ATTACHMENT 3
Fact Sheet Template

The Issue

Many aspects of wildfires in California and elsewhere in the Western United States have changed in the past several decades, including climate patterns and the development of human infrastructure near wildlands increasing the amount of wildland-urban interface (WUI) in the state. Climate change has led to wildland fuel conditions that have increased the likelihood of fire behavior that exceed the assumptions of existing modeling systems. The resulting impacts of wildfire on the investor-owned utilities' (IOUs') electric grid have resulted in increased costs, reduced safety and weakened reliability to ratepayers — a situation that will likely worsen in a changing climate. Wildfire science lacks the fundamental underpinnings to forecast risk in a changing climate and at scale. Operational wildfire behavior models are empirical and cannot be adapted to predict extreme fire behaviors resulting from prolonged heat release by large woody fuels and deep duff layers typical of modern California forests. The current near-term risk forecasts underestimate extreme weather events, surface fuel loads in elevated tree mortality areas and fire-spread dynamics due to omission of novel driving factors. For long-term planning, there is a lack of a comprehensive modeling framework to make mid- to late-century projections of fire risk. Therefore, IOUs, State agencies and stakeholders relying on the grid lack scientifically robust information and actionable insights to make effective near-term management and long-term planning decisions.

Project Description

To address this challenge, an interdisciplinary team of experts, led by Spatial Informatics Group (SIG), proposes the comprehensive open-source development of next-generation wildfire models for grid resiliency and safety. The next-generation models will provide actionable information at fine-scale resolution in the near term and coarse-scale resolution in the long term. In Phase 1, the proposed project will advance wildfire science by incorporating the dynamics of tree mortality and extreme fire weather in next-generation fire models. Building on the new science, we will develop computationally efficient wildfire risk forecasting models and deploy them at IOUs to demonstrate the potential of promising technologies to reduce the impacts of wildfire on the electricity grid. At both time horizons, our team will compare different approaches to addressing the multiple technical dimensions and converge on the first best path to the next generation of wildfire models. In Phase 2, we will then integrate risk forecast models at IOUs and support the Fifth Climate Change Assessment (Fifth Assessment) with future fire projections.

The proposed research will advance wildfire science by incorporating the interaction of tree mortality and extreme fire weather in next-generation fire models by leveraging facilities and expertise at the United States Forest Service Missoula Fire Sciences Laboratory, the UC Berkeley Center for Fire Research and Outreach and the Mesocale and Microscale Laboratory at the National Center for Atmospheric Research. Building on the advances in wildfire science, the project team will develop the next generation of wildfire models to improve assessment of risks to the electric grid from wildfires now and under climate change. The innovation will be to develop zero-to-seven-day risk forecasts for the grid with best-in-class predictive capabilities, computational efficiency and scalability that incorporates the latest wildfire science. To support planning, the project team will develop long-term fire projections using a coupled fire-climate-vegetation statistical and dynamical model to integrate the latest climate projections, tree mortality, development in the wildland-urban interface, and adaptation strategies. At both time horizons, the project team will compare different approaches to addressing the multiple technical dimensions and converge on the first best path to the next generation of wildfire models. To integrate the models into electric utility management and planning, the project team will facilitate workshops with IOUs to understand needs, design the models and provide technical support for deployment and implementation. To support the Fifth assessment, the project team will develop a web-based scenario analysis tool to visualize and manipulate the impacts of climate change and landscape/urban adaptation strategies on the grid.

Anticipated Benefits for California

The first anticipated benefit results from improved decision-making by IOUs to reduce the cost of wildfire impacts to the grid. The decision-support tools developed during the project will be integrated into IOU operating practices to deliver a more reliable, safe and cost-effective grid. The secondary benefit to ratepayers is from improved planning by State agencies and stakeholders relying on the grid. Mitigating the impacts of wildfires in a changing climate is a multi-stakeholder endeavor. The extent of the adaptation measures requires a new approach to address landscape-level challenges. In response, the project will deliver fire risk projections to support the Fifth Assessment and develop a web-based tool to improve long-term planning by State agencies and stakeholders relying on the grid. These products will enable better planning and implementation of adaptation strategies, which will reduce wildfire risk, and consequently reduce the impacts to the grid.

Our decision-support tools will support IOU efforts to mitigate the risk of wildfire consequences and reduce the damage of fires spreading onto the grid. Improved data and models for fire behavior prediction, particularly with respect to fuel load reductions, de-energization and fire hardening, will allow for fire mitigation investments to be strategically targeted, increasing marginal risk reduction for each dollar invested. With the use of more granular, dynamic fire-spread models, mitigation activities can be more precisely configured, making them consequently less extensive in scope. Such improvement in management would not only bring down management costs, but would also ultimately reduce fire damage to grid infrastructure and outages that would result from such damage. The lower-cost, more effectively designed fuel treatments, de-energization and fire hardening would also yield safety benefits to life and property in communities that are proximate to grid infrastructure.

Project Specifics

Contractor: Spatial Informatics Group LLC
Partners: Reax Engineering, University Corporation of Atmospheric Research (UCAR), University of California (UC) Merced, UC Berkeley, United States Forest Service Missoula Fire Sciences Laboratory (FireLab), Eagle Rock Analytics, United States Geological Survey (USGS), University of New Mexico, Pyrologix, Salo Sciences, Brattle Group, University of San Francisco, Commonwise, Prometheus Fire Consulting, Sonoma Technology, Deer Creek Resources and Clere
Amount: $5,000,000
Co-funding: $1,656,600 from USGS, FireLab, Reax Engineering, Spatial Informatics Group, Pyrologix, NCAR, Brattle Group, Eagle Rock Analytics.
Term: June 2019 to December 2023