



**Texas State Soil and Water Conservation Board
 CWA §319(h) Nonpoint Source Grant Program
 FY 2012 Workplan 12-08**

SUMMARY PAGE

Title of Project:	Statewide Delivery of the Beef Cattle, Dairy Cattle, Poultry and Horse Components of the Lone Star Healthy Streams Program
Project Goals:	<ul style="list-style-type: none"> • Facilitate the statewide implementation of the <i>Lone Star Healthy Streams</i> (LSHS) education program through local and distance education to reduce bacterial contamination caused by grazing and dairy cattle, poultry, and horses in Texas waterbodies. • Educational events will be targeted toward livestock and poultry producers in bacteria impaired watersheds where these animals have been identified as potential sources. • The program will be evaluated to better assess changes in producer knowledge and understanding regarding bacteria pollution and BMPs to minimize bacterial contamination, expected adoption of BMPs, and any barriers to BMP adoption and implementation in Texas.
Project Tasks:	(1) Project Administration; (2) Coordinate and deliver LSHS locally or through distance education in targeted watersheds; (3) Evaluate the effectiveness of the LSHS program.
Measures of Success:	<ul style="list-style-type: none"> • Delivery of a minimum of 20 LSHS local and 6 distance educational trainings. • Number of livestock producers and landowners participating in educational events delivered locally or through distance education; • Number of unique visitors to the LSHS project website (http://lshs.tamu.edu); • Number of factsheets, publications, and other educational materials distributed regarding the LSHS program and BMPs to reduce bacterial contamination; • Increased knowledge and understanding of livestock producers and landowners on bacteria pollution and BMPs to reduce bacteria runoff, increased understanding of the expected adoption of BMPs, increased understanding of the barriers associated with BMP adoption and implementation as measured by surveys and pre/post evaluations.
Project Type:	Implementation (); Education (X); Planning (); Assessment (); Groundwater ()

Status of Waterbody on 2010 Texas Integrated Report	<u>Segment ID:</u>	<u>Parameter</u>	<u>Category</u>
	0612	Bacteria	5b
	1103	Bacteria	5a
		Depressed DO	5a
	1103A	Bacteria	5a
	1103B	Bacteria	5a
	1103C	Bacteria	5a
		Depressed DO	5c
	1103D	Bacteria	5c
	1103E	Bacteria	5b
	1104	Bacteria	5a
		Depressed DO	5c
	1804A	Bacteria	5c
	1428C	Bacteria	4a
	1004E	Bacteria	5a
	1008	Bacteria	5a
		Depressed DO	5b
	1008H	Bacteria	5a
	1009	Bacteria	5a
	1009C	Bacteria	5a
	1009D	Bacteria	5a
	1009E	Bacteria	5a
	1010	Bacteria	5a
	1011	Bacteria	5a
	1810	Bacteria	4b
	1217B	Depressed DO	5c
	1217D	Depressed DO	5b
	1221	Bacteria	5b
	1221A	Depressed DO	5c
		Bacteria	5b
	1221B	Bacteria	5b
	1221D	Bacteria	5b
	1221F	Bacteria	5b
	1901	Bacteria	4a
	2311	Depressed DO	5c
	1301	Bacteria	5c
	1302	Bacteria	5b
	1302A	Bacteria	5b
	1302B	Bacteria	5b
		Depressed DO	5c
		Depressed DO	5a
	1245	Bacteria	5b
	1245C	Bacteria	5b
	1245D	Bacteria	5b
	1245F	Bacteria	5b
	1245I	Bacteria	5b

Project Location (Statewide or Watershed and County)	Attoyac Bayou Watershed upstream of Sam Rayburn Reservoir in San Augustine, Nacogdoches, Shelby, and Rusk Counties; Bastrop Bayou Watershed in Brazoria County; Buck Creek Watershed in Childress, Collingsworth and Donley Counties; Dickinson Bayou in Brazoria and Galveston Counties; Geronimo Creek Watershed in Guadalupe and Comal Counties; Gilleland Creek in Travis County; Lake Granbury Watershed in Hood, Parker, Palo Pinto, Ranger, Erath, and Jack Counties; Lake Houston Area Watersheds in Grimes, Harris, Liberty, Montgomery, San Jacinto, Walker, and Waller Counties; Lampasas River Watershed in Bell, Burnet, Coryell, Hamilton, Lampasas, Mills, and Williamson Counties; Leon River Watershed below Proctor Lake and above Belton Lake in Comanche, Hamilton, Erath, Coryell, Mills and Bell Counties; Lower San Antonio River Watershed in DeWitt, Goliad, Guadalupe, Karnes, Refugio, Victoria, and Wilson Counties; Pecos River Watershed in Texas in Crane, Crockett, Pecos, Reeves, Terrell, Upton, and Ward Counties; Plum Creek Watershed in Caldwell, Hays, and Travis Counties; San Bernard River Watershed in Austin, Colorado, Wharton, Fort Bend, and Brazoria Counties; Upper Oyster Creek in Fort Bend County				
Key Project Activities:	Hire Staff (X); Surface Water Quality Monitoring (); Technical Assistance (); Education (X); Implementation (); BMP Effectiveness Monitoring (); Demonstration (); Planning (); Modeling (); Bacterial Source Tracking (); Other ()				
Texas NPS Management Program Elements:	<ul style="list-style-type: none"> • Element One LTGs 1, 2, 4 • Element One STGs 3A, 3B, 3F • Element Two • Element Three 				
Project Costs:	Federal:	\$282,623	Non-Federal:	\$202,420	Total: \$485,043
Project Management:	Texas AgriLife Extension Service (Extension)				
Project Period:	November 1, 2012 – February 29, 2016				

Part I – Applicant Information

Applicant							
Project Lead		Larry A. Redmon					
Title		Professor and State Forage Specialist Soil and Crop Sciences					
Organization		Texas AgriLife Extension Service					
E-mail Address		l-redmon@ag.tamu.edu					
Street Address		2474 TAMU					
City	College Station	County	Brazos	State	TX	Zip Code	77843-2472
Telephone Number		979.845.2425		Fax Number		979.845.0604	

