for additional road conditions to be provided by either professional drivers or the public. Although road conditions should not be input without verifying them, road conditions called in from other reliable sources, such as the Montana Highway Patrol; MDT Motor Carrier Service staff; and the 'Highway watch' a program designed to have commercial vehicle operators and professional drivers identify and report problems on roadways, could be beneficial.
- Opportunity to transfer to other services. There were eight requests for this menu structure change. Other services that callers would like to be transferred to include tourism and transit agencies. Discussions between Travel Montana and MDT have occurred in the past to discuss this potential, and the issue remains unresolved whether or not the 511 vendor can accommodate this menu structure change.
- Snow plow and sanding activity. There have been seven requests for this information. Information requested includes locations of snow plows and sanding, when it occurred, and how often it occurs. Although this information is not currently available in an easy to deliver format, there is a pilot project currently ongoing to equip some of the MDT snow plow fleet with automatic vehicle location (AVL) to track their locations. As part of that project, discussions will include the potential use of that information to feed 511.
- Driving directions. There were six requests for driving directions. The challenge is that it may be difficult to relay this information over the phone if callers do not have a map or a print out of the directions available.

- Phone numbers or access to non-emergency help. There were six requests for this information. The request was for phone numbers or transfers to the non-emergency number for police/sheriffs, tow truck companies, and service stations for help with flat tires. It is all information that you would need while on the road, but may not have if you are traveling out of your town.
- City information. There were six requests for city information. Specifically, the information requested was construction and road conditions. Currently, MDT provides information on state maintained primary and secondary routes only; therefore most city and county routes are not included in the 511 service.
- Public transportation information. There were six requests for this information. Although there are not as many public transportation agencies in Montana (fourteen public transportation agencies and fifty Para transit agencies) as in an urban state, this information may be useful to travelers. Both public inner-city transit and Para transit information could be provided including schedules and phone transfers to operators for more information (and Para transit reservations). Currently, MDT is evaluating a potential research project which would make this information available on both the MDT web site and 511.
- Hospital and clinic information. There were five requests for this information. In this case, respondents requested locations and phone numbers or transfers to the closest hospital or clinic.
- Information on current/special events by highway exit. There were five requests for this information. In a state that is driven by tourism, this information would be useful to visitors. Information provided would include name of event, time that gates open, price, parking/access, and road closures due to event. Examples of these events may include county fairs, rodeos, the Lewis and Clark bicentennial exhibit, Shakespeare in the park, etc. This information could be provided by Travel Montana and local communities.
- Option for obtaining information by origin and destination. There were five requests for this feature. This feature would allow a caller to hear road conditions and construction for all of the roads between their origin and destination (e.g. Missoula and Billings) without having to type in each roadway to hear the information.
- Live person to talk to. There were five requests for this menu structure change; however, this enhancement is not recommended due to the added staff costs and time for providing this service. There would most like also need to be an increase in phone lines due to longer times spent on 511.

8. GUIDELINES

Three types of guidelines are discussed below including the 511 Deployment Coalition Guidelines; ITS Standards and technology guidelines; and MDT and other agency roles and responsibility guidelines.

8.1. 511 Deployment Coalition Guidelines

The 511 Deployment Coalition has put together a document on operational guidelines for 511 services (2). Guidelines include:

- “511 systems must be designed to provide information beyond a single agency, mode or content type;”
- The system shall “provide sufficient ‘context’ for an unfamiliar user of the service;”
- “..so long as quality basic context [basic content includes roadway, transit or public transportation, and weather] is being provided, the Coalition encourages that 511 implementers consider providing optional content that will benefit callers;”
- “...optional content is up to the discretion of the system implementers and can include additional content supported by the public sector and/or private sector supported services;”
- “In examining the addition of optional content, system implementers should be careful to design a system that complements - rather than diminishes – the impact of the basic content services;”
- “...511 implementers must focus on the following five quality parameters: accuracy, timeliness, reliability, consistency of presentation, and relevancy;”
- “The quality of basic content information will largely determine the success of 511. This is why the information is recommended to be tailored to the travelers’ needs along their route;”
- “Providing a time/date identified to provide callers with a sense of reliability and accuracy of the information provided is desired by some deployers and some customers;” and
- “While consistency is vital, meeting a travelers’ needs should always be the top priority (2).”

