NORTH/WEST PASSAGE

DOT Traveler Information Website Features and Usage

Project 14.5 – FINAL

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Table of Contents

1. INTRODUCTION

The North/West Passage (NWP) pooled fund program focuses on cross-border intelligent transportation systems (ITS) coordination along the I-90 and I-94 corridors through the states of Washington, Idaho, Montana, Wyoming, North Dakota, South Dakota, and Minnesota, as illustrated in Figure 1.

Figure 1: North/West Passage Members

Each NWP state operates and maintains a traveler information website although the features and usage vary among them. NWP member states were interested in identifying what traveler information website features were offered and most used as they plan for changes to their own websites.

This report examines the similarities, differences, and usage of state Department of Transportation (DOT) traveler information website features.

The report is based on review of thirteen traveler information websites that included the NWP states, another corridor effort (I-80 Coalition which includes the states of California, Nevada, Utah, Wyoming, and Nebraska), and other NWP neighboring states (Iowa and Wisconsin). From this review, nine states were selected for phone interviews to gather additional details on features and usage of their websites. This report is not meant to be comprehensive, but rather highlight several traveler information website features and usage as examples. The states that were interviewed are:

- Washington State DOT (WSDOT)
- Idaho Transportation Department (ITD)
- Montana DOT (MDT)
- Wyoming DOT (WYDOT)
- North Dakota DOT (NDDOT)
- South Dakota DOT (SDDOT)
- Minnesota DOT (MnDOT)
- Iowa DOT
- Nevada DOT (NDOT)

The sections of this report include:

- 2. Project Approach - Describes the project tasks taken to complete this project.
- 3. Key Findings - Highlights key traveler information website features and usage from the nine states interviewed for this project.
- 4. Summary - Overall summary from the key findings.

2. PROJECT APPROACH

Four tasks were completed for this project to provide NWP member agencies with an understanding of what key features select states were providing on their traveler information website and the extent to which these features were used.

The first task focused on reviewing traveler information websites from the NWP states, another corridor effort (I-80 Coalition which includes the states of California, Nevada, Utah, Wyoming, and Nebraska), and other neighbors (Iowa and Wisconsin) to document key features including details on:

- **Road work:** Road work is identified on traveler information websites through current or future construction or maintenance activities and their effect on traffic. Typical road work information includes the road involved, the section under construction, start/end dates, warnings to motorists, and a satellite or map view of the area. Traffic may be affected through lane reductions, road closures, delays, and lane width restrictions.
- **Road weather conditions:** Road weather conditions are often winter driving conditions and may include information regarding the degree of snow cover present on the roadway or travel restrictions.
- **Traffic incidents:** In addition to vehicle crashes, traffic incidents may include the presence of wildlife, debris, and stalls on or near the roadway.
- **Traffic speeds**: Real-time traffic speeds may be displayed directly from the DOT or from third-party vendors such as Google or Waze. They may be provided for all state and federal routes within the state or only for urban routes.
- **Weather information:** Weather stations provide information including temperatures (air, maximum, minimum, dewpoint), wind direction (average and gust), wind speed (average and gust), precipitation (over various time periods or at a specified rate), and relative humidity. Weather warnings and forecasts may also be included under weather information.
- **Cameras:** Stationary cameras provide information through photos or video feeds. Mobile cameras installed on maintenance vehicles or snowplows also may transmit photos or video to the traveler information website.
- **DMS messages:** This key feature identifies typical DMS locations displayed on the traveler information site and the message being displayed. Messages may address a variety of issues including truck or ramp parking availability, time to downtown, incidents, lane closures, specific roadway cautions, or reminders such as "Eyes up, Phones down".
- **Commercial Vehicle (CV)-specific information:** Information that is specific to commercial vehicles such as weigh station locations, weight or lane width restrictions, and real-time CV parking availability may be provided on either a separate site or CV-specific layer.
- **Neighboring states info:** Traveler information websites may provide information from or links to neighboring states.
- **Personalized reports:** Some traveler information websites provide travelers with an option for generating personalized reports based on information requested for a custom area, on a specific route, or near a given site.
- **Other:** Identifies whether multiple versions are available, any features that are not included in other key feature categories, and general observations about the website.

The following thirteen State DOT traveler information websites were reviewed in October 2019.

- Washington State
- Idaho
- Montana
- Wyoming
- North Dakota
- South Dakota
- Minnesota
- Iowa
- Nevada
- Nebraska
- Wisconsin
- California
- Utah

Key features from each website reviewed and documented are included in Appendix A. An excerpt from the Iowa DOT review is shown in Figure 2. For example, it notes that Iowa DOT provides camera still images on their website. It is important to note, that some states do not provide information in each of the areas, however these categories were used to gather consistent information among the thirteen states.

	Road Work	Road Weather Conditions	Traffic Incidents	Traffic Speeds	Weather Information	Cameras	DMS Messages	CV-specific Information	Neighboring States Information	Personalized Reports	Other
Key Features	- Current and planned road work - Road closures - Detour routes - Flaggers - Lane reductions - Truck Restrictions (e.g. width, length, height) - Traffic Delays - Re-opening notification - Major Project website links in Construction events	- Seasonal, partially covered, completely covered, travel not advised, impassable, closure or blockage	- Critical disruptions - Traffic delays - Closures or blockages - Warnings - Lane closures - Information	- Google traffic speeds	- Weather warnings	- Still images - Streaming video - Plow camera images with a recent history - RWIS Images	- Active and inactive signs with messages	- Restrictions - Axle Load Limit - Closures with detour maps and height or width limits - Weigh stations	- MN, WI, IL, MO, NE, SD	- Personalized reports	- Travel At-A-Glance option - Rest areas with location, status, and parking availability - Separate Waze reports

Iowa DOT — Membership: NWP Neighboring State

Figure 2: Traveler information website features gathered from Iowa DOT in October 2019

Based on the website features collected from the NWP, I-80 Coalition, and neighboring states, nine states were selected to interview during the second task. The interviews allowed additional information to be gathered about usage data on key features, as well as future plans. All NWP states were selected because of the value in comparing what neighboring states along the I-90/I-94 corridor are doing. Iowa was added as a neighboring state to the NWP corridor and Nevada was selected as a member of another corridor effort and similar rural state.

The interviews focused on gathering the following usage information:
- Overall annual visits for the last five years
- Top three most visited pages or features
- The three least visited pages
- Unique features influencing usage trends over the last five years

Usage information was provided by states in a variety of formats, and the information ranged from anecdotal based on staff observations to formal based on more sophisticated website analytics. This variability was acceptable as the usage information was requested to identify general trends versus specific patterns or comparisons.

In addition to usage information, interviews explored the following:
- What new features are scheduled to be added within the next year?
- What features have worked well and why?
- What features have been removed and why?
- How have changes in website features been informed by customer input, market research, trends in other states, or other sources?

These questions were identified by NWP members as those most relevant to understand about the evolution of website features among the states interviewed. As with usage information, responses to these questions were used to identify general trends versus specific guidance on how states should manage website features.

Once the interviews were completed, key findings were presented to the NWP members during the Operations Task Force meeting in April 2020 as part of the third task.

The final project task produced this document to present the information gathered from the interviews and identify similarities and differences in features and usage between the states.

3. KEY FINDINGS

This section includes key findings from the online review of traveler information websites and phone interviews with Washington State, Idaho, Montana, Wyoming, North Dakota, South Dakota, Minnesota, Iowa, and Nevada.

3.1 Traveler Information Website Review

Nearly all states websites reviewed for this project provided core information on construction, road conditions, incidents, and travel times (where relevant in more urban areas). Most states also display camera views although they use slightly different framing as shown in Figures 3-5 below:
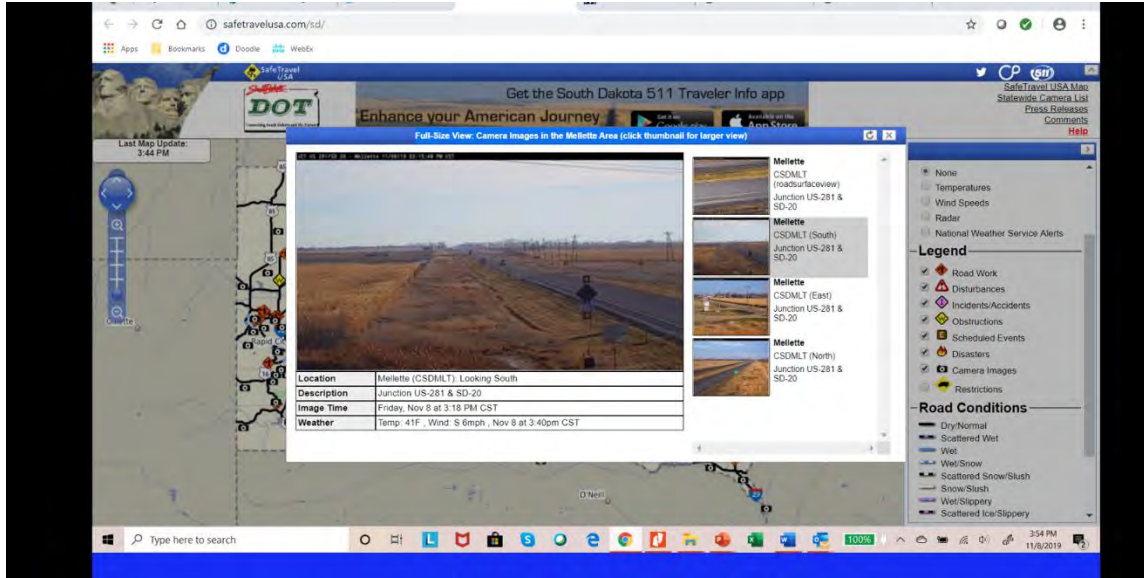

