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Gully Erosion Control With Vegetative Barriers

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In June of 1996, the Kika de la Garza Plant Materials Center (PMC) was looking for a study site to evaluate the ability of vegetative barriers to control gully erosion. Vegetative barriers, or grass hedges as they are sometimes called, are narrow strips (1-3 feet wide) of stiff, erect densely growing grasses planted across the slope perpendicular to the dominant slope. They function to slow water runoff, trap sediment and prevent gully development. They inhibit the flow of water because of their dense concentration of thick stems, thus slowing and ponding water and causing sediment to deposit in back of them. Over time, these deposits can develop into benched terraces. These barriers function to spread water runoff so that it slowly flows through them without erosion. Vegetative barriers are resilient to failure because water passes over a broad area secured with perennial root reinforcement.

Jim Hluchan, District Conservationist with the USDA Natural Resources Conservation Service in Bellville, Texas, found a site with a deep 7-foot gully in an over-grazed pasture near Kenney, Texas. With funding and support from the Austin County soil and Water Conservation District, Texas State Soil and Water Conservation Board, Texas A&M – Kingsville, and the US Environmental Protection Agency, the plant Materials Center started to work.

In September of 1996, we shaped the gully head to a 5:1 slope. Then we planted vetiver grass (Vetiveria zizanioides) across does not produce viable seed. The PMC propagates vetiver vegetatively for select erosion control sites.

Vegetative barriers or grass hedges can be an effective erosion control treatment for gullies and waterways. The treatment site should be surveyed, designed and shaped similar to a grass waterway.

The gully site was planted using a walk-behind trencher that produced a 6-inch wide trench. A 13-13-13 fertilizer was sprinkled in the trench at approximately and 80 pound per acre rate. The vetiver plants were bare-root clumps that were 9 inches tall with 4-inch roots. They were placed end-to-end in the trench and then back-filled. Straw bundles that were approximately 5 inches thick were placed on the downstream side across the basin to prevent dislodging of the plants. Three years after planing, the site has a dense stand of vetiver grass and has captured over 6 inches of sediment behind the vegetative barriers.

Vetiver grass preformed successfully at runoff velocities of 6 feet per second. The limiting factor on site establishment is the soil-runoff velocity relationship. Where runoff velocities exceed the bare soil value, there is the treat of developing plunge pools that can threaten the stability of the vegetative barriers.

Vetiver grass had only a 61 percent survival rate when planted in the fall. When replanted in April, it established a 93 percent stand. It is known to be sensitive to freezing temperature, therefore, it is best to plant it in the spring when it is starting its period of rapid growth.

Switchgrass (Panicum virgatum) is another species that can be used as a vegetative barrier. It is a native species with good frost tolerance, it is recommend that two rows of transplants be used to minimize gaps, reduce replanting, and ensure good functionality of the vegetative barrier.