

Texas Water Resources Institute

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

Quarter no. 10 From 4/1/09 Through 6/30/09

I. Abstract

Texas AgriLife Extension Service (AgriLife Extension) is nearing the completion of the LSHS PowerPoint presentation for dissemination to the public. The project website has already been visited by over 870 unique visitors since the website went online. GPS collars were installed on cattle for the final time April 9-May 8 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 48-53% 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 in April and May; however, the creek went dry in June. During this quarter, *E. coli* levels averaged 212 cfu/100 ml above the ranch and 2073 cfu/100 ml below the ranch. At the Welder Wildlife Refuge and Riesel, dry conditions continued and no runoff was collected at either location. Analysis of *Bacteroidales* continued this quarter; however, much more work is left to do. It is hoped that the analysis of all *Bacteroidales* samples collected to date will be completed next quarter. Finally, AgriLife Extension plans to deliver the Lone Star Healthy Streams education program to the TSSWCB next quarter for final review and approval to proceed. At that time, a targeted watershed will be selected for program launch during the fourth quarter of 2009.

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. The 3rd LSHS Steering Committee Meeting has tentatively been scheduled for Monday, October 19, 2009 in Arlington, Texas in conjunction with the Annual Meeting of the Association of Texas Soil and Water Conservation District. This date will be confirmed next quarter and planning for the meeting will proceed accordingly.

65% 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 3, Quarter 1 Progress Report on April 15, 2009.

65% 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 April 8, May 1, and June 12, AgriLife Extension and TWRI met to discuss project activities and schedule.

65% 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 June 26, AgriLife Extension and TWRI met with the TSSWCB to review the LSHS program and discuss project status and future activities.

65% 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 May 31, 2009, \$123,905.83 or 69% of federal project funds had been expended.
- b. Progress of Allocations to each Department is as follows:
 - TWRI has expended 76.2% of their funds
 - SCSC has expended 67.5% of their funds
 - ESSM has expended 48.5% of their funds

69% 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:
 - 20 unique visitors in April 2009
 - 21 unique visitors in May 2009
 - 6 unique visitors in June 2009
 - A grand total of 870 unique visitors since September 2007
- c. The website will be continually updated as new data and information are obtained.

65% 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. This quarter, the Extension Planning Team reviewed the Lone Star Healthy Streams program prior to submission to the TSSWCB. Following review of the program, changes were made to facilitate improved targeting of the presentation and educational materials to protection of waterways from bacteria rather than a more generalized program involving sediment and nutrients.

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. AgriLife Extension continues to review existing literature regarding information on BMPs that help reduce livestock bacteria levels in water bodies. This is expected to be completed next quarter.

90% 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. AgriLife 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. AgriLife Extension delivered the PowerPoint presentation to the TSSWCB on June 26 and received a number of very helpful comments. These are being incorporated into the presentation which is expected to be completed next quarter.
- c. Upon completion of the presentation, AgriLife Extension will turn its focus to the LSHS Resource Manual. This resource manual will be based on the PowerPoint presentation and the information compiled during the development of the PowerPoint. Once completed, the resource manual will be distributed via hard copy and the Forages and TWRI web sites.

65% 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. AgriLife Extension continues 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. AgriLife Extension continues to meet regularly 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, however, based upon discussions with TSSWCB, investigation of specific types of web-based tools have begun to be evaluated. 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.

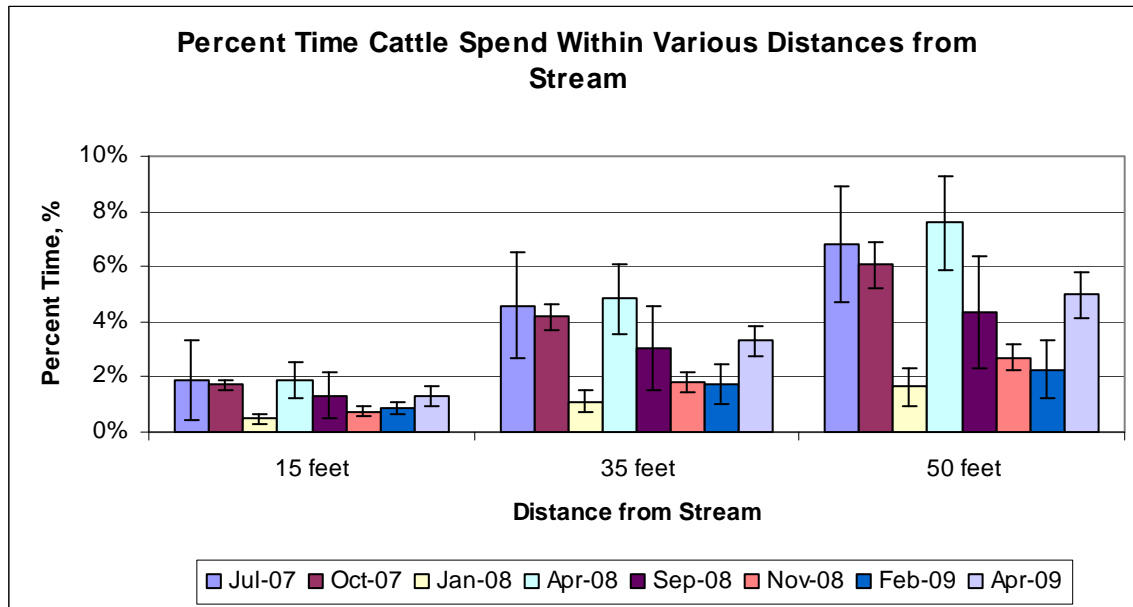
100% Complete

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 for the final time on April 9th and removed May 8th.

