

# North/West Passage Pooled Fund Study

TPF-5(190)  
Work Plan 5

**Project 5.1:  
Citizen Assisted Reporting Feasibility Study**

**Expanding Citizen Reporting**

**Final Report**

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# 1. Introduction

The Wyoming Department of Transportation (DOT) has successfully developed and deployed a system that allows authorized citizens to manually report driving conditions to Wyoming DOT staff, who then enter the events into the statewide reporting system for dissemination on 511 and the web. A side benefit of this Enhanced Citizen-Assisted Reporting (ECAR) program was recognized when the Wyoming DOT used the ECAR training materials and processes to standardize reporting conditions among the department's maintenance forces.

Additional details of Wyoming's ECAR program were of interest to the eight North/West Passage (NWP) states (Washington, Idaho, Montana, Wyoming, North Dakota, South Dakota, Minnesota and Wisconsin) and the NWP Steering Committee approved a citizen assisted reporting project in their annual work plan. The goals the project were to share details of Wyoming's ECAR program with other NWP states, to explore ways in which Wyoming's program could be improved upon for maximized success in future implementations, and to explore the feasibility of the citizen reporting system expanding to additional NWP States.

## 2. Addressing Potential Challenges to a Citizen Reporting System

On September 23, 2010, the project facilitated a webinar where representatives from the Wyoming ECAR program provided details on the operation of ECAR in Wyoming. Twenty-five individuals from the North/West Passage states participated in the webinar. During the webinar, participants identified a number of concerns or challenges that they felt might prevent a citizen reporting system from succeeding in their state. The concerns primarily related to:

- Staffing;
- Institutional Issues; and
- Funding Issues.

The following table identifies the concerns, and summarizes how Wyoming DOT was able to overcome many of the same concerns to create a successful citizen reporting program.

Citizen Reporting Concerns	What did Wyoming DOT do?	Recommendations
<b>Concern #1: Staffing</b>		
Is 24/7 staff support needed?	The Wyoming DOT operates a Traffic Management Center (TMC) for the entire state of Wyoming. The TMC is staffed 24/7 allowing citizen reporters to phone in reports 24/7.	If your state does not report road conditions 24/7, some options for the reporting system are: - to identify those hours that citizen reports are accepted; - to allow citizens to leave recorded messages to be reviewed when staff are available; - to allow reporting using alternative methods (beyond telephone reports).
Are dedicated staff needed to receive citizen reports?	The Wyoming DOT TMC operators answer/listen to voice messages received from citizen reporters. Currently 300 volunteers participate in the program. On a typical day operators receive up to 6 calls and during a weather event up to 12 calls. The small number of calls has not impacted the daily job duties of the operators. However, as the program grows dedicated staff may be needed. The Wyoming DOT statewide TMC has between 2 and 6 individuals on staff at any given moment; this number varies according to conditions.	In a 'call in' based citizen reporting system, the number of calls received could be substantial (especially in metro areas).  Examine alternate approaches and technologies to reduce or eliminate the need for telephone reporting (suggested approaches are included at the end of this report).
Are dedicated staff needed to manage the citizen reporting program?	One individual manages the citizen reporting program in addition to other job duties. Administration of the program includes:	Training materials and the ECAR database tool (both used by Wyoming) are available for other states to use to develop their own systems.

Citizen Reporting Concerns	What did Wyoming DOT do?	Recommendations
	<ul style="list-style-type: none"> <li>• Citizen Training</li> <li>• Wyoming DOT Maintenance Staff Training</li> <li>• ECAR database management (all calls are entered into a database developed as open source software by the Wyoming DOT)</li> <li>• Managing the citizen incentive program to thank volunteers who participate in the program</li> </ul>	<p>Recruitment and training can occur in the off-season, when timing is not as critical.</p> <p>Time dedicated to recruiting and training volunteers can be limited to the available from the staff assigned to the project. In other words, the program can grow at whatever pace the staff member can achieve with available time.</p>
<b>Concern #2: Institutional Issues</b>		
How were liability issues addressed?	<p>The legal authorities within the Wyoming DOT were involved as the program was being developed. It was the opinion of WYDOT that the program was in the best interest of the public and that the DOT was doing its best to provide information to the public.</p> <p>WYDOT has not had any lawsuits from this program.</p>	<p>Involve your state legal staff in the planning process of creating a citizen reporting program to ensure the liability concerns are stated and addressed.</p> <p>Ensure that the legal staff understands that the intent is to gather more information about road conditions than the DOT could do without the citizens. The additional information is intended to help improve safety of travelers.</p>
Were there concerns that citizens were allowed input to which roads should be plowed or treated first?	<p>The Wyoming DOT led this program through the traveler information section of their department and participants were very clear that the program was intended to gather information to be shared with the public to assist them in driving decisions.</p> <p>WYDOT did not approach this as a maintenance project, nor is the information used to advise on maintenance.</p>	<p>Citizen reporting projects in other states are suggested to be initiated and led under the traveler information group, not through the maintenance group.</p>
<b>Concern #3: Funding</b>		
What is the operating budget of the program?	<p>The Wyoming DOT has a \$5,000/year operating budget to manage the program. The effort has not overwhelmed the TMC.</p>	

### 3. Suggested Steps to Develop a Citizen Reporting Program

Based on the information gathered from the Wyoming DOT ECAR system, the following suggested steps were identified for state DOT's to consider as they plan for a citizen road reporting system.

