

Texas Water Resources Institute

Lone Star Healthy Streams FY 06 CWA 319(h) TSSWCB Agreement No. 06-05-07-02

Quarter no. 9 From 1/1/09 Through 3/31/09

I. Abstract

Texas AgriLife Extension Service (Extension) continued work on a PowerPoint presentation and white paper for dissemination to the public. The project website has been visited by over 800 unique visitors since the website went online. GPS collars were installed on cattle February 4-March 5 at the 2S Ranch to evaluate the percent time they spend in the riparian area now that alternative water is present. Preliminary analyses of the GPS data indicate a 53-57% reduction in the percent time cattle spend near the creek when alternative water is present. Water samples were also collected at the 2S Ranch bi-monthly throughout the quarter. During this quarter, *E. coli* levels averaged 1061 cfu/100 ml above the ranch and 1995 cfu/100 ml below the ranch. At the Welder Wildlife Refuge and Riesel, dry conditions continued. However, runoff was collected at Riesel on May 15. Analysis of *Bacteroidales* was initiated this quarter. It is hoped that the analysis of all *Bacteroidales* samples collected to date will be completed next quarter. Finally, Extension plans to deliver the Lone Star Healthy Streams education program to the TSSWCB next quarter for review and approval to proceed.

II. Overall Progress and Results by Task

TASK 1: Project Coordination and Administration

Subtask 1.1: TWRI, in coordination with Extension, will organize a Project Steering Committee to coordinate project efforts with all project participants. This Committee will be composed of TSSWCB, SWCDs, Extension, AgriLife Research, TWRI, NRCS, TDA, FSA, GLCI, and producer groups such as TFB and TSCRA. This Committee will meet at least semi-annually to provide input on the evaluation of BMPs and the education program; provide input into curriculum development, program delivery and CEU processes; discuss project status, provide input on demonstration/BMP evaluation efforts, and coordinate project activities.

The following actions have been completed during this reporting period:

- a. No activity to report this quarter. Work will begin next quarter on scheduling and preparing for the 3rd LSHS Steering Committee Meeting.

55% Complete

Subtask 1.2: TWRI will prepare electronic quarterly reports for submission to the TSSWCB. All progress reports will be provided to the Steering Committee.

The following actions have been completed during this reporting period:

- a. TWRI submitted Year 2, Quarter 4 Progress Report on January 15, 2009.

55% Complete

Subtask 1.3: TWRI will conduct quarterly TTVN meetings as appropriate with project participants to discuss project activities, project schedule, lines of responsibility, communication needs, and other requirements.

The following actions have been completed during this reporting period:

- a. On February 5, TWRI met with Extension to discuss to discuss the budget, project status, and request for no-cost extension.
- b. On February 27th, TWRI and Extension met to discuss the future delivery of Lone Star Healthy Streams throughout the state and potentially to a wider audience.

55% Complete

Subtask 1.4: TWRI will attend meetings with the TSSWCB project manager and other meetings, as needed, to review project status, deliverables, etc.

The following actions have been completed during this reporting period:

- a. TWRI routinely communicates with the TSSWCB project manager on project status and issues.
- b. On February 13, TWRI met with the TSSWCB to review the project status.

55% Complete

Subtask 1.5: TWRI will submit appropriate Reimbursement Forms.

The following actions have been completed during this reporting period:

- a. As of the last billing period which ended on February 28, 2009, \$159,030.43 or 61% of federal project funds had been expended.
- b. Progress of Allocations to each Department is as follows:
 - TWRI has expended 65% of their funds
 - SCSC has expended 60% of their funds
 - ESSM has expended 46% of their funds

61% Complete

Subtask 1.6: TWRI will develop (Months 1-3), host and maintain (Months 3-36) an internet website for the dissemination of information.

The following actions have been completed during this reporting period:

- a. In September 2007, TWRI developed the website titled "Improving Water Quality of Grazing Lands" to disseminate information on the Lone Star Healthy Streams project and related projects. It can be found at <http://grazinglands-wq.tamu.edu/index.php>

- b. The website was viewed by:
 - 54 unique visitors in January 2009
 - 42 unique visitors in February 2009
 - Estimated 46 unique visitors in March 2009
 - A grand total of 815 unique visitors since September 2007
- c. The website will be continually updated as new data and information are obtained.

