



Hydro-geomorphic approaches to designing nature-based flood and drought management schemes

David Hetherington (1), Andy Large (2), and Paul Quinn (3)

(1) ARUP Consulting, Newcastle upon Tyne United Kingdom, (2) Univeristy of Newcastle, School of Geography, Newcastle upon Tyne, United Kingdom, (3) Univeristy of Newcastle, Civil Engineering and Geosciences, Newcastle upon Tyne, United Kingdom

The need for nature-based solutions to runoff management is more pressing than ever. If it is possible to calculate how much water needs to be managed and where the opportunities are in the landscape, then it would be a significant step forward in water resources management. Here we will show how basic hydro-geomorphic indices can guide a catchment manager in identifying the types of intervention that are appropriate at different scales. Using runoff management zones can provide key ecosystems services that make the whole catchment system function better. The key indicators are: a) The Topographic Wetness Index, for use in small catchment and on hillslopes for identifying overland flow pathways that can be managed to store and disconnect fast runoff; b) Strahler stream order to show which small channels can be directly managed to slow, store and filter flow and c) Geomorphic Indices that estimate the floodplain extent, related to stream order, where flood storage zones could be created to hold back large amounts of water. Estimating how much flood water and sediment can be managed by the addition of runoff attenuation features in a landscape could be very important to policy makers. If enough water can be stored in small, medium and extreme events, then the more severe issues of floods, pollution and drought could potentially be addressed, obviating calls for ever bigger and more complex flood protection schemes.