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16. ABSTRACT

Real-time traveler information services have thrived in two primary contexts: urban-focused systems and regional systems. Urban systems, strengthened by an extensive sensing and technology infrastructure, can offer significant volumes of information, updated on regular intervals. Regional systems offer information over a larger geographic area and can more readily serve travelers on less regular trips, such as recreational or longer distance travel. However, these systems generally provide information on specific areas or highway segments, meaning that prospective travelers may need to consult multiple links to determine the travel conditions they will experience, and make a prudent decision regarding when to leave, which route to take, and how to prepare for the trip. The objective of this project has been to present both route-oriented and regional real-time and near real-time information together in a single web-based location and in a user-friendly format that does not stop at jurisdictional boundary lines (state, district or county lines, for example). This allows travelers making a trip in or through rural areas to have current travel information on a route-specific basis and across a wide geographic area, customized for a specific origin and destination, which will help them to make their trip more safely and with minimum delay.

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**Rural Traveler Information Needs Assessment and Pilot Study  
Phase III : Bordering States Rural Coverage**

**Final Report**

by

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A report prepared for the

**State of California, Department of Transportation  
Division of Research, Innovation and System Information**

March 30, 2018

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## EXECUTIVE SUMMARY

Real-time traveler information services have thrived in two primary contexts: urban-focused systems and regional systems. Urban systems, strengthened by an extensive sensing and technology infrastructure, can offer significant volumes of information, updated on regular intervals. Regional systems offer information over a larger geographic area and can more readily serve travelers on less regular trips, such as recreational or longer distance travel. However, these systems generally provide information on specific areas or highway segments, meaning that prospective travelers may need to consult multiple links to determine the travel conditions they will experience, and make a prudent decision regarding when to leave, which route to take, and how to prepare for the trip.

The objective of this project has been to present both route-oriented and regional real-time and near real-time information together in a single web-based location and in a user-friendly format that does not stop at jurisdictional boundary lines (state, district or county lines, for example). This allows travelers making a trip in or through rural areas to have current travel information on a route-specific basis and across a wide geographic area, customized for a specific origin and destination, which will help them to make their trip more safely and with minimum delay. This project initially focused on a limited geographic area - Caltrans District 1 and District 2, and Oregon - to provide a proof-of-concept of this approach. Subsequently it expanded to cover all of California, Oregon, Nevada and Washington. In Phase 2 it was further expanded to cover the “Western States Region” with the addition of Arizona, New Mexico, Utah, Colorado, Idaho, Montana and Wyoming, resulting in coverage of the 11 contiguous states west of the Rocky Mountains. While this scale of implementation yields direct benefits for the selected area, researchers believe that a great value of this effort is in demonstrating the feasibility and attractiveness of a One-Stop-Shop website for real-time route-specific traveler information for rural areas.

In Phase 3, a mobile, web-based version of the One-Stop-Shop was developed. The original, desktop version of the One-Stop-Shop was not conducive to use on mobile devices, particularly Smart Phones. Rather than develop “apps”, the project team chose to develop a mobile-friendly web-based version of the One-Stop-Shop that would work on most mobile devices. A subset of the functionality and data was chosen based on prior usage and interests expressed by users.

This report presents the results of work culminating in the development of the mobile version of the One-Stop-Shop. Project tasks included consideration of system expansion, mobile application development, on-going system development and system testing and evaluation.

## 1. INTRODUCTION

Transportation challenges within urban areas often attract significant attention, because the scale and location of these challenges affect large numbers of Americans daily. With the emphasis on urban areas, the transportation needs of rural areas are often ignored. It is often assumed that solutions to urban transportation challenges can be implemented in rural areas. This is typically not the case, as the unique characteristics of rural transportation preclude the application of urban solutions.

The use of real-time traveler information represents one class of solutions to address mobility and safety challenges. Significant improvements in sensing, communications and computational technology over the last twenty years have resulted in the proliferation of information regarding the performance of the transportation system. With rapidly increasing construction costs and the difficulties associated with adding capacity, state transportation agencies have increasingly adopted an “operations” approach to their highway networks, focusing on improving the use of existing assets. The real-time information capability offered by new technologies can help agencies to manage the system more efficiently. In addition, this information can help travelers to make more informed decisions to minimize their delay and enhance their safety.

Real-time traveler information services have thrived in two primary contexts: urban-focused systems and in-state, regional systems. Urban systems, strengthened by an extensive sensing and technology infrastructure, can offer significant volumes of information, updated at regular frequencies. These systems focus on shorter-distance trips within metropolitan areas, primarily during peak travel periods associated with work commute trips. Regional systems offer information over a larger geographic area and can therefore more readily serve travelers on less regular trips, such as recreational or longer distance travel. However, these systems generally provide information on areas or highway segments within a specific jurisdiction, meaning that prospective travelers may need to follow dozens of links to determine the travel conditions they will experience, and make a prudent decision regarding when to leave, which route to take, and how to prepare for the trip.

Neither urban systems nor regional systems efficiently serve the rural traveler, whose trip may span a great distance between and/or through urban areas. In addition, these types of systems are typically designed to conform to specific jurisdictional lines, whereas rural trips typically span multiple jurisdictions. While many rural agencies and districts have sought to provide traveler information, there is considerable variation in the level of information provided and how to access it.

In terms of transportation funding and political support, rural travel needs generally rate as lower priorities than those of urban travelers. However, California’s rural travel needs merit consideration for a variety of reasons. First, 15 percent of vehicle-miles of travel in California occur on rural highways (1), even though less than 6 percent of California residents live in areas classified by the U.S. Census Bureau as rural (2). Second, movement of goods is primarily interurban and requires accurate real-time traveler information to ensure timely delivery of freight to markets and factories. Third, the lack of alternative routes in rural areas means that motorists may experience delays of hours or even days during catastrophic events, which can have significant mobility (and even health and safety) implications.

To address these challenges, this document discusses work undertaken to develop the One-Stop-Shop for Rural Traveler Information.

## 1.1. Background

Caltrans has shown an interest in improving traveler information for drivers on all of California's highways, including those in rural areas. For example, the rural California/Oregon Advanced Transportation Systems (COATS) project has focused on investigating technological applications for addressing the unique transportation challenges present in the rural regions of Northern California and Southern Oregon. The project's boundaries spanned two states, multiple maintenance districts within each state, and involved dozens of agencies.

The COATS project's first phase, initiated in 1998, placed significant importance on understanding traveler needs. WTI conducted traveler information needs surveys at nearly two dozen rest areas in southern Oregon and northern California and conducted outreach to dozens of agencies. The results of the project, completed in 2001, included early-winner demonstrations of intelligent transportation systems (ITS) in rural areas, as well as an ITS strategic deployment plan to improve traveler information in rural areas.

The initial COATS effort was followed by COATS Showcase, a demonstration and evaluation effort funded by Caltrans and WTI, which ran from 2000–2005. This was followed by COATS Phase 3, which focused on further demonstration of ITS as well as technology transfer. All phases of the COATS project have included efforts to improve traveler information, especially across jurisdictional boundaries. As a result, there have been several successful deployments of innovative ITS technologies and traveler information system enhancements in the region.

A specific effort within COATS Phase 3, called Rural Integrated Corridor Management (ICM), also dovetailed effectively with the research of this project. The rural ICM project sought to develop a pilot mechanism to employ integrated corridor management on a rural highway. The test corridor included two primary routes connecting Eugene, Oregon, and Weed, California: Interstate 5, and Oregon 58/US Route 97. To facilitate corridor management, a data platform was established to strengthen center-to-center communications. This data platform provided a location where data could be stored and read on a real-time basis, with common data formats ready for use by different agencies. This data platform established a framework for the Phase One-Stop-Shop and gathered some of the data that will be conveyed to travelers.

In a project funded by the Federal Highway Administration to demonstrate uses of the *Clarus* System, the One-Stop-Shop was expanded to cover all of California, Oregon, Nevada and Washington. Subsequently, in Phase 2 of the One-Stop-Shop, the system was expanded to cover all contiguous states west of the Rocky Mountains with the addition of Arizona, New Mexico, Utah, Colorado, Idaho, Montana and Wyoming. In Phase 3, a mobile, web-based version of the One-Stop-Shop was developed.

## 1.2. Project Motivation

Two of Caltrans' overarching goals include (3):

- Safety: Provide the safest transportation system in the nation for users and workers
- Mobility: Maximize transportation system performance and accessibility

Real-time traveler information is a valuable tool in maintaining and enhancing both traveler safety and mobility, even in rural areas. From a safety perspective, it is important for rural travelers to know about potential challenges that may impact their trip, including snow, ice, high winds, fires and other hazards. These same challenges also degrade mobility, along with other events such as vehicle crashes and work zones. While such information may currently be available through a variety of sources, the type, quality, and timeliness of data is not consistent. In addition, the information is generally scattered over numerous web-based (and sometimes non-web-based) sources or provided by different agencies/jurisdictions, meaning travelers must spend significant amounts of time searching for and assembling updates before making a trip. Because of the effort involved, many rural travelers do not seek out any or all of the information they need. This may result in increased delays and degraded safety for the traveler.

The objective of this project has been to put a variety of real-time and near real-time information together in a single web-based location in a user-friendly format. This allows travelers making a trip in or through rural areas to have current travel information on a route-specific basis, customized for a specific origin and destination, which will help them to make their trip more safely and with minimum delay. At the onset of the project and as recently as 2009, no agency has put a variety of route-oriented real-time and near real-time information together in a single web-based location in a user-friendly format that does not stop at jurisdictional boundary lines (state, district or county lines, for example). While some states now provide all their available information in one location, that information conforms to jurisdictional boundaries and does not cross state borders to a significant extent or provide a mechanism to identify information by a specific routing.

This research is focused on a large geographic area – the western United States - to provide a proof-of-concept of this approach. While this scale of implementation yields direct benefits to users in the large study area, the researchers believe that the principal value of this effort is in demonstrating the feasibility and attractiveness of a One-Stop-Shop for real-time route-specific and general traveler information for rural areas. The proof-of-concept has been designed in a scalable fashion, so that the concept may be expanded to additional states, as has been demonstrated through several expansion efforts. Ultimately, as larger geographic areas are covered, this could become an umbrella traveler information website, which could be used as a primary point of reference for longer distance trips, with travelers interested in shorter trips looking at other websites for information. This could revolutionize traveler information, improving safety and mobility for all highway system users.

### 1.3. Project Tasks

As proposed, the One-Stop-Shop Phase 3 project consisted of five tasks (including Project Management). This scope of work corresponds to the third phase of the project, and the primary goal was development of a mobile version of the One-Stop-Shop. The emphasis of this phase of the project was to expand and demonstrate the initial prototype to provide a statewide information delivery mechanism. The project tasks for the third phase of this research included the following:

- *Task 1: Project Management*, to keep the Caltrans project manager and technical panel apprised of project progress;
- *Task 2: Expansion (Data Sources and Coverage)*, identifies data sources and implements expansion of the system to include new data and geographic coverage;

- *Task 3: Mobile Application Development*, which will involve development of a mobile interface for the prototype system;
- *Task 4: On-Going System Development*, to conduct on-going development of new application functionality and perform general system maintenance;
- *Task 5: System Testing and Evaluation*, to examine the way users interact with the prototype system, including selection of information, referring sources, etc. and summarize the project in a final report.

While completing this project, a slight change was made to the sequencing of the scope. An early development push was made to develop the mobile version of the One-Stop-Shop. As a result, other documentation and planning-related tasks were deferred. Thus, the Concept of Operations and Requirements documents were treated documentation of the system rather than plans for the development of the system. Task 2, an investigation of need for expansion of the system, was implicitly conducted by way of the prior expansion (Phase 2) and subsequent related used of the system by users in neighboring states and/or those planning to visit neighboring states. Note that many sources of data were identified outside the Western States Region, and some experimentation was done in implementing retrieval mechanisms for those sources. The potential still exists for expansion beyond the current states in the One-Stop-Shop. With that said, no further geographic expansion was conducted within Phase 3.

#### **1.4. Report Overview**

This report is organized into six chapters. Chapter One provides an introduction and background on the problem of interest. Chapter Two discusses the development of the prototype (desktop) website and provides an overview of its functionality. Chapter three discusses the development of the mobile website and demonstrates its functionality. Chapter Four presents survey results, websites analytics and sites that link to the One-Stop-Shop. Chapter Five discusses the conclusions drawn from the project, as well as the challenges encountered and recommendations for future work.

## 2. PROTOTYPE WEBSITE (DESKTOP OSS)

The One-Stop-Shop is a website that integrates and presents different data streams of interest to users. The data comes from existing agency databases; agencies populated the databases with the information of interest as part of their normal operations, while the website pulled this data in and disseminated it to users. In this manner, the website presented many different data elements both at a region-wide level and at a focused, route-specific level based on an origin and destination entered by the user. The website was developed to pull data in from agency web or ftp sites at a high frequency (depending on the dataset, this frequency may be as often as every five minutes) and presented it to users in a manner which differed from existing DOT traveler information websites. During the initial proof-of-concept stage, local (northern) and statewide data elements from California (based on availability) and Oregon (statewide) were incorporated into the prototype website. As the system proved itself, data from other geographic areas and agencies were added resulting in Phase 2 with the coverage of the 11 contiguous states west of the Rocky Mountains.

### 2.1. Interface Environment

The user interface was a web-based map built using Google Maps. Custom markers (icons) presented point-based information such as commercial vehicle enforcement sites, CCTV camera images, incident and construction locations, and dynamic sign messages in their appropriate locations. Raster graphics were superimposed on the map to represent data such as forecast conditions over the region of interest. The system incorporated a route planner, which allowed the user to select a route via Google Maps routing capability and display an elevation profile of the route along with select data layers including forecast information.

Dynamic HTML, Javascript and general AJAX (asynchronous JavaScript and XML) capability were used to retrieve and display data on the map, and for periodic updates of the displayed data. This display was accomplished with Dynamic HTML, CSS and Javascript. The website operates on a standard (CentOS) Linux platform running the Apache web server and scripting languages including PHP and Python. A standard hardware platform was used for initial development and the production version of the system was eventually migrated to offsite hosting.

### 2.2. Website Functions

As developed, the prototype website was designed to perform many different functions related to the provision of traveler information. An in-depth discussion of each function is beyond the scope of this document; however, a high-level overview of the various features of the website is provided in the following sections. This overview is intended to provide a summary of the website's capabilities. The reader is encouraged to visit the original prototype website at <http://oss.weathershare.org/> to experience firsthand the various features and capabilities that it offers.

#### 2.2.1. Initial View

When first accessing the One-Stop-Shop prototype, a viewer is presented with a view of the region, as illustrated in Figure 2-1. The initial view of the region presents the user with a series of icons related to DOT field elements, including CCTV camera images, CMS messages, incident and construction locations, RWIS station sites, and chain requirements (during winter weather). Note

that CMS signs that have a message posted are displayed with a yellow border and text, while inactive signs are displayed with grey features. In addition to the default information presented, the user may toggle on or off additional data streams. These streams include current and forecast weather for the region, and the location of mountain passes, vista (scenic) points, rest areas and truck scales (commercial vehicle sites), as well as fire information. The user is also presented with a mechanism to enter origin and destination information for custom route mapping. When any of the active icons on the display is selected, the site-specific information associated with it will be presented. Finally, like traditional Google Maps displays, the user can also select a traditional map background, a satellite image, a hybrid image (map and satellite image) or a terrain display.

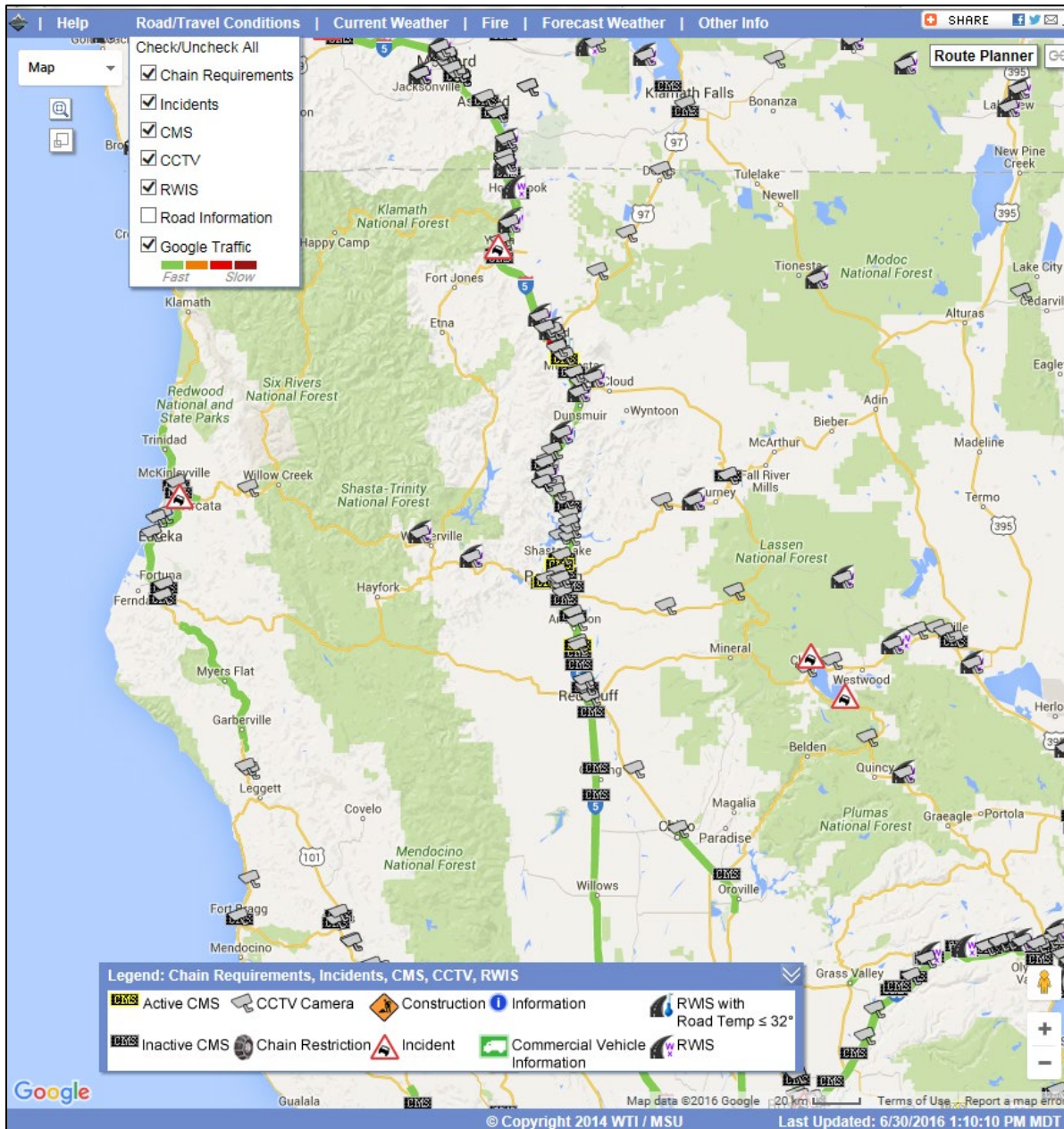


Figure 2-1: One-Stop-Shop initial view



Current and forecasted weather is also available to One-Stop-Shop users. Figure 2-2 presents an example of one type of weather view that can be displayed by the website: current temperature. When the temperature icon is selected, various weather data from the weather station is presented to the user. In addition to current temperature, a number of other current conditions can be selected by the user for display through the use of a drop-down menu. This information includes wind speed and direction, hourly precipitation, 24-hour precipitation, humidity, and National Weather Service observed 24-hour precipitation. Note that the information presented by the prototype is provided by MADIS, Mesowest and state DOT RWIS. The availability of current weather information should be of great interest and utility to users in planning their trip, as it provides a picture of present conditions along roadways throughout the region.

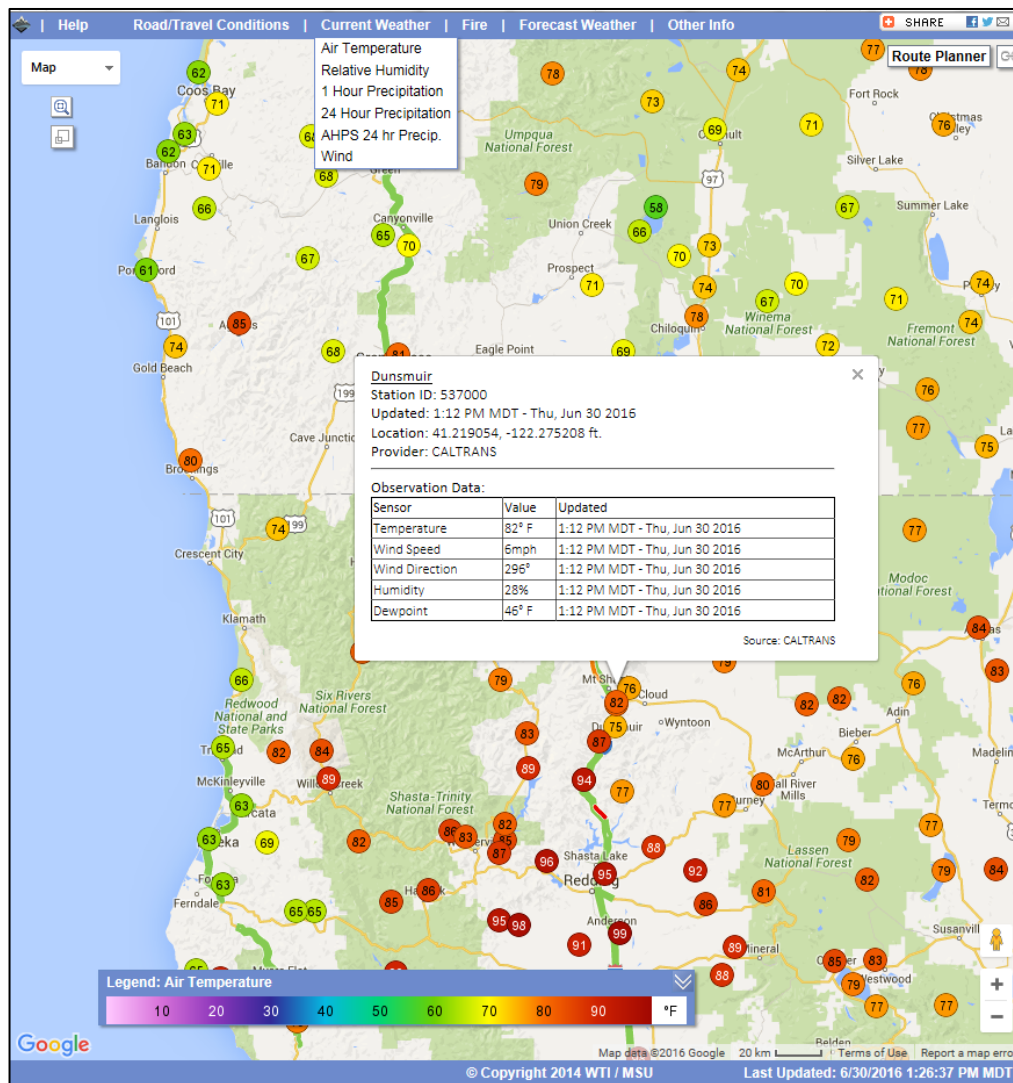
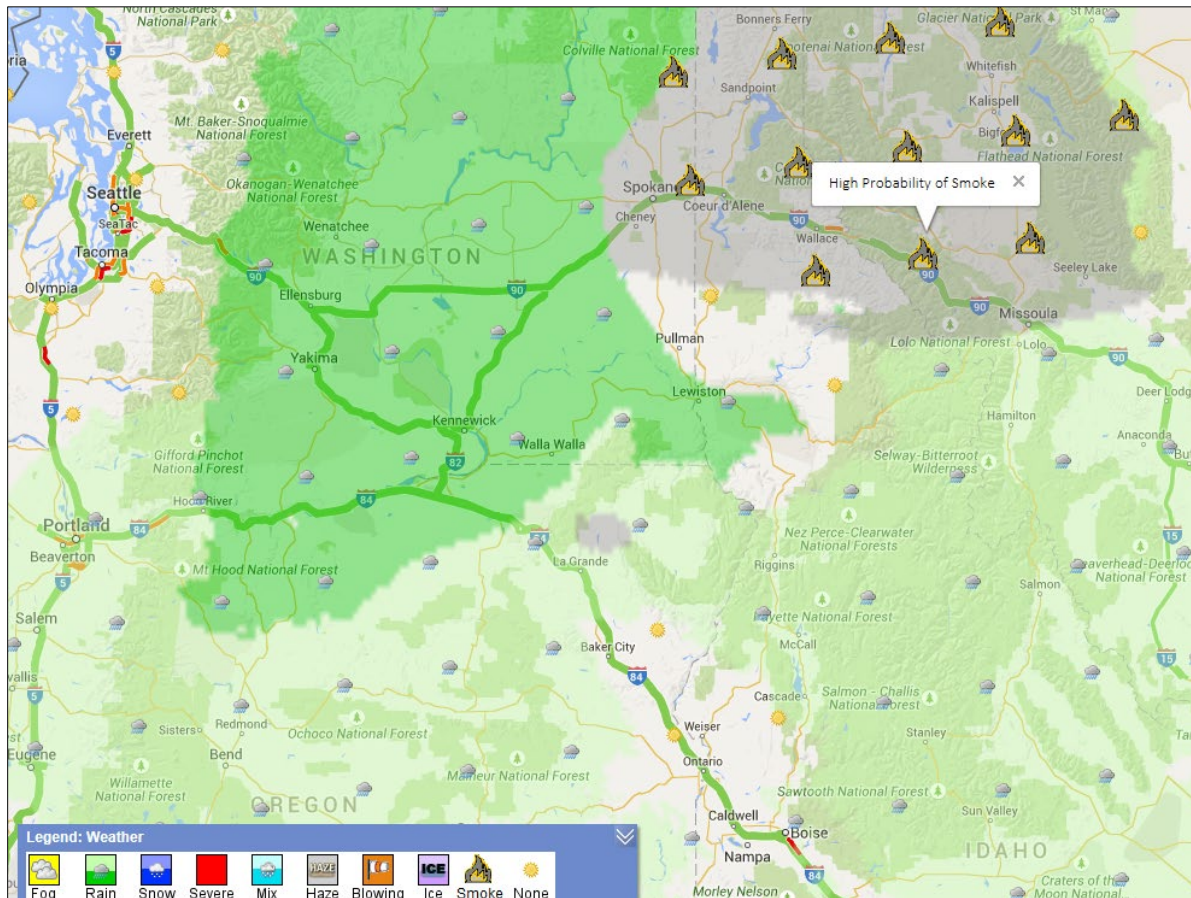


Figure 2-2: One-Stop-Shop current weather display

Figure 2-3 shows one layer of the weather forecast that can be displayed by the website: forecasted weather condition. When a weather condition icon is selected, additional information about the forecast condition is presented to the user. In addition to weather condition, available forecasted data includes air temperature, humidity, wind speed, wind gust speed, sky cover, 12-hour probability of precipitation, 6-hour amount of precipitation and snow. The forecasted weather conditions are provided at varying intervals for periods ranging from present to three days into the future and present to seven days into the future. These weather forecasts may be the most useful information provided to One-Stop-Shop users, as they provide a picture of conditions that are likely to occur during their trip.



**Figure 2-3: One-Stop-Shop forecasted weather display**

Users can access additional point-specific information by clicking on the various icons displayed. For example, Figure 2-4 presents the display generated when a user selects an active CMS sign. As this figure illustrates, the user was presented with the exact text message that was being displayed by the sign while the user was on the website. Such messages may pertain to weather conditions, chain requirements, road closures (as shown), construction, or other information of interest to motorists. Depending on the scenario, the information presented by CMS signs may alert travelers to conditions that they might have otherwise been unaware of until they encountered them en-route.

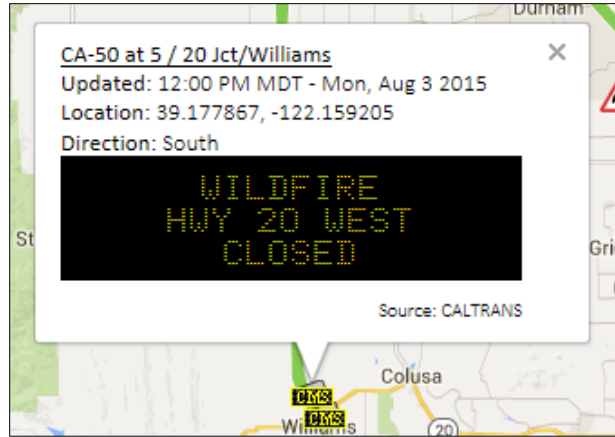


Figure 2-4: One-Stop-Shop CMS message display

Figure 2-5 presents an example of the information displayed when viewers select a chain control icon. Note that chain control icons should only display data in the One-Stop-Shop prototype when weather conditions warrant their use in the field (i.e. during the winter). As this figure indicates, the chain control that was active when this graphic was captured required motorists to have tire chains or traction tires on their vehicle to travel this particular route (I-80 over Donner Pass). Such information is of great use to travelers pre-trip, as they will be informed of the conditions that await them along their route. This would alert them to carry the appropriate equipment, identify an alternative route with less restrictions, or postpone their trip until conditions improve.

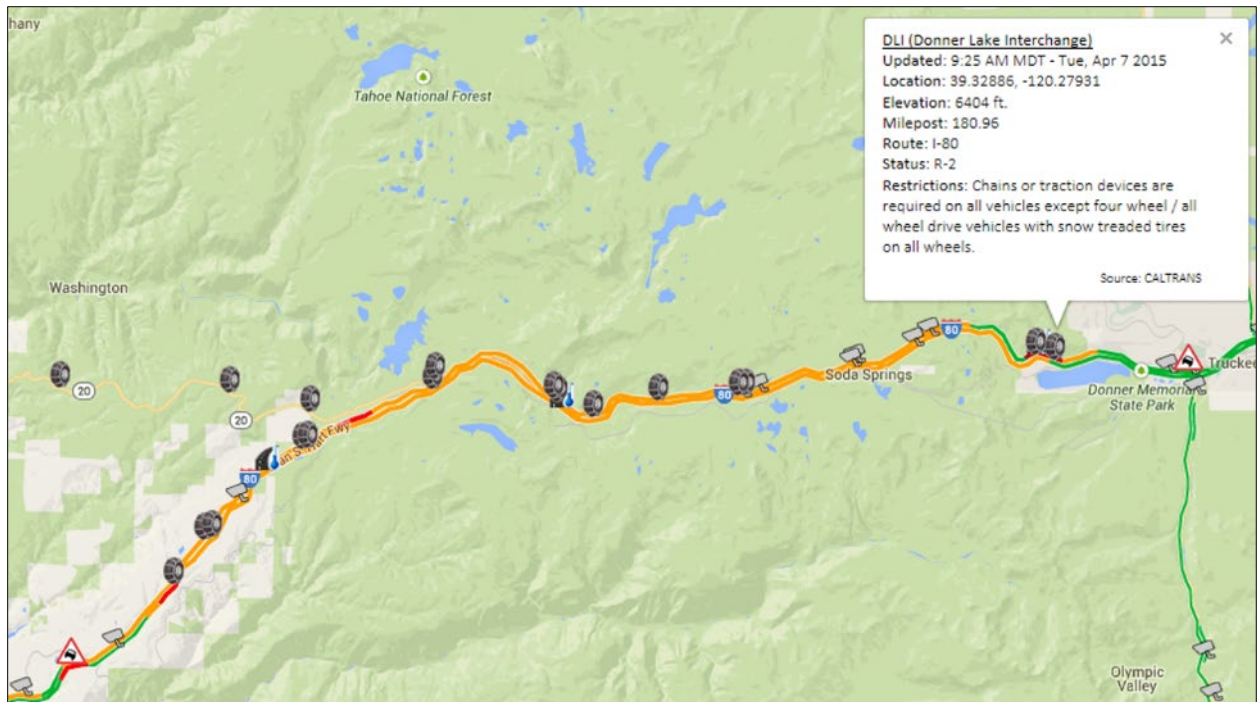


Figure 2-5: One-Stop-Shop chain requirement display



Figure 2-6 presents the image display a user will see when selecting a CCTV camera site. This image indicates that the weather and roadway conditions along I-90 on Donner Pass was degrading. Other CCTV images for this area could visually confirm to the user whether conditions warranted chains or traction tires.

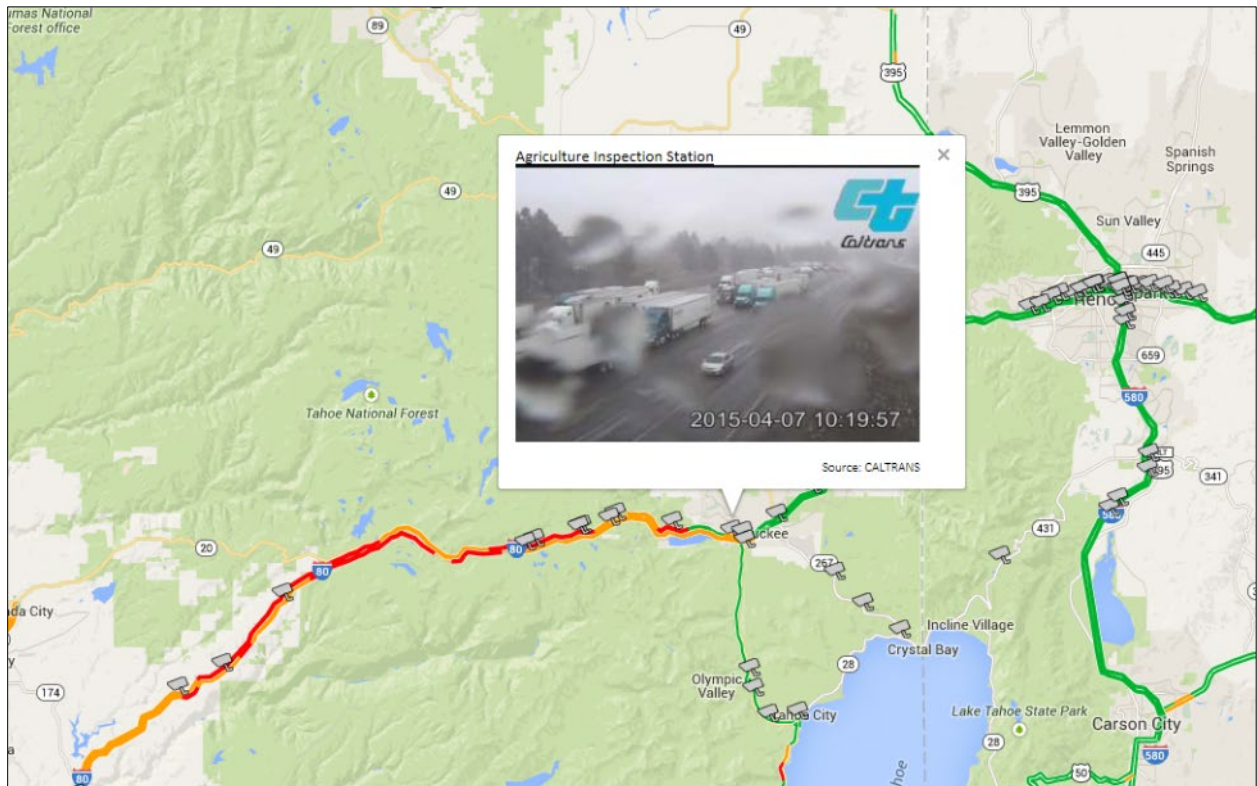


Figure 2-6: One-Stop-Shop CCTV image display

Figure 2-7 presents the information a user would see when selecting an RWIS station. While RWIS data is likely to be of use primarily to DOT personnel, it may also be of interest to travelers who wish to see point conditions along a route. In addition to current conditions (temperature, dew point, humidity, etc.), pavement conditions are also available to the user. This information provides an indication of the conditions found on the roadway at that specific point (ex. dry, wet, icy, etc.).