Figure 3: South Dakota Camera View
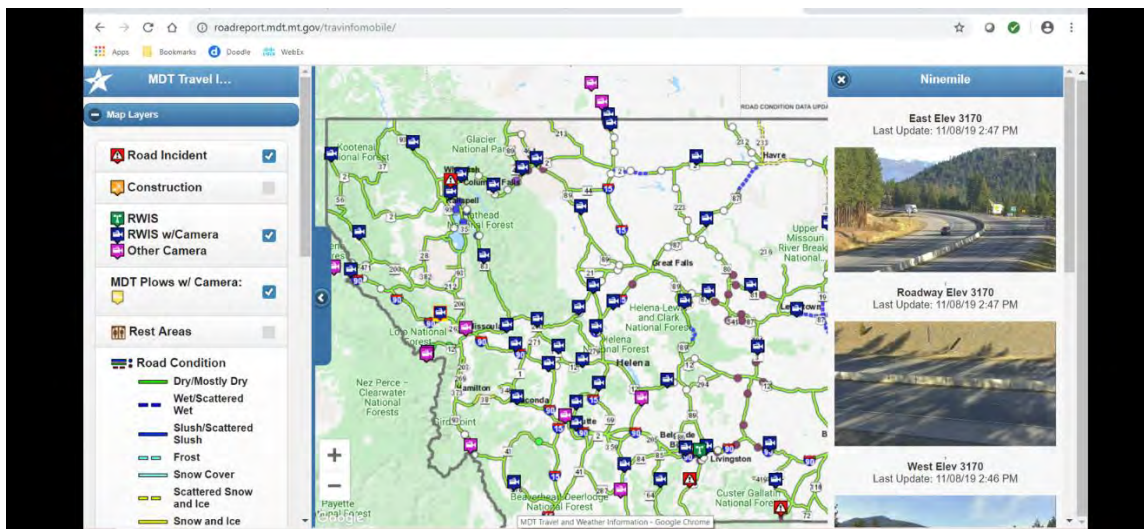
Figure 4: Montana Camera View
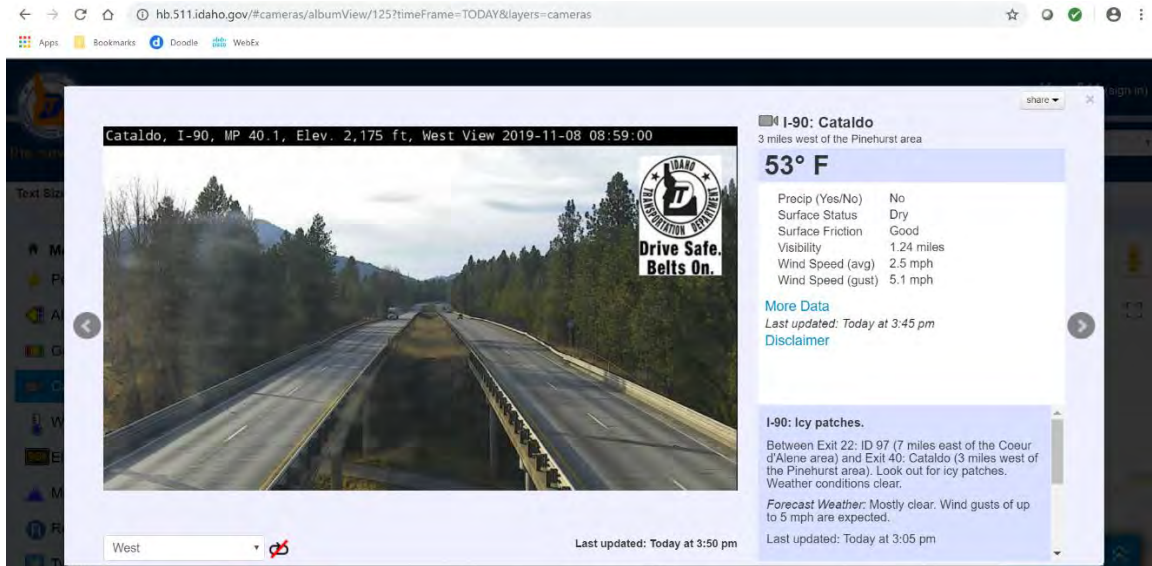
Figure 5: Idaho Camera View

There are also some differences in the way states present traveler information. For example, Washington State DOT displays traveler information by impact level first and then identifies the type of event causing the impact as shown in Figure 6.
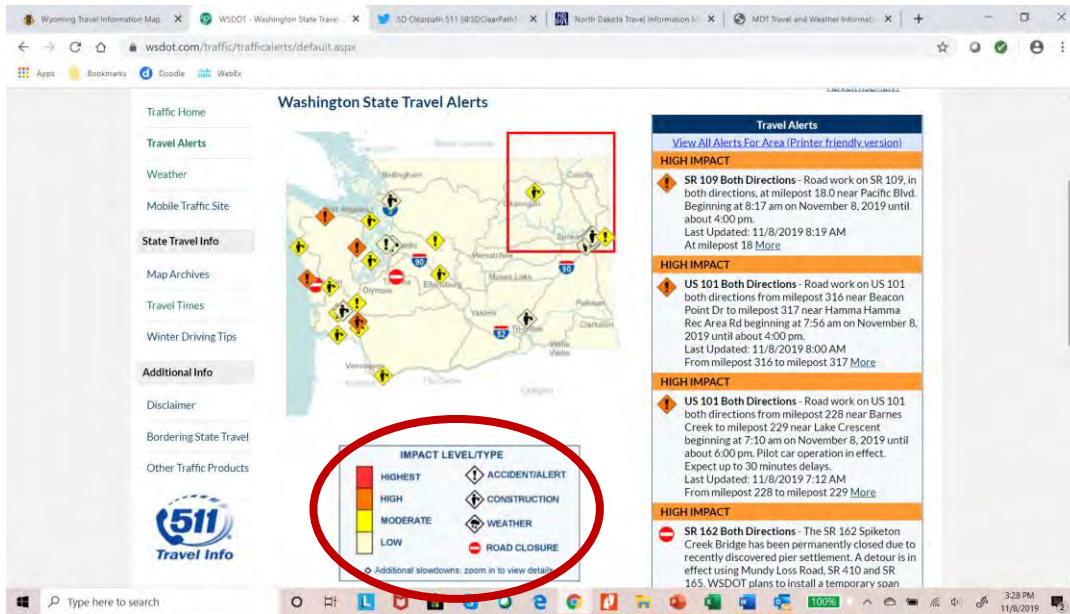
Figure 6: Screenshot of Washington State DOT Impact Level

Wyoming takes an approach similar to Washington State's although the visual display between Washington State and Wyoming is considerably different. A screenshot of impacts shown in Wyoming's travel information map is shown in Figure 7.
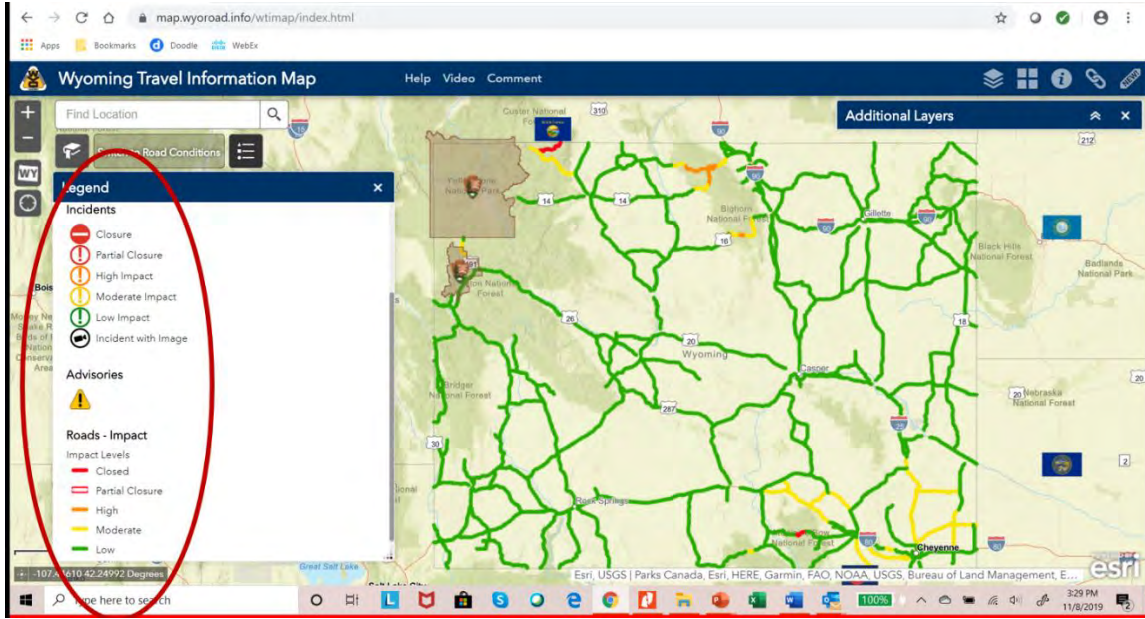
Figure 7: Screenshot of Wyoming DOT Impact Level

In contrast, many states, such as North Dakota, first display events as layers to their map and then identify the impact of an event, often using different colored lines and icons.

Figure 8: Screenshot of North Dakota DOT Event Layers

Minnesota takes a similar approach to North Dakota as shown in Figure 9.

Figure 9: Screenshot of Minnesota DOT Events

Additional differences are apparent in the type of maps used by the traveler information websites, the level of interaction, and the terminology each state uses.

3.2 Interview Highlights

Nine states were selected and interviewed in this project to gather additional information about the features and usage of their traveler information website. Each state provides traveler information but tailor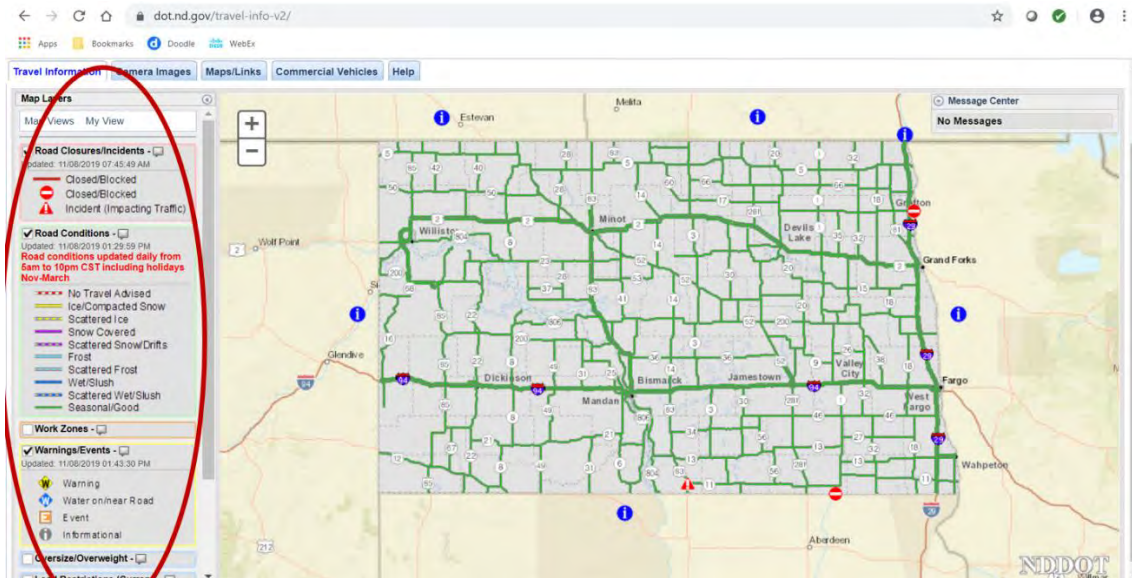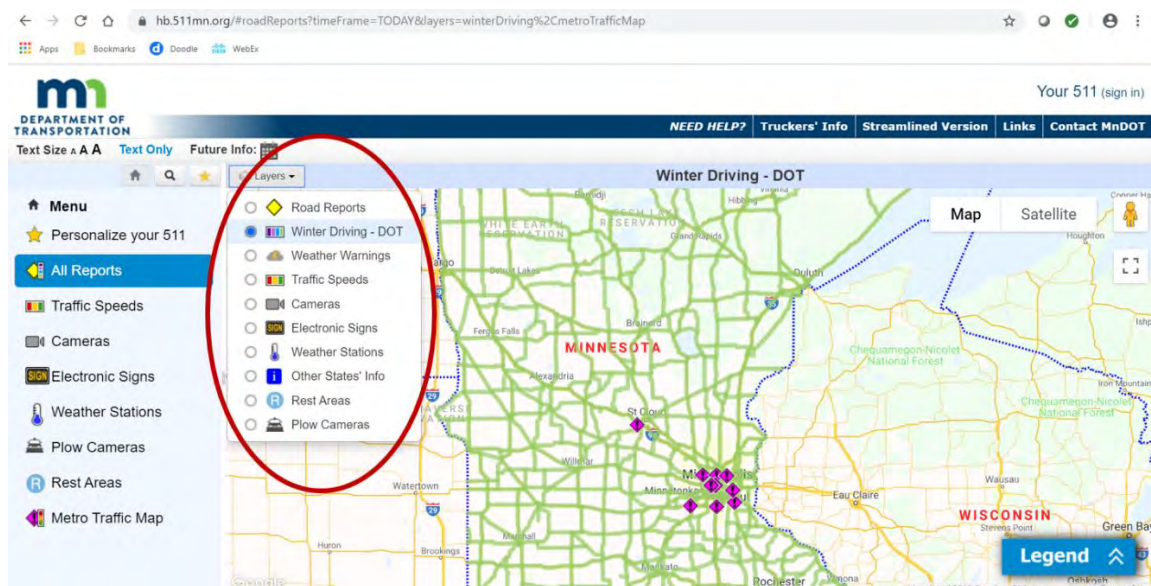s what and how they present that information to meet the needs of their state. The nine states selected represent those that are rural in nature and have some common issues but use varying approaches to address their needs. The states track their website usage differently, so usage statistics cannot be directly compared among the states. This section highlights website features and usage from the nine states that were interviewed. Complete interview summaries are provided in Appendix B.

