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Connectivity and the affect of valley constrictions on sediment delivery in the Fitzroy River Basin, Australia.

J. Croke, D Purvis-Smith, C Thompson, and K Amos

1 School of Physical, Environmental and Mathematical Sciences, University of New South Wales, ACT 2600.

The concept of 'connectivity' is increasingly being applied within a range of disciplines in the Earth and Environmental sciences. Although many types of connectivity are defined, overall, there is widespread recognition that the term connectivity in any 'geo-ecological' sense is useful in promoting the interconnection between the morphological components of the landscape and the material fluxes that move across, and through, the drainage basin. The term has also allowed us to think of dis-connectivity (or isolation as used in ecological studies) between both landscape parts and sources of water and sediment. All forms of connectivity are considered relevant to the storage, residency and delivery of sediments and pollutants within a drainage basin.

Using field and modeling data from the Fitzroy River Catchment (FRC), a large (140,000km^2) sub-tropical basin in Queensland Australia, we investigate connectivity and conversely dis-connectivity and its potential impact on sediment delivery to the adjacent Great Barrier Reef Marine Park. Two forms of connectivity are recognised; (1) landscape connectivity; specifically hillslope-channel coupling and (2) sedimentological connectivity where certain features act to prevent and/or enhance the downstream transfer of sediment. Specifically the occurrence of major within-valley constrictions, hereafter referred to as 'bottlenecks', are investigated where valley width reduces dramatically relative to the upstream reaches. In many of these bottlenecks, channel pattern upstream and downstream of the bottleneck is notably different, with

a propensity for change from multi-channel anabranching to single meandering. The affect of such features on sediment routing and delivery is investigated at a number of spatial scales. Using a representative example from the Nogoa sub-catchment, we present results of both field surveys and hydraulic modeling to describe the affect of the bottle neck on sediment deposition, storage and delivery downstream. Using this data, we extrapolate these findings to investigate their affect on the routing, residence time and delivery of material fluxes throughout the entire 140,000km^2 basin.