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Double trouble: the influence of wildfire and flow regulation on fine sediment accumulation in the Cotter River, Australia

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Abstract In January 2003, the Australian Capital Territory and surrounding areas of New South Wales experienced one of the most severe wildfires in living memory. The majority of the Cotter River catchment (266 000 ha), which is a water supply region for the ACT was burnt. This study monitored the accumulation and movement of fine surficial sediment in the regulated Cotter catchment and several free flowing streams for 15 months after the fire. Significant quantities of fine surficial sediment were deposited within the channel of the Cotter River immediately following the fire. Seven months after the fire, a major rainfall event increased quantities of fine sediment by several orders of magnitude. The organic matter was significantly higher after the wildfire. Flushing flows released from the Bendora Dam removed sediment from downstream reaches causing fine surficial sediment to be preferentially eroded from riffle sections and deposited in adjacent pools. Quantities of fine surficial sediment delivered to the two unregulated streams; the Goodradigbee and Goobarragandra rivers, were much lower compared to the regulated Cotter catchment. Flows in the unregulated rivers had a greater capacity to flushing the fine material through downstream reaches because of longer duration of high flows. The results have implications for flow management and aquatic habitat in the Cotter catchment.

Key words wildfire; river regulation; fine sediment; flow management