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The role of ant activity in limiting the effectiveness of erosive overland flow in eucalypt forests, Central Tablelands, south-east Australia

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Following wildfire, slopes tend to be highly susceptible to soil erosion during the first heavy rainstorms. The highly water repellent and erodible sandy soils in the well-dissected eucalypt-forested terrain in Nattai National Park, south-west of Sydney, Australia would, therefore, be expected to have been prone to serious erosion following the devastating wildfires of late 2001. Whilst scorched topsoil, ash and charcoal were readily transferred from hillslope to channel systems in moderate post-fire rainstorms, the underlying erodible water repellent sandy subsurface soil underwent largely local redistribution on the slopes. This has been attributed to several factors including the development of litter dam - microterrace complexes, dense root mats and the nesting activity of ant species. Notable amongst the species is the funnel ant (*Aphaenogaster longiceps*), which builds circular mounds 20-30 cm in diameter and 5-10 cm high surrounding a 4 cm wide, vertical tunnel entrance which extends 30 cm below the surface leading to extensive lateral gallery systems. At least some of the ant population can survive following even the highest surface temperatures generated during fires because the nests extend below c. 20 cm, which is considered to be the threshold for survival. Despite reduced numbers after fire, ant mounding activity generally increases in all but the most severely burnt terrain. Although this leads to the production of large quantities of easily eroded surface material and can lead to substantial quantities of material downslope being moved, the main impact in the Nattai field study area following the 2001 fires seems to have been to increase surface roughness and provide

routes for overland flow to reach wettable soil below the highly repellent upper layer. Along deeply dissected valleys, ants' nests seem to have been a major factor in limiting hillslope – channel sediment transfer by acting as sinks for potentially erosive overland flow especially in footslope zones.