

Assessment of Land-Use Impacts on Forced-Pool Characteristics in Constriction-Dominated Channels

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Abstract. Historical and contemporary land use practices that have occurred in Colorado for the last two centuries have altered the supply of sediment and water to many channels in the upper South Platte Basin. As a result of increased sediment supply and mobility and reduced erosivity of high flows, the characteristics of pools associated with channel constrictions, referred to as forced pools, have been altered and important habitat diversity has been lost. In order to assess these alterations, the differences in forced-pool characteristics between impacted and controlled reaches were statistically compared. According to ANCOVA stepwise model selection, degree of land-use (categorical), bankfull pool spacing, upstream riffle slope and expansion ratio were all significant ($\alpha=0.1$) predictors of pool volume ($R^2=0.73$). After standardizing pool volume by stream scale variables (discharge and slope), the mean pool volume in the control reach was significantly different from reaches subject to land-use activities. Although it was expected that mean pool volume would be lower in impacted reaches because of increased sediment and decreased water supply, the mean pool volume was significantly lower in the control reach. This was likely a function of higher large woody debris loading in the control reach. Bankfull pool spacing was positively correlated with pool volume and assessment of land-use effects on pool spacing suggested that closer spaced pools were associated with a high degree of land-use.