8.2. ITS Standards and Technology Guidelines

The 511 Deployment Coalition decided not to initiate 511-focused standards development at this point in time due to uncertainty over what standards would be necessary for a 511 system (2); however, the following guidelines should be used to provide consistency in Montana’s data for the public.

- If a database will be used to feed information to 511, it must export the data into extensible markup language (XML);
- Information provided by an agency to the 511 vendor must be available for download via an FTP site; and

- For text supplied by a database describing traveler information, the following standards should be used to make the information compatible with other 511 systems:
 - SAE J2353 – Advanced Traveler Information Systems (ATIS) Data Dictionary;
 - SAE J2354 – Advanced Traveler Information Systems (ATIS) Message Sets;
 - ITE’s Advanced Transportation Management System (ATMS) Traffic Management Data Dictionary (TMDD).

8.3. Role and Responsibility Guidelines

These guidelines describe the roles and responsibilities of both MDT and the participating agency when they partner to include additional information on 511.

8.3.1. MDT

- No matter what information is added to the 511 system, MDT retains ownership of the 511 system;
- MDT has final jurisdiction on what information shall be put on the 511 system and any participating agency shall abide by MDT’s decision on this information;
- MDT shall be the single point of contact for discussing issues with the 511 vendor;
- MDT shall notify all participating agencies if a change in vendor occurs;
- MDT shall notify all participating agencies if a menu change affects that particular agency;
- MDT shall market partnerships with other agencies;
- MDT shall provide the partnering agency with instructions on how to incorporate their information onto 511 (e.g. if using the alert system, MDT will provide instruction and the appropriate codes); and
- MDT shall have the vendor add the participating agency to the email list which receives daily 511 call volume statistics.

8.3.2. Other Agency

- Participating agencies shall provide accurate, timely, and reliable information;
- Participating agencies shall pay for the phone calls to their portion of the 511 system;
- Information provided by participating agencies must be provided at least once daily and updated as changes occur during their scheduled season. During off season times, an end of the season message must remain on the 511 system and shall be updated as needed;
- Date and time of message generation must be on the message;
- The message must indicate what agency provided the information; and
- The participating agency shall market the inclusion of their information onto the 511 system.

9. CHECKLIST FOR REQUESTING TO PARTNER ON 511

Step 1 – Fill out ‘Request to Add Information to MDT’s 511 System’ form shown in Appendix B.

Step 2 – MDT will review the request and decide if this information would be useful to the public; if not, the agency is told, if so, MDT will meet with the agency

Step 3 – Meet with MDT to discuss what information would be included and options for how to include the information.

Step 4 – If MDT and the partnering agency agree to an option for providing the information, then they complete a memorandum of understanding (MOU)/contract agreement.

Step 5 – Agency begins providing the information.

Step 6 – Periodically MDT checks the information to ensure that it is following the guidelines.

Step 7 – Yearly, the memorandum of understanding (MOU)/contract agreement is reviewed.

10. CASE STUDY

Glacier and Yellowstone National Parks were invited to partner with MDT as a case study for how public/private agencies can have their information incorporated into Montana's 511 system.

The benefits of having national park information on Montana's 511 system include:

- Increase the number of users of 511 for not only the national park's portion, but also for the MDT portion, because more people become aware of 511;
- Decrease calls to YNP, Glacier, and MDT operators;
- National park information is beginning to be more prevalent on 511 (e.g. VA, AZ, ME);
- The National 511 survey found that people want weather information (#1 choice) – park roads close mostly due to weather (e.g. snow and fire);
- Great way to increase the summer usage of the system; and
- Great way to provide road closure, construction, and fire season information.

Although Glacier and Yellowstone did not originally fill out the request form, a request form has been filled out for the parks¹ and is shown in Appendix C as an example.

MDT met with Yellowstone National Park (YNP) on December 4, 2002 in Bozeman, Montana to discuss inclusion of Yellowstone information onto 511. MDT then met with Glacier National Park on February 4, 2003 in Kalispell, Montana to discuss inclusion of Glacier information onto 511. Meeting summaries follow.