**Step 1: Assess the current road reporting coverage in the state in order to identify any lack of road reports.** For example, reports from operators of maintenance vehicles are a common method for road condition reporting. However, there may be portions of the road network where these reports do not occur as often as desired. Additionally, if citizen reporting could reduce the need for maintenance operators to perform reporting, this may be a further benefit to the state. This first step will help each state assess the need for citizen reporting.

- Note: In addition to winter weather driving conditions, states should consider whether current reporting of delays due to construction or conditions due to summer weather are sufficient to meet driver needs. Citizen reporting could be used to allow citizens to report their experiences passing through construction zones.

**Step 2: Develop a High Level Plan for Citizen Reporting as a source of travel information.** The high level plan should include:

- Objectives for geographic and temporal coverage (addressing any gaps identified in Step 1);
- A Technical Plan for how reports will be relayed to the DOT. Wyoming DOT uses telephone reports from the citizens to the statewide Traffic Management Center (TMC), but other options could include technologies used to relay the observations (note: a later stage of this report will address other options);
- A funding plan to cover staff costs, training materials, or other development.

**Step 3: Involve legal staff within your organization during the early planning stages to ensure liability issues are addressed.** Once a high level plan is developed, it is suggested that the legal staff be briefed on the concept and that their input is requested and addressed.

**Step 4: Develop a Detailed Program Plan.** The detailed Program Plan should address the technologies to be used to receive reports, store reports, and relay reports to the information dissemination systems. The plan should also address recruitment, training, and quality control.

- The detailed Program Plan should consider using the open source database created by the Wyoming DOT for entering citizen reports. The database is not linked to Wyoming DOT's reporting system, but as the program increases this option may be pursued.
- Identify a reporting process for your state
  - Will all reports go to one location/system?
  - Will there be manual 'handling' of the information once it is received, or will it go directly to the information dissemination systems?
  - Identify the details of what should be included in a citizen report such as direction of travel, weather conditions, route, etc.

- Create road and weather condition definitions with corresponding photos for consistency (note: the Wyoming DOT materials are available to be used 'as is' or as a starting point to create the training materials for other states).
- Consider training maintenance staff or those staff that report conditions in your state with the same materials used for citizen training to ensure consistent reporting.
- Conduct training prior to the fall/winter season, not during summer months. Citizens are then able to use the training information immediately.

## 4. Defining and Addressing the Needs for Citizen Reporting Expansion

Based on the concerns noted in the previous section, three challenges were then identified to expand citizen reporting. The challenges were then translated into needs and potential strategies and tools needed to address the need were identified as shown in the table below. The following sub-sections define each need and present how the tools identified provide a solution to the challenges.

**Table 1 – Challenge, Needs and Potential Strategies for ECAR Expansion**

<b>Challenges to the Expansion of ECAR</b>	<b>Need</b>	<b>Potential Strategy</b>	<b>Tools (available or needed)</b>
The current structure of the Wyoming citizen reporting system (manual citizen phone calls to DOT operators) would likely not scale to a large metropolitan area where demands are for frequent traffic and condition reports.	Need #1: A mechanism to allow input from more citizens than is possible with a controlled (recruited and trained) group of citizens.	Allow large numbers of citizens to contribute system information	Crowd-sourcing: <ul style="list-style-type: none"> <li>• Twitter</li> <li>• Blog Tools</li> </ul>
Many agencies even in rural areas are not staffed to handle citizen phone calls reporting road conditions.	Need #2: To eliminate the need for DOT staff to answer phone calls from citizens, and minimize the DOT input level	Allow citizens to self-report conditions in a way that does not require DOT personnel to enter reports	Citizen Web Entry Tools: <ul style="list-style-type: none"> <li>• Browser Entry Tool</li> <li>• Mobile Entry Tool</li> <li>• Text Entry</li> <li>• Twitter</li> </ul>
The current Wyoming citizen reporting system only addresses driving conditions, while increased details are needed for other types of events	Need #3: A citizen reporting strategy to expand reporting capabilities to roadwork.	DOTs create ‘events’ describing roadwork activities, citizens comment on real-time observations of delays & impacts at the sites	Crowd-sourcing: <ul style="list-style-type: none"> <li>• Twitter</li> <li>• Blog Tools</li> </ul> Citizen Web Entry Tools



## **4.1 Input from More than a Controlled Group of Citizens**

The process of recruiting, training, and maintaining relationships with the citizens participating in the ECAR program does require some effort. The Wyoming DOT has demonstrated an efficient process for accomplishing this. However, if the ECAR concept were ever to expand to a metropolitan area, increase the content delivered to include traffic and/or delay reports, or expand to a wide area such as the entire NWP Corridor, the act of maintaining a set of trained citizen reporters able to perform detailed entry as required could become unwieldy. Therefore, one need that might be experienced would be the need to allow input from a larger crowd than just a controlled group of trained citizens.

