

Texas Water Resources Institute

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

Quarter no. 11 From 7/1/09 Through 9/30/09

I. Abstract

Texas AgriLife Extension Service (AgriLife Extension) is finalizing the *Lone Star Healthy Streams* (LSHS) PowerPoint presentation and resource manual and preparing for dissemination of the program to the public. A number of areas have already been identified for delivery, including the West Region and Caldwell County (i.e. Plum Creek). The project website has already been providing information to the public. To date, it has been visited by over 900 unique visitors since the website went online. Field work at the 2S Ranch was completed in July. Data collected from the 2S Ranch is now being analyzed to assess the water quality impacts of providing alternative water supplies that resulted from the cattle spending 50% less time near the stream. At the Welder Wildlife Refuge and Riesel, conditions improved towards the end of the quarter; however, no runoff has been received at the Welder. At Riesel, one small runoff event occurred this quarter at the moderately grazed site SW17. Analysis of *Bacteroidales* continued this quarter; however, as a result of complications establishing a standard curve, 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 will deliver the Lone Star Healthy Streams education program to the LSHS Steering Committee next quarter for final review and comment. Once final comments are incorporated, both the LSHS presentation and resource manual will be finalized and delivered to the TSSWCB, EPA and landowners throughout the state.

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 been scheduled for Monday, October 19, 2009 from 1:30-3:30 in Arlington, Texas in conjunction with the Annual Meeting of the Association of Texas Soil and Water Conservation District Directors.

- b. The Committee will preview the LSHS educational presentation and guide and be updated on the BMP evaluations at this meeting (see attached agenda).

75% 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 2 Progress Report on July 15, 2009.

75% 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 August 27, September 11, and September 28, AgriLife Extension and TWRI met to discuss the LSHS Guide and Presentation.

75% 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.

75% Complete

Subtask 1.5: TWRI will submit appropriate Reimbursement Forms.

The following actions have been completed during this reporting period:

- a. As of September 30, 2009, \$323,817 or 80% of federal project funds had been expended.
- b. Progress of Allocations to each Department is as follows:
 - TWRI has expended 86.4% of their funds
 - SCSC has expended 78.4% of their funds
 - ESSM has expended 58.2% of their funds

80% 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:
 - 14 unique visitors in July 2009
 - 12 unique visitors in August 2009
 - 12 unique visitors in September 2009
 - A grand total of 908 unique visitors since September 2007
- c. The website will be continually updated as new data and information are obtained.

75% 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. Complete. Garrett Norman was hired as the LSHS 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. Complete. No activity to report this quarter.

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. Complete. However, AgriLife Extension will continually review existing literature regarding information on BMPs that help reduce livestock bacteria levels in water bodies. Any new relevant material will be incorporated into the LSHS program.

100% 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 made significant progress this quarter in the development of the LSHS Resource Manual. The DRAFT resource manual was provided to TWRI on August 27 for review. It is expected that this resource manual will be completed next quarter and delivered to the LSHS Steering Committee for review and comment. Once completed, the resource manual will be distributed by hard copy and electronically via the Forages and TWRI web sites.
- b. AgriLife Extension continued work on the LSHS PowerPoint presentation to (1) incorporate comments received from the TSSWCB on June 26 and (2) ensure consistency between the resource manual and presentation. The presentation is expected to be completed next quarter and delivered to the LSHS Steering Committee for review and comment.

85% 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 is in the final stages of development of the educational program for Lone Star Healthy Streams as outlined in subtask 3.1.

85% 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 meets regularly with members of the Texas Watershed Steward team to discuss integration of the two programs.

75% 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. AgriLife Extension succeeded in getting the LSHS program accepted by the West Region RPD as a program they wish to use in that region.
- b. AgriLife Extension also has the Caldwell County agent on board for a LSHS presentation this coming year.

