

Texas Water Resources Institute

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

Quarter no. 16 From 10/1/10 Through 12/31/10

I. Abstract

This quarter the project began winding down. The 4th LSHS Steering Committee Meeting was held on October 25 at 1:30 pm in Lubbock in conjunction with the Annual Meeting of Texas Soil and Water Conservation District Directors. AgriLife Extension proposed the outline for the Beef Cattle Manual and submitted the following sections to TSSWCB for review: (1) The Value of Clean Water to Agriculture, (2) Bacteria Fate and Transport, (3) Cost-Share and Technical Assistance Programs for Conservation Practice Implementation, and (4) BMP "info sheets" for the Fencing and Watering Facility practices. The manual will be completed next quarter. The LSHS Program was introduced by AgriLife Extension at 5 locations around the state, including a full LSHS program being presented on October 29 at the Luling Foundation Water Field Day. A survey administered at the Luling Foundation Water Field Day indicated that as a result of the education program, the average knowledge gained was 52%, and 82% were likely to adopt one or more of the BMPs presented. AgriLife Extension will develop a voice-over presentation for the website next quarter. *Bacteroidales* PCR (library-independent BST) will be completed next quarter in time for inclusion in the final report.

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 4th LSHS Steering Committee Meeting was held on October 25, 2010 at 1:30 pm in Lubbock in conjunction with the Annual Meeting of Texas Soil and Water Conservation District Directors. The agenda, presentations, and sign-in sheet are available on-line at <http://lshs.tamu.edu/projects/steering-committee>.
- b. TWRI and SCSC provided a presentation about the project and a draft template of the beef cattle manual for review and comment to members of the LSHS Project Steering Committee attending the October 19, 2010 Ag Council Meeting.

- c. Finally, TWRI met with Wilson Scaling, member of the LSHS Project Steering Committee, at his ranch on November 29.

100% 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 4, Quarter 3 Progress Report on October 13, 2010.
- b. The final QPR for the project will be submitted on January 14, 2011.

98% 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 25, 2010, TSSWCB was updated by AgriLife Extension and TWRI on project activities and findings during the LSHS Steering Committee Meeting.

98% 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. In addition to this, TWRI also participated in the Annual Meeting of Texas SWCD Directors on October 25-27, 2010 and November 10, 2010 TSSWCB Board Meeting.
- b. Next quarter, TWRI will participate in the TSSWCB Board Meeting on January 27.

98% Complete

Subtask 1.5: TWRI will submit appropriate Reimbursement Forms.

The following actions have been completed during this reporting period:

- a. As of December 22, 2010, \$397,663 (98%) of federal project funds had been expended.
- b. Progress of Allocations to each Department is as follows:
 - TWRI has expended 97% of their funds
 - SCSC has expended 99% of their funds
 - ESSM has expended 100% of their funds

98% 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 *Lone Star Healthy Streams* and related projects. The website (<http://grazinglands-wq.tamu.edu/>) has been viewed by 1,101 unique visitors since September 2007 including 39 this quarter (16 in October; 9 in November; and 14 in December).

98% 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. AgriLife Extension submitted the Lone Star Healthy Streams Annotated Bibliography to TSSWCB in July 2010. This has since been converted into an online searchable database accessible from <http://lshs.tamu.edu>. The database continues to be updated with journal articles and other publications pertinent to the LSHS project.

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.

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. See status reported below in Subtask 3.2.

98% 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 proposed the following outline for the manual:
 - Program Introduction
 - Background on Water Quality in Texas
 - Sources of Bacteria
 - Bacteria Fate and Transport
 - Value of Clean Water to Agriculture
 - Detailed "information sheets" on top BMPs
 - Cost-Share and Technical Assistance Programs
 - Conclusion
 - References
 - Appendices
- b. On November 29, AgriLife Extension submitted (1) The Value of Clean Water to Agriculture, (2) Bacteria Fate and Transport, and (3) Cost-Share and Technical Assistance Programs for Conservation Practice Implementation to TSSWCB.
- c. On December 3, AgriLife Extension submitted draft BMP "info sheets" for the Fencing and Watering Facility practices. Info sheets continue to be developed for the additional conservation practices identified by project partners.