55% Complete

TASK 2: Compile Existing Information

Subtask 2.1: Extension will hire a LONE STAR HEALTHY STREAMS Extension Assistant to assist with and coordinate a review of the literature of the state of current knowledge regarding the effects of grazing animals on bacterial levels of riparian areas and associated water bodies and BMPs designed to minimize these impacts. Further, the Extension Assistant will lead all future LONE STAR HEALTHY STREAMS Program efforts.

The following actions have been completed during this reporting period:

- a. Garrett Norman was hired as the Lone Star Healthy Streams Extension Assistant.

100% Complete

Subtask 2.2: Extension will organize internal Extension Planning Team consisting of Extension personnel specializing in animal production systems and associated environmental issues.

The following actions have been completed during this reporting period:

- a. No activity to report this quarter. Next quarter, the Extension Planning Team will be reviewing the Lone Star Healthy Streams program prior to submission to the TSSWCB.

100% Complete

Subtask 2.3: Extension will assess and inventory education/training materials within Extension and related materials developed through similar efforts in other states addressing bacteria from grazing cattle. In order to make the program more thorough, educational materials addressing nutrient and sediment runoff from grazing lands and proper grazingland management will also be assessed and inventoried.

The following actions have been completed during this reporting period:

- a. Extension continues to review existing literature regarding information on BMPs that help reduce livestock bacteria levels in water bodies.

80% Complete

TASK 3: Develop Bacterial Education Programs for Beef Cattle Producers

Subtask 3.1: Extension will facilitate the modification necessary to integrate existing materials from subtask 2.3 into the LONE STAR HEALTHY STREAMS Program.

The following actions have been completed during this reporting period:

- a. Extension delivered a DRAFT version of the PowerPoint presentation to the LSHS Steering Committee on October 27 and requested comments from the Committee. To date, no comments have been received.
- b. Extension also continues work on the LSHS BMPs “white paper” publication. This white paper is based on the PowerPoint presentation and cannot be completed until the PowerPoint is done. Once completed, the white paper will be distributed via hard copy and the Forages and TWRI web sites.

75% Complete

Subtask 3.2: Extension will develop a core land/grazing management educational component that provides growers with state-of-the-art production technology training on fundamental BMPs and strategies which can be employed to protect and conserve water resources from bacterial and other NPS contamination originating from grazing lands.

The following actions have been completed during this reporting period:

- a. Extension has begun development of an educational program for Lone Star Healthy Streams as outlined in subtask 3.1.

75% Complete

Subtask 3.3: Extension will integrate and coordinate the Lone Star Healthy Streams Program with the Texas Master Watershed Steward program to provide producers with a more comprehensive environmental education curriculum incorporating basic training in watershed form and function, watershed management, sources of nonpoint source (NPS) pollution and BMPs and strategies which can be employed to protect and conserve water resources.

The following actions have been completed during this reporting period:

- a. This quarter, Extension met with members of the Texas Watershed Steward team to discuss integration of LSHS into their training meetings and into their training manual.

50% Complete

Subtask 3.4: Extension will establish a continuing education component that enables acquisition of CEUs in both environmental and production management.

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

0% Complete

Subtask 3.5: Extension will develop and provide a certificate of completion, or other mechanism enabling individuals to take credit for participation in education program.

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

0% Complete

TASK 4: Education Program Testing and Delivery

Subtask 4.1: Extension will test the educational program in a pilot watershed selected with input from the Project Steering Committee. Extension will coordinate with local SWCDs and others, such as the NRCS, to deliver and evaluate the educational program.

The following actions have been completed during this reporting period:

- a. No activity to report this quarter. Activity will be initiated upon completion of Task 3.

0% Complete

Subtask 4.2: To increase Program availability, Web-based and related local “on-demand” program delivery tools (i.e., CD, videos, worksheets) will be developed for both core and CEU components.