10% 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:

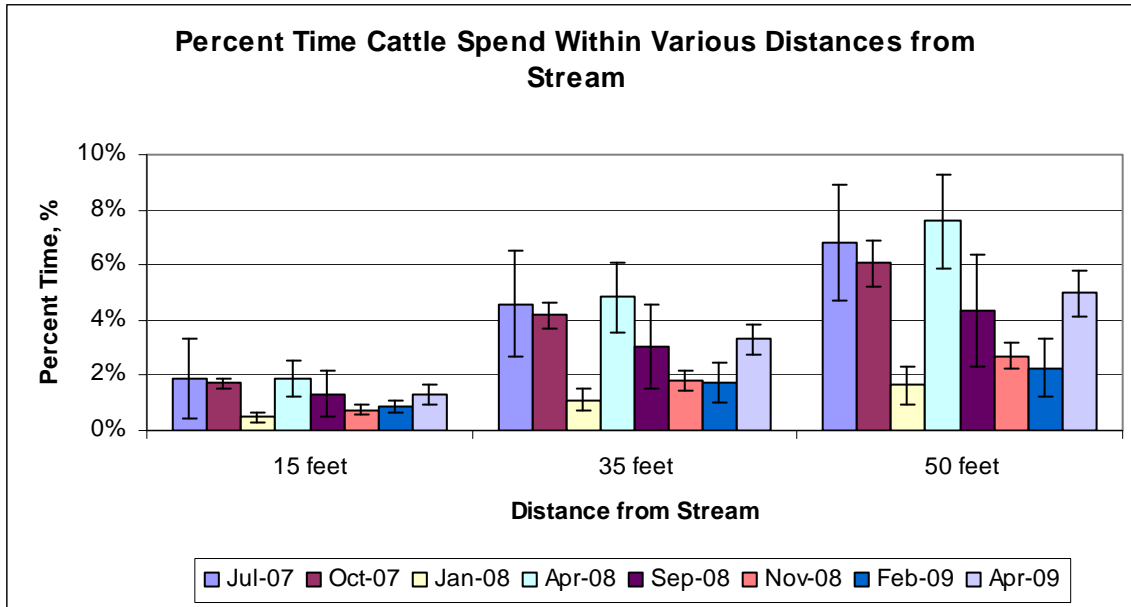
- a. Complete. No activity to report this quarter.

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. This task has been completed. The GPS collar data collected indicated a 48-53% reduction in the percent time that cattle spend near the stream as a result of the implementation of alternative water. The percent time cattle spent within 15, 35, and 50 feet of the stream during each monitoring period is plotted below.



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 (100% complete)
 - Water sampling at the 2S Ranch was completed in July 2009.
- b. Welder Wildlife Refuge (72% complete; 23/32 mos.)
 - Equipment maintenance was performed on July 29, August 28, and September 30.
 - No grazing was conducted this quarter as a result of the low rainfall and poor grass growth.
 - No runoff has occurred since the ISCO automated samplers were activated on October 30, 2007. Recent rains have improved conditions; however, rainfall continues to be well below normal.