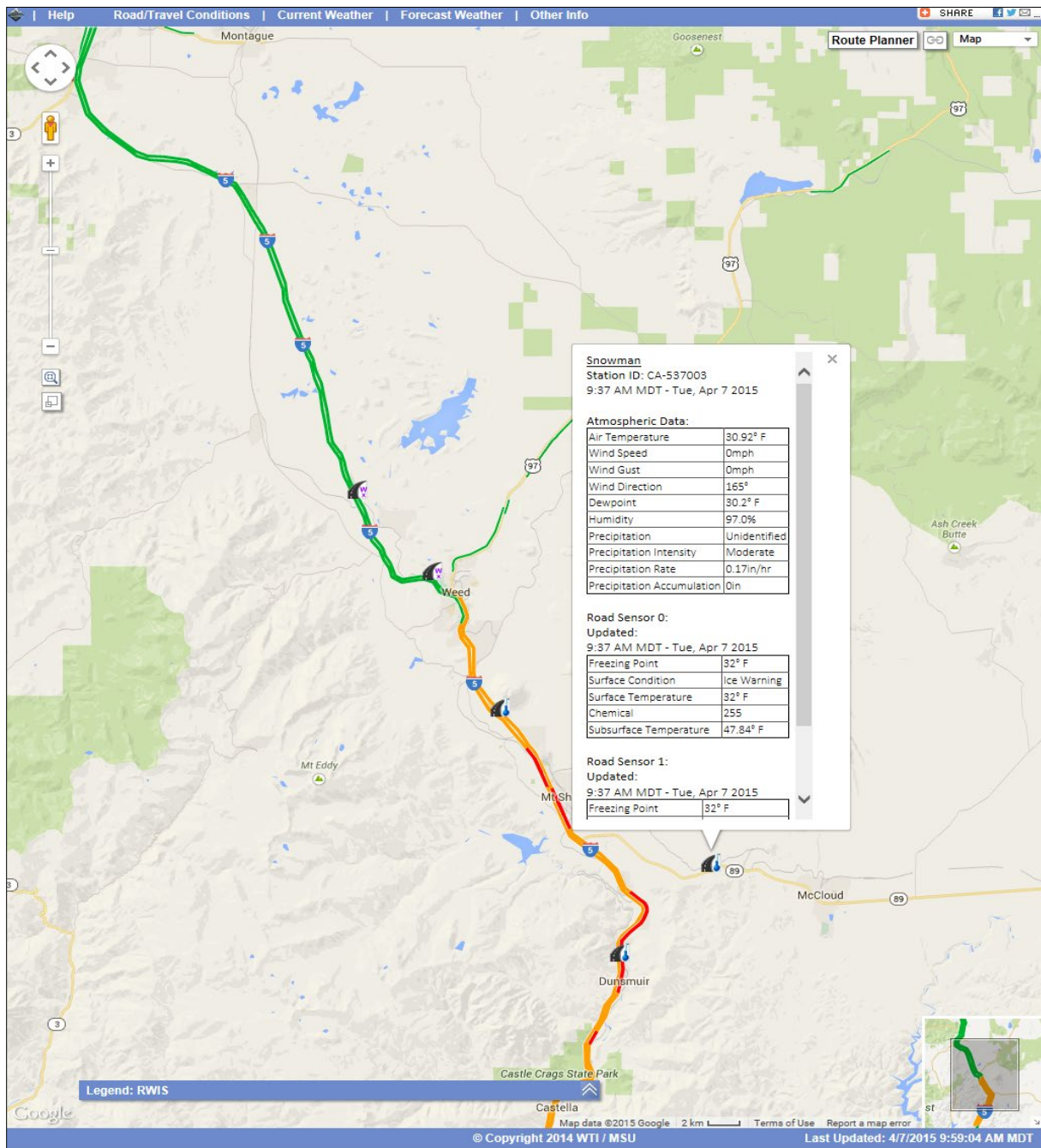


Figure 2-7: One-Stop-Shop RWIS data display

Figure 2-8 presents the construction icon information display. Information provided by this display includes the start and end points of the construction zone, as well as the date of activities, the type of closure, the type of work, and the expected time delay that may be encountered. This information alerts travelers to the location and impact of construction activities along their route.

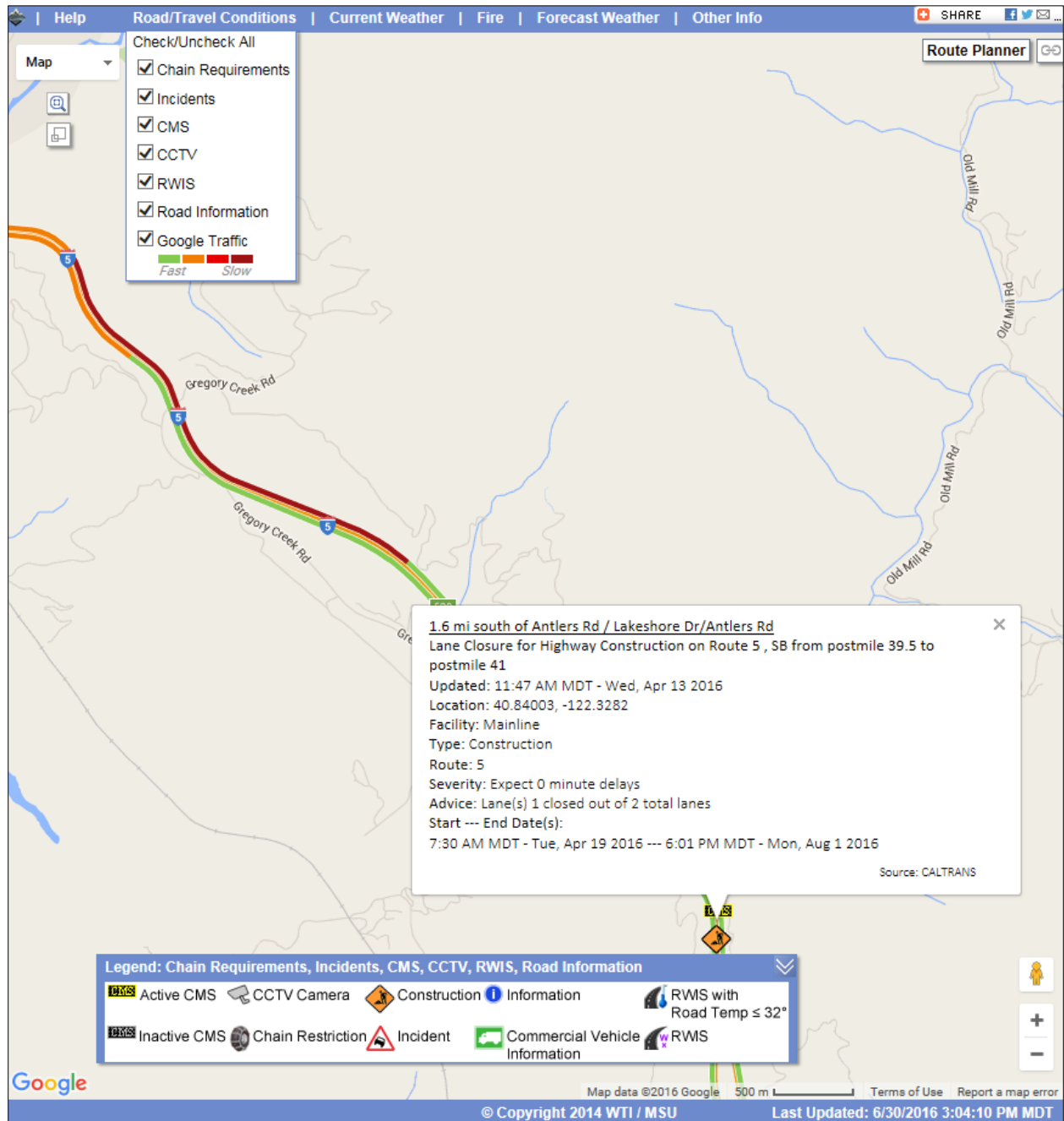


Figure 2-8: One-Stop-Shop construction data display



Figure 2-9, Figure 2-10, Figure 2-11 and Figure 2-12 present the data displayed when the mountain summit, vista point, rest area and truck scale icons are selected, respectively. Mountain summit information includes location and elevation. Vista point information includes location, route and post mile. Rest area information includes location, route, description and services available. Finally, truck scale information includes location, county, route and post mile. The information provided by these different icons has varying utility to the different website user groups. Note that, unlike the DOT field element data, the information for these sites is primarily static and will rarely change.

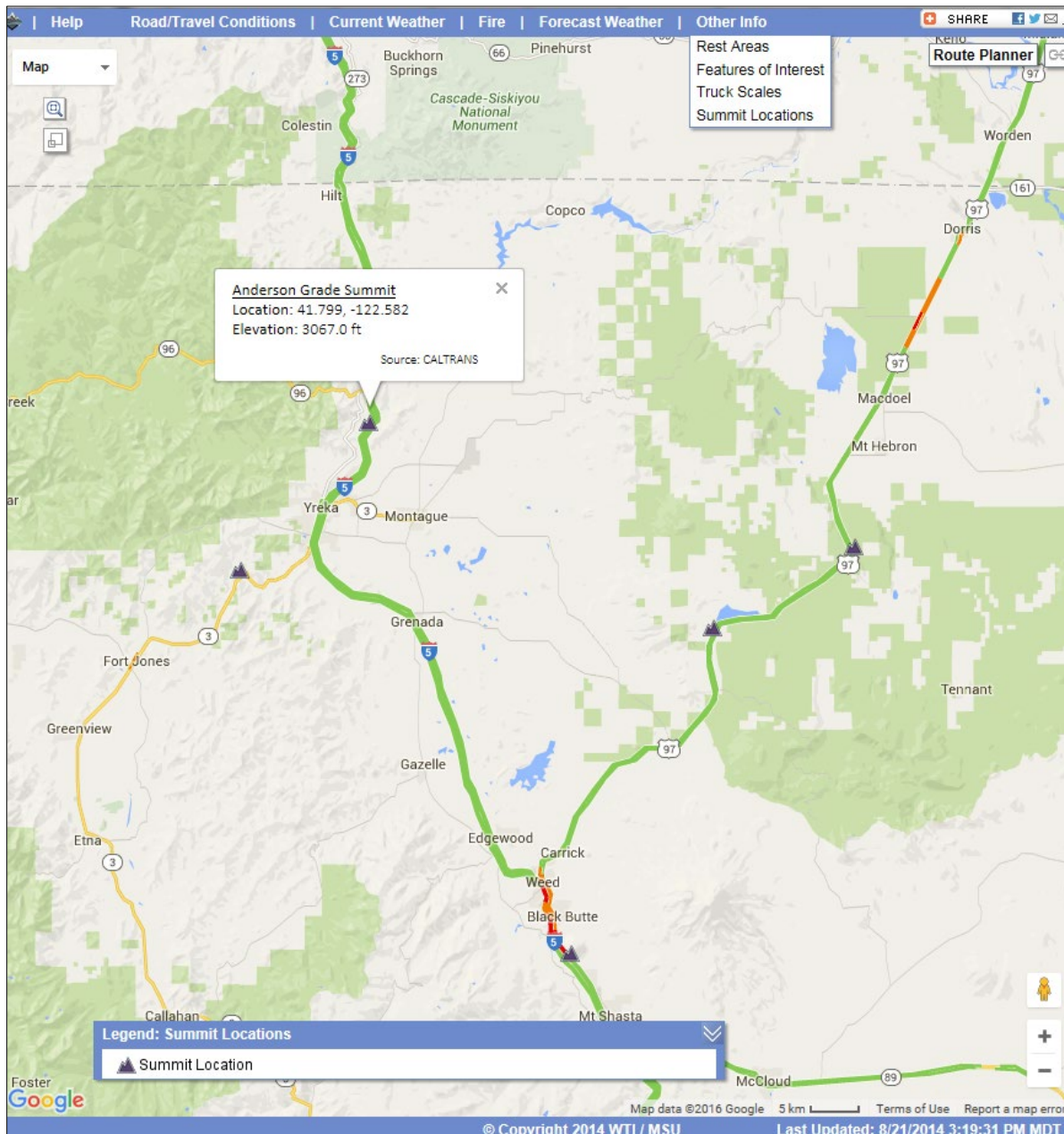


Figure 2-9: One-Stop-Shop mountain pass data display

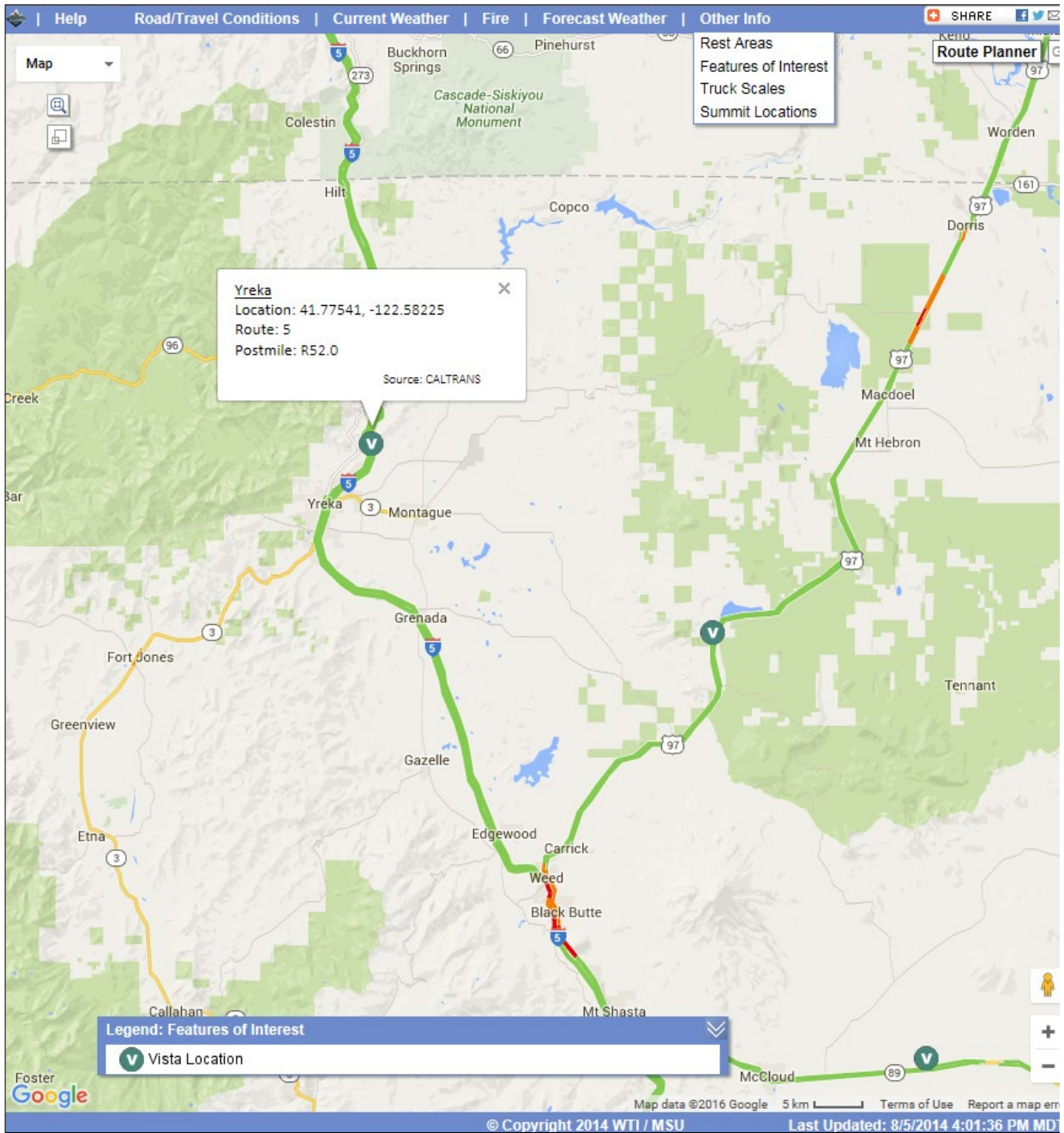


Figure 2-10: One-Stop-Shop vista point data display



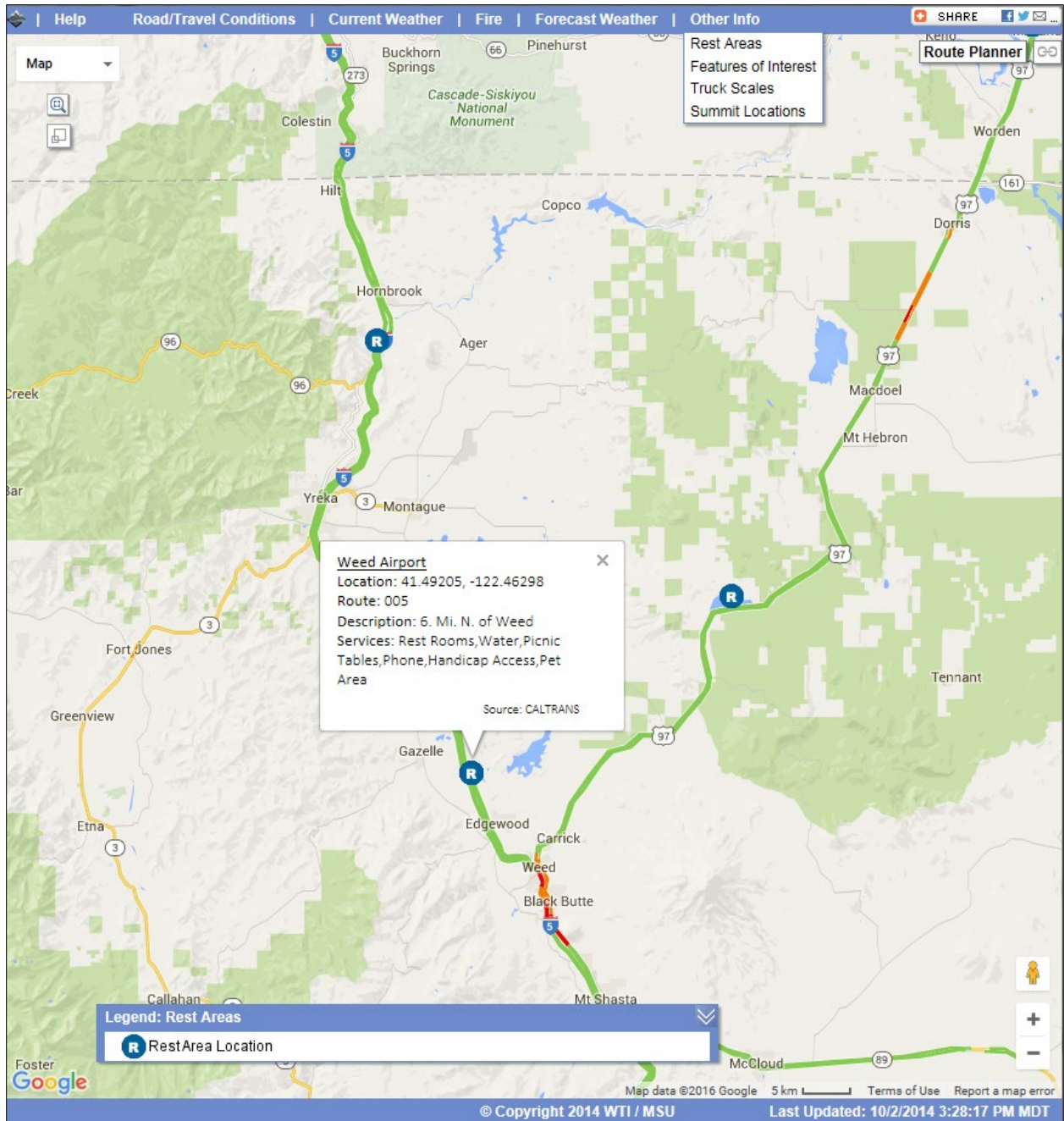


Figure 2-11: One-Stop-Shop rest area data display

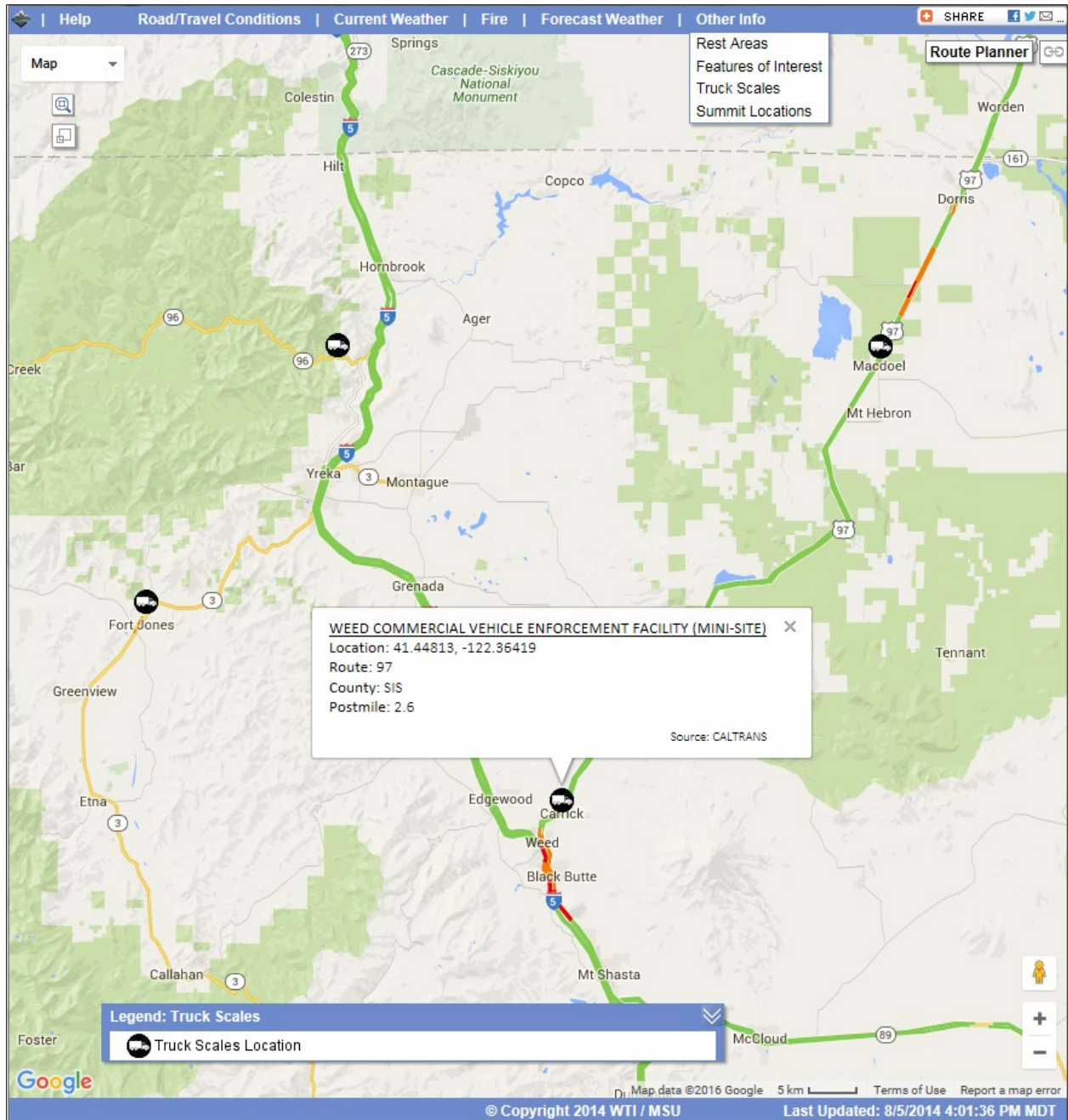


Figure 2-12: One-Stop-Shop truck scale data display



### 2.2.2. Route Planner

A motivating factor behind this project was the provision of route-specific information to users based on their origin and destination. Consequently, it is useful to discuss the display of information provided to the user when the route planner feature is employed. For the purposes of this discussion, the route displayed will use Redding, California as the origin and Medford, Oregon as the destination.

When users specify their origin and destination and select the “Plan Route” button, they are presented with an outline of their route, all of elements available along that route and in the map view, and map points indicating the specified origin and destination. The data streams available for viewing are the same as those already discussed in the previous section. The only difference is that the route, along with reference points and an elevation profile, is presented in conjunction with a regional display. This view is presented in Figure 2-13. Note that the route is generated using Google Map’s Directions/Routing services.

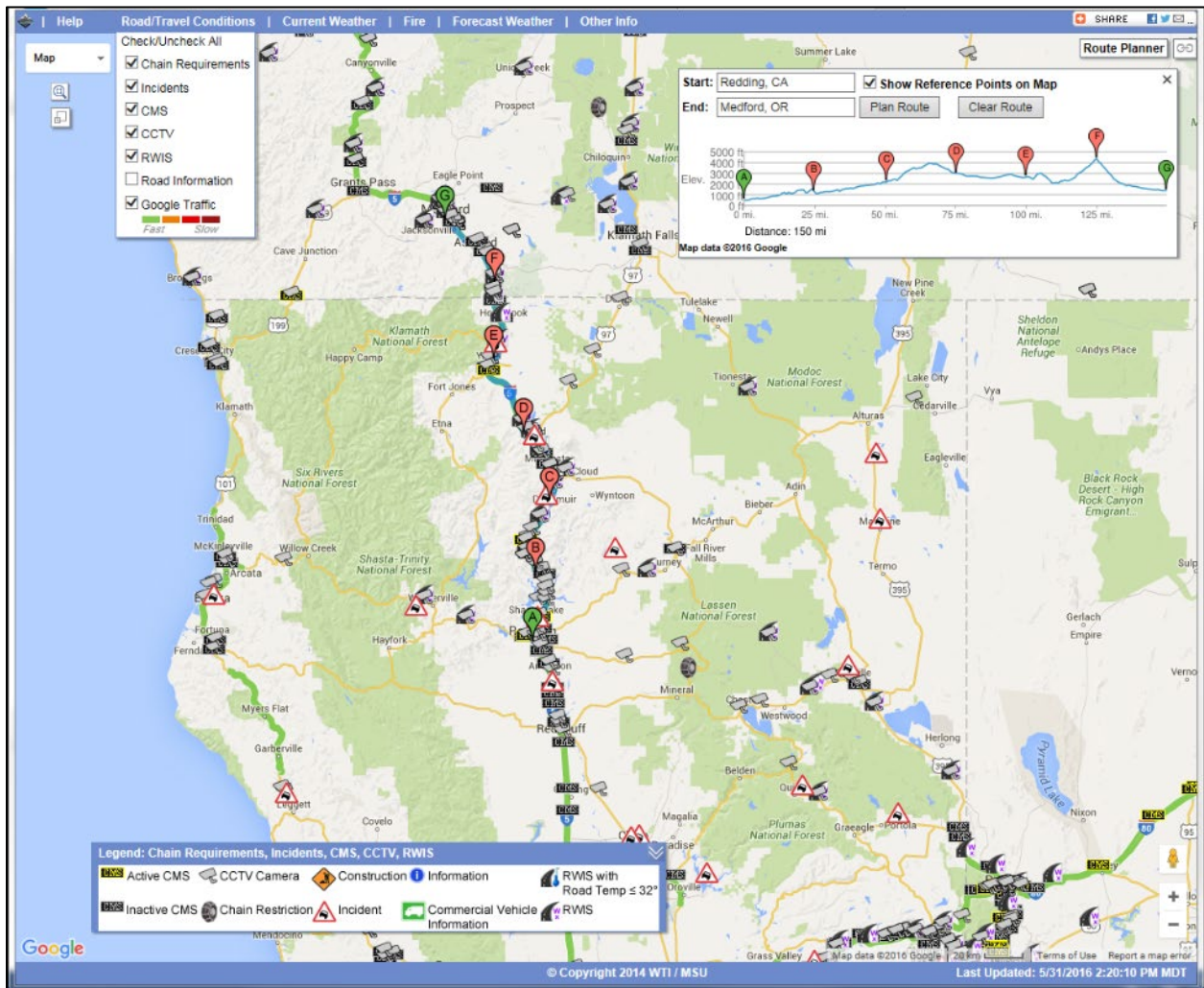


Figure 2-13: Road/Travel Conditions and Route Planner

Aside from providing a more focused view of the route, as well as a route profile, the information presented when a user selects an icon displayed on the screen is consistent with the examples discussed in the previous section. Like traditional Google Maps displays, the user can once again select a display that shows a traditional map background, a satellite image, a hybrid image (map and satellite image), or terrain.

Through analysis of usage statistics and discussion of potential short-comings of using routes selected by a third-party tool (Google Maps and Directions), the project team has determined that Route-Planner functionality should be considered for elimination in subsequent revisions of the system. Usage of the Route-Planner is low compared to other functionality. And, there is potential that a bad or dangerous route will be selected by the third-party tool that does not account for current conditions. Elimination of the Route-Planner would also eliminate the corresponding elevation profiles which are not available elsewhere in the system. It is believed that some users find these elevation profiles useful.

### **2.3. Summary**

This chapter has provided an overview of the functions of the original prototype One-Stop-Shop website. The user interface developed in this project was a web-based map built using Google Maps. Custom markers (icons) present point-based information such as commercial vehicle enforcement sites, CCTV camera images, incident and construction locations, and dynamic sign messages in their appropriate locations. Raster graphics are superimposed on the map to represent data such as forecast conditions over the region of interest. The system incorporates a route planner, which allows the user to select a route via Google Maps routing capability and display an elevation profile of the route along with select data layers including forecast information. The Route Planner is used minimally by users and should be considered for removal in a subsequent system revision so-as to avoid potential for bad/dangerous routes to be presented to users. Dynamic HTML, Javascript and general AJAX (asynchronous Javascript and XML) capability is used to retrieve and display data on the map, and for periodic updates of the displayed data. This display is accomplished with Dynamic HTML, CSS and Javascript.

When first accessing the One-Stop-Shop website, a user is presented with a view of the region showing a series of icons related to DOT field elements, including CCTV camera images, CMS messages, incident and construction locations, RWIS station sites, and chain requirements (during winter weather). In addition to the default information presented, the user may toggle on or off additional data streams. These streams include current and forecast weather for the region, and the location of mountain passes, vista (scenic) points, rest areas and truck scales (commercial vehicle sites). When a user selects an active icon on the display, the site-specific information associated with it will be presented.

### 3. MOBILE OSS

A mobile version of the One-Stop-Shop, referred to as Mobile OSS, was brought online on November 15<sup>th</sup>, 2016 at the address: <http://oss.weathershare.org/m>. For the sake of tracking usage and general testing, the mobile site was considered separate from the prior desktop offering even though it resides on the same server and uses a subset of the data from the original site. No attempt was made to automatically detect mobile users and redirect them to the mobile site. As such, they could only reach the mobile site via the link above or a variation of the link that includes location parameters. As discussed later, it will be desirable to merge the two offerings into a single offering in subsequent development. See Figure 3-1.

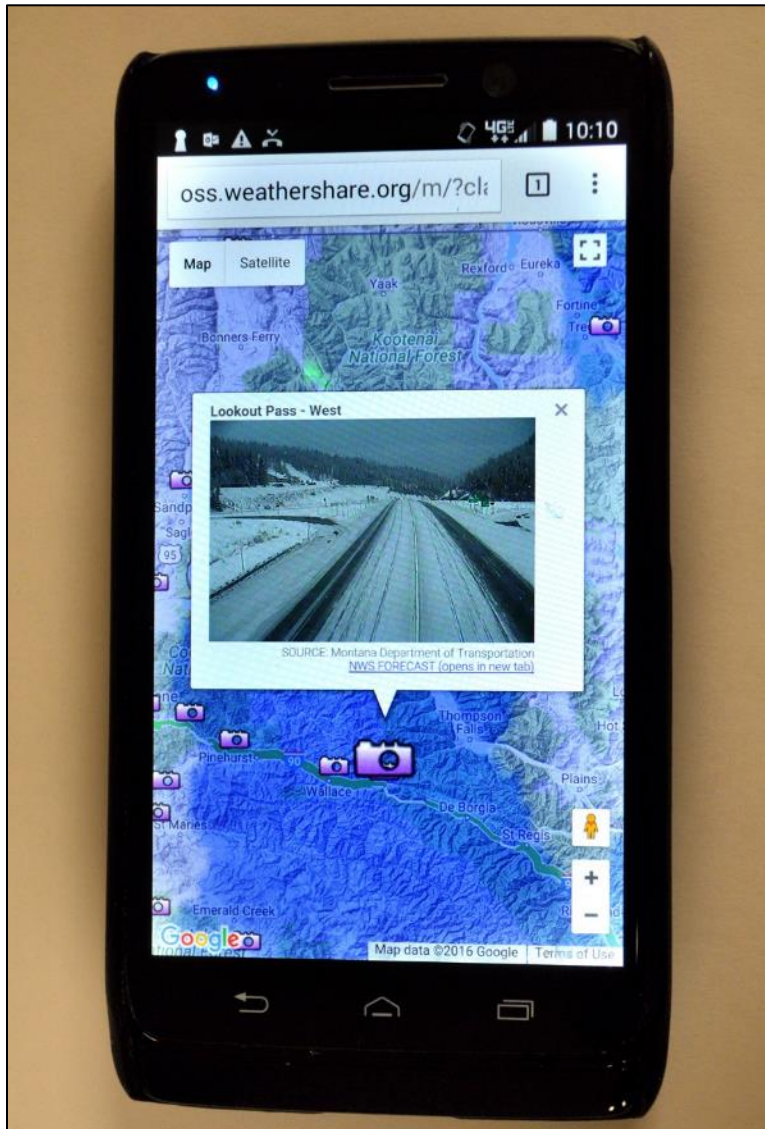


Figure 3-1: Mobile OSS as shown on a Smart Phone



For ease of development and support, Mobile OSS was developed as a mobile-friendly web application rather than as an “app”. Like the desktop application, a Google Maps interface was chosen, with raster images and markers/icons displayed upon the map to show OSS content. Larger markers were used to better enable selection using touch on a smart phone display. Other features were incorporated such as automatic centering on selected content, automatic update of the URL based on map position and selection, recall of the last position shown, etc. so-as to improve usability on a mobile display. It was determined that the initial version of Mobile OSS would not include menus, with the intent that all displayed content would be intuitive and so-as not to clutter small displays. Subsequently, menus may be added to facilitate display of additional information.

Users are always shown the following information on the Mobile OSS display:

- Google Maps background
- Google Traffic
- Forecast Weather Raster for the Current Hour (as a proxy for current weather conditions)
- CCTV Locations
- Incident Locations
- Chain Control Locations
- CMS Message Sign Locations

This limited display was chosen based on usage patterns observed in the original desktop OSS to present users with the data that is of most interest. All data is shown always, even at wide zoom levels. See Figure 3-2.

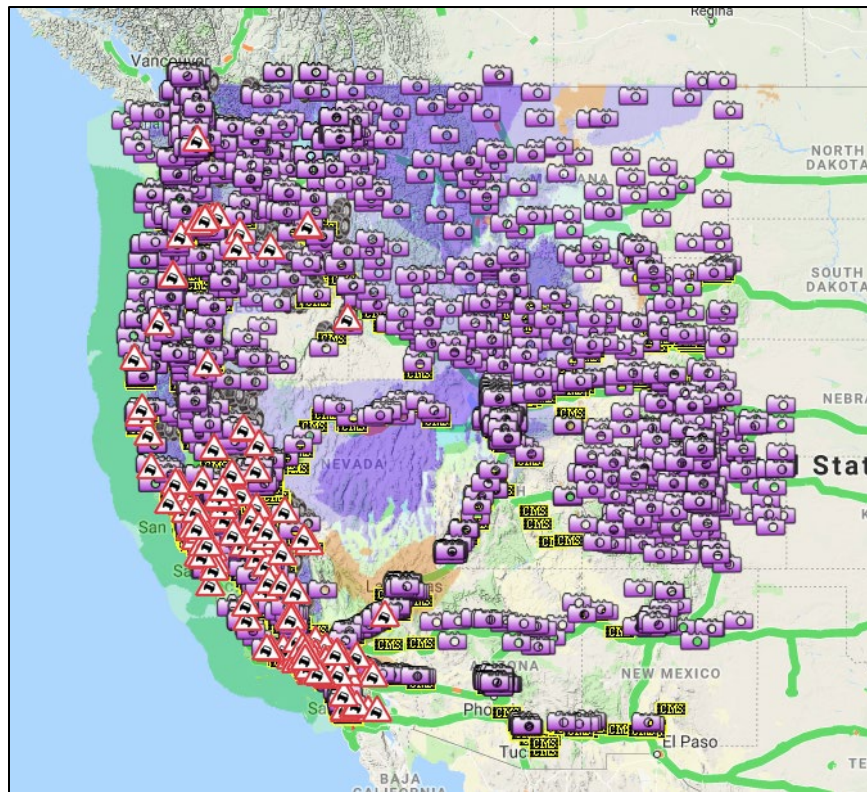


Figure 3-2: Mobile OSS at wide zoom level

Recognizing that users want access to weather forecast information beyond that for the current hour, links were added at the bottom of marker detail displays for CCTV, incidents, CMS and Chain Control to invoke the National Weather Service’s Mobile Forecast site with forecast information for the corresponding location. See Figure 3-3.



Figure 3-3: NWS Forecast link shown with CMS message

The corresponding forecast opens in a new browser tab/window so the user does not have to leave the OSS Mobile site. See Figure 3-4.

