



**Texas State Soil and Water Conservation Board
 State Nonpoint Source Grant Program
 FY 2016 Workplan 16-50**

SUMMARY PAGE			
Title of Project	Improving runoff water quality from small pork production facilities using vegetative treatment areas		
Project Goals	<ul style="list-style-type: none"> Evaluate the efficiency of a stand-alone VTA at removing E. coli, nitrogen, and phosphorus from swine facility runoff and compare the VTA runoff to local ambient water quality to evaluate VTA effectiveness Provide results of the VTAs' effectiveness to pork producers, natural resource agencies, and others involved in animal waste management 		
Project Tasks	(1) Project Administration; (2) Quality Assurance; (3) VTA evaluation; (4) Outreach		
Measures of Success	<ul style="list-style-type: none"> Evaluate the effectiveness of VTAs in reducing bacteria and nutrient runoff from three evaluation sites Ensure data of known and acceptable quality is collected utilizing established methods Transfer results from VTA effectiveness evaluation to landowners, natural resource agencies and others involved in animal waste management through presentations and publications Pursue incorporation of findings, as appropriate, into practice standards and program guidance of natural resource management agencies 		
Project Type	Implementation (); Education (); Planning (); Assessment (X); Groundwater ()		
Status of Waterbody on 2012 Texas Integrated Report	<u>Segment ID</u> 1209E 1213A	<u>Parameter of Impairment or Concern</u> bacteria bacteria	<u>Category</u> 5b 5c
Project Location (Statewide or Watershed and County)	<u>County</u> Bell Brazos Robertson	<u>Watershed</u> Big Elm Creek Wickson Creek Little Brazos River	
Key Project Activities	Hire Staff (); Surface Water Quality Monitoring (X); Technical Assistance (); Education (X); Implementation (); BMP Effectiveness Monitoring (X); Demonstration (X); Planning (); Modeling (); Bacterial Source Tracking (); Other ()		
2012 Texas NPS Management Program Reference	<ul style="list-style-type: none"> Component 1 LTGs A, B Component 1 STGs 2B Component 2 Component 4 		
Project Costs	\$28,697		
Project Management	<ul style="list-style-type: none"> Texas Water Resources Institute (TWRI) United States Department of Agriculture-Agricultural Research Service (USDA-ARS) 		
Project Period	October 1, 2015 – January 31, 2017		

Part I – Applicant Information

Applicant							
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Project Co-Lead		Dr. Terry Gentry					
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Project Co-Lead		Dr. Daren Harmel					
Title		Agricultural Engineer					
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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 and TCEQ.
Texas Water Resources Institute (TWRI)	<ul style="list-style-type: none"> • Project management. • Quality assurance management • Manage subcontract for water quality sampling. • Assist with data analysis and reporting. • Dissemination of project findings.
USDA-ARS, Grassland, Soil and Water Research Laboratory	<ul style="list-style-type: none"> • Stormwater sampling training and assistance. • Soil sampling and analysis. • Laboratory analysis for sediment, nitrogen, phosphorus. • Lead data analysis and reporting. • Dissemination of project findings.
Texas A&M Soil & Aquatic Microbiology Lab (SAML)	<ul style="list-style-type: none"> • Laboratory analysis for <i>E. coli</i> (1603).
Cooperating pork producers	<ul style="list-style-type: none"> • Conduct land management. • Record land management data for VTA and control sites.

Part II – Project Information

Project Type						
Surface Water	X	Groundwater				
Does the project implement recommendations made in (a) a completed WPP, (b) an adopted TMDL, (c) an approved I-Plan, (d) a Comprehensive Conservation and Management Plan developed under CWA §320, (e) the <i>Texas Coastal NPS Pollution Control Program</i> , or (f) the <i>Texas Groundwater Protection Strategy</i> ?				Yes	No	X
If yes, identify the document.		N/A				
If yes, identify the agency/group that developed and/or approved the document.		N/A		Year Developed	N/A	

Watershed Information				
Watershed or Aquifer Name(s)	Hydrologic Unit Code (12 Digit)	Segment ID	Category on 2012 IR	Size (Acres)
Big Elm Creek	12070204	1213A	5c	642,127
Little Brazos River	12070101	1242E	N/A	104,847
Wickson Creek	12070103	1209E	5b	74,816

