

## Texas Water Resources Institute

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

Quarter no. 12 From 10/1/09 Through 12/31/09

#### I. Abstract

Texas AgriLife Extension Service (AgriLife Extension) continued work to finalize the *Lone Star Healthy Streams* (LSHS) PowerPoint presentation and resource manual and prepare for dissemination of the program to the public. The presentation and manual were provided to the TSSWCB and LSHS Steering Committee this quarter for review and comment. Once final comments are incorporated, both the LSHS presentation and resource manual will be delivered to the TSSWCB, EPA and landowners throughout the state. Delivery of the full LSHS presentation as well as portions of it has already begun with its delivery at a half dozen venues across the state this quarter. At the Welder Wildlife Refuge and Riesel, conditions improved resulting in the first runoff events of the project at the Welder and the addition of 7 new sampling events to the Riesel data set. 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 within the next few months.

#### 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. On October 12, TWRI emailed the LSHS Steering Committee a meeting reminder and the agenda for the October 19<sup>th</sup> Meeting.
- b. The 3<sup>rd</sup> LSHS Steering Committee met on 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. The Committee reviewed and provided input on the LSHS educational presentation and guide and then was provided an update on the BMP evaluations.

**82% 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 3 Progress Report on October 9, 2009.

**82% 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 October 2, October 19, and November 12, AgriLife Extension and TWRI met to discuss the project contract, budget, and deliverables (LSHS Guide and Presentation).

**82% 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 October 2, TWRI and AgriLife Extension met with TSSWCB to review and gather input on the DRAFT LSHS Guide.
- c. On November 19, TWRI participated in the TSSWCB Board Meeting.

**82% Complete**

*Subtask 1.5: TWRI will submit appropriate Reimbursement Forms.*

The following actions have been completed during this reporting period:

- a. As of November 30, 2009, \$340,336 or 84% of federal project funds had been expended.
- b. Progress of Allocations to each Department is as follows:
  - TWRI has expended 89% of their funds
  - SCSC has expended 83% of their funds
  - ESSM has expended 64% of their funds

**84% 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:
  - a. 14 unique visitors in October 2009
  - b. 12 unique visitors in November 2009
  - c. 10 unique visitors in December 2009
  - d. A grand total of 944 unique visitors since September 2007
- c. The website will be continually updated as new data and information are obtained.

**82% 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 provided the DRAFT LSHS resource manual to the TSSWCB on October 2 for review and comment.
- b. AgriLife Extension provided the DRAFT LSHS resource manual to the LSHS Steering Committee on October 19 for review and comment.
- c. AgriLife Extension has completed the modification of the LSHS resource manual based on Dr. Harmel's written comments and the input provided by the steering committee at the meeting on October 19.
- d. Once completed, the resource manual will be distributed by hard copy and electronically via the Forages and TWRI web sites.
- e. AgriLife Extension continued work on the LSHS PowerPoint presentation to (1) incorporate comments received from the LSHS Steering Committee and (2) ensure consistency between the resource manual and presentation.

**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.

**82% 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. On October 14, AgriLife Extension presented the LSHS Power Point for the first time to the annual meeting of the National Devon Cattle Association in Freestone Co.
- b. On October 23, AgriLife Extension shared limited information regarding LSHS at Washington Co. cow-calf clinic.
- c. On October 26, AgriLife Extension shared limited information regarding LSHS at Gonzales Co. forage program.
- d. On November 6, AgriLife Extension shared limited information regarding LSHS at Van Zandt Co. at North Texas Environmental conference and expo.
- e. On December 3, AgriLife Extension presented LSHS Power Point program (somewhat shortened) at Texas Plant Protection Conference in College Station.
- f. On December 10, AgriLife Extension shared limited information regarding LSHS at Robertson Co. forage program.
- g. AgriLife Extension visited with the San Antonio River Authority about partnering in their watershed to conduct LSHS meetings.
- h. AgriLife Extension is working to contact several other river authorities to see if they would like to partner on meetings in their respective watersheds.

**82% 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.

**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.

**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.

**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. Following the first presentation of the LSHS Power Point to the National Devon Cattle Association in Freestone Co. on October 14, AgriLife Extension made modifications to the presentation based on producer response.

**82% 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.
- b. The second annual revision was submitted to TSSWCB on November 13, 2009. Approval is pending.

**82% 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.

**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 (81% complete; 26/32 mos.)
  - Equipment maintenance was performed on October 29, November 20, December 2 and December 11.
  - No grazing was conducted this quarter as a result of the low rainfall and poor grass growth.
  - The first runoff since monitoring began occurred this quarter on October 26, November 20, November 21, December 1, and December 17. Berm failure has occurred at the heavy grazed site (site WWR2). As soon as equipment can get into the site, it will be repaired.

- To date, the site mean *E. coli* level at the ungrazed site (WWR1) is 5115 cfu/100 ml while the site mean *E. coli* level at the moderately grazed site (WWR2) is 5952 cfu/100 ml).
- c. Riesel (81% complete; 29/36 mos.)
  - Runoff occurred on October 9, 11, 13, 22, 26, 30, and November 21. Since monitoring was initiated in July 2007, the site mean *E. coli* level at the ungrazed site (SW12) has been 6,634 cfu/100 ml and 31,652 cfu/100 ml at the moderately grazed site (SW17).

### **87% 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. Development of the standard curve for AllBac and HuBac was attempted again on October 6-8; however, we continued to encounter difficulties. 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 resulted from the unsophisticated 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 of Unusual Developments**

- TWRI made presentations on “An Assessment of Grazing Land BMPs for Riparian Area Protection” at the Land Water People 2009 Conference in San Marcos and at the WCSC Meeting in Columbus.

### **IV. Projected Work for Next Quarter**

- Prepare and submit Year 3, Quarter 4 Progress Report on January 15.
- Complete LSHS PowerPoint presentation and LSHS resource manual
- Deliver program as outlined in Task 4
- Continue monitoring runoff at Riesel and the Welder Wildlife Refuge
- Continue work on *Bacteroidales*