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RECENT CHANNEL AND FLOODPLAIN ADJUSTMENTS IN THE FORTORE RIVER: STATE OF DEGRADATION AND RESTORATION POTENTIAL

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This contribution analyses the recent channel and floodplain changes that have affected the Fortore River (southern Italy) and the potential of channel recovery and river restoration.

To assess such changes, we performed a multi-temporal analysis in a GIS environment using topographic maps, aerial photos and orthophotos. Field surveys and DGPS topographic measurements, mainly aimed at the assessment of the present river morphology and dynamics, integrated the cartographic GIS analysis. The obtained results highlight that the Fortore River, as many other Italian rivers, has undergone relevant river corridor adjustments over the last 60 years that have occurred in two distinct phases.

During the first phase, from the 1950s to the end of the 1990s, the most intense alterations occurred, mainly channel narrowing, mostly exceeding 85%, channel configuration changes from multi-threaded to single-threaded pattern, accompanied by a considerable reduction of the number and surface of bars, and channel-bed lowering. Meantime, floodplain areas increased highlighting lowering in water level and alterations of sediment regimes. The reduction of the hydrological functionality caused also the degradation and the decrease of the variability of the riparian habitats. These adjustments are considered to be primarily driven by human disturbances, especially gravel mining, construction of weirs and levees and the closure of the Occhito dam in 1966. During the second phase, occurred over the last 15-20 years, the reaches located upstream the Occhito dam were affected by some channel widening, the increase of bars and the reduction of floodplain areas. This trend inversion seems to be primarily linked to major flood events from 2000 onwards, especially those occurred in 2003 and 2005. The reaches located instead downstream the Occhito dam are completely stable since the 1990s.

Recent channel recovery and the moderate to high connectivity of some reaches located upstream the Occhito dam, allow considering them as reaches with a relative high recovery potential. Good connectivity conditions are especially due to the main channel well coupled with the hill slopes and tributaries and to the presence of bank protection structures presently no longer in contact with the river banks. In these reaches, interventions aimed at river restoration could produce positive effects on both hydrological functionality and biological communities. Such interventions should focus on the improvement of lateral and longitudinal continuity, the development of the vegetation in the floodplains areas and the preservation and expansion of river habitats and ecosystems. The reaches located downstream the Occhito dam instead are characterized by very low connectivity due to overall very scarce lateral and longitudinal sediment inputs and consequently nil recovery potential. For these reaches, only some interventions in order to avoid further channel degradation can be currently considered.

