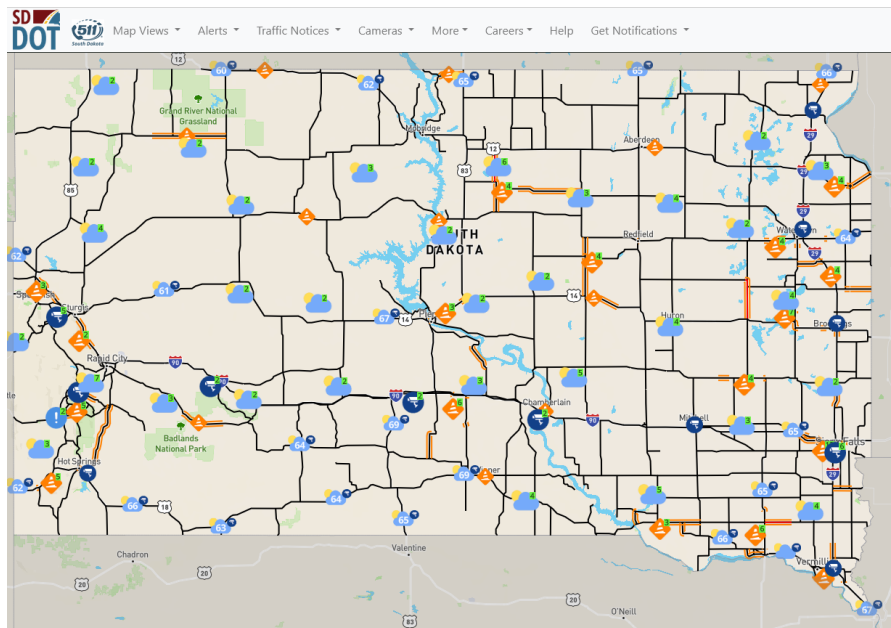


# NORTH/WEST PASSAGE



December 2023

## Benefits of Traveler Information Provided by Departments of Transportation

FINAL Project 17.3

*Prepared by: Athey Creek Consultants*



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*Note: The image on the cover page is from the South Dakota Department of Transportation 511 website.*

## 1.0 INTRODUCTION

The [North/West Passage Transportation Pooled Fund Study](#)<sup>1</sup> focuses on developing effective methods for sharing, coordinating, and integrating traveler information, operational activities, and emerging technologies across state and provincial borders. Membership includes the states of Washington, Idaho, Montana, Wyoming, North Dakota, South Dakota, and Minnesota.

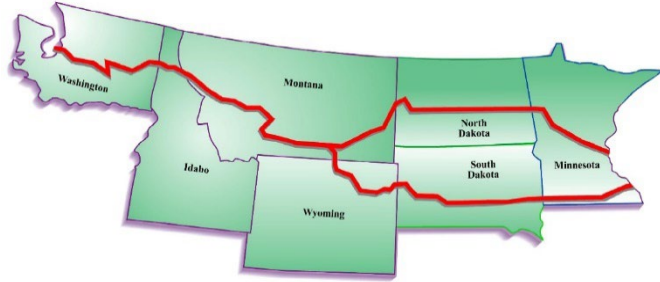


Figure 1. North/West Passage Members

See Figure 1. The corridors within the North/West Passage states function as major corridors for commercial and recreational travel and are predominantly rural.

The North/West Passage states understand that it can be challenging to quantify and document traveler information benefits. However, the members were interested in understanding traveler information benefits to assist in determining for example future funding needs, deciding which features and functions are most used and beneficial to support allocation of future funds, understanding the impacts of Connected and Autonomous Vehicles (CAV) on traveler information, and responding to inquiries about the need for public traveler information systems when there are third-party traveler information systems available to the traveling public.

This project examined how to quantify or describe benefits of traveler information provided by state departments of transportation (DOTs) and began by considering agency needs for understanding the benefits of traveler information. This project determined that the various needs for conducting an evaluation of traveler information benefits generally fit within one of the following two categories:

- Justifying funding and understanding public value.
- Identifying needed changes.

With this context, the primary research for this project was an online search of available resources and examples of agencies evaluating their traveler information systems. However, from the onset of this research, member agency participants recognized that easily defined quantifiable approaches for comprehensively describing the benefits of traveler information would likely not be identified. For instance, traveler information is a key “public-face” of the agency and often a primary mechanism that the traveling public uses to interact with the agency on a regular basis. As such, the provision of agency traveler information, directly to the traveling public and indirectly via third-parties, and its quality and consistency, can contribute to a positive public perception of the agency and be used to justify funding and make enhancements, however this benefit is not easily quantified.

### Project Purpose

To research approaches towards quantifying or describing the benefits of traveler information provided by state DOTs.

<sup>1</sup> <https://www.nwpassage.info/>

To supplement this research, two webinars were conducted with the North/West Passage members including traveler information coordinators from each member agency summarized as follows:

- In **Workshop #1 held on August 22, 2023**, each member agency described how they currently assess the benefits of traveler information, as well as additional ideas and concepts to expand the assessment of traveler information benefits. Additionally, members described how their agencies might use the results of understanding traveler information benefits.
- In **Workshop #2 held on October 30, 2023**, the results of the online research were shared with members, and each offered their input and reactions to the findings of the literature review.

Some key takeaways from this effort include:

- There are many options available to evaluate traveler information benefits, however the various approaches to assess benefits do not proportionally yield greater accuracy or quality for an increased level of effort. For example, simple examination of user numbers on traveler information websites, applications, and phone can yield greater understanding of benefits than in-depth simulation modeling, which generally relies on major assumptions.
- Some evaluation approaches like scenario tracking (e.g., tracking the publication and updates to an agency event on a third-party traveler information application over time) can generate very valuable information with a relatively low level of effort.
- A 2013 National Cooperative Highway Research Program (NCHRP) study [\*Deployment, Use, and Effect of Real-Time Traveler Information Systems\*](#)<sup>2</sup> provides a good model for conducting quality evaluation of benefits via traveler opinion surveys, focus groups, and agency staff surveys. Results from a comprehensive national study like this may be used to estimate benefits of an agency's traveler information system.
- Some agency traveler information systems are known by the agency to be popular with the traveling public that they are fully supported by decision makers, such that documenting benefits is not needed.

This report provides an overview of identified approaches that have been used to document and quantify the benefits of traveler information. The organization of this report consists of the following sections:

- [Chapter 2.0](#): Identified approaches for evaluating traveler information system benefits,
- [Chapter 3.0](#): Mapping evaluation approaches to needs for assessing traveler information system benefits,
- [Chapter 4.0](#): Key takeaways and next steps, and
- [Appendix](#): Select findings from NCHRP "Deployment, Use, and Effect of Real-Time Traveler Information Systems."

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<sup>2</sup> <https://nap.nationalacademies.org/catalog/22664/deployment-use-and-effect-of-real-time-traveler-information-systems>

## 2.0 IDENTIFIED APPROACHES FOR EVALUATING TRAVELER INFORMATION SYSTEM BENEFITS

An initial webinar was held with North/West Passage member agencies to provide an opportunity for members to share how they are currently assessing the benefits of traveler information, as well as additional ideas and concepts to expand the assessment of traveler information benefits. Additionally, members described how their agencies might use the results of understanding traveler information benefits. An online search was then conducted to expand upon and further research the concepts identified in the initial project webinar. A second webinar was held to present the online search and members shared how traveler information system benefits have been evaluated at their agencies.

This section begins by summarizing findings from feedback provided by North/West Passage members during the two project webinars and the online search of related studies. In addition, this section includes a summary of the studies found in the online search.

### 2.1 Summary of Identified Approaches

There were a number of approaches identified for evaluating traveler information systems through webinars conducted as part of this project through an online search. Addition detail for each following approach is described in more detail below.

- Usage numbers.
- Scenario tracking.
- Solicited traveler feedback via traveler opinion surveys, market survey, or focus groups.
- Evaluation of available traveler information alternatives.
- Agency staff surveys.
- Quality, consistency, and quantity of available traveler information.
- Formal evaluation.
- Informal feedback from users, public comments via email, or other public forums.
- User delay costs or hours saved based on usage.
- Simulation modeling of possible mobility, safety, environmental, and/or user cost or travel time impacts.

Two project webinars, in addition to an online search, were conducted to identify recent evaluations of state DOT traveler information systems and the approaches used to examine their benefits.

