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THE USE OF LANDSCAPE FABRIC AND SUPPLEMENTAL IRRIGATION TO ENHANCE SURVIVAL AND GROWTH OF WOODY PERENNIALS PLANTED ON RECLAIMED SURFACE MINE LANDS

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Project Description and Objectives:

This project was designed to determine the effectiveness of landscape fabric to control competing vegetation and improving growth and survival of aspen and serviceberry planted on reclaimed surface coal mine lands at high elevation sites in Colorado. The method can be used to mechanically replant large areas with woody perennials and enhance survival and growth of trees and shrubs on reclaimed surface mines.

Applicability to Mining and Reclamation:

This methodology can be a useful tool to ensure survival and growth of woody perennials on reclaimed surface mine lands where regeneration of trees and shrubs has been problematic due to competition for soil moisture from natural regenerating or replanted herbs and forbs. The method can be used in any area of the country where woody perennial vegetation needs to be reestablished, but where growth and survival of the vegetation limited by competition for water. The landscape fabric planting technique is commonly used in agriculture for windbreak establishment, and is easily adapted to reclamation of surface mined lands. The equipment used to lay the fabric and plant the trees or shrubs is tractor-mounted and is available from many state or county agencies. Large areas of reclaimed land can be mechanically planted using this technique.

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ABOVE PHOTO: Landscape fabric and/or lack of competing vegetation increased soil moisture.

ABOVE PHOTO: Layout of aspen and serviceberry plantings at Seneca 2W, June 2008.

Methodology:

The study was conduced at high elevation on relatively steep slopes of the Seneca Coal Mine of Hayden, Colorado. The area was surface mined for coal, overburden was replaced, and about three feet of topsoil was added. One-gallon potted aspen and 10 cubic inch Ray Leach supercell serviceberry nursery plants were planted with or without landscape fabric and with or without biweekly supplemental irrigation.

The experimental areas were fenced to prevent browsing by herbivores. Rows of six foot wide strips of landscape fabric were used with trees or shrubs planted 5 ft apart in each row. Trees or shrubs were planted in the row, then landscape fabric was laid and slit at each plant. Fabric was secured with landscape pins. Random rows without the fabric were also planted at the 5 ft spacing.

Highlights:

Landscape fabric: Data analysis indicates that aspen tree survival and growth was greatly enhanced by use of the landscape fabric in the first year after planting. The response was particularly dramatic where the amount of competing vegetation was high. Soil moisture was higher under the landscape fabric.

Irrigation: Less response was evident from the irrigation treatment. Rainfall was sufficient to allow the plants to survive without the supplemental irrigation. There was a small increased growth response to the supplemental irrigation.

Serviceberry plants were smaller than aspen when planted, and showed little response to either the landscape fabric or to irrigation treatment in the first year. It is expected that the serviceberry may show greater response to treatment in the second year after planting.

Results/Findings:

The study demonstrates the effectiveness of landscape fabric to enhance survival and growth of aspen in the first year after planting. Additional years are needed to determine if aspen tree survival can be sustained; or the effectiveness of the landscape fabric in survival and growth of the serviceberry.

Above Photo: Competing vegetation grew best along the edges of the landscape fabric.

Website Information:

The final project report can be found at **http://www.techtransfer.osmre.gov/NTTMainSite/appliedscience/2008appscience/CompletedProjects/AspenServberryABirchfield08FR.pdf**

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