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Variability in sediment delivery and storage along river courses in Bega catchment, NSW, Australia: implications for geomorphic river recovery

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Abstract

In many catchments in southeastern Australia, alluvial stores have been the dominant source of sediments mobilised in the period since European settlement. In Bega catchment, on the South Coast of New South Wales (NSW), this has been reflected by dramatic changes to river morphology. Extensive volumes of material have been released and efficiently flushed to the lowland plain, with a sediment delivery ratio of almost 70%. However, only 16% of these alluvial sediments have been flushed through to the estuary, as antecedent controls on valley width have resulted in the lowland plain acting as a large sediment sink. The changing nature of sediment source, transfer and accumulation zones has varied markedly from subcatchment to subcatchment. The volume of material supplied to the lowland plain from differing subcatchments is not related to subcatchment area. Rather, the pattern of river types dictates the spatial variability in storage and transfer. Over 67% of sediment released has been sourced from just 25% of the catchment, from subcatchments characterised by large valley fills (cut and fill River Style) that previously stored extensive volumes of material at the base of the escarpment. These parts of Bega catchment were especially sensitive to disturbance. Sediment exhaustion from these parts of the catchment, and from river courses elsewhere, has major implications for the geomorphic recovery potential of rivers, constraining what can be realistically achieved in terms of river rehabilitation.

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