Water Quality Impairment			
Describe all known causes (i.e., pollutants of concern) and sources (e.g., agricultural, silvicultural) of water quality impairments or concerns from any of the following sources: <i>2012 Texas Integrated Report</i> , Clean Rivers Program Basin Summary/Highlights Reports, or other documented sources.			
IMPAIRMENTS: <i>2012 Texas Integrated Report</i> <u>Segment 1209E</u> : Wickson Creek- Perennial stream from the confluence with an unnamed first order tributary (approximately 1.3 km upstream of Reliance Road crossing) upstream to the confluence with an unnamed first order tributary approximately 15 meters upstream of Dilly Shaw Road			
1209E_01: Entire water body	<u>Impairment</u> bacteria	<u>Category</u> 5b	<u>Year Listed</u> 2006
<u>Segment 1213A</u> : Big Elm Creek- From the confluence with Little River in Milam county, 4.5 km northeast of the City of Cameron, upstream to its headwaters in McLennan County, 0.7 km west of Moody.			
1213A_01: Portion of Big Elm Creek from the confluence with the Little River upstream to confluence with Little Elm Creek.	<u>Impairment</u> bacteria	<u>Category</u> 5c	<u>Year Listed</u> 2010

Project Narrative

Problem/Need Statement

On December 15, 2002, the Administrator of the United States Environmental Protection Agency (EPA) signed the final rule regulating concentrated animal feeding operations (CAFOs). In this rule, it reinforced the need for all animal feeding operations (AFOs), regardless of the definition as a CAFO and required to operate under the coverage of a National Pollutant Discharge Elimination System (NPDES) permit, to manage manures and wastewater by-products in a manner that is protective of waters of the U.S. The requirement for nutrient management plans (NMPs) and the recommendation that all AFOs obtain comprehensive nutrient management plans (CNMPs) was a key strategy for achieving maximum protection. As EPA has delegated the NPDES program to the State of Texas, the Texas Commission on Environmental Quality (TCEQ) has adopted the Texas Pollutant Discharge Elimination System (TPDES) under administrative rule, and certain management practices and technical requirements specific to unpermitted AFOs in Texas Administrative Code §321.47.

In Texas, the Texas State Soil and Water Conservation Board (TSSWCB), the agency responsible for the management, prevention, and abatement of nonpoint source (NPS) pollution from agricultural and silvicultural activities, administers a certified Water Quality Management Plan (WQMP) Program. The term NPS, as it relates to AFOs, is loosely used to differentiate between AFOs, which do not require written authorization from TCEQ, from point source CAFOs, which do require written authorization under a permit. Because of this understanding, the TSSWCB's WQMP Program is applicable for any AFO not defined as a CAFO. There are approximately 3000 such AFOs currently operating under the authority of a WQMP certified in accordance with Texas Agriculture Code §201.026. The technical elements of a WQMP are based entirely on the United States Department of Agriculture - Natural Resource Conservation Service's (NRCS) Field Office Technical Guide (FOTG), which is the best available technology and the basis for many of the management practices and agricultural engineering standards incorporated into the permitting program. A certified WQMP developed for an AFO that meets the technical requirements of the FOTG is a CNMP. A WQMP is effectively a conservation plan that includes a functionally equivalent level of environmental protection from a voluntary perspective. As a result, the TSSWCB encourages as many AFOs as possible to voluntarily participate in the WQMP Program, even if they are not explicitly required to obtain permit coverage.

Historically, the dairy and poultry industries have demonstrated significant levels of interest in WQMPs and make up the bulk of the AFOs currently participating. In contrast, limited participation of the pork industry has occurred largely due to logistical and operational issues on smaller operations. Smaller pork facilities generally operate on smaller tracts of land that do not support traditional animal waste management systems such as waste storage ponds, treatment lagoons, and significant expanses of land application acreage. The manure and wastewater is generally kept contained in "waste pits" and other structural measures that may or may not be adequate. As a result, this project will evaluate an alternative wastewater treatment system including manure scraping and offsite hauling and a vegetated treatment area (VTA) that was designed by NRCS to treat runoff and wash water prior to leaving the VTA. This system is compatible with the style of operation of small producers and was designed to function well with minimal management intensity. In addition, this project will serve to demonstrate the potential effectiveness of the alternative system to the regulatory community and unpermitted pork producers, thus encouraging increased participation in the WQMP program. Finally, this project will provide scientific evaluation of the system for possible inclusion into the WQMP Program as an approved practice and assistance from the EQIP Program.