3.2.1 Most Used Website Features

During the interview process, states were asked to identify their most used features. Some states were able review their usage statistics to directly pinpoint these features, but other states did not have analytics to provide this information. In these cases, states were asked to provide the information based on more subtle indicators such as the type of feedback they receive when a feature is unavailable. For example, if a camera feed is unavailable and the DOT receives calls asking for it to be restored, this provides the DOT some information on camera use from the public. Table 1 on the following page shows a summary of the top features that each state identified as their most used features.

Table 1: Traveler Information Features States Identified as their Top Most Used Features

State	Road Work	Road Weather Conditions	Traffic Incidents	Traffic Speeds	Weather Info	Cameras	DMS Messages	CV-specific Info	Neighboring States	Personalized Reports	Other	Explanation of Other
Washington State	✓					✓					✓	Travel alerts, Mountain passes
Idaho	✓	✓				✓						
Montana		✓	✓			✓						
Wyoming		✓				✓					✓	Text-based pages, Travel forecast map
North Dakota		✓				✓					✓	Weather radar
South Dakota	✓	✓				✓						
Minnesota		✓	✓			✓				✓		
Iowa		✓				✓					✓	Plow locations, Plow cams
Nevada		✓	✓			✓						

Cameras and road weather conditions were identified as the most used features for nearly all states. The states interviewed were primarily northern, rural states where winter weather can be a significant danger to travelers. Knowing what impact weather is having on the roads is valuable traveler information and states do a good job of providing that information through tailored map layers and markings, brief narratives for affected roadways, and camera views.

Camera images may be also consumed in unique ways and used for a variety of applications. For example, internally MDT is a high consumer of camera images and uses the images to assist maintenance in scheduling staff and equipment based on current weather and pavement conditions to assist in minimizing traveler's exposure to hazardous weather-related road conditions.

Some states may have needs that influence their most used features. For example, one of the most used features on the WSDOT website is roadwork and construction. The SR99 tunnel under Seattle was a project that shut down the freeway for three weeks. Significant public outreach before the closure changed the travel pattern.

Most states struggled to identify the least used features of their websites and some states do not provide all the features listed in Table 1. Typically states agreed that although a feature may not be used a lot, it

may provide essential information. Similarly, states also noted that static information such as the location of truck escapes or rest areas may not be used often but costs very little or nothing to maintain and provides useful information to select travelers.

State traveler information websites serve multiple and diverse groups of customers, sometimes with conflicting purposes. Lesser used features may provide valuable information to very select user groups. If a feature provides key information and does not cost a lot to maintain many states opt to provide the information to meet the needs of these smaller user groups. For example, WYDOT recognizes that chain laws are not used by everyone but are extremely important to those who need that information. Also, the Grand Forks Air Force Base in North Dakota uses NDDOT's wind speed to prepare for emergencies such as fires or chemical spills.

3.2.2 Adding and Removing Features

Several states are in the process of redesigning and launching updated traveler information websites, but which features each state changes and when the state's new traveler information website becomes active varies between the states. A summary of the changes planned by each state and where they are in the process is provided below.

WSDOT is redesigning their website in three phases, but it is unlikely any major changes will occur in the next 12 months. In the next 6 months they plan to redesign the ferry information page to decrease phone calls to the ferry help desk. Phase 2 is projected for June 2021 and will change website content. WSDOT hopes to acquire additional funding to implement a zoomable traveler information map and add personalization to their website update. WSDOT removed a table of historic travel times from the website since it is available elsewhere but costly to provide and maintain.

Currently, **Idaho** provides low and high bandwidth information for travelers and separate sites for truckers. ITD is in the process of transitioning to one traveler information website that functions with lower bandwidth needs and has layers designed for truckers. Once the new website is rolled out, ITD hopes to add Waze reports to the website to import citizen reports for events such as crashes, debris, and other road closures. One new feature ITD included in their website redesign is delay information for more urban areas within the state from Google traffic speeds. This allows ITD to report delays such as those caused by a road work event or the degree to which traffic is being slowed down due to winter travel conditions.

An internal version of a new traveler information website is available in **Montana**. The update will be rolled out to the public in summer 2020. With the updates, MDT is considering adding personalized reports and a DMS layer. Montana felt there was little benefit in maintaining two map versions so they will discontinue the low band width map on the new website.

WYDOT reformatted their traveler information website using Esri as their base map. They recently launched a forecasted travel weather impacts map that allows users to select a road and view a text page identifying incidents, advisories, impact levels, and road conditions. WYDOT reformatted text-based pages for efficiency to present information either alphabetically by route or by milepost and is planning updates to the road weather forecast including adding incidents to text-based pages and adding city labels and information about wildfires to the map page. In addition, WYDOT offers different versions of their traveler information map for color blind users. Though this affects a small percentage of the population, WYDOT feels it is important to offer these various formats and it does not require a lot of extra work.

In June 2019, **North Dakota** developed a Traveler Information Map Enhancements Decision Document to identify the changes they wanted to make to their existing traveler information map. NDDOT plans to redesign their travel map in 2020 by adding new features, improving some existing features, and possibly incorporating citizen reporting based on the findings from the decision document. NDDOT is looking into how many layers on the travel map would provide the information the public needs without appearing cluttered and hopes to have a test site up internally by spring 2020. Prior to redesigning their traveler information map, NDDOT removed or discontinued some features such as RSS feeds; however, many of these features were restored due to customer requests.

South Dakota will implement a major 511 website update during late summer 2020. SDDOT plans to use cloud-based resources to host this update. Some of the features SDDOT will add include DMS messages, plow camera images, and plow locations. In addition, SDDOT will update their mobile app to reflect their website changes. Future updates SDDOT is interested in making to their website include providing construction detour information and using automation with the highway patrol to improve traffic incident reporting.

Minnesota is launching a new 511 website in multiple phases utilizing a soft launch to allow travelers to use the old website while also getting comfortable with the new. Access to the old 511 website will be discontinued in mid-2020. For the past 2-3 years, MnDOT has been working on an automated road weather feature that will integrate MDSS with road segment condition data and provide updates to road conditions at regular intervals. They also plan to incorporate visibility and generic forecasting information into their website.

Iowa launched phase 1 of their new 511 website in January 2020. Phase 1 added features including streaming video, future events, and camera scrolling. Phase 2 will launch in Summer 2020 and will cluster icons at various zoom levels when there is a lot going on in an area. For example, an area with multiple incidents will include the number of incidents in the incident symbol and individual incidents will be visible only when the map is zoomed in. In Fall 2020 Phase 3 will incorporate ADA-compliant views.

Iowa is utilizing a soft launch to help users transition to the new website. The new website will be responsive and include a separate commercial vehicle layer so Iowa DOT will no longer provide both high bandwidth and low bandwidth versions. Iowa's new website will add additional weather information to provide more information during storms and will incorporate snowplow tracking as a layer, eliminating the need for a separate Track-a-Plow website.

NDOT does not plan to make any enhancements to their current website as all efforts and funding are being applied to the development of an altogether new website. The current system agreement will end in April 2021 after which NDOT plans to update the system by adding a route planner, creating automatic segment drawing for operators, and integrating more crowdsourced data.

3.2.3 Default Information
Many states including Idaho, Montana, North Dakota, Minnesota, and Iowa change the default information presented to users between summer (construction) and winter (road weather conditions) seasons, however, the specific dates for this change vary.

Some states such as Wyoming and Nevada use browser cookies on the traveler information map to retain users' preferences from visit to visit. The Wyoming traveler information main page does not have a default

for what is placed on it but regularly changes it with new information that is typically displayed at the top. Other states such as South Dakota never change their website defaults.

Commercial vehicle websites may have different default information than the main traveler information pages. For example, in Idaho the high bandwidth trucker site is formatted with truckers needs in mind and commercial vehicle restrictions are the first thing that are loaded.

3.2.4 Urban vs Rural

Some differences do exist between the urban and rural use of traveler information website features.

Idaho's traveler information website is used more frequently in rural areas than in urban for winter travel conditions and road work events. In the Boise area, the website is used to communicate congestion during rush hours. In contrast, WSDOT has not seen a lot of web traffic in rural areas except in mountain passes. Most of WSDOT's web traffic comes from population centers where users check traffic information more frequently to monitor congestion.

South Dakota is a rural state that is not able to update road conditions 24/7 with the available resources. Consequently, there may be significant gaps in time between road conditions updates. To mitigate this, SDDOT uses an overlay feature that depicts a 24-hour threat forecast, providing information about projected road conditions over the next 24 hours based on weather and road surface models. This 24-hour threat forecast predicts threats along the roadway that may impact travelers and has worked well for South Dakota as the presence (or absence) of a threat forecast provides additional information about the current state of the roadway. See Figure 10 below.

Figure 10: Screenshot Displaying SDDOT 24-hour Threat Forecast

For the last three years, NDDOT has communicated important information on the location of select plows through their track-a-plow pilot project. To further assist users in making sound travel decisions in this

rural state, the travel map also includes a weather radar layer, travel alerts, detailed road conditions, and information for each direction of a divided highway.

Nevada provides features for both urban and rural areas in a consistent manner. Iowa treats urban and rural areas similarly, however, most of Iowa's RWIS information, including cameras and rest areas, are in rural areas and video is treated differently in Iowa's metro areas where there is fiber to support streaming video.

3.2.5 Informed Decisions

State DOTs use a variety of methods to inform their decisions about how to present traveler information. The approaches used by each state are summarized below.

Washington State DOT completed a study on usability in 2016, including interviews, surveys, and analytics, to research citizen's interests and identify the top tasks for helping travelers make decisions about website features. The study found that the traveler information website is not mobile-friendly or easy to use and it does not prioritize content for the user's top tasks. For example, a freight driver may need to check multiple areas in order to make a travel decision. WSDOT learned that they needed to shift what and how information was provided because unclear and inconsistent branding and sites have been detrimental to educating the public on where to go for information.