Figure 2 presents a subjective view illustrating each of the identified approaches mapped to both the level of effort to evaluate benefits and the likely quality/accuracy of the evaluation approach. During the second webinar, this plot was shared with attendees and input from the attendees helped to arrange the positions of each approach. Based on both the online research and the input from webinar attendees, this plot illustrates the most likely relation of each identified approach to quality and level of effort.

However, this plot is described as subjective and there are situations that could affect these, such as:

- Informal unsolicited feedback in the form of public comments via email require minimal level of effort to collect and tend to skew towards biased input (with more negative comments than positive) and therefore is plotted as low on the quality scale. However, some comments received may provide insights on possible changes or enhancements to traveler information and could prove to be very useful and effective.

- Traveler opinion surveys run a similar risk of being skewed with a negative bias without intentional selection of population and/or distribution mechanism; however, conducting an effective traveler opinion survey requires a greater level of effort in order to more accurately document benefits.
- Finally, some methods of evaluation like scenario tracking or formal evaluation could be conducted in a way that entails a higher or lower level of effort than is depicted in Figure 2, which may yield higher or lower quality of benefits data, depending on how the approach is structured.

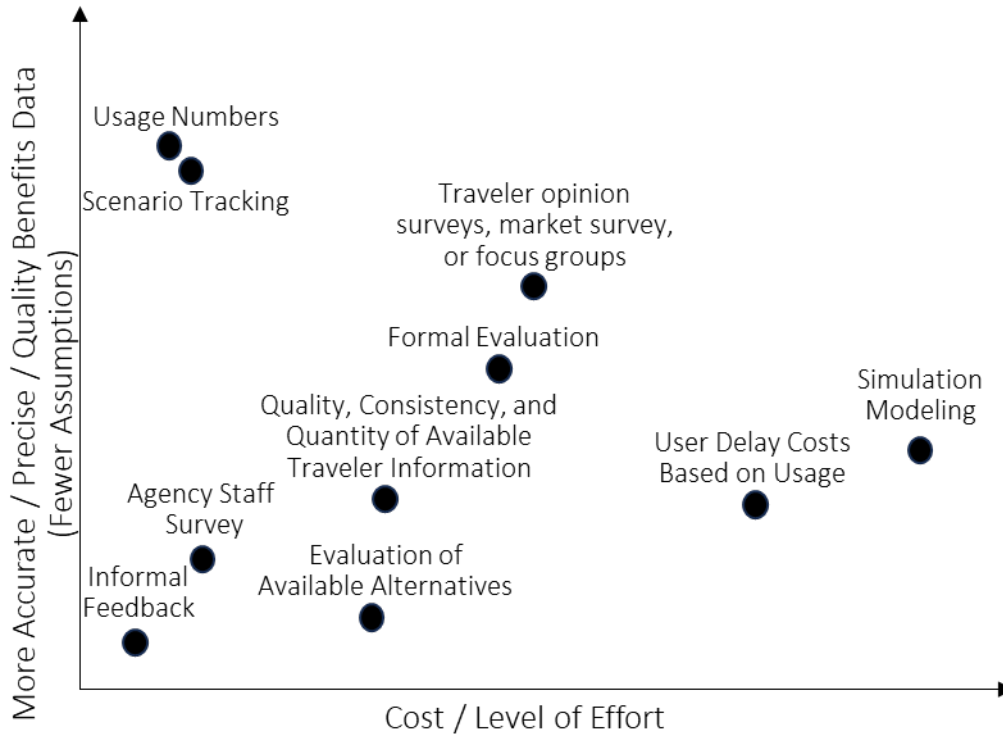


Figure 2. Subjective Illustration that the Cost or Level of Effort for Evaluating Traveler Information Benefits is not Always Proportional to the Accuracy, Precision, or Quality of Findings

**Usage numbers.** This measure may be the easiest for agencies to access and use to determine benefits of various agency traveler information systems. This type of metric has evolved over time from call volumes and duration of calls to also include number of webpage hits, camera views, and application downloads. Specifically, this approach may document overall or specific website hits or calls over time, either overall for the traveler information system or specific types of information, layers, or modules, or examine before/after usage numbers when a new or upgraded feature becomes available. A specific focus may also be placed on the number of third-party data requests or downloads of data via XML feeds or data exchanges. Note that in some cases, the ability to track these types of usage and access numbers may require a more complex registration process for third-parties or others to request and access the information or additional cost for states to track more detailed website usage.

**Scenario tracking.** State DOTs typically publish traveler information data through data feeds (e.g., using XML, JSON, or other approaches) and share these feeds with third-party traveler information applications such as Waze, Apple Maps, and Google Maps. Feedback from North/West Passage members suggests that little is known about the details of how the third-party applications use the data. Scenario tracking could

be conducted by selecting a set of event reports (e.g., work zones, crashes, driving conditions, closures) and manually visiting the various third-party applications to track if and how the events are displayed on their applications and/or websites. The scenario tracking could track such things as:

- If the event on a state DOT data feed is displayed and if the information/location are displayed correctly on the third-party site;
- If updates to the event tracked through and appear properly on each third-party site;
- If the event is removed from the third-party application after being removed from the State DOT feed; and
- The timeliness and any time lag in any of the bullets above.

These scenario tracking approaches may provide insights into how effectively and accurately agency data is translated into traveler information events, demonstrate the extent of third-party usage of agency information reaching a broader audience, and identify possible improvements that can be made.

**Solicited traveler feedback via traveler opinion surveys, market survey, or focus groups.** These approaches (traveler opinion survey, market survey, and focus groups), used in a comprehensive 2013 NCHRP study<sup>3</sup>, may be considered a toolbox of traveler information assessment approaches, and may be web-based and include both heavy and light or non-users of traveler information to determine the value and use of traveler information (e.g., whether the user accesses traveler information, their preferred source of traveler information, their ability to identify the information needed, the type of information desired, percent of users acting on the information, estimated average time saved by drivers using the information vs. minutes saved by drivers NOT using information, or “is this information source needed?”). While local efforts may give a more accurate picture of how travelers use agency traveler information, a quality evaluation of this nature may be costly and a broader or national study like the 2013 NCHRP effort may be successfully leveraged instead to estimate benefits, depending on the characteristics of areas where travelers were surveyed. Note that care should be taken to intentionally distribute or open the survey to a balanced or random population of users so that the findings are a balanced representation of public views and do not have a negative bias toward users (or non-users) with complaints. If this type of information were available at a national level or from agencies with similar characteristics, findings could be extrapolated<sup>3</sup> or assumed to apply at other locations. Similarly, reported usage might be used to make assumptions to calculate other estimates of quantitative benefits:

Sample questions, similar to those used in the 2013 NCHRP study, may include:

- Where do you get your traveler information (e.g., news, website, etc.)?
- What types of information do you access from each source?
- Follow up questions for each source type:
  - What do you like about this information specifically?
  - What made you decide to use this source of information?
  - How did you find out about it?
  - Do you look for this source of information pre-trip or during trips?

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<sup>3</sup> <https://nap.nationalacademies.org/catalog/22664/deployment-use-and-effect-of-real-time-traveler-information-systems>

- What effects do these information sources have on your trip? (e.g., frequency of changed route choices, route choice, travel time expectation, aborted or delayed trips)
- Are there any other benefits of this source? (e.g., peace of mind, calling ahead to someone)
- How often do you change (including delaying or cancelling) a trip based on traveler information before the trip has begun?
- What limits the usefulness of traveler information sources for you?
- Please rank the importance of each traveler information source that you use.
- Please rank the accuracy of each traveler information source that you use.

An [Appendix](#) includes select findings from the 2013 NCHRP study to help illustrate how the responses to these questions may be documented and could be leveraged to support this evaluation approach.

**Evaluation of available traveler information alternatives.** This approach generally examines the relative benefits of different types of traveler information systems or data sources that the agency has and the various users of those systems. This approach may also examine other approaches that are either new or used at other agencies to help determine if a given system is outdated or provides unique benefit that is still needed.

