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## Automatic Extraction of Intermittent Channel Systems of a Low-Relief, Low-Gradient Floodplain

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Intermittent floodplain channels are low-relief conduits etched into the floodplain surface and remain dry much of the year. These channels comprise expansive systems and are important because during low-level inundation they facilitate lateral hydraulic connectivity throughout the floodplain. Nevertheless, few studies have focused on these floodplain channels due to uncertainty in how to identify and characterize these systems in digital elevation models (DEMs). In particular, their automatic extraction from widely available DEMs is challenging due to the characteristically low-relief and low-gradient topography of floodplains. We applied three channel extraction approaches to the Congaree River floodplain DEM and compared the results to a channel reference map created through numerous field excursions over the past 30 years. The methods that we tested are based on flow accumulation area, topographic curvature, and mathematical morphology, or the D8, Laplacian, and bottom-hat transform (BHT), respectively. Of the 198 km of reference channels the BHT, Laplacian, and D8 extracted 83%, 71%, and 23%, respectively, and the BHT consistently had the highest agreement with the reference network at the local (5 m) and regional (10 km) scales. The extraction results also include commission “error”, augmenting the reference map with about 100 km of channel length. Overall, the BHT method provided the best results for channel extraction, giving over 298 km in 69 km<sup>2</sup> with a detrended regional relief of 1.9 m.