

Mapping Hydromorphic Areas and Drainage Networks in Tropical Riparian Zones using Topographic Attributes

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Abstract

Riparian areas and channel networks are important landscape compartments, with key hydrological and ecologic functions. Hence, defining their spatial boundaries is an important step towards sustainable riparian management. In tropical countries, riparian areas are rarely mapped, although they represent a crucial component of local livelihoods and ecosystems. In this study, topographic attributes generated with a 30m SRTM DEM were used to delineate wet areas and stream networks of two small catchments in Central Brazil. The topographic attributes were the local slope, the slope curvature, and the Topographic Wetness Index-TWI, respectively. Threshold values of the selected topographic attributes were calibrated in the Santa Maria catchment, comparing the synthetic wet areas and drainage networks with corresponding reference (map) features, and validated in the nearby Santa Maria basin. Drainage network and wet area delineation accuracies were estimated with multi-criteria and confusion matrix methods. The drainage network delineation accuracy was 67.2% and 70.7%, and wet area prediction accuracy was 72.7% and 73.8%, for the Santa Maria and Gama catchments, respectively. The delineation errors resulted from model incompleteness, DEM grid size and vertical inaccuracy, and from cartographic misrepresentation of the reference maps. The method performed equal or better than other studies in the literature, and could be used for preliminary mapping of riparian areas of tropical catchments.

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