The following actions have been completed during this reporting period:

- a. No activity to report this quarter. Activity will be initiated upon completion of Task 3.

0% Complete

Subtask 4.3: Evaluate changes in producer knowledge and awareness of important production and environmental issues.

The following actions have been completed during this reporting period:

- a. No activity to report this quarter. Activity will be initiated upon completion of Task 3.

0% Complete

Subtask 4.4: Utilizing participants surveys, identify and address any barriers to producer participation and successful implementation of the program.

The following actions have been completed during this reporting period:

- a. No activity to report this quarter. Activity will be initiated upon completion of Task 3.

0% Complete

Subtask 4.5: Make appropriate modifications to the program to facilitate greater producer participation and adoption of recommended BMPs.

The following actions have been completed during this reporting period:

- a. No activity to report this quarter. Activity will be initiated upon completion of Subtask 4.3 and 4.4.

0% Complete

TASK 5: Evaluate And Demonstrate Value-Added BMPs To Reduce Bacteria Contamination Of Streams And Water Bodies From Grazing Lands

Subtask 5.1: TWRI will develop a Quality Assurance Project Plan (QAPP) that will detail project goals and objectives, the data needs to fulfill those objectives, lists field and laboratory methods, procedures and schedules to be followed, and specify a data management structure and quality assurance protocols. The QAPP will be developed using guidelines in EPA QA/R-5, "EPA Requirements for Quality Assurance Project Plans".

The following actions have been completed during this reporting period:

- a. The QAPP was approved on September 24, 2007.

100% Complete

Subtask 5.2: TWRI will provide annual revisions to the QAPP and amendments, as necessary, to the TSSWCB and EPA.

The following actions have been completed during this reporting period:

- a. The first annual revision was submitted on September 23, 2008 and approved on November 20, 2008. The next revision is due on November 20, 2009.

75% Complete

Subtask 5.3: TWRI and Extension will identify a cooperator to conduct the BMP demonstration/evaluation with assistance of the Steering Committee, local SWCD, NRCS, TWRI, and Extension agents.

The following actions have been completed during this reporting period:

- a. Complete. No activity to report this quarter.

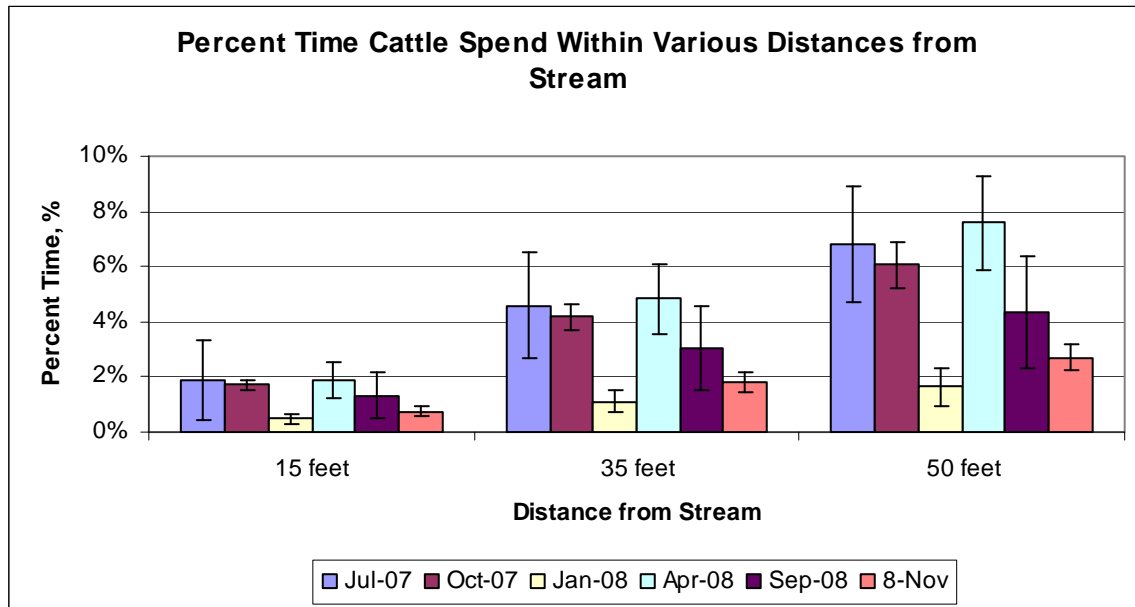
100% Complete

Subtask 5.4: TWRI and Extension will assess cattle and other animal behavior to determine the amount of time spent in the stream and riparian area before and after BMP implementation. GPS tracking will be utilized.

