

USDA-NRCS
Booneville Plant Materials Center
Oklahoma Department of Transportation
2007 Report of Progress
“Vegetative Rehabilitation of Highway Cut Slopes”
Contract # 3459013317, Job Piece 01946(48)
Item Number 2188

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 the Oklahoma Dept. of Trans. (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, Arkansas Highway and Transportation Department, Arkansas Game and Fish Commission, US Forest Service, et al.

Scope of work:

Plant Materials Center (PMC) staff performed site characterization on three sites in Oklahoma, during November 2006. Soil samples were collected at each 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.

The PMC staff laid out the research areas (each site is 600' X 60', with the Muldrow site being excluded from the project) at each site on March 12, 2007. Supplies (seed, fiber mulch, soils amendments, etc.) were purchased for the research plots in April.

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 indiagrass, big bluestem, little bluestem, and 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.



Staff visited sites on 10 day intervals to record germination dates, plant vigor, and stand percentages (see spreadsheet).

Results:

The native grasses germinated (in tilled plots) within 15 days of planting. The stands averaged 60% on the tilled plots. Germination took About a week longer in no-till plots, with stands in no-tilled plots averaging only 5%. 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. A number of management techniques will be tested on these plots in the next 4 years to identify the best management practices for recommendation to ODOT.

Heavener					
<u>Tilled</u>	<u>Germ Date</u>	<u>Vigor</u>	<u>Erosion control</u>	<u>% Stand</u>	
Rep 1-1 ton	5/12/2007	2	3	65	
Rep 1-1/2 ton	5/12/2007	3	4	60	
Rep 2-1 ton	5/12/2007	3	2	55	
Rep 2-1/2 ton	5/12/2007	2	2	60	
No-till					
Rep 1-1 ton	5/23/2007	7	9	5	
Rep 1-1/2 ton	5/22/2007	6	9	5	
Rep 2-1 ton	5/23/2007	8	9	5	
Rep 2-1/2 ton	5/24/2007	6	9	5	

Poteau					
<u>Tilled</u>	<u>Germ Date</u>	<u>Vigor</u>	<u>Erosion control</u>	<u>% Stand</u>	
Rep 1-1 ton	5/17/2007	3	2	55	
Rep 1-1/2 ton	5/17/2007	3	2	50	
Rep 2-1 ton	5/17/2007	4	5	65	

Rep 2-1/2 ton	5/19/2007	3	3	60
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No-till

Rep 1-1 ton	5/30/2007	8	9	5
Rep 1-1/2 ton	5/30/2007	8	8	5
Rep 2-1 ton	5/28/2007	7	9	5
Rep 2-1/2 ton	5/28/2007	9	9	5

Numerical ratings: 1=excellent
10=poor