

# **Safety Hot Spot Analysis Methodology in Utah**

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**Abstract:** The Utah Department of Transportation (UDOT) Traffic and Safety Division continues to advance the safety of roadway sections throughout the state. To aid UDOT in meeting their current goal of zero fatalities the Department of Civil and Environmental Engineering at Brigham Young University has worked with the Statistics Department in developing analysis tools for safety. The most recent of these tools has been the development of the Utah Crash Prediction Model to evaluate traffic crashes and safety on UDOT roadways statewide using hierarchical Bayesian models. The results of this model are integrated in a Geographic Information System framework. This research focuses on the enhancement of the Framework for Highway Safety Mitigation in Utah with its six primary areas of emphasis. The framework was enhanced by developing a methodology for accomplishing the areas of network screening, diagnosis, and countermeasure selection. This methodology is titled, “Hot Spot Identification and Analysis,” and consists of the following seven steps: 1) identify problematic segments with safety concern, 2) identify problem spots within the segments, 3) micro analysis of problematic segments and spots, 4) defining the segment, 5) defining the problem, 6) evaluation of possible countermeasures, and 7) selection and recommendation of feasible countermeasures. This methodology is to help in the identification of hot spots with safety concerns so that they can be analyzed and countermeasures can be identified to mitigate the safety issues.

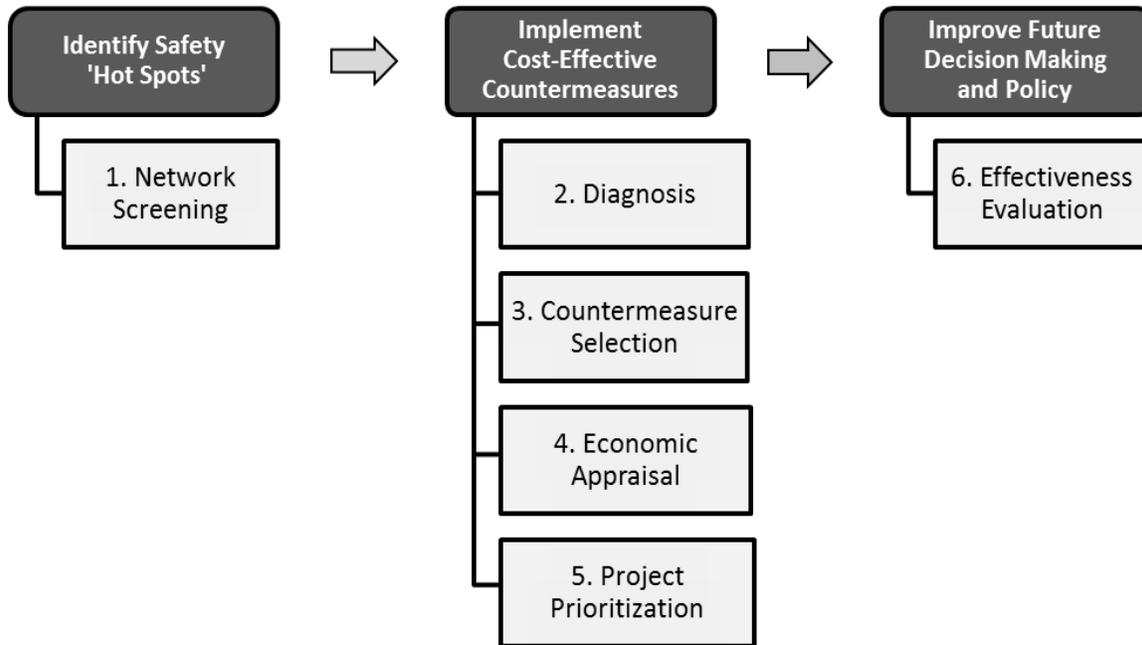
## **INTRODUCTION**

From the previously published Transportation Research Board (TRB) paper (Schultz et al. 2015):

“The Utah Department of Transportation (UDOT) Traffic and Safety Division continues to advance the safety of roadway sections throughout the state. UDOT has continually placed safety at the forefront of their priorities and continues to develop and publicize the ‘Zero Fatalities: A Goal We Can All Live With™’ campaign to increase awareness of the importance of highway safety (UDOT 2013). UDOT has also continued at the forefront of research and education through their active participation and membership in the TRB Highway Safety Performance Committee and their willingness to invest in safety research. The Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO) are also continually working to aid states in safety analysis, primarily with the release of the AASHTO *Highway Safety Manual* (HSM) to aid in the analysis of transportation safety data (AASHTO 2010).

“The purpose of this paper is to report on research conducted to advance the level of safety research in the state of Utah further by applying the Framework for Highway Safety Mitigation across the state and building upon...research to provide UDOT with transportation safety research that addresses the future of the system and the needs of tomorrow. The Framework for Highway Safety Mitigation, illustrated in Figure 1, was adapted from the HSM Roadway Management Process (AASHTO 2010). Safety research in Utah was advanced by the development of a methodology for accomplishing the first three areas of the framework. This methodology is titled, ‘Hot Spot Identification and Analysis,’ and covers the network screening, diagnosis, and countermeasure selection areas (Schultz et al. 2013)” (Schultz et al. 2015).

The previously published research provides the reader with background on the Framework for Highway Safety Mitigation, safety, crash analysis techniques, and crash type countermeasures. In addition, the Hot Spot Identification and Analysis Methodology is presented and conclusions to the research are given. The reader is referred to the previously published literature for the details of the framework (Schultz et al. 2015).



