

A River Restoration Case Study: Three Forks of the Little Snake River, Colorado

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Abstract. In the Summer and Fall of 2000, an extensive restoration project was implemented for over 14 miles of the Little Snake River and its tributaries in the Upper Yampa River Basin of northwestern Colorado. This project presented an interesting design scenario in which a managed trophy trout fishery was to coexist with a successful cattle ranching operation. The design involved reducing channel width, increasing available pool habitat, and constructing hundreds of rock structures to stabilize the channel and prevent bank erosion. An aggressive structural approach was selected given ongoing grazing and the goal of an immediate increase in pool habitat for trout. In accordance with a Clean Water Act §404 permit, Colorado State University is monitoring the project since construction. Peak flows during the past four years of the monitoring effort have been low relative to average conditions between 1943 and 1999 and the majority of the structures are performing as intended. However, some structures have not “sealed” and/or have been flanked. In a few instances, these unsealed structures required repair to prevent further erosion; the other unsealed structures are increasing habitat diversity. This case study provides insight into questions faced by designers regarding channel design width. As documented in studies by Hey and Thorne (1986), Andrews (1984), and others, bankfull channel width is often substantially smaller for channels with “thick” bank vegetation. While the vegetation is still generally thin along the project reaches, the constructed width of the channel using rock structures falls among natural channels with thick vegetation. In effect, the rock structures are used to lock the channel at a desired width until vegetation can provide lateral stability.

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