

## **Sediment storage, yield and wood accumulation in ephemeral headwater channels, southeastern Australia**

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**Abstract** Timber production in the coastal forests of New South Wales, Australia occurs predominately in small headwater drainage basins. It is anticipated that as the demand for high quality sawn timber increases, there will be increasing pressure to extract sawlogs from within current harvest exclusion zones. To predict the effects of timber harvesting on sediment and wood accumulation in these headwater systems, and the potential downstream effects, there is a need to better understand the processes and rates of sediment and wood accumulation and their transfer to higher order streams. To that end, the outlets of five unmapped headwater channels have been instrumented with weirs to measure streamflow and suspended sediment concentrations, and bed load traps to measure bed loads. This paper presents results on sediment storage and yield and large wood accumulation. The channels are ephemeral and flowed on average for 2% (21 days) of the time between April 2007 and December 2009. The amount of sediment stored in the channels was significant and ranged from 5947 kg to 21 449 kg, the majority of which was stored on the channel bed. The total amount of sediment stored was on average 99 times the average sediment yield, which ranged from 52 kg to 214 kg suggesting that undisturbed sediment residence time is of the order of a century. Sediment storage behind obstructions ranged from 464 kg to 1504 kg and on average represented 11 times the average sediment yield. The majority of large wood was located outside of the channels. For the large wood that was functional the majority of pieces had diameters  $\leq 30$  cm. The majority of large wood was recruited from the channel margins within riparian management zones. The average large wood source distance was between 4.3 and 7.0 m. Windthrow, trunk and branch snap were the main mechanisms supplying large wood to the channels. The large wood was not being realigned by flow and was remaining where it had fallen.

**Key words** timber production; large woody debris; unmapped headwater channels; sediment storage