

## Improving Success of Willow Cuttings Planted in Damaged Riparian Zones: Little Topashaw Creek Study

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Revegetation of eroded riparian streambanks using dormant black willow (*Salix nigra*) cuttings (posts) is an efficient and cost effective method of stabilizing the soil and re-establishing native woody vegetation. However, many revegetation projects fail when cuttings die. Previous studies have found close correlations between willow post performance and environmental conditions of plant elevation relative to baseflow; and soil texture, moisture and redox conditions. Information is needed on pre-planting treatments that could improve survival and enhance establishment of willow cuttings. In a previous greenhouse experiment, willow posts soaked in water for 10 days had significantly greater survival and growth than unsoaked posts. The purpose of this study is to verify these greenhouse findings under field conditions characterized by infertile soils, flooding, drought and other stresses. We hypothesized that the acceleration of initial root and shoot development by soaking would lead to rapid establishment and increase survival rates compared to unsoaked posts. As part of the Little Topashaw Creek project, about 4,000 willow posts were planted using a water jetting technique. Within the planted zones, twenty study plots representing a range of physical conditions were each planted with eight soaked and eight unsoaked posts. Posts approximately 2.5 m in length and 2.5 cm diameter were cut from local willow populations. Posts in the soaked treatment were soaked for 14 days prior to planting. Unsoaked posts were planted immediately following harvest. Posts in study plots were partially protected from herbivores using 1-m high plastic collars.

Results from the first growing season supported our hypothesis. Soaking treatment significantly enhanced plant survival. Some plant destruction by erosion occurred, but results below are based on survival of posts not washed away. Percent survival of soaked posts (64%) was significantly greater than survival of unsoaked posts (53%) six weeks after planting ( $p=0.06$ ), ten weeks after planting ( $p=0.05$ ) and 34 weeks after planting ( $p=0.07$ ). Plots with highest survival rates (81% - 94%) were characterized by moderate elevation above stream baseflow stage (0.6 – 1.1 m) and soils containing moderate amounts of sand (54% - 73%). Lowest survival plots (0% - 31%) were generally located at lower elevations (< 1.0 m above the baseflow). Soils at low survival plots contained a wide range of sand (13% - 92%). Plots where soaked posts had at least 25% higher survival rates than unsoaked posts were generally characterized by higher elevation (1.2 – 2.0 m above baseflow) and moderate to high sand content (66% - 92%). Results from the first growing season clearly indicated enhanced early survival of soaked willow posts compared to unsoaked posts in field conditions.

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