



Channel bed adjustments during active neck cutoffs of a meandering river.

Kory Konsoer (1,2) and Derek Richards (1)

(1) Louisiana State University, Geography and Anthropology, Baton Rouge, United States (kkonsoer@lsu.edu), (2) Louisiana State University, Coastal Studies Institute, Baton Rouge, Louisiana, United States

Meander bend cutoffs and oxbow lakes are essential and ubiquitous features of meandering river floodplains. Yet, the processes involved in the evolution of elongated bends to neck cutoff and oxbow lake remain incompletely understood. Three neck cutoffs occurring on the White River, central Arkansas (USA), with similar planform geometry, within close proximity but at different stages of cutoff evolution, were examined for this study. High-resolution channel bathymetry data was collected using a multibeam echo sounder. These data were collected over a three year duration, providing difference maps of bed elevation at annual, daily, and hourly timescales. Findings from this study reveal an initial deep scour hole that forms at the location of the floodplain neck that extends in the downstream direction and results in the entrance and exit of the abandoned bend being perched above the new channel bed. Sedimentation rates within the entrance and exit of the abandoned bend are relatively slow, allowing for hydrologic connectivity to the main channel even after 10 years for one cutoff site. Within the downstream limb of the receiving channel, a large point bar forms adjacent to the cutoff while the opposite bank undergoes rapid initial erosion. This study provides insight into the morphodynamics of neck cutoffs during active formation in the field, for which similar investigations are sparse.