

Quantification Of Incised Channel Evolution And Equilibrium

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Abstract. Incised channels are caused by an imbalance between sediment transport capacity and sediment supply that alters channel morphology through bed and bank erosion. Consistent sequential changes in incised channel morphology may be quantified and used to develop relationships describing quasi-equilibrium conditions in these channels. We analyzed the hydraulic characteristics of streams of the Yazoo River Basin, Mississippi in various stages of incised channel evolution. The hydraulic characteristics of incising channels were observed to follow the sequence predicted by previous conceptual models of incised channel response. Multiple regression models of stable slopes in quasi-equilibrium channels that have completed a full evolutionary sequence were developed. These models compare favorably with analytical solutions based on the extremal hypothesis of minimum stream power and empirical relationships from other regions. Appropriate application of these empirical relationships may be useful in preliminary design of stream rehabilitation strategies.

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