This benefits assessment is often multi-faceted to consider various types of user groups and geographic conditions. The assessment may examine low usage numbers for a given traveler information system to determine:

- If there are unique factors associated with that usage, like if the service is used by a niche audience or provides a service to users in remote areas with limited connectivity and no available alternative. For example, if the number of 511 phone users are low, do those users who call 511 have access to internet to use an online alternative, or is 511 phone their only way of easily obtaining traveler information?
- Alternatively, this approach may examine low system usage numbers and determine that users can access the same information on other traveler information services. One evaluation approach would be to conduct market research (e.g., a survey) on the service of interest (e.g., “we are considering eliminating this service, please take a brief survey to let us know if you use this service and how it benefits you” or on 511 phone, “click 1 to take a brief survey to let us understand why you are using this traveler information system”).

The market research approach and assessment should consider a diverse set of user groups and situational factors such as age, accessibility, location (e.g., rural, urban), travel patterns (e.g., recreational, commercial), and other factors that may be unique to a state or region and considers equity in terms of services offered.

**Agency staff surveys.** In some cases, agency staff may use traveler information either for personal or agency use, and be able to provide insights about the usefulness, quality, consistency, and accuracy of information that is provided by various traveler information sources, and identify areas for improvement.

- Do you use agency traveler information sources for your work duties? If so, what source(s) and information (e.g., travel speed, weather, work zone) do you use. If you use non-agency traveler information sources for work duties, what sources are they and why do you use them instead?



- Do you use agency traveler information sources for your personal travel? If so, what source(s) and information (e.g., travel speed, weather, work zone) do you use. If you use non-agency traveler information sources for personal travel, what sources are they and why do you use them instead?
- Please rate the completeness of agency traveler information, and suggest areas for improvement.
- Please rate the accuracy of agency traveler information, and suggest areas for improvement.
- Please rate the usefulness of agency traveler information, and suggest areas for improvement.

**Quality, consistency, and quantity of available traveler information.** Agency traveler information is often a primary “public face” of the agency. As such, quality and consistency of traveler information may be useful for maintaining a positive public perception of the agency. Assessing the quality and consistency of traveler information may either use a detailed assessment or less formal assessment to understand gaps in offerings or issues regarding accuracy and timeliness of information. An examination may identify gaps or the benefits of a change to the traveler information system (e.g., a new full-time position for a traveler information manager or new traveler information feature) that relates to the quality, consistency, and quantity of available traveler information. A relative scan to compare agency information types to other states may help to identify other, more beneficial alternative mechanisms to share traveler information.

**Formal evaluation.** There are various types of formal evaluations that could provide information about the benefits of traveler information. For example:

- Surveys or interviews of third parties who access agency traveler information data feeds to understand the benefits of agency data and the number of users reached that use agency-provided information, or
- An in-depth look at third-party use of agency traveler information on their platforms and the relative accuracy and quality of the provided information on third-party platforms would help to understand a relative value and impact of agencies providing data feeds.

A formal evaluation could also examine traveler needs versus available offerings (e.g., analysis of causes of crashes, examine other states with different traveler information features). In the future, a formal evaluation may be conducted to examine the number of connected vehicle (CV) warnings, alerts, or advisories issued based on traveler information.

**Informal feedback from users, public comments via email, or other public forums.** Unsolicited feedback from the traveling public or third-party users can be beneficial for anecdotally understanding the benefits and possible changes needed to traveler information systems.

**User delay costs or hours saved based on usage.** These benefits measures are generally calculated based on assumptions about how travelers who access traveler information actually use that information, which may be extrapolated from available traveler opinion surveys, market surveys, or focus groups that include a broader audience and not just users of traveler information systems. As a result, these calculations may not be very accurate. It may also be possible to identify changes in traffic patterns (e.g., fewer vehicles traveling immediately prior to a severe weather event or planned special event, reduced congestion due to better urban route choices) that can be attributed to the implementation of new traveler information systems or features.

**Simulation modeling.** In some instances, simulation models may be used to determine safety, mobility, and environmental benefits of traveler information, as well as user impacts of travel delay or costs, based on assumptions about the percentage of travelers who access and use traveler information. The accuracy of these measures is often tied to assumptions about reported use of traveler information and the relation of traveler information to trip diversions or changes. However, detailed feedback from travelers can help to mitigate these assumptions.

## 2.2 Identified Studies to Evaluate Traveler Information System Benefits

There were a number of resources found related to evaluating traveler information system benefits as described below.

- NCHRP (2013): [\*Deployment, Use, and Effect of Real-Time Traveler Information Systems\*](#)<sup>4</sup>, included a comprehensive and valuable assessment of traveler information benefits from various sources based on usage. Specifically, a **traveler survey** documented relative usage and preferences of various traveler information sources, and an **agency survey** documented how systems are evaluated (i.e., call and web usage data, traveler surveys, and traveler focus groups).
- ENTERPRISE Pooled Fund Study (2019): [\*Evolving and Phasing Out Legacy ITS Devices and Systems\*](#)<sup>5</sup>, documented several agency practices for evaluating available alternatives to phase out existing systems or features. Specifically:
  - Wisconsin DOT conducted a **user survey** of highway advisory radio (HAR) users (via HAR) to provide input on phasing it out and most indicated a low need.
  - Kentucky DOT 511 phone was phased out in 2016 due to **usage numbers** being low, **traveler input**, and costs.
  - Other agency considerations for phasing out 511 phone included **usage numbers**, **traveler surveys**, and **available alternatives**, considering the availability of cellular service access.
  - Other agency considerations for phasing out a specific traveler information web feature included **web analytics services of usage**, **market research** to identify user preferences, and **available alternatives**.
- North/West Passage Pooled Fund Study, (2018): [\*Evaluation of Rural 511 Phone Service\*](#)<sup>6</sup> and (2020): [\*DOT Traveler Information Website Features and Usage\*](#)<sup>7</sup> provide insights to evaluating benefits of traveler information phone service and website, respectively, based primarily on **usage numbers**.
- Ohio-Kentucky-Indiana (2014): [\*Cincinnati Region Advanced Regional Traffic Interactive Management & Information System \(ARTIMIS\)\*](#)<sup>8</sup> describes a **simulation model** that developed benefits measures for mobility (travel time and travel time reliability), safety, fuel use, and emissions based on incident clearance times, penetration rates of traveler information usage from a market survey, and assumptions of benefit values used in other area BCA studies. This model compared traveler information benefits versus a project to add a highway lane.

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<sup>4</sup> <https://nap.nationalacademies.org/catalog/22664/deployment-use-and-effect-of-real-time-traveler-information-systems>

<sup>5</sup> <https://enterprise.prog.org/projects/evolving-and-phasing-out-legacy-its-devices-and-systems>

<sup>6</sup> <https://www.nwpassage.info/projects/downloads/12-4-511-phone-evaluation.pdf>

<sup>7</sup> <https://www.nwpassage.info/projects/downloads/14-5-traveler-information-website-features-and-usage.pdf>

<sup>8</sup> <https://ops.fhwa.dot.gov/publications/fhwahop14032/ch11.htm#112>

- Utah DOT (2016): [Annual Innovations and Efficiencies Report](#)<sup>9</sup> documented the benefits of making the traveler information operator a full-time position, noting increased **quality and consistency of traveler information**.
- Illinois DOT (2020 is latest posted): [Annual Traveler Opinion Survey](#)<sup>10</sup> is a **traveler survey** that documents measures about the traveler information system, including the number of people accessing the traveler information website, their ability to identify needed information, and the type of information they desire.
- Washington State DOT (2023): [De-activating the 511 Phone Number](#)<sup>11</sup> describes reasons for de-activating the 511 phone service, including **available alternatives** that use new technology, a dramatic decrease in **usage numbers** (down 86% since 2009), and system cost and staffing.
- Michigan DOT (2016): [Weather Responsive Traveler Information \(Wx-TINFO\) System](#)<sup>12</sup> summarized an **evaluation** of road weather traveler information updates to the agency website and dynamic message sign (DMS) messaging using an **agency survey** of TMC operators about the system, before-after **usage numbers** of website hits, and **user delay costs** during NWS Advisory and Warning alerts.
- Minnesota DOT used to conduct periodic **traveler surveys** on various topics of interest via email with a group of travelers to gather their opinions.
- Federal Highway Administration (FHWA): [Tool for Operations Benefit Cost Analysis \(TOPS-BC\) Model](#)<sup>13</sup> measures traveler information benefits based on **usage numbers** of people accessing the information, and estimates or assumptions of the percentage of people acting on the information, the average time saved by drivers using the information (vs. minutes saved by drivers NOT using information), total hours saved, and user costs saved, which may be derived from **traveler surveys** and other means.
- Texas DOT (2021): [TxDOT Statewide TSMO Benefit-Cost Analysis](#)<sup>14</sup>, included discussion about traveler information with a general description for conducting a qualitative benefit-cost analysis (BCA) and a quantitative BCA using the FHWA TOPS-BC model.