### **Candidate Solutions:**

Two technology tools have been identified that could address this need:

- Social media systems such as Twitter; and
- Blog Sites.

**Twitter (and other social media systems)** facilitates a concept referred to as ‘Crowd-sourcing’. Crowd-sourcing is effectively enlisting a general ‘crowd’ of unspecified individuals to offer their input to a process. Through the available Twitter System (for example), a DOT could create a Twitter account and allow any citizen to contribute input to the DOT. More details of the Social Media approach (more specifically Twitter) are described in later sections.

**Blog Capable Web Sites** allow users (either registered or not) to comment on messages and/or stories. The most common use of Blog Capable Web Sites is traditional local newspapers. Nearly every community now has some form of on-line newspaper. After nearly every story, readers are allowed to enter their comments on the story. Users may need to be registered (typically registration involves entering an email address) or meet other requirements to enter comments. These ‘Blog Sites’ also typically have someone monitoring the site to remove inappropriate comments. However, at this stage, the concept being discussed is an information gathering system. The ‘Blog Sites’ could be used for a DOT to post either preliminary information or a request for information and to allow any citizens with knowledge to post to the site. The DOT could decide how to review/process the information before releasing it to the public.

## **4.2 Reduce the Actions Required by DOTs to Receive Citizen Reports**

The Wyoming ECAR program enables authorized citizens to call a number and describe the driving conditions (either to an operator answering the call or through a voice recording). This requires another step for the DOT representative to enter the reported condition into their entry tool/database. The expansion of ECAR to other locations or additional content could be limited by this requirement for DOT effort, and a lack of staff to operate the phone system. Therefore, one need that has been identified is the need to eliminate and/or reduce the manual actions that are required by DOT staff members. This could allow more citizen reports to reach travelers while not increasing the staffing demands on the DOT.

One aspect to consider with this need is the extent to which the DOT wishes (or needs) to perform verification and validation of the events entered by citizens. Many DOTs have policies that require that all information disseminated must be validated by a DOT employee before being disseminated. Therefore, the manual step performed by Wyoming DOT to receive the voice report from citizens and re-enter the condition report does allow and require DOT validation of the event. The following concepts offer solutions to this:

- **Reducing DOT staff time but not eliminating it.** An ECAR enhancement could facilitate the citizens reporting the conditions with the help of a tool that eliminates the need for the DOT staff to re-enter the report, but yet still requires the DOT staff to read, validate, verify, or otherwise ‘authorize’ the report to reach the travelers.
- **Disseminating ‘unverified’ reports.** An ECAR enhancement could allow for citizen reports to be directly disseminated to the public such that they are clearly identified as ‘unverified’. These might be helpful during times of the day when DOT staff are not available to validate the reports. As an example, if a citizen were to report that they observed black ice late at night at a time when DOT staff are not available to validate it, the information dissemination system could disseminate “An unverified report of Black Ice has been received for the following location\_\_\_\_\_”. The advantage is that this might alert travelers and prevent crashes, but it clearly identifies that the DOT has not been able to verify the condition yet.

### **Candidate Solutions:**

**Citizen Web Entry Tools** would allow authorized citizens to enter driving conditions by using a series of drop-down boxes and or free text entry tools. The concept would be very similar to a DOT operated condition reporting system, however citizens would log in and make their entry. The result of a citizen entering an event into the system might prompt a DOT representative to review and verify the event or might allow the event to be posted as an ‘unverified event’ as described above.

**Twitter (and other Social Media Systems)** are used by some states today. WSDOT operates a Twitter system and allows citizens to report events which are viewed by other Twitter users.

### 4.3 Expanding the Citizen Reporting Beyond Driving Conditions

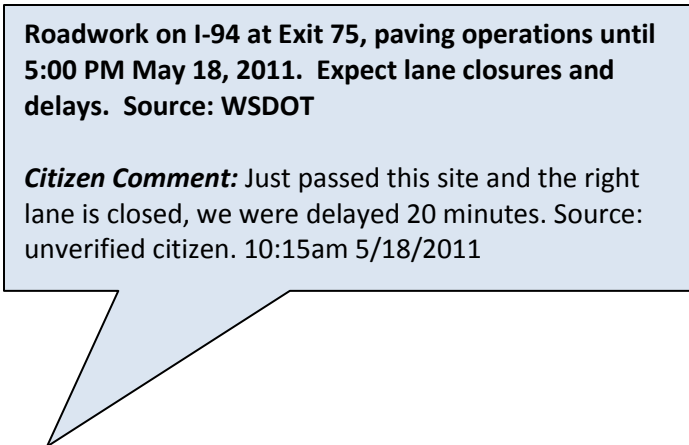
The Wyoming ECAR program trains citizens and authorizes them to report driving condition reports. Driving condition reports are arguably the most needed reports for rural states, and also the most difficult to cover solely with the DOT staff, therefore it is the most logical use of citizen reporting. However, during this project, a need was identified to facilitate the entry of additional types of information, such as road work descriptions and/or traffic reports.