Though **Idaho** can only track features used on the low bandwidth version of their website, they have observed a correlation between what users look at and the feedback and complaints they receive. Customer complaints received through the phone system, website, or by calling ITD general information have indicated that users are using Waze to fill gaps in information such as incidents. This feedback helps ITD make decisions about future website features. Idaho concentrates their decision-making on winter road conditions since the public is most interested in receiving information on this feature. ITD also follows other states with similar climates such as Minnesota and Iowa to learn what and how they are handling and presenting traveler information.

Intentional outreach for feedback occurs through a comment survey on **WYDOT**'s travel map. In addition, Wyoming utilizes a customer satisfaction phone survey every two years. WYDOT also receives a lot of feedback via email and makes changes accordingly. For example, Wyoming offers many categories of road conditions and travel impacts using a variety of shadings and markings on the map. A few years ago, WYDOT tried to streamline the colors, but public feedback convinced them to continue with multiple colors.

NDDOT responds to public feedback and requests, at times altering how available information is presented. Through unsolicited feedback NDDOT learned that users do not like to click links; they essentially want a map at a glance.

SDDOT surveys 1,200 citizens annually to improve public awareness regarding the traveler information website and identify the public's perception of the accuracy of the information. Results show that travelers view weather as the top threat to travel safety and appreciate the 24-hour threat assessment feature of the website.

 NDOT receives voluntary feedback from the public if features are not working properly. Comments are accepted through the website and give NDOT a good sense of public opinion. Since NDOT is in the beginning stages of redesigning their traveler information website, they are conducting research and are

reaching out to operators to also get their perspective. NDOT is also looking at other states' best practices and costs to assist in their decision-making process.

3.2.6 Usage

States track website usage in a variety of ways. Some are able to document user views of specific pages, others simply track hits to the sites, and some do not currently track any usage statistics.

WSDOT tracks the number of page views and unique views on their website. Analytics allow WSDOT to see when visitors go from traveler information to construction project pages. WSDOT receives an average of 400,000 page views daily. Google Analytics showed that in 2016, the third most visited page on WSDOT's website was "404 Page Not Found". This suggests that the site may be too link heavy to be properly maintained, even with dedicated staff concentrating on fixing broken links.

Montana uses Google Analytics to track website usage. Montana's current traveler information site is widely used and, in fact, is the most visited site among the Montana state government websites. **Nevada** also uses Google Analytics to track website usage. Since April 2013, NDOT has recorded over 8.6 million sessions and receives an average of 1 million hits annually. NDOT's usage peaked in February 2019 and resulted in 2019 total usage reaching a high over 2.5 million. Winter weather causes the biggest change in Nevada's website usage, especially in the northern part of the state, near Reno, and in mountain passes.

North Dakota also uses Google Analytics to track use of their website travel map, page views, and every mobile app click. They average 5.5 million hits annually between the website travel map and mobile app however this number appears to grow each year and the mobile app appears to be increasing at a faster rate than the website travel map. Winter storms cause the highest peaks in usage each year.

South Dakota does not track hits by page and **Idaho** can only track feature use on their low bandwidth version. **WYDOT** tracks hits for text-based pages, but they do not track map usage because the text-based pages are used more than their traveler information map.

MnDOT tracks the number of visits to their 511 website and mobile app but they do not currently track page use although this feature may be available in the future. MnDOT plans to use Google Analytics on their redesigned website that is in the midst of a phased implementation. The annual combined website and app usage for Minnesota has grown from approximately 5 million visits in 2015 to nearly 20 million visits in 2019. These visits continue to be split fairly evenly between the website and the mobile app.

Iowa tracks 511 website usage in monthly reports. Annual 511 website and app usage has grown from approximately 4.5 million sessions in 2014 to nearly 14.5 million sessions in 2019 with app downloads increasing from 50,000 in 2013 to over 175,000 downloads in 2019. Since some users prefer 511 phone, Iowa also has an active 511 phone system that handled nearly 250,000 calls in 2019.

3.2.7 The Future of Traveler Information Websites

Most states began providing traveler information with 511 phone service and then developed companion traveler information websites. Some states offered different versions of their website including low bandwidth, full featured, or trucker. With the prevalence of smart phone data capabilities, many states have also chosen to provide traveler information in a mobile app. The changes and variety of ways traveler information is being disseminated has initiated many discussions about the future of traveler information. It is possible that with the continued growth in mobile app use that traveler information websites will decrease as users opt in favor of the app or look at third parties to provide traveler information services.

There is a level of trust for information distributed by state agencies that needs to be protected. Individual states have made varied observations about trends in traveler information use:

- **MnDOT** launched its mobile app in 2013 and has observed a trend toward high app usage, especially during weather events.
- The launch of a mobile app in **South Dakota** did not noticeably detract from the traveler information website use since SDDOT has struggled with users not being aware of the app.
- In 2014, **ITD** implemented a mobile app for traveler information and it is now their fastest growing platform. The mobile app replaced Idaho's 3G mobile website, so all former mobile website users transitioned to the mobile app. In addition, many 511 phone users are using the mobile app.
- The mobile app release has changed how people are using **WSDOT**'s website as well as the content that is offered. WSDOT has observed a general decline in 511 phone usage due to the impact of social media, the mobile app, and other tools that have been made available.
- The **Washington** State legislature requires that WSDOT incorporate advertising to support the traveler information website. Spikes in traffic occur during major weather events, resulting in increased revenue. WSDOT can generate up to $100,000 annually based on views and click-throughs. Strict parameters for the type of advertising allowed on the WSDOT website help make the ads more useful to travelers (e.g. traction tires or insurance).
- An increase in **Washington** State's social media use documents that as 511 calls are decreasing, Twitter use is increasing.
- Weather is a highly used feature on **WSDOT**'s website, however, since this information is provided elsewhere WSDOT is evaluating whether it is something they should be devoting resources to.
- Over the last five years **WYDOT** has observed a steady increase in website use.
- **Nevada** has observed a decrease in desktop usage and reports that most users access the website with mobile devices. In addition, NDOT records steady usage of the 511 phone system and has seen no significant drop off over time.
- Though use of both the website travel map and the mobile app appear to be increasing, **NDDOT** believes the mobile app is increasing at a faster rate than the website travel map.
- **NDDOT** believes that an increasing number of travelers are using the mobile app in the morning as they head out and switch to the website map once they reach their destination.

4. SUMMARY

Many states provide traveler information websites that are unique to the needs of their states. Often there are similarities in the way information is portrayed but there can also be vast differences in what and how information is made available to the traveling public. In addition to reviewing DOT traveler information websites, nine predominantly rural states were interviewed to pinpoint some of the similarities and differences between state traveler information websites. Key findings from the website review and interviews include:

- Nearly all states interviewed provided core information on construction, road conditions, incidents, and travel times.
- Cameras and road weather conditions were identified as the most used website features, although the way the information is presented may differ.
- States track website usage in a variety of ways; some states use website analytics to track page views or hits to the website, other states track usage anecdotally, and still other states do not track usage at all.
- Several states are in the process of adding and removing features through website redesigns.
- With Internet service becoming more consistent, states like Iowa, Minnesota and Idaho are moving away from low and high bandwidth versions of their websites.
- Some states such as Idaho, Montana, North Dakota, Minnesota and Iowa change their default information based on the season while other states like Wyoming and Nevada use cookies to provide default information based on a user's previous visit.
- The most notable difference between rural and urban information is congestion information.
- The methods state DOTs use to inform their decisions around how to present traveler information varies among states but may include usability studies, surveys, website analytics, and customer comments and complaints.
- The variety of ways traveler information is being disseminated and the many changes with technology and the availability of data have initiated many discussions about the future of traveler information.
- State traveler information websites serve multiple and diverse groups of customers, sometimes with conflicting purposes. Lesser used features may provide valuable information to very select user groups.

The information gathered for this project highlights usage as well as similarities and differences between websites that can be utilized as a basis by the NWP members as they continue to plan and redesign their traveler information websites.

APPENDIX A: KEY WEBSITE FEATURES

Washington State DOT (WSDOT)   Membership: North/West Passage

	Road Work	Road Weather Conditions	Traffic Incidents	Traffic Speeds	Weather Information	Cameras	DMS Messages	CV-specific Information	Neighboring States Information	Personalized Reports	Other
Key Features	- Real-time state travel alerts (accidents, construction, weather, and road closures) by impact level/type - Details regarding route and direction including images from traffic cameras - Lane and ramp closures - Some links to construction project information	- Current road temperatures as measured by weather stations	- Accidents by impact level - Delays	- In urban areas, traffic is designated as stop and go, heavy, moderate, or wide open	- Weather information including temperature, pressure, elevation, humidity, dew point, visibility, wind speed, wind direction - Weather station data, weather forecasts, road temperatures, satellite views, photos - NOAA radar	- Still images updated every 2 minutes - Camera images are available by region or by route	- N/A	- State route bridge vertical clearance trip planner allows a trucker to enter vehicle height to see map of bridges where vehicle will not pass under and bridges where vehicle may pass under if the correct lane is chosen - Restrictions for oversize/ overweight vehicles - Bridge restrictions - Road restrictions - Axle and maximum weight limits	- OR, ID, British Columbia	- N/A	- Mountain passes (elevation, temperature, restrictions, weather conditions)

Idaho Transportation Department (ITD)   Membership: North/West Passage

	Road Work	Road Weather Conditions	Traffic Incidents	Traffic Speeds	Weather Information	Cameras	DMS Messages	CV-specific Information	Neighboring States Information	Personalized Reports	Other
Key Features	- Current and planned road work - Traffic delays - Road restrictions - Road closures - Construction projects links	- Winter driving (difficult, fair, good, closure)	- Crashes - Critical disruptions - Traffic delays	- Google traffic speeds	- Weather warnings - RWIS weather station including dewpoint, precipitation, surface temperature, wind speed and direction, atmospheric pressure	- Still images	- Active and inactive signs and messages	- Separate full featured and streamlined sites for truckers in addition to smartphone apps for both iOS and Android - Truck ramps - Distance for steep grade, max grade, and direction - Weigh stations - Restrictions - HAR locations and radio frequency	- WA, OR, MT, Yellowstone, WY, UT, NV, British Columbia, Alberta	- Travelers sign up for a free account to receive personalized reports, alerts, and to save routes	- Mountain passes including area photo, road condition report, RWIS data - Rest areas (open and closed) including amenities and truck and vehicle parking (not real-time)

Montana DOT (MDT)									Membership: North/West Passage	
	Road Work	Road Weather Conditions	Traffic Incidents	Traffic Speeds	Weather Information	Cameras	DMS Messages	CV-specific Information	Neighboring States Information	Personalized Reports	Other
Key Features	- Speed reductions - Lane closures - Delays - Flaggers - Width restrictions - Blocked lanes	- Road conditions (dry/mostly dry, wet/ scattered wet, slush/ scattered slush, frost, snow cover, scattered snow and ice, snow and ice, ice/black ice, severe driving condition, road closed, closed for the season - Areas of frost/ice - "Watch for Fallen Rock" warning	- Incident location	- N/A	- Radar layer - RWIS information - Fog, freezing rain, high winds, reduced visibility – blowing/ drifting, snowing	- Still images - RWIS images - Photos from cameras operated by other agencies (ex. ND, ITD) - Plow cameras	- N/A	- Chains required on towing vehicles - Load and speed restrictions (text format from MDT website)	- Some camera images from neighboring states	- N/A	- Rest areas with truck parking information (not real-time)

Wyoming DOT (WYDOT)

