

**Project Title:** Environmental Management of Grazing Lands

**Project Cooperators:**

- Texas State Soil and Water Conservation Board (TSSWCB) – John Foster
- Texas Water Resources Institute (TWRI) – Dr. Allan Jones and Kevin Wagner
- Texas Cooperative Extension (TCE) – Dr. Larry Redmon
- Texas Agricultural Experiment Station (TAES) – Dr. Terry Gentry
- Texas A&M Department of Rangeland Ecology & Management – Dr. Bob Knight
- USDA-Agricultural Research Service (USDA-ARS) – Dr. Daren Harmel
- Welder Wildlife Refuge – Dr. Lynn Drawe

**Statement of Need/Description:**

Livestock grazing on grasslands, if not properly managed, can contribute to nonpoint source pollution in streams. Although sediment is generally considered the largest water quality problem from improper livestock grazing, nutrients and pathogens may also be a concern.

Currently, approximately 50% of the impairments on the 2004 Texas 303(d) List are due to elevated bacteria. The State has initiated a major effort to improve the management of grazing lands to reduce NPS runoff of pathogens.

This is an important effort because livestock production on grazing lands is a major component of Texas's agricultural economy.

**Relevance/Background:**

Proper management of grazing lands includes implementation of integrated grazing management practices. These practices sustain forage productivity and soil health, improve air and water quality, and enhance habitats for wildlife. Proper management also increases infiltration and flood protection, sequesters carbon, and provides hunting and other recreational opportunities which contribute positively to the economy of many regions.

This project will assist with development and delivery of technical information and support to ranchers on protection and enhancement of the functions and values of grasslands.

**Objectives/Work to Be Accomplished:**

The goal of this proposed project is to work in conjunction with the *Lone Star Healthy Streams* project, which is funded through an EPA CWA §319(h) grant that is administered by the TSSWCB and was awarded to TWRI and TCE. Together, these projects will develop and deliver current information to landowners on production and environmental management of grazing lands and their associated watersheds to address water quality and other concerns in the State.

To accomplish this, several objectives will be completed by the proposed project: 1) compile existing information on environmental management of grazing lands, 2) evaluate and demonstrate the effectiveness of proper grazing management in reducing bacterial runoff from grazing lands, 3) initiate evaluation of the effect of complementary practices (i.e. alternative water supplies and fencing) on cattle behavior and stream water quality, and 4) promote adoption of appropriate grazing land management practices.

At least three study sites will be used – Welder Wildlife Refuge, Riesel Experiment Station, and a private ranch (TBD). Evaluation and demonstration of proper grazing management will primarily take place on the Welder Wildlife Refuge near Sinton, Texas. Three small (1-2 acres) watershed sites on the Welder Refuge will be refurbished and equipped to measure runoff and collect samples for three years from three different treatments - one with no grazing, one with prescribed grazing, and one with heavy grazing. These data will be compared to that collected at Riesel on (1) ungrazed native prairie and (2) grazed improved pasture over the same three year period to identify regional differences and effects of grazing. On the private TBD ranch, effects of prescribed grazing used in conjunction with alternative water supplies and fencing will be determined over a three year period. A report summarizing the existing information on environmental management of grazing lands and describing results of the first year of the evaluation will be provided.

### **Tasks, subtasks, schedules, and deliverables:**

#### **Task 1: Project Coordination and Administration**

**Objectives:** To effectively coordinate and monitor all work performed under this project including technical and financial supervision, preparation of status reports, and maintenance of project files and data. TWRI will perform accounting functions for project funds and be responsible for developing timely and accurate reports. Progress reports will document all activities performed within a quarter and will be submitted not later than thirty (30) days after the close of the quarter.

**Subtask 1.1** TWRI will prepare electronic quarterly reports for submission to the TSSWCB (Start Date: Month 1; Completion Date: Month 12).

**Subtask 1.2** TWRI will participate in meetings and teleconferences with the TSSWCB project manager, as needed, to review project status, deliverables, etc. (Start Date: Month 1; Completion Date: Month 12).

**Subtask 1.3** TWRI will submit appropriate Reimbursement Forms (Start Date: Month 1; Completion Date: Month 12).

**Subtask 1.4** TWRI will coordinate this project with the *Lone Star Healthy Streams* project and related USDA-ARS efforts at Riesel (Start Date: Month 1; Completion Date: Month 12).

**Subtask 1.5** TWRI will prepare a final report for submission to the TSSWCB summarizing the existing information on environmental management of grazing lands and describing results of the first year of the evaluation (Start Date: Month 11; Completion Date: Month 12).

**Deliverables:**

- Quarterly Progress Reports
- Reimbursement Forms
- Final Report

**Task 2: Compile Existing Information**

**Objectives:** To compile existing information on environmental management of grazing lands.

**Subtask 2.1:** TCE and TWRI will coordinate a review of literature of the state of current knowledge regarding environmental management of grazing lands (Start Date: Month 1; Completion Date: Month 12).