Therefore, a need has been identified to expand citizen reporting to include additional information content. Since the majority of the NWP Corridor is rural in nature, roadwork event descriptions are most likely the next type of event to consider allowing citizens to report.

#### Candidate Solutions:

**Comment/Blog options on Web Entry Tools** would enable a DOT user to create an event description, such as a construction or roadwork event. This would then allow citizens to add details to the event, perhaps commenting on the delays currently experienced or the lane closures in effect that day. The location and high level description of the event would have been entered by the DOT staff when the event was created.

The result could be an icon on a traveler information website that displays the official DOT-created description of the event, together with citizen added reports (most likely removed automatically after an agreed timeframe so only the most recent reports are displayed). The following graphic illustrates how a pop-up display might display this information.



**Roadwork on I-94 at Exit 75, paving operations until 5:00 PM May 18, 2011. Expect lane closures and delays. Source: WSDOT**

**Citizen Comment:** Just passed this site and the right lane is closed, we were delayed 20 minutes. Source: unverified citizen. 10:15am 5/18/2011

## 5. Candidate Tools for ECAR Expansion

This section presents three tools as candidates to support expansion of the ECAR system geographically (to other states or the entire NWP Corridor) or to support the expansion of services within Wyoming.

Potential ECAR Tool	Brief Description of Tool	Needs Addressed by Tool
<b>Citizen Web Entry Tool</b>	<p>A Web based entry tool for authorized citizens to use to enter reports. Citizens could select from pre-defined segments and from pre-defined message sets after verifying their identify using login/password. This tool could eliminate or supplement the phone entry concept. Variations could include:</p> <ul style="list-style-type: none"> <li>- Standard Internet browser tool;</li> <li>- Mobile App / Mobile web page;</li> <li>- Texting Tool</li> </ul>	#2: To eliminate need for DOT staff to answer phone calls
<b>Crowd-sourcing / Social Media Tools</b>	<p>Social Networking Tools (such as Twitter and/or Facebook) allow large numbers of citizens to participate in sharing information. These systems are commercially available and many citizens already use them. They offer a ready-made solution to encourage input from a wide audience.</p>	#1: To allow input from more citizens than is possible with a controlled group of citizens.
<b>Blog Enabled Websites</b>	<p>A Blog enabled website refers to the functionality to allow the public to add comments to information presented by the DOT. This may be a 'Web Entry Tool' or a public information dissemination website. The concept is that for each DOT report, there is the option for citizens to add more detail or comments. Each DOT may decide if all citizens are allowed to comment (which is typically done by newspapers) or may restrict entry to trained citizens (by password). The concept is that specific events (such as roadwork) where citizens would not create the event, could be created by a DOT representative and details could be added (as blog comments) by citizens.</p>	<p>#3: A citizen reporting strategy to expand reporting capabilities to roadwork.</p> <p>#1: To allow input from more citizens than is possible with a controlled group of citizens.</p> <p>#2: To eliminate need for DOT staff to answer phone calls</p>

## 5.1 Citizen Web Entry Tool

The following table describes the citizen web entry tool.