The following actions have been completed during this reporting period:

- a. GPS collars were placed on cattle at the 2S Ranch on February 4th and removed March 5th. This data will be analyzed next quarter.

- b. The percent time cattle spent within 15, 35, and 50 feet of the stream during each monitoring period is plotted below.



- c. GPS collar data collected to date indicate a 53-57% reduction in the percent time that cattle spend near the stream as a result of the implementation of alternative water.

85% Complete

*Subtask 5.5: TWRI and Extension will assess water quality before and after BMP implementation. Bacteria (*E. coli*) will be the focus of this effort and will be monitored bi-monthly (enumeration only). Water quality will be assessed for 12 months prior to implementation and then 12 months following implementation.*

The following actions have been completed during this reporting period:

- a. 2S Ranch (79% complete; 19/24 mos.)
 - Water samples were collected above and below the 2S Ranch on January 8 and 22, February 12 and 26, and March 12 and 26 to evaluate bacteria levels following implementation of alternative water supplies and shade.
 - During this quarter, *E. coli* levels averaged 1061 cfu/100 ml above the ranch and 1995 cfu/100 ml below the ranch.
 - Water samples are scheduled to be collected at the 2S Ranch on April 9 and 23, May 14 and 28, and June 11 and 25.
- b. Welder Wildlife Refuge (53% complete; 17/32 mos.)
 - Equipment maintenance was performed on January 27, February 18, and March 17.
 - No grazing treatments were conducted at the Welder this quarter.
 - No runoff has occurred since the ISCO automated samplers were activated on October 30, 2007. Rainfall during this period has been well below normal.

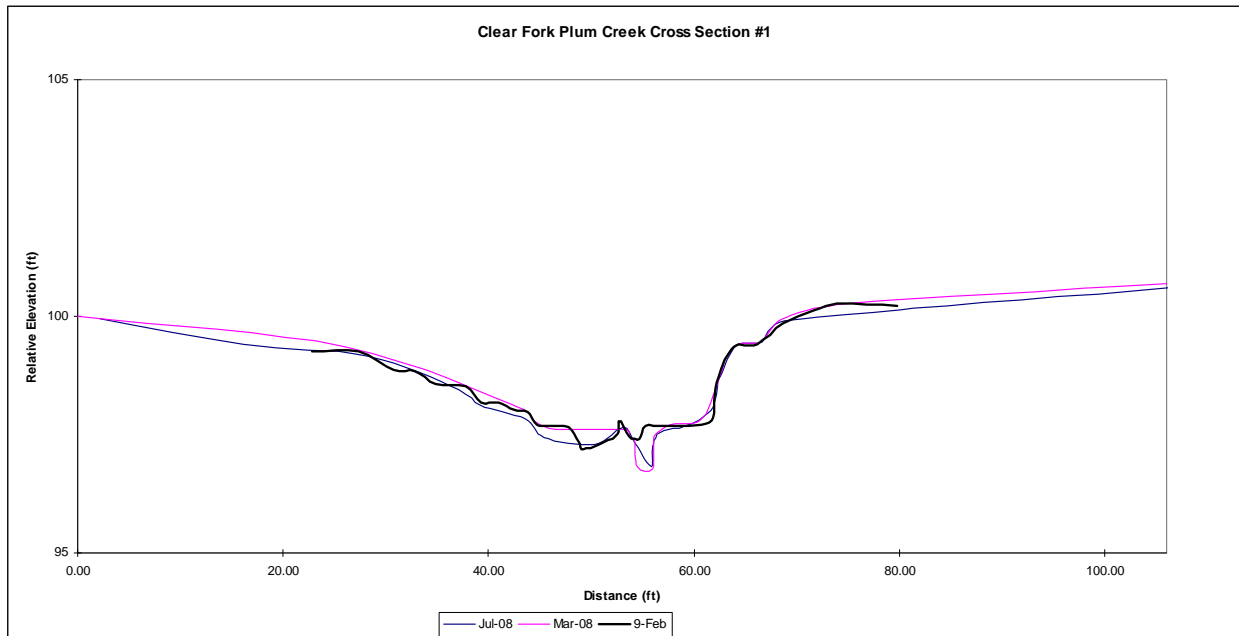
- c. Riesel (56% complete; 20/36 mos.)
- The first runoff event since May 15, 2008 occurred at Riesel this quarter. Grab samples collected at the ungrazed site SW12 yielded *E. coli* concentrations of 260 cfu/100 ml, while levels in grab samples from the grazed site SW17 were 5400 cfu/100 ml.