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<sup>9</sup> [https://issuu.com/utahdot/docs/udot\\_efficiencies\\_report\\_2016](https://issuu.com/utahdot/docs/udot_efficiencies_report_2016)

<sup>10</sup> <https://idot.illinois.gov/about-idot/our-story/performance/reports/traveler-opinion-survey.html>

<sup>11</sup> <https://wsdotblog.blogspot.com/2023/04/deactivating-511.html>

<sup>12</sup> <https://www.michigan.gov/mdot/-/media/Project/Websites/MDOT/Programs/TSMO/ITS/Wx-TINFO-Flyer.pdf?rev=6f3a51440a1b4d79825602afdb8d23ad&hash=FDE2DCE2C96EA54D47FC7FB4DF077F7E>

<sup>13</sup> <https://ops.fhwa.dot.gov/plan4ops/topsbctool/index.htm>

<sup>14</sup> <https://ftp.txdot.gov/pub/txdot-info/trf/tsmo/benefit-cost-analysis.pdf>

### 3.0 MAPPING EVALUTATION APPROACHES TO NEEDS FOR ASSESSING TRAVELER INFORMATION SYSTEM BENEFITS

Another goal of this project was to link the evaluation approaches for assessing traveler information benefits to the specific needs that agencies may have for understanding the benefits. Ultimately, the need to assess traveler information system benefits in general relates to either:

1. **Justifying funding and understanding public value.**

Future spending on traveler information systems may depend on public value, including the role and value of traveler information systems to the public and/or outside systems (e.g., CVs, automated vehicles (AVs), third-party providers), and how they impacted by traveler information available from agencies (and compared with private traveler information providers).

The need to assess traveler information system benefits generally relates to either:

- 1) Justifying funding and understanding public value, or
- 2) Identifying needed changes.

2. **Identifying needed changes.** For example, identifying traveler information system features that work well and should be expanded, features that are not used, and understanding whether performance is being met or if changes are needed.

Traveler information is a key “public face” for many transportation agencies and often a primary mechanism that the traveling public uses to interact with the agency on a regular basis. As such, the provision of agency traveler information, directly to the traveling public and indirectly via third-parties, and its quality and consistency, can contribute to a positive public perception of the agency and be used to justify funding and make enhancements, however this benefit is not easily quantified.

#### ***Grouping of Evaluation Approaches***

Table 1 links the evaluation approaches summarized in [Section 2.1](#) with the two primary agency needs for assessing traveler information system benefits defined above. These approaches are grouped within three categories of questions for how an evaluation may be conducted:

1. Public Access and Use: what traveler information data is accessed and used by the traveling public, third-party providers, CVs, and AVs, and how do they use that data?
2. Impacts: how does traveler information impact traffic and/or safety?
3. Feedback and Perception: what do users think and how do they use traveler information?

Specifics are provided in more detail in Table 2 for justifying funding and understanding public value and in Table 3 for identifying needed changes, which may include enhancements to existing traveler information system offerings, expanding to include new features, or deactivating existing but underutilized features.

Table 1. Recommended Evaluation Approaches of Traveler Information System Benefits Based on Agency Needs

Need for Assessing Benefits	Evaluation Approach		
	Public Access and Use	Impacts	Feedback and Perception
Justifying Funding and Understanding Public Value	<ul style="list-style-type: none"> <li>• Usage numbers</li> <li>• Scenario tracking</li> <li>• <u>Local</u> traveler opinion surveys, market survey, or focus groups</li> <li>• Formal evaluation of third-party use</li> <li>• Evaluation of available alternatives</li> </ul>	<ul style="list-style-type: none"> <li>• <u>National or local</u> traveler opinion surveys, market survey, or focus groups</li> <li>• Formal evaluation of other states</li> <li>• Quality, consistency, availability, and quantity of traveler information</li> <li>• Simulation models</li> <li>• Number of CV warnings, alerts, or advisories issued based on traveler information</li> <li>• Calculated user delay costs or time saved</li> </ul>	<ul style="list-style-type: none"> <li>• <u>Local</u> traveler opinion surveys, market survey, or focus groups</li> <li>• Quality, consistency, and quantity of available traveler information</li> <li>• Informal feedback via email, social media, or other forums from the public</li> <li>• Data requests from external users or third parties</li> <li>• Feedback about accuracy</li> </ul>
Identifying Needed Changes	<ul style="list-style-type: none"> <li>• Usage numbers</li> <li>• Scenario tracking</li> <li>• Evaluation of available alternatives</li> <li>• Survey of third parties, travelers, agency staff, other users about value of information</li> </ul>	<ul style="list-style-type: none"> <li>• <u>National or local</u> traveler opinion surveys, market survey, or focus groups</li> <li>• Formal evaluation of traveler needs, causes of crashes, etc. versus availability of relevant traveler information</li> <li>• Quality, consistency, availability, and quantity of traveler information</li> </ul>	<ul style="list-style-type: none"> <li>• <u>Local</u> traveler opinion surveys, market survey, or focus groups</li> <li>• Informal feedback via email, social media, or other forums from the public</li> <li>• Agency staff input</li> </ul>

Table 2. Evaluation Approaches for Assessing Traveler Information Benefits to Justify Funding and Understand Public Value

Evaluation Approaches to Justify Funding and Understand Public Value	
<b>Public Access and Use</b>	<ul style="list-style-type: none"> <li>• <b>Usage numbers.</b> May include information on the number of unique users; number of calls; number of website hits overall or for specific webpages; available social media usage statistics (views, likes); and trends over time, including individual users and third-party usage via data feeds to understand the value of agency traveler information.</li> <li>• <b>Scenario tracking.</b> May demonstrate value that agency-provided traveler information gives by reaching a broader audience via third-party applications.</li> <li>• <b>Local traveler opinion surveys, market survey, or focus groups.</b> May include questions specific to traveler information system users within the agency jurisdiction about their relative use of various types of sources, including if they use multiple sources and types and value of information accessed from each source, to understand the relative value of agency traveler information.</li> <li>• <b>Formal evaluation of third-party usage.</b> May involve outreach via email, surveys, or interviews to external third-party users to understand their value and use of information received from the agency, and the number of users reached indirectly by the agency data.</li> <li>• <b>Evaluation of available alternatives.</b> May include an analysis of other traveler information sources that are available in terms of quality, quantity, and accuracy of information to make a case for agency traveler information systems.</li> </ul>
<b>Impacts</b>	<ul style="list-style-type: none"> <li>• <b>National or local traveler opinion surveys, market survey, or focus groups.</b> Examines direct (within agency jurisdiction) or assumed (national) traveler usage of agency traveler information to assess the actions taken and possible individual or systemic impacts on safety and mobility.</li> <li>• <b>Formal evaluation of other state traveler information system features.</b> May identify relative traveler information impacts in states with similar characteristics but which may offer different traveler information types or features in order to identify benefits of existing (or justify expansion to add new) traveler information types or features.</li> <li>• <b>Quality, consistency, availability, and quantity of traveler information.</b> Examines agency traveler information to infer a relative benefit based on availability of traveler information that is accurate, consistent, and available for more roadways and disruption types.</li> <li>• <b>Number of CV warnings, alerts, or advisories issued based on traveler information.</b> An emerging approach, this infers a benefit of traveler information based on issued CV messages.</li> <li>• <b>Simulation models.</b> Relies on assumptions about traveler information usage derived from national or local traveler opinion surveys, etc. to extrapolate mobility, safety, and environmental benefits.</li> <li>• <b>Calculated user delay costs or time saved.</b> Relies on assumptions about traveler information usage and actions per national or local traveler information surveys, or assumptions based third party traveler information provision and usage.</li> </ul>
<b>Feedback and Perception</b>	<ul style="list-style-type: none"> <li>• <b>Local traveler opinion surveys, market survey, or focus groups.</b> Relies on traveler responses demonstrating their use of traveler information and specific sources used, perceived benefits and their need for using the traveler information, and customer satisfaction.</li> <li>• <b>Quality, consistency, and quantity of available traveler information.</b> May include an informal assessment or feedback and reactions from agency staff, contractors third-party providers, or users about the agency traveler information provided.</li> <li>• <b>Informal feedback via email, social media, or other forums from the public.</b> While not a complete picture, public support or issues may be identified from unsolicited input.</li> <li>• <b>Data requests from external users or third parties.</b> Use of agency traveler information by external users or third parties may signify the value of available data.</li> </ul>