Applicable to	Need #2
<b>Description</b>	<p>Web based entry tool for authorized citizens to use to enter reports. Eliminate or supplement the phone entry concept. Variations could include:</p> <ul style="list-style-type: none"> <li>- Standard Internet browser tool;</li> <li>- Mobile App / Mobile web page;</li> <li>- Texting Tool</li> </ul>
<b>Candidate ECAR Concepts</b>	<p><b>Standard Internet browser Tool:</b>            Create a web based entry tool that includes a simple interface for authorized citizens to easily create and update a report.</p> <ol style="list-style-type: none"> <li>1. Citizens could select pre-defined segments, and select pre-defined phrases describing driving conditions (similar to current WYDOT ECAR). Citizen info could be pre-populated based on login, and they only need to change it if different (veh, phone #, name, access code)</li> <li>2. Citizens could select from existing (DOT created) events (such as roadwork) and add details recently observed. – e.g. if they just drove through a work zone and noted a lane closure or a long delay.</li> <li>3. Citizens could select more specific locations (e.g. spot locations) and describe any observed conditions, from a pre-defined list.</li> <li>4. Based upon each citizen’s profile, they options they view could be limited to their commute route, or those events they have been trained to observe.</li> </ol> <p><b>Mobile App / Mobile web page:</b>            Create a mobile web page or App that allows entry from cell phones or mobile devices:</p> <ol style="list-style-type: none"> <li>1. All options described for the Internet browser tool are possible, although fewer options and a simpler interface may be offered.</li> <li>2. Apps might tie to the GPS in the device to automate entry of location.</li> <li>3. Apps could ‘self-report’ simply by reporting the time required to travel a distance and not require manual entry (most suited to metro areas).</li> <li>4. Could tie in to IntelliDrive/Connected Vehicle concepts eventually.</li> <li>5. Could also be used by DOT staff in the field.</li> </ol> <p><b>Texting Tool:</b>            Authorized reporters could be asked to send a text to a DOT account (e.g. ‘WYECAR’) to report driving conditions or delays:</p> <ol style="list-style-type: none"> <li>1. DOT could recognize the reporter by the cell phone number the text is sent (name, ID, vehicle type, call back number)</li> <li>2. Simple commands could be agreed for the text (e.g. &lt;access code&gt;,&lt;hwy #&gt;,&lt;Milepoint&gt;,&lt;description&gt;) -- e.g. 1234,190,147,Slick, blowing snow</li> <li>3. DOT could automatically receive and interpret the message, and send an auto-reply “You reported Slick, blowing snow on I-90 at Milepoint 147”</li> <li>4. Texting might be preferred by some citizen reporters (who are comfortable texting and prefer it to calling)</li> </ol>

<p><b>Examples in Use or Other Systems that Relate to this Concept</b></p>	<p><b>1. Weather Spotters.</b> NOAA weather spotters may use the eSpotter – on-line weather reporting system. <a href="http://espotter.weather.gov/">http://espotter.weather.gov/</a> to report weather conditions. The weather spotters concept is analogous to ECAR in that citizens are trained to perform entry to supplement information.</p> <p><b>2. Waze.</b> The privately owned and operated Waze system (<a href="http://www.waze.com">www.waze.com</a>) allows travelers to download an App that self-reports driving speeds, and allows travelers to manually report conditions or events. All information on waze.com is generated by private citizen drivers.</p> <p><b>3. State DOT Condition Reporting Systems.</b> Although these systems are typically only used by DOT or partner agencies, there has been much learned about what works and does not work from Internet based entry tools.</p> <p><b>4. On-line Newspapers &amp; Blog Entries.</b> Most on-line newspapers present a story, and then allow citizens to submit comments below the story. A similar approach could be used where a DOT enters a roadwork event and allows authorized citizen reporters to add details. Citizen reports could be time-stamped and automatically removed after a given time. For example, the DOT could enter “Maintenance operations on I-90 at Milepoint 147, from July 15 to July 30” as an event, and citizens could comment after they pass the location about daily delays, lane closures etc.</p>
<p><b>Scenario #1 – Entry of New Driving Condition</b></p>	<p>A citizen reporter has reached their destination and is preparing to send in their road report. Instead of leaving a message for DOT operators with all of the road details, the reporter logs on to the DOT Citizen Web Entry from their home or office.</p> <p>Once logged in the citizen reporter is able to quickly enter road details by selecting options from drop down menus.</p> <p>The following items are saved each time the user logs in, however the reporter has the option to change the information as needed.</p> <ul style="list-style-type: none"> <li>Citizen’s Name</li> <li>Access Code</li> <li>Type of vehicle</li> <li>Call back telephone number</li> </ul> <p>Next the citizen reporter selects the route and milepost or milepost range of the event from a pop down menu. The menu is customized based on the route most frequently traveled by the reporter, but the reporter will also have the option to choose other locations.</p> <p>The citizen reporter will then select the direction of travel, direction impacted, and weather conditions from a pop down menu.</p>

	<p>There will also be an option to provide a detailed description of the event.</p> <p>Once the reporter has completed the report they will submit the report by clicking done.</p> <p>The report will then automatically populate the citizen reporting database maintained by the Wyoming DOT operators.</p> <p>Wyoming DOT operators will then be able to review and validate citizen reports in one location. This will alleviate the step of operators entering reports.</p>
<p><b>Scenario #2 – Update to DOT Created Event</b></p>	<p>A Citizen Reporter who commutes to work past a location that is undergoing bridge maintenance is aware that there is a roadwork event lasting for one month.</p> <p>On this particular day, the citizen reporter spends approximately 20 minutes waiting for the flagger to flag traffic through the workzone as all but one lane is closed.</p> <p>The citizen reporter reaches work 5 minutes after clearing the workzone and immediately logs in to the computer and finds the roadwork event in the ECAR system and adds a description of today’s delays encountered.</p> <p>From the other travelers’ perspectives:</p> <ul style="list-style-type: none"> <li>- Travelers viewing the website notice the roadwork icon for this event is colored different from other events (indicating a recent update). As they click the event to view the information, they are presented with the latest DOT entered description, but they also can view the ‘citizen reported update’ describing the 20 minute delay.</li> <li>- Callers to the 511 phone system who request this highway hear the report as follows: “On I-90 at Milepoint 147 there is bridge construction and there is an unconfirmed report of delays up to 20 minutes”.</li> </ul> <p>From the system’s view, the update to the roadwork description is disseminated for an agreed period (approximately 1 hour) until the system automatically deletes the update unless another report is received.</p> <p>The system logs the entry and the ID of the citizen who made the entry. DOT representatives may review the entry (either while it is active or after the fact) to monitor the entries made by authorized citizens.</p>