Co-Applicant							
Project Lead		Mark L. McFarland					
Title		Professor and Extension Soil Fertility Specialist					
Organization		Texas AgriLife Extension Service					
E-mail Address		ml-mcfarland@tamu.edu					
Street Address		2474 TAMU					
City	College Station	County	Brazos	State	TX	Zip Code	77843-2472
Telephone Number		979.845.5366		Fax Number		979.845.0604	

Project Partners	
Names	Roles & Responsibilities
Texas State Soil and Water Conservation Board (TSSWCB)	Provide state oversight and management of all project activities and ensure coordination of activities with related projects.
Texas AgriLife Extension Service (Extension)	Provide overall project management including project coordination, submission of quarterly and final reports, delivery of LSHS through local and distance education, and evaluation of project effectiveness.
Department of Agricultural Leadership, Education, and Communications at Texas A&M University (ALEC)	Assist in the program evaluation component.
Natural Resources Conservation Service (NRCS)	Provide guidance and information on best management practices (description, cost, specifications, etc.) and financial assistance programs.
Texas Water Resources Institute (TWRI)	Host and maintain the LSHS website for the dissemination of information and track website usage.
Department of Animal Science at Texas A&M University	Provide guidance on poultry, dairy, and horse components and assist in program delivery.

Part II – Project Information

Project Type				
Surface Water	<input checked="" type="checkbox"/>	Groundwater		
Does the project implement recommendations made in a completed Watershed Protection Plan or an adopted TMDL or Implementation Plan?			Yes	<input checked="" type="checkbox"/>
If yes, identify the document.			No	<input type="checkbox"/>
Draft Bastrop Bayou Watershed Protection Plan; Draft Buck Creek Watershed Protection Plan; Eight Total Maximum Daily Loads for Indicator Bacteria in Dickinson Bayou and Three Tidal Tributaries; Draft Geronimo and Alligator Creeks Watershed Protection Plan; Implementation Plan for One Total Maximum Daily Load for Bacteria in Gilleland Creek; Lake Granbury Watershed Protection Plan; Fifteen TMDLs for Indicator Bacteria in Watersheds of the Lake Houston Area; Watershed Protection Plan for the Leon River Below Proctor Lake and Above Belton Lake, One Total Maximum Daily Load for Bacteria in the Lower San Antonio River; A Watershed Protection Plan for the Pecos River in Texas; Plum Creek Watershed Protection Plan; San Bernard River Watershed Protection Plan; One TMDL for Bacteria in Upper Oyster Creek				
If yes, identify the agency/group that developed and/or approved the document.			Year Developed	2011; 2012; 2012, 2012, 2007, 2011, 2011; 2011; 2008; 2008; 2008; 2011; 2007
Bastrop Bayou Stakeholder Group facilitated by Houston-Galveston Area Council, Buck Creek Watershed Partnership facilitated by Texas Water Resources Institute and TSSWCB; Galveston Bay Estuary Program and TCEQ; TCEQ, University of Houston, and CDM; The Geronimo and Alligator Creeks Watershed Partnership facilitated by GBRA, Texas AgriLife Extension Service and TSSWCB; TCEQ and the Lower Colorado River Authority; The Lake Granbury Watershed Protection Plan Stakeholders Committee facilitated by the Brazos River Authority and TCEQ; TCEQ and James Miertschin & Associates, Inc.; Brazos River Authority; TCEQ and James Miertschin & Associates, Inc.; Landowners and entities in the Pecos River watershed, facilitated by AgriLife Extension, TWRI and TSSWCB; Plum Creek Watershed Partnership facilitated by Texas AgriLife Extension Service and TSSWCB; Houston-Galveston Area Council and TCEQ; TCEQ and Texas Institute of Applied Environmental Research				

Watershed Information				
Watershed Name(s)	Hydrologic Unit Code (12Digit)	Segment ID	305(b) Category	Size (Acres)
Attoyac Bayou	120200050301 – 120200050307, 120200050401 – 120200050406, 120200050501	0612	5b	426,880
Bastrop Bayou Tidal	120402050400	1105	2	188,965
Buck Creek	111201050204, 111201050208, 111201050303, 111201050305 – 111201050307, 111201050401 – 111201050407, 111201050501 – 111201050502	0207A	2	187,270
Dickinson Bayou	120402040200	1103	5a	63,287
Geronimo Creek (including its tributary, Alligator Creek)	121002020110, 121002020111	1804A	5c	44,152
Gilleland Creek	120903010106	1428C	4a	52,866
Lake Granbury	120602010601 – 0608, 120602010701 – 0706, 120602010801 – 120602010809, 120602010901 – 120602010907, 120602011001 – 120602011004, 120602011101 – 120602011110, 120602011201 – 120602011208	1205	2	1,335,138
Stewarts Creek	120401010401	1004E	5a	21,051
Spring Creek	120401020201, 120401020205, 120401020209, 120401020212, 120401020213	1008	5a, 5b	100,148
Willow Creek	120401020210	1008H	5a	35,310
Cypress Creek	120401020103, 120401020104, 120401020106, 120401020107	1009	5a	24,299
Faulkey Gully	120401020106	1009C	5a	35,082
Spring Gully	120401020106	1009D	5a	35,082
Little Cypress Creek	120401020105	1009E	5a	34,687
Caney Creek	120401030101, 120401030102, 120401030104, 120401030105, 120401030110	1010	5a	114,773
Peach Creek	120401030106 – 120401030109	1011	5a	308,922
Lampasas River (Lampasas River above Stillhouse Hollow Lake, Rocky Creek, Sulphur Creek, Simms Creek)	120702030101 – 120702030509	1217 1217A 1217B 1217C	5c 2 2 2	839,800
Leon River below Proctor Lake and above Belton Lake	120702010501 – 120702010509, 120702010601 – 120702010605, 120702010701 – 120702010705, 120702010801 – 120702010806, 120702010901 – 120702010908, 120702011002	1221	5a	871,488

