

## Texas Water Resources Institute

### Evaluation and Demonstration of BMPs for Cattle on Grazing Lands for the Lone Star Healthy Streams Program State General Revenue Nonpoint Source Grant Program FY2010 Workplan 10-52

Quarter no. 5 from 6/1/11 through 8/31/11

#### I. Abstract

Alternative shade was evaluated for a second time, and partners have discussed the possibility to conduct the evaluation a third time due to vast temperature differences during the two trials. Due to extended drought conditions there is discussion. LSHS streams presentations continue to be exhibited.

#### II. Overall Progress and Results by Task

##### TASK 1: Project Administration and Coordination

*Subtask 1.1: TWRI will prepare electronic quarterly progress reports (QPRs) for submission to the TSSWCB. QPRs shall document all activities performed within a quarter and shall be submitted by the 15th of December, March, June, and September. QPRs shall be posted to the project website and distributed to all project partners.*

The following actions have been completed during this reporting period:

- a. TWRI submitted the Year 1, Quarter 4 Progress Report on June 14, 2011.

**50% Complete**

*Subtask 1.2: TWRI will perform accounting functions for project funds and will submit appropriate Reimbursement Forms to TSSWCB at least quarterly.*

The following actions have been completed during this reporting period:

- a. Expenditures thus far have totaled \$84,382 or roughly 52% of total project funding.

**52% Complete**

*Subtask 1.3: TWRI will host coordination meetings, conference calls, or TTVN meetings with the TSSWCB and SCSC, and include as appropriate SAML, ESSM, and USDA-ARS, approximately quarterly to discuss project activities, project schedule, communication needs, deliverables, and other requirements. TWRI will develop lists of action items needed following each project coordination meeting and distribute to project personnel. These coordination meetings may be held concurrently with TSSWCB project 09-06 coordination meetings.*

The following actions have been completed during this reporting period:

- a. On June 23, project partners met to discuss the progress of all LSHS projects.
- b. On June 24, TWRI, SAML personnel, and SCSC graduate student met to discuss lab procedures for *Bacteroides* analysis.
- c. On August 18, project partners met to discuss project progress, the need to contact producer groups, and presenting project progress/results to the steering committee at the Annual SWCD Association meeting in San Antonio on October 24<sup>th</sup>.

#### **63% Complete**

*Subtask 1.4: TWRI and/or SCSC will attend and participate in public meetings as appropriate in order to communicate project goals, activities and accomplishments to affected parties. Such meetings may include, but are not limited to, the Annual Meeting of Texas SWCD Directors, the TSCRA Annual Convention and various leadership meetings, the TFB Annual Convention and various leadership meetings, Clean Rivers Program Basin Steering Committee meetings, and watershed stakeholder meetings for certain TMDLs and WPPs.*

The following actions have been completed during this reporting period:

- a. LSHS results were presented at the:
  - 6/22 Independent Cattlemen's Association Annual meeting – 38 individuals
  - Watershed Coordinator Roundtable held on July 27, 2011 in Austin- 107 individuals
  - 7/29 Oklahoma Cattlemen's Association Annual meeting – 112 individuals
  - 8/11 Harris County-79 individuals
  - 8/18 Lampasas County- 69 individuals
  - 8/25 Taylor County 78- individuals
- b. TWRI planned and hosted the Bacteria Dynamics, Assessment Methods and BMPs Watershed Coordinators Roundtable (WCR) meeting, 107 participants, on July 27.
- c. TWRI Associate Director Wagner presented **Effects of fencing, alternative water, grazing management and other agricultural BMPs on bacteria loading** and discussed the LSHS project at the July 27 Bacteria Dynamics, Assessment Methods and BMPs WCR meeting.
- d. SCSC Assistant Professor Gentry presented **Effects of ag management, land use, and watershed scale on *E. coli* concentrations** at the July 27 *Bacteria Dynamics, Assessment Methods and BMPs* WCR meeting.

#### **63% Complete**

*Subtask 1.5: TWRI and SCSC will develop and disseminate project informational materials, including, but not limited to flyers, brochures, news releases, and other appropriate promotional publications. As appropriate, TWRI will include information about the project, as appropriate, in the tx H2O, New Waves e-letter, AgriLife News, USDA-ARS News, and livestock industry trade publications. TSSWCB will be provided such informational materials and publications developed by TWRI and SCSC for review prior to distribution.*

The following actions have been completed during this reporting period:

- e. In conjunction with TSSWCB Project 09-06 LSHS promotional brochures have been created, submitted and approved by TSSWCB (Appendix A).

