

International Journal of Wildland Fire

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Contents	Volume 19	Issue 2	2010
Wildland–urban interface fire behaviour and fire modelling in live fuels David R. Weise and B. Mike Wotton <i>International Journal of Wildland Fire</i> 19 , 149–152		The rationale for and results of two special invited sessions at the 2nd Fire Behaviour and Fuels Conference in March 2007, Destin, FL, USA are presented. Scientists from the fields of building fire research and wildland fire behaviour research met and shared research results.	
Experimental measurements during combustion of moist individual foliage samples Brent M. Pickett, Carl Isackson, Rebecca Wunder, Thomas H. Fletcher, Bret W. Butler and David R. Weise <i>International Journal of Wildland Fire</i> 19 , 153–162		Individual samples of high moisture fuels from the western and southern United States were burned over a flat-flame burner. Time-dependent mass and temperature profiles of these samples were obtained and analysed. It was observed that significant amounts of moisture remained in the individual samples after ignition occurred.	
An examination of fire spread thresholds in discontinuous fuel beds Mark A. Finney, Jack D. Cohen, Isaac C. Grenfell and Kara M. Yedinak <i>International Journal of Wildland Fire</i> 19 , 163–170		Laboratory experiments were conducted to examine fire spread thresholds in terms of fuel bed depth, horizontal gap and slope. Flame contact was found necessary to ignite fuels across the fuel voids. Fire spread thresholds were strongly dependent on the vertical expansion of flame profile relative to the gap distance.	
An examination of flame shape related to convection heat transfer in deep-fuel beds Kara M. Yedinak, Jack D. Cohen, Jason M. Forthofer and Mark A. Finney <i>International Journal of Wildland Fire</i> 19 , 171–178		A flame profile analysis using a simple laminar flame model and laboratory experiments indicates that non-steady flames within vertically arranged, discontinuous ‘deep-fuel’ beds can laterally extend across fuel voids to make contact with adjacent fuels and thus produce convective heating.	
A numerical study of slope and fuel structure effects on coupled wildfire behaviour Rodman R. Linn, Judith L. Winterkamp, David R. Weise and Carleton Edminster <i>International Journal of Wildland Fire</i> 19 , 179–201		Six FIRETEC simulations using three different fuel beds on flat and upslope topography were used to examine the possibility that slope affects fire differently depending on the fuel bed. In this examination, interactions between physical processes that control fire behaviour are studied.	
A sub-grid, mixture–fraction-based thermodynamic equilibrium model for gas phase combustion in FIRETEC: development and results Michael M. Clark, Thomas H. Fletcher and Rodman R. Linn <i>International Journal of Wildland Fire</i> 19 , 202–212		This paper describes the development of a gas phase combustion model, which relies on thermodynamic equilibrium to predict combustion products and temperatures in a physics-based landscape-scale wildland fire model. Simulations of fires in grassland, chaparral and ponderosa pine fuel beds demonstrate the feasibility of this approach.	
Testing and classification of individual plants for fire behaviour: plant selection for the wildland–urban interface Robert H. White and Wayne C. Zipperer <i>International Journal of Wildland Fire</i> 19 , 213–227		Plant-flammability lists for the wildland–urban interface often are problematic because of the sources of information to derive them. Measurements of flammability include ignition times, flame spread rate, flame height and thermal analysis. Recently, researchers have used oxygen consumption methodology to characterise flammability and improve plant lists.	
Ignition and flame-growth modelling on realistic building and landscape objects in changing environments Mark A. Dietenberger <i>International Journal of Wildland Fire</i> 19 , 228–237		A fast predictive ignition and fire growth model for structures and ornamental plants on a parcel lot in a changing environment was developed. Bench-scale and mid-scale fire tests provide data to derive flammability properties. Research is for mitigating fire threats to structures by preventing large-area ignitions on structures and flame travel from firebrand spotting.	

The wildland–urban interface fire problem – current approaches and research needs

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Wildfires that spread into wildland–urban interface (WUI) communities present significant challenges on several fronts. There is a need for a well-characterised, systematic testing of current and new approaches to reduce damages from WUI fires. This would result in improved fuel treatment techniques for wildland and residential fuels, risk assessment strategies, economic cost analysis models, and test methods for fire-resistant building designs and materials.



Images (clockwise from top left): burning manzanita leaf (T. H. Fletcher), deep fuel bed burning (USDA Forest Service, Fire Sciences Laboratory, Missoula, MT), cone calorimeter (USDA Forest Service, Forest Products Laboratory, Madison, WI), chaparral prescribed burn (USDA Forest Service, Forest Fire Laboratory, Riverside, CA), WFDS simulation (NIST, Building Fire Research Laboratory, Gaithersburg, MD).