

Engineered log jam design and its impact on channel morphology: a flume experiment

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Abstract:

An experiments was conducted in a recirculating 6 m flume to gain a better understanding of how the spacing of log jams affect the development of scour pools. The spacing between multiple structures was varied under constant flow conditions with a flow rate of $0.034 \text{ m}^3/\text{s}$ and under a constant bed slope of 0.5%. The width of the structure, measured perpendicular to the flow direction, was held at a constant 0.2 m or 20% constriction of the cross section for all of the series. Three spacing ratios of 3, 5 and 7 times the width of the structures were tested. Each setup was replicated three times. After each experiment the bed topography of the flume was determined using a point gage, and depth measurements were used to create topographic maps of the bed surface. Differences in scour parameters among runs were tested by a nonparametric analysis of variance (ANOVA). ANOVA results indicate that there is no significant difference between the shape and size of the scour pool and the distance between the two structures. There is a relationship, though, between the location and volume of sediment deposited and the spacing of the structures. These findings can help inform the design and placement of future engineered log jams so that they will be more efficient and effective in river restoration.