Research Project Highlight

Leveraging Leading Indicators for Wildfire Risk Reduction

TSRP Topic – Areas of Application, A3

Principal Investigator
Rune Storesund, Executive Director, Center for Catastrophic Risk Management, UC Berkeley

Research Team
Karlene Roberts, Director, Center for Catastrophic Risk Management, UC Berkeley
Khalid Mosalam, Director, PEER

Start-End Dates:
February – August 2020

Abstract
This integrated study by engineers and social scientists will advance the reach of Performance-Based Engineering (PBE) into public policy by identifying 'leading indicators' that can be used to enable the characterization and measurement of the skew between 'predicted' and 'actual/experienced' across system life-cycles phases of critical infrastructures subject to extreme events (in this case a focus on wildfires and impacts to California transportation systems) in the face of climate change. The 'expected condition' during operations can be used as a component of a 'leading indicator' program to enable early detection and correction by operators and managers to ensure the desired level of safety and reliability are achieved throughout the infrastructure life cycle.

The tools and method frameworks will be developed to: (1) capture and archive initial assumptions associated with the original configuration of the system {Assumption Register}; (2) establishing operational parameters that constitute the 'expected condition' of the system and associated envisioned 'decision points {Performance Manual}; (3) generating a 'feedback' mechanism across organizational perspectives to capture questions/issues/omissions associated with actual system performance relative to envisioned performance {Issue Tracker}; and (4) parameters for configuration of an organizational 'tactical team' to review 'unexpected' performance instances, analyze relative to original performance assumptions, and provide integrated response plans to system managers for implementation {Safety/Reliability Response Team}.

Deliverables
A PEER report and conference paper describing the analyses, framework and next steps. Additionally, the findings and next-step opportunities will be presented to the California Legislature, via Senator Jim Nielsen's office, who represents Butte County and the residents of the Camp Fire (2018).

Research Project Highlight

Leveraging Leading Indicators for Wildfire Risk Reduction

Research Impact

There is increasing recognition of the need to assess consequences and identify priority risk-based solutions to increase the resilience of California's interdependent energy and other critical infrastructures to climate change-driven extreme weather events. This requires gaining infrastructure operator and public support to make the necessary investments for often costly and long-term upgrades, building new or more resilient infrastructure, and economic, environmental, and other policy and regulatory changes. Securing this support and enabling informed decision-making requires a "whole sector and multi-stakeholder approach" that engages and takes into account the needs of key private and public sector customers, as well as the implications for public health and safety, regional economies, and overall societal well-being.
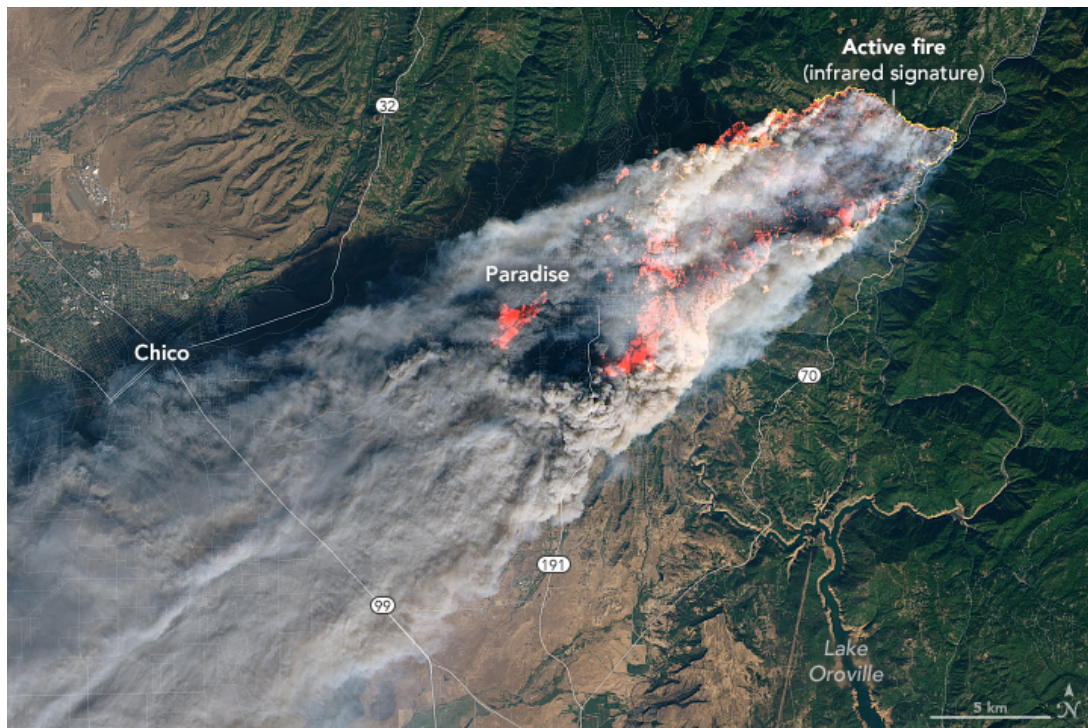
Project Image

Image from NASA's Earth Observatory showing the extents of the 2018 Camp Fire.
(Source: https://visibleearth.nasa.gov/images/144225/camp-fire-rages-in-california/144225t)