

Environmental Domain of Sand-Bed Braiding Rivers: Critical Factors Controlling Channel Pattern

By

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Why is the river braiding here and meandering there? This fundamental question in fluvial geomorphology is normally answered by stating that the channel slope is greater in the braiding reach producing a higher energy environmental domain. Paleogeographic reconstruction of fluvial systems is predicated on this belief. The research underlying this concept, however, comes predominantly from gravel-bed rivers. Unlike previous work, which combined both gravel and sand bed information into a single data set, this research will examine only sand-bed rivers.

Numerous rivers east of the Rocky Mountains, from the North Saskatchewan River in Alberta to the Red River in Texas/Oklahoma, have sand-bed sections displaying transitions from single channel to braiding. Aerial photography analysis will highlight downstream changes in channel pattern throughout the sand-bed reach of each river. This will be used to guide a sampling program which will measure discharge, sediment transport, slope and boundary composition in each channel pattern and across the intervening transition zone.

Given that this study is investigating the controlling factors on channel pattern, it will contribute to the body of knowledge on channel change, and can perhaps be used to predict how rivers will respond to human-induced alterations. The concept of high-energy braiding has become firmly embedded in the doctrine of both fluvial geomorphology and fluvial sedimentology. Preliminary research on a select number of sand-bed rivers has shown braiding in lower slope areas. If this project demonstrates that braiding in sand-bed rivers occurs in low-energy settings it will represent a significant change in thinking.