**63% Complete**

*Subtask 1.6: TWRI will continue to host and maintain an internet website <http://grazinglands-wq.tamu.edu/> for the dissemination of information.*

The following actions have been completed during this reporting period:

- a. This quarter, the website (<http://lshs.tamu.edu>) was viewed by 223 unique visitors (85 in June 2011, 72 in July 2011, and 66 in August 2011).

**63% Complete**

*Subtask 1.7: TWRI and SCSC will continue to utilize the LSHS Project Steering Committee organized through TSSWCB project 06-05. At a minimum, membership shall be composed of TSSWCB, certain SWCDs, AgriLife Extension, AgriLife Research, TWRI, USDA-NRCS, USDA-ARS, TDA, GLCI, TFB, TSCRA, ICA, and TCFA. This LSHS Project Steering Committee will provide input on the evaluation of BMP effectiveness, identification of demonstration sites, modifications to the LSHS curriculum, and general project coordination. This LSHS Project Steering Committee will meet as frequently as needed, likely annually. This Project Steering Committee may meet concurrently with the Program Steering Committee established through TSSWCB project 09-06.*

The following actions have been completed during this reporting period:

- a. This quarter, preparations have begun for the next LSHS Steering Committee, to be held on October 24, 2011 in San Antonio in conjunction with the 71<sup>st</sup> Annual Meeting of SWCD Directors.

**63% Complete**

*Subtask 1.8: TWRI, in collaboration with SCSC and SAML, will develop and submit a Final Report at the culmination of the project. This Final Report will document project performance related to each project goal, measure of success, and task. A draft of this Final Report will be submitted to TSSWCB for review prior to finalizing the document. This Final Report, and any associated project Technical Reports, will be permanently housed in the TWRI online Reports Database.*

The following actions have been completed during this reporting period:

- a. No progress to report this quarter.

**0% Complete**

## **TASK 2: Quality Assurance**

*Subtask 2.1: TWRI will develop a QAPP for activities in Task 3 consistent with EPA Requirements for Quality Assurance Project Plans (QA/R-5) and the TSSWCB Environmental Data Quality Management Plan.*

The following actions have been completed during this reporting period:

- a. The QAPP was approved by the TSSWCB on September 30, 2010.

**100% Complete**

*Subtask 2.2: TWRI will submit revisions and necessary amendments to the QAPP as needed.*

The following actions have been completed during this reporting period:

- a. Work has begun on the first revision of the QAPP which is due in September 2011.

**10% Complete**

## **TASK 3: Evaluate and Demonstrate BMPs to Reduce Fecal and Bacteria Loading From Cattle on Grazing Lands**

*Subtask 3.1: SCSC, with assistance from TWRI, will continue the evaluation of grazing management and stocking rates/densities at the Brazos Bottom (BB1, BB2, BB3), Welder Wildlife Refuge (WWR1, WWR2, WWR3) and Riesel (SW12, W10) demonstration sites. Runoff samples from three grazing treatments [no grazing, moderate grazing, and heavy grazing (2 x moderate grazing)] will be evaluated at the Brazos Bottom and Welder Wildlife Refuge and from two grazing treatments [no grazing and moderate grazing] will be evaluated at Riesel. ISCO automated samplers will be used to collect flow integrated samples and data on runoff quality and quantity and rainfall amounts and intensity. E. coli and other bacteria (i.e., Enterococcus, fecal coliform) levels in runoff will be measured and bacteria loadings will be determined. SAML will analyze all samples using EPA-approved methods as outlined in the QAPP. SAML is NELAC certified for E. coli and will use EPA-approved methods for analysis of all samples.*

The following actions have been completed during this reporting period:

- a. Brazos Bottom
  - Equipment maintenance was performed on Jun 10, Jul 22, Aug 10
  - Sites BB2 and BB3 were grazed Jun13 -Jun16,
  - No runoff occurred this quarter
  - Purchased and set out larger rip-rap Aug 31
- b. Welder Wildlife Refuge
  - Equipment maintenance was performed on Jun 2, Jul 12, Aug 24
  - Repaired bubbler line at WWR 1 Aug 29
  - No runoff occurred this quarter.
- c. McGregor
  - GPS collars were applied to cattle on May 26
  - Set shade cloth Jun 6
  - Removed collars Jun18

**63% Complete**

*Subtask 3.2: SCSC, with assistance from TWRI and ESSM, will evaluate the effectiveness of certain structural BMPs in modifying cattle movement to change fecal deposition patterns and reducing bacteria runoff. BMPs that have been identified as needing evaluation include (1) portable shade facilities/structures, (2) protected stream access points or stream crossing, (3) rip-rap application designed to limit cattle access to riparian areas, and (4) alternative water supplies designed to draw cattle away from waterbodies. Changes in cattle movement will be evaluated using GPS collars as described in Subtask 3.5. Reductions in bacteria contributions will be calculated based on the reduced time cattle spend in the stream and riparian area. Evaluation of protected stream access points or stream crossings will be dependent on finding a suitable cooperator where USDA-NRCS is designing and constructing this practice.*

The following actions have been completed during this reporting period:

- a. A second shade trial was run in June.
- b. Larger rip rap was purchased and placed around water tank in late August.
- c. No runoff has occurred this past quarter.