10.1. Yellowstone National Park

Three Yellowstone National Park employees were in attendance at the MDT/YNP meeting including the transportation planner, the web master, and a staff member from the visitor services office.

10.1.1. Existing Traveler Information

YNP discussed the traveler information they provide. They have five highway advisory radios (1610 AM) located at park entrances that are updated two to three times per year. Winter information is provided on their web site including daily segment based winter reports (sixteen segments), location based snow depths, and location based avalanche reports. They also have a park switchboard which provides manually recorded information such as weather forecasts, road updates, and camping and lodging status. The road updates are provided from the rangers in the field to the communications center. Currently YNP does not post accident information or pass closures if they will affect traffic for less than one day. The web site and switchboard information is collected by the communications center at YNP. YNP staff at the meeting felt that this would be a logical place for 511 information to be collected, because the center is operated twenty-four hours a day, seven days a week. However, they did note that the communications center is understaffed. YNP also has several cell service carriers including Verizon wireless in

¹ Note that the parks did not fill out these request forms for themselves

Park County, Wyoming and Western Wireless, along with several others providers in Teton County.

10.1.2. Possibilities for Montana 511

Information that Yellowstone felt should be provided on 511 for the park included:

- Road conditions,
- Road closures,
- Accessibility: wheeled traffic, snow mobile or snow coach,
- Weather forecasts,
- The availability of (307) 344-2113 for weather info,
- Snow regulations on open roads,
- Construction delays,
- Incident delays,
- Avalanche and snow depth information, and
- Fire information.

YNP staff members felt that YNP tourist information should not be included on 511, because there are too many services to list; however smaller national parks may want this available. Tourism information includes: Old Faithful eruption times, other geyser eruption times, and an extensive list of interpretive programs.

Menu options for the Yellowstone portion of the 511 system were also discussed. It was discussed that the menu may include:

1. Road information. According to roadway segment and according to area (e.g. Old Faithful);
2. Park weather information. As is currently provided;
3. Campground/lodging information. Including sites available; and
4. General information. Including fees, safety messages – such as warnings not to feed the animals and warnings to keep away from thermal features, Fall/Summer construction, snow tire regulations, and real-time and peak-time congestion information.

10.1.3. Concerns

Concerns that YNP had about integrating with the 511 system included the need for a database, that whatever is used for incorporating YNP onto Montana's 511 system must also be compatible with Idaho and Wyoming, and that the system should not be set-up for only one vendor due to the possibility of vendor changes. Lastly, they felt that a major challenge would be deciding how to segment the park for the 511 menu. Concerns include that U.S. routes outside the park are not named inside the park and reference point/node names need to be easily recognizable and should be on Montana, Idaho, Wyoming, and park maps for visitor use. Options include using the upper loop and lower loop as the menu options or using segments that designate distances between

destinations (e.g. Mammoth to Old Faithful). Another concern is the cost of adding YNP information onto the 511 system along with the possibility of having to add more phone lines when park information is added. YNP believed that by adding YNP information to Montana's phone system it could potentially add 100,000 calls per summer. (To calculate this number, YNP staff members used the volume for the gates in MT then divided by 3 people per car plus the factor for re-entry versus first-time entry).

10.2. Glacier 511 Meeting

Three Glacier National Park staff were in attendance at the MDT/Glacier meeting.

10.2.1. Existing Traveler Information

Glacier provides traveler information through its web site and a manually recorded phone number. The web site provides information on construction, campground availability, and when park roads or portions of park roads open and close. The phone system provides information on emergencies, roads in the park, accommodations, and requests for information packets to be mailed. Glacier staff members also call the MDT Kalispell Division to inform them of road closures. Lastly, Logan Pass currently has parking challenges, but they also do not have phone or electricity at this site, and therefore rely on the use of park radios to provide this information to people.