Table 3. Evaluation Approaches for Assessing Traveler Information Benefits to Identify Needed Changes

Evaluation Approaches to Identify Needed Changes	
<b>Public Access and Use</b>	<ul style="list-style-type: none"> <li>• <b>Usage numbers.</b> Trends may identify declining usage of specific systems or features, and information on unique user numbers, number of calls, number of website hits overall or for specific webpages may identify systems or features that are underutilized or warrant improvement.</li> <li>• <b>Scenario tracking.</b> May help understand how agency-provided data is translated into traveler information events on agency and third-party systems and identify areas for improvement.</li> <li>• <b>Survey of third parties, travelers, agency staff, other users.</b> May include questions specific to the value of information provided in agency traveler information systems, recommended areas for improvement, and usage of features (i.e., to identify underutilized features).</li> <li>• <b>Evaluation of available alternatives.</b> May include an analysis of other traveler information sources that are available in terms of quality, quantity, and accuracy of information to make a case for phasing out or upgrading specific agency traveler information systems.</li> </ul>
<b>Impacts</b>	<ul style="list-style-type: none"> <li>• <b>National or local traveler opinion surveys, market survey, or focus groups.</b> May examine relative impacts of traveler information systems either directly (within agency jurisdiction) or assumed (national) based on reported usage and actions taken in order to support enhancements, expansion, or deactivation of various traveler information system offerings based on agency and national findings.</li> <li>• <b>Formal evaluation of traveler needs.</b> May help identify gaps in traveler information that could be enhanced to better meet needs, or better prevent crashes or resolve congestion issues given better timeliness or quality of information, for example.</li> <li>• <b>Quality, consistency, availability, and quantity of traveler information.</b> Examines agency traveler information to identify gaps, areas for improvement, or system aspects that are not meeting performance targets to provide better traveler information, to better serve more travelers, and/or potentially increase impact (i.e., mobility, safety, and environmental benefits).</li> </ul>
<b>Feedback and Perception</b>	<ul style="list-style-type: none"> <li>• <b>Local traveler opinion surveys, market survey, or focus groups.</b> Relies on traveler responses about their use (or not) of specific traveler information offerings and types of information, specific sources used and reasons for that choice, traveler needs that may or may not be met by existing services, and customer satisfaction.</li> <li>• <b>Informal feedback via email, social media, or other forums from the public.</b> While not a complete picture, public feedback may include suggestions or issues for needed improvements. Feedback after changes or features are removed may reveal their value.</li> <li>• <b>Agency staff input.</b> Agency staff may be users of the traveler information system or have ideas for changes that would improve the provided offerings.</li> </ul>

## 4.0 KEY TAKEAWAYS AND NEXT STEPS

This project identified evaluation approaches towards quantifying or describing the benefits of traveler information provided by state DOTs. Some key takeaways from this effort include the following:

- The various needs for conducting an evaluation of traveler information benefits generally fit within one of the following two categories:
  - Justifying funding and understanding public value.
  - Identifying needed changes.
- There are many options available to evaluate traveler information benefits, however the various approaches to assess benefits do not proportionally yield greater accuracy or quality for an increased level of effort. For example, simple examination of user numbers on traveler information websites, applications, and phone can yield greater understanding of benefits than in-depth simulation modeling, which generally relies on major assumptions.
- Some evaluation approaches like scenario tracking (e.g., tracking the publication and updates to an agency event on a third-party traveler information application over time) can generate very valuable information with a relatively low level of effort.
- A 2013 National Cooperative Highway Research Program (NCHRP) study [\*Deployment, Use, and Effect of Real-Time Traveler Information Systems\*](#)<sup>15</sup> provides a good model for conducting quality evaluation of benefits via traveler opinion surveys, focus groups, and agency staff surveys. Results from a comprehensive national study like this may be used to estimate benefits of an agency's traveler information system.
- Some agency traveler information systems are known by the agency to be popular with the traveling public that they are fully supported by decision makers, such that documenting benefits is not needed.
- Traveler information is a key “public-face” of the agency and often a primary mechanism that the traveling public uses to interact with the agency on a regular basis. As such, the provision of agency traveler information, directly to the traveling public and indirectly via third-parties, and its quality and consistency, can contribute to a positive public perception of the agency and be used to justify funding and make enhancements, however this benefit is not easily quantified.

North/West Passage may consider evaluating traveler information systems through the variety of approaches identified in this report.

- Usage numbers.
- Scenario tracking.
- Solicited traveler feedback via traveler opinion surveys, market survey, or focus groups.
- Evaluation of available traveler information alternatives.
- Agency staff surveys.
- Quality, consistency, and quantity of available traveler information.
- Formal evaluation.

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<sup>15</sup> <https://nap.nationalacademies.org/catalog/22664/deployment-use-and-effect-of-real-time-traveler-information-systems>



- Informal feedback from users, public comments via email, or other public forums.
- User delay costs or hours saved based on usage.
- Simulation modeling of possible mobility, safety, environmental, and/or user cost or travel time impacts.

However, North/West Passage members noted that a first follow-on project that uses a scenario tracking approach to assess third-party use and display of specific DOT events from start to end may be valuable for understanding how agency information is used and possible areas for improving the quality and accuracy of information.

## APPENDIX: SELECT FINDINGS FROM NCHRP “DEPLOYMENT, USE, AND EFFECT OF REAL-TIME TRAVELER INFORMATION SYSTEMS”

The 2013 NCHRP study entitled *Deployment, Use, and Effect of Real-Time Traveler Information Systems*<sup>16</sup> provides a valuable and comprehensive snapshot of traveler information use, including different sources that travelers access and how that information is used to result in changes to travel. While this information is dated (e.g., it is likely fewer users rely on television, radio, and phone, and more users rely on mobile applications) and a study of this scale is costly to replicate, the information presented below illustrates how a future, similar evaluation with traveler opinion surveys, market surveys, or focus groups may present information given the specific questions asked.