## 5.2 Social Networking Tools

The following table describes social networking tools.

Applicable to	Need #1, Need #3
<b>Description</b>	<p>Social Networking Tools (such as Twitter and/or Facebook) allow large numbers of citizens to participate in sharing information. These tools can be useful for citizens to receive information from DOTs, and for citizens to share information to DOTs. Twitter is a specific example used by multiple DOTs to share information and to allow citizens to share information. The remainder of this definition will use Twitter as an example tool.</p>
<b>Candidate ECAR Concepts</b>	<p><b>DOT Post Twitter Messages – Citizens Reply</b></p> <p>DOTs can use Twitter to post messages describing accidents, driving conditions, roadwork, or other events. Followers on Twitter can reply, adding details to the information created by the DOT.</p> <p>This might be most suited to posting a Twitter message for planned or active roadwork, and allowing ‘followers’ to add details they observe while passing the location.</p> <div data-bbox="662 961 1235 1423" style="border: 1px solid #ccc; padding: 10px; margin: 10px 0;">  <p>The screenshot shows a tweet from @wsdot_traffic: "On SR 520 westbound just east of 148th Ave NE there is a collision blocking the HOV lane." It has two replies: "Brutal porche/honda collision. No fatalities." and "That guy should get out of the street..."</p> </div> <p>(Source: Active WSDOT Twitter account)</p>



	<p><b>DOT ‘Follows’ Citizens on Twitter</b></p> <p>For DOTs that have identified citizens who are willing to perform regular reporting of driving or traffic conditions, Twitter could be a tool that enables this reporting.</p> <p>If the citizen establishes a Twitter account and the DOT ‘follows’ the citizen, each time a citizen posts a message, the DOT Twitter account receives this information. An example of a WSDOT message received from a Twitter report of a citizen:</p> 
<p><b>Examples in Use or Other Systems that Relate to this Concept</b></p>	<p><b>1. NWP Member States use of Twitter</b></p> <ul style="list-style-type: none"> <li>• MDT – 778 followers (May 2011). Posts describing severe driving conditions, road closures, chain restrictions. No observations where citizens reply or add information to posts.</li> <li>• Mn/DOT – 2,598 followers (May 2011). Posts describe crashes, obstructions, other types of incidents. Posts are removed when conditions clear – only current conditions are visible. No observations where citizens reply or add information to posts.</li> <li>• Idaho (ITD) – 1,219 followers / following 611 Twitter accounts. Posts describe news and/or press releases (e.g. job announcements, plans for construction, seasonal requirements such as removal of studded tires). No observations where citizens reply or add information to posts.</li> <li>• WSDOT – 6,766 followers. Posts describe traffic, roadwork, incidents and other events impacting traffic. Several observations where citizens contribute information about traffic conditions and/or ask questions to WSDOT-Traffic and receive a response, thus allowing others to view and receive this information.</li> </ul>  <p style="text-align: center;">(Active WSDOT Twitter Account)</p>