10.2.2. Possibilities for Montana 511

Information that Glacier personnel believed should be provided on 511 for the park included:

- Road information such as openings and closures, including partial openings and closures;
- Weather forecasts;
- Construction information, because the Going-to-the-Sun Road is being reconstructed and there is a half hour delay threshold. Information provided will include location and time of construction as well as expected delays;
- Public transit such as fees and schedule for key stops (i.e. visitor centers) for the hiker shuttle and schedule for the proposed construction mitigation shuttle;
- Bus (red bus and cultural bus) and boat tours;
- Weight, height, length, width restrictions for vehicles, as there are two tunnels within Glacier;
- Bike information;
- Parking availability; and
- Driving directions.

Glacier staff members were asked to prioritize the above list. Road information, weather forecasts, construction information, and parking information all rated the highest with three votes. Weight, height, and width restrictions received two votes, and public transit received one.

Glacier staff also felt that information about how to get to Glacier from the Kalispell airport may be useful to visitors, as well as information about Eagle transit (a Para transit service).

Glacier believed that tourism information would be good information to provide, but that it would result in too much information on the system. Tourism information included: campground availability, backcountry camping, entrance fees, visitor center information, website, water safety, bear information, and park regulations (i.e. pets and weapons).

10.3. Options for National Park Information Inclusion in Montana's 511 System

The research team identified three potential ways that national park information could be included on Montana's 511 system: call transfer, database fed information, and manual recording of information.

10.3.1. Call Transfer

In this option, after callers select Glacier or Yellowstone National Park Information, they are automatically transferred to a different phone number to hear the information they requested rather than obtaining the information directly from the 511 system.

The benefits to this method include that it does not require that the words used to provide national park information are recorded, it does not require the park roads to be mapped, and it allows for the public to either hear a message or speak with an operator. The drawbacks to this option include the number of phone lines needed for transferring the calls between systems without someone getting a busy signal; operators answering calls only work certain hours and therefore another option would be necessary for night, weekends, and holidays; the option for a caller to return to the 511 menu after a call transfer may not be possible; and if a call transfer is used, the vendor will not be able to provide weather forecasts for the national park roads.

There are three ways to provide the public with information if the call transfer method is used, including: having an operator answer calls, providing a manual recording, and having an automatic recording. These are described below in more detail.

10.3.1.1. Operator

In this case, when a caller chooses to get information on one of the national parks, the 511 system would transfer that caller to the national park phone number and an operator would answer the phone and provide any information needed.

The benefits to this option are that there is a human to answer questions, and there is an ability to provide more information than on a recording. The drawbacks include that this would require a large amount of staff time, that operators are only available during certain hours (i.e. business hours), and that the call volume may exceed number of operators, therefore people would either get a busy signal or have to wait a significant amount of time before receiving the information needed.

10.3.1.2. Manual Recording

When a caller chooses to get information on one of the national parks, the 511 system would transfer that caller to the national park phone number, and the caller would hear a manually pre-recorded message.

The benefits to this option include that the parks will not need additional staff to answer phone calls, it is the least expensive of the call transfer options, and the message would be available at all times. The drawbacks include that a staff member will still be needed to record the message as conditions change, there is the possibility of forgetting to update the message, and a recorded message may not provide all of the information that a traveler needs.

10.3.1.3. Automatic Recording

For this option, when a caller chooses to get information on one of the national parks, the 511 system would transfer that caller to the national park phone number, and the caller would hear an automatically pre-recorded message.

The benefits of this option include that the message will automatically update based on information in a database, there will be message consistency due to this method, and the voice heard on the system would be the same everyday. The drawbacks include that the message may not provide the information that a traveler needs, the parks are currently manually recording their messages so this automatic system has not been implemented yet, and there is a significant cost associated with creating a database and setting it up to automatically create a message.

10.3.2. Database

In this case, after a caller selected Glacier or Yellowstone National Park Information, he or she would obtain the information requested directly from the 511 system and be able to continue using the 511 system to obtain other information.

The benefits for this option include that the message would be updated more frequently, the data would be stored in case it was needed for other requests, it relieves a person from manually recording the message, the road segments would be static, it allows weather forecasts to be made available, additional phone lines would not be needed at the park, and it would provide the ability to automate information sharing across systems and devices (e.g. websites, HAR, etc). The drawbacks include that creating a database is more expensive, more time intensive and requires extensive staff training.