Lower San Antonio River	121003030202, 121003030205, 121003030206, 121003030403, 121003030404, 121003030501, 121003030503, 121003030505, 121003030604 – 121003030608, 121003040405	1901	4a	776,863
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<p>Pecos River</p>	<p>130700010201 - 130700010207; 130700010301 - 130700010305 130700010401 - 130700010408; 130700010503 - 130700010506 130700010601 - 130700010605; 130700010701 - 130700010705 130700010801 - 130700010803; 130700010901 - 130700010906 130700011001 - 130700011006; 130700030101 - 130700030106 130700030201 - 130700030204; 130700030301 - 130700030308 130700030401 - 130700030403; 130700040101 - 130700040106 130700040301 - 130700040305; 130700040401 - 130700040406 130700040501 - 130700040506; 130700040601 - 130700040605 130700040701 - 130700040705; 130700040801 - 130700040806 130700050101 - 130700050106; 130700050201 - 130700050205 130700050301 - 130700050304; 130700060101 - 130700060105 130700060201 - 130700060206; 130700060301 - 130700060306 130700060401 - 130700060405; 130700060501 - 130700060506 130700060601 - 130700060605; 130700070206; 130700070209 130700070507; 130700070507 - 130700070510 130700070601 - 130700070607; 130700070701 - 130700070706 130700070801 - 130700070807; 130700070901 - 130700070903 130700071001 - 130700071006; 130700071101 - 130700071102 130700071201 - 130700071202; 130700071301 - 130700071305 130700071401 - 130700071406; 130700071501 - 130700071506 130700071601 - 130700071603; 130700071701 - 130700071709 130700071801 - 130700071806; 130700071901 - 130700071904 130700072001 - 130700072008; 130700072101 - 130700072106 130700080101 - 130700080109; 130700080201 - 130700080208 130700080301 - 130700080308; 130700080401 - 130700080405 130700080501 - 130700080508; 130700080601 - 130700080604 130700080701 - ...0703; 130700090101 - ...0109 130700090201 - ...0210;</p>	<p>2311</p>	<p>5c</p>	<p>8,958,079</p>
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Plum Creek	110901050702, 110901050703, 111002030102, 111301050208, 111302090204, 120100040204, 120301010104, 120500030306, 120601020401, 120702010804, 120702010805, 120800020403, 121002030401 – 121002030403	1810	4b	288,240
San Bernard River	120904010101, 120904010102, 120904010104, 120904010109, 120904010205, 120904010207, 120904010302, 120904010304 – 120904010306, 120904010308	1301 1302 1302A 1302B	5c 5a 5c 5c	672,000
Upper Oyster Creek	120402050100, 120402050200, 120701040403	1245	5a	65,649

Water Quality Impairment			
Describe all known causes (pollutants of concern) of water quality impairments or concerns from any of the following sources: <i>2010 Texas Integrated Report</i> , Clean Rivers Program Basin Summary/Highlights Reports or other documented sources.			
Segment ID	Body Name	Impairment	Code
0612	Attoyac Bayou	Bacteria	5b
1103	Dickinson Bayou Tidal	Bacteria	5a
		Depressed DO	5a
1103A	Bensons Bayou	Bacteria	5a
1103B	Bordens Gully	Bacteria	5a
1103C	Geisler Bayou	Bacteria	5a
		Depressed DO	5c
1103D	Gum Bayou	Bacteria	5c
1103E	Cedar Creek	Bacteria	5b
1104	Dickinson Bayou Above Tidal	Bacteria	5a
		Depressed DO	5c
1804A	Geronimo Creek	Bacteria	5c
1428C	Gilleland Creek	Bacteria	4a
1004E	Stewarts Creek	Bacteria	5a
1008	Spring Creek	Bacteria	5a
		Depressed DO	5b
1008H	Willow Creek	Bacteria	5a
1009	Cypress Creek	Bacteria	5a
1009C	Faulkey Gully	Bacteria	5a
1009D	Spring Gully	Bacteria	5a
1009E	Little Cypress Creek	Bacteria	5a
1010	Caney Creek	Bacteria	5a
1011	Peach Creek	Bacteria	5a
2311	Upper Pecos River	Depressed DO	5c
1810	Plum Creek	Bacteria	4b
1217B	Sulphur Creek	Depressed DO	5c
1217D	North Fork Rocky Creek	Depressed DO	5b
1221	Leon River below Proctor Lake	Bacteria	5b
1221A	Resley Creek	Depressed DO	5c
		Bacteria	5b