<p><b>Scenario #1 – Entry of New Event/Condition Report</b></p>	<p>A citizen reporter has reached their destination and is preparing to report on the driving conditions they observed while driving to work. Instead of leaving a message for DOT operators with all of the road details, the citizen uses the Twitter Application on their iPhone (or their Internet Browser) to make a brief post of the location and condition.</p> <p>A DOT representative receives a text alert of the report and is able to view the information. The DOT representative can make a determination if they wish to enter the condition report into their system that feeds the 511 phone system and public website, or if they wish to wait for further verification.</p> <p>Meanwhile, other followers of the DOT Twitter feed will be able to view the event entered by the citizen, however they will appear as conditions reported by citizens and not the DOT.</p>
<p><b>Scenario #2 – Update to DOT Created Event</b></p>	<p>A DOT representative posts a Twitter message describing a roadwork event planned for the current day.</p> <p>As the day progresses, numerous citizens (some who have been recruited and trained as reporters and some general citizens) reply to the Twitter post with observed details, as follows:</p> <p>At 9:15am, a citizen reports that they just went through the workzone and observed all lanes open and no delays.</p> <p>At 9:45, a citizen reports that they recently passed the zone and observed one lane closed and a 10 minute delay.</p> <p>At 11:00, a citizen reports that they recently passed the zone and observed all lanes open and no delays.</p> <p>At 1:00, a citizen reports that they recently passed the zone and observed a flagger letting traffic through intermittently and 20 minutes of delay.</p> <p>At 2:30, a citizen reports that they observed all lanes open and no delay.</p>
<p><b>Potential Issues and Other Considerations</b></p>	<p>1. Twitter (and other Social Networking Sites) offer essentially free access to on-line systems that are widely recognized and used by citizens. However, they do not offer the opportunity for tailoring or tweaking to meet specific needs. For example, a citizen who signs up to receive messages of all Twitter reports for the WSDOT or Mn/DOT traffic Twitter accounts can expect to receive 50-60 messages per day describing roads all over the metro area. Given that the citizen is likely only interested in a small number of these roads at limited times, they may grow irritated with the constant messages and turn off the text messaging alert.</p> <p>2. While Social Networking sites would provide a ready-made on-line system to allow citizens to report in the system, a DOT deciding to use this as the only mechanism would need to require the volunteer citizens to have a Twitter account, and therefore each report will identify who reported it. This ‘visibility’ may not be something all the citizen reporters are comfortable with. Therefore, while Twitter may be an option for citizen reporters, DOTs should probably not have it be the only reporting method.</p>

### 5.3 Blog Capable Websites

The following table describes blog capable websites.

**Table 5 – Blog Capable Websites**

<b>Applicable to</b>	<b>Need #1, Need #2, Need #3</b>
<b>Description</b>	<p>The term ‘blog’ refers to a type of website where information is posted, typically in chronological order, and others are allowed to comment or add to the descriptions. To post a comment to a Blog website, users may need to register with the site or may be able to post comments without any registration. Unlike some more specific Social Networking tools, blog sites typically do not push any messages to ‘followers’, but rather exist for others to visit as they wish. The potential for blog sites to play a role in citizen reporting systems is based on what we all experience in on-line newspapers or other informative websites. Today, it is very common for an on-line newspaper to report a story and then allow comments from readers. Readers may use the blog capability to add more detail, correct mistakes, or offer their own opinion. Often, the blog site is monitored to remove profanity or other inappropriate comments.</p>
<b>Candidate ECAR Concepts</b>	<p><b>Blog Pages for Key Stretches of Highway – DOT and Registered Citizens Enter Comments</b></p> <p>DOTs could create a series of Blog pages where each page is associated with a key stretch of highway. An overall map (or map of the NWP Corridor) could allow website visitors to click on a segment of highway and link to the appropriate ‘blog page’.</p> <p>The content on the blog page could be a combination of blog postings from DOT representatives AND trained citizen reporters (who have registered on the page by logging in). By only allowing the trained citizen reporters to have ‘write’ capabilities on the page, the DOT could eliminate the need to monitor the blog page closely (as it would if any public citizen could enter).</p> <p>Trained citizens could be asked to enter driving conditions (or traffic conditions) for pre-defined segments of highway (that correspond to a blog page). Similarly, DOTs could post specific information about roadwork that occurs on the stretch of highway covered by the blog page, and the trained citizens could comment on this specific roadwork, adding details.</p> <p>There are several commercial Blog Platforms (e.g. WordPress) that allow non-technical users to create blog pages and assign permissions, often for minimal fees. Similarly, a DOT (or the NWP Program) could create the software of a blog page.</p>

	<p><b>DOT Created Blog Pages – Any Citizen Allowed to Comment</b></p> <p>Similar to the above concept, a DOT (or group such as NWP) could establish one or multiple blog pages and allow any citizen (who registers and gives minimal information) to enter detailed road condition or traffic reports.</p> <p>This concept would allow for a potentially larger base of citizens contributing information, but this would introduce the need to more closely monitor the content that is posted (as well as questioning the accuracy of entries made by citizens who are not trained).</p>
<p><b>Examples in Use or Other Systems that Relate to this Concept</b></p>	<p>Newspaper websites, travel sites, restaurant review sites are just some examples of the types of blog sites that citizens experience every day. With increasing exposure to blog sites, citizens are increasingly familiar with how to interpret the comments posted to these sites. Whereas published articles from a newspaper have an assumed ‘credibility’ to them, readers of blog sites must keep in mind that the comments made by the general public can range in value.</p> <p>Therefore, if a DOT blog site for roadway condition reports were to use trained citizens, the blog site could include a description of the training process.</p>
<p><b>Scenario #1 – Entry of New Event/Condition Report</b></p>	<p>A citizen reporter has reached their destination and is preparing to report on the driving conditions they observed while driving to work. Instead of leaving a message for DOT operators with all of the road details, the citizen opens the public information website and clicks on the highway segment they observed. This takes them to the blog site for this segment. The user logs in as a registered (trained) user and is able to add a comment to the site.</p> <p>The Blog site is configured to delete all comments after an agreed period (most likely 3 hours), so the user does not need to enter an end time or remove the description entered.</p>
<p><b>Scenario #2 – Update to DOT Created Event</b></p>	<p>A DOT representative has posted a roadwork event and the event shows up on the Blog site. A trained citizen reporter passes the roadwork site each day to and from work. On days where a delay is observed, after completing the trip, the citizen visits the DOT website displaying the information, clicks on the stretch of road and adds a comment noting the delay that was encountered.</p>

## 6. Deployment Scenarios

This section presents a series of deployment scenarios that might be used in conjunction with one or multiple ECAR tools described in this report.