63% Complete

Subtask 5.6: In order to gain a more complete picture of the impacts of BMP implementation on stream bank stability and specific sources of bacteria, stream cross-sections will be performed at all stream sites before and after BMP implementation and Bacteroidales PCR (library-independent BST) will be assessed at runoff evaluation sites by TWRI, Extension, and AgriLife Research.

The following actions have been completed during this reporting period:

- a. DNA extractions from the preserved runoff samples collected at Riesel in 2008 were performed in February. *Bacteroidales* analysis using Realtime PCR is anticipated to be conducted on these samples next quarter.
- b. Stream cross-sections were surveyed for the third time at the 2S Ranch on February 12 to evaluate any changes in bank stability or stream morphology (see below). Although a slight filling and shifting of the thalweg can be observed; no significant changes occurred between March 2008 and February 2009. Cross-sections will be resurveyed in July 2009.



35% Complete

Subtask 5.7: TWRI and Extension will provide funding to cooperating ranch to implement BMPs to reduce bacteria and other NPS runoff from grazing lands.

The following actions have been completed during this reporting period:

- a. Four portable shade facilities were installed on the 2S Ranch in June 2008. The landowner has been unhappy with the design; thus, the structures will be removed in May 2009 following the removal of the GPS collars.
- b. Funding was provided to the 2S Ranch for grazing management on their creek pasture for year 1 of the project. At the end of year 2, it is anticipated that another reimbursement will occur.

79% Complete

III. Related Issues/Current Problems and Favorable of Unusual Developments

- Due to the lack of runoff which has hampered data collection activities, a one-year no-cost extension was requested and approved. As a result of the no-cost extension, the percent complete of a number of tasks were adjusted on this quarterly report.
- Extension introduced the LSHS concept in county extension meetings in:
 - a. Walker Co. 1/16/09
 - b. Williamson Co. 2/10/09
 - c. Travis Co. 3/2/09
 - d. Rusk Co. 3/24/09
- Extension provided a 1-hr LSHS program to central Texas cattlemen at the Central Texas Cow-Calf Clinic in Milano on January 9.
- TWRI provided a presentation on the LSHS project and results to date at Howard Payne University in Brownwood on January 21.

IV. Projected Work for Next Quarter

- Prepare and submit Year 3, Quarter 1 Progress Report on April 15th.
- Update the website
- Continue compilation of information on current knowledge regarding the effects of grazing animals on bacterial runoff and BMPs designed to minimize impacts
- Continue composition of land/grazing management education PowerPoint presentation addressing bacteria contamination of waterbodies
- Continue work on development of a white paper based on the PowerPoint educational program for distribution via hard copy and web
- Continue communication with landowners via educational programs
- Continue monitoring runoff at Riesel and the Welder Wildlife Refuge
- Conduct GPS tracking of cattle on the 2S Ranch from April 9 – May 2
- Analyze GPS collar data from February and April 2009
- Continue bi-monthly sampling on the 2S Ranch