



Do weirs influence a river's hydrosedimentological response to flood events?

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Weirs are the most common anthropogenic pressures in British river systems. The agenda for catchment-scale restoration of river systems, largely driven by the EU Water Framework Directive (WFD – 2000/60/EC), has led to a recognition that many of these structures may need to be removed to re-establish more 'natural' processes to river systems. These physical barriers impact rivers severely, modifying hydrology (i.e. creating artificial flow regimes), sediment flux (i.e. interrupting the sediment transfer through river systems), and channel forms at different scales (i.e. changing downstream erosion and deposition patterns). They also alter greatly the natural fluvial processes, hence making the regulated rivers behave significantly different to natural unmodified river channels. However, the above impacts, and the majority of accepted models for response to weir installation/removal, are conceptual and based on empirical observations. In fact, the impact of weirs on rivers hydro-geomorphology and sediment transport is largely unconstrained and poorly understood. Further to this, even less knowledge and research surrounds the impacts of weirs on individual flood events. The current study aims to use empirical observations of river flow (i.e. water monitoring), sediment transport (both suspended and bedload) and sedimentology (i.e. bed stability, sediment entrainment, long-term planform changes/evolution) together with climatic, hydrological and sedimentological modeling to improve the understanding of weirs' affectation on the river's hydro-geomorphology at several timescales (i.e. from singular flood events to annual/centurial scales). A step beyond the present project is to use the data and the knowledge that will be gained to better address/model the geomorphic adjustment of rivers following weir removal.