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Restoration of a severely degraded rangeland in the Chihuahuan Desert using cotton bur/burlap wattles

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Abstract Text:

Water is a critical component to range health, especially in arid regions such as the Chihuahuan Desert. A study to determine the feasibility of biodegradable wattles as a restoration technique was implemented in the Terlingua Creek watershed, 02 Ranch, Brewster County, Texas. Accepted mechanical techniques that are known to reverse site degradation were not applicable on the study site because the soils are sodic haplocambids which are highly erodable. We also wanted a treatment applicable to many land management agencies that are unable to disturb the soil surface without a cost prohibitive archeological survey. The objective of the study was to: 1) increase infiltration rates by slowing down runoff without using a highly intrusive technique, and 2) begin revegetation of desirable species in order to maintain improvements. This was done by laying wattles along contour lines every 33 meter within the study site. Two techniques were used to compare installation techniques. On one site the wattles were supported by wooden stakes and on the other the wattles were supported by the more intrusive technique of bulldozing a small trench to support the wattles. The wattles were constructed of 100% biodegradable burlap bags filled with cotton burs (gin trash). Bands above each wattle were harrowed and reseeded with native species. Soil samples were taken to compare moisture content. Erosion bridges were used to measure soil erosion/deposition. Vegetation was analyzed using the point-step method and transects. The two treatment sites were compared to a control site. The dozed treatment showed the highest percent soil moisture, showed the highest gain in soil height, and the showed the highest amount of revegetation. The staked treatment showed the second highest percent soil moisture, showed the lowest gain in soil height, and showed the second highest amount of revegetation. The control showed the lowest percent soil moisture, showed the second highest gain in soil height, and showed no perennial revegetation. Wattles were successful at creating a microclimate conducive for seedling germination on a site where germination would not otherwise occur.

Impact Statement:

This project has improved water quality by reducing sediment load into Paradise Draw. Increases in vegetation decrease the amount of soil eroding from the site. The project has also significantly increased the amount of water infiltration. More water is available for plant growth and soil recharge of ground water.