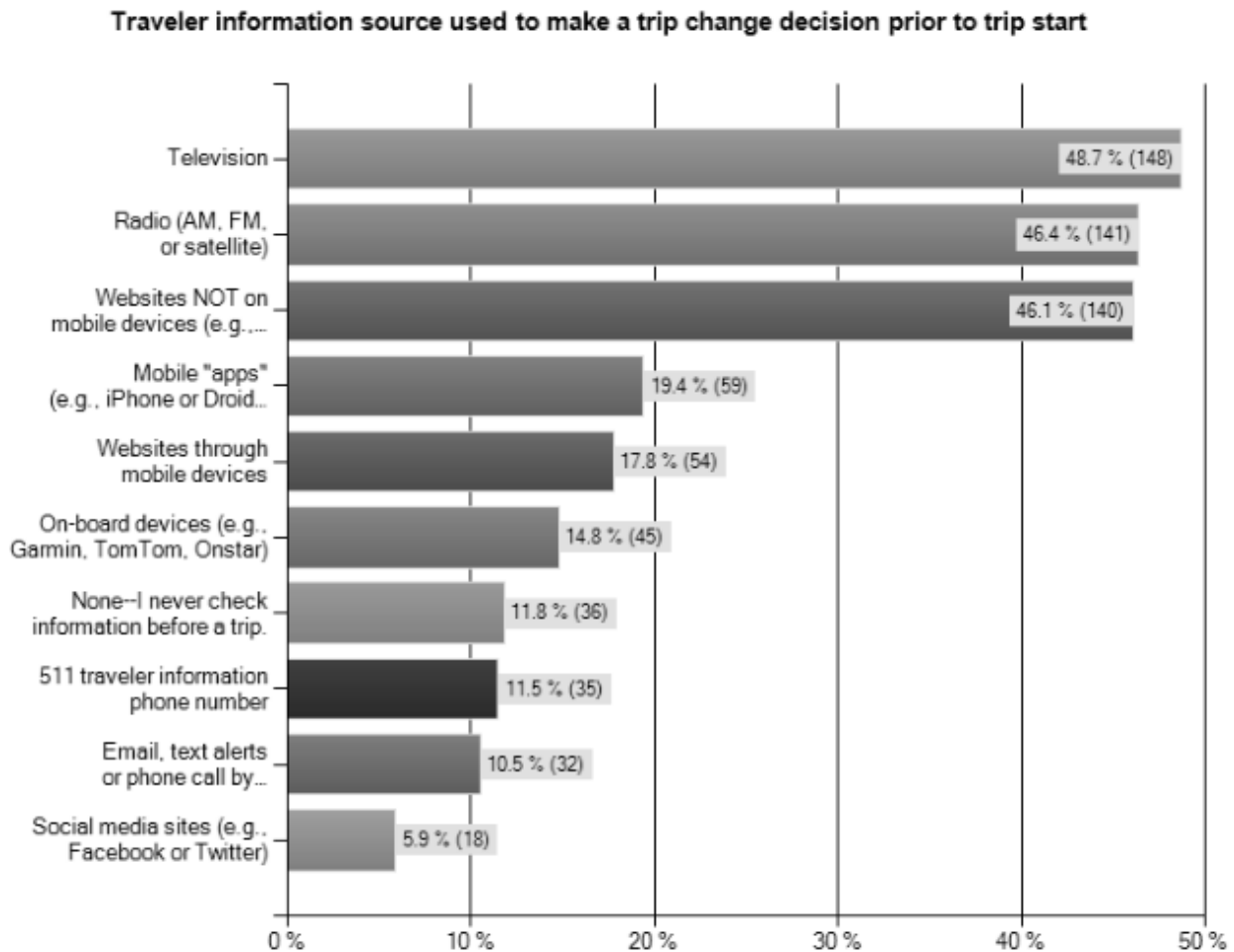


Figure 3. 2013 NCHRP Study Findings from a Traveler Survey on Traveler Information Sources Used Before a Trip

<sup>16</sup> <https://nap.nationalacademies.org/catalog/22664/deployment-use-and-effect-of-real-time-traveler-information-systems>

Information source used to make a trip change decision while in transit

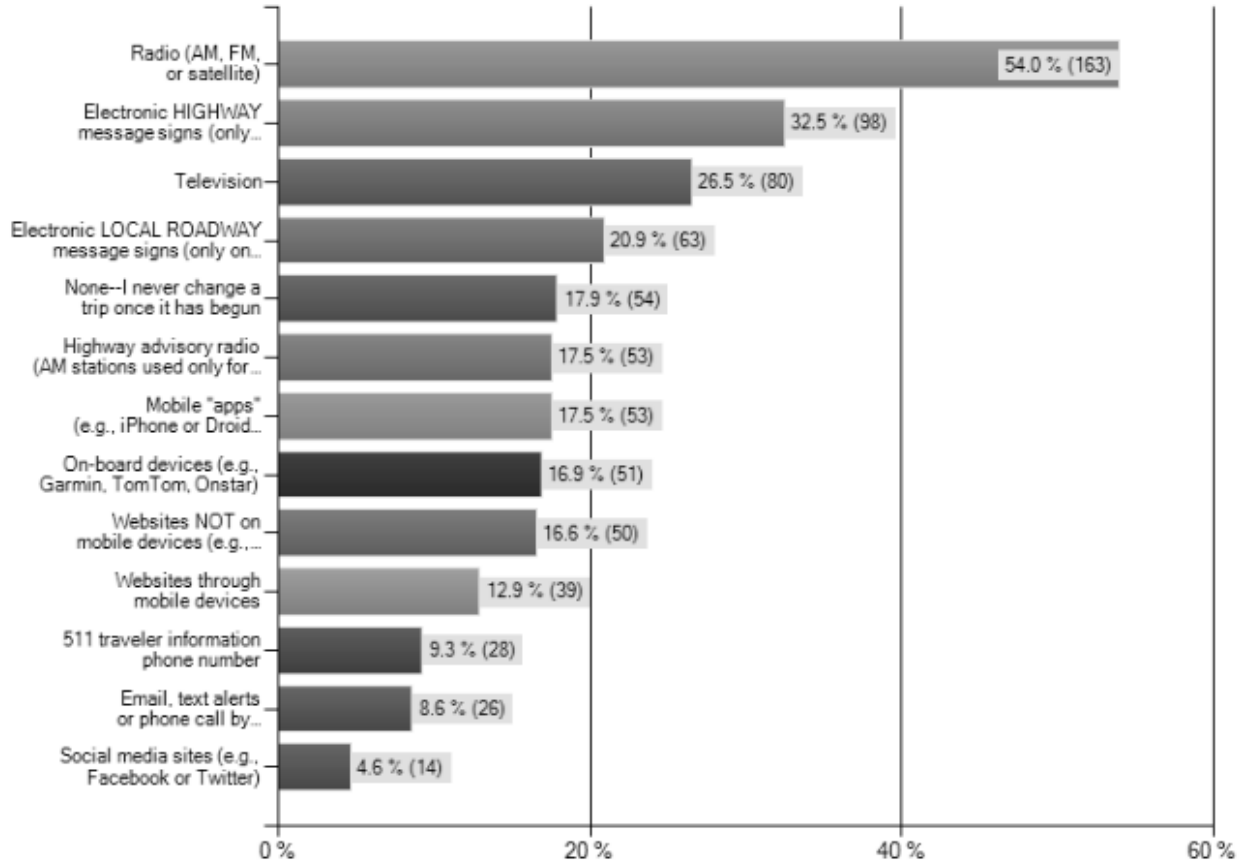


Figure 4. 2013 NCHRP Study Findings from a Traveler Survey on Traveler Information Sources Used During a Trip

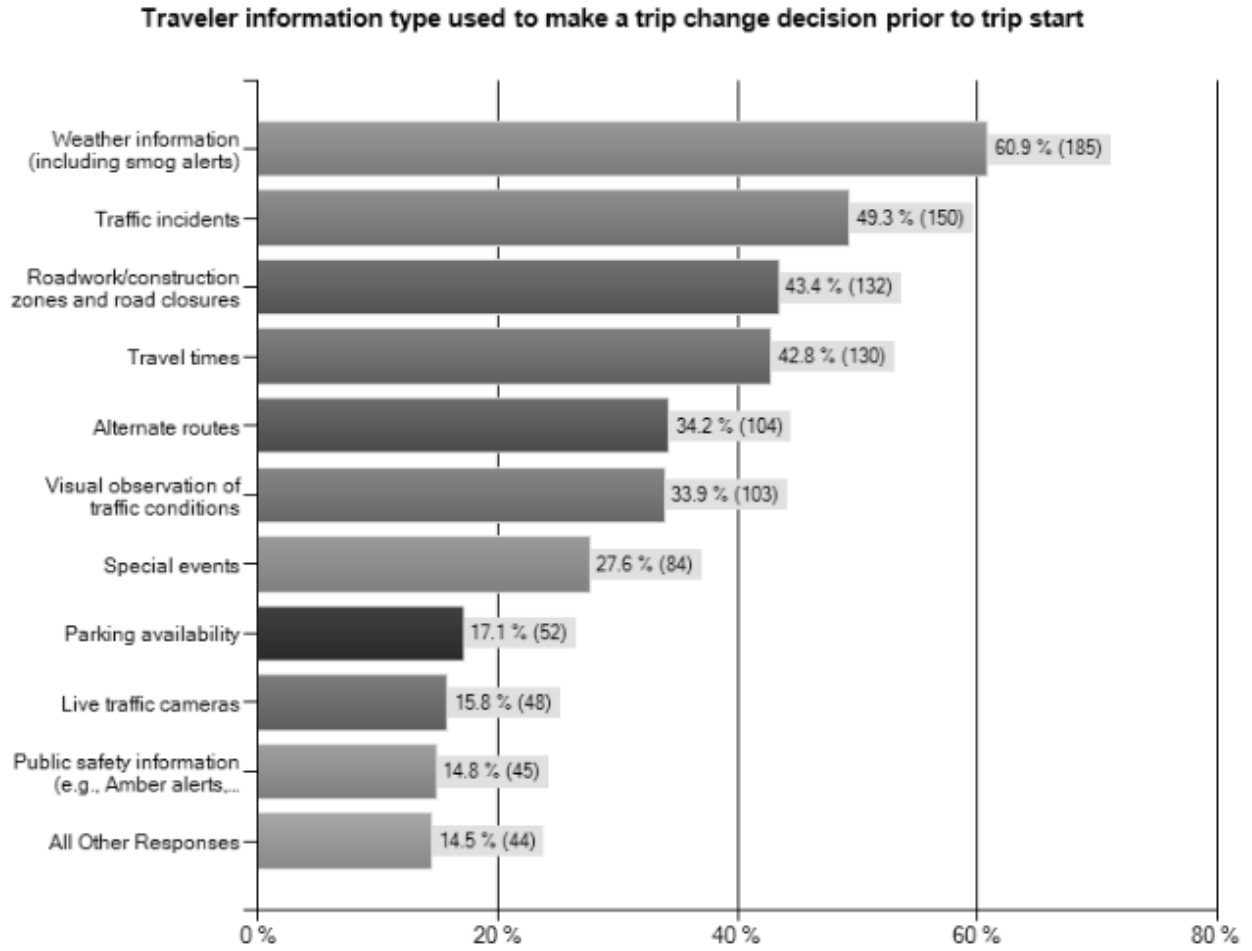


Figure 5. 2013 NCHRP Study Findings from a Traveler Survey on Traveler Information Data Types Used Before a Trip