If this option were chosen, there are three potential options for creating a database. The options include updating Glacier National Park's current database, purchasing the Meridian Environmental Technology database (i.e. the Montana 511 vendor), and purchasing another vendor's database. These options are described in more detail below.

10.3.2.1. Update Glacier National Park Database

Currently Glacier National Park has a database that it uses to collect park information. This database could be updated to function with the 511 system and include Yellowstone National Park roads. The information input into this database would then feed the 511 system

The benefits to this option include that this will be the least costly of the three database options, and the Glacier portion of the database is already complete. The drawbacks include that the Glacier database may not be easily upgradeable; the current database may not output in a compatible way for 511 to use the information; the 511 model will need to be adjusted to accommodate new information; YNP, just like Glacier, would need to host the server for the database and maintain the database; it may be difficult to upgrade the database to support

Yellowstone as YNP's road system is more complex than Glacier's; and Glacier and Yellowstone may want different information collected.

10.3.2.2. Purchase Meridian Environmental Technology's Database

Meridian Environmental Technology, the Montana 511 vendor, has a database for sale that can be used to collect the information to feed a 511 system.

The benefits of using this system include that the system is built by the current Montana vendor, therefore facilitating integration with 511, South Dakota currently uses this database, Meridian would maintain the database and host the server so the parks would not need to, and the data would also be available via the www.safetravelusa.com map. The drawbacks include that there are monthly operational costs associated with Meridian maintaining the database and hosting the server, that Montana may not remain with Meridian forever, and Idaho and Wyoming do not use Meridian as their 511 vendor.

10.3.2.3. Purchase Other Vendor's Database

In this case, a database would be purchased from a database vendor, not necessarily related to the Montana 511 system.

The benefits of this option are that an off-the-shelf or custom system could be purchased, MDT is currently researching the options for buying a new system and the parks could possibly use the same one as Montana, and the vendor may be able to maintain the database and host the server. The drawbacks include that the vendor may not be able to maintain the database and host the server, most likely a vendor that was willing to customize a database to work for a park versus a department of transportation would be needed, and there would most likely be monthly costs associated with the vendor maintaining the database and hosting the server.

10.3.3. Manual Recording

The final option for incorporating national park information onto the Montana 511 system is for a caller to receive a manual recording of national park information on the 511 system.

The benefits of this option include that it is the least expensive option of the three, it will not require as many changes to the 511 system, it can be accomplished in a very short amount of time, it is currently how the parks are recording their messages so it would not take a significant amount of effort, the words used by the 511 system would not need to be recorded, the roads would not need to be mapped, and additional phone lines would not be needed at the park. The drawbacks include that staff would be needed to manually record the message, the message would need to be updated as conditions change, a manual recording may not provide all of the information needed by the traveler, and the voice will be different than on the rest of the 511 system.

The two options available for this choice are to record the message into a wave file and have the vendor play that message on 511 or to have the parks record a message directly onto 511 using the alert system.

10.3.3.1. Wave file

In this case, a national park staff member would record the park message onto the computer and save it in the form of a wave file. This file would then be sent to the 511 vendor who would update the 511 system with the new file.

The benefit of this option is that a wave file could potentially be used to update more than one device (i.e. the same message could update the 511 system, the park phone system, and the HAR). The drawbacks include that the vendor would continuously be looking for new wave files from the park and would have to incorporate them into 511 each time, this method has never been done before and may be complicated; the voice will be different from the rest of the 511 system; and this may not be able to populate multiple devices and the staff would therefore still be recording the message more than once.

10.3.3.2. Alert System

In this case, the national park portion of the 511 system would be set up so that a park staff member could record a park message directly onto 511 in the same way that the AMBER, homeland, and general transportation alerts are recorded.

The benefit of this is that the park staff could record messages whenever one is needed, the vendor will not have to post the message on 511 as it will automatically occur, and as this method has been used before in Montana it will not take long to set it up and it is fairly easy to use. The drawbacks to this are that the voice will be different from the rest of the 511 system, and the park staff will have to record their message multiple times for the different devices.

