



**Texas State Soil and Water Conservation Board
 State Nonpoint Source Grant Program
 FY 2017 Workplan 17-51**

SUMMARY PAGE			
Title of Project	Phase 2: Development of a Watershed Protection Plan for Lake Lavon		
Project Goals	The goal of this project is to coordinate the development of a stakeholder-driven watershed protection plan for Lake Lavon that satisfies EPA's nine elements, while promoting enhanced stakeholder participation throughout the process and forward into the implementation phase to more rapidly achieve water quality improvement outcomes; and to advance spatially explicit analytical tools for estimating the likely distribution of pollutant sources in the watershed and their potential impact on in-stream water quality to improve implementation strategies and optimize resource utilization.		
Project Tasks	(1) Project Administration; (2) Facilitate and Promote Watershed Protection Plan Development		
Measures of Success	<ul style="list-style-type: none"> Development, submission, and local, state, and federal agency acceptance of a completed Watershed Protection Plan for Lake Lavon. Improvement to spatially explicit analytic tools for use in data collection and WPP development. 		
Project Type	Implementation (); Education (X); Planning (X); Assessment (X); Groundwater ()		
Status of Waterbody on 2014 Texas Integrated Report	<u>Segment ID</u> 0821; 0821A; 0821B; 0821C; 0821D	<u>Parameter of Impairment or Concern</u> Bacteria	<u>Category</u> 0821C (5c) 0821D (5c)
Project Location (Statewide or Watershed and County)	Lake Lavon in Collin, Grayson, Fannin, and Hunt Counties		
Key Project Activities	Hire Staff (); Surface Water Quality Monitoring (X); Technical Assistance (X); Education (X); Implementation (); BMP Effectiveness Monitoring (); Demonstration (); Planning (X); Modeling (X); Bacterial Source Tracking (); Other ()		
2012 Texas NPS Management Program Reference	<ul style="list-style-type: none"> Component One – LTGs 1, 6, 7, 8 Component One – STGs 1C, 1D, 3D, 3G Components Two & Four 		
Project Costs	\$149,223		
Project Management	<ul style="list-style-type: none"> Texas A&M AgriLife Extension Service, Department of Soil and Crop Sciences 		
Project Period	February 1, 2017 – October 31, 2018		

Part I – Applicant Information

Applicant							
Project Lead		Jake Mowrer					
Title		Extension Specialist and Asst. Professor, Department of Soil and Crop Sciences					
Organization		Texas A&M AgriLife Extension Service					
E-mail Address		jake.mowrer@tamu.edu					
Street Address		Extension Soil and Crop Sciences 2474 TAMU					
City	College Station	County	Brazos	State	TX	Zip Code	77843-2474
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Project Co-Lead		Raghupathy Karthikeyan					
Title		Associate Professor					
Organization		Texas A&M AgriLife Research					
E-mail Address		karthi@tamu.edu					
Street Address		Biological and Agricultural Engineering Department 2117 TAMU					
City	College Station	County	Brazos	State	Texas	Zip Code	77843
Telephone Number	979-845-7951			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 and TCEQ.
Texas A&M AgriLife Extension Service, Department of Soil and Crop Sciences (Extension)	Provide project administration and coordination, project reporting, and assistance for stakeholder relations. Support WPP development by providing technical review of documents.
TAMU Spatial Sciences Laboratory (SSL)	Deliver results of land use/land cover analysis to project partners and stakeholders
Texas A&M AgriLife Research, Department of Biological and Agricultural Engineering (BAEN)	Deliver results of improved SELECT analysis, LDC development, and load reduction estimations to project partners and stakeholders.
North Texas Municipal Water District (NTMWD)	Deliver results of water quality monitoring. Serve as watershed coordinator, provide assistance for stakeholder relations, and guide the development of the WPP.