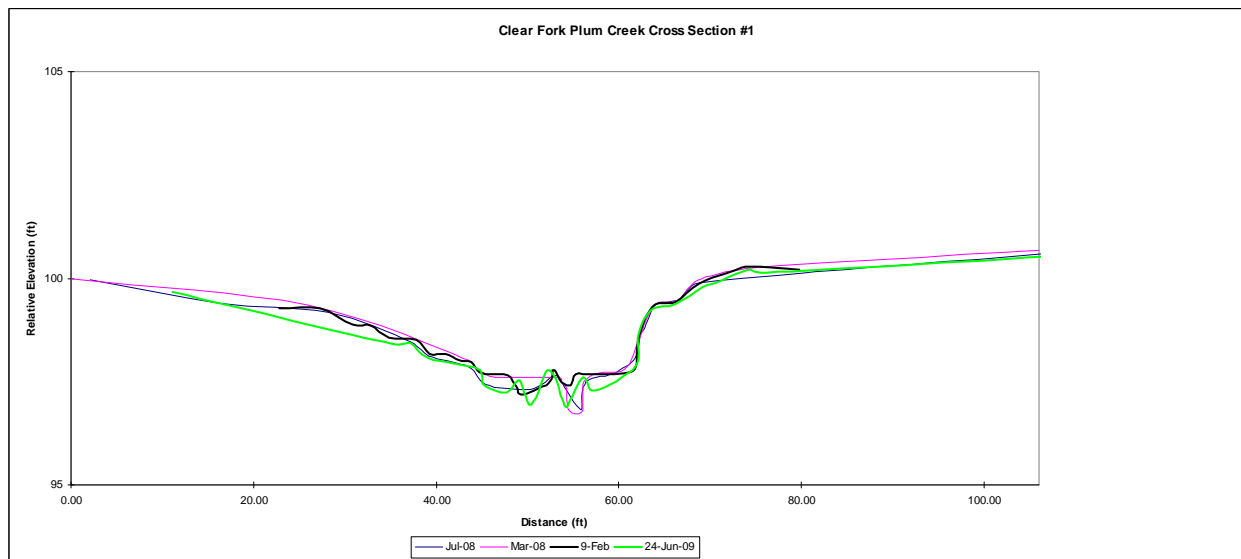
- c. Riesel (72% complete; 26/36 mos.)
 - One small runoff event occurred on September 14 at site SW17 only. *E. coli* levels in the runoff exceeded 800,000 cfu/100 ml.

80% 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 continued this quarter to develop a standard curve for the *Bacteroidales* analysis using Realtime PCR. DNA cloning was finally successful as a result of work on July 20-24. Development of the standard curve for AllBac and HuBac was attempted on July 27-28; however, we encountered difficulties with the plate sealer. The AllBac and HuBac curves were attempted again on August 3-4 after resolving issues with the sealer. However, issues were again encountered, but this time with the DNA. Samples were submitted for sequencing which indicated the need to remake DNA stock solutions. Work will continue next quarter on standard curves.
- b. Once the *Bacteroidales* DNA standard curve is developed, analysis of all samples collected to date can proceed. It is hoped that this can be accomplished next quarter.
- c. The evaluation of changes in bank stability or stream morphology at the 2S Ranch has been completed. Most of the observed differences in the profiles (below) resulted from errors in 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. Task complete. Funding was provided to the 2S Ranch for grazing management on their creek pasture for 2 years. Four portable shade facilities were also 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 this 2 year period indicated that the cattle at the 2S Ranch did not utilize the structures provided.

100% Complete

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

- “Alternative Water Supplies For Improving Water Quality” was provided to the TSSWCB for inclusion in the Annual NPS Report

IV. Projected Work for Next Quarter

- Conduct LSHS Steering Committee Meeting on October 19
- Prepare and submit Year 3, Quarter 3 Progress Report on October 9.
- Attend Annual Meeting of Texas Soil and Water Conservation District Directors
- Update the website
- Complete LSHS PowerPoint presentation
- Continue LSHS resource manual
- Initiate program delivery as outlined in Task 4
- Update QAPP
- Continue monitoring runoff at Riesel and the Welder Wildlife Refuge
- Continue work on *Bacteroidales*

Lone Star Healthy Streams Project Steering Committee

In conjunction with the
Annual Meeting of Texas Soil and Water Conservation District Directors
Arlington, Texas

October 19, 2009 1:30 – 3:30 pm

MEETING AGENDA

- 1:30-1:35** **Welcome**.....John Foster, TSSWCB
- 1:35-2:50** **LSHS PowerPoint Presentation & Discussion**Dr. Larry Redmon, Extension
- 2:50-3:05** **Preview and Discuss LSHS Guide**.....Dr. Larry Redmon, Extension
- 3:05-3:20** **Status/Findings of BMP Evaluation**Kevin Wagner, TWRI
- 3:20-3:30** **LSHS Program/Committee Changes**Mitch Conine/Aaron Wendt, TSSWCB
- 3:30** **Wrap-Up & Adjourn**Aaron Wendt, TSSWCB