Vegetation–hydrogeomorphology interactions in a low-energy, human-impacted river (Gurnell & Grabowski 2015) [1]

The geomorphological dynamics of rivers have been traditionally explained largely by the physical processes of water flow, and sediment erosion and deposition, but the significant role of a third element, vegetation, in driving geomorphological changes has been increasingly highlighted recently. However, few studies have documented how both aquatic and woody riparian plants interact with fluvial processes to induce landform development and initiate channel adjustment. This paper presents analyses of historical maps, recent aerial images and field observations from the River Frome (Dorset, UK), which, as a result of human pressures, has been subject to an increased supply of sand and finer sediment, particularly over the last 50–60 years.

Analysis of these information sources indicates that this low-energy river has adjusted to this delivery of finer sediment by narrowing and increasing its sinuosity. The analysis also indicates that this has been achieved through interactions amongst vegetation, water flow and sediment. Emergent aquatic macrophytes were observed to retain sediment, which leads to the development of submerged shelves that aggrade and become colonized by other plant species to form bars, berms and benches, eventually leading to the extension of river banks into the channel and also the formation of islands. Where woody riparian vegetation is well developed, complex geomorphic changes were observed, with fine sediment being absorbed into a diverse mosaic of geomorphic features initiated by living trees and large wood. These observations underline the importance of vegetation for the geomorphic dynamics and adjustment of lowland, low-energy rivers and its potential for inclusion in the development of sustainable, process-based river management and restoration strategies.

Key words: low-energy river; aquatic plants; riparian vegetation; hydrogeomorphology; fine sediment

Publication Date:

Monday, 6 July 2015

Full reference:

Gurnell, A.M. & R. C. Grabowski (2015) Vegetation–hydrogeomorphology interactions in a low-energy, human-impacted river. River Research and Applications. – published online 6 July 2015.

Link to DOI:

http://dx.doi.org/10.1002/rra.2922 [2]

Links
[1] https://reformrivers.eu/vegetation%E2%80%93hydrogeomorphology-interactions-low-energy-human-impacted-river-gurnell-grabowski-2015
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REFORM has received funding from the European Union's Seventh Programme for Research, Technological