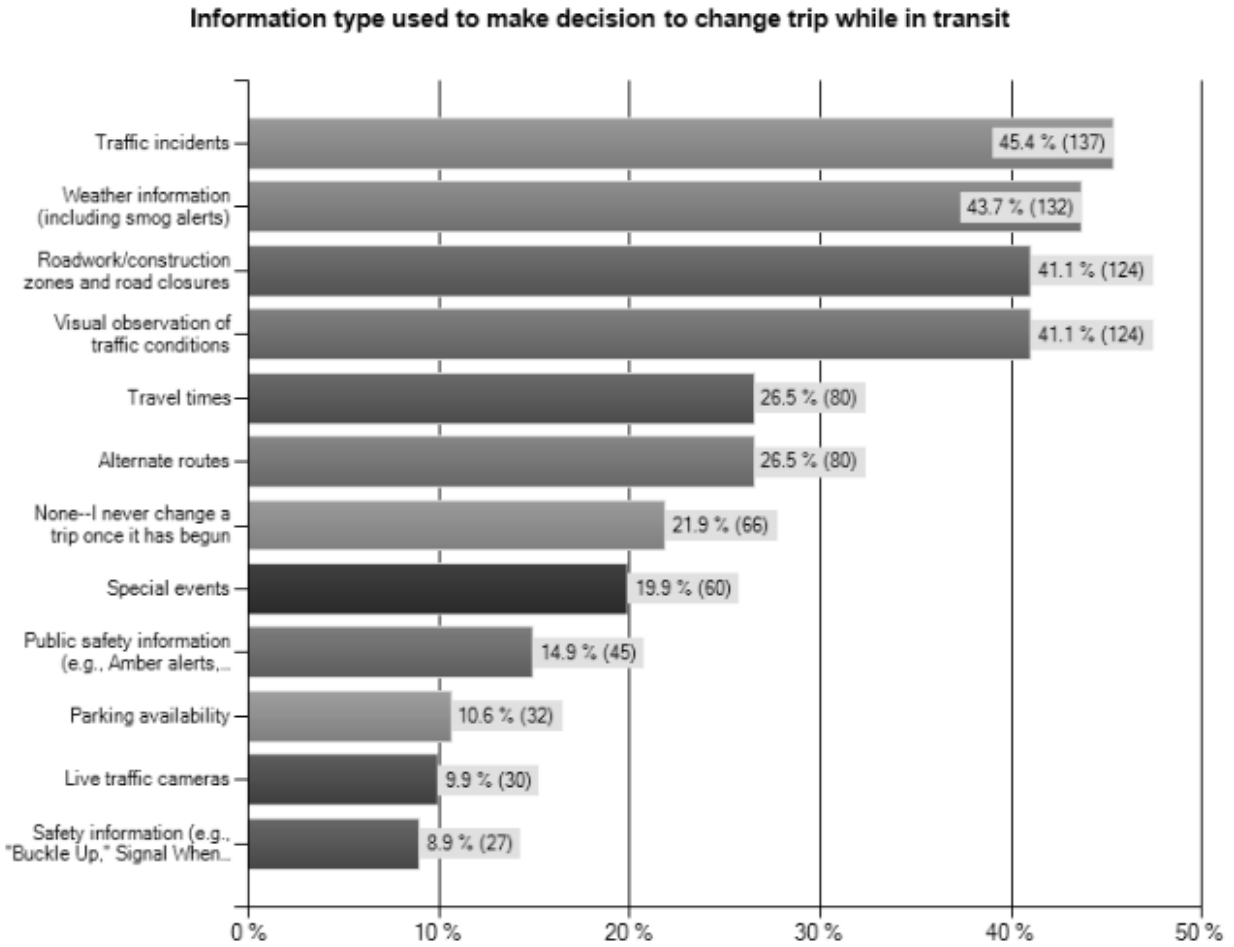


Figure 6. 2013 NCHRP Study Findings from a Traveler Survey on Traveler Information Data Types Used During a Trip

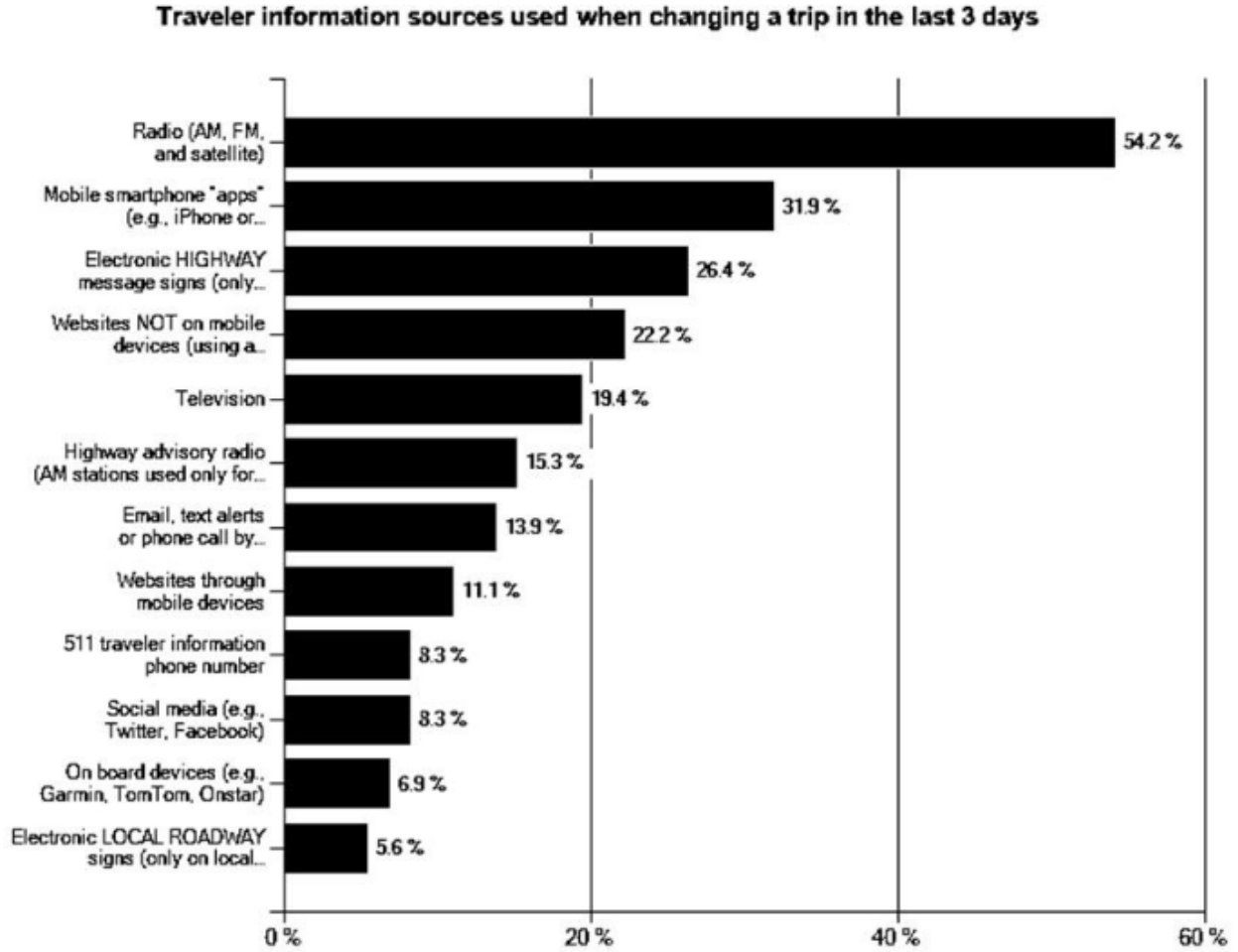


Figure 7. 2013 NCHRP Study Findings from a Traveler Survey on Recently Used Traveler Information Sources