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.						
If yes, identify the agency/group that developed and/or approved the document.				Year Developed		

Watershed Information					
Watershed or Aquifer Name(s)	Hydrologic Unit Code (12 Digit)		Segment ID	Category on 2014 IR	Size (Acres)
Lake Lavon	120301060101	120301060102	0821 0821A 0821B 0821C 0821D	0821C (5c) 0821D (5c)	491,520
	120301060103	120301060104			
	120301060105	120301060201			
	120301060202	120301060203			
	120301060204	120301060205			
	120301060206	120301060207			
	120301060208	120301060301			
	120301060302	120301060303			
	120301060304	120301060305			
	120301060306	120301060307			

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>2014 Texas Integrated Report</i> , Clean Rivers Program Basin Summary/Highlights Reports, or other documented sources.
<p>Lake Lavon (Segment 0821) is a 491,520-acre watershed in the Trinity River basin with a concern for nitrate. Two major tributaries to Lake Lavon, Wilson Creek (Segment 0821C) and the East Fork of the Trinity River above Lake Lavon (Segment 0821D), are identified as impaired on the 2012 303(d) list due to bacteria. Data used for the 2012 Integrated Report were 24 samples for Wilson Creek and 17 samples for the East Fork of the Trinity River above Lake Lavon, taken during the 7-year period between December 2003 and November 2010. The geometric mean of these data for <i>E. coli</i> bacteria was 181 colony forming units per 100 milliliters (cfu/100 mL) for Wilson Creek and 168 cfu/100mL for the East Fork of the Trinity River above Lake Lavon, which exceed the state standard of 126 cfu/100 mL.</p> <p>The 2012 Texas Integrated Report lists the sources of the bacteria impairment for Wilson Creek and the East Fork of the Trinity River above Lake Lavon as unknown. The Integrated Report also lists the source of nitrate in Lake Lavon as unknown. However, the 2014 Trinity River Basin Highlights Report identified Wilson Creek and the East Fork of the Trinity River above Lake Lavon as not supporting their contact recreation designated use due to bacteria impairment and indicated the cause of impairment may be due to livestock and runoff from agricultural lands in the watershed. The Basin Highlight Report also indicated that the nitrate concern in lower Lake Lavon could be due to naturally occurring nutrients in sediment buildup from tributaries feeding into the lake.</p> <p>There are eleven wastewater treatment plants in the watershed. All but one of these facilities, the Wilson Creek</p>

Regional WWTF, are identified as minor discharges by the National Pollutant Discharge Elimination System (NPDES) and have a design flow of <1 MGD. The Wilson Creek WWTF, operated by the NTMWD, discharges directly into Lake Lavon and has an average daily discharge rate of 64 MGD. Also located in the watershed is Melissa Feeders, a concentrated animal feeding operation (CAFO) located approximately 4 miles east of Mellisa, TX. This facility is focused on beef production. There are no other permitted point sources of bacteria or nutrients in the watershed.

Project Narrative

Problem/Need Statement

Lake Lavon was selected due to identification of two major tributaries, Wilson Creek and the East Fork of the Trinity River on Lake Lavon, on the 2012 303(d) list as impaired for *E. coli* bacteria (geometric mean = 181 and 168 cfu/100mL, respectively). The 2014 Trinity River Basin Highlights Report identified nonpoint source runoff as the likely cause of these impairments. The 491,520 acre watershed is made up primarily of rural and agricultural lands with intermittent small acreage home sites however, there is significant urban development in the Wilson Creek portion of the watershed. Major agricultural uses include livestock grazing, hay and forage production, and row crop grain production.