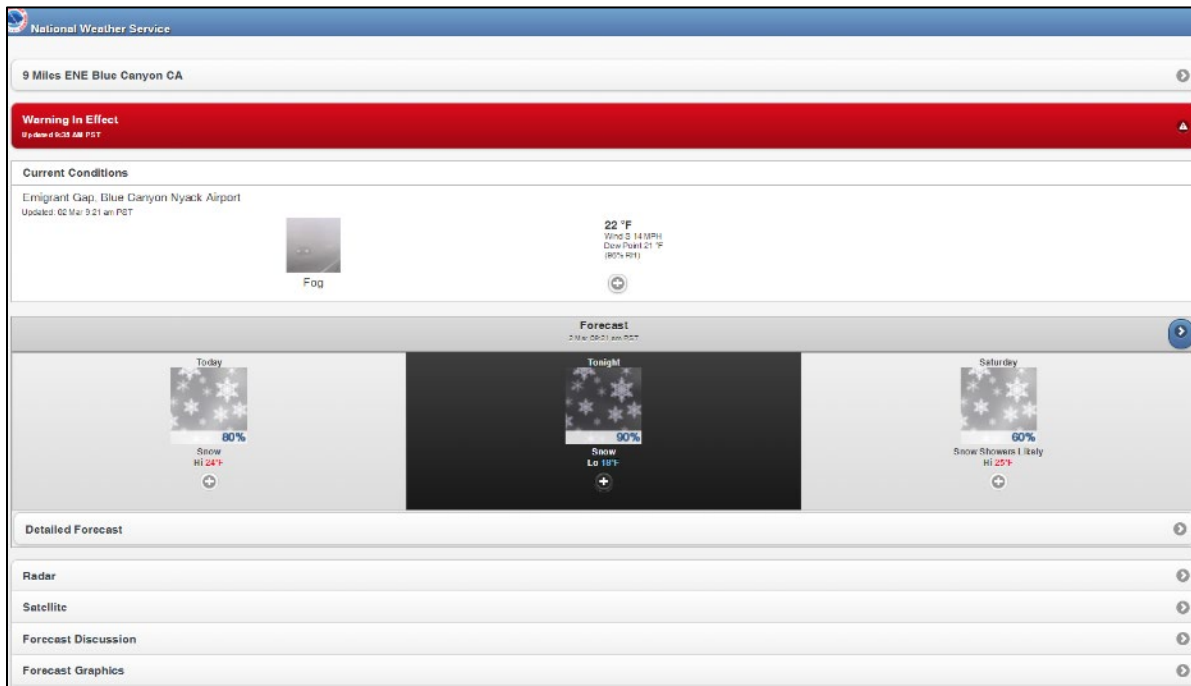


Figure 3-4: NWS forecast page invoked by link in OSS Mobile

Detailed information including daily and nightly forecast information is available. See Figure 3-5.

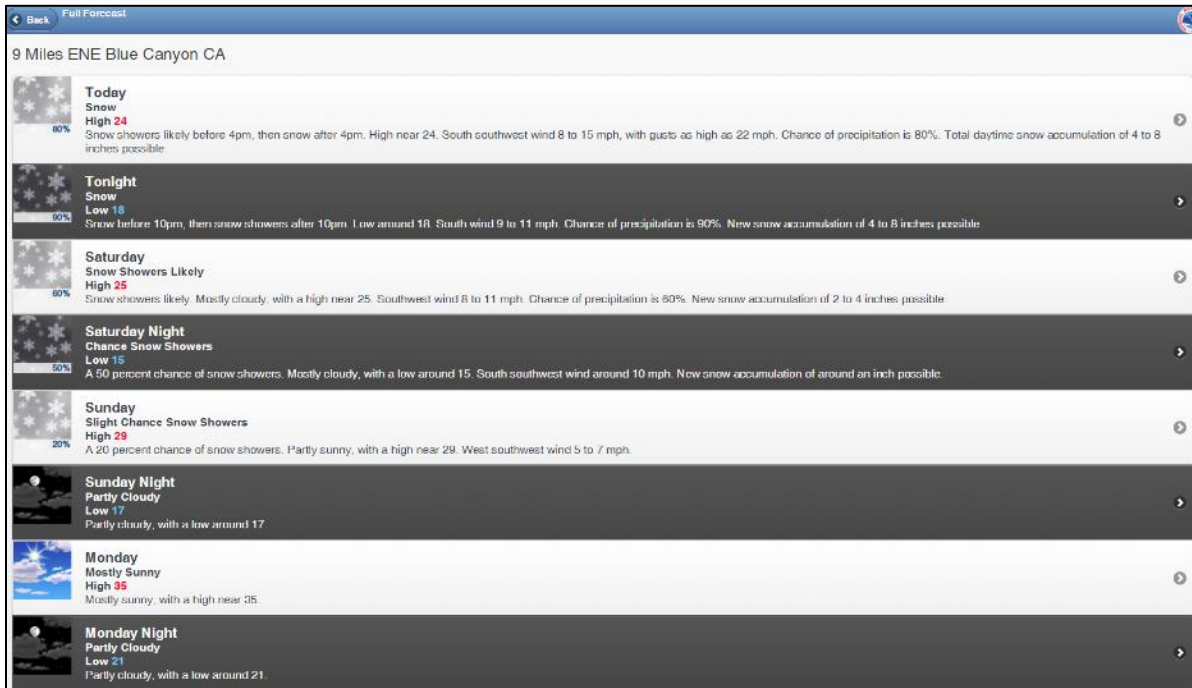


Figure 3-5: Daily and nightly forecast information shown in the NWS forecast page

Additional displays from Mobile OSS are shown in Figure 3-6, Figure 3-7, Figure 3-8, Figure 3-9 and Figure 3-10 showing a NDOT CCTV image, an ODOT chain control message, an ODOT CMS message, a CHP incident and a WYDOT CMS message.

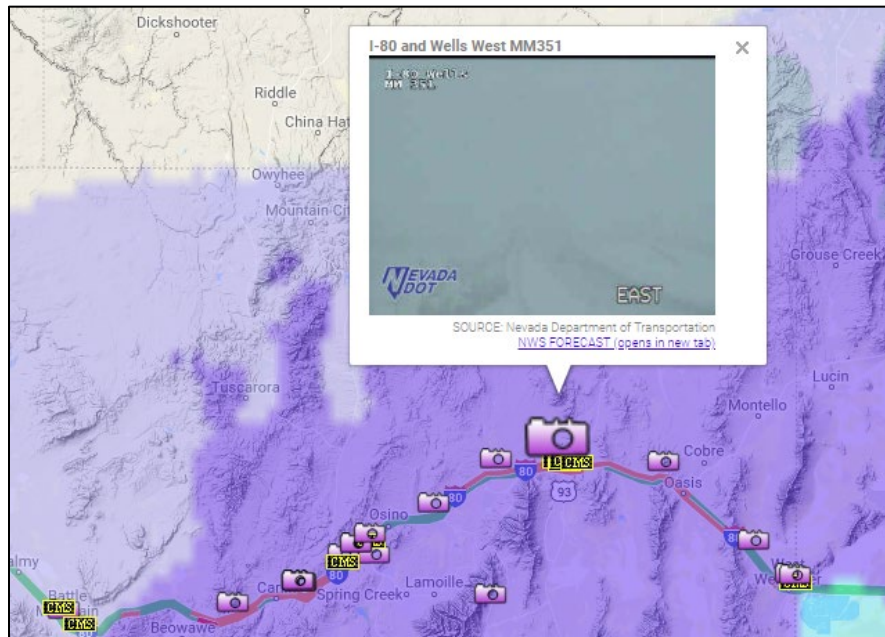


Figure 3-6: NDOT CCTV Image showing whiteout conditions near Wells, Nevada



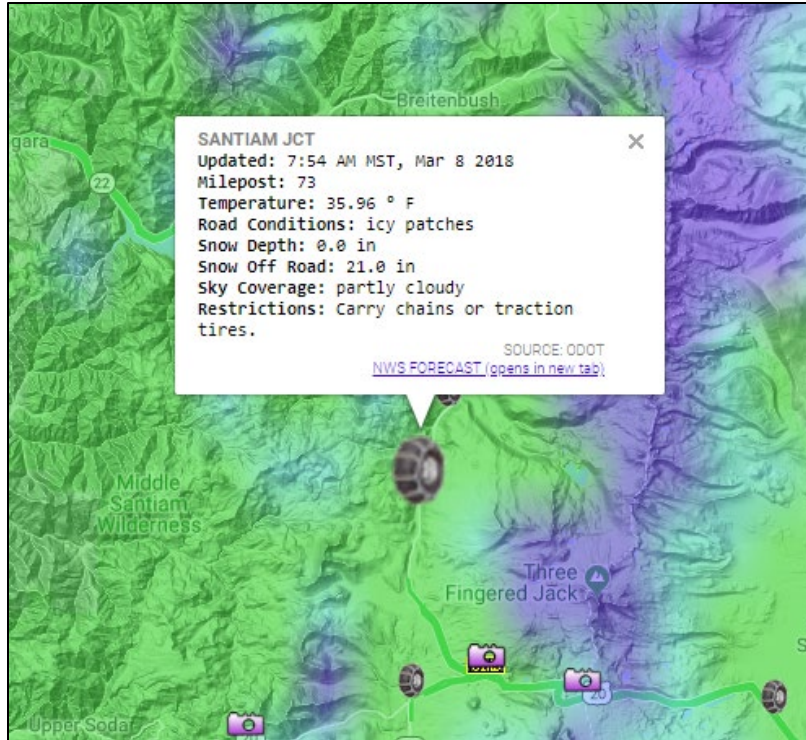


Figure 3-7: ODOT Chain message at Santiam Junction

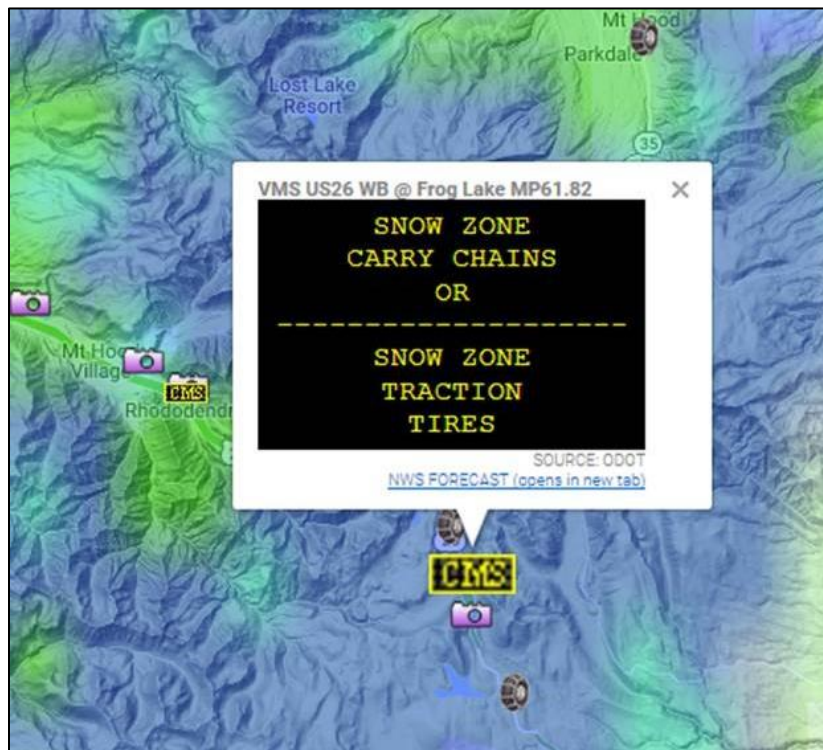


Figure 3-8: ODOT CMS Message with Chain information

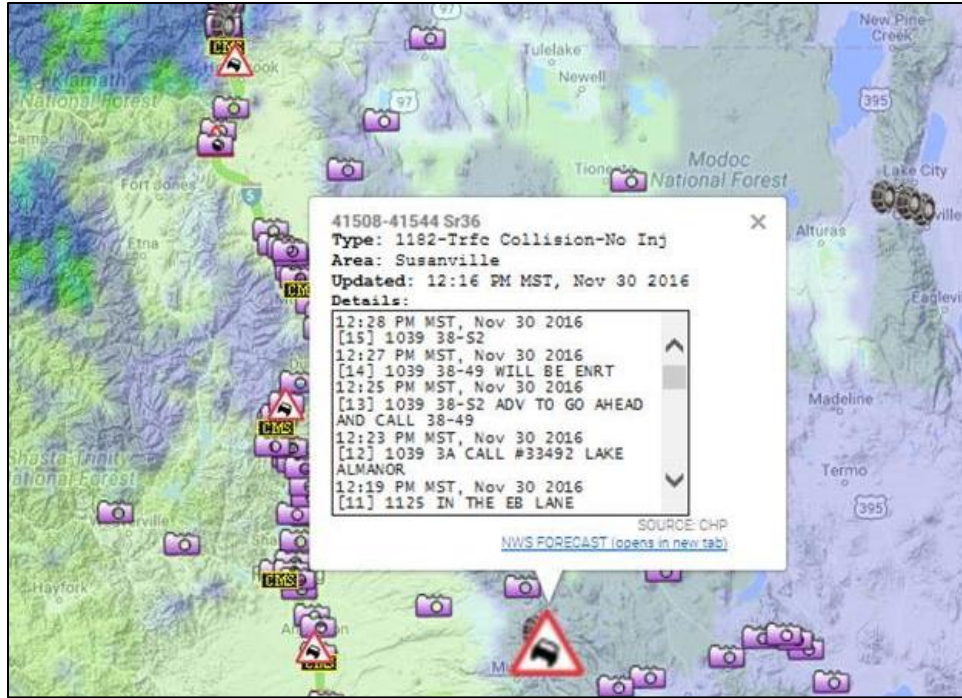


Figure 3-9: CHP Incident showing a collision near Susanville, CA



Figure 3-10: Wyoming DOT CMS message indicating high winds and blowing snow

## 4. SURVEY RESULTS AND EVALUATION

### 4.1. User Survey (Desktop OSS)

The user survey is conducted in an electronic format (Survey Monkey) and presented to users via a link on the (Desktop) One-Stop-Shop website that is present at all times. The survey asks users for feedback and comments regarding various aspects of the website, including appearance, usefulness, etc. The survey is brief (requiring 5 to 10 minutes to complete) and was developed in consultation with the project panel. The survey is only available on the desktop version of the site. It is not available for the mobile version.

#### 4.1.1. Survey Respondents

In total, 57 survey responses were collected between January 2012 and March 2018. Responses were obtained from users in Arizona, California, Oregon, Washington, Montana, Minnesota, Colorado, Nevada and Virginia (an RV traveler). Other than via a link on the project website, no attempts were made to solicit participation in the user survey. Most respondents (43) identified themselves as “general public.” It is believed that the feedback obtained here provides useful information which can be employed when future modifications and improvements are made to the One-Stop-Shop website. Some of the feedback has already been addressed with system changes. The following subsections summarize the responses obtained through the user survey.

#### 4.1.2. Website Visits

The initial survey question asks users how often they visit the website. The response results are presented in Table 4-1, Table 4-2 and Figure 4-1. Many of the respondents (35.29%) were first time users, so their subsequent responses may reflect some degree of unfamiliarity with site. This is good because the first impression of the site is important relative to ease of use and utility. The remaining responses are from users who have visited the site more frequently and help to provide a good balance in the responses.

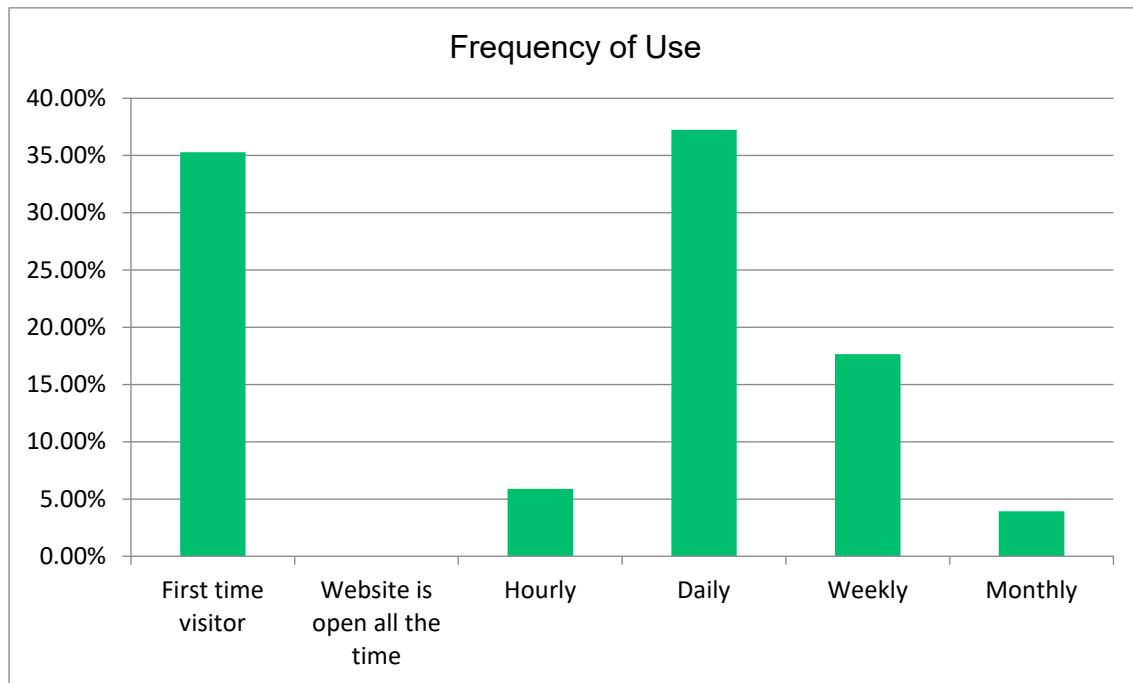
**Question: How often will/do you visit the One Stop Shop (OSS) website for information?**

**Table 4-1: Frequency of Use**

<b>Answer Options</b>	<b>Response Percent</b>	<b>Response Count</b>
First time visitor	35.29%	18
Website is open all the time	0.00%	0
Hourly	5.88%	3
Daily	37.25%	19
Weekly	17.65%	9
Monthly	3.92%	2
Other (please specify)		9
<b><i>answered question</i></b>		<b>51</b>
<b><i>skipped question</i></b>		<b>6</b>

**Table 4-2: Frequency of Use (Comments)**

#	Response Date	Other (please specify)
1	Jan 25 2018 08:52 AM	<i>seasonally - very helpful with snowfall on roads</i>
2	Jan 20 2017 02:18 PM	<i>When I believe it will be helpful in planning a trip.</i>
3	Jan 13 2017 07:29 PM	<i>Use multiple times per week but not necessarily daily - I put link to site on my desktop</i>
4	Apr 28 2016 01:59 AM	<i>When we travel and have a free internet connection</i>
5	Feb 18 2016 10:53 AM	<i>Use to determine winter road conditions; chain requirements, snow accumulations etc.</i>
6	Jan 06 2016 01:32 PM	<i>WILL CHECK SEVERAL TIMES A DAY IN THE WINTER, AS I TRAVEL A LOT</i>
7	Dec 30 2015 02:11 PM	<i>Found site while cross-country car trip was underway, would use on future trips</i>
8	Mar 14 2012 02:22 PM	<i>As conditions require</i>
9	Jan 20 2012 08:15 AM	<i>Seasonally, predominantly for winter storm watch</i>



**Figure 4-1: Frequency of Use**

### 4.1.3. Use of Information

The next survey question asks users how they used or intended to use the information presented by the website. The response results to this question are presented in Table 4-3, Table 4-4 and Figure 4-2. Respondents could select more than one use, and the results indicate many did so. The greatest use of the site was for trip planning (nearly all respondents), with use during incidents (weather, fire, etc.) being another highly selected category. A lesser proportion of responses (38.89%) indicated the use of the website during changing conditions. Relative to time of day, most use occurred during the day. Seven “Other” responses came from users who indicated they used the site at other times including relative to weather conditions. In the comments for the question, a user responded that mobile use, on an iPhone, is desirable. Note that this comment preceded development of Mobile OSS.

**Question: When/why will/do you use (or intend to use) the information? (Check all that are applicable.)**

**Table 4-3: Use of Information**

Answer Options	Response Percent	Response Count
Trip planning	87.04%	47
Under changing conditions only	38.89%	21
During incident conditions (storm/fire etc)	64.81%	35
Daytime hours	62.96%	34
Nighttime hours	40.74%	22
Other (please specify)		8
<b>answered question</b>		<b>54</b>
<b>skipped question</b>		<b>3</b>

**Table 4-4: Use of Information (Comments)**

#	Response Date	Other (please specify)
1	Jan 13 2017 07:29 PM	<i>All o the above</i>
2	Dec 30 2015 02:11 PM	<i>Would use anytime travelling in western states by car</i>
3	Dec 18 2015 11:58 AM	<i>Check weather conditions for curiosity</i>
4	Apr 05 2015 06:17 PM	<i>Would like to use on the road</i>
5	Nov 21 2014 05:20 PM	<i>Just because</i>
6	Mar 14 2012 02:22 PM	<i>For work info also</i>
7	Jan 23 2012 04:41 PM	<i>On our iPhone while traveling - if we can figure out how to interpret the abbreviations in the Legend. Not much help if we can't figure that out!</i>
8	Jan 17 2012 10:28 PM	<i>checking conditions for trucking runs from Northern Sacramento Valley north into Klamath Falls/Tulelake area and south into the San Joaquin Vly</i>



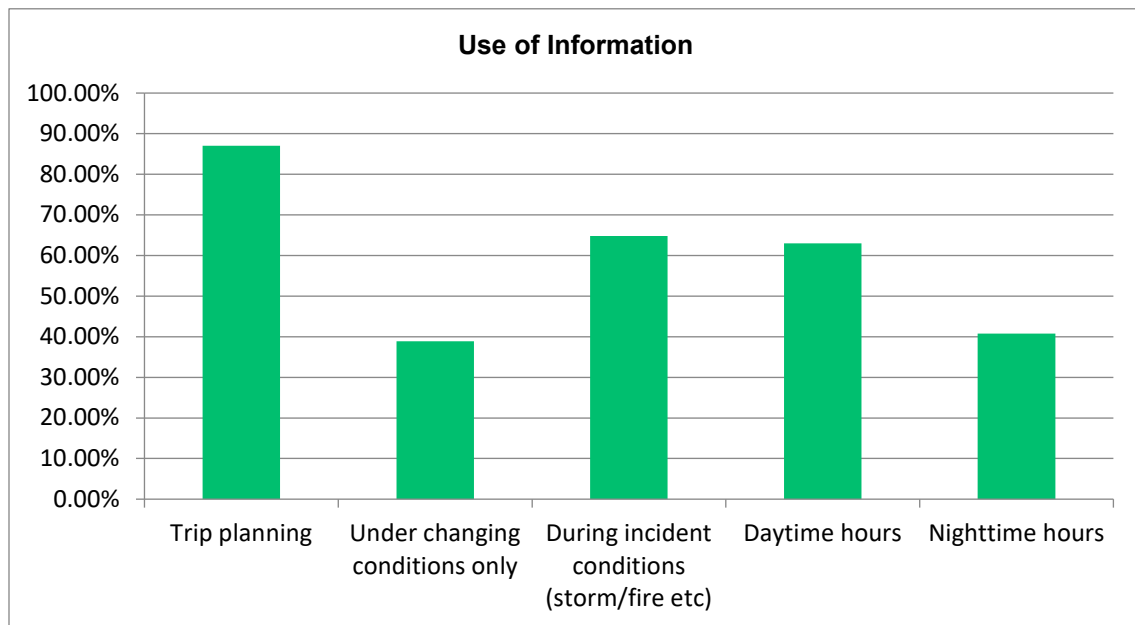


Figure 4-2: Use of Information

#### 4.1.4. Road/Travel Condition Data

Given that the principal function of the One-Stop-Shop website is the provision of traveler information, it was of interest to obtain feedback on the utility of the included traveler information data. The first set of travel information that users were surveyed on was road/travel conditions. The results of the usefulness to users of different road/travel condition data is presented in Table 4-5 and Figure 4-3. As shown, nearly all users found all the road/travel condition data presented on the website very or somewhat useful. This is not surprising, as the information in this dataset is typically of great interest to travelers in determining conditions along their expected routes, particularly closed-circuit television (CCTV) images (to view existing weather/conditions), road information (ex. construction, etc.) and incidents (ex. accidents). Changeable message sign text was also found to be very or somewhat useful to users, which is encouraging, as this information is not necessarily provided by some traveler information websites.

Question: Now we would like you to rate the usefulness of the Road/Travel Conditions data on the OSS website that you have used at least once. For each feature that you have not used, please indicate whether you were aware of this feature before taking this survey. (Please make a single selection for each data element.)

Table 4-5: Usefulness of the Road/Travel Condition Data

Answer Options	Very Useful		Somewhat Useful		Not Very Useful		Aware of it		Not Aware of it		Total
	%	Count	%	Count	%	Count	%	Count	%	Count	
Chain Requirements	66.67%	36	20.37%	11	1.85%	1	11.11%	6	0.00%	0	54
Road Information	76.79%	43	14.29%	8	7.14%	4	1.79%	1	0.00%	0	56
Incidents	61.54%	32	30.77%	16	1.92%	1	3.85%	2	1.92%	1	52
Changeable Message Sign Text	53.70%	29	20.37%	11	3.70%	2	7.41%	4	14.81%	8	54
CCTV Images	81.48%	44	12.96%	7	1.85%	1	1.85%	1	1.85%	1	54
RWIS	52.83%	28	18.87%	10	3.77%	2	5.66%	3	18.87%	10	53
<b>answered question</b>											56
<b>skipped question</b>											1

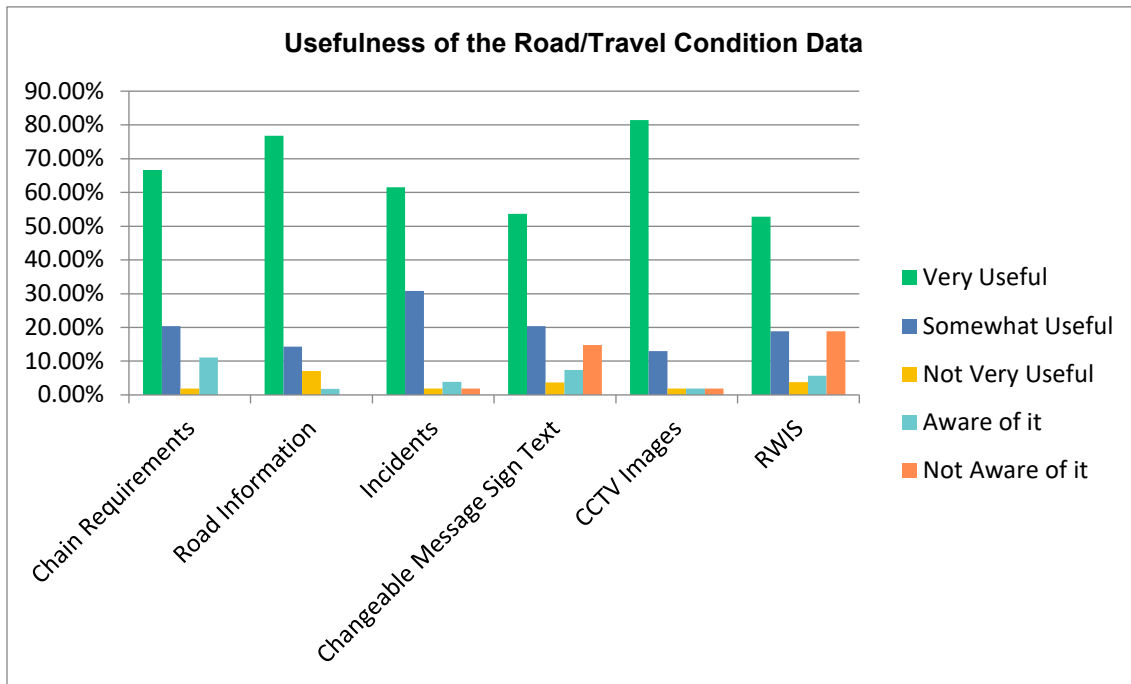


Figure 4-3: Road/Travel Condition Data

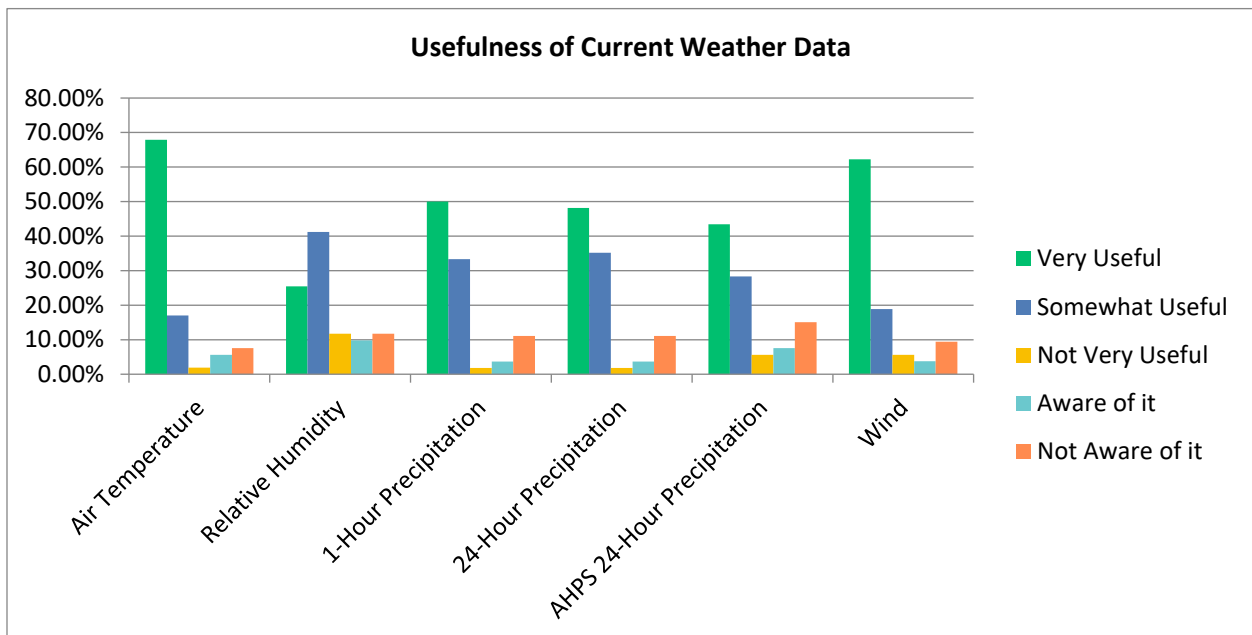
### 4.1.5. Current Weather Data

Survey respondents were next asked about the usefulness of the current weather data provided by the website. The results of this question are presented in Table 4-6 and Figure 4-4. The most useful current weather information as indicated by users was air temperature, followed by wind and then to a lesser extent by 1-hour precipitation and the 24-hour precipitation layers. Relative humidity was found somewhat useful. Relatively small numbers of users indicated that they found a data element not very useful or were unaware of it, which is encouraging.

**Question: Now we would like you to rate the usefulness of Current Weather data on the OSS website that you have used at least once. For each feature that you have not used, please indicate whether you were aware of this feature before taking this survey. (Please make a single selection for each data element.)**

**Table 4-6: Current Weather Data**

Answer Options	Very Useful		Somewhat Useful		Not Very Useful		Aware of it		Not Aware of it		Total
	%	Count	%	Count	%	Count	%	Count	%	Count	
Air Temperature	67.92%	36	16.98%	9	1.89%	1	5.66%	3	7.55%	4	53
Relative Humidity	25.49%	13	41.18%	21	11.76%	6	9.80%	5	11.76%	6	51
1-Hour Precipitation	50.00%	27	33.33%	18	1.85%	1	3.70%	2	11.11%	6	54
24-Hour Precipitation	48.15%	26	35.19%	19	1.85%	1	3.70%	2	11.11%	6	54
AHPS 24-Hour Precipitation	43.40%	23	28.30%	15	5.66%	3	7.55%	4	15.09%	8	53
Wind	62.26%	33	18.87%	10	5.66%	3	3.77%	2	9.43%	5	53
<b>answered question</b>											<b>54</b>
<b>skipped question</b>											<b>3</b>



**Figure 4-4: Current Weather Data**



### 4.1.6. Forecast Weather Data

As a follow-up to the use of current weather data, users were asked their views of the usefulness of various forecast weather data elements. The results of this question are presented in Table 4-7 and Figure 4-5. As expected, users found the forecast information for snow and general weather condition to be very useful. Users also indicated that air temperature, precipitation and wind speed information was also very or somewhat useful. Overall, most of the forecast weather information provided was rated as having some level of utility to users, although humidity and sky cover information did receive some responses indicating they were less useful than other sublayers. This is good to know, although no apparent action needs to be taken unless perhaps users are having trouble interpreting that layer. We doubt this is the case. We do know that humidity is valuable to users interested in fire conditions.

**Question: Please rate the usefulness of Forecast Weather data on the OSS website that you have used at least once. For each feature that you have not used, please indicate whether you were aware of this feature before taking this survey. (Please make a single selection for each data element.)**

**Table 4-7: Forecast Weather Data**

Answer Options	Very Useful		Somewhat Useful		Not Very Useful		Aware of it		Not Aware of it		Total
	%	Count	%	Count	%	Count	%	Count	%	Count	
Air Temperature	65.38%	34	19.23%	10	0.00%	0	3.85%	2	11.54%	6	52
Wind Speed	56.60%	30	22.64%	12	1.89%	1	3.77%	2	15.09%	8	53
Wind Gust Speed	60.38%	32	13.21%	7	3.77%	2	5.66%	3	16.98%	9	53
Humidity	22.45%	11	44.90%	22	10.20%	5	8.16%	4	14.29%	7	49
Sky Cover	30.61%	15	26.53%	13	10.20%	5	8.16%	4	24.49%	12	49
12-Hour Chance of Precipitation	55.77%	29	25.00%	13	1.92%	1	3.85%	2	13.46%	7	52
6-Hour Precipitation	60.00%	30	20.00%	10	2.00%	1	4.00%	2	14.00%	7	50
Snow	79.25%	42	5.66%	3	0.00%	0	5.66%	3	9.43%	5	53
Weather	75.00%	39	9.62%	5	0.00%	0	3.85%	2	11.54%	6	52
<b>answered question</b>											<b>53</b>
<b>skipped question</b>											<b>4</b>

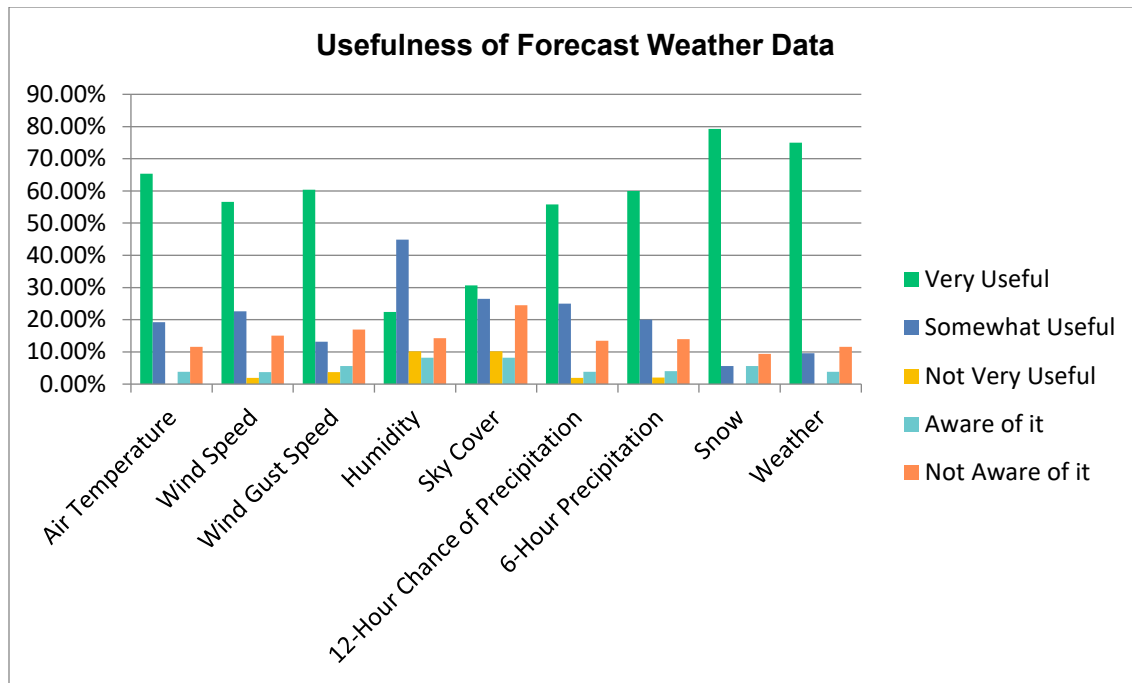


Figure 4-5: Forecast Weather Data

#### 4.1.7. Other Travel Data

In addition to real-time data streams such as CCTV images, the One-Stop-Shop website also provides users with static information, such as the location of rest areas. Users were asked for their opinion regarding the utility of this information. The results for this question are presented in Table 4-8 and Figure 4-6. Overall, users once again found most of the data streams to be very or somewhat useful except for truck scales. In the case of truck scales, this information may be of greater interest to the goods movement industry, which may not have been well-represented by survey takers.