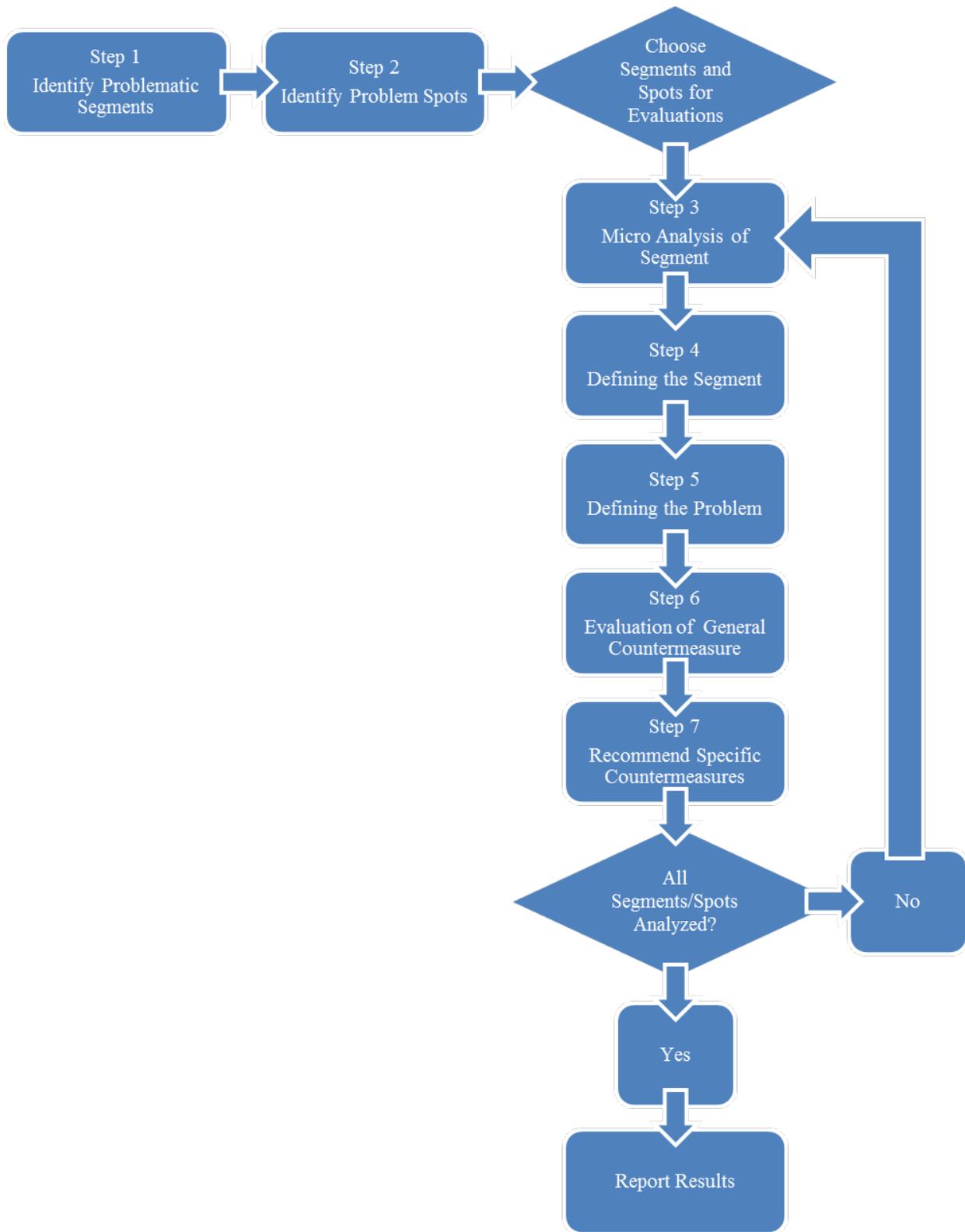
**Figure 1. Framework for Highway Safety Mitigation (adapted from AASHTO 2010).**

## CONCLUSIONS

The conclusions of the previously published research are as follows (Schultz et al. 2015):

“Because safety continues to be a high priority for UDOT, the purpose of this research was to advance the level of safety research in the state of Utah by developing a methodology for accomplishing the first three areas in the Framework for Highway Safety Mitigation as illustrated previously in Figure 1. This methodology is titled, ‘Hot Spot Identification and Analysis,’ and covers the network screening, diagnosis, and countermeasure selection areas of the framework. As illustrated...in Figure 2, the hot spot identification and analysis methodology for roadway safety consists of seven steps: 1) identify problematic segments with safety concern, 2) identify problem spots within the segments, 3) micro analysis of problematic segments and spots, 4) defining the segment, 5) defining the problem, 6) evaluation of possible countermeasures, and 7) selection and recommendation of feasible countermeasures. A detailed discussion on each step was provided [in the research paper] along with an example of how the methodology is applied...By using this methodology a systematic approach can be taken to identify safety issues in the roadway network and to select feasible countermeasures to mitigate the problem” (Schultz et al. 2015).

The reader is encouraged to refer to the literature for more information on this topic (Olsen et al. 2011, Schultz et al. 2011, Schultz et al. 2012, Schultz et al. 2010).



**Figure 2. Hot spot identification and analysis methodology for roadway safety flowchart (Schultz et al. 2015).**

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