Membership: North/West Passage and I-80 Coalition

	Road Work	Road Weather Conditions	Traffic Incidents	Traffic Speeds	Weather Information	Cameras	DMS Messages	CV-specific Information	Neighboring States Information	Personalized Reports	Other
Key Features	- Construction layer - Project descriptions - Speed limits - Detours - WYDOT and contractor contacts - Restrictions (e.g. width, bridge, lane) - Road and lane closures - Delays - Road damage	- Surface conditions (dry, wet, slick in spots, slick, slush, drifted snow, multiple surface conditions, partial closure, closed) - Atmospheric conditions (rain, fog, strong winds, snowfall, blowing snow, reduced visibility, multiple atmospheric conditions) - Road and travel advisories - Impact levels (closed, partial closure, high, moderate, low)	- Incidents (closure or partial closure, high/medium/low impact, incident image) - Vehicle restrictions - Closures - Wildlife - Falling rock - Blocked lanes	- Variable speed limit signs locations with speed and whether the speed has been reduced	- Statewide weather stations (air and surface temperature, dew point, relative humidity, wind speed and direction, visibility) - Weather radar (NEXRAD) - NWS weather watches, warnings, and advisory warnings (e.g. tornado, severe thunderstorm, flash flood)	- Still images from each roadway direction and road surface	- Active and inactive DMS with message	- Truck parking with number of parking spaces and amenities (restrooms, fuel, food, showers) - Ports of Entry (open and closed) with address, hours, phone - Current and future size and weight restrictions - Brake check/ turnout and escape ramp/ vehicle arrestor locations	- MT, ID, UT, CO, NE, SD	- 511 Notify allows citizens to receive messages via text or email	- Alternate fuel sites (e.g. electric vehicle charging stations, E-85 ethanol blend, compressed natural gas, biodiesel) - Visitor Information Centers - Rest areas and amenities

North Dakota DOT Membership: North/West Passage

	Road Work	Road Weather Conditions	Traffic Incidents	Traffic Speeds	Weather Information	Cameras	DMS Messages	CV-specific Information	Neighboring States Information	Personalized Reports	Other
Key Features	- Closed or blocked roads - Work zones (extending greater than 8 miles, less than 8 miles, inactive) - Warnings	- Road condition (seasonal/ good, scattered wet/slush, wet/slush, scattered frost, frost, scattered snow/drifts, snow covered, scattered ice, ice/ compacted snow, no travel advised) - From April to October only updated once daily or as conditions warrant - Water on/ near road	- Incidents	- Warnings identify the effect on travel speeds (e.g. reduced)	- Wind speed and direction - Sky condition, wind chill, relative humidity, dew point, and temperature - Weather radar shows precipitation intensity	- Still photos of ND highways taken from weather cameras - Camera images by highway or region are available on a separate tab but not located on traveler information map	- N/A	- Oversize/ overweight restrictions - Current load restrictions - Highway Patrol Motor Carrier Operations (e-permits, permit policies, weight limit charts, and forms) - NDDOT road restrictions chart, district contacts and resources, truck routing maps, rest area locations and amenities - Load restriction maps, text versions of current load restrictions and oversize/ overweight restrictions, and load restriction feeds (current and updates)	- MT, MN, WI, SD, WY, Saskatchewan, Manitoba	- N/A	- Track-A-Plow pilot project shows a small percentage of active plows, plow trails, and maintenance sections - Text/pdf versions of road closures/ incidents, road conditions, warnings/ events, and work zones

South Dakota DOT								Membership: North/West Passage			
	Road Work	Road Weather Conditions	Traffic Incidents	Traffic Speeds	Weather Information	Cameras	DMS Messages	CV-specific Information	Neighboring States Information	Personalized Reports	Other
Key Features	- Construction activity - Lane reductions - Speed limit changes - Delays - Passing restrictions - Disturbances - Obstructions - Restrictions - Route changes - Scheduled events - Disasters - Flaggers - Schedule changes	- Road conditions (dry/normal, scattered wet, wet, wet/snow, scattered snow/slush, snow/slush, wet/slippery, scattered ice/slippery, frost/ice/ slippery, no travel advised, closed/ blocked/ impassable, fog/low visibility	- Incidents/ accidents	- N/A	- Temperature - 24 hour threat forecast - Wind speed - Weather forecast - Radar indicates severity for rain, mix/ice, and snow - NWS alerts (winter storm warning, wind chill advisory, winter weather advisory, lake wind advisory)	- Camera images	- N/A	- Restrictions (length limit, width limit) - Speed limit changes for trucks - Existence of truck detour	- N/A	- N/A	- N/A

Minnesota DOT (MnDOT)
Membership: North/West Passage

	Road Work	Road Weather Conditions	Traffic Incidents	Traffic Speeds	Weather Information	Cameras	DMS Messages	CV-specific Information	Neighboring States Information	Personalized Reports	Other
Key Features	- Current and planned road work - Roadwork warning - Lane closures - Road closures - Detours - Delays - Width restrictions - Warnings to travelers - Some project page links	- Winter driving (normal, partially covered, completely covered, travel not advised)	- Crash - Critical disruption - Traffic delay	- Google traffic speeds	- Alerts for fog, high wind, snow, and rain - Flooding - Weather stations provide RWIS data	- Still camera images - Snowplow cams with a recent history	- Active signs with message or travel time	- Separate trucker website - Weigh stations - Roundabouts - Restrictions - Seasonal load limits - Rest area parking availability	- ND, SD, WI, IA, Manitoba, Ontario	- Travelers and truckers can sign up for a free account to get alerts and save routes	- Rest areas including amenities, truck parking availability

Iowa DOT

Membership: NWP Neighboring State

	Road Work	Road Weather Conditions	Traffic Incidents	Traffic Speeds	Weather Information	Cameras	DMS Messages	CV-specific Information	Neighboring States Information	Personalized Reports	Other
Key Features	- Current and planned road work - Road closures - Detour routes - Flaggers - Lane reductions - Truck Restrictions (e.g. width, length, height) - Traffic Delays - Re-opening notification - Major Project website links in Construction events	- Seasonal, partially covered, completely covered, travel not advised, impassable, closure or blockage	- Critical disruptions - Traffic delays - Closures or blockages - Warnings - Lane closures - Information	- Google traffic speeds	- Weather warnings	- Still images - Streaming video - Plow camera images with a recent history - RWIS Images	- Active and inactive signs with messages	- Restrictions - Axle Load Limit - Closures with detour maps and height or width limits - Weigh stations	- MN, WI, IL, MO, NE, SD	- Personalized reports	- Travel At-A-Glance option - Rest areas with location, status, and parking availability - Separate Waze reports

Nevada DOT (NDOT)   Membership: I-80 Coalition

	Road Work	Road Weather Conditions	Traffic Incidents	Traffic Speeds	Weather Information	Cameras	DMS Messages	CV-specific Information	Neighboring States Information	Personalized Reports	Other
Key Features	- Construction - Road closed - Delay - Lane and ramp closures - Width limit - Lane shift - Existence of detours (routes not shown) - Intersection closed - Flaggers - Construction project information - Project schedule	- Road conditions (adverse driving conditions, chains or snow tires required, holding traffic, road closed)	- Incident	- Live traffic speed (free flow, moderate traffic, heavy traffic, stop and go) - Work zone speed limit - Speed reduction - 2 color blind options for traffic speeds	- Wind alert - High winds - Weather advisories - Severity alert - Sensors wind speeds - Links to RWIS information	- Still images from map locations	- DMS locations and messages	- Truck restrictions - Truck parking - Oversized load	- N/A	- N/A	- Special event - Pilot vehicles - Overview of frequently asked questions - Link to NVRoads data exchange (allows software and system developers to gather information and data) - HAR sites - Rest areas and amenities - Welcome station and amenities

Caltrans   Membership: I-80 Coalition

	Road Work	Road Weather Conditions	Traffic Incidents	Traffic Speeds	Weather Information	Cameras	DMS Messages	CV-specific Information	Neighboring States Information	Personalized Reports	Other
Key Features	- Lane closures - Full closures - Waze road closures - Waze construction reports	- Snow plows (unable to observe) - Chain restrictions	- CHP incidents - Waze accidents - Hazards - Waze hazards	- Google traffic speeds - Traffic restrictions - Waze traffic jams	- Mountain pass closures list	- Still images at map locations	- Location and message/ travel time	- Truck chain requirements	- NV, OR - AZ (link broken)	- N/A	- Border Wait Time - Rest Area information

Nebraska DOT
Membership: I-80 Coalition

Key Features	Road Work	Road Weather Conditions	Traffic Incidents	Traffic Speeds	Weather Information	Cameras	DMS Messages	CV-specific Information	Neighboring States Information	Personalized Reports	Other
	- Road closures - Lane closures - Restrictions - Current and planned construction - Detours - Waze construction - Waze closure - Text construction report	- Impassable, completely covered, partially covered, normal or wet	- Crash - Waze accident - Waze hazard	- Google traffic speeds - Waze traffic	- Weather stations (air temperature, precipitation, wind speed, wind direction, relative humidity - Waze weather	- Still images from map locations	- N/A	- N/A	- IA, MO, KS, CO, WY, SD	- Personalized reports	- Plow tracker locations and photo on separate map view

Wisconsin DOT									Membership: Neighboring State	

	Road Work	Road Weather Conditions	Traffic Incidents	Traffic Speeds	Weather Information	Cameras	DMS Messages	CV-specific Information	Neighboring States Information	Personalized Reports	Other
Key Features	- Road closure - Lane closure - Flaggers - Restrictions	- Winter road conditions (good winter driving, slippery stretches, snow/ice covered, travel not advised)	- Incidents - Incident closures	- Traffic speeds	- Weather alert - Weather forecasts	- Still images from camera locations on map	- Message sign locations and messages	- Truck restrictions - Truck parking with amenities	- N/A	- Personalized routes	- Park and ride locations and available spots

APPENDIX B: INTERVIEW SUMMARIES

Washington State Interview Summary

Interview	Jeremy Bertrand and Justin Belk Washington State Department of Transportation (WSDOT) December 18, 2019
Website Usage • 2013-2018 Usage	WSDOT tracks the number of hits to their website on a monthly basis.

Year	Pageviews (in millions)	Unique Views (in millions)	Average Daily Pageviews (in millions)
2015	114.6	78.7	.314
2016	149.3	109.0	.408
2017	169.1	125.4	.463
2018	143.2	104.1	.392
2019 (Jan thru Aug)	112.7	83.8	.464
Total	**688.9**	**501**	**.404**

Analytics also allows WSDOT to see when visitors go from traveler information to construction project pages.

• Unique Factors

Content and format changes in the last 5 years have impacted usage statistics so there have been some challenges with planning for spikes during key events. Wildfires have impacted local roads more than state highways; however, in 2010 and 2012 there were significant snow events that shut down all three passes in King County (around Seattle).

The mobile app release has changed how people are using the website as well as the content that is offered. WSDOT has observed a general decline in 511 phone usage due to the impact of social media, the mobile app, and other tools that have been made available.

• MOST Used Features

- One of the most used features on the WSDOT website is roadwork and construction. The SR99 tunnel under Seattle was a project that shut down the freeway for three weeks. Significant public outreach before the closure changed the travel pattern.

- Travel alerts and mountain pass information are also commonly used, especially for Stevens and Snoqualmie passes.

- Cameras are also a highly used feature.

