

Report of Progress  
07/31/2008  
"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 were applied in the spring of 2008, after germination.

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 3 lb/ac 'Alamo' Switchgrass, 3 lb/ac 'Kaw' big bluestem, 3 lb/ac 'Aldous' little bluestem, and 3 lb/ac 'Cheyenne' indiangrass. 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 area received torrential rains during the spring of 2008. During evaluations in early April 2008 it was noted that no native grass species had germinated. It is believed that the heavy frequent spring rains, washed the mulch and seed away. The top 20 feet of the slope had germination of wheat, from the application of wheat straw mulch during planting in the fall of 2007.

The site was evaluated by Plant Materials Center (PMC) staff on 5 visits in November and December 2007, and 8 visits during March, April, May, and June, 2008. A proposal to modify this contract to replant the site using modified criteria has been submitted to ODOT for approval.

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) 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 hydroseeder. 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.

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 one half plants per square foot. The Heavner and Poteau plots received phosphorus and potassium fertilizer in the spring of 2008. These plots were evaluated by PMC staff 10 times during March, April, May, and June of 2008. The tilled plots are consistently producing 80-85% cover while the no-till treatments have only 0-5% cover. Competition from weed species has contributed to the failure of the no-till treatments. Weed species are present in the tilled treatments, but over the next 2-3 growing seasons, the native grasses will eliminate most competition without herbicide treatment.

This report covers January thru July, 2008.

Submitted by:

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