

Fire effects on forest hydrology: lessons from a multi-scale catchment experiment in SE Australia

**PATRICK N. J. LANE¹ GARY J. SHERIDAN¹, PHILIP J. NOSKE¹,
CHRISTOPHER B. SHERWIN¹, JOHN L. COSTENARO², PETTER NYMAN¹
& HUGH G. SMITH^{1,3}**

¹ *Department of Forest and Ecosystem Science, The University of Melbourne, 221 Bouverie St, Parkville, Victoria 3010, Australia*

patrickl@unimelb.edu.au

² *Department of Sustainability and Environment, Beechworth Victoria 3747, Australia*

³ *School of Geography, Earth and Environmental Sciences, University of Plymouth, PL4 8AA, UK*

Abstract Following severe wildfire in January 2003, a paired catchment experiment in a wet eucalypt forest in Victoria, Australia, was re-commissioned to investigate the effects of fire on discharge and catchment water quality. In parallel with the catchment-scale measurement, a series of nested hillslope and tracing experiments were conducted to understand the hydrologic processes driving changes in runoff, sediment and nutrient generation and export. The data collected and analysed produced insights into discharge; coarse and suspended sediment exports; phosphorus and nitrogen exports; the effect of cover and water repellency on the spatial and temporal dynamics of soil hydraulics and runoff, sediment and nutrient generation; nutrient enrichment processes; changes in sediment ratings curves as a function of vegetation recovery; and sources of exported sediment. The nested hillslope experiments and the sediment tracing studies provided unique insights into the system functioning and, importantly, the spatial and temporal scales and the resolution required to answer the scientific questions.

Key words wildfire; streamflow; sediment; nutrients; water repellency; scale