Potential point sources of bacteria in the watershed include eleven wastewater treatment plants. All but one of these facilities, the Wilson Creek Regional WWTF, are identified as minor discharges by the National Pollutant Discharge Elimination System (NPDES) and have a design flow of <1 MGD. The Wilson Creek WWTF discharges directly into Lake Lavon, and thus does not contribute bacteria to the impaired segments (0821C and 8021D). Also located in the watershed is Melissa Feeders, a concentrated animal feeding operation (CAFO) located approximately 4 miles east of Mellisa, TX. In addition, the Wilson Creek portion of watershed, along with the western banks of Lake Lavon, captures a stormwater runoff from several cities in Collin County (McKinney, Fairview, Allen, etc). Stormwater from these areas is regulated under Phase II MS-4 permitting.

This project will result in the development of a WPP by local stakeholders with guidance and support from NTMWD and state agencies. Efforts will focus on all nonpoint sources potentially contributing to the current impairment, while at the same time looking ahead at possible future issues and needs to protect the watershed. The WPP will identify strategies and management practices using an improved version of SELECT that if implemented will achieve the goals of water quality improvement and watershed protection.

Watershed protection plans in Texas have relied on the Spatially Explicit Load Enrichment Calculation Tool (SELECT) to identify potential sources of pollution and their likely distribution in a watershed. SELECT has become a key component of the WPP development process, determining and prioritizing implementation activities. However, with limited available implementation resources there is a need to develop more effective and efficient WPP implementation strategies.

In order to better facilitate efficient WPP implementation, Texas A&M AgriLife Research is working to improve the capabilities of SELECT. Currently, SELECT is capable of identifying the number and likely distribution of potential pollutant sources in a watershed. Improvements are being made to SELECT that incorporate the physical and hydrologic characteristics of the watershed to determine the likely effect of potential pollutant sources on in-stream water quality. These new capabilities will allow for the simulated implementation of combined management measures to determine the most effective and efficient implementation strategy which in turn, will help identify the best use of implementation resources.

This project will refine and utilize the improved capabilities of the SELECT in tandem with the development of a WPP for Lake Lavon. This project is unique in that it will utilize improved analytical methods to help stakeholders and agency partners develop a more effective and efficient implementation strategy. This project presents a substantial opportunity to serve as a model for future watershed protection planning efforts by demonstrating the potential for

successful WPP development using a more detailed analytical approach and incorporating a greater degree of detail into the implementation strategy.

Project Narrative

General Project Description (Include Project Location Map)

This project will coordinate the development of a stakeholder driven watershed protection plan for Lake Lavon that meets EPA guidelines for acceptance, with the fundamental purpose being to improve the development process by pioneering an improved method for analyzing pollutant sources in the watershed and their potential impact on in-stream water quality. Combined with the expedited development approach demonstrated by the Mill Creek project, this will allow stakeholders and agency partners to identify the most effective and efficient implementation strategy and maintain momentum moving forward into the implementation phase.