- 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 indicate a 48-53% reduction in the percent time that cattle spend near the stream as a result of the implementation of alternative water.

100% 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 (98% complete; 23.5/24 mos.)
 - Water samples were collected above and below the 2S Ranch on April 9 and 23; and May 14 and 28 to evaluate bacteria levels following implementation of alternative water supplies and shade. Samples were scheduled to be collected on June 11 and 24; however, due to no flow, no samples were collected.
 - During this quarter, *E. coli* levels averaged 212 cfu/100 ml above the ranch and 2073 cfu/100 ml below the ranch.
 - Water sampling at the 2S Ranch is scheduled to be completed on July 9.
- b. Welder Wildlife Refuge (63% complete; 20/32 mos.)
 - Equipment maintenance was performed on April 3 & 25, May 19, and June 17.
 - A grazing treatment was conducted at the Welder this quarter from April 27 – May 1. The moderately grazed site WWR-3 received 16 animal unit days (AUD) of grazing while the heavy grazed site WWR-2 received 32 AUD.
 - No runoff has occurred since the ISCO automated samplers were activated on October 30, 2007. Rainfall during this period has continued to be well below normal.

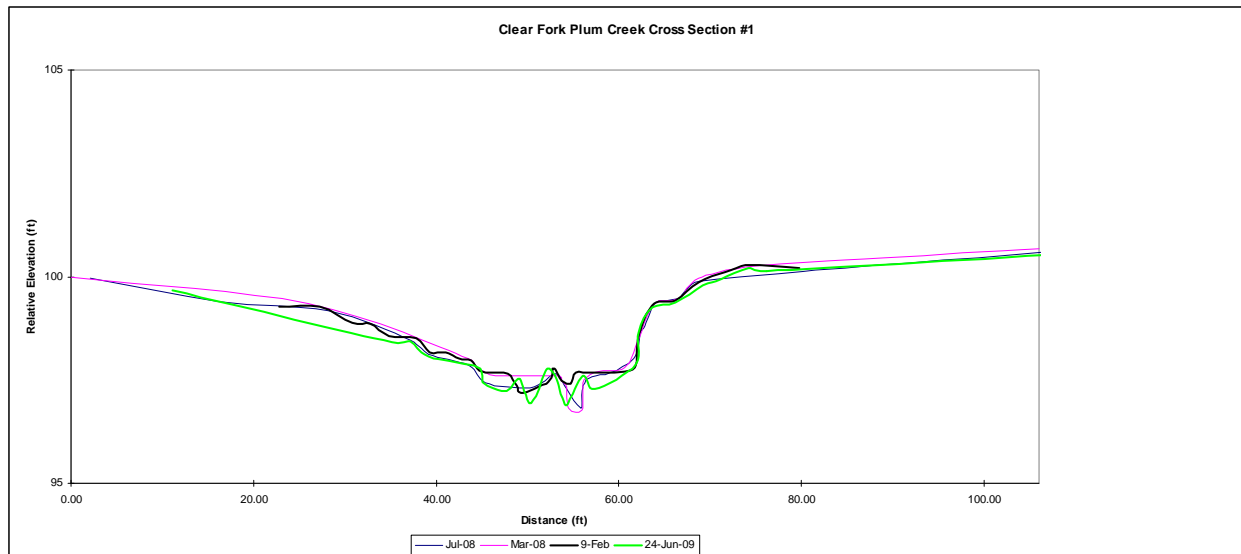
- c. Riesel (64% complete; 23/36 mos.)
 - No runoff occurred this quarter.

75% 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. Work began this quarter to develop a standard curve for the *Bacteroidales* analysis using Realtime PCR. DNA cloning to develop the standard curve was attempted March 31 – April 3 and April 13-16, however, to no avail. Next quarter, a different DNA cloning kit will be utilized which is anticipated to be more successful.
- b. To evaluate any changes in bank stability or stream morphology, stream cross-sections were surveyed for the final time at the 2S Ranch on June 24 (see below). Most of the observed differences in the profiles below resulted from the manual surveying technique employed rather than actual bank erosion or stream degradation. Thus, it is concluded that no significant changes occurred.



50% 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 and removed in May 2009 following the final removal of the GPS collars. GPS collar data collected over the 2 year project at the 2S Ranch will be evaluated next quarter to determine the percent time that the cattle utilized them.
- b. Funding was provided in May 2009 to the 2S Ranch for grazing management on their creek pasture for year 2 of the project.

90% Complete

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

- AgriLife Extension introduced the LSHS concept in county extension meetings in:
 - a. Lee County, 4-21-09
 - b. Polk, Tyler, and Houston Counties, 4-24-09
 - c. Bastrop County, 4-30-09
 - d. Caldwell County at the annual Luling Foundation Field Day
 - e. Brazos County, 5-29-09

IV. Projected Work for Next Quarter

- Prepare and submit Year 3, Quarter 3 Progress Report on July 15th.
- Update the website
- Complete compilation of information on current knowledge regarding the effects of grazing animals on bacterial runoff and BMPs designed to minimize impacts
- Complete composition of land/grazing management education PowerPoint presentation addressing bacteria contamination of waterbodies
- Continue work on development of resource manual based on the information compiled and PowerPoint presentation
- Continue communication with landowners via educational programs
- Continue monitoring runoff at Riesel and the Welder Wildlife Refuge
- Complete bi-monthly sampling on the 2S Ranch