- Google Analytics showed that in 2016, the third most visited page on WSDOT's website was "404 Page Not Found". This is evidence that the site is too link heavy to be properly maintained even with dedicated staff concentrating on fixing broken links.

• LEAST Used Features

Default Information	Most people access traveler information from the [Washington State DOT home page](#) but WSDOT considers the main traveler information page to be the [Washington State Traffic & Cameras](#) page.
New Features	WSDOT has not invested in the traveler information website since 2003 so it is not mobile-friendly or easy to use. They are currently redesigning their website in three phases, but they are unlikely to do anything in the next 12 months.
	• WSDOT will redesign the ferry information page in an effort to reduce phone calls to the ferry help desk in the next 6 months.
	• Phase 2 is projected for June 2021 and will change website content.
	• WSDOT hopes to acquire additional funding to implement a zoomable traveler information map and add personalization at some point.
	• An in-house app maintenance employee recently completed an update and has started exploring how Apple CarPlay and other applications may be able to help with provide data.
Existing Features	WSDOT uses the Google traffic layer in the mobile app but not on the website because of the associated cost to use on the website and the availability of the information through other third-party apps. The Google traffic layer includes information for all 50 states, so users can also view traffic in other states.
• What Works Well	The Washington state legislature requires that WSDOT incorporate advertising to support the traveler information website. Spikes in traffic occur during major weather events, resulting in increased revenue. WSDOT generates $75,000 - 100,000 annually based on views and click-throughs. Strict parameters for the type of advertising allowed on the WSDOT website help make the ads more useful to travelers (e.g. traction tires or insurance).
• Urban vs Rural	WSDOT has not seen a lot of web traffic in rural areas except for in mountain pass areas. Most web traffic comes from higher population/ congested areas. There is also a difference between the east and west sides of the state with the east side (e.g. Spokane) focusing more on the road conditions. Population centers check traffic information more frequently.
Removed Features	A website feature that has been removed is a table that identifies historic travel times (real-time, average, and 95%). This feature was removed since it is available through internet searches but costly to provide and maintain.
	WSDOT worked with the University of Washington to provide forecasted weather across passes after receiving a one-time grant, but

	funding for operation was not available so the feature was discontinued.
Informed Decisions	Washington State DOT completed a study on usability in 2016 including interviews, surveys, and analytics to research citizen's interests and find the top tasks to help them make decisions about website features. • The study found that the traveler information website is not mobile-friendly or easy to use. Users didn't know to go to several places to piece together their trip. For example, a freight driver may need to check multiple areas in order to make a sound travel decision. The site does not prioritize content for users' top tasks. • As part of the study, WSDOT had people perform various tasks with website information. WSDOT discovered that though several study participants were confident about their decisions, they interpreted the information erroneously and went to places WSDOT did not expect. Users were frustrated that WSDOT did not have a map they could pan and zoom in on their trip but believed there was a lot of useful information on the site. • WSDOT learned that they needed to shift and change what and how information is provided as a wide variety of branding and sites have been harmful with educating the public on where to go for information. A lot of the information travelers needed was separated by the office who published it, preventing users from getting the big picture. • WSDOT is challenged by the fact that though they have the funding to redo their website, they do not have the necessary resources to update the traffic map.
Additional Information	Though the weather feature is highly used on WSDOT's website, WSDOT is wondering whether they should continue to devote resources to providing weather information or if they should encourage people to go to the National Weather Service (NWS) site. WSDOT relies on the Pathfinder relationship, but this requires a high degree of maintenance to maintain. An increase in social media use is shown in the Gray Book which reports analytics for 511 calls and social media. This tracking shows that as 511 calls are decreasing, Twitter use is increasing. WSDOT is considering whether third parties will take over traveler information services and if the future of traveler information websites will experience a decline similar to 511 phone. The following graph is from WSDOT's March 2019 Travel Information Annual Report.

WSDOT's Twitter following continues to increase, 511 calls see decrease

April through March, 2016 through 2019[1]; Numbers in thousands

1 511 calls[1]   2 "@wsdot"[3] followers   3 "@wsdot_traffic"[4] followers

Data source: WSDOT Communications Office

Idaho Interview Summary

Interview	Tony Ernest Idaho Transportation Department (ITD) December 5, 2019
Website Usage • 2013-2018 Usage	Idaho tracks individual visits for their high bandwidth, low bandwidth, mobile, and mobile 3G sites.

Year	High Bandwidth	Low Bandwidth	Mobile App	3G Mobile
2013	474,113	1,582,866		356,750
2014	403,160	2,032,812	102,344	350,837
2015	443,081	2,108,205	346,067	253,124
2016	630,599	2,215,697	634,771	204,037
2017	1,214,699	3,102,799	1,242,387	307,504
2018	747,429	2,525,804	873,292	149,485
2019 (thru Sep)	911,646	2,366,497	1,025,072	1

• Unique Factors

- During the 2013-2018 period, Idaho observed an eclipse that may have affected website usage. Usage statistics for the eclipse on August 21, 2017 show the following number of visits to Idaho's traveler information sites:

	High Bandwidth	Low Bandwidth	Mobile App	3G Mobile
August 21, 2017 Eclipse	31,404	70,283	47,985	11,128

- Idaho's unique weather-related events that may have caused road closures and increased website usage include winter road conditions, forest fires, and avalanches.

- In 2014, ITD implemented a mobile app for traveler information and it is now their fastest growing platform. This mobile app replaced Idaho's 3G mobile website, so all former mobile website users transitioned to the mobile app. In addition, many 511 phone users are using the mobile app.

• MOST Used Features

Idaho can only track feature use on low bandwidth; however, there is a correlation between what users look at and complaints received as feedback. Most used features appear to be:
- Cameras
- Winter road conditions (the bulk of the use occurs during winter months)
- Road work (although this is used infrequently in the winter)

• LEAST Used Features	• Static information, especially on the truckers page (e.g. where truck escapes and rest areas are located) of Idaho's 511 traveler information website, costs nothing to maintain but is not used very often. • Neighboring states information

Default Information	The low bandwidth version of Idaho's traveler information website is fast loading and works on older browsers.
	
	Website defaults vary depending on the time of year.
	
	    • Seasonal – winter road conditions
	    • Summer – road work and Google traffic speeds
	
	The high bandwidth site for truckers is formatted with truckers needs in mind. Commercial vehicle restrictions are the first thing that pops up.

New Features	• ITD wants to transition to one traveler information website that functions with lower bandwidth needs and has a mode for truckers. With the current technology, both versions are no longer necessary. • Once a new website is rolled out, ITD hopes to add Waze information to the website. They plan to import citizen reports from Waze but filter police speed traps and group data to avoid duplicates before placing as events on the website. • A new feature incorporated into Idaho's website redesign is delay information from Google traffic speeds. This feature provides the delay caused by a road work event or the degree to which traffic is being slowed down due to winter travel conditions.
Existing Features • What Works Well	 • RWIS and camera information are highly used features. Users are shown hazardous travel conditions such as high winds even if they have the RWIS layer turned off. • Idaho pulls in NWS information to include in winter road reports. They select a few of the NWS squares, taking the worst spot forecast to create a composite, and use the composite information to generate a report for that particular section of the highway. In the last year this has been very reliable.
• Urban vs Rural	• Idaho's traveler information website is used more frequently in rural areas than in urban for winter travel conditions and road work events. • In the Boise area, the website is used to communicate congestion during rush hours.

Informed Decisions	• Idaho concentrates their decision making on winter road conditions as they perceive the public is most interested in receiving information on this feature. • ITD watches what other states with similar climates are doing (e.g. NWP states). • Customer complaints received through the phone system, website, or by calling ITD general information have indicated that users are using Waze to fill in gaps of information such as accidents. This feedback helps ITD make decisions about future website features.

Montana Interview Summary

Interview	Mike Warren Montana Department of Transportation (MDT) January 13, 2020
Website Usage • 2013-2018 Usage • MOST Used Features • LEAST Used Features	• MDT identifies the number of times a page reloads or that an incident has been viewed. Especially in winter: • Cameras • Road Weather Conditions • Traffic Incidents Likely general weather information and road work (in winter) are the least used but MDT does not have numbers to verify.
Default Information	From November 1 to March 31 the <u>Montana traveler information map</u> has the construction layer turned off, but users can manually turn it on as needed.

New Features	• A new system will be rolling out next season. MDT expects an internal version will be available to test and revise in late January/early February.
	   o MDT compared their requirements to the application and found they didn't match.
	   o The URL for the new system will be the same as the existing URL, but users will be redirected to the new map.
	   o The mobile app will completely change and will need to be downloaded.
	   o During the summer, Montana receives hits for construction work, but the numbers are not like the number of hits they receive in the winter. They hope to minimize the shock to users by rolling out a new system to the public during the summer months.
	
	• Currently road conditions are reported by MDT employees who radio to one of 10 divisions. The new system will centralize the process so plows drivers will call a TMC.
	   o As the TMC matures, MDT may also add traffic management information to monitor safety issues such as wrong way drivers.
	• MDT wants the data they provide to be timelier and more accurate with no noticeable difference to the public.
	
	• Most desired features are internal and related to how to maintain and present information and keep it updated.

	- MDT is changing from an Oracle system with batch jobs to new software that uses a map-base user interface and allows more driver input. - Features that are being considered for addition to the website include: - Personalized Reports – This feature does not exist in the current system. - DMS Messages – DMS is expected to be a layer on the new map. - There is increasing data being brought in and Montana would like to position themselves to potentially use this data by using snowplows as a rolling RWIS site or implementing a crowdsourcing app.
Existing Features • What Works Well	- Cameras are the most widely used feature. Internally MDT is also a high consumer of camera images. - Camera images from RWIS sites (where available) are consumed in a variety of ways and meet the needs of a different segment of the population.
Removed Features	Low band width map – Montana saw little benefit to maintaining two versions and the new system will be hard to translate to a low bandwidth site.
Additional Information	The current traveler information website is the most visited Montana state government website. Montana's current traveler information system has a radar layer.

Wyoming Interview Summary

Interview	Ali Ragan Wyoming Department of Transportation (WYDOT) December 19, 2019
Website Usage	Wyoming DOT developed and maintains their traveler information website in-house.
• 2013-2018 Usage	WYDOT tracks hits for text-based pages, but they did not track map usage in 2013 and, once collected, the stats have not been easy to obtain. The text-based pages are used more than their traveler information map because if users know the route the text-based pages are faster and poor internet connections make maps difficult. Website hits for text-based pages are: **Year** — **Number of Hits on Text-based Pages** 2013 — 601,385,512 2014 — 750,220,966 2015 — 985,628,223 2016 — 1,050,023,095 2017 — 1,130,018,494 2018 — 1,458,133,483 **Total** — **5,975,409,773**
• Unique Factors	WYDOT's traveler information system is used mainly for weather impacts not travel times. Over the last 5 years WYDOT has observed a steady increase in website use. They did not show a spike for the 2017 eclipse or any big wildfires.
• MOST Used Features	The most used features on Wyoming's 511 website are: • Text-based pages • Road weather conditions • Web cameras • Travel forecast map image for the next day's travel – forecasts the road weather impacts to travelers
• LEAST Used Features	Wyoming does not have analytics for specific URLs, so they do not have data to support the least used features of the traveler information website. They believe that even if the information is not used by a lot of people it is still important to some (e.g. chain laws). If they can provide information without spending a lot to collect or display it, they will.