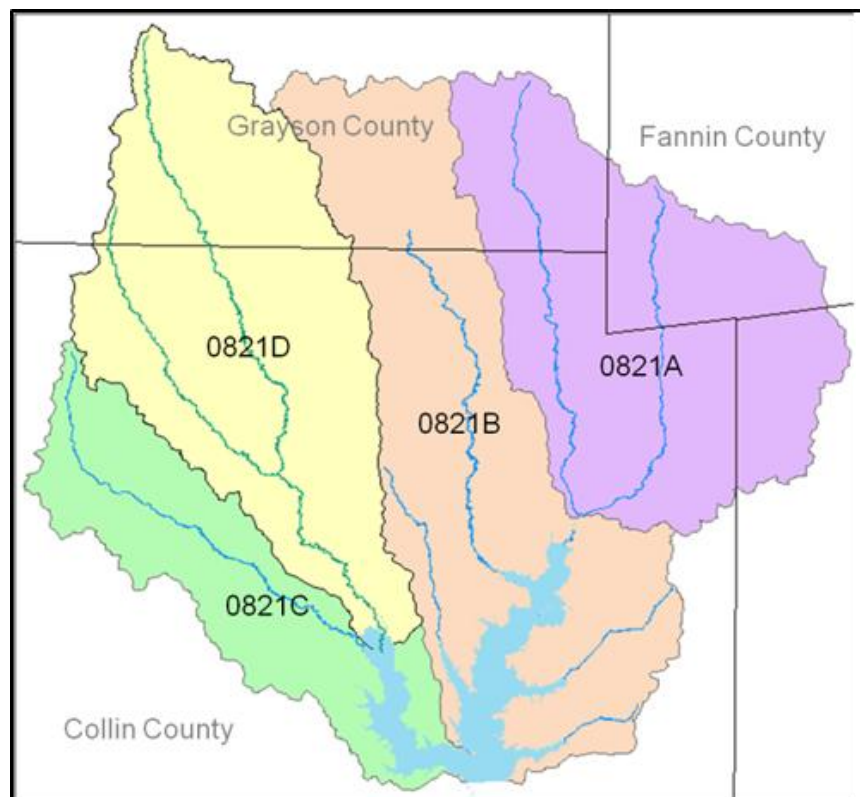
The NTMWD, in cooperation with Extension, will facilitate the stakeholder-driven plan development process with support from the Texas State Soil and Water Conservation Board (TSSWCB) and Trinity River Authority (TRA). Public meetings will be held to create a local Partnership and a steering committee formed with representatives from all major stakeholder groups in the watershed, including landowners, business owners, agricultural producers, city and county officials, and homeowners. The steering committee will serve as the decision making body for the Partnership, receiving support from partner agencies.

As part of this effort, Texas A&M Research/BAEN make improvements to the Spatially Explicit Load Enrichment Calculation Tool (SELECT). Additional physical, chemical, and biological inputs will be incorporated into SELECT that will allow it to model fate and transport of bacteria in the watershed. This will allow for more accurate identification of pollutant sources and their potential impact on in-stream water quality. Furthermore, these improvements will make SELECT capable of simulating the effect of implementation measures, thereby aiding in the development of an effective and efficient implementation strategy. In addition, SELECT will be upgraded for compatibility with QGIS, a widely used, open-source geographic software.

Twelve months of supplemental water quality data gathered by the NTMWD via targeted monitoring at selected locations in the watershed will be used to calibrate and validate the aforementioned improved version of SELECT and better enable selection, design, and targeted application of implementation measures. The TAMU SSL will continue conduct land use/land cover analysis with field validation and deliver the results for incorporation into the WPP. Texas A&M Research/BAEN will deliver LDCs and load reduction estimates. In addition, BAEN will use the improved SELECT analysis to distribute potential loads by source across sub-watersheds and evaluate their potential impact on in-stream water quality; this will help determine the most effective and efficient implementation strategy recommended in the WPP.

The intent of this project is to enhance the analytical methods used in WPP development and demonstrate the capabilities of improved SELECT in identifying and allocating best implementation resources. Watershed characteristics such as hydrology, distance from source to creek, hydrologic connectivity, slope, elevation, and land cover will be incorporated into an improved version of SELECT as part of this project to more closely identify the potential impact of pollutant sources on in-stream water quality. Implementation strategies based on this improved model will be incorporated into the WPP. Furthermore, it will allow stakeholders and agency partners to determine the most efficient use of implementation resources. Prioritizing implementation measures and resources in this manner will demonstrate how water quality management entities can have a greater impact on water quality.

This project will result in the development of a comprehensive WPP that addresses all potential sources of pollution and identifies an implementation strategy that has the greatest potential for addressing water quality issues in the watershed. The analytical tools and methods developed through this project will be made available to the public and serve as a model not only for future watershed planning projects but also for improving and updating existing WPPs.