**Question: Please rate the usefulness of the Other Information data on the OSS website that you have used at least once. For each feature that you have not used, please indicate whether you were aware of this feature before taking this survey. (Please make a single selection for each data element.)**

Table 4-8: Other Travel Data

Answer Options	Very Useful		Somewhat Useful		Not Very Useful		Aware of it		Not Aware of it		Total
	%	Count	%	Count	%	Count	%	Count	%	Count	
Rest Areas	51.92%	27	25.00%	13	1.92%	1	7.69%	4	13.46%	7	52
Features of Interest	26.00%	13	38.00%	19	10.00%	5	10.00%	5	16.00%	8	50
Truck Scales	19.61%	10	17.65%	9	13.73%	7	27.45%	14	21.57%	11	51
Summit Locations	50.98%	26	19.61%	10	1.96%	1	13.73%	7	13.73%	7	51
<b>answered question</b>											<b>52</b>
<b>skipped question</b>											<b>5</b>

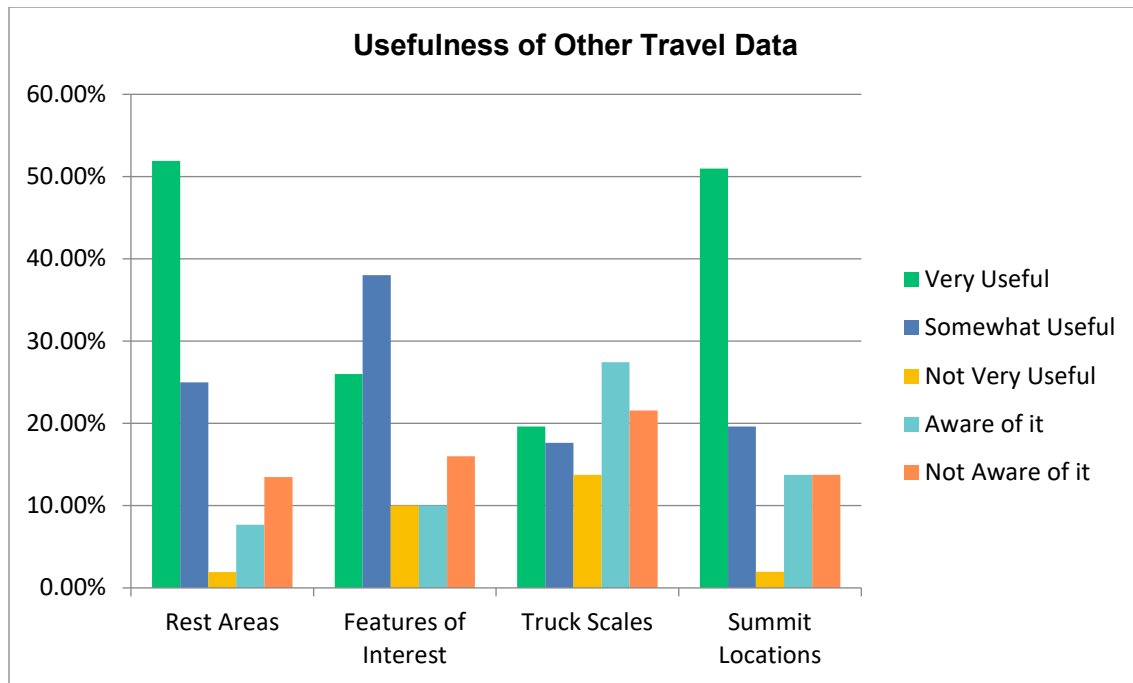


Figure 4-6: Other Travel Data

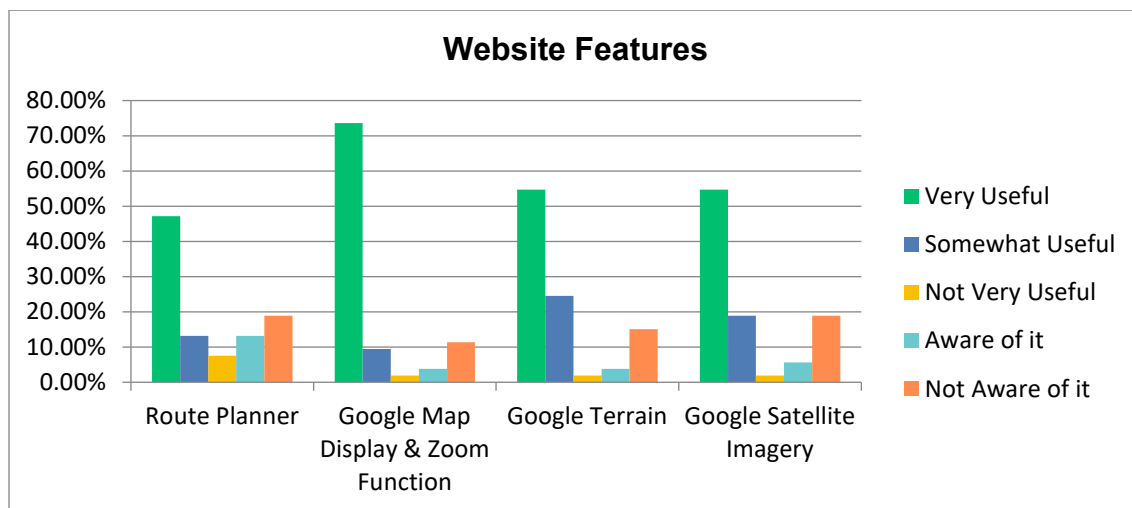
#### 4.1.8. Website Features

Next, users were asked for their thoughts on general website features and functions. The results from this question are presented in Table 4-9 and Figure 4-7. A clear majority of users found the Google Maps™ display and zoom function very useful, which is not surprising given the familiarity and acceptance that the public has developed for this particular mapping format. This finding was useful in that it validates the use of the Google Maps™ format for the presentation of data on the website. A lesser number of users found the Google satellite and terrain imagery and the route planner to be a very useful feature. Regarding the route planner, only four users indicated that it was not very useful. This could be taken as encouraging, as one of the intentions of the website is to serve as a trip planning tool, although it does seem to indicate that the Route Planner may not be as useful as originally anticipated. But, the project team has concerns about the potential for bad routes to be presented to users, so the Route Planner may be considered for elimination.

**Question: Now we would like you to rate the usefulness of the features on the website that you have used at least once. For each feature that you have not used, please indicate whether you were aware of this feature before taking this survey (Please make a single selection for each feature.)**

**Table 4-9: Website Features**

Answer Options	Very Useful		Somewhat Useful		Not Very Useful		Aware of it		Not Aware of it		Total
	%	Count	%	Count	%	Count	%	Count	%	Count	
Route Planner	47.17%	25	13.21%	7	7.55%	4	13.21%	7	18.87%	10	53
Google Map Display & Zoom Function	73.58%	39	9.43%	5	1.89%	1	3.77%	2	11.32%	6	53
Google Terrain	54.72%	29	24.53%	13	1.89%	1	3.77%	2	15.09%	8	53
Google Satellite Imagery	54.72%	29	18.87%	10	1.89%	1	5.66%	3	18.87%	10	53
<b>answered question</b>											<b>53</b>
<b>skipped question</b>											<b>4</b>



**Figure 4-7: Website Features**

#### 4.1.9. Website Perceptions

Next, users were asked about their perceptions of various aspects of the website. Most users agreed to some extent that the website was well organized and user friendly. Similarly, many users expressed that the website provided the right amount of information. When asked whether additional (or less) information should be presented, responses indicated that more information could be added, although this sentiment was not unanimous. Collectively, the responses to these questions provides an initial indication that most website visitors were comfortable with the type and quantity of data being presented. See Table 4-10 and Figure 4-8.

Next, users were asked whether the information should be presented in a different format. Few respondents indicated that they thought that a different format should be employed. Consequently, it appears that most users were comfortable with the existing presentation format. When asked if

the information being presented was timely and useful, most users indicated that they agreed with this statement. Similarly, most users agreed to some degree that the information presented was accurate and understandable. With that said, some separate comments (shown later) indicate some problems with timeliness of data.

**Question: Based on your experience using the website, please evaluate the site in terms of the following aspects - indicate your level of agreement with these statements.**

**Table 4-10: Website Perceptions**

Answer Options	Strongly Agree		Somewhat Agree		Neither Agree nor Disagree		Somewhat Disagree		Strongly Disagree		Total
	%	Count	%	Count	%	Count	%	Count	%	Count	
The site is well organized and user friendly.	62.75%	32	33.33%	17	1.96%	1	0.00%	0	1.96%	1	51
The site presents the right amount of information.	63.46%	33	26.92%	14	1.92%	1	7.69%	4	0.00%	0	52
I would like to see additional information added.	42.31%	22	11.54%	6	36.54%	19	9.62%	5	0.00%	0	52
I would like to see less information presented.	5.77%	3	7.69%	4	32.69%	17	9.62%	5	44.23%	23	52
Information should be presented in a different format than the current one.	11.54%	6	7.69%	4	30.77%	16	11.54%	6	38.46%	20	52
I find the information presented timely and useful.	61.54%	32	26.92%	14	3.85%	2	1.92%	1	5.77%	3	52
I find the information presented accurate and understandable.	56.86%	29	23.53%	12	5.88%	3	7.84%	4	5.88%	3	51
<b>answered question</b>											<b>53</b>
<b>skipped question</b>											<b>4</b>

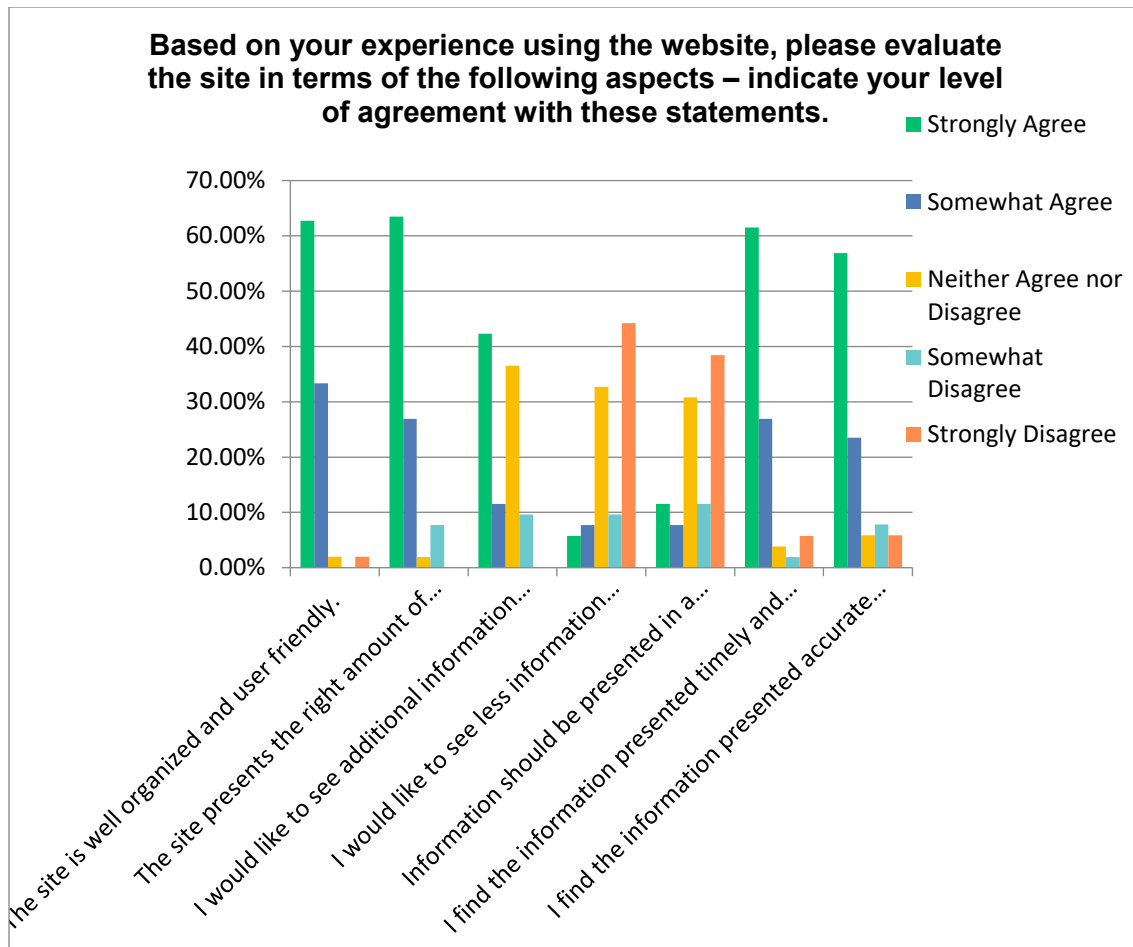


Figure 4-8: Website Perceptions

#### 4.1.10. Additional Information Feedback

Following the general survey questions, users were given an opportunity to provide their own feedback on different subjects. The first question posed pertained to additional information that could be provided by the website. Thirty-five users provided responses to this question. See Table 4-11 and Table 4-12.

Many interesting responses were given ranging from known missing data elements and user interface issues to potential new layers. Some suggestions like gas stations are, at least now, outside the scope and intent of the project. Others like road temperature are not presently available beyond the spot data that the RWIS sensors provide, to the best of our knowledge. Road conditions such as icy, wet, etc., is available from some of the included states by way of reported conditions from maintenance personnel, but we have chosen not to incorporate this data into the system because not all the states have it and the data for those that do is not consistent in terms of descriptors. Several other responses point out incorrect or untimely data and associated problems. Note that the comment submitted on March 3<sup>rd</sup>, 2018 corresponds to an outage in the Caltrans TMCAL system, which explains the delay in OSS showing the change in chain restrictions.



**Question: What additional information, if any, would you like to have, which is not available currently at this site? (Please specify the type, format, frequency of updating, and accuracy of data, if applicable.)**

**Table 4-11: Additional Information Feedback (Comments) – Part 1**

#	Response Date	Response Text
1	Mar 03 2018 12:14 PM	<i>I've been planning a trip today from Mt. Shasta to Medford, OR but the map is showing R2 chain restrictions around Weed and Mt. Shasta. I just found out from a friend that on a different Caltrans map chain restrictions were lifted hours ago. You cost me a trip today</i>
2	Jan 25 2018 08:52 AM	<i>On Each webcam, it would be EXTREMELY helpful to list the elevation of the cam. This way, one can get a sense of at what elevation snow is falling.</i>
3	Dec 27 2017 04:19 PM	<i>The best base map that I have used for web maps is the ESRI/USGS terian Map. The USGS 1:24000 map series has the best land marks. During the Eagle creek Fire it was critical to see fire information in relationship to known land marks. We needed to know stream names, ridge names, point ect. Need to be able to have people driving road segments post on the map the condition of the road. We do this in text form in the Hood River Weather Info blog. It is the most useful information. If someone has made the drive to Portland on I-84 they report back on road conditions. A Cluster map from crowd sourced data would be very useful! Also it would be really helpful to get highway mile points on a map.</i>
4	Nov 13 2017 03:40 PM	<i>There are two cameras listed as (Washington) SR516 @ SR18, neither of which have their logos in the correct position. One is south and the other is east of the intersection.</i>
5	Nov 03 2017 04:12 PM	<i>a glossary of terms.</i>
6	May 03 2017 08:02 PM	<i>Rotate stock more</i>
7	Apr 26 2017 02:43 PM	<i>Please include the elevation of the RWIS data. I have to go to the Caltrans traffic cam page to see what elevation the cameras are at.</i>
8	Mar 31 2017 07:23 AM	<i>When zooming in to an incident or camera the item needs to stay large enough to click on.</i>
9	Feb 03 2017 07:48 AM	<i>The rest of the country as you have for the western US</i>
10	Feb 02 2017 07:14 PM	<i>A glossary of terms. etc. "cws"</i>
11	Jan 20 2017 02:18 PM	<i>I can use <a href="http://oss.weathershare.org/m">http://oss.weathershare.org/m</a> on my desktop, but cannot find a way to use it on my mobile device(s).</i>
12	Jan 13 2017 07:29 PM	<i>I would like to see this format &amp; information to included across the entire United States</i>
13	Jan 11 2017 06:07 PM	<i>The placement of many of the camera icons are NOT where the camera is located. e.g. The Mount Rainier camera icon should be just south of Stage Peak on the road, not where it is.</i>
14	Dec 08 2016 05:46 PM	<i>On NV SR431 there are 2 fairly new cams that would be nice additions. One is called "431 Summit" and the other is "431 Bullseye"</i>
15	Apr 28 2016 09:05 AM	<i>Bridge height and overpass information</i>
16	Apr 28 2016 01:59 AM	<i>Weather alerts, perhaps in red would be useful. Expand to other states. Ability to put in my location. Would like a list of all the available overlays and ability to check off the ones I want displayed and have this "personal" configuration remembered.</i>
17	Apr 27 2016 10:38 AM	<i>Road temperature. The difference between wet road and black ice is significant. The site is really useful under marginal travel conditions. Anything that allows us to make an informed travel decision is important.</i>
18	Mar 30 2016 04:45 PM	<i>Icy or excessively wet roads. Not sure how that is/would be indicated.</i>

**Table 4-12: Additional Information Feedback (Comments) – Part 2**

19	Jan 06 2016 01:32 PM	MAYBE A RIVER GUIDANCE LIKE NOAA HAS ( <a href="http://www.cnrfc.noaa.gov/rfc_guidance.php">http://www.cnrfc.noaa.gov/rfc_guidance.php</a> ) IT MIGHT HELP ON WINTER TRAVEL ALSO
20	Jan 06 2016 10:59 AM	Gas stations
21	Dec 18 2015 11:58 AM	Some of the camera locations on the map are not accurate.
22	Dec 12 2015 05:13 PM	the Route Planner would be better if the user could change the route by dragging - like on Google Maps & Map Quest.
23	Dec 11 2015 10:35 PM	How about links to sites with relevant information, including (but not limited to) sites with information that you intend to integrate into your site in the future.
24	Mar 17 2015 12:05 PM	There are missing CCTV cameras on Highway 140 between MP 0 and MP 69/Medford & Klamath Falls.  The missing cameras are at MP 53.8/Doak Mountain, and MP 37/Lake of the Woods CCTV cameras are the primary tool I look for before studying the rest of the information. (1) CCTV (2) Temperature (3) Current Conditions, and the rest of the information fills in the gaps of information that most websites do not show. I think this is the best road/weather site on the internet, it just needs to have all of the information available.
25	Feb 15 2015 08:07 AM	Data point window pulldowns block too much of window
26	Jan 20 2015 05:50 PM	shows road work being done in California, months past when it was finished
27	Jan 01 2015 12:12 PM	On the road info for Caltras work, there are alot listed that were completed over 4 months ago.
28	Nov 30 2014 10:35 AM	I can't find the legend to determine road conditions, what do the colors mean
29	Nov 21 2014 05:20 PM	Instead of using pictures from the CCTV Cameras, you should use live video feed. As an example, so we can see the vehicles moving in real time rather than seeing a still picture of the vehicles that could have been taking 80 billion years ago for all we know. With the changes that you guys will be making, so we can see the vehicles moving in real time, it will make the website a lot more fun to use and obviously it won't be boring like it is now.
30	Nov 17 2014 05:39 AM	current road conditions, i.e. dry, snow-packed, black ice, etc
31	Oct 13 2014 09:24 AM	1. Alternate routes in the event of an incident 2. Mobile applications
32	Dec 22 2012 02:48 PM	Mot sure of update frequency but like to see it ass quick as possible in winter conditions.
33	Mar 14 2012 02:22 PM	If this is a statewide effort why is it for instance, that chain controls are not available in the Calif dist 3 area but other districts are?
34	Feb 29 2012 10:04 AM	CA 89 chain requirement information missing from Sierraville through Lake Tahoe.
35	Jan 17 2012 10:28 PM	When I click on an RWIS icon in Calif, a list of info comes up, but I do not know what all the entries mean. A key or legend would be nice. For instance, what is precipitation type 2 vs type 3. What is "ess"? Estimated? If so, that should be abbreviated "est".

#### 4.1.11. Chief Website Benefits

Users were next asked what they thought the chief benefits of the website were. Forty-two users provided responses to this question. See Table 4-13, Table 4-14 and Table 4-15. In general, users cited the all-in-one, One-Stop-Shop nature of the site as most beneficial in terms of both multi-state coverage as well as incorporation of numerous data layers. Weather was also mentioned frequently as a benefit in addition to the DOT-provided information. Several responses point out incorrect or untimely data and associated problems.

**What are the chief benefits of this website to you in the context of your current usage? Please be as specific as possible.**

**Table 4-13: Chief Website Benefits (Comments) – Part 1**

#	Response Date	Response Text
1	Mar 03 2018 12:14 PM	<i>there are no benefits if the info is not timely</i>
2	Jan 25 2018 08:52 AM	<i>Snow conditions</i>
3	Dec 27 2017 04:19 PM	<i>during a snow/ice/fire event lets me know condition of roads, fire direction, movement ect.</i>
4	Nov 13 2017 03:40 PM	<i>I determine my route depending on the traffic shown.</i>
5	Nov 05 2017 09:27 AM	<i>Cameras</i>
6	Nov 03 2017 04:12 PM	<i>I check the road conditions and area weather while traveling.</i>
7	May 03 2017 08:02 PM	<i>Learn note about what's available</i>
8	Apr 26 2017 02:43 PM	<i>To see road conditions thru out the area i plan to travel</i>
9	Feb 03 2017 07:48 AM	<i>Many benefits for travel. Road, route, weather are very beneficial to travel in this part of the US</i>
10	Feb 02 2017 07:14 PM	<i>During my trips, I can check the conditions on the road ahead and be more prepared. I ride motorcycles and use this quite often. Very informative site. And the web cam's are really a help.</i>
11	Jan 20 2017 02:18 PM	<i>Plan ahead, avoid, when possible dangerous conditions; seek alternate routes (actually, very few between Reno &amp; Sacto)</i>
12	Jan 13 2017 07:29 PM	<i>I check the traffic, Road information &amp; incidents every time I drive out of town. I check the traffic cams for traffic, Road information &amp; incidents on highways around town during inclement weather. And use the site when planning frequent trips. I like the "chains required" signs during winter &amp; the "fire" signs during spring &amp; summer time</i>
13	Jan 11 2017 06:07 PM	<i>It helps to plan a route when driving long distances.</i>
14	Jan 04 2017 08:54 PM	<i>Checking ability to go up or down mountain safely and easily. See actual weather when happening via cameras. Track movement of fires. Determine if chains are/will be needed. Plan when to travel for shopping &amp; other necessities.</i>
15	Dec 08 2016 05:46 PM	<i>assessing the road (Nv SR431) i drive almost daily</i>
16	Apr 28 2016 09:05 AM	<i>Road and weather conditions while traveling and pulling a trailer.</i>
17	Apr 28 2016 01:59 AM	<i>The way it brings together so many sites into one location.</i>
18	Apr 27 2016 10:38 AM	<i>We travel a lot in a RV. Great site to plan the days travel and keep current on road conditions.</i>
19	Mar 30 2016 04:45 PM	<i>To plan when to travel to avoid hazardous weather and slow road conditions due to weather or construction.</i>
20	Mar 08 2016 10:38 AM	<i>Just found this website! Recently, I had to go to separate DOT websites to try to piece together current highway conditions during winter for trips to visit our kids/grandkids from Eureka, CA to Hill AFB (near Salt Lake City, UT). This website is AWESOME. I especially like the live cams at summit elevations to know if we need chains or not!</i>

**Table 4-14: Chief Website Benefits (Comments) – Part 2**

21	Jan 06 2016 01:32 PM	<i>AS A CONTRACTOR LIVING IN A RURAL AREA AND HAVING TO TRAVEL THROUGH THE MOUNTAINS A LOT. I CAN SEE WHAT THE ROADS AND WHETHER IS. SO THE ROAD CAMS, CONDITION AND WEATHER, WIND CHART IS REALLY HELPFUL. THANK YOU</i>
22	Jan 06 2016 10:59 AM	<i>current and predicted weather conditions.</i>
23	Dec 30 2015 02:11 PM	<i>Single place to go for road conditions and travel information. Appreciate the seamless aggregation of various feeds across state lines. Ability to evaluate conditions at mountain passes and other remote areas provides useful information for trip planning and updating.</i>
24	Dec 22 2015 02:12 PM	<i>I have a PC and internet access in my car and am a ham radio operator, I can follow traffic conditions and monitor traffic cams on the fly. It also makes it easy to relay to the morning radio net, my local conditions and the surrounding ares.</i>
25	Dec 18 2015 11:58 AM	<i>I can check the condition of areas where family members live.</i>
26	Dec 12 2015 05:13 PM	<i>Family travels frequently between Oregon &amp; southern Calif &amp; Las Vegas - Utah. Some times to Washington state I like to check for construction, weather, road conditions, travel cameras - especially in winter. I like this site best because I do not have to go to each separate state site to see only road cams (some with temp) And on state sites the users has to go to another map site first, to find the name of the highway.  Your site is in REAL TIME vs other sites. Your site has ALL the information in one place &amp; is easy for find.</i>
27	Dec 11 2015 10:35 PM	<i>Planning a multistate road trip (CA, NV, UT, CO, WY, ID) winter 2015/16, and already love the site! Thank you! Forecasts of snow, reports of actual snow/road closures/incidents/etc are/will be especially useful. Route planner with elevations very useful. During trip, I will depend on intermittent updates of data at WiFi hotspots enroute.</i>
28	Oct 19 2015 09:30 AM	<i>It provides all areas in one place. As the name says, one-stop-shop is key.</i>
29	Apr 05 2015 06:17 PM	<i>Cellphone: On the road use via 4G data and website. Either with an app or mobile version of the current website that is optimized for mobile use.</i>
30	Mar 17 2015 12:05 PM	<i>As I said above, CCTV in multiple states, as well as the rest of the information provided. I travel between Southern Oregon and Northwest Nevada on a regular basis, as well as Highway 140 between Medford OR, and Klamath Falls, OR over the Cascade Range.</i>
31	Feb 22 2015 09:06 AM	<i>weather stations not use on other sites for temps and wind info</i>
32	Feb 15 2015 08:07 AM	<i>As mission says across states. Great!!!</i>
33	Jan 20 2015 05:50 PM	<i>Web cams weather traffic etc</i>
34	Nov 30 2014 10:35 AM	<i>you can plan a whole trip across several states and easy connection to cameras</i>
35	Nov 21 2014 05:20 PM	<i>None that I can think of.</i>
36	Nov 17 2014 05:39 AM	<i>when tacking trips across Wyoming, Montana and Colorado</i>

**Table 4-15: Chief Website Benefits (Comments) – Part 3**

37	Oct 13 2014 09:24 AM	1. Real-time traveler info 2. One web access for both travel and weather info
38	Dec 22 2012 02:48 PM	Quick and easy when drivers call me for info.
39	Feb 29 2012 11:12 AM	So amazing that this has been created- thanks to all. I love showing it off and sending it to friends and family. It can't be beat for travel planning, and checking on road conditions, accidents, looking at web cam, etc. Beats calling for road conditions.
40	Feb 29 2012 10:04 AM	Additional information from what Caltrans Quickmap provides
41	Jan 20 2012 08:15 AM	Trip planning during adverse weather conditions.
42	Jan 17 2012 10:28 PM	very helpful in helping me to decide when to leave on my run, especially up into Oregon, as that weather changes abruptly at times. The weather data provided (both current and forecast) helps me greatly when traveling on US97. I-5 gets all kinds of informational coverage, but finding info for the other hwys can be very very trying. Also helps to know what to expect in certain trouble prone areas.

#### 4.1.12. Website Improvements

Another survey question was posed to users regarded improvements they would like to see made to the website. Forty-one users provided responses to this question: See Table 4-16, Table 4-17 and Table 4-18. Separate from many good recommendations on how to improve the site as-is, some respondents again indicated a desire for a mobile version of the site. Those recommendations occurred prior to release of Mobile OSS.

**Question: Please also indicate how this website could be improved to better meet your needs. Consider information content, ease of use of the site, ability to understand what is presented and anything else that could make this site better.**

**Table 4-16: Website Improvements (Comments) – Part 1**

#	Response Date	Response Text
1	Mar 03 2018 12:14 PM	update as caltrans updates it's info
2	Dec 27 2017 04:19 PM	You have done a very good job of balancing the right amount of information vs. a good user experience. Too many web maps these days have way too much information on them and the use expereice suffers.  The UI/UX is clean and nice.
3	Nov 13 2017 03:40 PM	Someplaces you have too many cameras shown, with duplicates.
4	Nov 05 2017 09:27 AM	So many cameras said currently unavailable???? Why???
5	Nov 03 2017 04:12 PM	I can not think of any other improvements that are needed, however there may be others that have useful information that could help all of us.
6	May 03 2017 08:02 PM	clean more
7	May 01 2017 09:41 AM	Road conditions, especially closures, are often Very out of date. Example: Northern end of CA 16 shows closed when it isn't.
8	Apr 26 2017 02:43 PM	show more elevation data
9	Mar 31 2017 07:23 AM	When zooming in to an incident or camera the item needs to stay large enough to click on.
10	Feb 03 2017 07:48 AM	Haven't used it to know what could be added

**Table 4-17: Website Improvements (Comments) – Part 2**

11	Jan 20 2017 02:18 PM	<i>The Incident icons (California) often contain information superfluous to a General public/traveler user other than the fact that an incident does exist. The info within is primarily for the benefit of law enforcement &amp; is undecipherable &amp; may be distracting to the general public.</i>
12	Jan 13 2017 07:29 PM	<i>As above - the site is great but again - I would like to see this format &amp; information to included across the entire United States</i>
13	Jan 04 2017 08:54 PM	<i>Site could appear more towards the top in search research results. Other than that, it's so useful right now that I can't think of any way to improve it! This is a fantastic resource for keeping me and my family safe and prepared at any time and any where. Thank you very much for creating it!</i>
14	Dec 08 2016 05:46 PM	<i>see #9. thank you</i>
15	Apr 28 2016 09:05 AM	<i>Cell and tablet format</i>
16	Apr 28 2016 01:59 AM	<i>see #9</i>
17	Apr 27 2016 10:38 AM	<i>Great site. Well designed. Easy to use while traveling. I posted the link in a RV forum and people commented that they would be "willing" to pay for the site. When you get a bunch of cheap, retired RV'ers that are willing to pay for the site!!! It is that good. Thanks.</i>  <i>I know that for transportation agencies information is a secondary function, but for the traveler under adverse conditions it is critical. Great job with this program.</i>  <i>My advice, whatever you do keep the useable in a moving vehicle.</i>
18	Apr 05 2016 10:47 AM	<i>I have tried to save the settings without success. Whenever I use the link feature in the upper right corner to get a link to map as it is currently set up then attempt to use that link your site goes dim, shows a progress bar saying that it is loading data and stays that way forever. I'd really like to be able to set up the map settings and them come back to the map with those settings and centered/zoomed the way I want. Otherwise the map is of great use.</i>
19	Mar 08 2016 10:38 AM	<i>Will do so after more use. I am ecstatic to find it. I am retired Caltrans Right of Way Agent and so glad to find this travel tool. Great job!</i>
20	Feb 18 2016 10:53 AM	<i>UNABLE TO ACCESS WEBCAMS USING PALE MOON (FIREFOX BASED) BROWSER, VERSION 26.1. ALL OTHER FUNCTIONS AVAILABLE. Webcams are the most important functin for my needs so any suggestions as to how to access via this browser appreciated. My current workaround is to use IE, not a favorite option. Thanks.</i>
21	Jan 06 2016 01:32 PM	<i>RIVER GUIDANCE AS MENTIONED. ALSO THE CHP INCIDENT REPORTS LETS ME SEE ACCIDENTS, ROCKSLIDE EVENTS ROAD CLOSURES ,FROM CALL IN REPORTS (<a href="http://cad.chp.ca.gov/Traffic.aspx">http://cad.chp.ca.gov/Traffic.aspx</a>) OVERALL, THIS IS BY FAR THE BEST TRAVEL INFO WEBSITE I HAVE SEEN YET</i>



**Table 4-18: Website Improvements (Comments) – Part 3**

22	Jan 06 2016 10:59 AM	<i>keep it updated! Today is the 5th of January and it was last updated on the 4th at 4am.  If it is not updated I will not use it.</i>
23	Dec 30 2015 02:11 PM	<i>Prioritize mobile device performance highly. While the site works well on laptops, some mobile devices have trouble using the site effectively due to slow perf displaying numerous items. Other improvements--pan the map when opening any popups so the popup is visible.</i>
24	Dec 22 2015 02:12 PM	<i>The only thing that could be added for better ease of use is a detailed legend for the traffic layer.</i>
25	Dec 19 2015 09:54 AM	<i>What does it mean when a road is shown as orange or red? I can not find an index for this information.</i>
26	Dec 18 2015 11:58 AM	<i>Would like a 'home' window.</i>
27	Dec 12 2015 05:13 PM	<i>See #9 above.  Also, I would like to see similar site for mid-west &amp; east coast.</i>
28	Dec 11 2015 10:35 PM	<i>Still learning what you already have. :-) The speed with which the site updates and allows location changes (e.g., from one state to another) is very fast, very satisfying. Like that you are expanding incrementally into more states. Would be helpful if (at least some of) the CCTV images could be streaming.</i>
29	Oct 19 2015 09:30 AM	<i>The page is not very mobile-friendly. It would be nice to to have a mobile-friendly page that has text links for various user-defined areas. So, you could have links to Oregon cams, etc on a page, and then Northern CA cams, etc on another page. The current page's icons are too small on a phone to click on accurately. Also, the checkbox menus are too small.</i>
30	Apr 02 2015 09:23 AM	<i>Why is the Nevada camera views not updated? Still using views from 4 moths ago.</i>
31	Mar 17 2015 12:05 PM	<i>The CCTV camera logo could be a little more obvious. It is rather hard to see until you zoom completely in if there is another icon at the same location.</i>
32	Feb 15 2015 08:07 AM	<i>Google scale is in km not miles</i>
33	Jan 20 2015 05:50 PM	<i>keep info up to date</i>
34	Jan 01 2015 12:12 PM	<i>road work that has been completed should be deleted in a timely manner</i>
35	Nov 30 2014 10:35 AM	<i>again make it easier to find the legend</i>
36	Nov 21 2014 05:20 PM	<i>I just answered this in question number 9. Why do you have the same question twice?</i>
37	Oct 13 2014 09:24 AM	<i>Same as mentioned in Item 9.</i>
38	Feb 29 2012 11:12 AM	<i>I haven't any at this time</i>
39	Feb 29 2012 10:04 AM	<i>CA 89 chain requirement information missing from Sierraville through Lake Tahoe. Because of this, I have to question if other information is being omitted.</i>
40	Jan 23 2012 04:41 PM	<i>PLEASE don't use abbreviations on the Legend. Legends are supposed to explain things. CMS, CCTV, RWIS are letter groupings that have no meaning to me. Help us amatures out. Explain yourselves.</i>
41	Jan 17 2012 10:28 PM	<i>See question 9</i>

### 4.1.13. User Category

Finally, survey users were asked to categorize themselves by type. See Table 4-19, Table 4-20 and Figure 4-9. Of 55 who answered this question, 43 identified themselves as general public / traveler, 8 identified as transportation professional and 3 identified as goods movement / commercial trucking. Six respondents identified themselves as “other”.

**Question: User category:**

**Table 4-19: User Category**

Answer Options	Response Percent	Response Count
General public/traveler	78.18%	43
Transportation professional (ex. DOT)	14.55%	8
Goods movement/commercial trucking	5.45%	3
Law enforcement	1.82%	1
Other (please specify)		6
<b>answered question</b>		<b>55</b>
<b>skipped question</b>		<b>2</b>

**Table 4-20: User Category (Comments)**

#	Response Date	Other (please specify)
1	Dec 27 2017 04:19 PM	<i>I am a geospatial developer and make web mapping applications for a living.</i>
2	Jan 10 2017 08:31 AM	<i>Info points for road cameras I-90 Franklin Falls mp51.3 and I-90 Snoqualmie Summit mp52 are reversed. Summit is East of Franklin Falls. Check WSDOT site <a href="http://www.wsdot.com/traffic/passes/default.aspx">http://www.wsdot.com/traffic/passes/default.aspx</a></i>
3	Dec 08 2016 05:46 PM	<i>former Nv DOT, current ski patroller &amp; avalanche technician on SR431</i>
4	Jan 06 2016 01:32 PM	<i>ALSO USE IT FOR PERSONAL TRAVEL</i>
5	Dec 22 2015 02:12 PM	<i>Ham Wx relay (sic)</i>
6	Mar 17 2015 12:05 PM	<i>Before I retired I travelled Highway 140 between Medford and Klamath Falls 3 or 4 times/week. I still travel it at least twice a month for shopping and medical services. I have seen it under all weather conditions, and it is the primary highway between the two population centers, I have driven it so many times I know the location of every milepost.</i>
7	Nov 21 2014 05:20 PM	<i>Just because</i>
8	Dec 22 2012 02:48 PM	<i>Lots of truckers I used to work with call for road info when it is easier to go thru me.</i>
9	Feb 29 2012 11:12 AM	<i>also work for a county, and we have a link to it for public using our front facing GIS pages</i>

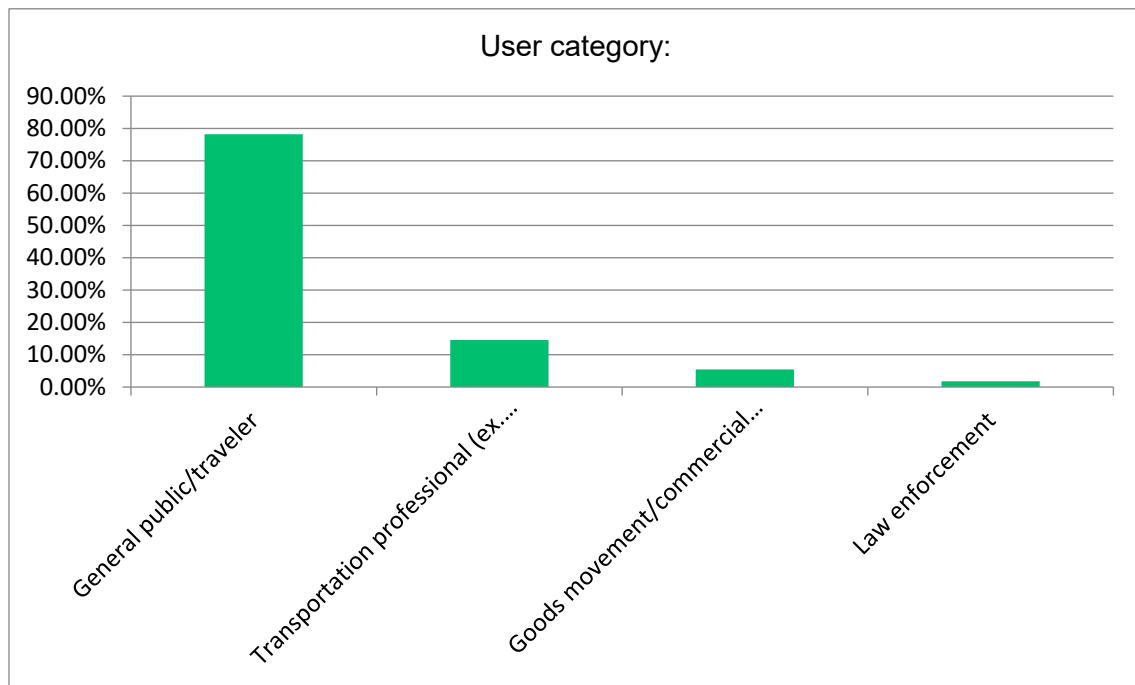


Figure 4-9: User Category

#### 4.1.14. Survey Summary

The One-Stop-Shop user survey has been helpful for collecting feedback from users. In some cases, it has helped to identify problems such as interface issues and missing or incorrect data. In other cases, it has helped to confirm longer term needs such as that of a mobile interface for the One-Stop-Shop. And, it has helped to confirm the utility of the system. While the various objective questions that involve rating of features is useful, the most useful aspect of the survey has been freeform response questions and the ability of respondents to add comments to various questions.