10.4. Option Chosen for Use

Both Glacier and Yellowstone are interested in providing their information on 511; however, Glacier was interested in providing this information on Montana's 511 system as quickly as possible so that travelers would be familiar with the system prior to the park needing to use it to provide information on the Going-to-the-Sun Road construction. Therefore, one solution was selected to provide Glacier's information to 511 in the short-term, while a longer-term option is explored that will allow both Glacier and Yellowstone information to be included in a more automated way. The two solutions will be described further below.

10.4.1. Short-term

The most logical short-term option was to provide the manual information onto 511 via the alert system (see section 10.3.3.2). The guidelines were used to create a memorandum of understanding or contract agreement to be signed between Glacier and MDT to acknowledge the partnership. This agreement describes in detail the roles and responsibilities of each party along with the associated costs. A copy of this agreement is shown in Appendix D.

The main tasks for accomplishing this change were to revamp the 511 menu structure and to set-up the alert system for Glacier use. MDT agreed to pay for the menu restructuring as this would have been done in the future anyway. The original menu structure is shown in Table 7. The new menu structure is shown in Table 8. In the new structure, the numbers that are not used (i.e. 2, 3, 5, and 6) are open for adding additional information in the future.

Table 7: Montana 511 Original Menu Structure

<ol style="list-style-type: none"> 1. Dial 511 2. Hear greeting: “Welcome to the Montana 511 traveler information system” 3. Hear voice recognition option: “This system uses voice recognition, to enable this feature press * now” 4. Hear state choices: “For Montana highways press 1” “For North Dakota highways press 2” “For South Dakota highways press 3” “For road weather information in other neighboring states press 4”

Table 8: New Montana 511 Menu Structure

<ol style="list-style-type: none"> 1. Dial 511 2. Hear greeting: “Welcome to the Montana 511 traveler information system. Some menu options have changed, please listen carefully.” 3. Hear voice recognition option: “This system uses voice recognition, to enable this feature press * now” 4. Hear information options: “For highway conditions press 1” “For tourism information press 4 (this option will only be available to callers if there is information available)” “For information in other states press 7”

Glacier paid for the alert system upgrade for recording their information. Glacier will also be responsible for paying for the phone calls to the Glacier portion of the 511 system. Information that Glacier will be recording on the system includes: road openings and closures, road maintenance information, construction information, and any other major event affecting travel.

10.4.2. Long-term

A project funded by the Alternative Transportation Program (ATP) of the Department of Interior through Yellowstone National Park is currently underway to identify a process for adding YNP and Glacier information to the Montana, and possibly Idaho and Wyoming, 511 systems for the long-term. This project is seeking to identify a database for use by the two parks. The project is currently exploring the three options listed in section 10.3.2.

11. CONCLUSIONS

Although the Montana 511 system has been successful since its deployment and enhancements have been made, there continues to be room for improvement. Based on MDT staff interviews, public surveys, and stakeholder workshops, six short-term and fourteen long-term enhancements recommendations were made.

Guidelines, for keeping 511 in Montana consistent as these enhancements are deployed, were also created. These guidelines stem from the 511 Deployment Coalition, national ITS standards and technology guidelines, and the roles and responsibilities of MDT and other agencies.

Working with Yellowstone and Glacier National Parks on a case study enhancement of 511 was successful. By working with these agencies, the options for inclusion of another agency's information onto Montana's 511 system were identified. This partnership also allowed for the development of a Request form and a Memorandum of Understanding/Contract Agreement which will be useful in the future as other agencies prepare to partner with MDT for inclusion of their information onto 511. Glacier information is currently being supplied on 511 and Yellowstone information will be available at the end of a research project to automate the inclusion of information on 511.

12. REFERENCES

1 A. Kalinowski and J. Eidswick, "Greater Yellowstone Regional Traveler Weather Information System 511 Evaluation Summary," Western Transportation Institute, Montana State University-Bozeman, August 2004.

2 511 Deployment Coalition *Implementation and operational Guidelines for 511 Services* http://www.deploy511.org/guidelinesv2_intro.htm (August 24, 2005).