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Roughness Coefficients for Southwestern Riparian Vegetation Complexes

Products A publication describing hydraulic resistance, plant composition and density for eight reference riparian communities in the desert southwest. A spreadsheet tool to assist in computing resistance.

Benefits The publication will give water and resource management personnel the ability to assess resistance and flood conveyance for candidate native riparian complexes that are proposed for flood damage reduction and restoration projects.

Issue Difficulties in formulating reasonable resistance estimates for dense riparian vegetation has long hindered attempts to incorporate environmental features into flood damage reduction projects. The ability to accurately characterize the influence of riparian vegetation upon energy and momentum loss, velocity distribution, and shear stress distribution would greatly enhance hydraulic and sediment modeling for systems in which riparian vegetation is subject to periodic inundation. Estimates are further complicated by the fact that riparian communities are dynamic and the characteristics of the vegetation change over time.

Description Eight study sites varying native riparian communities located near U.S. Geological Survey (USGS) gauging stations were identified in Arizona, Nevada, and New Mexico. At each site, several transects were established, and a point frame was used to measure vegetation density across the floodway. Vegetation species were identified so as to characterize the composition of the riparian community, which then serves as a “reference” or guide for possible restoration efforts. Channel geometry, bed material composition and slope were measured at each site, and high water marks from recent over bank flow events were established. Resistance characteristics as a function of depth were calculated using compositing techniques and the measured discharge, vegetation density, and water surface elevation. Results are presented in a familiar pictorial format to assist in estimating resistance coefficients.

Sponsor Urban Flood Damage Reduction and Channel Restoration Development and Demonstration Program for Arid and Semi-Arid Regions (UFDP).



Riparian corridor of Verde River below Tangle Creek, AZ

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Partners

None.