Project Narrative

General Project Description (Include Project Location Map)

This project will evaluate the alternative wastewater treatment system, which was designed for small pork production facilities in Texas and includes manure scraping, offsite hauling and a VTA. The implementation and demonstration of the system was initiated through several previous TSSWCB projects. These include:

- Demonstration of Alternative Best Management Practices for Small Pork Production Facilities (09-56, 11-53)
- Continued Demonstration of Alternative Best Management Practices for Small Pork Production Facilities (12-50)
- Preliminary Evaluation of VTA Effectiveness to Protect Runoff Water Quality on Small Pork Production Facilities in Texas (12-53)
- Evaluation and demonstration of VTA effectiveness to protect runoff water quality on small pork production facilities in Texas (14-50)

In the proposed project, evaluation of the system will be continued on three small pork production facilities in Bell, Brazos, and Robertson Counties (See Figure 1). At each of these facilities, water quality monitoring stations have been established: 1) on a control site to represent typical rural/agricultural land use, 2) below the pens and barns to quantify water quality leaving the facility prior to treatment in the VTA, and 3) at the VTA outlet to quantify effectiveness of the VTA in treating runoff. Rainfall depth, rainfall intensity, and flow will be measured for each event. Event mean concentrations for *E. coli*, nitrogen (N) and phosphorus (P) will be determined for each runoff event where sufficient sample volume is available. The project will allow scientific evaluation of the quality of water entering VTAs from runoff and washing and the water quality exiting the VTAs. Soil sampling will also be conducted to assess the spatial distribution and transport of nutrients within the VTAs.

Data produced in this project will be used by TWRI and USDA-ARS to evaluate VTAs as alternative wastewater treatment systems for small pork production facilities. At the conclusion of the project, TWRI and USDA-ARS will provide findings to TSSWCB, USDA-NRCS and others to show the effectiveness of VTAs to protect runoff water quality on small pork production facilities. Results of the VTA effectiveness will be distributed through outreach materials and producer meetings. If VTA effectiveness is confirmed, TWRI and USDA-ARS will develop a fact sheet summarizing the effectiveness of the VTA practice. This will be submitted to TSSWCB for review prior to publication. USDA-ARS and TWRI will present results to the Pork Producers Association and at State and National meetings. Finally, if VTA use is shown to be an effective practice, TWRI, TSSWCB, and USDA-ARS will work with USDA-NRCS and TCEQ to incorporate results into practice standards and achieve acceptance of this practice for meeting required environmental safeguards.

Tasks, Objectives and Schedules				
Task 1	Project Administration			
Costs	\$2,870			
Objective	To effectively administer, coordinate and monitor all work performed under this project including technical and financial supervision and preparation of status reports.			
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 15 th of December, March, June and September. QPRs shall be distributed to all Project Partners.			
	Start Date	Month 1	Completion Date	Month 16
Subtask 1.2	TWRI 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 16
Subtask 1.3	TWRI 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. TWRI will develop lists of action items needed following each project coordination meeting and distribute to project personnel.			
	Start Date	Month 1	Completion Date	Month 16
Subtask 1.4	TWRI will develop a Final Report that summarizes activities completed and conclusions reached during the project and discusses the extent to which project goals and measures of success have been achieved.			
	Start Date	Month 1	Completion Date	Month 16
Deliverables	<ul style="list-style-type: none"> • QPRs in electronic format • Reimbursement Forms and necessary documentation in hard copy format • Final Report in electronic and hard copy formats 			