## 4.2. Desktop Website Analytics: November 1<sup>st</sup>, 2011 – March 5<sup>th</sup>, 2018

In addition to the information collected by the website survey, additional usage information was collected using Google Analytics™. This is a tool which tracks website usage patterns, including individual site visits, time spent on the site and the features selected. The project team started using Google Analytics™ to track use of the One-Stop-Shop in November 2011. The following sections summarize the key information collected through this approach for the One-Stop-Shop website.

### 4.2.1. User Sessions

Between November 2011 and August 2014, use of the One-Stop-Shop was low. With a few exceptions, there was an average of less than 30 user sessions per day. When the One-Stop-Shop expanded to cover the 11 contiguous states west of the Rocky Mountains in September 2014, use increased dramatically – approximately 10-fold over prior use on average. The increased coverage area likely contributed to this increase, but the principal factor was the addition of links to the One-Stop-Shop from a Caltrans CCTV page to provide coverage outside California. The number of user sessions between July 2015 and June 2016 more than doubled over the prior year and nearly doubled again with the period between July 2016 and June 2017. Growth slowed over the period from July 2017 through March 2018, and this slowing appears attributable at least in part to the relatively mild winter experienced in California during this time. See Figure 4-10 and Table 4-21. There were 1,025,223 user sessions and 320,288 users between November 2011 and March 5<sup>th</sup>, 2018.

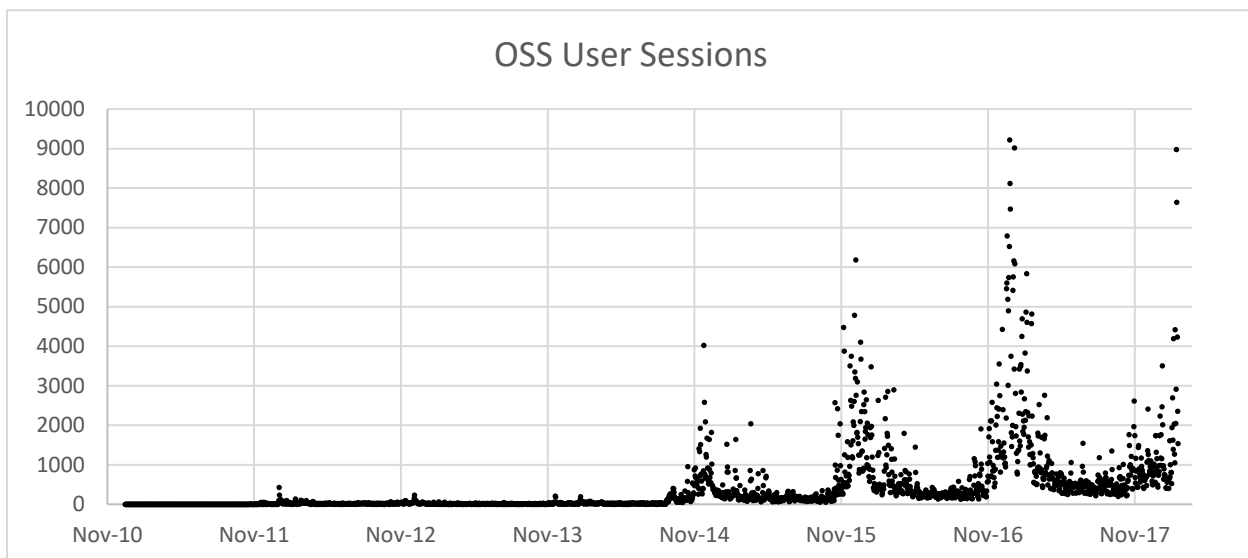


Figure 4-10: OSS User Sessions 11/2011 – 3/2018

**Table 4-21: Annual User Session Statistics**

<b>Date Range</b>	<b>Min</b>	<b>Max</b>	<b>Median</b>	<b>Average</b>
November 1st, 2011 - June 30th, 2012	0	435	20	28
July 1st, 2012 - June 30th, 2013	1	237	19	24
July 1st, 2013 - June 30th, 2014	0	211	20	24
July 1st, 2014 - June 30th, 2015	3	4030	172	297
July 1st, 2015 - June 30th, 2016	58	6190	327	698
July 1st, 2016 - June 30th, 2017	130	9228	561	1155
July 1st, 2017 – March 5 <sup>th</sup> , 2018	208	8983	609	869

There have been 18 days in which there were 5000 or more user sessions and 4 days in which there were 8000 or more user sessions for the One-Stop-Shop. The most user sessions in one day was 9228 on January 10<sup>th</sup>, 2017. See Table 4-22. Prior to Fall 2014, the most user sessions recorded was 435. Note that although usage slow on average from July 1<sup>st</sup>, 2017 through March 5<sup>th</sup>, 2018 relative to the prior year, the total number of user sessions on 3/1/2018 was 8983, which was very close to the all-time high. A winter storm impacted the I-80 and I-5 areas of California as well as other states at that time. And, although this was a major storm, it was arguably a lesser event than the storms of the prior winter. So, observed usage was on-par with if not better than that from comparable times during the prior year.

**Table 4-22: Days with 5000 or More User Sessions 11/2011 – 3/5/2018**

<b>Date</b>	<b>Sessions</b>
1/10/2017	9228
1/22/2017	9025
3/1/2018	8983
1/11/2017	8123
3/2/2018	7648
1/12/2017	7473
1/4/2017	6795
1/9/2017	6528
12/24/2015	6190
1/20/2017	6166
1/23/2017	6091
2/21/2017	5844
1/19/2017	5756
1/8/2017	5746
1/3/2017	5606
1/2/2017	5458
1/18/2017	5418
1/5/2017	5194

#### 4.2.2. User Locations

While users from 128 countries accessed the One-Stop-Shop during this time, over 97.6% (1,001,010) of the user sessions came from the United States. Canada had nearly 1% (10,184) of the user sessions. Users from all 50 states and the District of Columbia have accessed the One-Stop-Shop. Not surprisingly and by far, the most user sessions came from California. In second place by far was Nevada, with Oregon, Washington, Montana, Idaho, Arizona and Utah rounding out the top eight. All these states are in the coverage region of the One-Stop-Shop. Texas came in ninth place, beating out Colorado which came in tenth place. See Table 4-23. Proximity to the coverage region and large population likely contributed to the relatively high count from Texas. Wyoming, with a relatively low population came in 26<sup>th</sup> place with 2362 user sessions. The state within the coverage having the least number of user sessions was New Mexico, which was ranked 33<sup>rd</sup> with 1319 user sessions.

**Table 4-23: User Sessions by State 11/2011 – 3/2018**

State	Sessions	State	Sessions	State	Sessions
California	534,608	Texas	10,211	Pennsylvania	3406
Nevada	174,311	Colorado	9413	New York	3106
Oregon	69,559	Illinois	9265	Arkansas	3038
Washington	47,206	Minnesota	5634	Ohio	2941
Montana	25,699	Missouri	4976	Nebraska	2666
Idaho	21,955	Florida	4608	Michigan	2655
Arizona	14,531	North Carolina	4587	Wisconsin	2505
Utah	10,657	Iowa	4084	Georgia	2468

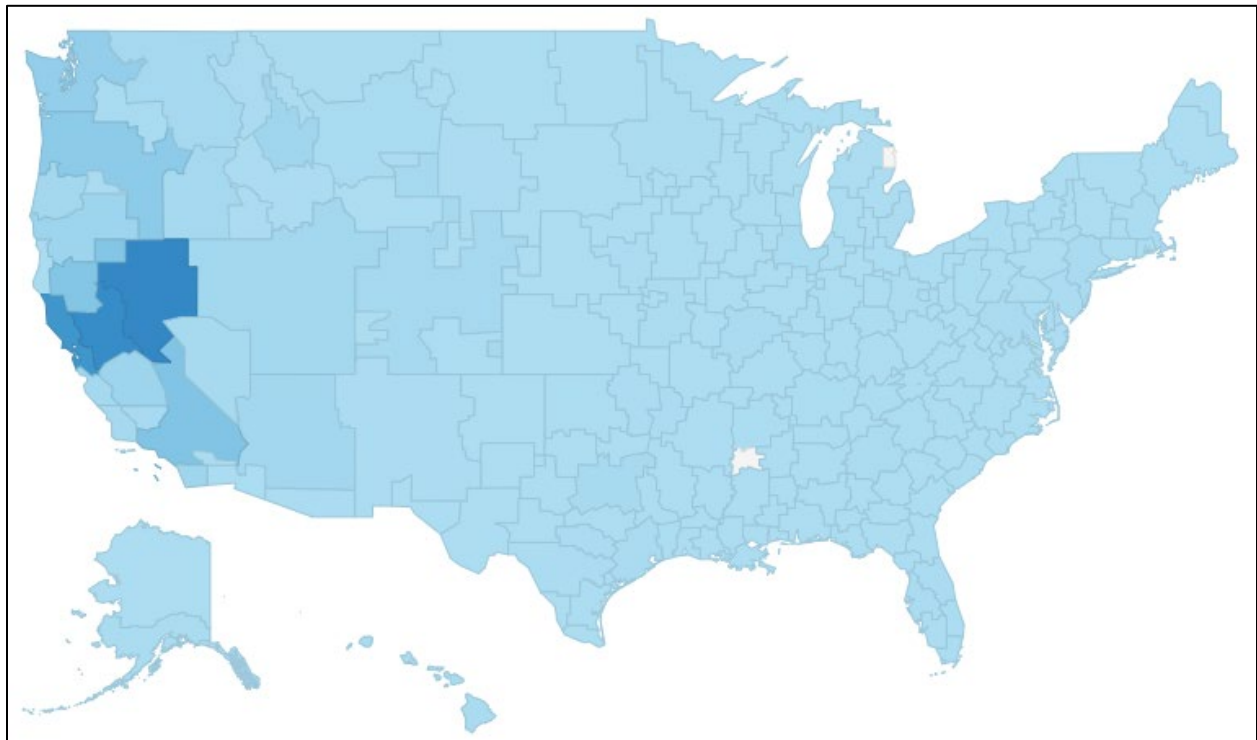
The One-Stop-Shop was accessed from over 4600 U.S. cities and towns between November 2011 and March 5, 2018. Reno, Nevada contributed the most user sessions with 88,729, beating Sacramento, which had 68,127 user sessions. All the cities in the top 12 are in California or Nevada. Portland, Oregon placed 13<sup>th</sup> with 10,122 Sessions. Other cities outside California and Nevada that ranked high in user sessions include Bozeman, Boise, Seattle, Salem, Phoenix, Bend, Las Vegas, Eugene, Salt Lake City, Medford, Denver, Chicago and Spokane. Bozeman ranked high in large part because WTI/MSU is in Bozeman. Also, press releases and new stories about the One-Stop-Shop resulted in subsequent, significant use in Montana. See Table 4-24.



**Table 4-24: User Sessions by U.S. City 11/2011 – 3/5/2018**

City	Sessions	City	Sessions	City	Sessions
Reno	88,729	Auburn	6172	Denver	3367
Sacramento	68,127	San Diego	6162	Chicago	3307
San Francisco	30,320	Yuba City	5420	Modesto	3282
Susanville	21,617	El Dorado Hills	5338	Gardnerville	3270
Redding	20,816	San Rafael	5317	Hood River	3264
Carson City	19,605	Bend	5251	Elk Grove	3225
Sparks	16,183	Corona	5052	Yreka	3103
Truckee	16,124	Long Beach	4894	Mount Shasta	3005
South Lake Tahoe	15,008	Red Bluff	4813	San Ramon	2947
Chico	12,961	Stockton	4682	Fernley	2923
Los Angeles	11,049	Las Vegas	4528	Fremont	2914
San Jose	10,774	Eugene	4507	Placerville	2820
Portland	10,122	Rocklin	4460	Spokane	2810
Bozeman	9832	Santa Rosa	4460	Citrus Heights	2793
Oakland	9146	Folsom	4421	Lincoln	2762
Boise	8854	Hollister	4082	Bakersfield	2694
Roseville	8482	Fresno	3995	Oroville	2643
Gardnerville Ranchos	7255	Rancho Cordova	3749	Johnson Lane	2579
Seattle	7165	Dayton	3689	Fort Dodge	2565
Incline Village	6943	Salt Lake City	3630	Apple Valley	2549
Salem	6937	Fallon	3527		
Phoenix	6836	Medford	3387		

User sessions originated from nearly all U.S. metropolitan areas, except for one in Mississippi and another in Michigan. As demonstrated by the city data, access to the system has been dominated by the west and particularly areas of California and Nevada traversed by Interstate 80. To a lesser degree, areas traversed by Interstate 5 also resulted in heavy use of the system. See Figure 4-2 and Table 4-25. The Reno metropolitan area provided the most user sessions (201,954) while the Sacramento metropolitan area provided 194,222 sessions. The San Francisco metropolitan area came in third place with 123,126 sessions.



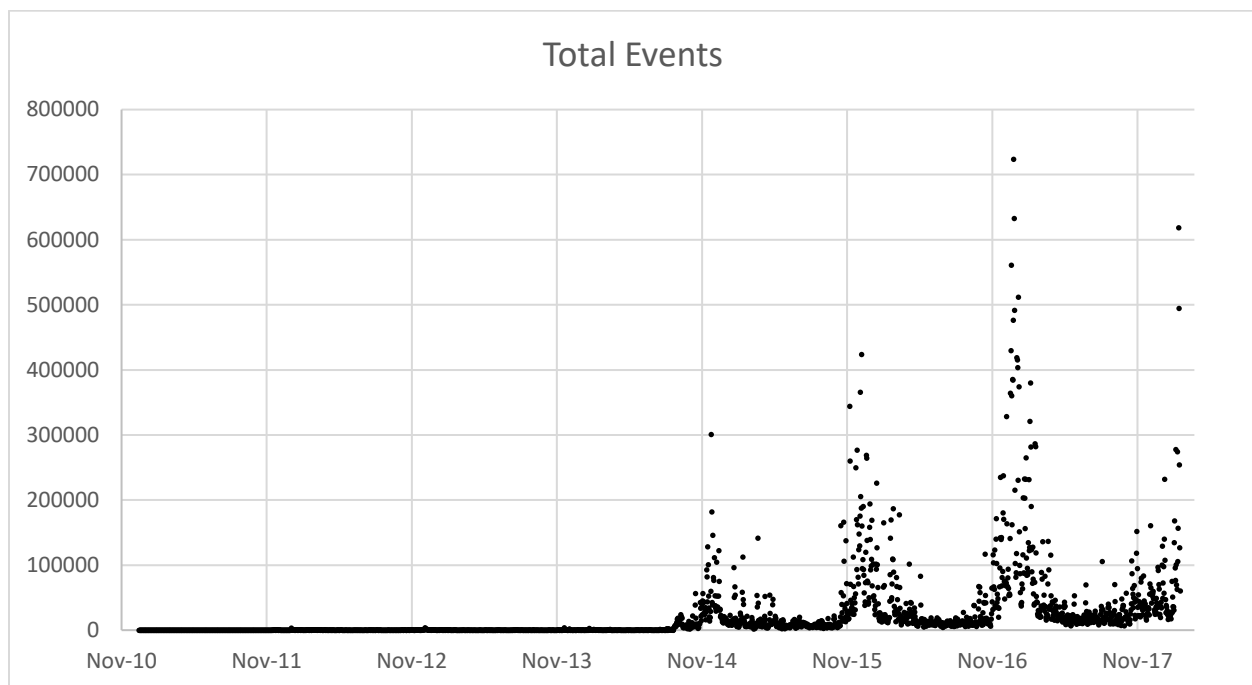
**Figure 4-11: User Sessions by U.S. Metropolitan Area 11/2011 – 3/2018**

**Table 4-25: User Sessions by U.S. Metropolitan Area 11/2011 – 3/2018**

<b>Metro</b>	<b>Sessions</b>	<b>Metro</b>	<b>Sessions</b>
Reno NV	201,954	Chicago IL	8151
Sacramento-Stockton-Modesto CA	194,222	Las Vegas NV	7841
San Francisco-Oakland-San Jose CA	123,126	Spokane WA	7746
Chico-Redding CA	54,895	Yakima-Pasco-Richland-Kennewick WA	6147
Los Angeles CA	50,408	Bend OR	6043
Portland OR	41,358	Missoula MT	5621
Seattle-Tacoma WA	33,121	Twin Falls ID	5607
Medford-Klamath Falls OR	18,765	Minneapolis-St. Paul MN	5218
Fresno-Visalia CA	14,348	Bakersfield CA	5066
Boise ID	13,199	Dallas-Ft. Worth TX	4318
Eugene OR	12,646	Eureka CA	4121
San Diego CA	12,346	Great Falls MT	3792
Phoenix AZ	11,910	Billings, MT	3543
Salt Lake City UT	11,857	Kansas City MO	3498
Monterey-Salinas CA	11,429	Palm Springs CA	3430
Butte-Bozeman MT	11,076	Greenville-Spartanburg-Asheville-Anderson	3062
Denver CO	8338	Des Moines-Ames IA	2984
Santa Barbara-Santa Maria-San Luis Obispo CA	8159		

### 4.2.3. Events/Interactions

The One-Stop-Shop tracks user “events”, which correspond to interactions with the One-Stop-Shop: menu/layer selections, marker selection, etc. This is useful because it provides information about how users are interacting with the system and what information they are looking at. At the same time the One-Stop-Shop was expanded to cover 11 states, the project team implemented functionality so that markers would display corresponding content if the user moved the mouse over the marker. Previously it was necessary to click on a marker to show its content – a CCTV image, for example. Because of this change, the number of events per user increased dramatically, corresponding to a much greater amount of information being viewed by users. This appears to have been very well-received by users. All total through March 5<sup>th</sup>, 2018, there have been 56,331,562 events generated by users of the One-Stop-Shop.



**Figure 4-12: Events Recorded by the One-Stop-Shop**

CCTV events (camera views) account for nearly 74% of all events in the One-Stop-Shop, with a total of 41,650,294 CCTV events. There have been 92 days in which there were 100,000 or more CCTV events. The most occurred on 1/10/2017, with 520,801 events.

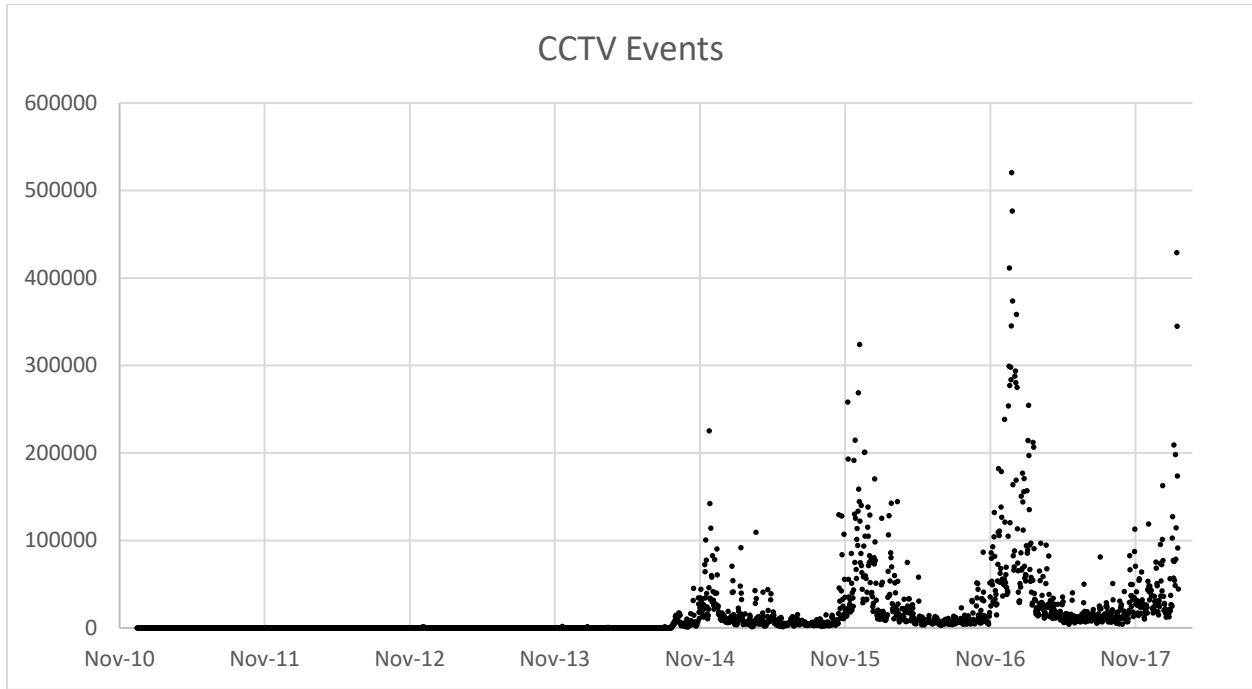


Figure 4-13: CCTV Events Recorded by the One-Stop-Shop

Table 4-26: Days with Over 200,000 CCTV Events

Day Index	Total Events	Day Index	Total Events	Day Index	Total Events
1/10/2017	520,801	1/7/2017	298,086	12/11/2014	225,514
1/11/2017	476,781	1/19/2017	293,721	12/13/2015	214,658
3/1/2018	429,324	1/18/2017	287,871	2/20/2017	214,356
1/4/2017	411,587	1/8/2017	283,952	3/5/2017	212,222
1/12/2017	374,099	1/20/2017	280,779	2/22/2018	209,374
1/22/2017	358,571	1/5/2017	277,439	3/6/2017	206,739
1/9/2017	345,386	1/23/2017	275,314	1/6/2016	200,886
3/2/2018	345,099	12/21/2015	268,858	1/5/2016	200,853
12/24/2015	324,336	11/24/2015	258,275	2/20/2017	214,356
1/3/2017	299,478	2/21/2017	254,796	3/5/2017	212,222

#### 4.2.4. Device Categories

Finally, Table 4-27 shows device categories for user sessions, and indicates whether users were using desktop, tablet or mobile (phone) devices. Not surprisingly, desktop usage dominates tablets and mobile (phone) devices. The original (desktop) version of the One-Stop-Shop is not conducive to use on mobile devices, so the result is not particularly surprising.

**Table 4-27: User Device Categories**

Device Category	Sessions
desktop	843,398
mobile	94,397
tablet	87,428
Total	1,025,223

#### 4.2.5. Analytics Summary

The collection of website analytics data has been quite helpful in gauging use of the One-Stop-Shop and particularly useful in determining what content is of interest to users and where those users are located. The One-Stop-Shop is clearly used most often during bad weather, particularly during snow events. Use of the system has been widespread, with use from every state and nearly every metropolitan area in the United States. Most use comes from the western states, particularly California and Nevada. Users along the Interstate 80 corridor from San Francisco through Nevada comprise the largest group of users of the system, with those along the Interstate 5 corridor from Sacramento to Seattle comprising the next largest group. CCTV imagery is by far the most viewed data set in the One-Stop-Shop. Usage has increased dramatically since September 2014 in conjunction with three major updates that were made in 2014: expansion to cover the eleven contiguous states west of the Rocky Mountains, introduction of mouse-over viewing of content such as CCTV images, and addition of links by Caltrans to their CCTV page. Usage remains primarily a desktop (or laptop) computer activity.

### 4.3. Linking Sites (Desktop)

#### 4.3.1. Top Linking Sites

Several links to the One-Stop-Shop implemented by Caltrans have contributed tremendously to the growth in usage of the One-Stop-Shop over the past several years. While Caltrans has linked to the One-Stop-Shop for some time, the links from the Caltrans CCTV Map, maintained by Sean Campbell at the Division of Research, Innovation and System Information, and implemented in September 2014, have provided by far the greatest number of user sessions to the One-Stop-Shop. See Table 4-28, Table 4-29 and Figure 4-14. Caltrans District 2 links have also referred users to the One-Stop-Shop, and other Caltrans districts have subsequently added links. See Figure 4-15 and Figure 4-16.

By way of the large number of “direct” links to the One-Stop-Shop shown in Table 4-28, many users bookmark and save links to the One-Stop-Shop once they find it. Search engines and social media also play a role in guiding prospective users to the site. There have also been many linking sites separate from Caltrans including those at WTI/MSU as well as travel-related entities such the Mt. Shasta Chamber of Commerce and the Lake Tahoe Visitors Authority. And, from time-to-time, television and weather entities have linked to OSS. See Figure 4-17 and Figure 4-18.

**Table 4-28: Top Sites Linking to the One-Stop-Shop**

Source	Sessions
(direct)	630,641
dot.ca.gov	236,678
google	59,918
ktvn.com	22,004
tahoessouth.com	12,611
bing	9167
m.facebook.com	8137
facebook.com	4951
westernstates.org	4892
yahoo	3562
montana.edu	3182
www2.cbox.ws	2253
l.facebook.com	1891
visitmtshasta.com	1529
renotahoeweather.com	1447
co.shasta.ca.us	1048
com.google.android.googlequicksearchbox	1044
searchlock.com	1034



**Table 4-29: Caltrans (dot.ca.gov) Links to the One-Stop-Shop**

<b>Referral Path</b>	<b>Sessions</b>
/research/its/cctv/hq/nevada.htm	144600
/research/its/cctv/iframe.htm	59065
/research/its/cctv/hq/oregon.htm	12377
/dist2/cctv/allcams.shtml	7561
/dist2/	4920
/dist2/chainup/allcntys.htm	2629
/research/its/cctv/hq/arizona.htm	2002
/dist2/index.shtml	982
/dist2/maps.htm	789
/research/OSS.htm	376
/d2/index.html	269
/dist10/	232
/ctnews/sep14/tc03.shtml	166
/dist3/departments/traffic/cameras/	134
/dist2/maint.htm	88
/d11/	86
/hq/paffairs/news/pressrel/14pr097.htm	78
/dist8/tmc/index.htm	66
/d2/	64
/dist6/cctv/	37
/d10/	33
/cgi-bin/roads.cgi	29
/d10/index.html	21
/newtech/OSS.htm	10
/d11/index.html	10
/dist8/tmc/	10
/d3/cameras.html	6
/	4
/ct/d10/	4
/ctnews/sep14/sum.shtml	4
/dist2/planning/pdf/sr139tcr.pdf	4
/hq/research/OSS.htm	4
/cttravel/	2
/d10/aboutd10.html	2
/d10/maps.html	2
/d10/tcr.html	2
/d10/x-project-sr12bouldinland.html	2
/dist2/pdf/oss091214.pdf	2
/research/rural/docs/OSS_Factsheet_2016Aug.pdf	2
/research/rural/index.htm	2
	236,676

A link to the One-Stop-Shop via the Caltrans CCTV page is shown in Figure 4-14. See <http://dot.ca.gov/research/its/cctv/iframeemap.htm>.

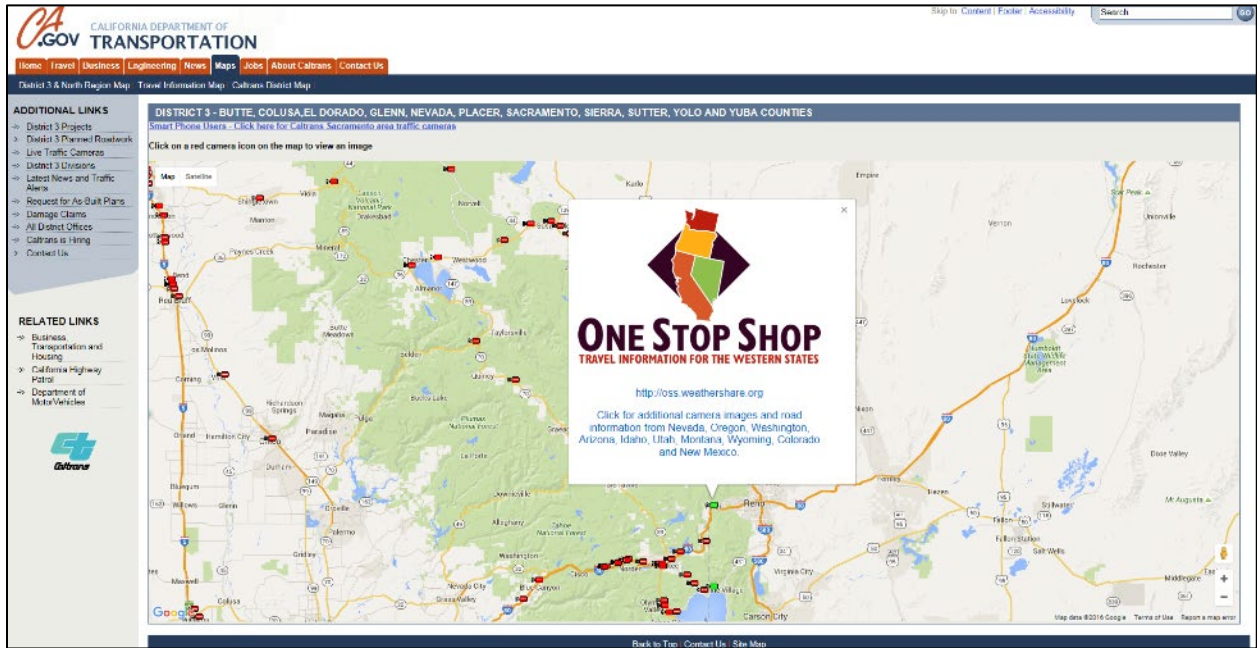


Figure 4-14: Link to the One-Stop-Shop via the Caltrans CCTV page

Figure 4-15 shows a link to the One-Stop-Shop from the Caltrans District 2 Home Page: <http://www.dot.ca.gov/d2/index.html>. See the related links section on the right.

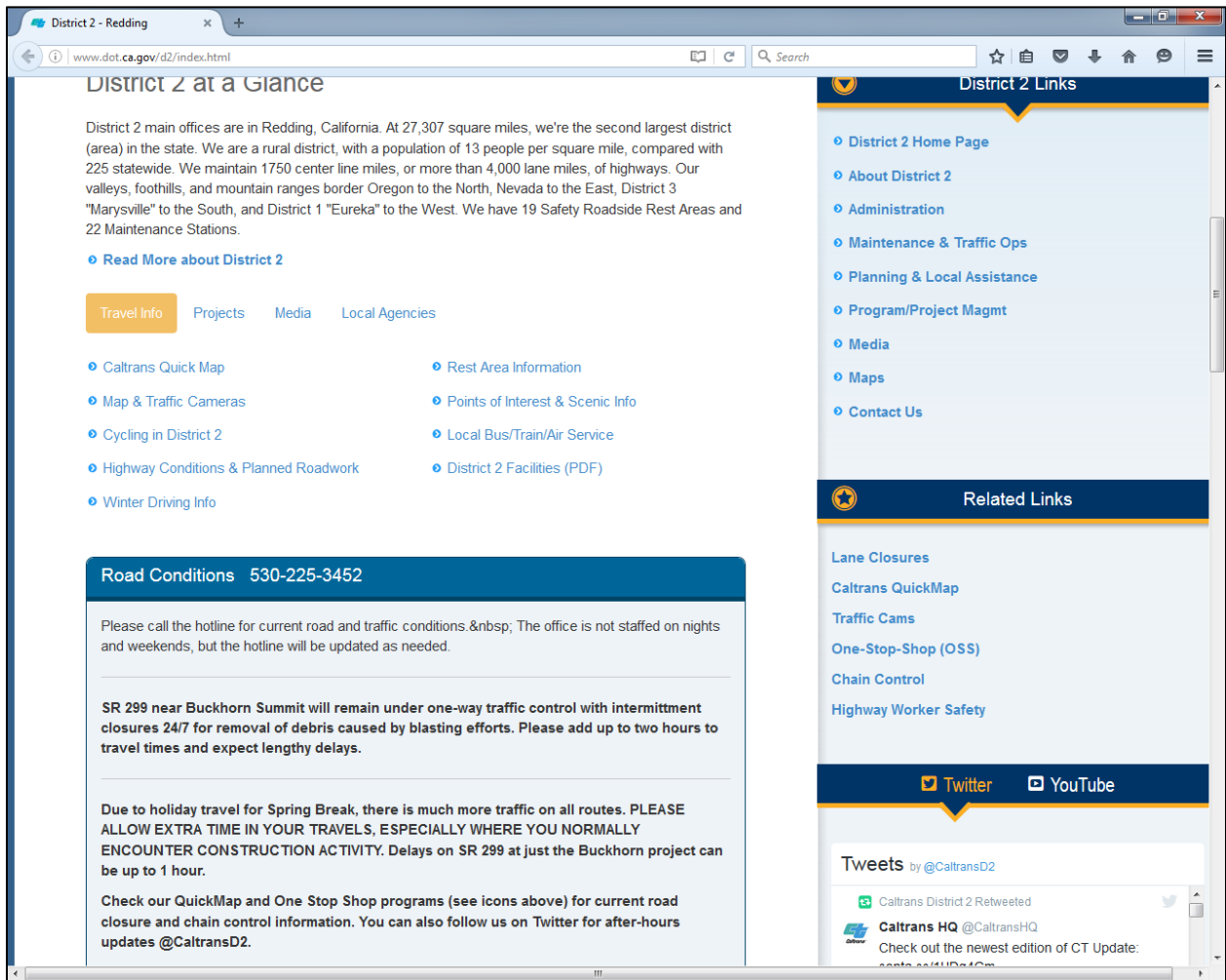


Figure 4-15: Link to the One-Stop-Shop via the Caltrans District 2 Home Page

Figure 4-16 shows a link to the One-Stop-Shop via the Caltrans District 2 All Cameras Page: <http://dot.ca.gov/dist2/cctv/allcams.shtml>. See the “Highway Conditions in Neighboring States” link in lower left.