1221B	South Leon River	Bacteria	5b
1221D	Indian Creek	Bacteria	5b
1221F	Walnut Creek	Bacteria	5b
1901	Lower San Antonio River	Bacteria	4a
1301	San Bernard River Tidal	Bacteria	5c
1302	San Bernard River Above Tidal	Bacteria	5b
1302A	Gum Tree Branch	Bacteria	5b
1302B	West Bernard Creek	Bacteria	5b
		Depressed DO	5c
1245	Upper Oyster Creek	Depressed DO	5a
1245C	Bullhead Bayou	Bacteria	5b
1245D	Unnamed Tributary of Bullhead Bayou	Bacteria	5b
1245F	Alcorn Bayou	Bacteria	5b
1245I	Steep Bank Creek	Bacteria	5b
Water Quality Concerns			
0612	Attoyac Bayou	Bacteria	CN
0207A	Buck Creek	Nitrate	CS
1105	Bastrop Bayou Tidal	Bacteria	CN
		Depressed DO	CS
1105A	Flores Bayou	Depressed DO	CS
1105B	Austin Bayou Tidal	Depressed DO	CN
1105C	Austin Bayou Above Tidal	Depressed DO	CS
1105E	Brushy Bayou	Depressed DO	CS
1103	Dickinson Bayou Tidal	Chlorophyll-a	CS
		Depressed DO	CS
1103B	Bordens Gulley	Depressed DO	CS
1103C	Geisler Bayou	Depressed DO	CS
1103D	Gum Bayou	Bacteria	CN
1103E	Cedar Creek	Depressed DO	CS
1104	Dickinson Bayou Above Tidal	Depressed DO	CS
1804A	Geronimo Creek	Nitrate	CS
1428C	Gilleland Creek	Bacteria	CN
		Nitrate	CS
		Orthophosphorus	CS
1008	Spring Creek	Depressed DO	CS
		Nitrate	CS
		Orthophosphorus	CS
		Total phosphorus	CS
1008H	Willow Creek	Nitrate	CS
		Orthophosphorus	CS
		Total phosphorus	CS
1009	Cypress Creek	Nitrate	CS
		Orthophosphorus	CS
		Total phosphorus	CS
1009C	Faulkey Gully	Nitrate	CS
		Orthophosphorus	CS
		Total phosphorus	CS
1009D	Spring Gully	Nitrate	CS
		Orthophosphorus	CS
		Total phosphorus	CS
1009E	Little Cypress Creek	Nitrate	CS

		Orthophosphorus	CS
		Total phosphorus	CS
1011	Peach Creek	Bacteria	CN
1217B	Sulphur Creek	Depressed DO	CS
1221	Leon River Below Proctor lake	Chlorophyll-a	CS
		Depressed DO	CS
1221A	Resley Creek	Chlorophyll-a	CS
		Nitrate	CS
		Bacteria	CN
		Orthophosphorus	CS
1221B	South Leon River	Depressed DO	CS
1221D	Indian Creek	Depressed DO	CN
		Nitrate	CS
		Orthophosphorus	CS
1205	Lake Granbury	Chlorophyll-a	CS
1901	Lower San Antonio River	Bacteria	CN
		Chlorophyll-a	CS
		Nitrate	CS
		Orthophosphorus	CS
		Total phosphorus	CS
2311	Upper Pecos River	Bacteria	CN
		Chlorophyll-a	CS
		Depressed DO	CS
		Golden alga	CN
1810	Plum Creek	Depressed DO	CS
		Nitrate	CS
		Orthophosphorus	CS
		Total phosphorus	CS
1301	San Bernard River Tidal	Chlorophyll-a	CS
1302	San Bernard River Above Tidal	Depressed DO	CS
1302A	Gum Tree Branch	Bacteria	CN
		Depressed DO	CS
1302B	West Bernard Creek	Depressed DO	CS
1245	Upper Oyster Creek	Chlorophyll-a	CS
		Depressed DO	CS
		Nitrate	CS
		Orthophosphorus	CS
1245A	Red Gully	Bacteria	CN
		Nitrate	CS
		Orthophosphorus	CS
1245E	Flewellen Creek	Bacteria	CN
1245F	Alcorn Bayou	Nitrate	CS
		Orthophosphorus	CS
1245I	Steep Bank Creek	Orthophosphorus	CS
1245J	Stafford Run	Bacteria	CN
Special Interest			
1105	Bastrop Bayou Tidal	Bacteria	WAP
0207A	Buck Creek	Bacteria	WAP
1205	Lake Granbury	Bacteria	WAP
1217	Lampasas River Above Stillhouse Hollow Lake	Bacteria	WAP

Project Narrative

Problem/Need Statement

Excessive levels of fecal indicator bacteria (e.g. *E. coli*) remain a major cause of water quality impairment throughout Texas. According to the 2010 Texas Integrated Report for Clean Water Act Sections 305(b) and 303(d), a total of 621 impairments are included in Category 5. Impairments due to elevated bacteria represented the highest percentage (51%) of those included in Category 5. Total Maximum Daily Loads (TMDLs), TMDL Implementation Plans (I-Plans), and watershed protection plans (WPPs) are being developed to address these impairments.

Fecal indicator bacteria are common inhabitants of the intestines of all warm-blooded animals, including livestock. Although watersheds can be affected by microbial pollution from a wide variety of sources, livestock are increasingly under scrutiny. In order to alleviate this, preclude potential regulatory implications, and most importantly, protect human health, progressive implementation of best management practices (BMPs) is needed. To achieve this progressive implementation of BMPs, significant resources will be needed to educate livestock and poultry producers as well as landowners on bacteria impairments, their causes, and most importantly, BMPs that can be implemented to reduce bacterial contamination.

Due to the magnitude of the bacteria issues in the state, this problem is not isolated to one watershed or region, but is a need statewide. Through the joint vision of the Texas State Soil and Water Conservation Board and Texas AgriLife Extension Service, a program was specifically designed and developed to provide this information to landowners. The Lone Star Healthy Streams (LSHS) education program was first developed to address bacteria originating from beef cattle operations (TSSWCB project 06-05 *Lone Star Healthy Streams*) and later expanded to address dairy cattle, horse operations, poultry operations, and feral hogs (TSSWCB project 09-06 *Development of a Synergistic, Comprehensive Statewide Lone Star Healthy Streams Program*). Through these projects, presentations were developed, manuals were published, and other resources were made available for online delivery.

Since then, this program has been tested at select venues around the state and has received positive feedback to date. Its benefits have already been recognized by various watershed groups and the program is now ready for delivery to targeted watersheds across Texas.

In addition, this project will include a program evaluation component which will seek to better assess knowledge gained, adoption of BMPs, and perhaps more importantly, potential barriers that exist in the adoption and implementation of BMPs by Texas livestock and poultry producers as well as landowners. An evaluation instrument will be used to investigate how demographic, socioeconomic, policy, and farm characteristics play a role in a producer's decision to adopt one or more BMPs that are known to reduce bacterial contamination of waterbodies.