Default Information	The Wyoming Traveler Information main page regularly changes the information presented on it. They do not have a default for what is placed where on the main page, but typically new information is shown at the top.
	On the map page, short term weather warnings, incidents, traveler impacts, and advisories are on by default. Browser cookies allow users to revisit and return to the last view similar to personalized reports.
New Features	Wyoming recently launched a forecasted travel weather impacts map. In addition to the map, this page allows users to select a road and view a text page that identifies real-time incidents, advisories, impact levels, and road conditions.
	Planned updates to the road weather forecast include adding incidents to text-based pages and adding additional city labels at higher zoom levels and information about wildfires to the map page.
Existing Features • What Works Well	• Text-based pages allow fast access to information by route. WYDOT reformatted text-based pages for efficiency to present information by route and milepost. • Wyoming DOT is unique in how they present information on their 511 website. Their travel information map displays roads with the impact to travelers first and then, if a user clicks on a line segment, a pop up provides the cause of the impact. • Wyoming offers many categories of road conditions and travel impacts using a variety of shadings and markings on the map. A few years ago, WYDOT tried to streamline the colors, but public feedback convinced them to continue with multiple colors.
• Urban vs Rural	Wyoming is a rural state and WYDOT feels they have good rural traffic management.
Removed Features	Wyoming DOT has reformatted the website and uses Esri instead of a Google base map
Informed Decisions	WYDOT receives a lot of feedback via email and makes changes accordingly. People believe if they voice their opinion it will be considered, and it is. Feedback typically comes from email but occasionally people call Public Affairs.
	Intentional outreach for feedback occurs through a Comment heading on the travel map which links to a survey. In addition, Wyoming performs a customer feedback survey by phone every 2 years. The results for WYDOT's 2018 Customer Satisfaction Survey are posted online.
Additional Information	WYDOT offers different versions of their traveler information map for color blind users. The same information is provided but different color

schemes are used. Though this affects only a small percentage of the population, WYDOT feels it is important to offer these various formats. They use a website that has performed color scheme research. WYDOT can upload an image to see what a person with a certain type of color blindness would see. This service does require that they duplicate their map, but it does not require a lot of extra work. Resources used to select colors for the colorblind version of the map are:

- Color Blindness Simulator: https://www.color-blindness.com/coblis-color-blindness-simulator/
- Color selector tool: http://colorbrewer2.org/#type=sequential&scheme=BuGn&n=3

North Dakota Interview Summary

Interview	Brandon Beise, Brian Bieber, and Mike Kisse North Dakota Department of Transportation (NDDOT) December 10, 2019
Website Usage • 2013-2018 Usage	North Dakota DOT provides a website Travel Information Map and a mobile app (ND Roads). They use Google Analytics to track both website travel map and page views as well as every click on their mobile app. • From 2013 to 2018, NDDOT averaged 3.7 million page views annually on their website map. The mobile app, developed in 2013 with data collection stats beginning in 2014, has received approximately 1.8 million map views between 2014 and 2018. This means NDDOT receives an average of 5.5 million hits annually between the website travel map and the mobile app. • The number of hits appears to be increasing each year, with winter storms generating the highest peaks in usage each year.
• Unique Factors	Though use of both the website travel map and the mobile app appear to be increasing, the mobile app seems to be increasing at a faster rate than the website travel map. NDDOT believes that more travelers are using the mobile app in the morning as they head out, then switch to the website map once they reach their destination. Typically, during a winter storm there will be approximately 300,000 hits. However, a peak storm occurred on December 26, 2016 when the ND website travel map received 439,000 page views and ND Roads logged 222,000 map views.
• MOST Used Features	The most used features on the website travel map are: • Road weather conditions • Cameras • Weather radar Many other features are used by different groups of people to address a wide variety of needs. For example, the Grand Forks Air Force Base uses wind speed to prepare in case of a fire or chemical spill. Third party travel sites use NDDOT camera information, Iowa DOT includes NDDOT road conditions on their regional map, and oil companies frequently monitor road conditions for transport.
• LEAST Used Features	The least used features on North Dakota's website travel map may be: • Warnings and events • Oversize/overweight information – The travel map tabs such as the oversize/overweight tab are important for a select group but are not used by the general public.

	Also, NDDOT has found that people do not like to click links; they essentially want a map at a glance.
Default Information	The NDDOT travel map default shows road closures/incidents and road conditions in the winter and work zones and warnings/events in the spring and summer. These defaults are coded into the travel map.
New Features	ND has many reasons to switch to a new traveler information system. The current system was developed many years ago without a lot of mobile device capabilities, so they are changing to newer file formats. NDDOT would also like the website travel map and the mobile app to look and feel similar.
	NDDOT plans to redesign their travel map this winter, adding new features and modifying some existing features. Some of the changes are a result of NDDOT's review of travel maps from 35 states. This review resulted in a spreadsheet with a screenshot from each state and led to creation of a decision document to provide NDDOT with a direction. The document identified a significant number of desirable features from other states and was presented to executive staff; all items that were recommended in the decision document were approved for implementation.
	One feature NDDOT is looking into adding is citizen reporting. North Dakota is looking at the Utah model for guidance and hopes to incorporate online training and verification to address quality control. NDDOT is also interested in working with county sheriffs to update county road conditions since NDDOT is not staffed 24/7. NDDOT has trained some PSAPs (911 call centers) how to update road conditions, and they have been doing this since last season.
	NDDOT would like to be a one-stop shop and generate a decision support system for all different kinds of users. For example, if a school sports team is scheduled to play in a tournament on Saturday but a storm is predicted, they must decide whether to travel on Friday or on Saturday and then return on Saturday or stay over until Sunday.
	One decision NDDOT is looking into is how many layers are ideal to provide all the information the public needs without appearing cluttered. NDDOT will complete their website update internally and hopes to have test sites up by spring.
Existing Features	
• What Works Well	NDDOT's goal is to create a dynamic map with added layers to provide the public with information to make informed travel decisions. Some unique features from North Dakota's travel map include the track-a-plow pilot that has been available for the past 3 years, a weather radar layer, and travel alerts.
	Unlike many other states, North Dakota displays the roadway direction of divided highways separately and has found this to work

	well. They have also received a favorable response to their road conditions (e.g. ice/compacted snow, scattered ice, snow covered) that provide significant detail on the travel map.
	Updating the travel map is a coordinated effort. NDDOT updates road conditions from 5 am until 10 pm. However, given the mobile capabilities for updating the information, road conditions can be updated any time. Administration updates the map for all closures and "no travel" advisories.
	In addition to updating road condition reports on a pre-planned schedule, plow operators may update the information when they have time and as conditions change. For each section, the responsibility for updating the travel map is rotated between plow operators. Typically, updates occur inside the truck on either an iPad or a cell phone.
Removed Features	NDDOT has removed or discontinued some features such as links and special feeds, but many of these features have been restored due to customer requests. Many people are forced to make decisions based on many tools.
Informed Decisions	The traveler information NDDOT provides is used for a lot of diverse purposes. NDDOT responds to public feedback and requests, at times altering how available information is presented.
Additional Information	Though North Dakota does not incorporate Waze data into their travel map, they do provide data to Waze and grab Waze data for internal use.

South Dakota Interview Summary

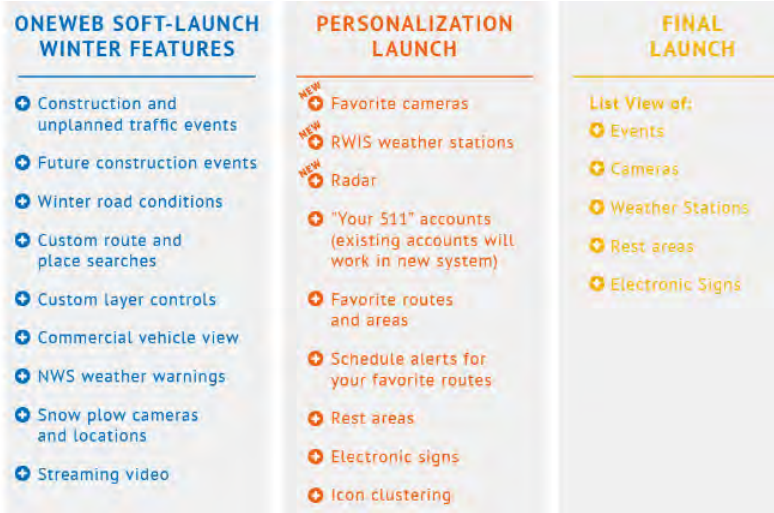|	
Interview	Dave Huft South Dakota Department of Transportation (SDDOT) December 18, 2019

Website Usage
 	
• **2013-2018 Usage**
 	
• **Unique Factors**
 	
• **MOST Used Features**
	
	South Dakota does not track hits by page.
	
	Mobile apps did not noticeably detract from website use because South Dakota has struggled with people not being aware of their mobile app.
	
	Though South Dakota does not have analytics to identify their most and least used features of the 511 website, from the complaints they receive the most used features appear to be:
	    • Cameras – The addition of cameras everywhere is SDDOT's most popular feature on the 511 website. The predominant use of the website is during winter months. Some locations in South Dakota can be 30-40 minutes from a camera. SDDOT plans to fill in some of the gaps between cameras by adding 10-12 sites next year. They will not double the number of cameras they now have, but they will consistently add.
	    • Road weather conditions
	    • Road work

Default Information	South Dakota uses consistent default information on their 511 website year round. Most information is available on the map legend or selected as an overlay displayed with the map. SDDOT does not offer DMS, neighboring state, or traffic speed information but they do have commercial vehicle information and users can subscribe for personalized reports. Users also can click on road segments to get road conditions and weather.
New Features	Currently, SDDOT is working to complete a major update including adding new website features and updating their 511 website, mobile apps, and 511 phone. They have a target implementation date of late summer 2020 and plan to host this update differently, taking advantage of cloud-based resources separated geographically. SDDOT's new website will be based on Google. The road condition depiction may change. Added features will include DMS messages, plow cam images, and plow locations. SDDOT is updating their mobile app to reflect their updated website and they are considering the possibility of using intelligence regarding location and direction if location information is enabled on the phone. SDDOT is also in the process of trying to improve on traffic incident reporting by automating with the highway patrol. Providing work zone information is labor intensive to enter and maintain, however, if a work zone interferes with traffic for more than

	2 hours SDDOT enters it into the system. A feature South Dakota wants to add is construction zone detour information. Their challenge has been not knowing where people are or where they are going.
Existing Features • What Works Well	• Many overlays are available on the SDDOT 511 website. One overlay feature unique to South Dakota is the 24-hour threat forecast. ○ Road segments in an area with potential adverse road conditions during the next 24 hours are highlighted in yellow. Currently South Dakota is unable to update road conditions continually, and it may have been hours since the last road conditions update for a segment. ○ The 24-hour threat forecast provides information about projected road conditions over the next 24 hours based on weather and road surface models in an effort to predict threats along the roadway that may impact travelers. ○ The presence (or absence) of a threat forecast may provide additional information about the current state of the roadway. • SDDOT's use of cameras has worked well. Cameras are in place at RWIS stations to provide RWIS information.
• Urban vs Rural	South Dakota is a rural system. The only urban roads SDDOT is responsible for are interstates in Rapid City, Sioux Falls, and Mitchell. In these urban areas SDDOT may need to improve incident reporting. Congestion is minimal but some congestion may occur in Sioux Falls.
Removed Features	SDDOT has not removed features from their traveler information website.
Informed Decisions	A customer satisfaction survey of 1,200 people is completed annually. SDDOT uses the annual survey to improve public awareness of their traveler information site and identify the public's perception of the accuracy of the information. Survey results show that the top threat to travel safety is weather and they have received a favorable response to the 24-hour threat assessment feature.
Additional Information	South Dakota's 511 phone system will have a new menu structure and voice recognition will be added. Poor phone service in the past has not allowed them to utilize voice recognition. The new phone system will remember phone numbers and provide more personalized service based on user preferences. Road condition information in South Dakota is reported by Maintenance. SDDOT does not currently use crowdsourced road condition reports and has no plan to move that direction.