**63% Complete**

*Subtask 3.3: SCSC will continue to gather information from the growing body of literature on 1) bacteria fate and transport, 2) effects of grazing cattle on bacterial levels in waterbodies, and 3) effect of BMPs designed to minimize grazing cattle impacts on riparian areas and bacteria loading. A compendium of this literature will be posted on the project website.*

The following actions have been completed during this reporting period:

- a. SCSC continues to gather information and post it on the Lone Star Healthy Streams website as follows: <http://lshs.tamu.edu/research/bibliography> .

**63% Complete**

*Subtask 3.4: SCSC will identify cooperator(s) to conduct the BMP demonstration and evaluation with assistance of the LSHS Project Steering Committee, local SWCDs, USDA-NRCS, TWRI, and local AgriLife Extension agents. For the evaluation of protected stream access points or stream crossings, and possibly alternative water supplies, SCSC and TWRI will work closely with USDA-NRCS and local SWCDs to identify potential cooperators where these practices are being planned. Funding will be provided to the cooperator(s) as needed to implement BMPs and participate in the BMP demonstration and evaluation. SCSC and TWRI will encourage the cooperator(s) to obtain a certified WQMP from the TSSWCB.*

The following actions have been completed during this reporting period:

- a. No activity to report.

**75% Complete**

*Subtask 3.5: SCSC and ESSM will assess cattle behavior in response to BMPs to be evaluated in Subtask 3.2 utilizing Lotek GPS collars to determine the amount of time cattle spend in the stream and riparian areas before and after BMP implementation. TWRI will assist with GPS collar data analysis.*

The following actions have been completed during this reporting period:

- a. AgriLife Extension assistant sent June shade trial GPS data to TWRI. After normalizing the data, SCSC found that alternate shade showed a reduction in time of approximately 11% in and around the stream, but not with the same efficacy as the first trial (approximately 25%). Partners have discussed this and believe that the differences in temperature between the first and second trials may not accurately reflect the same conditions. A third trial is being planned if McGregor grazing conditions will allow
- b. Rip rap results will be evaluated next quarter.

### **63% Complete**

*Subtask 3.6: SCSC will transfer results from BMP effectiveness studies to landowners, natural resource agencies, and others through the LSHS Program and other publications in order to increase BMP adoption rates and participation in federal and state technical and financial assistance programs. SCSC, with assistance from TWRI and USDA-ARS and in cooperation with local SWCDs and local Extension and USDA-NRCS staff, will conduct at least 1 field day at a demonstration sites to highlight the BMP effectiveness studies and promote adoption of BMPs by ranchers.*

The following actions have been completed during this reporting period:

- a. SCSC held LSHS programs:
  - 6/22 Independent Cattlemen's Association Annual meeting – 38 individuals
  - 7/29 Oklahoma Cattlemen's Association Annual meeting – 112 individuals
  - 8/11 Harris County -79 individuals
  - 8/18 Lampasas County- 69 individuals
  - 8/25 Taylor County- 78 individuals
- b. TWRI planned and hosted the Bacteria Dynamics, Assessment Methods and BMPs Watershed Coordinators Roundtable (WCR) meeting, 107 participants, on July 27.
- c. TWRI Associate Director Wagner presented **Effects of fencing, alternative water, grazing management and other agricultural BMPs on bacteria loading** and discussed the LSHS project at the July 27 Bacteria Dynamics, Assessment Methods and BMPs WCR meeting.
- d. SCSC Assistant Professor Gentry presented **Effects of ag management, land use, and watershed scale on E. coli concentrations** at the July 27 *Bacteria Dynamics, Assessment Methods and BMPs* WCR meeting.

