

## [Biogeomorphic responses to flow regulation and fine sediment supply in Mediterranean streams \(the Guadalete River, southern Spain\) \(González del Tánago et al. 2015\) \[1\]](#)

Geomorphic responses to damming are primarily determined by the magnitude of sediment transport and sediment supply alteration and by the resulting change in the balance between the two. The former change is caused by alterations in the flow regime that are caused by reservoir operations. Flow regime changes also affect the distribution and amount of riparian vegetation that, in turn, also may enhance geomorphic responses. The latter change is caused by sediment trapping in reservoirs and by the magnitude of sediment supply from watersheds that are downstream from the dam. We examined the bio-geomorphic responses to flow regulation along a Mediterranean stream located in an agricultural area of southern Spain where there is significant fine sediment erosion from adjacent hillsides.

We measured changes in active channel width and riparian corridor features during the last fifty years, based on field work and aerial photographs surveys from 1956, 1984 and 2004. We assessed the hydrological alteration and sediment delivery trends linked to dam operation and land use changes. Channel narrowing of nearly 75% and 30% reduction in total corridor area, together with average accretion rates of 0.045 m y<sup>-1</sup> and vegetation encroachment with a 305% increase of mature forest occurred between 1956 and 2004. Causal linkages were attributed to the strong reduction of peak flows and transport capacity of flows, together with land-use changes that likely promoted increased fine sediment delivery. Vegetation overgrowth favored by increased summer flows could contribute to the narrowing and aggradation processes. Our results differ from channel responses to damming in Mediterranean regions dominated by steep gradient gravel bed rivers, and highlight the relevance of topography and land-use affecting the sediment regime downstream from the dams. We argue for a more holistic approach of water resources and land-use management at the catchment scale in order to understand the synergistic effects of dams, sediment supply, and vegetation growth, and to design appropriate flow regulation schemes to cope with irrigation demands and flood risk management in Mediterranean streams.

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