



Caltrans Division of Research,
Innovation and System Information

Research

Notes

Planning, Policy,
and
Programming

AUGUST 2022

Project Title:
Improving Our Understanding
of Fire Displacement Effects

Task Number: 3339

Start Date: January 1, 2020

Completion Date: August 31, 2021

Task Manager:
Frank Law
Project Manager
frank.law@dot.ca.gov

Improving Our Understanding of Fire Displacement Effects

Improve understanding of the urban edge wildfire resilience by developing greater insight into three key mobility aspects of the Camp Fire disaster: communication, evacuation, and post-disaster residential location decision-making.

WHAT IS THE NEED?

Although there is significant literature on evacuations for slow-moving disaster events (e.g., hurricanes), far less is known about rapid evacuation decision-making. There is limited understanding about how populations respond to post-disaster. Understanding the evacuation and communications patterns as well as the ways in which populations relocate post-disaster has significant planning and operational implications statewide.

More than 300 California communities are at high risk for rapid evacuation due to wildfires, including those from the Southern California, fires displaced more than 150,000 people statewide in 2019. Evacuations from rapidly advancing fires on the urban edge are subject to roadway availability, often involving fire response crews moving in the opposite direction from evacuees. Understanding how to quickly mobilize, execute road closures, and even where and when to deploy communication and visual assessment tools is paramount to ensuring safety in those kinds of events.

WHAT ARE WE DOING?

In this project, the researchers will draw on two major sources of information. First, they will use survey data that was collected from Camp Fire survivors in November and December 2018. Second, the research team will conduct a limited number of focused in-depth interviews conducted with individuals who were semi-permanently relocated to the Chico area.

The survey data were collected inside Red Cross shelters at the Chico Silver Dollar Fairgrounds and the Butte County Fairgrounds and at the Federal Emergency Management Agency Camp Fire



DRISI provides solutions and
knowledge that improves
California's transportation system

Disaster Recovery Center. As part of this work, the researchers will conduct a follow-up survey with participants 6 to 8 months after the initial survey.

The researchers will query recipients on residential decision-making and location status, the type of residential structure, and any aid disbursements. Combining the initial data plus the follow-up data, the researchers will be able to begin to trace regional movement, status and dislocation issues among those affected by the Camp Fire. In particular, the researchers will explore the movement of disadvantaged groups and the varying availability and use of resources at different points in time.

The researchers will first analyze the survey data relating to evacuation departure point, departure time, route choice, smartphone use, time informed of fire, trip duration, and destination etc. They will develop a wildfire evacuation model and compare route choice and travel time etc. under different scenarios.

WHAT IS OUR GOAL?

This research aims to improve understanding of urban edge wildfire resilience by examining three key mobility aspects of the Camp Fire disaster: communication, evacuation, and post-disaster residential decisions. Specifically, the researchers will study evacuation behavior and communication patterns as well as the residential decisions made post-disaster, paying particular attention to disadvantaged populations who are limited in their options in the wake of disasters.

To answer these questions, the researchers will use the survey data collected from November 2018 through January 2019 of Camp Fire survivors living in Red Cross shelters coupled with a 6-month follow-up survey. The research team will answer these questions by designing and completing quantitative counterfactual exercises in the framework of a state-of-the-art general equilibrium quantitative urban model.

WHAT IS THE BENEFIT?

Understanding the evacuation and communications patterns as well as the ways in which populations relocate post-disaster will help to improve planning and operational effort regarding rapid evacuation and relocation decision-making and resources statewide. Knowing how and where people disperse in the short term is important for many reasons. First, evacuation behavior has important ramifications for evacuation models used in fire safety engineering. There is also a significant and important gap in understanding how to best accommodate vulnerable populations in these kinds of crises. Many of those who perished during the fire evacuation were the elderly and disabled.

WHAT IS THE PROGRESS TO DATE?

The final report was submitted in July 2022. The researcher informed us that they are awaiting the acceptance of the paper for academic journey publication.