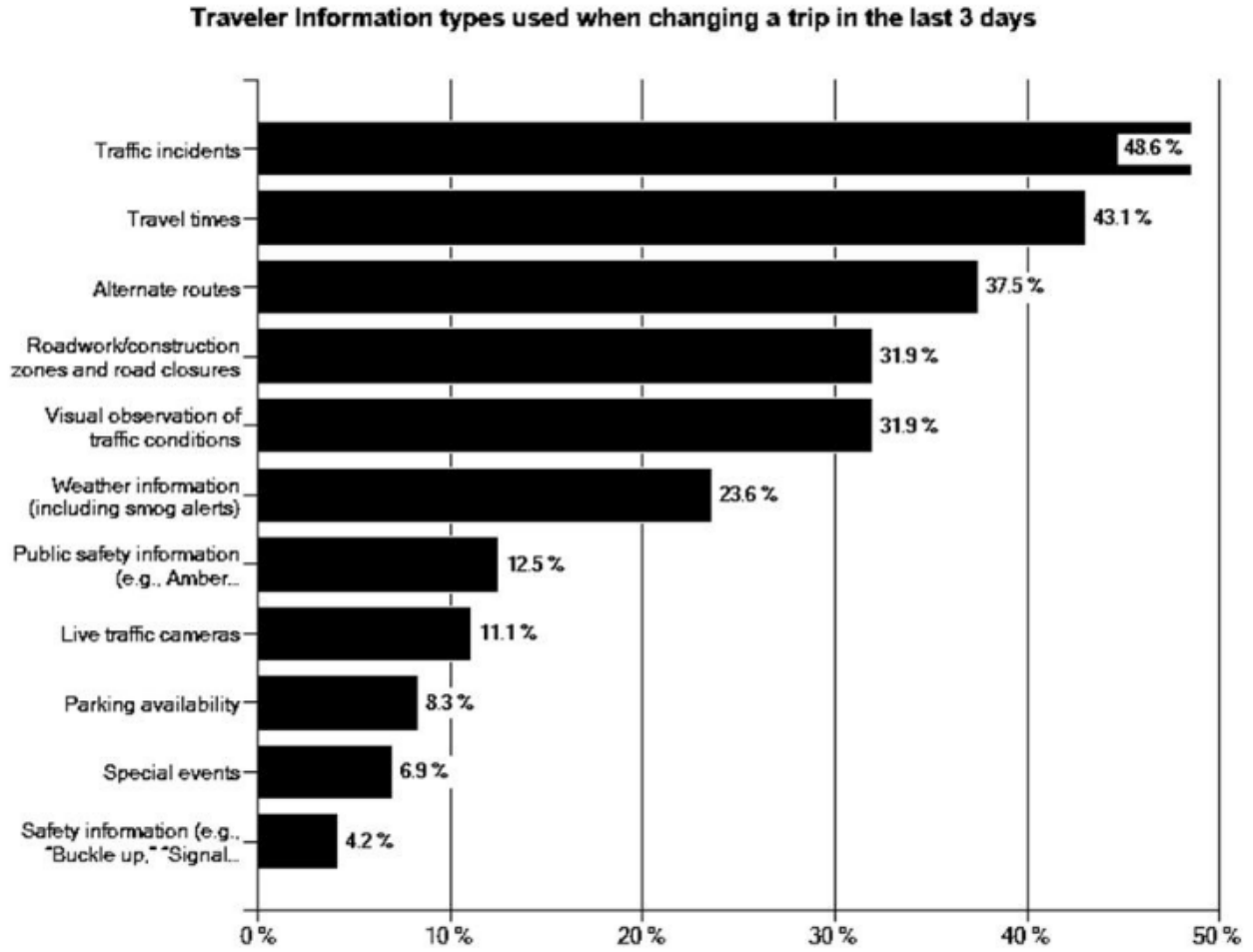


Figure 8. 2013 NCHRP Study Findings from a Traveler Survey on Recently Used Traveler Information Data Types

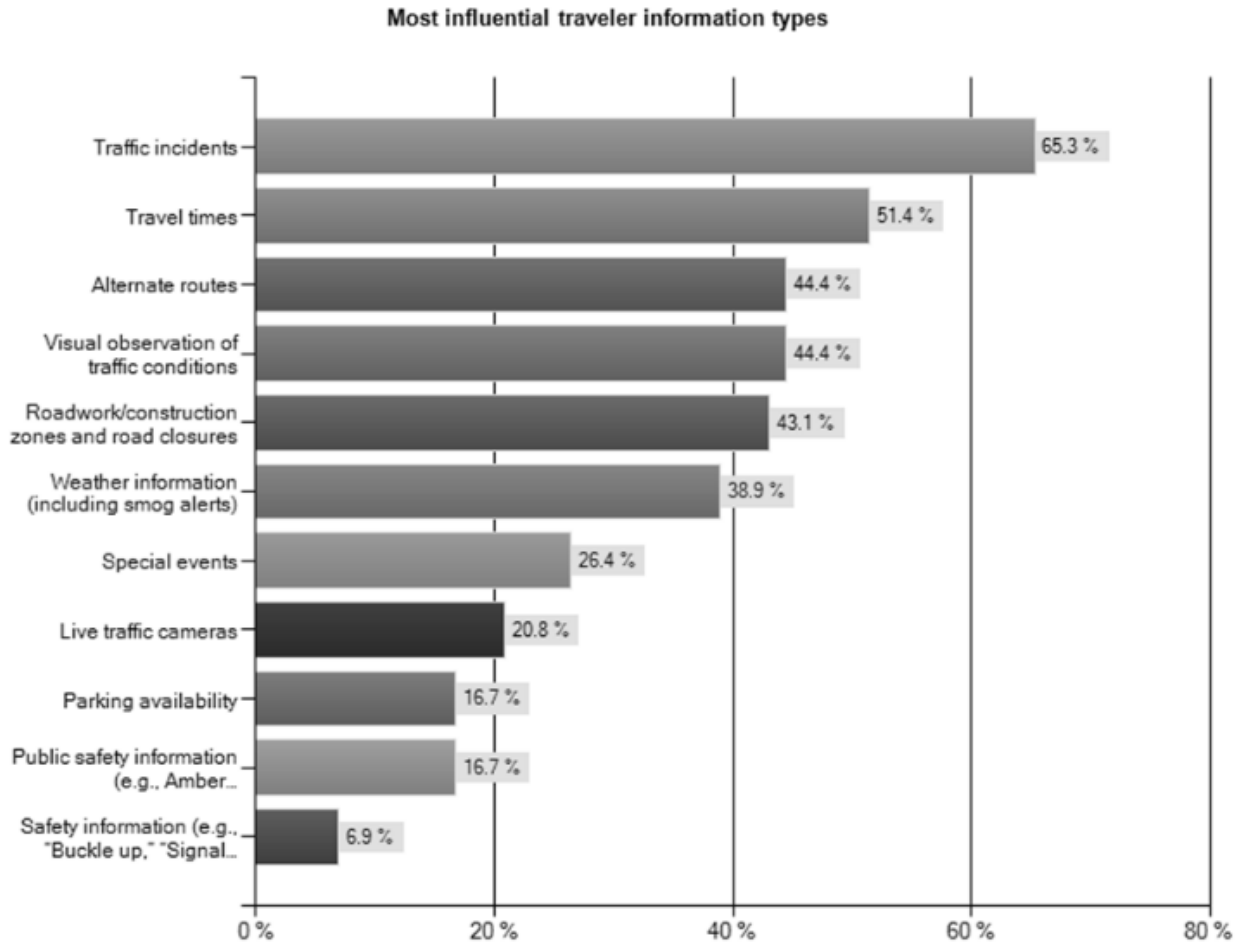


Figure 9. 2013 NCHRP Study Findings from a Traveler Survey on Most Influential Traveler Information Data Types