A better understanding of the BMP adoption behavior of Texas livestock and poultry producers, as well as landowners, will enable state water quality and natural resource agencies to improve design practices and programs that encourage and secure participation, facilitate sustained adoption of practices, and meet water quality goals in the most cost effective manner.

The LSHS program is an important water quality education initiative in Texas. This project will provide implementation of the LSHS program to support and enhance current and future watershed protection efforts in Texas and provide a basis for gaining landowner participation and adoption of BMPs.

Project Narrative

General Project Description (Include Project Location Map)

This project will deliver the *Lone Star Healthy Streams* program through local and distance education events in targeted watersheds across Texas.

Local Watershed and Distance Education. Extension will work with Extension Regional Program Directors, County Extension Agents, and Extension Specialists around the state to deliver this program in bacteria impaired watersheds through local or distance education which uses **Centra Symposium or Lync software**. The delivery will take place in conjunction with County Extension Agents and their program planning committees; continued use of the LSHS website, and additional written materials as needed.

Locations for training programs will be selected in concert with the TSSWCB and will target bacteria impaired watersheds where livestock and poultry have been identified as potential contributors, as well as those watersheds currently undergoing development and/or implementation of a WPP, TMDL, or I-Plan (Figure 1). Training programs will also be conducted at field days, conferences, and other county extension events as necessary.

Both local and distance education programs will vary in length and topic depending on the audience or location of the program. Distance education events will be delivered using software such as Centra Symposium and/or Lync. These software programs allow a presenter to load materials onto a platform while interested participants log in from a remote site to listen and view the presentation live. Presentations can also be recorded so that participants who missed the live presentation can log on at a later time to listen to the presentation and view the presentation materials. A minimum of 20 local events and 6 distance education events will be conducted. Curriculum and training materials have been developed to address topics and BMPs related to beef cattle, dairy cattle, poultry, and horses. As part of each training program, participants will learn about water quality law and policy, sources of bacteria in Texas waterways, bacteria fate and transport, benefits of voluntary conservation practices, sources of financial and technical assistance, and livestock-specific BMPs that are designed to reduce bacterial contamination of runoff.

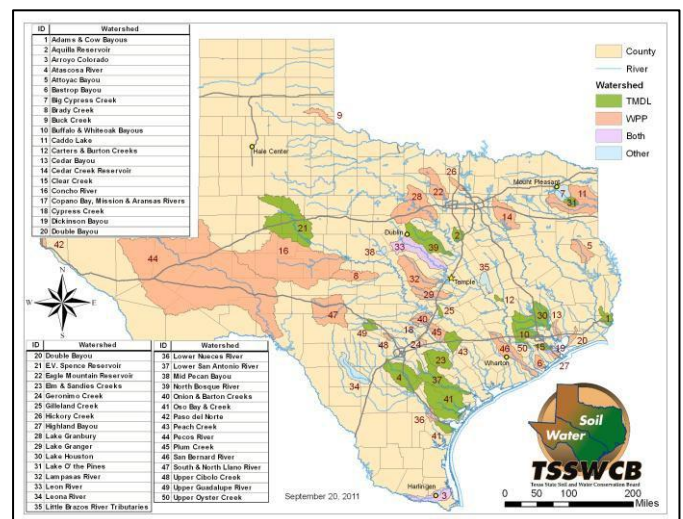


Figure 1. Locations of WPPs and TMDLs in Texas. Image courtesy of the TSSWCB.

Evaluation and Assessment. The impacts and effectiveness of the LSHS program will be assessed using a multi-stage evaluation approach. The first stage will use a pre-test/post-test evaluation strategy which will be utilized at the beginning and end of both watershed and computer-based training programs. The pre-test will ask knowledge-based questions that will include a combination of multiple choice and true/false questions. The post-test will measure the same knowledge-based questions to determine the knowledge change of participants. In addition, the post-test will include 'satisfaction' questions and 'intentions to adopt' questions. The 'intentions to adopt' questions will focus on BMPs that participants should adopt based on what they have learned and the practice's ability to reduce bacterial contamination.

The second stage of the evaluation approach will utilize a more lengthy evaluation instrument designed specifically to evaluate the factors that motivate and barriers that limit producer adoption/implementation and sustained management of BMPs known to reduce bacterial contamination of waterbodies. Demographic, socioeconomic, policy, and farm characteristics data will be analyzed to identify and better understand the controlling factors. The evaluation will be mailed to participants who have attended LSHS programs as well as to a random sample of livestock producers and

landowners in Texas. A minimum of 384 responses are needed to produce a statistically valid sample. Using 5% margin of error and assuming a response rate of 30%, we will mail a total of 1,280 evaluations to achieve this statistically valid sample. Using Dillman's Tailored Design Method which has been successful in securing high response rates from evaluated participants, individuals will first receive a letter notifying them they have been selected for the evaluation. Approximately one week later, individuals will receive a cover letter with instructions on completing the evaluation, the evaluation itself, and a pre-paid envelope to return the evaluation. Next, individuals will receive a follow-up post-card thanking those that have already completed the evaluation and requesting a response from those who have not yet responded. Lastly, approximately two weeks following the mailing of the post-card, individuals who still haven't responded will receive a new cover letter, evaluation, and return envelope.

Descriptive, correlational, analysis of variance, and other relevant statistical procedures will be utilized in this evaluation study. An SPSS software package will be utilized for data analysis. Results will be continuously summarized and program will be tailored to address feedback. Research briefs will be developed to document and enhance the success of future LSHS and training programs.

In addition, the distribution of educational materials, engagement and back channel statistics/chatter of social networking, and website activity will all be tracked and reported.