Lake Lavon HUC 4 sub-watersheds

Tasks, Objectives and Schedules				
Task 1	Project Administration			
Costs	\$18,584			
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	Texas A&M AgriLife Extension Service 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 January, April, July and October. QPRs shall be distributed to all Project Partners.			
	Start Date	Month 01	Completion Date	Month 21
Subtask 1.2	Texas A&M AgriLife Extension Service will perform accounting functions for project funds and will submit appropriate Reimbursement Forms to TSSWCB at least quarterly.			
	Start Date	Month 01	Completion Date	Month 21
Subtask 1.3	Texas A&M AgriLife Extension Service 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. Texas A&M AgriLife Extension Service will develop lists of action items needed following each project coordination meeting and distribute to project personnel.			
	Start Date	Month 01	Completion Date	Month 21
Subtask 1.4	Texas A&M AgriLife Extension Service 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 01	Completion Date	Month 21
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	Watershed partnership facilitation and protection plan development.		
Costs	\$110,639		
Objective	NTMWD, in coordination with Texas A&M AgriLife Extension, will work with local stakeholders and partner agencies to develop a watershed protection plan for Lake Lavon based on improvements to the SELECT model.		
Subtask 2.1	NTMWD, in coordination with Texas A&M AgriLife Extension, will lead public education efforts for the project, including mass media (newspaper, radio), development of a project website (in cooperation with Texas A&M AgriLife Extension Service), educational programs (to include one Texas Watershed Stewards event Texas A&M AgriLife Extension Service), etc.		
	Start Date	Month 01	Completion Date Month 21
Subtask 2.2	NTMWD, in coordination with Texas A&M AgriLife Extension, will facilitate public, steering committee, and partnership meetings to support development of a watershed protection plan for Lake Lavon.		
	Start Date	Month 01	Completion Date Month 21
Subtask 2.3	SSL and BAEN will work with NTMWD and Texas A&M AgriLife Extension to deliver the results of the work performed in TSSWCB Project 16-62 to local stakeholders.		
	Start Date	Month 01	Completion Date Month 21
Deliverables	<ul style="list-style-type: none"> • Meeting agendas • Meeting attendance lists • News releases and meeting announcements • Draft watershed protection plan • Final watershed protection plan 		

Tasks, Objectives and Schedules			
Task 3	Improve capabilities of SELECT		
Costs	\$20,000		
Objective	BAEN will update SELECT using python to provide a higher level of detail to the implementation strategy		
Subtask 3.1	Texas A&M AgriLife Research will work to improve the capabilities of SELECT. Currently, SELECT is capable of identifying the number and likely distribution of potential pollutant sources in a watershed. Improvements are being made to SELECT that incorporate the physical and hydrologic characteristics of the watershed to determine the likely effect of potential pollutant sources on in-stream water quality. SELECT Graphical User Interface (GUI) was developed using Visual Basic (VB) and relies on ArcGIS software to perform its analysis. Recent versions of ArcGIS no longer support VB programming, making SELECT nonfunctional when using ArcGIS version 10.2 or later. Therefore, as part of this project, Texas A&M AgriLife Research will reprogram SELECT software using Python 2.7, which is the current ArcGIS programming language.		
	Start Date	Month 01	Completion Date Month 21
Deliverables	<ul style="list-style-type: none"> • Updated SELECT using Python coding for compatibility with ArcGIS 		

Project Goals (Expand from Summary Page)

To coordinate development of a watershed protection plan for Lake Lavon that satisfies EPA's nine elements and makes efficient use of implementation resources as a result of improvements to the SELECT model.

Measures of Success (Expand from Summary Page)

Measures of success include completion and formal acceptance by local stakeholders and state and federal agencies of a locally developed, comprehensive watershed protection plan for Lake Lavon. Improvements to the SELECT model that can be documented and brought forward for future Watershed Protection Plans will be considered additional measures of success.

