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Long-term morphological changes in Welsh regulated rivers under distinct impoundment configuration

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Dams cut the continuity of sediment and water transfer worldwide. Magnitude and frequency of competent events are reduced while important percentages of the sediment load of regulated rivers are trapped in reservoirs. These alterations cause morphological changes on downstream reaches and coastline ecosystems and may create important effects on river's habitat. The analyses of such alterations are relevant for water and sediment management purposes in regulated rivers and, in the case of the European Union, may inform actions to restore geomorphic integrity of fluvial systems under the Water Framework Directive. In this work we present the preliminary results of a research project with the aim to study long-term morphological alterations in four regulated rivers under different impounded configuration in Wales, United Kingdom. Impoundment configuration refers to the number and relative position of dams along a stream course of a channel network. The project involve (i) state-of-the-art high resolution topographic surveys upstream and downstream from dams acquired by means of RTK-GPS and Terrestrial Laser Scanning, (ii) determination of the morphological changes downstream from dams since they were commissioned using historical maps and aerial photographs, (iii) ground-based characterization of surface and subsurface bed material, (iv) hydrological modelling to asses the effects of dams on flow regimes and flood magnitude and frequency and (v) hydraulic modelling to study bed stability downstream from the dams.