Tasks, Objectives and Schedules						
Task 1:	Project Administration					
Costs:	Federal:	\$8,649	Non-Federal:	\$7,021	Total:	\$15,670
Objective:	Administer, coordinate, and monitor all work performed under the project including technical and financial supervision and preparation of quarterly progress and final reports.					
Subtask 1.1:	Extension will prepare QPRs for submission to the TSSWCB. QPRs shall document all activities performed within a quarter and shall be submitted by the 15 th of January, April, July and October. QPRs shall be distributed to all project partners.					
	Start Date:	Month 1	Completion Date:	Month 40		
Subtask 1.2:	Extension will perform accounting functions for project funds and will submit appropriate Reimbursement Forms to TSSWCB at least quarterly.					
	Start Date:	Month 1	Completion Date:	Month 40		
Subtask 1.3:	Extension will host coordination meetings or conference calls, at least quarterly, with project partners to discuss project activities, project schedule, communication needs, deliverables, and other requirements. Extension will develop lists of action items needed following each project coordination meeting and distribute to project personnel.					
	Start Date:	Month 1	Completion Date:	Month 40		
Subtask 1.4:	Extension, with assistance from project partners, will develop the final report assessing the effectiveness of the LSHS program, including the local and distance education events.					
	Start Date:	Month 1	Completion Date:	Month 40		
Deliverables	<ul style="list-style-type: none"> • Quarterly progress reports in electronic format • Reimbursement Forms and necessary documentation in hard copy format • Lists of action items from project coordination meetings • Final report 					

Tasks, Objectives and Schedules						
Task 2:	Coordinate and deliver LSHS locally or through distance education in targeted watersheds					
Costs:	Federal:	\$174,338	Non-Federal:	\$126,943	Total:	\$301,281
Objective:	Deliver a statewide educational program that provides landowners and land managers applicable information on water quality law and policy, sources of bacteria in Texas waterways, bacteria fate and transport, benefits of voluntary conservation practices, sources of technical assistance and financial incentives, and livestock-specific BMPs that are designed to reduce bacterial contamination of runoff. Extension will work in cooperation with the TSSWCB and other agencies and organizations as appropriate to guide program delivery and selection of training locations.					
Subtask 2.1:	Extension will employ a Program Specialist who will serve under the leadership of the Extension State Forage Specialist as the full-time LSHS Program Coordinator and will be responsible for promoting, coordinating, and delivering local and distance education LSHS training events.					
	Start Date:	Month 1	Completion Date:	Month 40		
Subtask 2.2:	Extension will work in concert with TSSWCB and state and local organizations to select locations for the LSHS training events. Extension will coordinate efforts with state agencies and organizations already involved in WPP/TMDL processes in specific watersheds.					
	Start Date:	Month 1	Completion Date:	Month 40		
Subtask 2.3:	Extension and will actively market LSHS programs through news releases (AgriLife News and local media outlets), Internet postings, newsletter announcements, public/conference presentations, flyers, etc., to enhance awareness and utilization. TSSWCB will be provided all promotional materials for review and approval and approval at least 2 to 3 weeks prior to distribution.					
	Start Date:	Month 1	Completion Date:	Month 40		
Subtask 2.4:	<p>Extension will coordinate with Extension Regional Program Directors, County Extension Agents, local SWCDs, NRCS, TSSWCB, and others to deliver the LSHS educational program to bacteria-impaired or threatened watersheds throughout the state. Trainings will include the standardized presentation developed in Subtask 3.3 of TSSWCB project 09-06 <i>Development of a Synergistic, Comprehensive Statewide Lone Star Healthy Streams Program</i>. Production characteristics of each watershed will dictate LSHS component to be discussed and the mode of delivery (local or distance). Expected workshops will include:</p> <p><i>Local Training Events (20):</i></p> <ul style="list-style-type: none"> • Lone Star Healthy Streams (Grazing Cattle component) workshop – 12 events • Lone Star Healthy Streams (Dairy Cattle component) workshop – 2 event • Lone Star Healthy Streams (Horses component) workshop – 3 events • Lone Star Healthy Streams (Poultry component) workshop – 3 events <p><i>Distance Training Events (6):</i></p> <ul style="list-style-type: none"> • Lone Star Healthy Streams (Grazing Cattle component) workshop – 3 events • Lone Star Healthy Streams (Dairy Cattle component) workshop – 1 event • Lone Star Healthy Streams (Horses component) workshop – 1 events • Lone Star Healthy Streams (Poultry component) workshop – 1 events 					
	Start Date:	Month 1	Completion Date:	Month 40		
Subtask 2.5:	Extension will participate in meetings as appropriate in order to efficiently and effectively achieve project goals and summarize activities and achievements made throughout the course of this project. Such meetings may include, but are not limited to, local soil and water conservation districts (SWCDs), the Texas Watershed Planning Short Course, Texas Watershed Coordinator Roundtables, the TSSWCB Regional Watershed Coordination Steering Committee, the annual meeting of Texas Soil and Water Conservation District Directors, the National Water Quality Conference, American Society of Agronomy annual meeting, and the Society for Range Management annual meeting.					

	Start Date:	Month 1	Completion Date:	Month 40
Subtask 2.6:	Extension, with assistance from TWRI, will continue to host and maintain a website (http://lshs.tamu.edu/) to serve as a public clearinghouse for all project related information. All workshop information as well as other material will be available at this website. The number of unique visitors to the website and the distribution of <i>Lone Star Healthy Streams</i> educational materials will be tracked to assess its impact and reported each quarter.			
	Start Date:	Month 1	Completion Date:	Month 40
Deliverables	<ul style="list-style-type: none"> • LSHS Website • Collection of press releases, newspaper articles, newsletters, public information statements, etc., as developed and disseminated • Tracking report of website usage • Schedule of program delivery, participation in workshops and educational events, and related activities • List of participants from educational events 			

