

PROJECT NARRATIVE

Project Title: Validation of Restoration Practices on Rangeland Health At The Landscape Scales

New Project or Request for Continuation: New

Geographic Area of Project: Rio Grande Plains; Coastal Prairie; and Transitional Counties. Results may be applied statewide in lower rainfall areas.

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Co-Investigators: (see attachment)

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Amount of Funding Requested: \$9,900.00

Project Need, Description and Expected Outcomes

Rangeland health is defined and measured in terms of three criteria: degree of soil stability and watershed function; integrity of nutrient cycles and energy flows; and presence of functioning recovery mechanisms. Heavy grazing for several hundred years, combined with cessation of fire and frequent droughts has disrupted ecological processes and negatively impacted health on most Texas rangelands. Lack of organic matter, loss of fertility, erosion, and compaction all contribute to decreased water infiltration and increased runoff, resulting in lowered vegetation diversity, surface coverage, increases in brush, lowered productivity, etc. Unchecked, the downward spiral of resource deterioration will continue. Increasing soil stability and water infiltration rate in the soil surface will initiate the repair and maintenance of damaged processes that in turn, enhances plant production and protects the soil surface with plant litter or living vegetation.

There is a need for validating vegetation and soil renovation/restoration practices designed to increase grass production and more favorably utilize rainfall. Information is available on various practices at the small, individual plant scale but does not include data from pasture or ranch scales in a Total Resource Management context. This project would permit establishment of renovation practices (grazing, vegetation management, soil renovation, seeding, etc.) rangeland, to improve health under South Texas under climate and soils.

Objectives are to: 1) Install and monitor rangeland management practices designed to enhance rangeland health at the total ranch scale; 2) Collect data on the response of soil, vegetation, and animals to these practices; and 3) extend that information through a variety of methods to interested clientele.

This information would impact/influence ranchers who currently depend on dryland perennial grass pastures in the counties of Brooks, Kleberg, Nueces, San Patricio, Jim Wells, Bee, Atascosa, Live Oak, Duval, and Jim Hogg. These counties transition from mixed livestock and row crop counties to almost purely livestock and wildlife production areas. Outside of oil and gas, these are the only marketable agricultural products of the region and every livestock producer requires hay and pastures year round to survive. This project clearly touches all who use or rely on grass/forage production.

Increased awareness, knowledge, and skills will allow producers and managers to better make decisions concerning rangeland restoration. This should allow better adoption of practices resulting in lower risk and greater probability of success. The project is a followup on previous soil and water conservation and EQIP projects.

The project will be conducted on La Copita Demonstration Ranch (located near Alice, in Jim Wells County, in South Texas), a working ranch designed to demonstrate sustainable resource management to interested publics. It is owned by the Texas Agricultural Experiment Station but oversight and management of the Ranch is the responsibility of the Department of Rangeland Ecology and Management. The Los Indios Division of La Copita Ranch is 512 acres in size. Over the years it has been heavily grazed and traditionally managed. A lack of timely decisions and a series of drought years has resulted in degradation of vegetation and soils and deteriorated rangeland health.

It is a multi-year project and requested funds will be used to initiate the project. Rangeland restoration and desertification reversal through the application of restoration practices will be monitored. These practice include:

1. Intensive grazing. The 512 acres will be divided into eight (8) 64 ac paddocks with electric fence and grazed with one herd of cows. Timing, intensity, and frequency of defoliation will be managed for maximized stubble and residue thresholds, soil coverage, and mineral/nutrient cycling.
2. Brush Management. Dense stands of huisache and mixed and mixed brush occupy specific sites on the property. Brush sculpting using Brush Busters technology will be applied to thin brush stands, diversify vegetation, improve wildlife habitat, and reallocate water throughout the rangeland ecosystem.
3. Soil Renovation. Mechanical treatments such as ripping, chiseling, disking, paratilling, etc. can expedite natural recovery of desertified rangelands. It is proposed that appropriate sites in each of the paddocks be treated mechanically by ripping and paratilling. Ripping, for example, (also referred to as subsoiling or deep chiseling) involves pulling a heavy shank equipped with a broad lifting tip, 12 to 20 inches deep through the soil on the contour at 30 foot

spaces. Ripping increases soil porosity and rate of infiltration, causes uplifting of the soil (which resists surface runoff), leaves a furrow in the center of the uplift which helps retain water, and provides a seedbed for new plant establishment. Research conducted near San Angelo, Texas showed ripping increased carrying capacity from 104 acres/animal unit to 20 acres/animal unit, at a cost of \$2 to \$3/acre.

4. Specific treated areas will be seeded using two methods: a) treatments will be seeded to grasses through the use of native hay mulches (spreading seed-containing hay along the seedbed). This mulch keeps water from running off the site, slows the flow, and allows it to infiltrate into the soil. Seeds are protected, have adequate moisture and protection, thus enhancing germination probability and lowering the risk of stand failure and b) the use of a single row seeder mounted on the ripper. Both native and introduced grasses will be seeded. Cattle will be allowed to graze over the treatments to use animal impact and hoof action to incorporate the seeds.

Permanent vegetation transects, grazing exclosures and photopoints will be established in each paddock and will be monitored annually. A Prism data logger/soil moisture probe will be used to monitor water allocation in the system following each rainfall event. Project personnel will monitor vegetation, soil characteristics, and water parameters; maintain records; and develop reports and other educational materials. Soil will be analyzed for biota densities, carbon, etc. to establish baseline parameters.

Results will be extended at ranch, county, and SWCS field days; as a demonstration site for visitors to the ranch, and as a basis for developing procedures for repairing damaged south Texas rangelands. It will be part of the RLEM Risk Management program. Procedures will be taught to CEAs, NRCS, and other Natural Resource Agency personnel for use in educational and/or technical assistance program to ranchers. Appropriate reports, mass media news releases, and fact sheets will be developed. The La Copita Demonstration Ranch and other Web Pages will post results, procedures, etc.

Specific Soil and Water Conservation Issues Addressed: This project will address a variety of issues and concerns including:

- Water management and conservation
- Soil management
- Soil quality/soil health
- Resource Management
- Brush Control/Management
- Land Management related to soil and water conservation
- Conservation practices economics
- Carbon sequestration

Collaboration:

1. Texas Cooperative Extension
 - a. County Extension Agents - Ag in Brooks, Duval, Live Oak, Nueces, and Kleberg Counties. Communicating results to clientele.

- b. Texas Cooperative Extension Specialists in Rangeland Ecology and Management, Animal Science, Soil and Crop Sciences, Wildlife and Fisheries Sciences, and Agricultural Economics. Assist in installation, monitoring, evaluation, and communicating of results.
- 2. Natural Resource Conservation Service. Assist with installation, monitoring, and communicating results.
- 3. Texas State Soil and Water Conservation Board Representatives: Communicating results.
- 4. Clientele Committees (Jim Wells Beef Cattle Improvement Association, Wildlife Coop, Beef Improvement, etc.): Communicating results.
- 5. Texas A&M University-Kingsville. Monitoring of results; Information dissemination.

Submitted by _____
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Approved for Submission _____
Robert E. Whitson