Advances on modelling riparian vegetation—hydromorphology interactions (Solari et al. 2015) [1]

Riparian vegetation actively interacts with fluvial systems affecting river hydrodynamics, morphodynamics and groundwater. These interactions can be coupled because both vegetation and hydromorphology (i.e. the combined scientific study of hydrology and fluvial geomorphology) involve dynamic processes with similar temporal and spatial scales. To predict and assess the consequences of restoration measures, maintenance operations or human pressures in rivers, managers and planners may wish to model these interactions considering the different and interdisciplinary implications in the fields of ecology, geomorphology and hydrology. In this paper, we review models that are currently available and that incorporate the processes that relate riparian vegetation to hydromorphology.

The models that are considered include those emphasizing hydraulic-geomorphological processes (such as flow resistance, sediment transport and bank dynamics) as well as those emphasizing ecological processes (seed dispersal, plant survival, growth, succession and mortality). Models interpreting the coupled evolution between riparian vegetation and river morphology and groundwater are also presented. The aim is to provide an overview of current modelling capabilities and limitations and to identify future modelling challenges.

Key words: riparian vegetation; hydromorphology; modelling; REFORM project

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