Minnesota Interview Summary

Interview	Kelly Braunig Minnesota Department of Transportation (MnDOT) December 17, 2019
Website Usage • 2013-2018 Usage	• MnDOT does not have information regarding page use; however, they will be using Google Analytics with their redesigned website so this may be available in the future. Currently they track the number of visits by month. The number of visits to the 511 website and mobile app by year are shown below.

Year	Web Usage (in millions)	App Usage (in millions)	Web + App (in millions)
2014	6.0	1.9	7.9
2015	2.7	2.3	5.0
2016	4.5	3.9	8.4
2017	3.7	4.0	7.7
2018	6.7	6.6	13.3
2019	9.8	9.9	19.7
Total	33.4	28.6	62.0

• Unique Factors	Changes in website usage in the last 5 years include: • Launching the 511 app just before July 4, 2013 • A trend toward higher app usage, especially during weather events.
• MOST Used Features	It is difficult to identify the most used features of the 511 website, but, based on questions and comments the following features appear to be widely used: • Road weather information • Traffic incidents • Cameras, including both traffic cameras and plow cameras • The use of personalized reports is also increasing
• LEAST Used Features	The least used features of the 511 website are even more difficult to pinpoint. Potentially these may include: • Neighboring states information • Commercial vehicle information
Default Information	Through April, MnDOT defaults their 511 website to show winter weather including road weather information, closures, reduced lanes, and ramp closures.

	During the summer months the default is road reports, traffic speeds, congestion, crashes, and future events. All year the website shows NWS warnings for events such as blizzards or tornados by shading the counties affected and weather warnings such as high winds or dense fog.
New Features	MnDOT will launch their new 511 website on January 2, 2020. They will use a soft launch, temporarily continuing to allow access to the old 511 website. Updates to the new website will occur in February and April with access to the old website being removed in April. A "For Feedback" pop up will collect user comments for Castle Rock and be forwarded to MnDOT. By late January/early February, an automated road weather feature will integrate MDSS with segment condition data and provide updates every 5 minutes. MnDOT has been working on this system for the last 2 ½ years and will be the first state to implement this feature. They also plan to incorporate visibility such as fog or haze and generic forecasting. As a backup, if MDSS goes down the road weather feature will revert back to the old manual system. Posting "Road Closed" or "Travel Not Advised" will continue to be updated manually.
Existing Features • What Works Well • Urban vs Rural	 • Road Conditions • Road Reports • Maintenance and Construction There are some differences between urban and rural use of features. For example, the "Tell Me" feature gives all the information available for an area and cannot be limited. This works great in rural areas but provides too much urban information, so most users turn it off. MnDOT is finetuning the feature to limit the information it provides in urban areas.

Iowa Interview Summary

Interview	Sinclair Stolle Iowa Department of Transportation (Iowa DOT) December 16, 2019
Website Usage • 2013-2018 Usage	Iowa documents 511 website usage in a monthly report. Annual hits to the traveler information page for 2013-2019 are shown in the table and graph below.

Year	511 Calls	511 Web Sessions	App Sessions	App Downloads
2013	189,402	5,015,868	NA	49,200
2014	166,081	4,389,476	378,412	70,283
2015	132,784	3,539,410	1,444,031	78,383
2016	129,827	3,395,928	1,988,213	71,582
2017	104,957	2,878,319	1,873,729	68,242
2018	166,487	5,062,506	3,693,452	96,661
2019	247,380	8,675,477	6,922,310	175,759

• Unique Factors	Some 511 users also want the 511 phone system to continue.
• MOST Used Features	Currently, analytics from Castle Rock are not available so Iowa DOT does not track the most or least used features. However, they believe that winter information receives some of the most use including road conditions, plow locations, plow cams, and cameras.
• LEAST Used Features	
Default Information	Iowa's 511 website adjusts the default features between construction and road condition information on approximately October 15 and April 15.
New Features	Iowa has re-evaluated the information that is being provided on their 511 site and they are preparing to launch Phase 1 of their new site on January 22, 2020. The new 511 website is being launched in 3 phases using a soft launch which will allow the old and new 511 websites to operate simultaneously during phase 1. • The beta site is available for viewing at new.511ia.org. There will no longer be high and low bandwidth versions. • A summary of the features and abilities included in each phase of Iowa's launch was provided by Iowa DOT in the graphic below:

• Phase 2 will launch in July 2020 and will cluster icons when there is a lot going on in an area.
• The final phase of launching Iowa's 511 updated website will occur in September 2020 and will include ADA-compliant list views of the site. The full feature 511 website that is being replaced was not ADA compliant although the streamlined version was.

One of Iowa's requirements for the new 511 website is to eliminate the need for different versions of the website as it is too cumbersome to manage.

	Iowa currently has a trucker and general traveler version of the 511 mobile app. As part of their 511 system update they will only have one app with a separate layer available for commercial vehicles.
	Some additional features that are being added to Iowa's new 511 website include more weather information such as RWIS and ATIS and weather radar to provide more information during storms.
	Flood closures prompted some changes to depicting road closures and allow users to always see the extent of the closure using an icon and painted road. Prior to the flooding, a user had to hover over or click on the closer to see the extent of the closure.
	Iowa's new site is responsive, allowing the map to adjust to different browsers and devices. The mobile app for android users will launch Summer 2021. The app for iOS users will follow. Until the new apps are developed and released, the existing mobile apps will continue to function. Similar to the new website, the new apps will allow users to take a tour and then start onboarding.
Existing Features • What Works Well	• Iowa's 511 site has 3 general groups of customers: general public/travelers, truckers, internal staff, and media, sometimes with conflicting purposes. Features that have worked well and will be preserved are road weather conditions (especially in winter) and cameras (particularly with plow cameras). • Since 2013, the Personalization feature has seen increased usage each year. As of 11/1/2019, Iowa DOT had approximately 29,000 subscribers to the Personalization feature with slight, steady climbs through the summer months and stronger jumps during the winter.
• Urban vs Rural	Urban and rural areas are treated similarly, however most RWIS information, including cameras and rest areas, are in rural areas. Video is treated differently where there is fiber to support streaming video (usually in metro areas). Currently, icon clustering helps for urban areas where there are more events, but this feature will not be active on the new site until phase 2.
Removed Features	On the new 511 website, Iowa has renamed "Electronic Signs" to "Message Signs" and "Winter Driving" to "Road Conditions" but they did not remove any information.
Informed Decisions	Streamlining operator data entry was an important goal for Iowa 511's new launch and ATIS/ATMS procurement. For example, tow bans are one of the more laborious processes to manually message out to the public via social media. Now, that process of posting tow bans to social media is automated using the CARS data feed. Iowa DOT has performed customer outreach to assist with completing an ATIS/ATMS RFP to adjust data feeds to tell a story more efficiently.

	They are relying on Castle Rock, a vendor, and a user group to identify trends.

Nevada Interview Summary

Interview	LaShonn Ford Nevada Department of Transportation (NDOT) January 13, 2020
Website Usage	Nevada provides a travel information website (NVRoads) and uses Google Analytics to track website usage.

• 2013-2018 Usage	• Since April 2013, NDOT has recorded over 8.6 million sessions including:
	   o 2019 (through November) – 2,435,027
	   o 2018 – 1,437,373
	   o 2017 – 2,184,341
	   o 2016 – 990,193
	   o 2015 – 695,191
	• NDOT receives an average of 1 million hits annually.
	• The maximum annual number of hits was recorded in 2019 with February receiving record usage.

• Unique Factors	Winter weather causes the biggest change in website usage, especially in the northern part of the state, near Reno, and in mountain passes. Users in these areas routinely check cameras, chain restrictions, and road conditions. Annually, before winter weather begins, Nevada DOT sends press releases as a reminder to motorists to sign up for 511 notifications. This typically results in a small bump in usage. Nevada has observed a decrease in desktop usage and reports that most users access the website with mobile devices. In addition, Nevada records steady usage (though low) through their 511 IVR phone system and has seen no significant drop off over time.
• MOST Used Features	From Google Analytics, Nevada reports the 3 most used features are: • Cameras • Road conditions • Traffic incidents
• LEAST Used Features	Nevada's 3 most under-utilized features are: • Road Work • Weather (general) • Personalized Reports (My511)
Default Information	Initially, NDOT's website default includes incidents, construction, weather, special events, cameras, and road conditions. Nevada's website is customizable by the user and uses cookies to retain the user's preferences.
New Features	No enhancements are being made to the current site. Nevada plans to update their current system in April 2021 when the existing

	agreement ends. All efforts and funding are being put forward for development of the next 511 system. Some potential feature enhancements that are being considered include: • Adding a route planner that is more accessible outside of MY511 by pulling up incidents on routes to improve the trip feature by making it more accessible from the home page. • Creating an automatic segment drawing for Operators. • Leveraging utilization and integration of more crowdsourced data either through partnership with Waze or by using the Waycare platform analytics software.
Existing Features • What Works Well • Urban vs Rural	• Nevada's chain control/road condition reporting system works very well. It uses predefined segments and allows Operators to simply click and add input. This feature uses mileposts which are less familiar to users so NDOT is trying to make a change to using more user-friendly points. Also, users seem to want an indicator for a clear road since there is some confusion if a segment does report any road conditions. • Cameras are widely used and work well in Nevada. NDOT receives the most comments about cameras and video feeds. People enjoy the ability to see conditions for themselves and commonly report when cameras go down or are pointed the wrong direction. Users seem to want to evaluate the condition of the road or traffic with their own eyes. Nevada is a large, rural state and, as such, experiences issues common to that type of environment. They handle features for both urban and rural areas in a consistent manner.
Removed Features	Though no features have been removed, the action for selecting a feature changed between the website and mobile application to make the application more user friendly. For example, on the website users hover over a feature such as video to launch it. Since hovering is not mobile friendly, mobile users click to launch the same feature.
Informed Decisions	Though no formal survey has been conducted, NDOT receives feedback from the public if features are not working properly. Comments are accepted through the website and give NDOT a good sense of public opinion. Nevada DOT is in the beginning stages of redesigning their traveler information website. They are in the process of conducting research to upgrade their traveler information site in 2021 and are looking at other states' best practices and costs to assist in their decision-making process as they move forward with their redesign.
Additional Information	Currently, maintenance calls into a Road Operations Center in Reno, Las Vegas, or Elko and they enter road conditions and update the 511 website. This process may continue with the new website design,

	however, NDOT may also look into allowing maintenance employees to update the information from the field since they plan to use a new maintenance platform with tablets. NDOT plans to reach out to operators to get their perspective for the website redesign.