Tasks, Objectives and Schedules						
Task 3:	Evaluate the effectiveness of the LSHS Program					
Costs:	Federal:	\$99,636	Non-Federal:	\$68,456	Total:	\$168,092
Objective:	To measure both knowledge and behavior changes of individuals participating in the LSHS program using a staged evaluation approach.					
Subtask 3.1:	With assistance from ALEC, develop and conduct pre-test/post-test evaluations (for both local and distance education events) to measure changes in knowledge of participants regarding water quality law and policy, sources of bacteria in Texas waterways, bacteria fate and transport, benefits of voluntary conservation practices, sources of financial and technical assistance, and livestock-specific BMPs that are designed to reduce bacterial contamination of runoff; to evaluate participant satisfaction with the program; and to evaluate participant's intentions to change their behavior as a result of the program					
	Start Date:	Month 1	Completion Date:	Month 40		
Subtask 3.2:	With assistance from ALEC, develop and deliver stage 2 mailout evaluation specifically designed to assess the barriers and factors related to the adoption and implementation of BMPs known to reduce bacterial contamination of water bodies.					
	Start Date:	Month 1	Completion Date:	Month 40		
Subtask 3.3:	With assistance from ALEC, analyze demographic, socioeconomic, policy, and farm characteristics data to better understand the factors involved in producer adoption of BMPs. Results will be used to periodically evaluate and modify LSHS education program materials and incorporated into the final report.					
	Start Date:	Month 1	Completion Date:	Month 40		
Subtask 3.4:	Extension, with assistance from ALEC, will develop research briefs summarizing results and project updates. Briefs will be developed for the purposes of documenting and enhancing the success of future LSHS and similar training programs.					
	Start Date:	Month 1	Completion Date:	Month 40		
Deliverables	<ul style="list-style-type: none"> • Stage 1 pretest/post test evaluation for local and distance education LSHS training. • Stage 2 mailout evaluation for assessment of barriers related to BMP adoption and implementation. • Results from Stage 1 and Stage 2 evaluations. • Research briefs summarizing results and project updates. 					

Project Goals (Expand from NPS Summary Page)

The goal of this project is to promote healthy watersheds and improve water quality through delivery of the Lone Star Healthy Streams program, using both local and distance education in targeted watersheds across the state. This will be accomplished through the education of Texas livestock and poultry producers and land managers on how to best protect Texas waterways from bacterial contributions associated with the production of livestock and poultry. In addition, this project aims to better understand the barriers and factors associated with the adoption and implementation of BMPs known to reduce bacterial contamination in waterways and develop recommendations for enhanced landowner participation.

Measures of Success (Expand from NPS Summary Page)

- Delivery of a minimum of 20 LSHS local and 6 distance educational trainings;
- Number of livestock producers and landowners participating in educational events delivered locally or through distance education;
- Number of unique visitors to the LSHS project website (<http://lshs.tamu.edu>);
- Number of factsheets, publications, and other educational materials distributed regarding the LSHS program and BMPs to reduce bacterial contamination;
- Increased knowledge and understanding of livestock producers and landowners on bacteria pollution and BMPs to reduce bacteria runoff, increased understanding of the expected adoption of BMPs, increased understanding of the barriers associated with BMP adoption and implementation as measured by surveys and pre/post evaluations.

2005 Texas Nonpoint Source Management Program Reference (Expand from NPS Summary Page)

Goals and/or Milestone(s)

Element 1 – Explicit short- and long-term goals, objectives and strategies that protect surface and groundwater.

LTG: To protect and restore water quality from NPS pollution through assessment, implementation and education

1. Focus NPS abatement efforts ...and available resources in watersheds identified as impacted by NPS pollution.
2. Support the implementation of state, regional, and local programs to prevent NPS pollution through assessment ...and education.
4. Increase overall public awareness of NPS issues and prevention activities.

STG Three – Education: Conduct education and technology transfer activities to help increase awareness of NPS pollution and prevention activities contributing to the degradation of waterbodies... by NPS.

- Objective A – Enhance existing outreach programs at the state, regional, and local levels to maximize the effectiveness of NPS education.
- Objective B – Administer programs to educate citizens about water quality and their potential role in causing NPS pollution.
- Objective F – Implement public outreach and education to maintain and restore water quality in waterbodies impacted by NPS pollution.

Element 2 – Working partnerships and linkages to appropriate state, interstate, tribal, regional, and local entities, private sector groups, and Federal agencies.

Element 3 – Balanced approach that emphasizes both statewide NPS programs and on-the-ground management of individual watersheds

Part III – Financial Information

Budget Summary			
Federal	\$282,623	% of total project	58%
Non-Federal	\$202,420	% of total project (at least 40%)	42%
Total	\$485,043	Total	100%
Category	Federal	Non-Federal	Total
Personnel	\$149,829	\$125,982	\$275,811
Fringe Benefits	\$43,323	\$16,359	\$59,682
Travel	\$22,527	\$0	\$22,527
Equipment	\$0	\$0	\$0
Supplies	\$1,700	\$0	\$1,700
Contractual	\$0	\$0	\$0
Other	\$28,380	\$0	\$28,380
Total Direct Costs	\$245,759	\$142,341	\$388,100
Indirect Costs (≤15%)	\$36,864	\$60,079	\$96,943
Total Project Costs	\$282,623	\$202,420	\$485,043

Budget Justification (Federal)		
Category	Total Amount	Justification
Personnel	\$149,829	3 Extension Program Specialist @ .5 - 1 FTE for 3.3 years @ 52,000/yr-66,000/yr (\$125,527) Extension Forage Specialist (Educational delivery): @ .15 FTE (\$13,567) Extension Soil Fertility Specialist (Educational delivery): @ .05 FTE (\$5,542) ALEC Extension Program Specialist Evaluation: development and Implementation @ .08 FTE (\$5,193)
Fringe Benefits	\$43,323	15-35% depending on each individual employee of Personnel Cost at effort plus \$474/mo/FTE group health insurance