98% 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 will integrate and coordinate the *Lone Star Healthy Streams* program with the *Texas Watershed Steward* program as appropriate to provide producers in target watersheds with a more comprehensive environmental education.

98% 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. Complete. The LSHS program has been approved for 4 hours of credit for the Texas Certified Crop Adviser Program and has submitted an application for 1 CEU through TDA for Certified Pesticide Applicators.

100% 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. Extension has developed and submitted to the TSSWCB a certificate of completion for participation in the education program.

100% 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. The LSHS concept was introduced through presentations at the following dates and locals this quarter:
 - October 12-15 – Ranch Management University
 - October 21 – Burnet County
 - October 26 – Comanche County
 - December 14 – Guadalupe County (98)
- b. The full LSHS program was presented on October 29 at the Luling Foundation Water Field Day.

98% 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. AgriLife Extension will develop a voice-over presentation for the website next 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. A survey instrument has been developed to evaluate changes in producer knowledge and awareness of important production and environmental issues as well as identify any barriers to producer participation and successful implementation of the program. The survey has been provided to the TSSWCB for comment.
- b. The survey was utilized on October 29 at the Luling Foundation Water Field Day. Survey results (Appendix A) indicated that 97% of participants were mostly or completely satisfied with the educational program; 100% would recommend the program to others; and 82% were likely to adopt one or more of the BMPs presented during the program to improve water quality. Further, the survey indicated that as a result of the education program, the average knowledge gained was 52%.

100% 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. The survey distributed at Luling did not identify any barriers.

100% 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. The program has been well received by all participants to date. Modifications will be made to improve the format of the material and add new material as it becomes available.

98% 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 and final annual revision was submitted to TSSWCB on November 13, 2009 and approved on February 1, 2010.

100% 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 (100% complete)
 - Water sampling at the Welder Wildlife Refuge was completed in June 2010.
- c. Riesel (100% complete)
 - Water sampling at Riesel was completed in July 2010.

100% 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. A standard curve for the *Bacteroidales* analysis using Realtime PCR has been completed and samples continue to be analyzed. Analysis of *Bacteroidales* will be completed next quarter.
- b. Evaluation of changes in bank stability or stream morphology at the 2S Ranch has been completed. Observed differences in the profiles resulted from the manual surveying technique employed rather than actual bank erosion or stream degradation. Thus, it is concluded that no significant changes occurred.

75% 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

- N/A

IV. Projected Work for Next Quarter

- Prepare and submit Year 4, Quarter 4 Progress Report on January 14, 2011.
- Develop a voice-over presentation for the website
- Finalize Beef Cattle Manual
- Continue delivery of LSHS programs statewide
- Complete analysis of *Bacteroidales*
- Develop and submit final report