### **63% Complete**

*Subtask 3.7: In order to determine and document the synergistic effectiveness of BMPs prescribed in a WQMP in reducing bacteria loading from grazing cattle, a team consisting of SAML, USDA-ARS, SCSC TWRI, and others as appropriate, will design a water quality monitoring regime for evaluating whole-farm effect of implementing WQMPs on livestock operations. This team will work with the LSHS Project Steering Committee and other project partners to identify prospective cooperating ranches across an array of ecoregions and climatic zones. To the extent possible, the monitoring regime will be designed*

*for watersheds with on-going WPP or TMDL development or implementation. The monitoring regime will be designed such that results are transferable to other watersheds. The monitoring regime will take advantage of all available and suitable methodologies, including Bacterial Source Tracking (BST). The monitoring regime will be incorporated into a proposed scope of work and budget.*

The following actions have been completed during this reporting period:

- a. No progress to report this quarter.

**5% Complete**

*Subtask 3.8: Through TSSWCB project 09-50, USDA-ARS is developing an easy-to-use Texas BMP Evaluation Tool (TBET) to aid in science-based BMP selection on-farm and cost-effective conservation spending. Specifically, TBET is being designed to 1) assist land managers and agency planners in conservation practice decision-making related to on-farm (field-scale) alternatives and effectiveness, and 2) facilitate evaluation and reporting of agricultural nonpoint source load reductions from WQMP implementation. SCSC and TWRI will work with USDA-ARS to incorporate findings from the BMP evaluations in this project into TBET, to the extent practical.*

The following actions have been completed during this reporting period:

- a. No activity to report.

**0% Complete**

*Subtask 3.9: SCSC, with assistance from TWRI and TSSWCB, will work very closely with the USDA-NRCS to provide USDA-NRCS with the information they need to establish a practice standard for Livestock Shade Structure as a BMP to effect cattle movement and fecal deposition patterns and impact pollutant loading and water quality. Examples of this practice standard (717) exist in South Carolina, Georgia, Florida, and Virginia.*

The following actions have been completed during this reporting period:

- a. TWRI has contacted the NRCS State Engineer regarding scheduling a meeting to present results and discuss NRCS needs for approval of practice. This meeting is expected to occur next quarter.

**10% Complete**

*Subtask 3.10: SCSC, with assistance from TWRI, will develop technical reports, refereed journal articles, Extension Fact Sheets, and other publications as appropriate, summarizing the results of the demonstrations (grazing management treatments and structural BMP evaluation) and the analysis of the impacts of BMPs on bacteria runoff.*

The following actions have been completed during this reporting period:

- a. As results are being generated they are being transferred to Jennifer Peterson to be included in the LSHS BMP manuals, website and searchable database in conjunction with TSSWCB Project 09-06

**50% Complete**

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

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

- Present results to LSHS Steering Committee
- Meet with NRCS regarding approval of shade
- Revision of QAPP
- Evaluate Rip-rap data
- Continue maintenance
- Continue sampling as opportunity arises





# LONE STAR HEALTHY STREAMS

**Lone Star Healthy Streams (LSHS)** is a program developed by the Texas AgriLife Extension Service, the Texas State Soil and Water Conservation Board, and the Texas Water Resources Institute.

The program's major goal is the protection of Texas waterways from bacterial contamination originating from beef cattle, dairy cattle, horses, poultry, and feral hogs that may pose a serious health risk to Texas citizens.

LSHS educates Texas farmers, ranchers, and landowners about proper grazing, feral hog management, and riparian area protection to reduce the levels of bacterial contamination in streams and rivers.

## BACTERIA IMPAIRMENTS IN TEXAS



## DID YOU KNOW?

BACTERIA IS THE NUMBER ONE CAUSE OF WATER POLLUTION IN TEXAS AND THAT MORE THAN HALF OF THE WATER BODIES EVALUATED IN THE STATE ARE IMPAIRED BECAUSE OF EXCESS BACTERIA LEVELS?

While some water pollution is often easy to detect, bacteria pollution is not. A water body choked with algae, a muddy river loaded with sediment, or a lake covered with an oily sheen all exhibit clearly noticeable impairments. Bacteria in water, on the other hand, are not at all noticeable to the naked eye.

## RESOURCE MANUALS

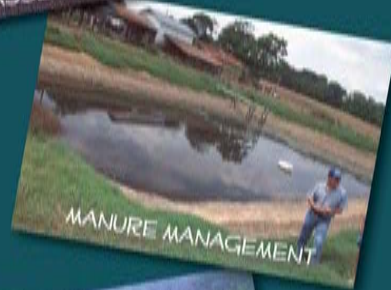




**BEST MANAGEMENT PRACTICES**

The resource manuals include information on Best Management Practices (BMPs) that can be used for each animal class to help reduce bacteria contributions to Texas waterways.

Examples of BMPs include practices involving riparian area management and protection, manure management, grazing management, and runoff management.



**LONE STAR  
HEALTHY STREAMS**

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