# Abstract

Emergency planning is required to respond to the increasing wildfire threat. A part of this is to assess a community’s capacity to move to a safe place during wildfires. This can be achieved by calculating the time it takes for a community to evacuate from an at-risk area to a relatively safe place. Simple approaches, such as the commonly used engineering calculation, may provide access to a broader group of practitioners to assess or estimate a community’s evacuation time. However, **currently there is no publicly available engineering calculation that considers community characteristics and road network for evacuation during wildfires.**

This work presents a **first attempt to produce a simple set of engineering calculations to capture the impact of a wildfire emergency on traffic performance during an evacuation of a community**. An existing mathematical traffic model was identified and has been improved to represent traffic conditions during wildfire evacuations. Factors assumed to directly impact the traffic performance during evacuations were added to this model to improve the numerical framework representation of wildfire conditions and their impact on traffic movement. The factors were derived from conditions found in the past wildfire evacuations by reviewing previous wildfire evacuation case studies.

The improved model was then applied and compared to an empirical data set from a past wildfire evacuation and showed a better representation than the existing theoretical model. A set of test case was examined to investigate the impacts of the existing theoretical model improvements on predicted performance.