Tasks, Objectives and Schedules				
Task 2	Quality Assurance			
Costs	\$925			
Objective	To develop data quality objectives (DQOs) and quality assurance/control (QA/QC) activities to ensure data of known and acceptable quality are generated through this project.			
Subtask 2.1	TWRI will develop a QAPP for activities in Task 3 consistent with the most recent versions of <i>EPA Requirements for Quality Assurance Project Plans (QA/R-5)</i> and the <i>TSSWCB Environmental Data Quality Management Plan</i> . All monitoring procedures and methods prescribed in the QAPP shall be consistent with the guidelines detailed in the <i>TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue (RG-415)</i> and <i>Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data (RG-416)</i> . [Consistency with Title 30, Chapter 25 of the Texas Administrative Code, <i>Environmental Testing Laboratory Accreditation and Certification</i> , which describes Texas' approach to implementing the National Environmental Laboratory Accreditation Conference (NELAC) standards, shall be required where applicable.]			
	Start Date	Month 1	Completion Date	Month 2
Subtask 2.2	TWRI will implement the approved QAPP. TWRI will submit revisions and necessary amendments to the QAPP as needed.			
	Start Date	Month 1	Completion Date	Month 16
Deliverables	<ul style="list-style-type: none"> • QAPP approved by TSSWCB and EPA in both electronic and hard copy formats • Approved revisions and amendments to QAPP, as needed • Data of known and acceptable quality as reported through Task #3 			

Tasks, Objectives and Schedules				
Task 3	VTA Evaluation			
Costs	\$22,032			
Objective	Manage sites and measure runoff water quality from VTA inlets and outlet and an adjacent pasture site on small hog farms in Bell, Brazos, and Robertson counties.			
Subtask 3.1	Land management. Cooperating hog farms will perform grazing management, tillage, weed and insect control, fertilizer application, and crop production on VTAs and adjacent pastures. Cooperators will gather and record land management data for each site and provide that data to USDA-ARS.			
	Start Date	Month 1	Completion Date	Month 16
Subtask 3.2	Soil sampling. USDA-ARS will collect and analyze soil samples to evaluate N and P movement and potential buildup in the VTAs and adjacent pastures.			
	Start Date	Month 1	Completion Date	Month 16
Subtask 3.3	Grab sampling. If flowing, weekly grab samples will be collected by USDA-ARS at the inlet and outlet of each VTA and at the adjacent pasture.			
	Start Date	Month 1	Completion Date	Month 16
Subtask 3.4	Stormwater sampling. Stormwater runoff samples will be collected by USDA-ARS at the inlets and outlets of each VTA site and the adjacent pasture following runoff events.			
	Start Date	Month 1	Completion Date	Month 16
Subtask 3.5	Lab analysis of water quality samples. SAML will perform E. coli analysis on samples from the Bell, Brazos and Robertson County hog farm sites. USDA-ARS will perform N and P analysis for all samples.			
	Start Date	Month 1	Completion Date	Month 16
Deliverables	<ul style="list-style-type: none"> VTA evaluation results described in fact sheet (Task 4.1), presentations (Task 4.2), practice standards (Task 4.3), journal article (Task 4.4), and final report (Task 1.4) 			

Tasks, Objectives and Schedules				
Task 4	Outreach			
Costs	\$2,870			
Objective	To provide the results of the VTAs' effectiveness and evaluation to pork producers, natural resource agencies, and others involved in animal waste management.			
Subtask 4.1	If VTA effectiveness is confirmed, TWRI and USDA-ARS will develop and distribute a fact sheet summarizing the results of the VTA evaluation.			
	Start Date	Month 1	Completion Date	Month 16
Subtask 4.2	USDA-ARS and TWRI will present results to the Pork Producers Association, State and National meetings, and at other venues as needed to disseminate the results of the VTA effectiveness study.			
	Start Date	Month 1	Completion Date	Month 16
Subtask 4.3	If VTA use is shown to be an effective practice, TWRI, TSSWCB, and USDA-ARS will work with USDA-NRCS and TCEQ to incorporate results into practice standards and achieve acceptance of this practice for meeting required environmental safeguards.			
	Start Date	Month 1	Completion Date	Month 16
Subtask 4.4	USDA-ARS, TWRI, and SAML will draft a journal article describing the evaluation and its results.			
	Start Date	Month 1	Completion Date	Month 16
Deliverables	<ul style="list-style-type: none"> Fact Sheet Presentation(s) to Pork Producers Association and State and National meetings Revised practice standards/environmental requirements, if appropriate DRAFT refereed journal publication 			

Project Goals (Expand from Summary Page)

Goal: Reduce bacteria and nutrient runoff from small pork operations

Objectives:

- 1) Demonstrate and evaluate VTA effectiveness at small pork operations.
- 2) Transfer findings to natural resource agencies and pork producers

Measures of Success (Expand from Summary Page)

To achieve the goals of this project, the project team will 1) evaluate the effectiveness of VTAs in reducing bacteria and nutrient runoff from three evaluation sites and one demonstration site, 2) ensure data of known and acceptable quality are collected utilizing established methods, 3) transfer results from VTA effectiveness evaluation/demonstration to landowners, natural resource agencies and others involved in animal waste management through presentations, a fact sheet and a refereed publication, and 4) pursue incorporation of findings, as appropriate, into practice standards and program guidance of natural resource management agencies.