### 6.1 Deployment Scenario #1: NWP I-90/I-94 Corridor Deployment

The NWP members could agree to jointly develop a citizen assisted reporting (ECAR) system for the entire NWP corridor. The NWP Corridor ECAR system could populate the NWP travel information website, allowing the NWP website to have different information than what appears on the individual State DOT websites and phone systems. This scenario would allow citizens to be recruited to enter conditions in any combination of states along the corridor and allow for events to cross borders. Similarly, the NWP Corridor member states could determine if they prefer to only allow entry from trained citizens or to allow 'crowd-sourcing' style entry from all citizens.

#### **Citizen Web Entry Tool:**

- A corridor-wide web entry tool that only includes the I-94/I-90 highways could be created. The corridor could be divided into pre-defined segments and citizens could use the tool to select a pre-defined segment and describe conditions;
- The web entry tool could ingest events from each state's condition reporting system, therefore populating the database with events entered by DOT personnel;
- The events in the citizen web entry tool (DOT entered and citizen entered) could directly feed the corridor-wide traveler information website;
- As many travelers are regular commercial carriers who travel multiple states, the recruiting and training of citizen reporters might be accomplished regionally. The NWP states could share in the effort to recruit citizens to perform these tasks;
- The results of the earlier NWP project to define consistent corridor-wide descriptions of events and conditions could be used as optional messages for the travelers to select; and
- This would essentially be a geographic expansion of what is operational in Wyoming, however by allowing citizens to report directly to a web tool it would remove the need for telephone reporting.

#### **Twitter:**

- A technology simple deployment could be accomplished by the creation of a NWP Corridor Twitter account and by encouraging corridor travelers to 'follow' the NWP Corridor and enter events to be shared with other Twitter followers;
- DOT operators could monitor the NWP Twitter feed for events entered by travelers, and when appropriate enter these events in their local traveler information systems.

## **6.2 Deployment Scenario #2: Wyoming Expansion**

Wyoming DOT could implement a NWP project to expand their existing ECAR project to allow authorized citizens to use any of the optional web entry tools. The other NWP states would benefit from learning of the lessons learned by Wyoming, and the deployment in Wyoming would be low cost given that they have trained citizens already on-board. Some citizens may not wish to enter using the web tool (and this would be valuable insight as well).

### ***Citizen Web Entry Tool:***

- Wyoming DOT could (possibly with the support of NWP funding through a Work Plan 6 project) develop a web entry tool and offer that existing trained citizen reporters could use the web entry tool to report conditions rather than calling the ECAR phone system;
- Over the initial years of operations, the system could be monitored to observe if there is a difference in reporting frequency, detail of reporting, or citizen preferences;
- Wyoming DOT could experiment with different options for web entry tools, such as mobile tools, text messaging or standard internet tools.

### ***Social Networking / Twitter:***

- Wyoming DOT could consider implementing a Twitter account and allowing trained citizen reporters to use the Twitter account to post messages as opposed to using the phone system. DOT staff could monitor the Twitter page (receiving text messages when there is a post from a trained citizen) and inserting the text into the Wyoming DOT reporting system. This technology test could determine if this is easier than monitoring phone calls and voicemails.
- Wyoming DOT could consider implementing a Twitter account and allowing the general public to contribute condition reports. While there are no expectations that the general public would report conditions with the reliability that the trained citizens do, the additional number of potential reports could provide an increase in the information content.

### ***Blog Enabled Website:***

- Wyoming DOT could consider deploying a website that allows comments to DOT postings. This could allow Wyoming DOT to create event reports for roadwork and for the authorized and trained citizens to add comments each time they observe actual conditions within a work zone.

### **6.3 Deployment Scenario #3: Other State Deployment**

A (non-Wyoming) member state could deploy a web based entry tool for authorized citizens to report conditions and/or events to supplement their existing condition reporting system that feeds their state operated traveler information system.

- The DOT could select whether to only allow entry from trained citizens or whether to invite the 'crowd' to enter event reports;
- This project could be a NWP deployment and could be compared to the phone entry system in Wyoming to assess the differences in staff time dedicated to operating the system and differences in citizens reactions to the systems (for example, citizens might prefer either phone entry or web entry while the other option might be less burdensome on the DOT to operate).