**Deliverables**

- Summary of the current knowledge regarding environmental management of grazing lands will be included in the final report and other publications.

**Task 3: Evaluation of Proper Grazing Management**

**Objectives:** To evaluate and demonstrate effects of grazing management on runoff quantity and quality (*E. coli*) at three study sites – Welder Wildlife Refuge, Riesel Experiment Station, and a private ranch (TBD).

**Subtask 3.1:** Purchase equipment as outlined in budget (Start Date: Month 1; Completion Date: Month 3).

**Subtask 3.2:** Refurbish and equip three small (1-2 acres) watershed sites on the Welder Wildlife Refuge to measure runoff and collect *E. coli* samples from three different treatments: (1) no grazing, (2) prescribed grazing, and (3) heavy grazing (Start Date: Month 1; Completion Date: Month 6).

**Subtask 3.3:** Select ranch for evaluation of grazing management and complementary practices (Start Date: Month 1; Completion Date: Month 6).

**Subtask 3.4:** Install sampling equipment on selected ranch needed to measure runoff and collect *E. coli* samples. On the private ranch selected, the effects of grazing management and complementary practices will be assessed over a three year period through the *Lone Star Healthy Streams Project* (Start Date: Month 1; Completion Date: Month 9).

**Subtask 3.5:** Collect runoff, rainfall, and *E. coli* data from Welder Wildlife Refuge and selected ranch (Start Date: Month 6; Completion Date: Month 12).

**Subtask 3.6:** Obtain data collected by USDA-ARS at Riesel on (1) ungrazed native prairie and (2) grazed improved pasture (Start Date: Month 1; Completion Date: Month 12).

**Subtask 3.7:** Compare data collected at Riesel, Welder Wildlife Refuge, and selected ranch to identify regional differences and effects of grazing (Start Date: Month 11; Completion Date: Month 12).

#### **Deliverables**

- Summary of data collected and preliminary findings for inclusion in final report.
- Photo-documentation of monitoring sites will be included in the final report

#### **Task 4: Evaluation of Complementary Practices**

**Objectives:** To initiate the evaluation of the effectiveness of complementary practices, such as alternative water supplies and fencing, on cattle behavior and stream water quality (*E. coli*).

**Subtask 4.1:** Install stream sampling equipment on ranch selected in Subtask 3.3 to measure stream flow and rainfall, and collect stream samples for *E. coli* analysis (Start Date: Month 1; Completion Date: Month 9).

**Subtask 4.2:** Initiate stream sampling and evaluation of cattle behavior (using GPS collars) to assess background conditions prior to implementation of complementary practices (i.e. alternative water supplies, fencing, etc.) in years 2 and 3 of the evaluation funded through the *Lone Star Healthy Streams Project*. (Start Date: Month 9; Completion Date: Month 12).

#### **Deliverables**

- Summary of preliminary data collected and findings for inclusion in final report.
- Photo-documentation of monitoring sites for inclusion in final report.

## **Task 5: Technical Transfer**

**Objectives:** To disseminate educational materials, on a statewide basis, that promote adoption of appropriate grazing land management practices.

**Subtask 5.1:** TCE and TWRI will coordinate with the TSSWCB, NRCS, local SWCDs and others, to deliver current knowledge to landowners on production and environmental management of grazing lands and their associated watersheds to address water quality and other concerns in the state (Start Date: Month 1; Completion Date: Month 12).

### **Deliverables**

- Summary of educational programs delivered for inclusion in final report.

## GRP Project Budget

<b>Category</b>	<b>Total</b>
<b>1. Personnel</b>	\$ 17,675
Subtotal Personnel	\$ 17,675
<b>2. Fringe Benefits</b>	\$ 4,498
Subtotal Fringe	\$ 4,498
<b>3. Travel</b>	\$ 7,000
Subtotal Travel	\$ 7,000
<b>4. Equipment</b>	
ISCOs with Bubble Flow Meters (6)	\$ 36,000
Subtotal Equipment	\$ 36,000
<b>5. Supplies</b>	
GPS Collars (2 @ \$3500)	\$ 7,000
Lab Supplies	\$ 1,614
Hobo Tipping Bucket Rain Gage (5)	\$ 500
Solar Panels for ISCOs (6)	\$ 1,800
HD Batteries for ISCOs (6)	\$ 420
Housing for ISCOs (6)	\$ 3,600
Subtotal Supplies	\$ 14,934
<b>6. Contractual</b>	
Subtotal Contractual	\$ -
<b>7. Construction</b>	
Subtotal Construction	\$ -
<b>8. Other Direct Costs</b>	
Publication Costs	\$ 1,250
Lab Analysis	\$ 3,600
Watershed Structure Installation (1)	\$ 1,100
Watershed Structure Maintenance (3)	\$ 900
Subtotal Other	\$ 6,850
<b>9. Total Direct Costs</b>	\$ 86,957
<b>10. Indirect costs (15% IDC)</b>	\$ 13,044
<b>11. Total</b>	<b>\$ 100,000</b>