

Report of Progress
12-31-2007
"Vegetative Rehabilitation of Highway Cut Slopes"
Contract # 3459013317, Job Piece 01945(50)
Item Number 2188
Booneville Plant Materials Center
USDA-NRCS

Problem Statement:

Areas of moderate to severe erosion are occurring on highway rights of way in eastern Oklahoma. The silt from this erosion is filling ditch bottoms causing drainage problems. It is very expensive for ODOT to remove and dispose of this material, only to have to do it again in the future. The answer to this problem is to research techniques to permanently vegetate the erosive areas so that the soil remains on the slope and out of the drainage system.

The USDA-NRCS Booneville Plant Materials Center (PMC) specializes in critical area treatment. The PMC has researched and developed Critical Area Vegetation Specifications for the Bureau of Mines, Office of Surface Mines, Corps of Engineers, Ark. Highway and Transportation Dept., Arkansas Game and Fish Commission, US Forest Service, et al.

Scope of work:

Plant Materials Center (PMC) staff performed site characterization on SH-128 at Sugar Creek, during October 2007. Soil samples were collected at the site and analyzed by the University of Ark., Fayetteville. There was no recommendation for lime, based on species to be planted, but phosphorus and potassium were required for each site. These elements will be applied in the spring of 2008, when seed germinates.

The PMC staff laid out the research area (approx. 600' X 100'). Supplies (seed, fiber mulch, soils amendments, etc.) were purchased for the research plot in October. On November 3, 4, 5, and 6, the entire slope was hydroseeded with 3lb/ac 'Alamo' Switchgrass, 3lb/ac 'Kaw' big bluestem, 3lb/ac 'Aldous' little bluestem, and 3lb/ac 'Cheyenne' indiagrass. The top 20' of the site was mulched with wheat straw at a rate of 1.5 tons/acre, while the lower 80' of the slope was hydromulched, at a rate of 1 ton/acre.

The contractor damaged a portion of the seeded/mulched slope by operating a bulldozer over the finished slope on November 7th. This damage will probably affect germination of native grasses seed in the spring of 2008. Damage will be evaluated and repairs will be discussed with ODOT.

The site was evaluated by Plant Materials Center (PMC) staff on 5 visits in November and December 2007.

The Heavener site was prepared and planted April 17, and 18, 2007. The Poteau site was prepared and planted on April 20, and 21, 2007. Site preparation was tillage (8' tractor mounted tiller was used) of half of each plot (300' X 60'). A mixture of 'Cheyenne' indiagrass, 'Kaw' big bluestem, 'Aldous' little bluestem, and 'Alamo' switchgrass was applied by means of a hydro seeder.

The seeding rate was: big bluestem @2lb Pure Live Seed (PLS)/acre, switchgrass @2lb PLS/ac, indiagrass@ 2lb PLS/ac, and little bluestem @2lb PLS/ac. The sites were mulched immediately after seeding, with ½ ton, and 1 ton, of wood fiber mulch. Each mulch treatment was replicated 3 times at each site, on both tilled and non tilled plots.

The PMC staff visited the Heavner and Poteau sites on 10 day intervals to record germination dates, plant vigor, and stand percentages (see attached spreadsheet).

Results:

The native grasses germinated (in tilled plots) within 15 days of planting. The stands averaged 85% on the tilled plots. Germination took 25 days in no-till plots. The grasses in the tilled plots have grown at twice the rate of plants in the no-till plots. This is a function of inter-plot competition for light, moisture, and nutrients.

The PMC staff evaluated these plots 12 times during October, November, and December, 2007. The fall evaluations produced data that indicated moderate to high success for tilled treatments, and poor to zero success where seed was applied "no-till". Stand success for native warm season grasses is measured by plant density. Ideal is one to one and a half plants per square foot. (see attachment). The Heavner and Poteau plots will probably need phosphorus and potassium fertilizer in the spring of 2008.

This report covers October, November, and December 2007.

Submitted by:

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