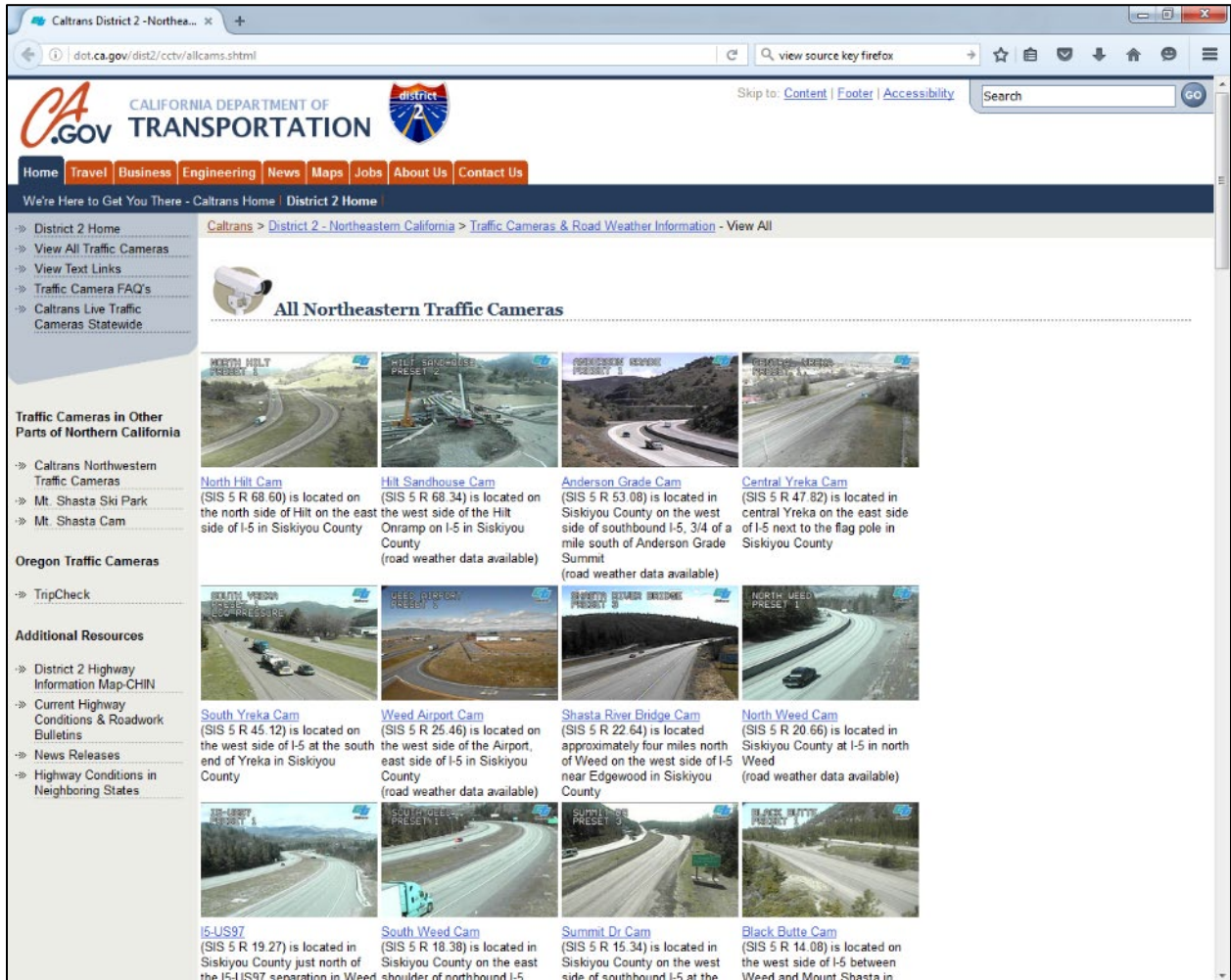


Figure 4-16: Link to the One-Stop-Shop via the Caltrans District 2 All Cameras Page

Figure 4-17 shows a link to One-Stop-Shop from the Mt. Shasta Chamber of Commerce: <http://visitmtshasta.com/directions/>. See the link “View current chain restrictions ... all on one map!”.

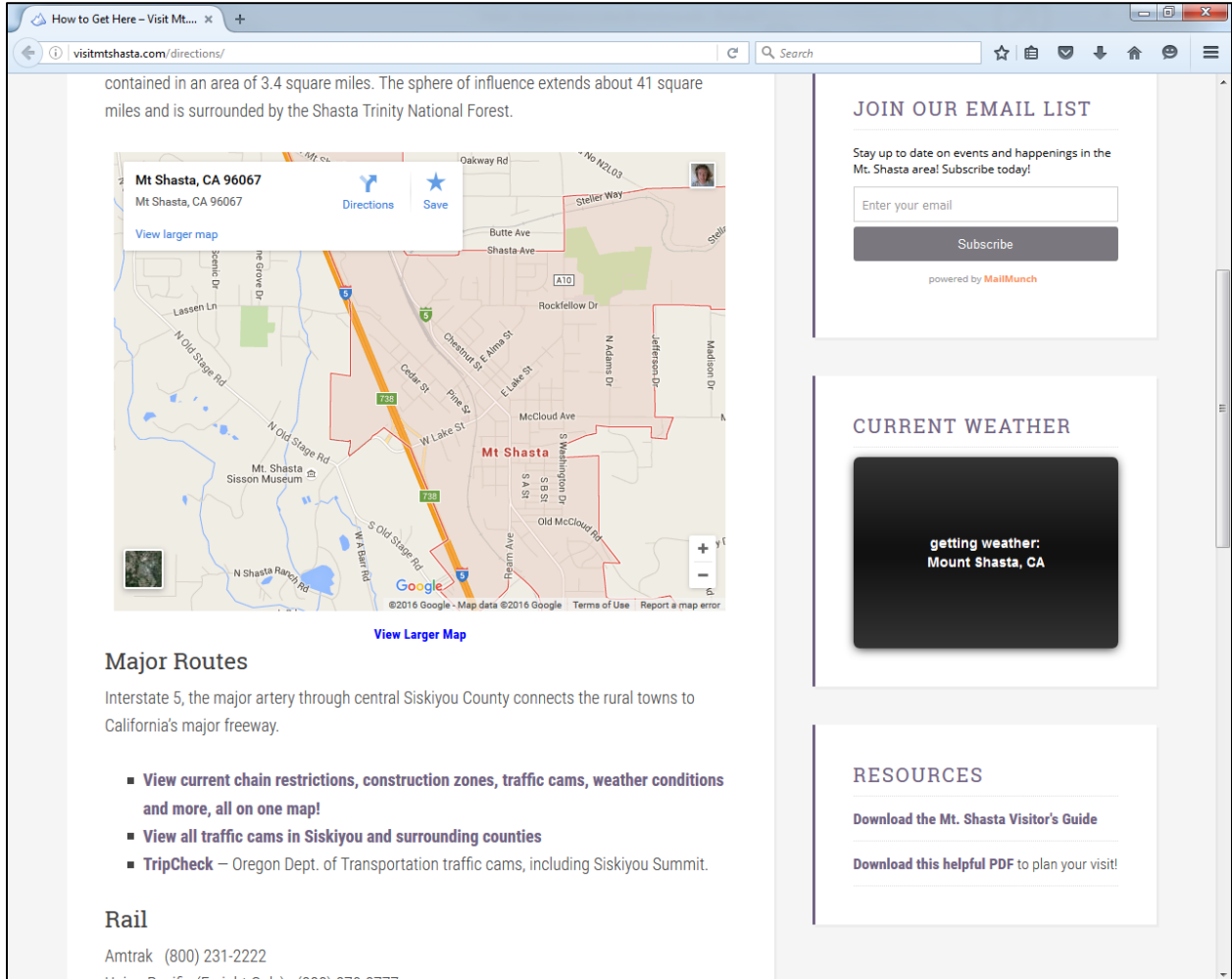


Figure 4-17: Link to One-Stop-Shop from Mt. Shasta Chamber of Commerce



Figure 4-18 shows a link to One-Stop-Shop from TahoeSouth.com See the “Roads” link.

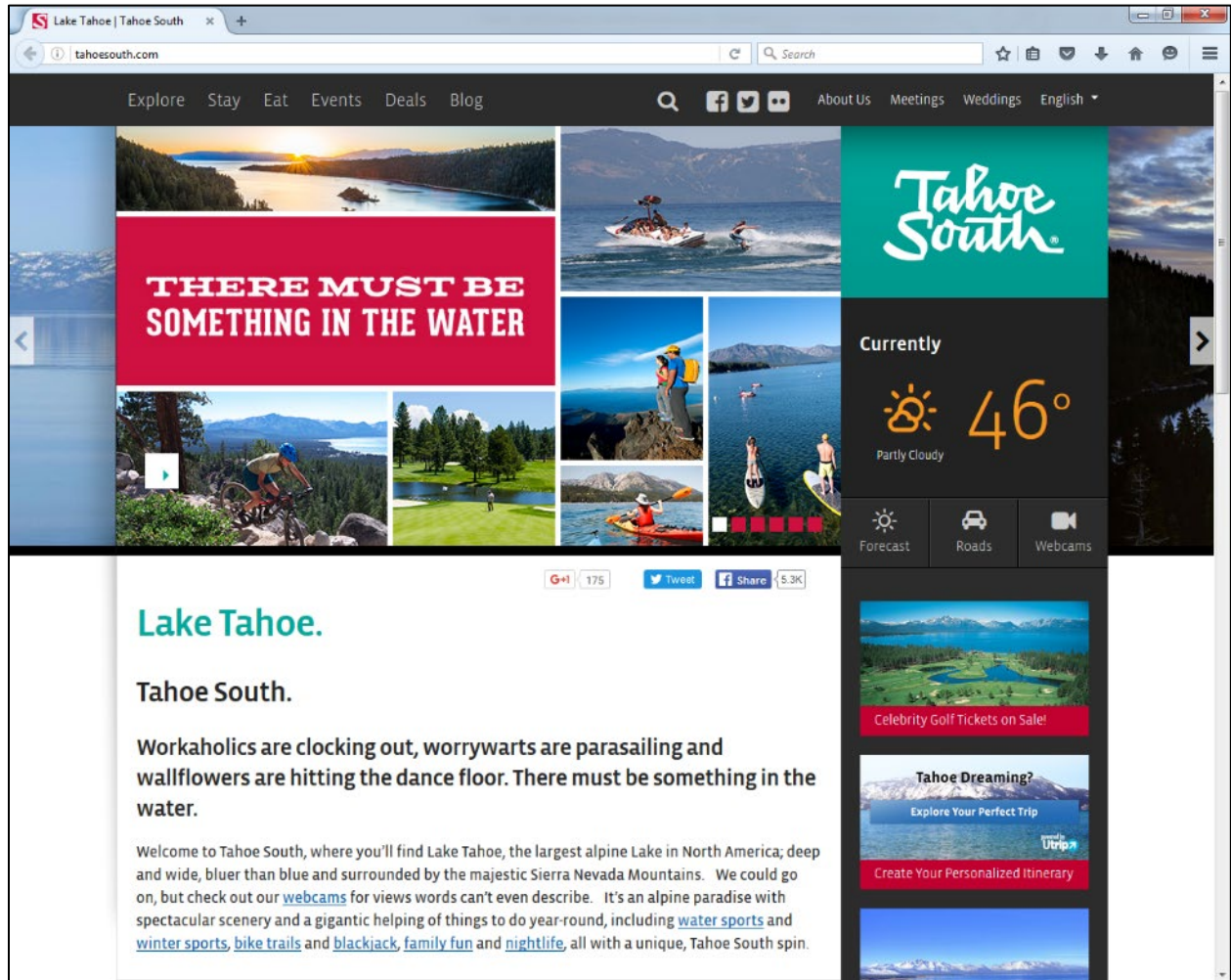


Figure 4-18: Link to One-Stop-Shop from TahoeSouth.com



### 4.3.2. Other Linking Sites

While not an exhaustive list, we provide here many additional screenshots showing interesting links to the One-Stop-Shop.

Montana State University has published several press releases related to the One-Stop-Shop. The press release shown in Figure 4-19 was published prior to Christmas 2015. See: <http://montana.edu/news/15905/msu-transportation-website-has-latest-info-on-driving-conditions>.

The screenshot shows a news article on the Montana State University website. The header includes the MSU logo, navigation links for 'A-Z Index' and 'Directories', and a search bar. The article title is 'MSU transportation website has latest info on driving conditions', dated December 22, 2015. The text describes the 'One-Stop Shop for Traveler Information (OSS)' website, highlighting its integration of weather and road data from multiple states. It mentions record traffic in November and December 2015. A map of a road with a camera view inset is shown. Social media sharing options for Facebook, Twitter, and Google+ are visible. At the bottom, there is a 'Subscribe to MSU Newsletters' form and a 'Recent News' section with links to other articles.

Figure 4-19: Press Release for the One-Stop-Shop from Montana State University

The Bozeman CBS affiliate, KBZK, picked up on an MSU press release covering the One-Stop-Shop in November 2014. The One-Stop-Shop has received a lot of press coverage in Montana via MSU press releases. See Figure 4-20 and <http://www.kbz.com/story/28701375/msu-launches-new-rocky-mountain-weather-and-road-condition-reports>.

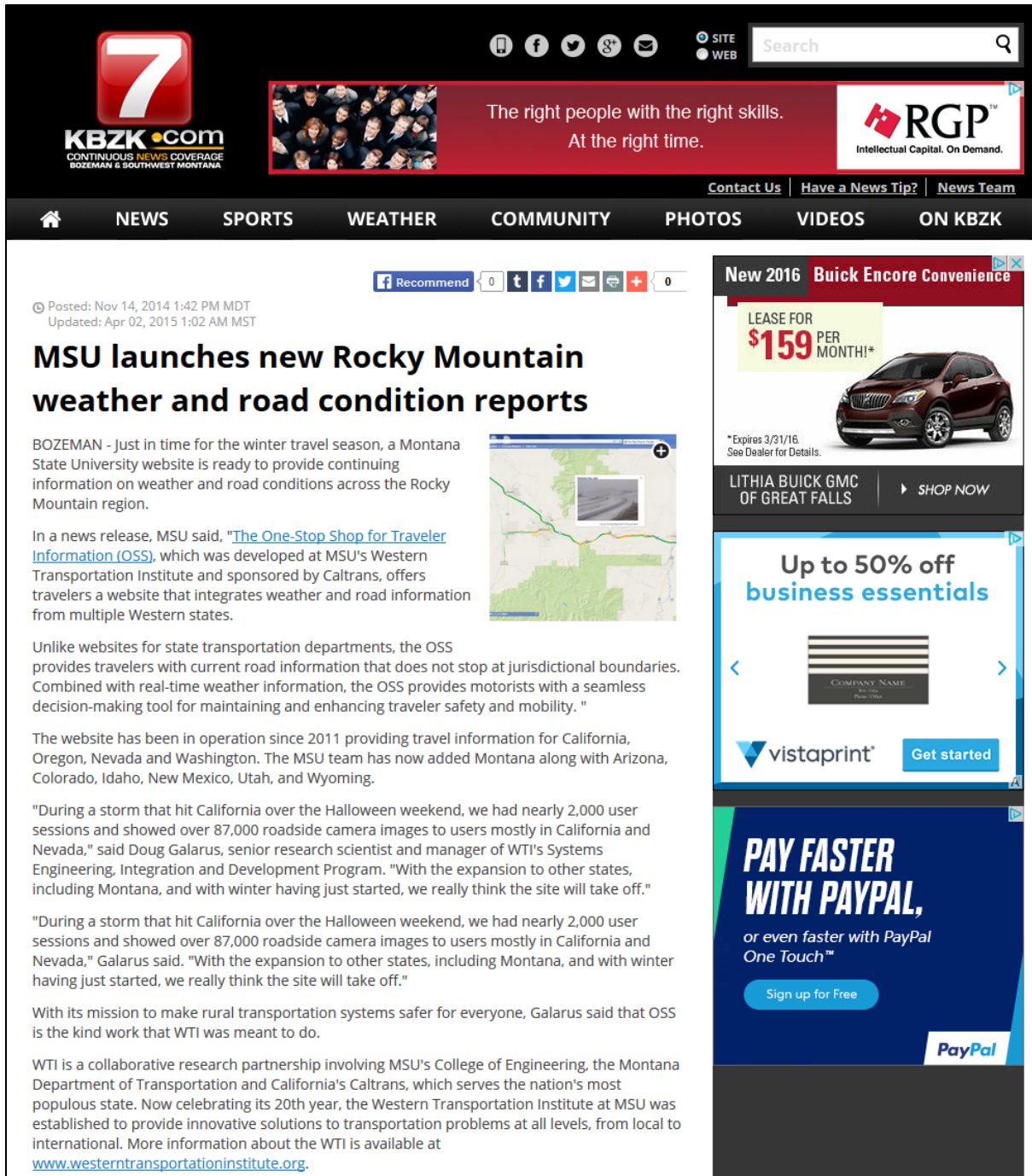
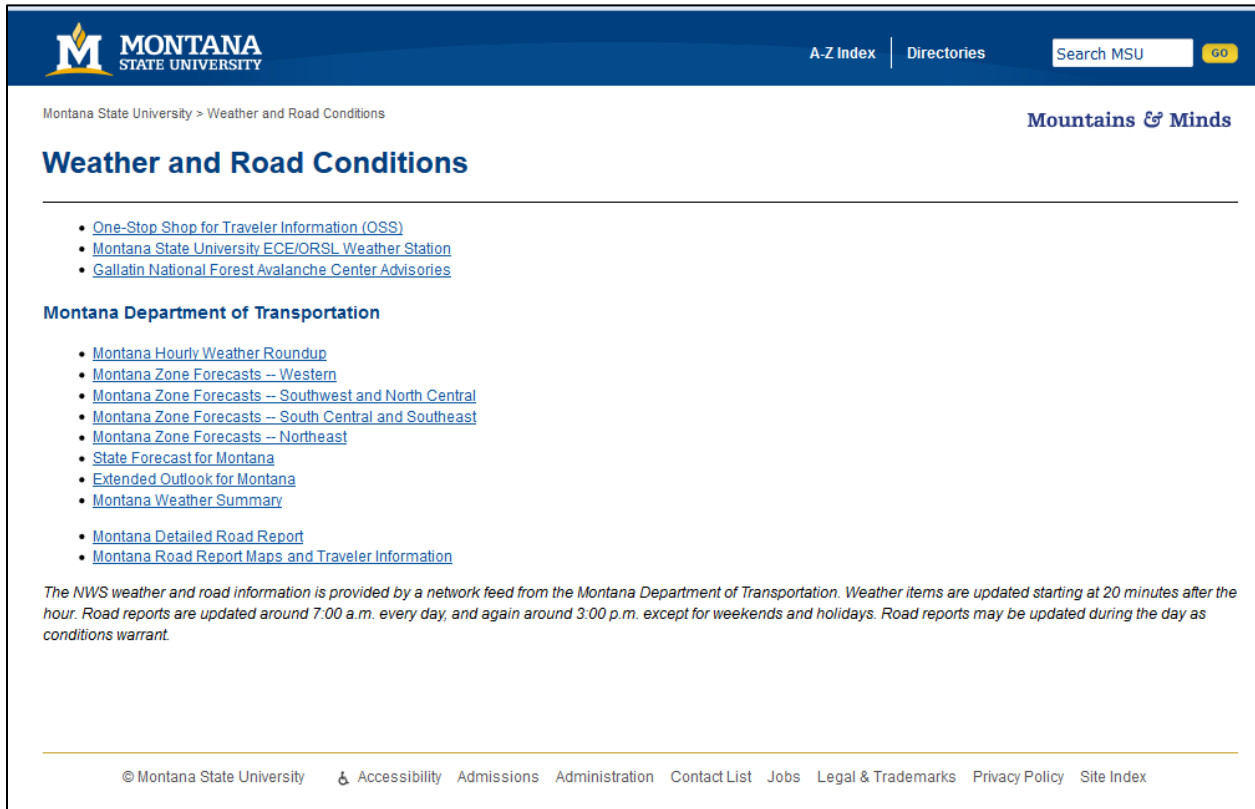


Figure 4-20: Link to One-Stop-Shop from KBZK, Bozeman’s CBS Affiliate

Montana State University also top-linked the One-Stop-Shop on its Weather and Road Conditions page in 2015. See Figure 4-21 and <http://www.montana.edu/weather/>.



**Figure 4-21: Link to OSS from MSU’s Weather and Road Conditions Page**

The State of Montana Governor’s Office of Community Service included a link to the One-Stop-Shop in its “Turkey Day Safety” posting in November 2014. See Figure 4-22 and <http://serve.mt.gov/turkey-day-safety/>.

**servemontana**  
GOVERNOR'S OFFICE OF COMMUNITY SERVICE

home about servemt readymt americorps resources

*I will get things done for Montana*  
**Apply to serve in AmeriCorps**

**Turkey Day Safety**  
Hard to believe, but Thanksgiving is just around the corner. While the holiday season is typically filled with tasty food, festive decorations, and time with family and friends, there are also some safety concerns to keep in mind.

**Home Fires**  
According to the National Fire Protection Association, Thanksgiving is the top day for home fires caused by cooking accidents. In fact, 2 times more home fires are reported on Thanksgiving than on an average day! So how can you reduce your risk? Follow these tips:

- Never leave your home while food is baking in the oven. Additionally, set an oven timer so you don't burn your food.
- Keep young children and pets away from the stove.
- Clear the floor in your kitchen from any tripping hazards.
- Stay in the kitchen when food is cooking on the stovetop.
- Avoid wearing loose clothing or dangling jewelry while cooking.
- Check the batteries in your smoke alarms.

**Food Safety**  
It's an American tradition to gorge ourselves on Thanksgiving dinner, but if you're not careful, that tasty meal may leave you sick.

- Cook your turkey until the temperature reaches at least 165 degrees.
- Avoid leaving food out too long. Toss perishable food if it has been unrefrigerated for 2 or more hours.
- If you are traveling with a food dish, keep them at safe temps. Keep warm foods at 140 or higher by wrapping in foil and towels. Keep cool dishes at 40 degrees or lower with coolers filled with ice.
- The 5 second rule is a myth! If you drop your dinner roll, put it in the trash, not your mouth!

**Holiday Travel**  
If you are heading out to eat someone else's Thanksgiving feast, keep these travel safety tips in mind before you go:

- Check road conditions frequently. Montana weather can vary drastically from one end of the state to the other. <http://coss.weathershare.org/#>
- Keep an emergency supply kit in your car for all members of your family.
  - Heavy coat, gloves, hat
  - Sturdy boots
  - Blanket or sleeping bag
  - Extra water and food
  - Small shovel or scoop (you can also pop off a hubcap or the windshield visor and use it to scoop snow)
  - Bright flagging or a flashlight to identify your location
  - First aid kit
- Don't rush. Expect heavy traffic. Leave early so you don't have to hurry.
- Keep your gas tank full- no one wants to be stranded in a cold car.

**THANKSGIVING SAFETY**  
Fire fighters say the greatest number of home cooking fires occur on Thanksgiving Day. Top causes are:

- 8% unattended cooking equipment
- 9% product misuse
- 10% hot liquids too close to flammable materials
- 11% unattended materials
- 28% other
- 34% unattended equipment

**BUILDING AN EMERGENCY SUPPLY KIT FOR YOUR CAR**  
WHY? BECAUSE YOU NEVER KNOW WHEN YOU WILL ENCOUNTER WINTER WEATHER OR AN EMERGENCY ROAD CLOSURE.

- CELL PHONE CHARGER
- FIRST AID KIT
- JUMPER CABLES
- FLARES
- SWITCHES, SNACKS
- FULL TANK OF GAS
- FLASHLIGHT
- TOW ROPE
- BOOTS, GLOVES, WARM CLOTHES
- BLANKET
- SHOVEL, ICE SCRAPER, SNOW PRAISE
- BALE OF SAND OR CAT LITTER
- WAX CHAINS OR SNOWBLADES

Posted on November 19th, 2014

Twitter Like Facebook Printer-friendly

Figure 4-22: Link to One-Stop-Shop from The State of Montana Governor’s Office

On Christmas Eve 2014, CarsonNOW.org published an article related to Christmas travel over the Sierra mountain passes. For road conditions they provided a link to the One-Stop-Shop. See Figure 4-23 and <http://carsonnow.org/story/12/24/2014/chains-snow-tires-required-over-sierra-mountain-passes>.

The screenshot shows the CarsonNOW.org website interface. At the top left is the logo "CarsonNOW.org" with the tagline "Your One Stop for Carson City News". To the right is a weather widget for Carson City showing 42° Mostly Cloudy. Below the logo is a navigation menu with links for NEWS, EVENTS, HOMES, CARS, JOBS, MARKETPLACE, SUBMIT STORIES/PHOTOS, ABOUT, ADVERTISE, and VISIT CARSON CITY. A search bar is located on the right. The main content area features a large banner with a quote: "To achieve maximum performance don't compete with others; compete with yourself." attributed to John Underwood. Below the banner is a "Home" link and a news article titled "Chains, snow tires required over Sierra mountain passes" submitted by Jeff Munson on Wed, 12/24/2014 - 4:34pm. The article includes social media sharing buttons (Tweet, Like, G+, Share) and several paragraphs of text providing updates on snow conditions and forecasts. To the right of the article is a sidebar with local business advertisements, including "Bleu Cafe - Continental and American cuisine" and "NAI Alliance Carson City".

Figure 4-23: Link to One-Stop-Shop from CarsonNOW.org



The National Weather Service in Reno has posted numerous links to the One-Stop-Shop on their Facebook account, typically regarding Donner Summit. See Figure 4-24 and <https://www.facebook.com/NWSReno/>.

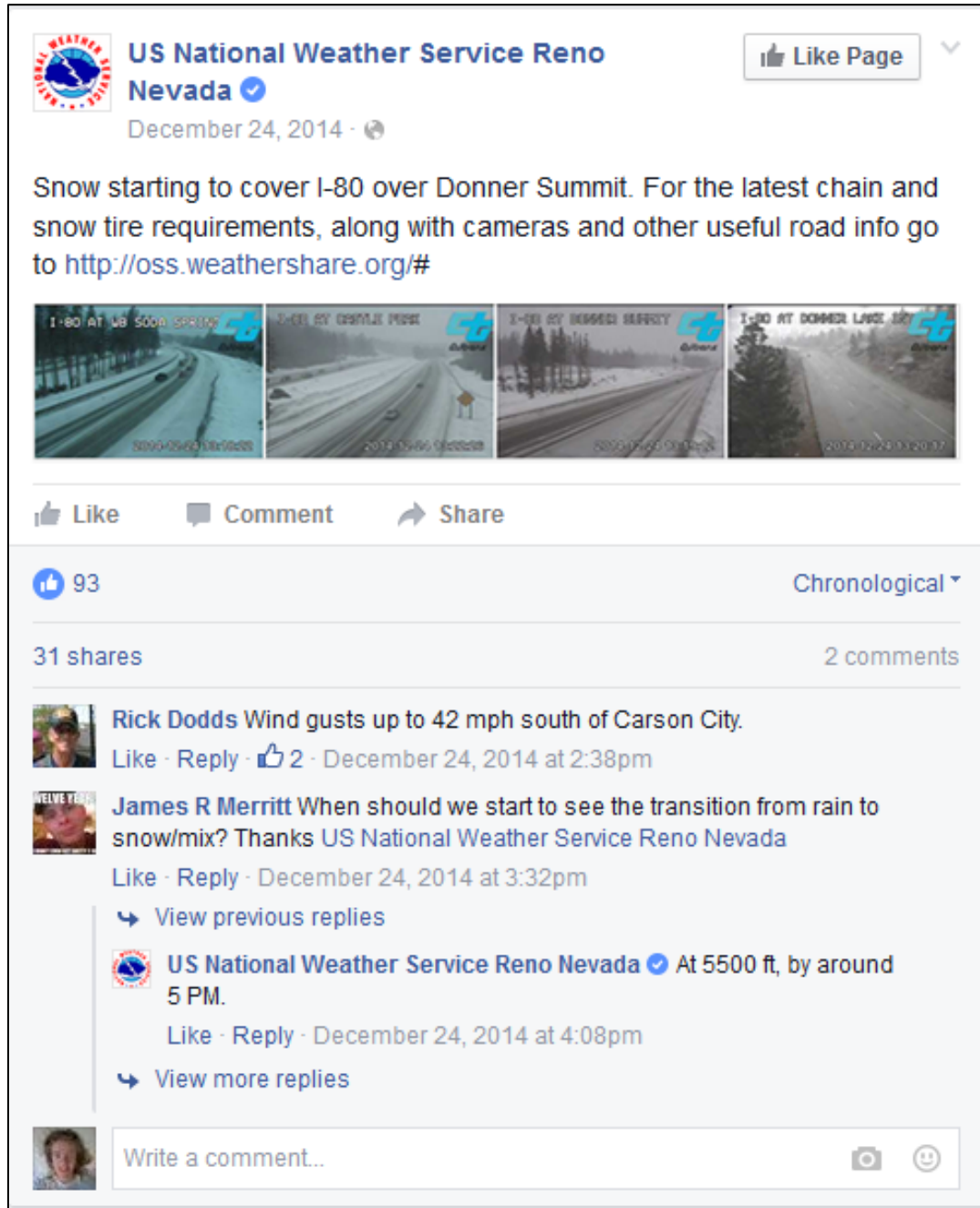


Figure 4-24: Link to One-Stop-Shop from Reno National Weather Service’s Facebook Page

A user posted a link to the One-Stop-Shop on the Weather-Watch Forum, an online forum for weather station operators: See Figure 4-25 and <http://weather-watch.com/smf/index.php/topic,61797.0.html>.



Figure 4-25: Link to One-Stop-Shop from the Weather-Watch Forum



The Western Weather Group, a provider of weather information products and services, provides a link to the One-Stop-Shop via the Weathershare link in the Web Cams section of a page that they label Forecaster Information. See Figure 4-26 and [http://customerweb.westernwx.com/forecast/WWGforecastinfo\\_css.htm](http://customerweb.westernwx.com/forecast/WWGforecastinfo_css.htm).

**WESTERN WEATHER GROUP** Forecaster Information

Latest Eastern Pacific (IR) Imagery

**WWG Forecasts & 7 Day Summaries**

click below	7 Day	Annual (AM)	Frost (PM)	
Sacramento Valley	pdf		pdf	web site
SID	pdf			web site
CRC	pdf			web site
Hughson	pdf		pdf	web site
No San Joaquin	pdf		pdf	
Lodi	pdf			web site
WCGF	pdf			web site
San Joaquin Valley	pdf			web site
LakeCo	pdf		pdf	web site
Sonoma	pdf		pdf	web site
Napa	pdf		pdf	web site
PRWCA	pdf		pdf	web site
MCVGA	pdf			web site
Oahu (Pioneer)				web site
HC&S	pdf			web site
Kauai	pdf			web site

**WWG Seasonal, Outlooks & Archive**

Sierra at Tahoe	prelim	Ex	web site
Northstar	prelim	Ex	web site
Heavenly	prelim	Ex	web site
Kirkwood	prelim	Ex	web site
SCVWD	pdf		web site
LWA Sacramento	pdf		web site
LWA Fresno	pdf		
Pacific Ecorisk	pdf		web site
<b>AgBurn</b>	8am pdf	9am pdf	11am pdf
AMOS Obs	Web Host	Obs	Matts-ALL Obs WA100
Airport Obs	NWS Google	NWS Google II	All CA
Precipitation	OLD		
MOS airport output	OLD		
<b>WWG forecast archive</b>			
DWR 24hr Precipitation Archive			
Sacramento Valley AMOS Historical Data			

**Client Tree & Server Access**

- WWG Client Tree Previous
- Forecaster Shift Schedule as pdf
- Western Weather VPN
- WWG App
- WWG Mobile Data Menu
- WWG HC&S Mobile Data Menu
- Daily Weather Maps
- WWG Public Webpage
- Backdoor to Database
- Manage Weather Database
- Database logoff
- WWG MISC-US MAP
- WWG HAWAII MAP
- WWG CALIFORNIA MAP

**Forecast Model Data**

- WWG Model Animator
- Canadian
- European Ensemble
- UW NoGaps
- MesoScale**
- UW NorCal
- UW West Coast
- UW High Clouds
- UW Low Clouds
- WeatherBell Graphics**
- WX Bell Main Page
- HRRR NorCal SFO
- ECMWF NorCal
- NAM NorCal
- NAM Hawaii
- ECMWF SoCal
- FIMNOC (Navy)
- NCAR
- COLA
- Utah
- CANSAC WRF (CS)
- Hawaii
- WRF (NWS/MTR)
- HYSPLIT
- ECMWF California
- RAP W USA
- NAM W USA
- GFS W USA
- CMC 24hr W USA
- CMC 48hr W USA

**Tahoe & Hawaii Forecasting**

- Lake Tahoe**
- Snowiel Data
- Freezing level chart
- Ski Report Summary
- Dweeb Report
- Davis Wx Data
- Hawaii**
- UH Hawaii Weather
- Hawaii Hydrology
- NWS Maui CV zone fcst
- WWG HC&S MAP
- Hawaii Air Q
- Fall Burn**
- ARB PFIRS mapping
- ARB Burn Allocation
- ARB 2 Day BAM
- SacVal Zone Map
- Wet Bulb Calculator
- ESR Lab
- Tahoe Wx Discussion
- Sierra-At-Tahoe data
- NWS Tahoe remotes
- Upper Air Soundings
- Vog Model
- Hawaii NWS
- 2015 HCS Active Fields
- Plantation Stability Page
- FB conference Call Info
- ARB Aircraft Sounding
- ARB AQMIS Retrieval
- FB Program Archive

**Web Cams**

- CalTrans
- ODOT
- WSDOT
- WWG Tahoe
- Sausalito
- Golden Gate
- Variety (KCRA)
- Monterey-SNS (KSBW)
- California (KABC)
- WWG cam (images)
- WWG cam (Live)
- Maui Wind cam
- Paia cam
- Maui-Sunset Cam
- Poipu Kauai
- Wanink Deck Cam
- Weathershare
- Healdsburg
- Healdsburg2
- Chalk Hill
- Bodega Bay
- Mt Hamilton (Lick Obs)
- Stockton West
- Other WC Cams
- Templeton-Westward
- TempletonEast-West
- Bend Cam 1 Cam 2
- Space Needle
- Salt Lake

**Other Forecasting Aids**

- GFS - Chico data
- 500mb Chart
- AWC Metar obs
- 24hr NorCal changes
- Chico Area Obs
- WWG stn plot (home)
- Sonoma Co plot
- National Wind Map
- MODIS Fire Detection
- SST (World) GOOCS
- National Hurricane Center
- Storm Prediction Center
- Climate Prediction Center
- NOAA Climate Data
- NWS Product List
- CIIMS
- Model Initialization**
- 500mb Sfc
- Sonoma Model Spectrum**
- Home Tmin TwMin
- Surface Charts**
- Pacific NW NorCal USA
- UW Imagery
- NWS Imagery
- NRL home
- NRL fog
- NRL fog loop
- CA Profilers
- ALL MAIN 4
- Navy site
- Fort Ord
- SFS data archive
- NorCal Visible Fog
- Hawaii IR
- MesoWest home NWS**
- Weather Underground**
- WWG Obs Lodi Sonoma
- Radar**
- Intellicast CIC SAC FAT SNS
- Hawaii NWS Intellicast
- NWS National image Loop

**NWS Zone forecasts**

- Sacramento Valley
- San Joaquin Valley
- Salinas Valley
- Paso Robles
- Lake County
- North Bay
- Lake Tahoe
- San Jose
- Concord
- North Central South Delta
- North Central South
- Coast North South
- 30/90 Outlooks**
- New Sacramento Valley
- New San Joaquin Valley
- New North Coast
- New Central Coast
- New Lake Tahoe
- New Maui

**NWS text files & links**

- Discussion**
- STO MTR HNX LOX REV
- NWS Offices**
- STO MTR HNX LOX REV
- RTP bulletin**
- STO MTR HNX LOX REV
- EKA VEF SGX
- Tabular forecasts**
- STO MTR HNX LOX REV
- EKA MFR HNL
- NWS Cities Roundup**
- CA NV OR

**WESTERN WEATHER GROUP** 530.342.1700 info@westernwx.com © 2016 Western Weather Group - All Rights Reserved.

Figure 4-26: Link to One-Stop-Shop from Western Weather Group

The J&J Grizzly Store and Camping Resort provides a link to the One-Stop-Shop under their Local Weather page. See Figure 4-27 and <http://grizzlystore.portola-ca.com/Weather/default.html>.

**J&J Grizzly Store and Camping Resort**

Store (530) 832-0270  
Email: [grizzlystore@sbcglobal.net](mailto:grizzlystore@sbcglobal.net)  
Address: 7552 Lake Davis Road. Portola, CA. 96122

- Home
- Fishing Report
- News
- Directions
- Camp Ground Info
- Lake Davis Map
- Rates
- Calendar
- Contact
- Weather
- Kayak Rental
- Favorites

### Local Weather

The weather at Lake Davis is "interesting" to say the least. Almost every Weather source has something different. So, here are a few that you might want to look at and do is to take the one that we "like the best" or "average" their "guess".

From Weather.com [Portola Weather Forecast, CA \(96122\)](#)  
From NOAA [NOAA Weather Report](#)  
Another good source for GREAT road conditions [One Stop for Travelers](#)

...or You can use the BEST method that we know of.

Give us a call and we will look out the window!

[Home](#) | [Fishing Report](#) | [Calendar](#) | [Contact](#) | [Employees](#) | [Weather](#) | [Directions](#) | [Favorites](#)  
[News](#) | [kayak Rental](#) | [Lake Davis Map](#) | [Camp Ground Info](#) | [Rates](#) | [Archive](#) | [Site Map](#)  
Copyright © 2012 J&J Grizzly Store. All Rights Reserved.

Figure 4-27: Link to OSS from the J&J Grizzly Store and Camping Resort in Portola

Several postings have been made providing links to the One-Stop-Shop in RVNetwork.com, a network/forum for RV owners. See Figure 4-28 and <http://www.rvnetwork.com/index.php?showtopic=121089>.