Travel	\$22,527	<p>Travel to/from Educational Programs, Project Meetings, and Conferences: * Estimates were calculated based on 10 locations/year x \$108/night (if overnight travel is required) + mileage @ \$.555/mile for trips ranging from 100-600 miles roundtrip + 2 days per diem @ \$58.50/day.</p> <ul style="list-style-type: none"> • \$108: This is the average of the highest and standard lodging rates listed for Texas on the GSA.gov website. • \$0.555: This is the standard mileage reimbursement rate for AgriLife Extension. • \$58.50: This is the average of the highest and standard per diem rates listed for Texas on the GSA.gov website. • TOTAL = \$5,512/year (($\\$108 * 10 \text{ locations}$) + ($.555 * 588\text{mi} * 10 \text{ locations}$) + ($\\$58.50 * 2 \text{ days} * 10 \text{ locations}$)) <p>* Travel estimates above include costs associated with attendance at 1 National Conferences and 1 regional conference for Extension Program Specialist (\$500 airfare + rental car @35/day + per diem @ \$58.50/day for 5 days + hotel @ \$108/night for 5 days).</p> <ul style="list-style-type: none"> • \$500: This is an estimate for an airline ticket with destination outside of Texas. This estimate includes costs for checked luggage. • \$35: This is based on the business contract rates that AgriLife Extension has with Enterprise Car Rental. • \$108: This is the average of the highest and standard lodging rates listed for states outside of Texas on the GSA.gov website. • \$58.50: This is the average of the highest and standard per diem rates listed for states outside of Texas on the GSA.gov website.
Equipment	\$0	N/A
Supplies	\$1,700	Office supplies (pens, pencils, paper, mouse, laser pointer, paper clips, flash drive, etc.) @ \$1,700
Contractual	\$0	N/A

Other	\$28,380	Graduate student tuition and fees (\$12,419) Agrilife Extension Vehicle Mileage (\$478) A&M Travel System Fees (\$46) Laptop computer (\$1,419) Projector (\$1,212) Off-campus printing of marketing materials (\$1,200): <ul style="list-style-type: none"> ▪ tri-fold brochure 1000 copies ▪ factsheet 1000 copies Copying of presentations, sign in sheets, and other associated training material (\$1,440) Copying and multiple mailings of evaluation (\$10,166) <ul style="list-style-type: none"> ▪ Prenotice Postcard: \$1,000 ▪ Evaluation Packet #1: \$4,083 ▪ Postcard Reminder: \$1,000 ▪ Evaluation Packet #2: \$4,083 ▪ Postcard Reminder: \$1,000
Indirect	\$36,864	15% of Total Direct Costs - Federal

Budget Justification (Non-Federal)		
Category	Total Amount	Justification
Personnel	\$125,982	<p>Professor & State Forage Specialist:</p> <ul style="list-style-type: none"> Year 1: Annual Salary = \$106,666 * 0.11* = \$12,445 Year 2: Annual Salary = \$106,666 * 0.11* = \$12,444 Year 3: Annual Salary = \$106,666 * 0.11* = \$12,444 Year 4: Annual Salary = \$106,666 * 0.05 = \$5,333 TOTAL: \$42,666 <p>Professor & State Soil Fertility Specialist:</p> <ul style="list-style-type: none"> Year 1: Annual Salary = \$120,745 * 0.06* = \$7,648 Year 2: Annual Salary = \$120,745 * 0.06* = \$7,648 Year 3: Annual Salary = \$120,745 * 0.06* = \$7,647 Year 4: Annual Salary = \$120,745 * 0.01 = \$1,207 TOTAL: \$24,150 <p>Assistant Professor and Extension Agronomist:</p> <ul style="list-style-type: none"> Year 1: Annual Salary = \$86,518 * 0.05 = \$4,326 Year 2: Annual Salary = \$86,518 * 0.05 = \$4,326 Year 3: Annual Salary = \$86,518 * 0.05 = \$4,325 Year 4: Annual Salary = \$86,518 * 0.01 = \$865 TOTAL: \$13,842 <p>Extension Program Specialist – Evaluation:</p> <ul style="list-style-type: none"> Year 1: Annual Salary = \$67,227 * 0.06* = \$4,258 Year 2: Annual Salary = \$67,227 * 0.06* = \$4,258 Year 3: Annual Salary = \$67,227 * 0.06* = \$4,258 Year 4: Annual Salary = \$67,227 * 0.01 = \$672 TOTAL: \$13,446 <p>Assistant Professor and Extension Poultry Specialist:</p> <ul style="list-style-type: none"> Year 1: Annual Salary = \$71,248 * 0.03* = \$2,256 Year 2: Annual Salary = \$71,248 * 0.03* = \$2,256 Year 3: Annual Salary = \$71,248 * 0.03* = \$2,256 Year 4: Annual Salary = \$71,248 * 0.005 = \$356 TOTAL: \$7,124 <p>Assistant Professor and Horse Specialist:</p> <ul style="list-style-type: none"> Year 1: Annual Salary = \$75,590 * 0.05 = \$3,780 Year 2: Annual Salary = \$75,590 * 0.05 = \$3,779 Year 3: Annual Salary = \$75,590 * 0.05 = \$3,779 Year 4: Annual Salary = \$75,590 * 0.01 = \$756 TOTAL: \$12,094 <p>Professor and State Soil Environmental Specialist:</p> <ul style="list-style-type: none"> Year 1: Annual Salary = \$99,612 * 0.04* = \$4,051 Year 2: Annual Salary = \$99,612 * 0.04* = \$4,051 Year 3: Annual Salary = \$99,612 * 0.04* = \$4,050 Year 4: Annual Salary = \$99,612 * 0.01 = \$996 TOTAL: \$13,148
Fringe Benefits	\$16,359	17.2% of Personnel Cost at effort plus \$474/mo/fte group health insurance
Travel	\$0	N/A
Equipment	\$0	N/A
Supplies	\$0	N/A
Contractual	\$0	N/A
Construction	\$0	N/A

Other	\$0	N/A
Indirect	\$60,079	26% of Total Modified Non Federal Direct Costs, 11% of Total Direct Costs - Federal (difference between DHHS approved negotiated IDC rate of 26% and the 15% allowed per guidelines)