2012 Texas NPS Management Program Reference (Expand from Summary Page)

Components, Goals, and Objectives

Component 1 – Explicit short- and long-term goals, objectives and strategies that protect surface and ground water.

- Long-Term Goal – Objective 2 – Support the implementation of state, regional, and local programs to prevent NPS pollution through assessment, implementation, and education.
- Short-Term Goal 2 – Implementation – Objective B – Develop and implement BMPs to address constituents of concern or waterbodies not meeting water quality standards in watersheds identified as impacted by NPS pollution.

Component 2 – Working partnerships and linkages to appropriate state, regional, and local entities, private sector groups, and federal agencies

Component 4 – Abatement of water quality impairments from NPS pollution and prevention of significant threats to water quality from present and future NPS activities

**EPA State Categorical Program Grants – Workplan Essential Elements
 FY 2011-2015 EPA Strategic Plan Reference**

Strategic Plan Goal – Goal 2 Protecting America’s Waters

Strategic Plan Objective – Objective 2.2 Protect and Restore Watersheds and Aquatic Ecosystems

Part III – Financial Information

Budget Summary	
Category	Costs
Personnel	\$ 7,440
Fringe Benefits	\$ 2,338
Travel	\$ 1,200
Equipment	\$ 0
Supplies	\$ 2,632
Contractual	\$ 10,344
Construction	\$ 0
Other	\$ 1,000
Total Direct Costs	\$ 24,954
Indirect Costs (≤15%)	\$ 3,743
Total Project Costs	\$ 28,697

Budget Justification		
Category	Total Amount	Justification
Personnel	\$ 7,440	<ul style="list-style-type: none"> • Principle Investigator K. Wagner at Texas Water Resources Institute (TWRI), \$83,238 annually at 0.48 months (\$3,429). • Program Manager, \$74,767 annually at 0.14 months (\$924). • SCSC/SAML Technician, \$36,041 annually at 0.80 months (\$2,472). • Quality Assurance Officer, \$61,475 annually at 0.12 months (\$615).
Fringe Benefits	\$ 2,338	Per TAMU System benefits rates, the fringe rate for full-time employees is calculated at 18% of salaries and insurance is calculated at \$647/month
Travel	\$ 1,200	Transportation, lodging for four nights at \$106/night and per diem for four days at \$61/day at the state rates for PI out-of-state travel to soil and water conservation professionals at the SWCS Annual Conference in Louisville, KY (\$1,200)
Equipment	\$ 0	N/A
Supplies	\$ 2,632	SCSC SAML lab supplies: 94 samples at \$28 per sample
Contractual*	\$ 10,344	USDA-ARS subcontract
Construction	\$ 0	N/A
Other	\$ 1,000	Publication costs & SWCS conference registration
Indirect	\$ 3,743	15% of federal MTDC (\$24,954)

Contractual Budget Justification – USDA-ARS		
Category	Total Amount	Justification
Personnel	\$ 0	N/A
Fringe Benefits	\$ 0	N/A
Travel	\$ 3,537	<ul style="list-style-type: none"> In-state travel includes 25 trips to sites and the lab at \$0.555/miles rate; 154 miles round-trip (\$2,137) Out-of-state travel is for one trip to a regional/national meeting to present results (\$1,400)
Equipment	\$ 0	N/A
Supplies	\$ 1,600	<ul style="list-style-type: none"> Repairs and supplies needed for repairing sampling equipment
Contractual*	\$ 0	N/A
Construction	\$ 0	N/A
Other	\$ 3,858	<ul style="list-style-type: none"> Soil sampling and soil and water analysis (\$3,858)
Indirect	\$ 1,349	15% of total federal direct costs.