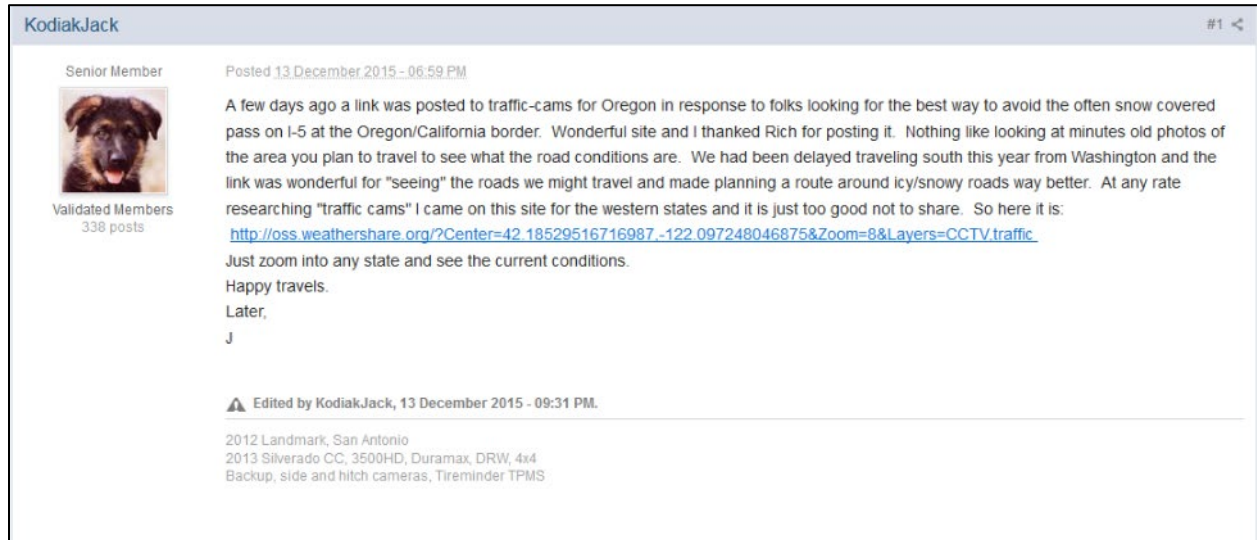


Figure 4-28: Link to One-Stop-Shop from RVNetwork.com

A user of the nwhikers.net discussion forum, a venue for hikers in the Northwest to discuss hiking and things related to hiking, posted a link to the One-Stop-Shop. See Figure 4-29 and <http://www.nwhikers.net/forums/viewtopic.php?p=1051911>.



Figure 4-29: Link to One-Stop-Shop from nwhikers.net

A user posted a link to the One-Stop-Shop on WashingtonFlyfishing.com, a community site for fly fishing in Washington state. See Figure 4-30 and <http://washingtonflyfishing.com/forum/threads/sfr-western-states-travel-information-site.117312/>.

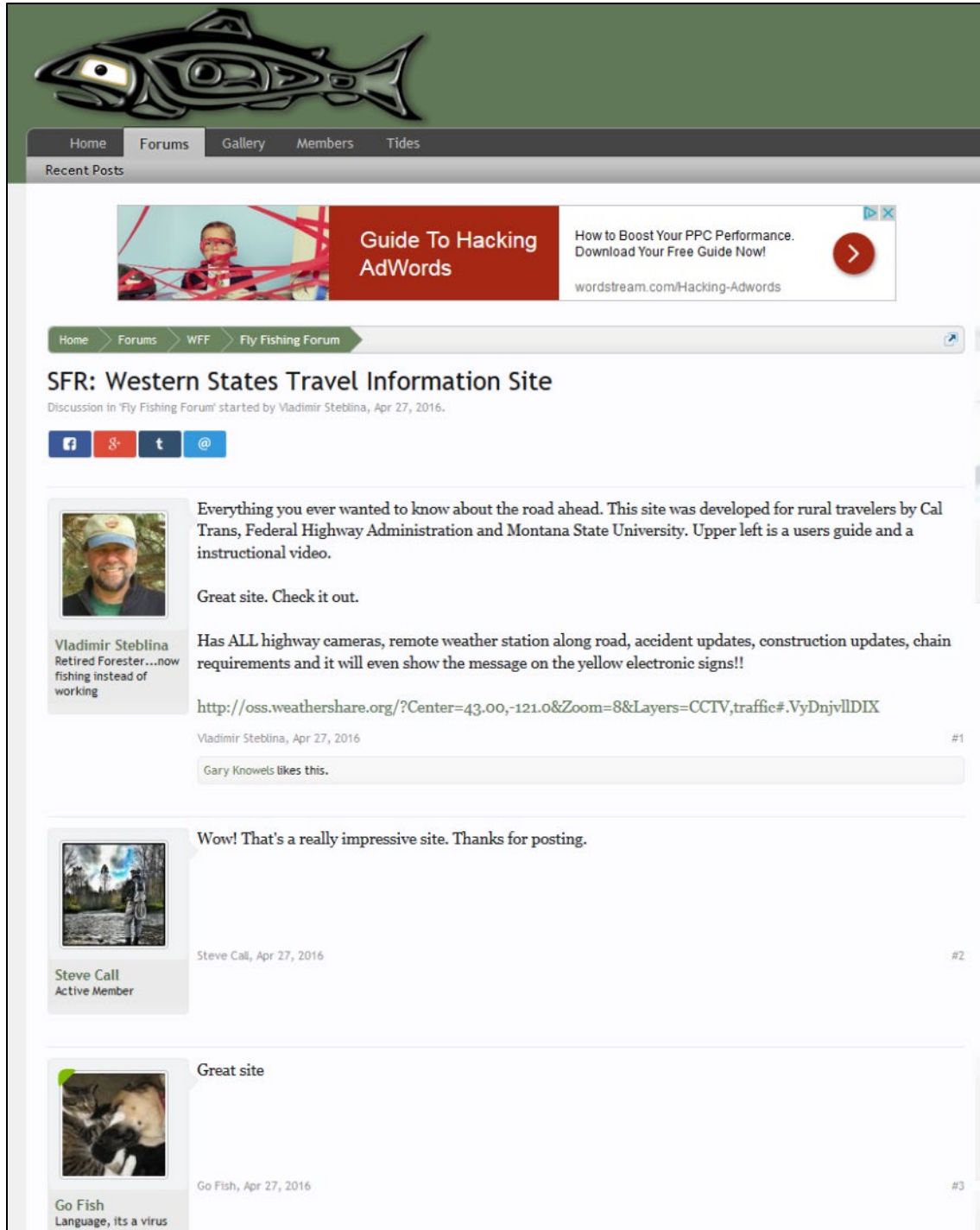


Figure 4-30: Link to One-Stop-Shop from WashingtonFlyfishing.com



Pro Powder Guides, a company that provides ski lessons in the Lake Tahoe area, provides a link to the One-Stop-Shop via their California & Nevada Webcams link. See Figure 4-31 and <http://www.propowderguides.com/tahoe-drive-cams/>.

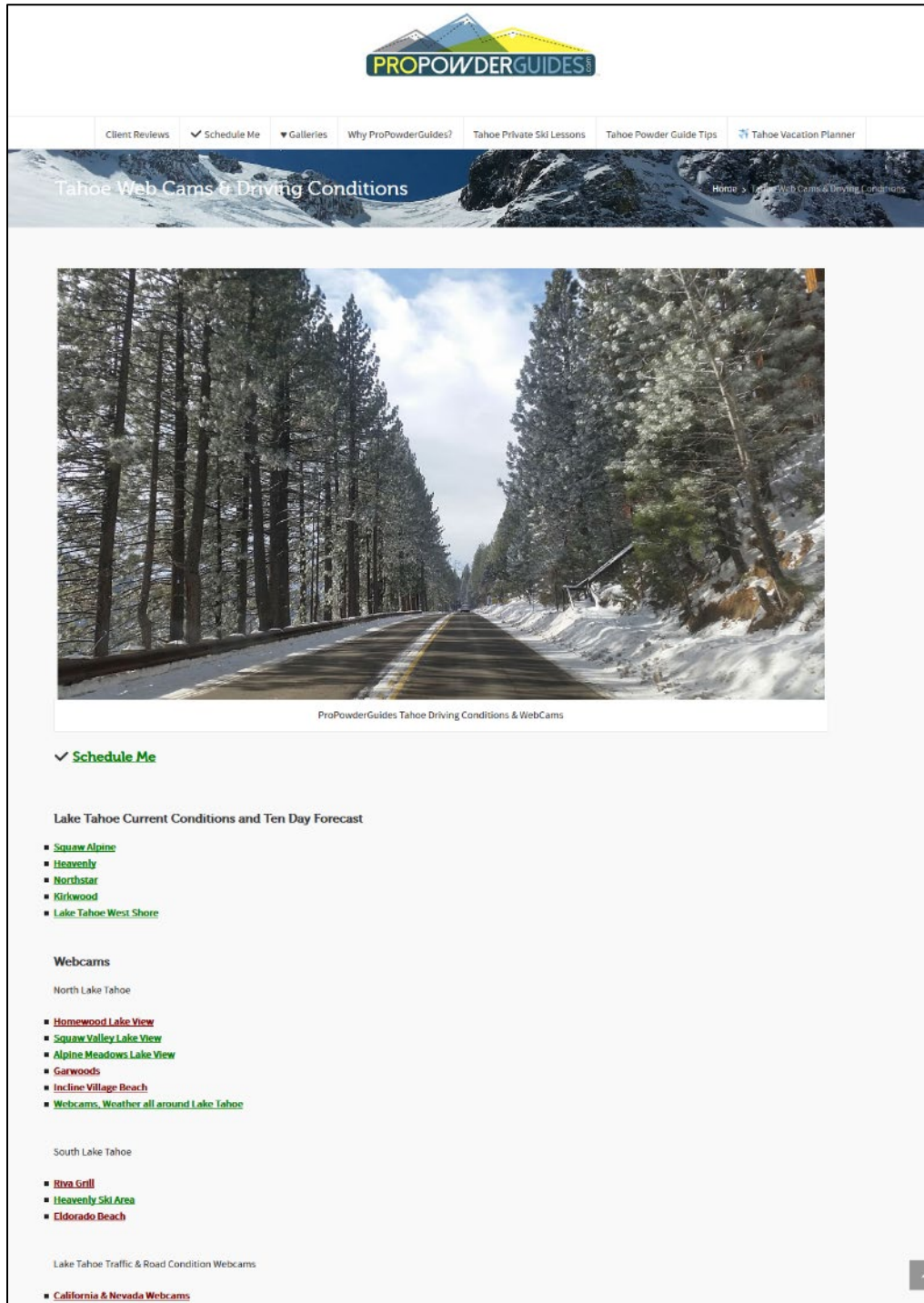


Figure 4-31: Link to One-Stop-Shop from ProPowderGuides.com

A user of the TheTruckersReport.com, a forum for truck drivers, provided a link to the One-Stop-Shop in an Interstate 80 topic area. See Figure 4-32 and <http://thetruckersreport.com/truckingindustryforum/threads/i80-from-west-coast-this-time-of-year.268458/page-7>.

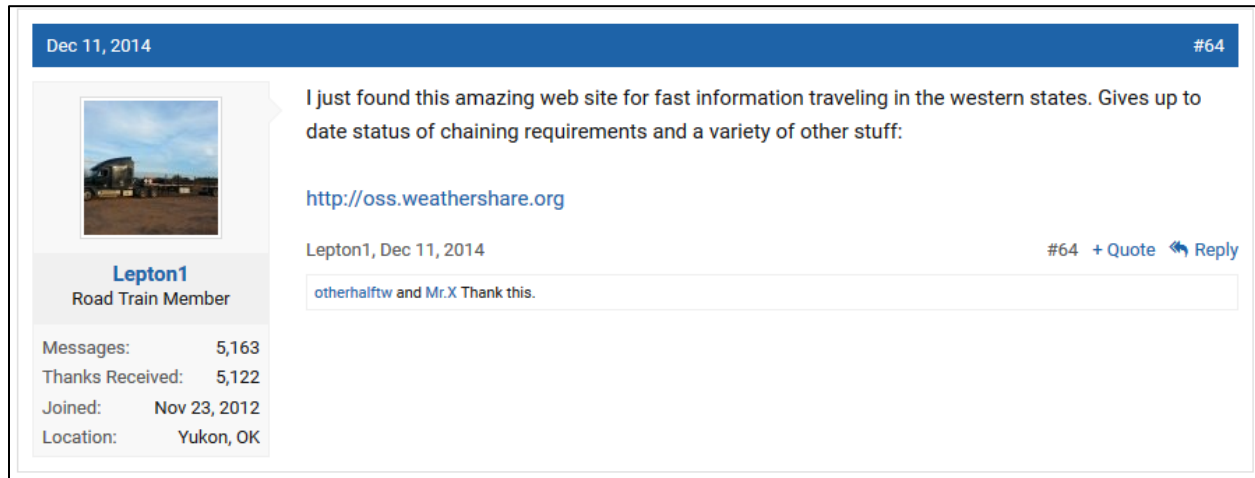


Figure 4-32: Link to One-Stop-Shop from TheTruckersReport.com

There have been multiple postings on TripAdvisor.com with links to the One-Stop-Shop, often in response to a question from another user. See Figure 4-33 and [https://www.tripadvisor.com/ShowTopic-g1-i12567-k8048687-Denver\\_to\\_Las\\_Vegas\\_Elevation\\_Migraines\\_Southern\\_Route-Road\\_Trips.html](https://www.tripadvisor.com/ShowTopic-g1-i12567-k8048687-Denver_to_Las_Vegas_Elevation_Migraines_Southern_Route-Road_Trips.html).

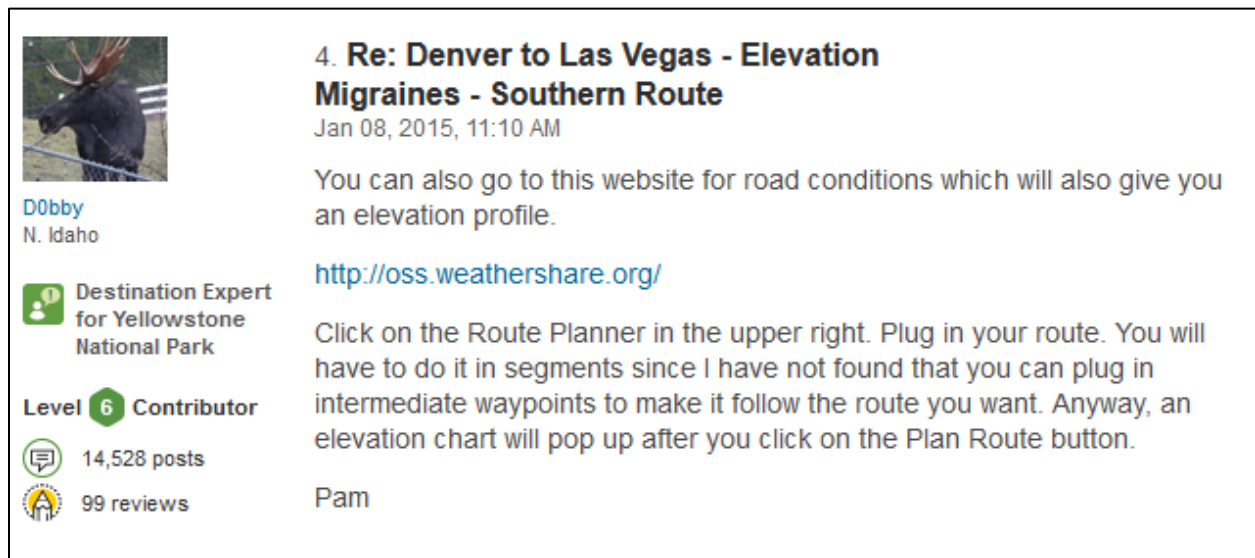


Figure 4-33: Link to One-Stop-Shop from TripAdvisor.com

Industrial Logistics Transportation Services links to the One-Stop-Shop with their Traffic Cameras link. See Figure 4-34 and <http://www.iltsnv.com/>.

**INDUSTRIAL LOGISTICS TRANSPORTATION SERVICES**  
 P.O. Box 22012  
 CARSON CITY, NV 89721  
 PHONE: (775) 882-8850 ~ FAX: (775) 882-8852  
 MC# 562610 FED ID# 80-0682622

[Home](#) | [NDOT Trucking Information](#) | [Current Road Conditions](#) | [Traffic Cameras](#)

## Licensed Freight Brokerage

ILTS is a highly respected licensed and bonded freight brokerage company based in Carson City, Nevada. We specialize in & offer competitive rate quotes on all full truckloads, oversize, over dimensional & heavy loads, as well as less than truckloads (LTL) shipments shipped throughout the United States & Canada. Our professional staff will select the most efficient method of transportation for your freight at the most economical rate. We then monitor it's movement to assure on time pick up and delivery. We are a financially strong brokerage that assures a long range commitment to our customers.

Running our business professionally has placed us in excellent standing with all our customers. We can transform your shipping and receiving department into a smoother, more efficient operation. We'll show you how easy it is to use our services either by phone or by email, and, at the same time, save time and money on all of your shipping needs.

**We offer new solutions for today's logistic challenges.**

Companies, large and small, check us out! Compare your current LTL rates with our rates. We'll show you competitive rates and outstanding customer service.

We welcome the opportunity to provide your company with a rate quote on your upcoming shipment. Call or email us today and let ILTS deliver a truckload of value for you.

Figure 4-34: Link to One-Stop-Shop from Industrial Logistics Transportation Services

### 4.3.3. Linking Sites Summary

Linking sites have been key to driving traffic to the One-Stop-Shop, particularly those from Caltrans. Some users continue to follow the same links to get to the One-Stop-Shop – for instance, it appears that some users have bookmarked press releases and other news coverage of the One-Stop-Shop and use those bookmarked pages to navigate to the System. However, it does appear that many users bookmark the site and use those bookmarks to navigate to the site or type the URL for navigation. A surprisingly diverse set of sites have linked to the One-Stop-Shop including commerce and tourism –related sites, outdoor activity sites, weather and weather-enthusiast –related sites, and trucking entities. And, many of the links to the One-Stop-Shop have come from user contributions to online forums of various types. The impact of these sites can vary dramatically with a relatively large amount of traffic coming when a link or article is posted, and a lesser although surprising amount of traffic coming from subsequent access. Links from prominent sites such as DOT (principally Caltrans) traveler information sites appear to be the best mechanisms for steering people to the One-Stop-Shop, since users of the DOT sites already are



looking for the type of information in the One-Stop-Shop, and these users are also generally prepared to use the map interface of the System.

#### 4.4. Mobile Analytics: November 2016 – March 5<sup>th</sup>, 2018

Google Analytics data has been collected for the Mobile OSS site since with went live on November 15, 2016. Similar data is tracked for Mobile OSS as is collected for Desktop OSS, so comparison can be made. While the Mobile OSS site has been advertised in press releases and is linked to by various entities, it certainly does not have the same coverage as the desktop version. As such, it receives less traffic. We do not take this as an indication of lesser user satisfaction, but that of less paths leading to the site. Generally, the numbers are less by an order of magnitude from the desktop version of OSS.

##### 4.4.1. User Sessions

There were 65,472 user sessions for the Mobile OSS site between November 15, 2016 and March 5<sup>th</sup>, 2018. As was observed for the original desktop OSS, the number of user sessions during the winter of 2017-2018 is less than during the winter of 2016-2017. We attribute this to the relatively mild winter in 2017-2018 as compared to 2016-2017. Note as will be shown later that a site that linked to Mobile OSS and sent a relatively large amount of traffic in 2016-2017 stopped linking later in 2017, and this too contributed to the drop-off. See Figure 4-35 and Table 4-30.

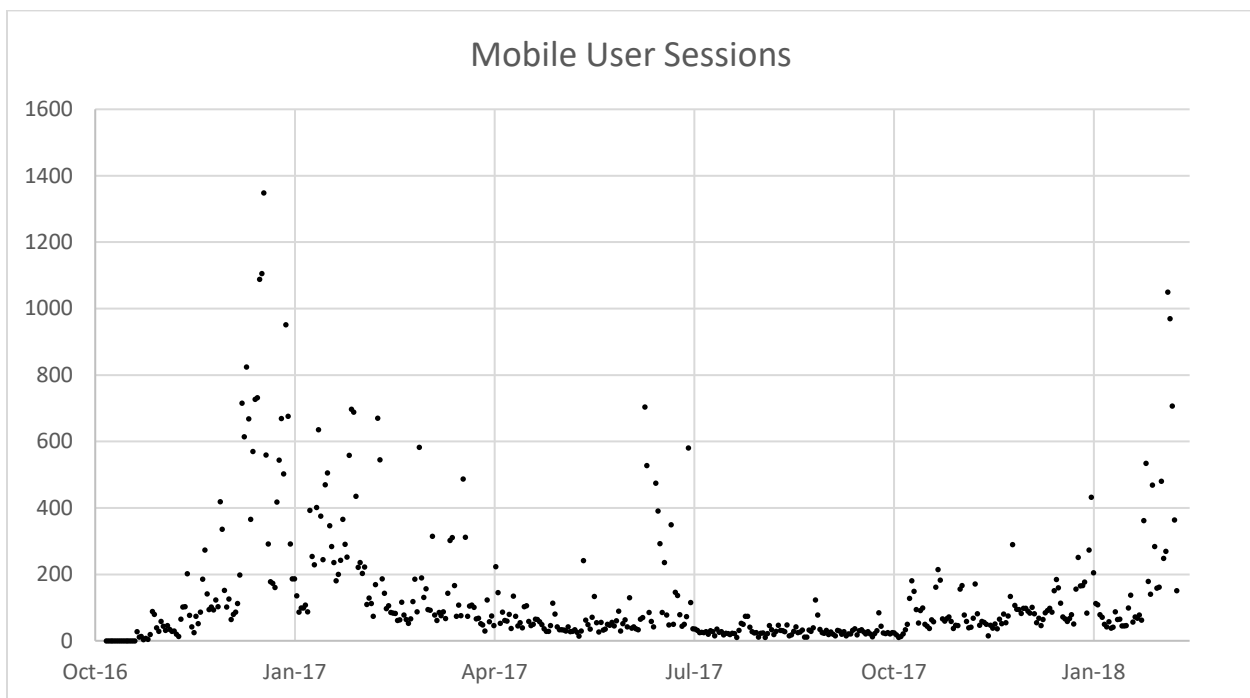


Figure 4-35: Mobile OSS User Sessions November 15, 2016 – March 5, 2018

**Table 4-30: Mobile OSS User Sessions by Year**

	Min	Max	Median	Average
November 15, 2016 - June 30th, 2017	4	1349	89.5	180
July 1st, 2017 – March 5 <sup>th</sup> , 2018	11	1050	51.5	98

There have been 31 days in which there were 500 or more user sessions and 4 days in which there were 1000 or more user sessions for the Mobile One-Stop-Shop. The most user sessions in one day was 1349 on January 12<sup>th</sup>, 2017. When winter weather hit California in early March 2018, the number of user sessions rose to high levels again. See Table 4-31.

**Table 4-31: Top Days for Mobile OSS Sessions**

Date	Sessions	Date	Sessions
1/12/2017	1349	1/20/2017	670
1/11/2017	1106	1/5/2017	669
1/10/2017	1089	2/6/2017	636
3/1/2018	1050	1/3/2017	615
3/2/2018	970	3/24/2017	583
1/22/2017	952	7/25/2017	581
1/4/2017	825	1/7/2017	570
1/9/2017	732	1/13/2017	560
1/8/2017	727	2/20/2017	559
1/2/2017	716	3/6/2017	545
3/3/2018	707	1/19/2017	544
7/5/2017	704	2/19/2018	535
2/21/2017	698	7/6/2017	528
2/22/2017	689	2/10/2017	506
1/23/2017	676	1/21/2017	503
3/5/2017	671		

#### 4.4.2. User Locations

Users from 67 countries have accessed Mobile OSS, and 98.4% of the user sessions (64,452) have come from U.S. 0.8% of user sessions (531) came from Canada. All 50 U.S. States and the District of Columbia have visited the site, with the most traffic coming from California and the second most traffic coming from Nevada, with Oregon, Washington, Michigan, Utah, Texas, Montana, Arizona, Nebraska, Idaho, and North Carolina rounding out the top twelve states. Michigan and North Carolina are somewhat surprising. See Table 4-32.

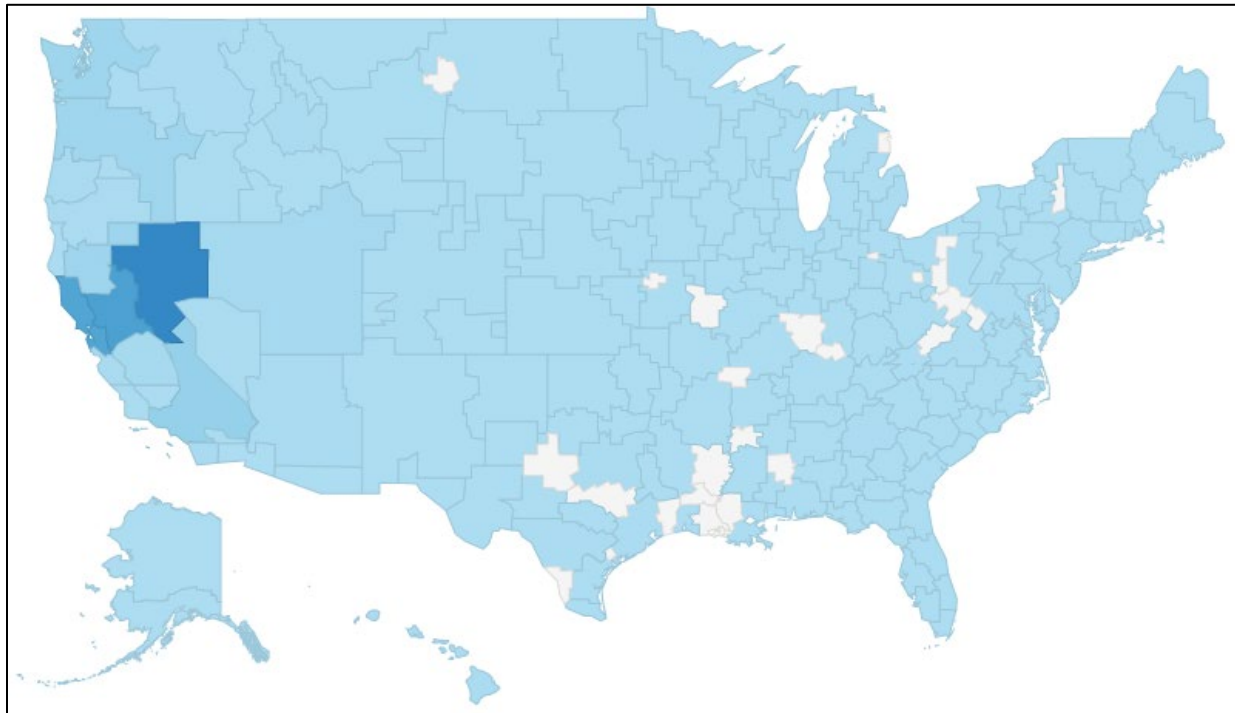
**Table 4-32: Mobile OSS Sessions by State**

State	Sessions	State	Sessions
California	34724	Illinois	329
Nevada	16377	Colorado	243
Oregon	3322	Missouri	156
Washington	2195	Florida	133
Michigan	1226	Minnesota	125
Utah	1049	New York	120
Texas	698	Georgia	120
Montana	622	Hawaii	115
Arizona	559	Ohio	89
Nebraska	522	Wisconsin	76
Idaho	487	Virginia	74
North Carolina	339	Tennessee	56

Users from over 1670 cities have access the Mobile One-Stop-Shop, and the highest-ranking city is Reno, following by Sacramento and San Francisco. Not surprisingly, the top seven cities are in California or Nevada. Seattle contributed the eighth most user sessions. In eleventh place is Rochester Hills, Michigan. It is unclear why there is a large amount of usage from this location relative to other locations. See Table 4-33. Results for metropolitan areas are similar, with the most traffic coming from areas along western Interstate 80 and Interstate 5. Most metropolitan areas in the United States have sent traffic to the Mobile One-Stop-Shop. See Table 4-34 and Figure 4-36.

**Table 4-33: Mobile OSS Sessions by City**

City	Sessions	City	Sessions	City	Sessions
Reno	8754	Gardnerville Ranchos	499	Phoenix	246
Sacramento	6857	Fernley	471	Oakland	245
San Francisco	6432	Salt Lake City	449	Folsom	244
Sparks	2552	Yuba City	398	Eugene	240
Roseville	1635	Gardnerville	395	Greenville	239
San Jose	1208	Omaha	392	Chicago	227
Carson City	1167	Truckee	374	Bishop	226
Seattle	1145	Bozeman	368	Dallas	225
South Lake Tahoe	1040	Auburn	359	Elk Grove	220
Los Angeles	1012	Medford	315	Rocklin	219
Rochester Hills	848	Fallon	301	Yerington	215
Redding	742	Dayton	292	North Highlands	211
Salem	730	Fresno	290	Mission Viejo	204
Portland	718	Johnson Lane	284	Fremont	202
Susanville	698	Weaverville	275	Santa Clara	200
Bakersfield	585	San Diego	270		
Chico	577	Incline Village	257		



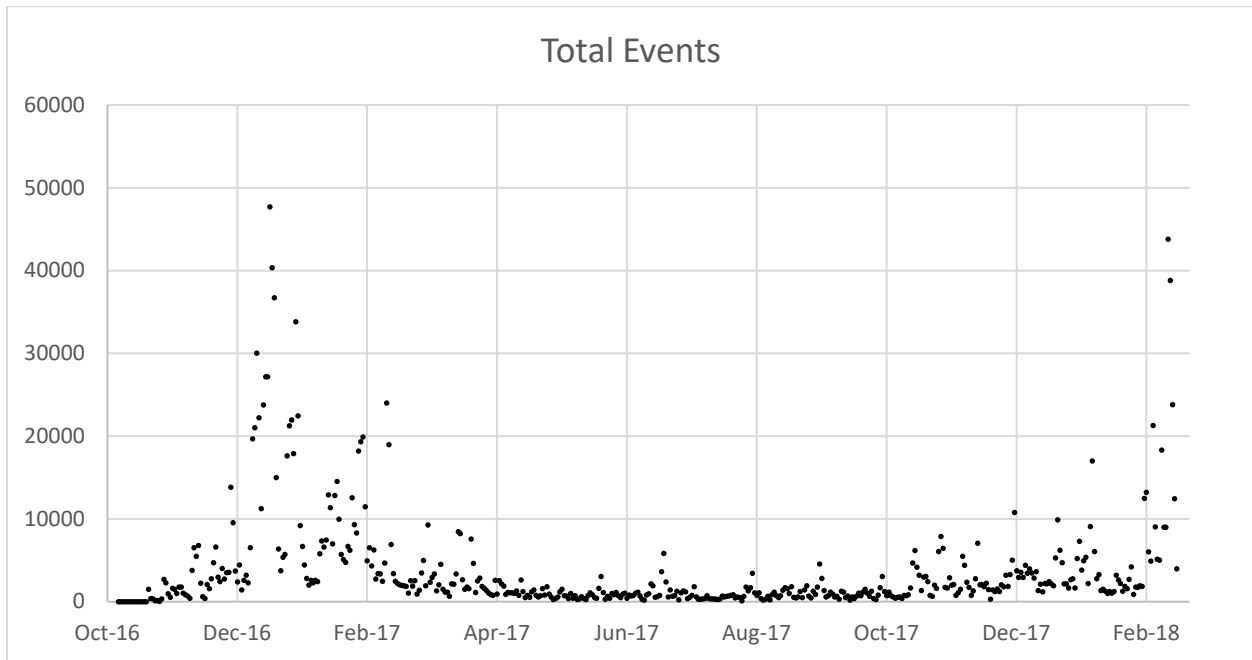
**Figure 4-36: Map of Mobile OSS User Sessions by Metro Area**

**Table 4-34: Mobile OSS Sessions by Metro Area**

Metro	Sessions	Metro	Sessions
Reno NV	17519	Monterey-Salinas CA	321
Sacramento-Stockton-Modesto CA	13390	Chicago IL	315
San Francisco-Oakland-San Jose CA	11147	Boise ID	301
Los Angeles CA	2697	Santa Barbara-Santa Maria-San Luis Obispo CA	258
Chico-Redding CA	2349	Las Vegas NV	258
Portland OR	2288	Greenville-New Bern-Washington NC	244
Seattle-Tacoma WA	1760	Denver CO	241
Salt Lake City UT	1123	Yakima-Pasco-Richland-Kennewick WA	235
Detroit MI	1028	Spokane WA	171
Fresno-Visalia CA	806	Traverse City-Cadillac MI	168
Bakersfield CA	685	Eureka CA	165
Medford-Klamath Falls OR	569	Bend OR	155
Phoenix AZ	461	Billings, MT	137
Omaha NE	421	New York NY	125
San Diego CA	416	Minneapolis-St. Paul MN	120
Eugene OR	406	Houston TX	115
Butte-Bozeman MT	403	Washington DC (Hagerstown MD)	115
Dallas-Ft. Worth TX	385	Honolulu HI	115
Palm Springs CA	343	San Antonio TX	101

### 4.4.3. Events/Interactions

The Mobile One-Stop-Shop also tracks user events, and events correspond to user interactions such as marker selections. Between November 15, 2016 and March 5<sup>th</sup>, 2018 there were 1,845,749 events recorded. See Figure 4-37.



**Figure 4-37: User Events for Mobile OSS**

Between November 15, 2016 and March 5<sup>th</sup>, 2018 there were 1,302,093 CCTV events, recorded in the Mobile One-Stop-Shop, accounting for approximately just over 70% of all events. See Figure 4-38. There have been 28 days with 10,000 or more CCTV events. The most occurred on 1/10/2017, with 30,567 events. See Table 4-35.

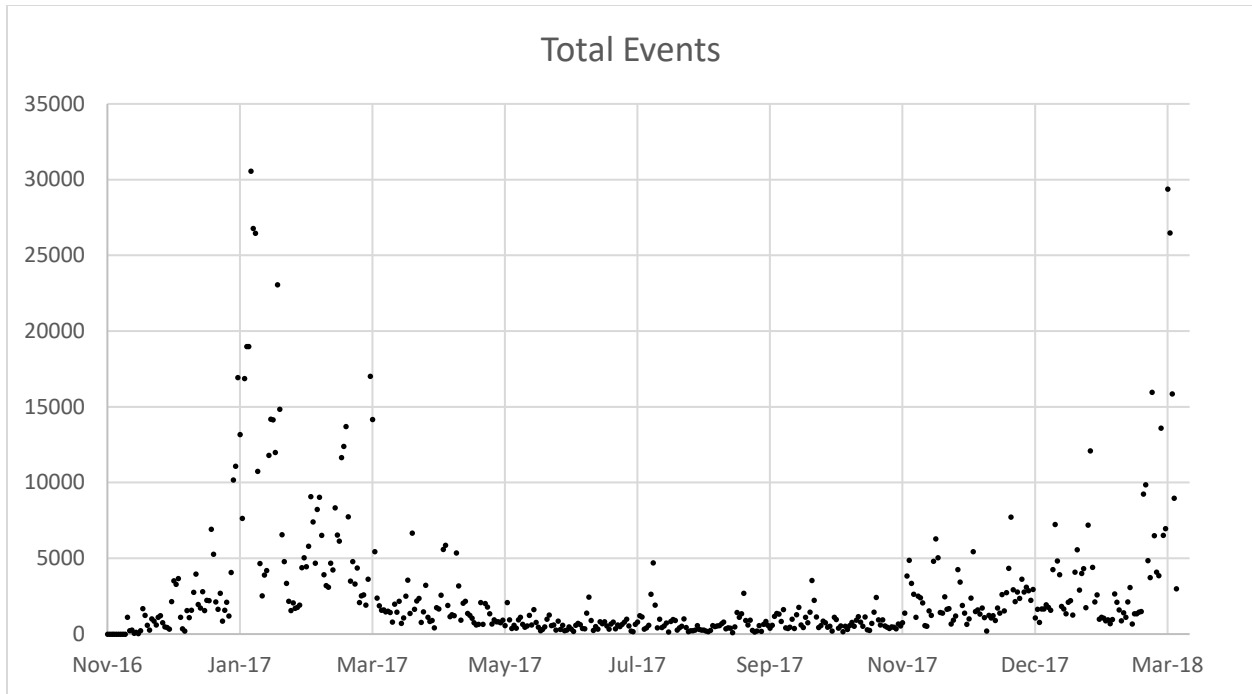


Figure 4-38: CCTV Events for Mobile OSS

Table 4-35: Top Days for Mobile OSS CCTV Events

Date	Total Events	Date	Total Events
1/10/2017	30,567	1/19/2017	14,194
3/1/2018	29,389	3/6/2017	14,170
1/11/2017	26,774	1/20/2017	14,142
3/2/2018	26,485	2/22/2017	13,709
1/12/2017	26,468	2/26/2018	13,598
1/22/2017	23,073	1/5/2017	13,178
1/9/2017	18,995	2/21/2017	12,401
1/8/2017	18,985	1/25/2018	12,096
3/5/2017	17,018	1/21/2017	11,993
1/4/2017	16,930	1/18/2017	11,801
1/7/2017	16,870	2/20/2017	11,654
2/22/2018	15,963	1/3/2017	11,090
3/3/2018	15,854	1/13/2017	10,742
1/23/2017	14,855	1/2/2017	10,171



#### 4.4.4. Device Categories

Table 4-36 show device categories for Mobile OSS user sessions. Unlike the desktop version of the One-Stop-Shop, mobile usage dominates for Mobile OSS, with approximately two-thirds of the user sessions coming from cell phones (mobile). While not surprising, this is encouraging, considering that the site is tailored for mobile use.

