

Watershed Conservation on Grazing Lands in Central Texas: Cowhouse Creek Case Study

Background

Rangelands continue to degrade at an accelerated pace. Drivers of these changes can include rising atmospheric CO₂, desertification, woody plant encroachment, and invasion of non-native species. The implications in terms of water, sediment and nutrient budgets are not understood. Degraded rangelands are known to be “leaky” systems and watershed conservation should, therefore, focus on restoring the system’s ability to retain resources. Thus, watershed conservation practices can be broadly defined as any practices that enhance the ability of the landscape to retain resources.

The Cowhouse Creek in North Central Texas is a tributary of the Brazos River draining 400,000 acres, most of which is rangeland within the Lampasas Cut Plain. From the headwaters in NE Mills County, the creek flows southeast for approximately 90 miles through Hamilton, Coryell and Bell counties and drains into Belton Lake, a flood control and water supply reservoir operated by the U.S. Army Corps of Engineers. This watershed offers a unique opportunity to assess, at multiple scales, the effects of conservation practices used in grazing lands within Central Texas. The project will:

- Determine the influence of grazing land conservation practices on watershed health and functioning;
- Examine the socio-economic drivers of, and constraints on, conservation of grazing lands; and
- Conduct education programs to encourage and support the most beneficial conservation practices.

Approach

In order to achieve these objectives, an intricate combination of methods must be employed given the complexity of rangeland systems. These include basic hydrologic research, socio-economic evaluations and development of innovative outreach programs to mesh results. We will focus on compilation, analysis and synthesis of existing data collected and maintained by Texas AgriLife Research scientists, NRCS field personnel and Fort Hood military land managers. These data sets will be used to calibrate and adapt the Agricultural Policy/Environmental eXtender (APEX) model for rangelands and to evaluate various conservation scenarios within a virtual watershed contained in the greater Cowhouse Creek watershed.

In conjunction with hydrologic/watershed modeling, the team will survey landowners to determine the socio-economic drivers governing acceptance and implementation of conservation practices within the target basin.

Major emphasis on education and outreach to local stakeholders, as well as the development of materials, will be applied in the Cowhouse Creek watershed and extended to other regions in Texas through the Ecosystem Science & Management Departments Extension programs.

Impacts

The project addresses the fundamental goals of the National Integrated Water Quality Program and will result in:

- Improved understanding of fundamental linkages between grazing land conservation practices and watershed health at watershed and landscape scales;
- Increased capacity for improving watershed health through grazing land conservation based upon a broadly applicable simulation modeling tool;
- Identification of an optimal suite of conservation practices as well as appropriate timing and geographic distribution at the landscape scale to improve watershed health; and
- Extension and outreach activities that transfer this knowledge and these tools to the stakeholders for long-term implementation.

Funding

Funding for this project is provided by the Cooperative State Research, Education, and Extension Service: Integrated Research, Education, and Extension Competitive Grants Program – National Integrated Water Quality Program and the Conservation Effects Assessment Project (CEAP).

Partners

Texas AgriLife Research
Texas AgriLife Extension
USDA Natural Resources Conservation Service

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