

# Effects of Tree Revetments on the Abiotic and Biotic Components in Two Kansas Streams

by

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## ABSTRACT

Tree revetments have been used throughout the Midwest since the 1930s to provide streambank stabilization and prevent soil erosion. However, there have been few studies to address what effect they have upon stream morphometry and aquatic biota. I studied the effects of tree revetments on the abiotic and biotic components in two Kansas streams.

Tree revetments were installed on Kings Creek (Riley County), and West Creek (Greenwood County), Kansas during the spring of 1995. Prior to tree revetment installation, downstream control, upstream control, and tree revetment locations were sampled. All locations were sampled approximately quarterly for one year after installation of tree revetments. Changes in channel morphometry were quantified by net change in area ( $\Delta A\%$ ), absolute percent change in area ( $|\Delta A\%|$ ), and the Gini coefficient (G). Siltation was assessed by mean percent change in dry weight (g). Changes in aquatic insects were quantified by density. Fish populations were assessed using relative abundance, mean length, and biomass.

Time by location interactions were used to identify differences among locations. Significant ( $P < 0.05$ ) interactions only occurred for  $|\Delta A\%|$  and G at Kings Creek. Net streambed degradation was the least at the tree revetment locations on Kings Creek and West Creek. In addition, there were no significant ( $P > 0.05$ ) interactions for amount of silt.

Twenty-three families of aquatic insects were collected in Kings Creek and twenty-one in West Creek. There were no significant ( $P > 0.05$ ) interactions for density of the three most common families of aquatic insects. Twenty species of fish were collected in Kings Creek and thirty-two in West Creek. In general, there were no significant interactions for relative abundance for the four most abundant fish species in Kings Creek and West Creek. In addition, mean length and biomass did not differ significantly among locations ( $P > 0.05$ ).

In general, abiotic and biotic variables at tree revetment locations on Kings Creek and West Creek varied in concert with those at control locations -- as indicated by numerous non-significant time by location interactions. These data indicate that tree revetments can likely reduce excessive streambank erosion.