**Table 4-36: Mobile OSS Sessions by Device Categories**

Device Category	Sessions
mobile	42,733
desktop	12,731
tablet	10,008
	65,472

#### 4.4.5. Analytics Summary

While usage of the Mobile One-Stop-Shop is roughly an order of magnitude less than that for the original (desktop) One-Stop-Shop, the results are encouraging. Mobile users are predominantly using the site and they appear to be viewing content in patterns similar to the desktop version.

#### 4.5. Linking Sites (Mobile)

As was seen with the original (desktop) One-Stop-Shop, much of the traffic comes from Caltrans. An even greater number comes directly to the site, so people appear to have bookmarked the mobile site. A relatively large number of sessions, large enough to rival those sent by Caltrans, came from a television station website in Reno. That site embedded Mobile OSS into their own website and used it to show traveler information from some time during 2016-2017. Subsequently, they removed the connection to Mobile OSS. Had they kept it, statistics for 2017-2018 would have been much higher. Note that search engines and social networks also send traffic to the Mobile OSS site. See Table 4-37. Table 4-37 shows the pages linking to Mobile OSS from the Caltrans website.

**Table 4-37: Referring Sites for Mobile OSS**

Source / Medium	Sessions
(direct) / (none)	22,318
dot.ca.gov / referral	21,972
ktvn.com / referral	15,370
google / organic	2924
westernstates.org / referral	692
m.facebook.com / referral	346
wsdot.com / referral	213
montana.edu / referral	213
1das.net / referral	197
wsdot.wa.gov / referral	179
facebook.com / referral	171
krctv.com / referral	154
redbluffdailynews.com / referral	152
bing / organic	85
outlook.live.com / referral	60
tahoexc.org / referral	53

**Table 4-38: Caltrans Referring Pages for Mobile OSS**

Referral Path	Sessions
/research/its/cctv/hq/nevada.htm	13,443
/research/its/cctv/iframe.htm	7908
/research/its/cctv/hq/oregon.htm	493
/research/its/cctv/hq/arizona.htm	73
/dist8/tmc/	31
/dist8/tmc/index.htm	10
/cgi-bin/roadscell.cgi	6
/dist3/departments/traffic/cameras/	5
/	2
/dist2/maint.htm	1

#### 4.6. AddThis.com Tracking (Desktop)

In December 2016, the project team placed an AddThis.com widget on the original (desktop) OSS website to facilitate social media sharing. The widget occupies minimal space on the screen that may go unnoticed by many users. As a result, social media interaction via the widget may not be as effective as possible. Sharing activity via the AddThis.com widget between December 6, 2016 and March 5, 2018 numbered in the hundreds. See Table 4-39. While these numbers may not be impressive, realize that a social media posting by one individual can lead to dozens or even hundreds of visits from others. We don't know for sure who has posted links to the One-Stop-Shop on social media because some posts are private. With that said, thousands of visits to the One-Stop-Shop have come from social media referrals. See Table 4-40.

**Table 4-39: AddThis.com sharing activity for the One-Stop-Shop**

Other	Facebook	Email
148	150	96

**Table 4-40: Social sources for the One-Stop-Shop as reported by AddThis.com**

Service	Visits
Facebook	8007
Outlook	85
Twitter	43
Vkontakte	7
Reddit	3
Baidu	2
Pinterest	1

Following are some social network postings that have linked to the One-Stop-Shop in the past several years. Figure 4-39, Figure 4-40, Figure 4-41, Figure 4-42 and Figure 4-43 show Twitter Tweets from various agencies. Figure 4-44, Figure 4-45, Figure 4-46, Figure 4-47, Figure 4-48, Figure 4-49, Figure 4-50, Figure 4-51, Figure 4-52, Figure 4-53 and Figure 4-54 show Facebook posts from some of the same agencies as well as others.



Figure 4-39: Tweet from Western States Trucking Association

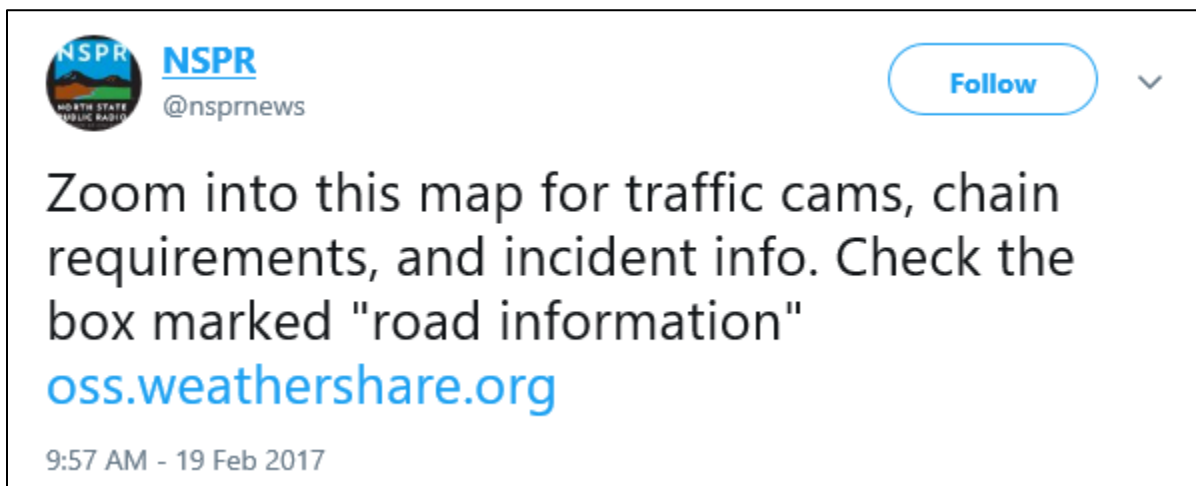


Figure 4-40: Tweet from North State Public Radio

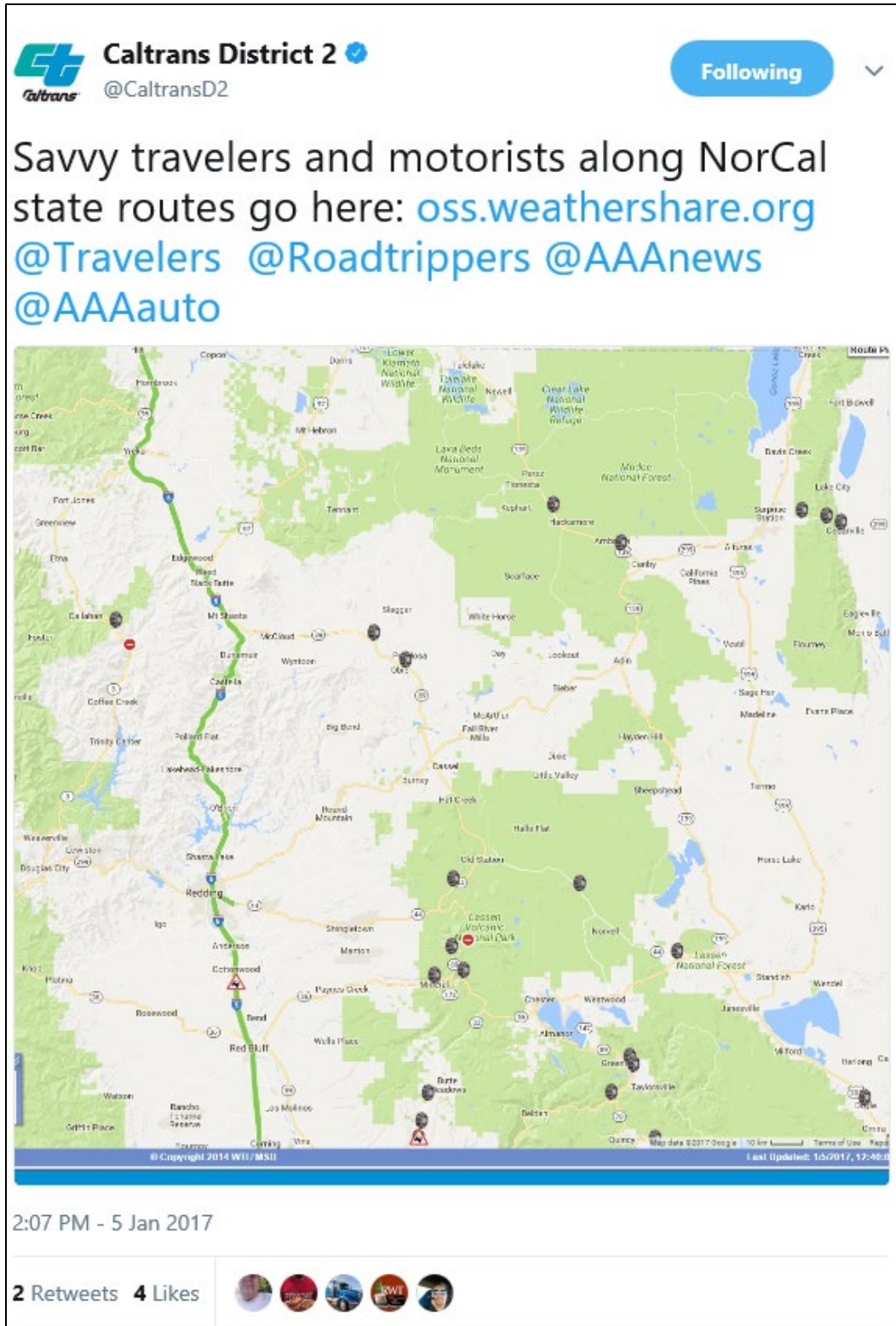


Figure 4-41: Tweet from Caltrans District 2



Figure 4-42: Tweet from NWS Reno

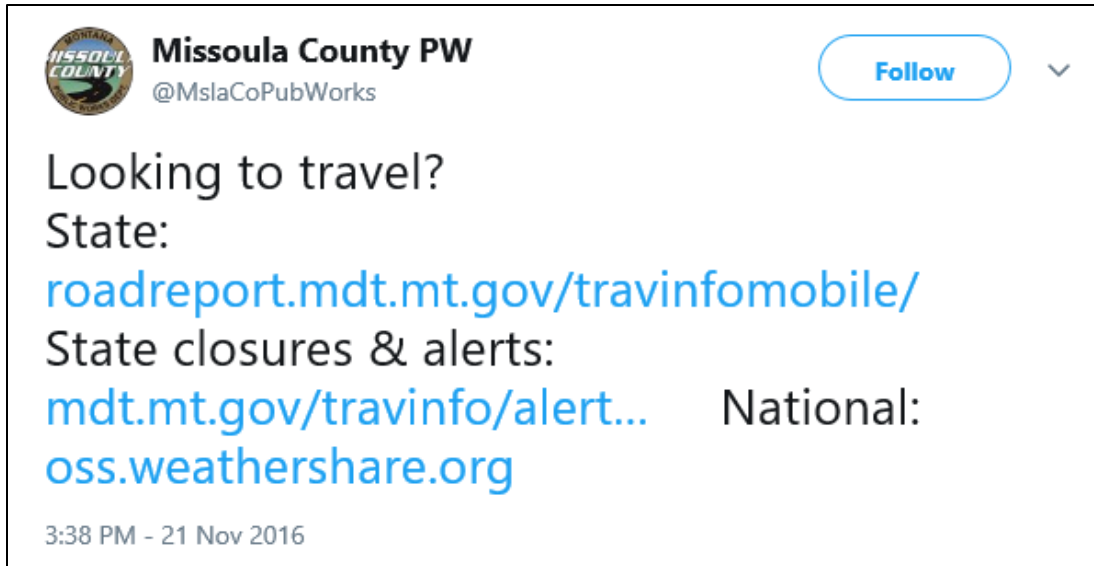


Figure 4-43: Tweet from Missoula County Public Works



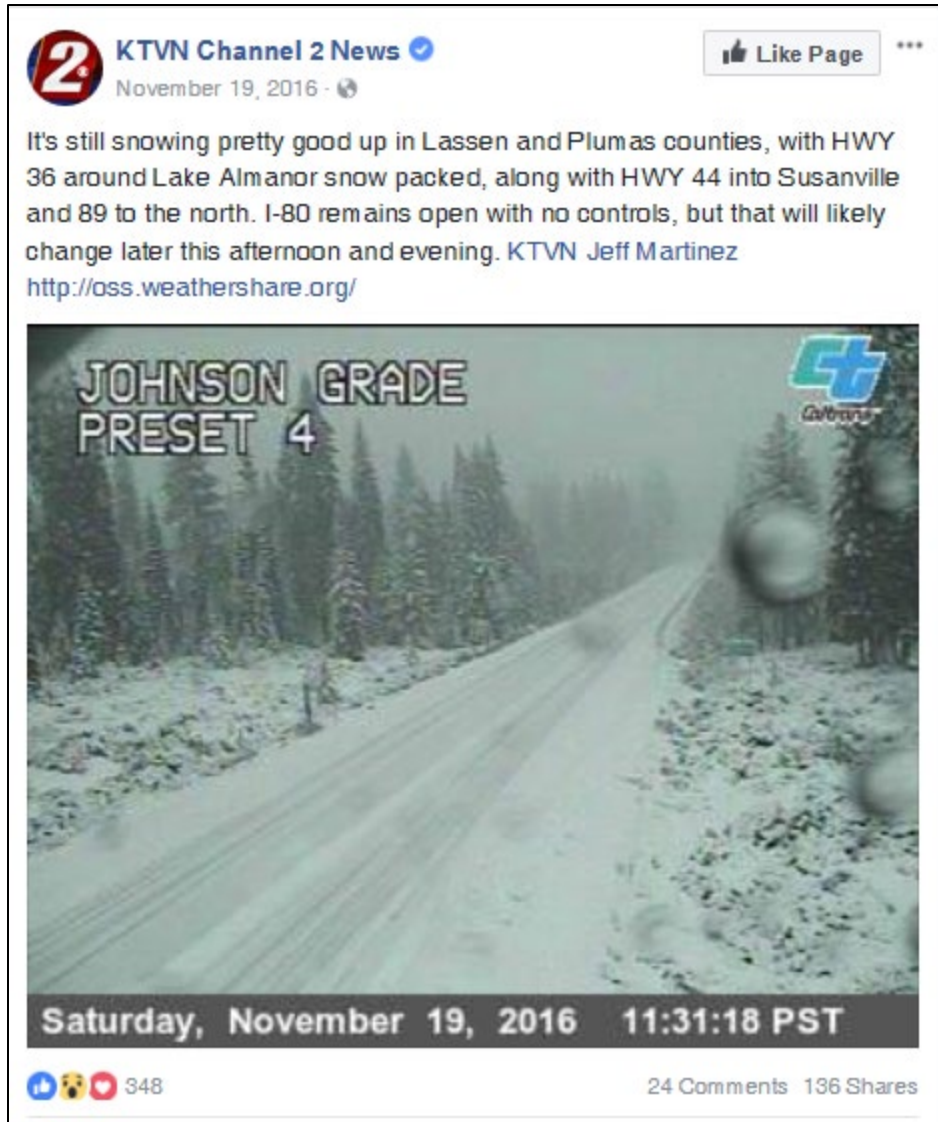


Figure 4-44: Facebook post from Reno KTVN Channel 2 News

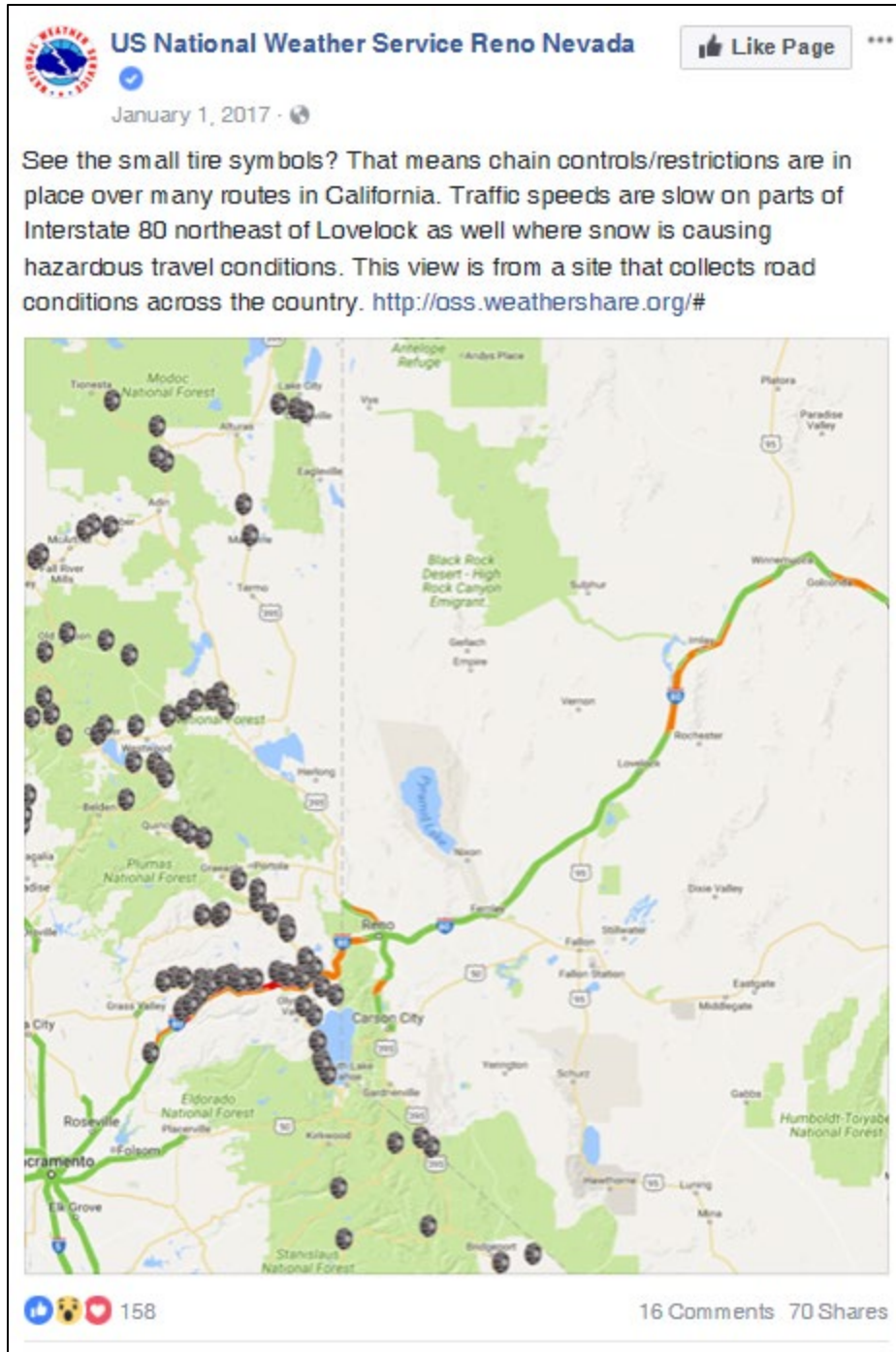


Figure 4-45: Facebook post from NWS Reno



Figure 4-46: Facebook post from Shasta High School

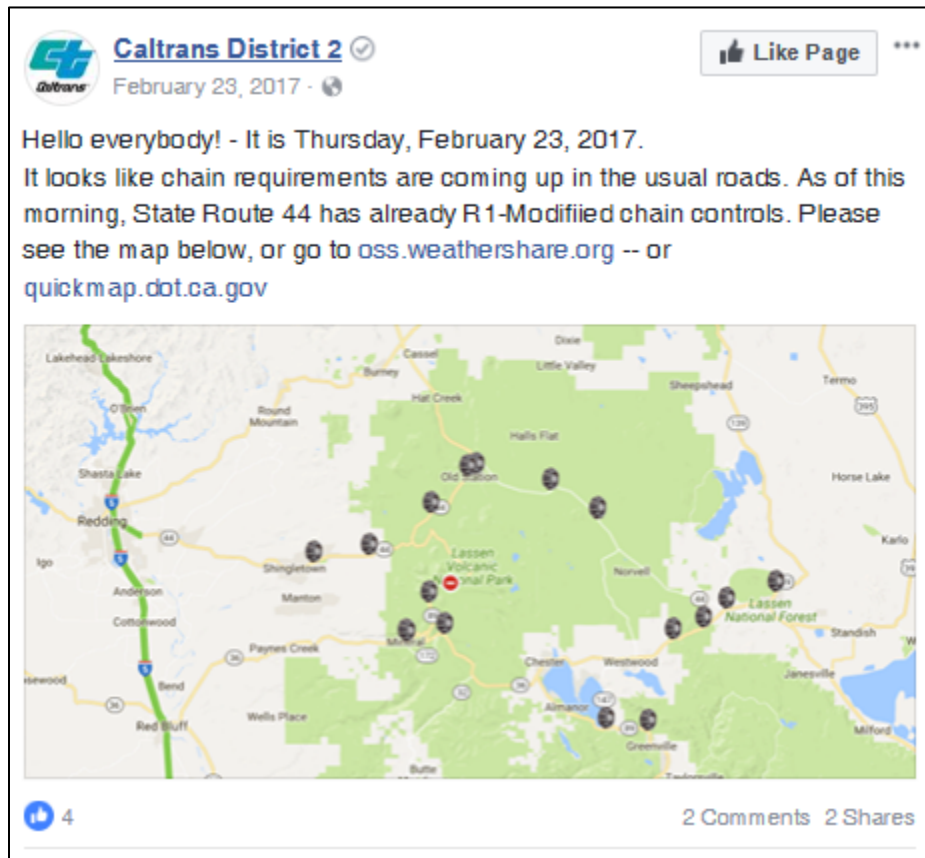


Figure 4-47: Facebook post from Caltrans District 2



Figure 4-48: Facebook post from Highway 49 Adventures





Figure 4-49: Facebook post from Missoula County Government



Figure 4-50: Facebook post from North State Public Radio

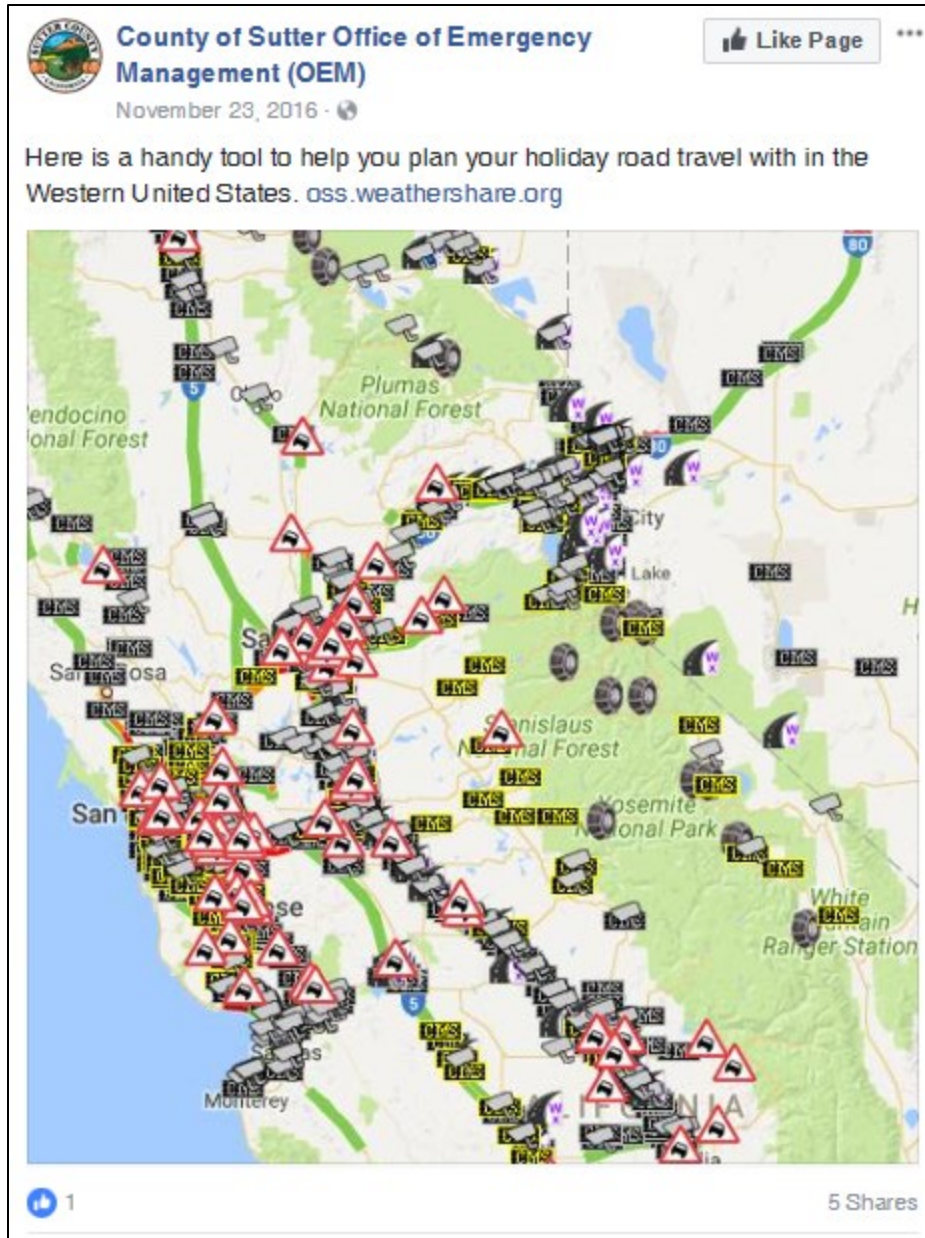


Figure 4-51: Facebook post from Sutter County OEM





Figure 4-52: Facebook post from the Western States Trucking Association

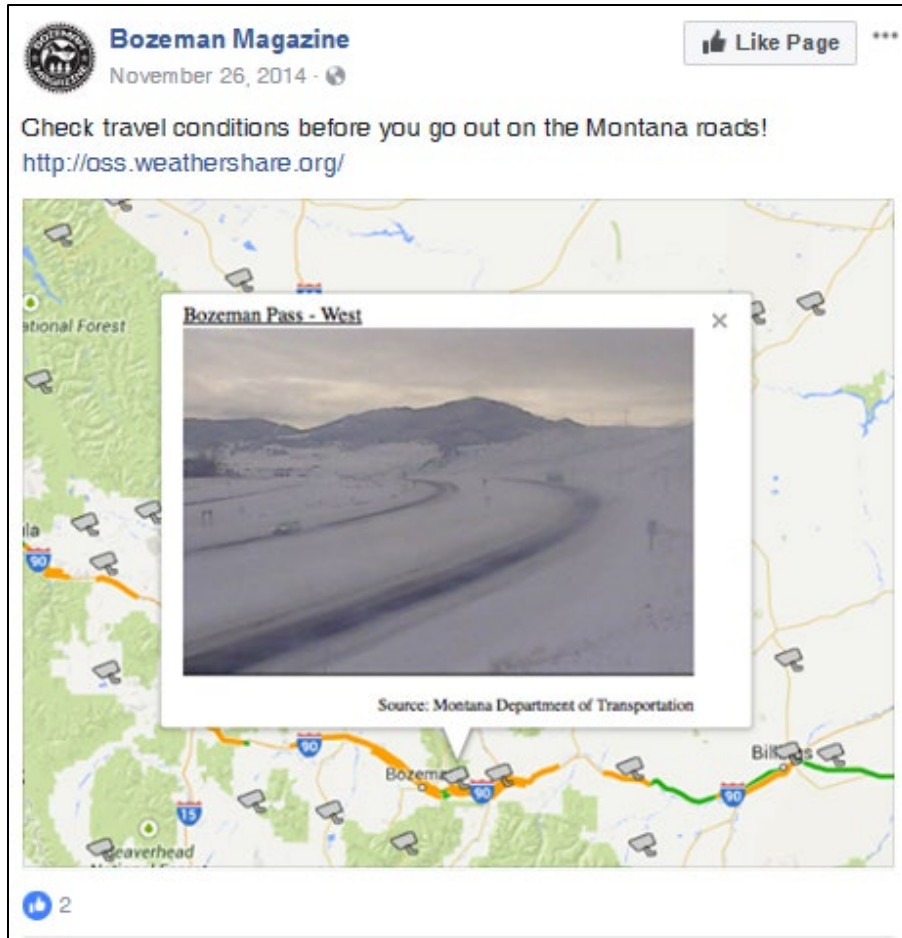


Figure 4-53: Facebook post from Bozeman Magazine

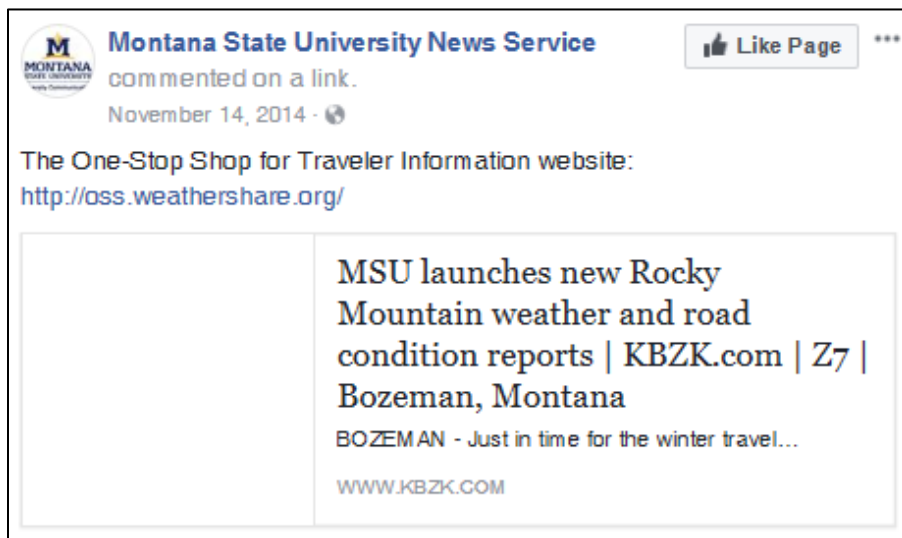


Figure 4-54: Facebook post from Montana State University

## 5. CONCLUSIONS AND RECOMMENDATIONS

Real-time traveler information services have thrived in two primary contexts: urban-focused systems and regional systems. Urban systems, strengthened by an extensive sensing and technology infrastructure, can offer significant volumes of information, updated at regular frequencies. Regional systems offer information over a larger geographic area and can therefore more readily serve travelers on less regular trips, such as recreational or longer distance travel. However, these systems generally provide information on specific areas or highway segments, meaning that prospective travelers may need to consult dozens of links to determine the travel conditions they will experience, before they make a prudent decision regarding when to leave, which route to take, and how to prepare for the trip.

The overall objective of this project was to put a variety of route-oriented real-time and near real-time information together in a single web-based location in a user-friendly format that does not stop at jurisdictional boundary lines (state, district or county lines, for example). This would allow travelers making a trip in or through rural areas to have current travel information on a route-specific basis and across a wide geographic area, customized for a specific origin and destination, which will help them to make their trip more safely and with a minimum of delay. This project focused initially on a limited geographic area -Caltrans District 1, District 2 and Oregon - to provide a proof-of-concept of this approach. Subsequently the system was expanded to cover all of California, Oregon, Nevada and Washington. In September 2014 it was expanded to cover all eleven of the contiguous states west of the Rocky Mountains with the addition of Arizona, Utah, Idaho, Montana, Wyoming, Colorado and New Mexico. Coupled with an interface change that made it easier to view content such as CCTV images and links from a prominent Caltrans traveler information web page, the expansion of the system coincided with a dramatic increase in system usage. Also, in September 2014 the One-Stop-Shop was awarded ITS America's Best of ITS Award for Best New Innovative Practice – Research Design and Innovation. In December 2016, the project team released a mobile version of the One-Stop-Shop, and it has been well-received. As such, the researchers believe that the principal value of this effort has been in demonstrating the feasibility and attractiveness of a One-Stop-Shop for real-time route-specific and general traveler information for rural areas across jurisdictional boundaries.

### 5.1. Conclusions

This project has developed a prototype website that provides various traveler information items in one location on a route-specific basis. The One Stop Shop that was developed addresses a present shortcoming in traveler information provision that was confirmed by a review of current state practices completed during this project. That review of practice found that no work had been performed that provided a user with all available traveler information in one location *and* the ability to specify an origin/destination to receive all available information for the planned route(s). The review also confirmed that the current provision of traveler information is confined by jurisdictional boundaries (state, county, district borders). Consequently, the opportunity to provide travelers with comprehensive information on a trip across state and jurisdictional boundaries remained unmet. The provision of data across jurisdictional boundaries takes on added importance for rural trips which often entail long distances.

In developing the One Stop Shop prototype, the researchers completed many specific tasks. This included the development of concept of operations and requirements documents. The concept of

operations established that the One Stop Shop website would allow users to specify their origin and destination and display a map of the preferred routing as well as all available traveler information along that route. The requirements document described what the website should do to accomplish its intended function.

Following the concept of operations and requirements documents, the researchers developed the prototype One Stop Shop website. The completed prototype is a web-based map built using Google Maps. Custom markers (icons) present point-based information such as commercial vehicle enforcement sites, CCTV camera images, incident and construction locations, and dynamic sign messages in their appropriate locations. Raster graphics are superimposed on the map to represent data such as forecast conditions over the region of interest. The system incorporates a route planner, which allows the user to select a route via Google Maps routing capability and display an elevation profile of the route along with select data layers including forecast information.

Subsequently, the project team developed and released a mobile version of the One-Stop-Shop. Focusing on the features that were most-used on the original version of the site, the Mobile One-Stop-Shop presents users with important information in an interface that can be viewed on a variety of devices including smart phones, tablets and desktop computers.

Based on the work completed during this project, it was demonstrated through the prototype that the concept of providing travelers with comprehensive information for a specific route based on a trip origin and destination and across state and jurisdictional boundaries. The prototype website and mobile site provide travelers in rural areas with a comprehensive source of information available to them for the planning of their trip. The availability of this information in one location will save travelers time in planning their trip, as well as will help make that trip more safely and with a minimum of delay.

## 5.2. Challenges

Performance and compatibility of the prototype website have been challenges throughout the project, principally due to the large volume of information presented and the limitation of web browsers and devices. There were challenges in trying to retain compatibility with older versions of Internet Explorer that were still common on Caltrans desktops. An approach has been taken of maintaining compatibility with “recent” versions of Internet Explorer, Firefox, Chrome and Safari, while pushing the envelope in terms of amount of data presented. The challenge carried over to the development of the mobile version of the One-Stop-Shop so that it would work with Apple iOS devices and Google Android devices, as well as desktop system.

Data quality was and will continue to be a challenge. Mis-located sites and bad timestamps impact the display of information. Bad data in general is prevalent throughout all the data sets, impacting sensor data, CCTV images, CMS messages, incident information, and other types of data.

The potential also exists for agencies to change aspects of data elements included on the One-Stop-Shop page without warning. This has happened many times during the development of the One-Stop-Shop. The principal example of this problem occurred when the Clarus Project data feeds were taken offline. Since these data feeds were being used to provide RWIS data for states outside of California, RWIS data became unavailable for those states for a short amount of time until the project team was able to identify and use alternate feeds directly from the individual states. The data elements are provided by different agencies and via different data streams that are provided

with a “buyer beware” understanding. That means that data formats and even locations can change at any time, and some of the route information displayed will may become inaccurate or absent. While Caltrans’ Commercial Wholesale Web Portal and Oregon’s TripCheck do send alerts to users when updates or revisions are planned, many of the data streams employed in the prototype One-Stop-Shop now come from other sources. This is an issue that must be kept in mind when maintaining the One-Stop-Shop website or similar systems.

### **5.3. Recommendations and Future Work**

The primary recommendation of this work is that additional One-Stop-Shop website development is necessary through future project phases. The purpose of the initial prototype was to demonstrate the overall One-Stop-Shop concept and to build a foundation for the overall website with respect to appearance, content and function. Based on this initial foundation, the work of Phase 2 centered on refinement and expansion of that prototype with, the addition of new data and expansion of geographic coverage.

In Phase 3, the mobile One-Stop-Shop was developed and appears to be successful. Given that the objective of the original project was to have one, comprehensive and consistent source for traveler information, it is desirable to merge the mobile and desktop versions into one, consistent offering rather than a separate desktop and mobile version. One approach to accomplishing this is to start with the current mobile version and add additional data layers from the desktop version. A mobile version of the site was critical for continued, expansion in usage. And, it was obvious that a mobile version could not convey the same amount of information on a smaller and less robust display in the same way. So, a clever approach will need to be taken to incorporate the missing information.

Expansion of the system to cover eleven states surely gave the system one of the largest if not the largest coverage areas of such a system, given the breadth and depth of the information presented. Further expansion is feasible not only in terms of geographic coverage, but also in terms of the data shown for each covered state.

Google Analytics should continue to be used in future project phases to analyze the use and usability of the revised prototype, including navigation paths and information selection. And, it will continue to be beneficial to obtain feedback from users regarding the One-Stop-Shop website. Questions should focus on website aspects such as utility to the traveler, performance, whether it met their needs/expectations, whether the data provided was sufficient and timely, and if not, what other data should be added, and general feedback and impressions related to the website. It is recognized from experience that soliciting the participation of the public in completing such a survey will be a challenge. Therefore, approaches to obtaining a representative sample of user input and feedback will need to be carefully considered.

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## 6. REFERENCES

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