

This document is copyrighted material.

Alaska Resources Library and Information Services (ARLIS) is providing this excerpt in an attempt to identify and post all documents from the Susitna Hydroelectric Project.

This document is unable to be posted online in its entirety. Selected pages are displayed here to identify the published work.

The item is available in print at ARLIS.

UNIVERSITY OF ALASKA
ARCTIC ENVIRONMENTAL INFORMATION
AND DATA CENTER

A Review of the Braided-River Depositional Environment

Andrew D. Miall

ABSTRACT

Miall, A.D., 1977. A review of the braided-river depositional environment. *Earth-Sci. Rev.*, 13: 1-62.

Generalized sedimentation models have been developed from a review of more than sixty recent papers on modern and ancient braided-stream deposits. Braided rivers consist of a series of broad, shallow channels and bars, with elevated areas active only during floods, and dry islands. There are three main bar types; longitudinal, comprising crudely bedded gravel sheets; transverse to linguoid, consisting of sand or gravel and formed by downstream avalanche-face progradation; and point or side bars, formed by bedform coalescence and chute and swale development in areas of low energy. Important sediment-forming processes include bar formation, channel-floor dune migration, low-water accretion and overbank sedimentation.

Braided-stream deposits consist of up to three gravel facies, five sand facies and two fine-grained facies. Vertical sequences recorded in modern and ancient deposits are of several types: flood-, channel fill-, valley fill-, channel re-occupation- and point bar-cycles. Some of these fine upward and could be confused with meandering-river sequences. Facies assemblages and vertical sequences fall into four main classes, which are proposed as sedimentation models for the interpretation of ancient braided-river deposits in the surface and subsurface:

(1) Scott type: consists mainly of longitudinal bar gravels with sand lenses formed by infill of channels and scour hollows during low water.

(2) Donjek type: may be dominated by sand or gravel; distinguished by fining-upward cycles caused by lateral point-bar accretion or vertical channel aggradation. Cycles commonly are less than 3 m thick, but cycles up to 60 m may be present, representing valley-fill sequences. Longitudinal and linguoid-bar deposits, channel-floor dune deposits, bar-top and overbank deposits all may be important.

(3) Platte type: characterized by an abundance of linguoid bar and dune deposits (planar and trough crossbedding). No well-developed cyclicity, probably owing to a lack of topographic differentiation in the river (no evidence of deep, primary channels, abandoned areas or overbank areas).

(4) Bijou Creek type: consists of horizontally laminated sand plus subordinate amounts of sand showing planar crossbedding and ripple marks. Formed during flash floods and may be most typical of ephemeral streams.

INTRODUCTION

Braided rivers and meandering rivers commonly are regarded as the two main river types in the geological literature. Meandering rivers, it is now widely understood, form deposits primarily by the action of lateral accretion