

# A Fire Severity Mapping System (FSMS) for Real-time Fire Management Applications and Long Term Planning: Developing a Map of the Landscape Potential for Severe Fire in the Western United States

\*Gregory K. Dillon<sup>1</sup>, Zachary A. Holden<sup>2</sup>, Penny Morgan<sup>3</sup> and Bob Keane<sup>4</sup>

<sup>1</sup>Ecologist, USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory, Missoula, MT USA. <sup>2</sup>Biological Scientist, USDA Forest Service, Northern Region, Missoula, MT USA. <sup>3</sup>Professor, University of Idaho, Department of Forest Resources, Moscow, ID USA. <sup>4</sup>Research Ecologist, USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory, Missoula, MT USA.

The Fire Severity Mapping System project is geared toward providing fire managers across the western United States with critical information for dealing with and planning for the ecological effects of wildfire at multiple levels of thematic, spatial, and temporal detail. For this project, we are developing a comprehensive, west-wide map of the landscape potential for severe fire. Holden et al. (in press) demonstrated on the Gila National Forest that using satellite-derived fire severity data from the Monitoring Trends in Burn Severity (MTBS, <http://www.mtbs.gov>) project, coupled with topographic and biophysical predictor variables, they could predict locations of high severity fire with over 80% accuracy. Given the availability of MTBS data for all large fires from 1984 – 2006, we propose to apply similar methods across the western United States. Our methods will consist of the following major steps: 1) compile dependent and independent variable data layers; 2) develop statistical predictive models using the Random Forests machine learning algorithm; 3) apply models spatially to produce raster output; and 4) conduct an accuracy assessment. Using these steps, we will build unique predictive models for distinct ecological regions across the west, eventually merging them into a seamless, wall-to-wall, 30-meter raster geospatial layer with each cell assigned a probability (0-1) of burning as high severity. This layer will be completed by fall 2011 and served alongside LANDFIRE data layers at the USGS National Map website (<http://landfire.cr.usgs.gov/viewer/>), where it will be available for download to support fire management decisions. Others in our team are developing fire effects simulation models that will produce refined, timely predictions of burn severity for local areas.

Gregory K. Dillon

Ecologist

USDA Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory

5775 US Hwy 10 W

Missoula, MT USA 59808

Phone: (406) 829-6783

Fax: (406) 329-4877

Email: [gdillon@fs.fed.us](mailto:gdillon@fs.fed.us)