Appendix A – Luling Foundation Water Field Day. Survey Results

BEFORE PROGRAM	AFTER PROGRAM	KNOWLEDGE GAIN (%completely + %good)
Understanding of Clean Water Act 3.03% Completely 18.18% Good 42.42% Fairly 33.33% Poorly 3.03% Didn't answer	Understanding of Clean Water Act 24.24% Completely 57.58% Good 18.18% Fairly 0.00% Poorly 0.00% Didn't answer	Understanding of Clean Water Act 60.6%
Understanding of 303(d) List 9.09% Completely 12.12% Good 24.24% Fairly 48.48% Poorly 6.06% Didn't answer	Understanding of 303(d) List 33.33% Completely 42.42% Good 21.21% Fairly 3.03% Poorly 0.00% Didn't answer	Understanding of 303(d) List 54.54%
Understanding of TMDL s 9.09% Completely 12.12% Good 15.15% Fairly 54.55% Poorly 9.09% Didn't answer	Understanding of TMDL s 33.33% Completely 42.42% Good 18.18% Fairly 0.00% Poorly 6.06% Didn't answer	Understanding of TMDL s 54.54%
Understanding of <i>E. coli</i> causing illnesses 18.18% Completely 33.33% Good 21.21% Fairly 21.21% Poorly 6.06% Didn't answer	Understanding of <i>E. coli</i> causing illnesses 39.39% Completely 51.52% Good 6.06% Fairly 0.00% Poorly 3.03% Didn't answer	Understanding of <i>E. coli</i> causing illnesses 39.39%
Understanding that <i>E. coli</i> is an indicator organism 6.06% Completely 33.33% Good 33.33% Fairly 18.18% Poorly 9.09% Didn't answer	Understanding that <i>E. coli</i> is an indicator organism 36.36% Completely 54.55% Good 3.03% Fairly 0.00% Poorly 6.06% Didn't answer	Understanding that <i>E. coli</i> is an indicator 51.51%

BEFORE	AFTER	DIFFERENCE
Understand water quality is determined by <i>E. coli</i> 12.12% Completely 21.21% Good 36.36% Fairly 24.24% Poorly 6.06% Didn't answer	Understand water quality is determined by <i>E. coli</i> 39.39% Completely 45.45% Good 12.12% Fairly 0.00% Poorly 3.03% Didn't answer	Understand WQ is determined by <i>E. coli</i> 51.51%
Understanding of riparian areas 15.15% Completely 27.27% Good 27.27% Fairly 24.24% Poorly 6.06% Didn't answer	Understanding of riparian areas 42.42% Completely 51.52% Good 6.06% Fairly 0.00% Poorly 0.00% Didn't answer	Understanding of riparian areas 51.51%
Understand BMPs can protect riparian areas 9.09% Completely 15.15% Good 39.39% Fairly 21.21% Poorly 15.15% Didn't answer	Understand BMPs can protect riparian areas 30.30% Completely 51.52% Good 9.09% Fairly 0.00% Poorly 9.09% Didn't answer	Understand BMPs protect riparian areas 57.57%
Understand cost-share programs 3.03% Completely 24.24% Good 30.30% Fairly 33.33% Poorly 9.09% Didn't answer	Understand cost-share programs 33.33% Completely 42.42% Good 18.18% Fairly 0.00% Poorly 6.06% Didn't answer	Understand cost-share programs 48.48%
AVERAGE KNOWLEDGE GAIN FOR ALL QUESTIONS:		52.18%

Overall, how satisfied are you with this educational program activity?

48.48%	Completely
48.48%	Mostly
0.00%	Somewhat
0.00%	Slightly
0.00%	Not at all
3.03%	Didn't answer

What did you like most about this educational program activity?

- Everything
- Learned a lot and I can use these practices at home
- Variety of topics covered
- The range management
- That there were many different, yet related, subjects
- It applied to current issues facing the farmer/rancher
- All
- Speakers
- Field trips
- *E. Coli* information
- Tours and speaker
- Water law
- Rainwater harvesting, solar water well
- Onsite, in field presentations
- Clean water act
- Texas water laws
- Laws
- Hay ride tour
- Texas water laws
- Field trip visit to rain harvest sites
- 39.39% did not answer question

What did you like least about this educational program activity?

- Fertilizer info
- Cold and dusty out in the field
- Some info was only to commercial agricultural producers
- Too fast
- Got started too late
- Soil nutrient (not a cattle producer)
- Sleepy after lunch
- None, all good
- Fertilizations
- Hard seats
- 69.70% did not answer question

Would you recommend this particular educational program activity to others?

100%	Yes
0.00%	No

How likely are you to adopt one or more of the BMPs presented in today's program designed to improve water quality?

81.82%	Likely
18.18%	Not likely