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...water
LTG: To protect and restore water quality from NPS pollution through assessment, implementation and education
Focus NPS abatement efforts ...and available resources in watersheds identified as impacted by NPS pollution.
Develop partnerships, [and] relationships ...to facilitate collective, cooperative approaches to manage NPS pollution.
Increase overall public awareness of NPS issues and prevention activities.
Enhance public participation and outreach by providing forums for...ideas and concerns about the water quality management process.
STG One – Data Collection and Assessment: Coordinate with appropriate federal, state, regional, and local entities, and stakeholder groups to target water quality assessment activities...where additional information is needed.
Objective C – Conduct special studies to determine sources of NPS pollution and gain information to target water quality planning and BMP implementation.
Objective D – Develop TMDLs, I-Plans, and WPPs to maintain and restore water quality in water bodies identified as impacted by NPS pollution.
STG Three – Education: Conduct education and technology transfer activities to help increase awareness of NPS pollution and activities which contribute to the degradation of water bodies... by NPS pollution.
Objective D – Conduct outreach through the CRP, AgriLife Extension, SWCDs, and others to enable stakeholders and the public to participate in decision-making...complete understanding... to each citizen.
Objective G – Implement public outreach and education to restore water quality in water bodies impacted by NPS pollution.

Component 2 – Working partnerships... to appropriate State, ...regional, and local entities, private sector groups, and Federal agencies.

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

Part III – Financial Information

Category	Total
Personnel	\$ 14,342
Fringe Benefits	\$ 4,298
Travel	\$ 3,852
Equipment	\$ 0
Supplies	\$ 1,500
Contractual	\$ 98,545
Construction	\$ 0
Other	\$ 20,076
Total Direct Costs	\$ 142,613
Indirect Costs (≤ 15%)	\$ 6,610
Total Project Costs	\$ 149,223

Budget Justification Texas A&M Extension Service		
Category	Total Amount	Justification
Personnel	\$ 14,342	1 Assistant Professor (salary \$76,127, 10.55% FTE) 1 Program Specialist (salary \$63,119, 10% FTE)
Fringe Benefits	\$ 4,298	Fringe benefits are calculated at a rate of 17.8% of salary to cover FICA, UCI, WCI, and retirement. An additional amount of \$695/month (prorated by % FTE) is calculated for group medical insurance. These estimates are in accordance with the TAMUS Office of Budget and Accounting estimating procedures established for FY2013.
Travel	\$ 3,852	Travel to the watershed to perform project tasks. \$1,500 Travel to meetings and for professional development. \$ 2,352
Equipment	\$ 0	N/A
Supplies	\$ 1,500	Office & Printing supplies (\$1,500)
Contractual*	\$ 98,545	Texas A&M AgriLife Research
Construction	\$ 0	N/A
Other	\$ 20,076	Graduate Student Tuition and Fees (SCSC \$9,727), WPP production costs (\$7,500), watershed tour (\$1,000); cell phone service plan \$40/ mo; \$840); Computer services (\$259), conference fees (\$750)
Indirect	\$ 6,610	15% of Modified Total Direct Cost

Budget Justification Texas A&M AgriLife Research		
Category	Total Amount	Justification
Personnel	\$ 63,792	1 Associate Professor (salary \$130,680, 0.17 FTE) 1 Professor (salary \$185,000, 0.11452 FTE) 1 Graduate Student (salary \$40,800, 0.5 FTE)
Fringe Benefits	\$ 14,190	Fringe benefits are calculated at a rate of 17.8% of salary to cover FICA, UCI, WCI, and retirement. An additional amount of \$695/month (prorated by % FTE) is calculated for group medical insurance. These estimates are in accordance with the TAMUS Office of Budget and Accounting estimating procedures established for FY2013.
Travel	\$ 1,032	Travel for conferences \$ 1,032
Equipment	\$ 0	N/A
Supplies	\$ 0	N/A
Contractual*	\$ 0	N/A
Construction	\$ 0	N/A
Other	\$ 6,677	Conference registration (\$968); Graduate Student Tuition and Fees (BAEN \$5,709)
Indirect	\$ 12,854	15% of Total Direct Cost