

FIRESEV: A Fire Severity Mapping System for Real-Time Fire Management Applications and Long-Term Planning

Introduction

Accurate, consistent, and timely fire severity maps are needed in all phases of fire management including planning, managing, and rehabilitating wildfires. The problem is that fire severity maps developed from satellite imagery are difficult to use for planning wildfire responses before a fire has actually happened and can't be used for real-time wildfire management because of the timing of the imagery delivery. Moreover, imagery is difficult to use for controlled fires such as prescribed burning.

FIRESEV (FIRE SEVerity Mapping Tools): We created a suite of digital maps, simulation models, analysis tools, study results, and synthesis papers integrated into a comprehensive system for the creation of fire severity maps for wide-ranging fire management applications: (1) real-time forecasts and assessments in wildfire situations, (2) wildfire rehabilitation efforts, and (3) long-term planning. FIRESEV is a comprehensive set of tools and protocols to deliver, create, and evaluate fire severity maps for all phases of fire management. It can be used to create real-time fire severity maps on its own or along with current satellite imagery products to enhance data analysis of fire effects. FIRESEV also provides a thorough background on how to measure, interpret, and apply fire severity in fire management. This complements the suite of burn severity products currently used by fire management (e.g., BARC and BAER severity maps). A blending of many fire severity mapping approaches will help meet demands from fire and other natural resource managers for accurate and rapid assessment of spatial fire severity given time, funding, and resource constraints.

Science managers can use for assessing fire severity

Severe Fire Potential Map (SFPM) quantifies the potential severity of future fires across the western United States to meet immediate needs of fire management. This wall-to-wall 30-m map can be instantly accessed over the Internet to evaluate potential fire severity for a burned area. Developed from empirical models relating topographic, vegetation, fire behavior, and fire weather variables to fire severity as mapped using the Monitoring Trends in Burn Severity (MTBS) digital products, this map for 90th percentile 1000-hr fuel moisture can included as a layer in Wildland Fire Decision Support System or other GIS analysis.



- Fire severity mapping algorithm was added to the Wildland Fire Assessment Tool (WFAT) developed by the National Interagency Fuels Technology Transfer (NIFTT) team. WFAT is used for fuel treatment planning to predict potential fire effects under prescribed fire weather conditions (<u>http://www.frames.gov/partner-sites/niftt/tools/niftt-current-resources/</u>). Now, fire severity can be mapped explicitly from fire effects simulation models (FOFEM, Consume) for realtime and planning wildfire applications.
- We showed how results from the WFAT simulated fire severity can be integrated with satellite imagery to improve fire severity mapping for local applications Satellite imagery can be used to develop other maps of fire severity (MTBS, BARC) in 2-4 weeks, but these maps can be improved by merging simulation modeling and satellite imagery to estimate fire severity

We hope you find these publications useful for describing, interpreting, and mapping fire severity for wildland fire management (visit project web site to access them):

- An objective method of quantifying fire severity from fire effects to obtain nine unique classes of fire severity
- Research contrasting all current classifications of fire severity using Composite Burn Index (CBI) as measured on over 300 plots across the western United States to determine commonalities and differences
- Synthesis paper discussing the problems involved in measuring, describing, and quantifying fire severity.
- > Comprehensive database of field assessments of fire severity across the western United States
- Digital tree list that links to LANDFIRE map products that can be used to estimate tree mortality and to describe fire severity.

For more information

- Project Website: <u>http://www.firelab.org/research-projects/fire-ecology/128-firesev</u>
- FIRESEV Severe Fire Potential map and GIS data available online from FRAMES: <u>http://www.frames.gov/firesev</u>

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