Texas State Soil and Water Conservation Board
State Nonpoint Source Grant Program
FY 2016 Workplan 16-62

SUMMARY PAGE			
Title of Project	Data Collection and Development of Essential Components to Support the Development of a Watershed Protection Plan for Lake Lavon		
Project Goals	The goal of this project is to coordinate data collection and analysis that will be used to develop a stakeholder-driven watershed protection plan for Lake Lavon using new and advanced 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 better identify the most effective implementation strategy and more efficiently utilize implementation resources.		
Project Tasks	(1) Project Administration; (2) Quality Assurance; (3) Develop New and Improved Pollutant Source Analysis; (4) Water Quality Monitoring and Data Analysis; (5) Watershed Partnership Facilitation.		
Measures of Success	• Baseline work that will be used to develop a Watershed Protection Plan for Lake Lavon.		
Project Type	Implementation ( ); Education (X); Planning (X); Assessment (X); Groundwater ( )		
Status of Waterbody on *2012 Texas Integrated Report*	Segment ID 0821; 0821A; 0821B; 0821C; 0821D	Parameter of Impairment or Concern Bacteria	Category 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	Component One – LTGs 1, 6, 7, 8 Component One – STGs 1C, 1D, 3D, 3G Components Two & Four		
Project Costs	$220,448		
Project Management	• Texas A&M AgriLife Extension Service, Department of Soil and Crop Sciences		
Project Period	February 1, 2016 – April 30, 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						
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City	College Station	County	Brazos	State	Texas	Zip Code	77843
Telephone Number	979-845-2425			Fax Number	979-845-0604		

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)	Conduct land use/land cover analysis.
Texas A&M AgriLife Research, Department of Biological and Agricultural Engineering (BAEN)	Conduct SELECT analysis, develop LDCs, and determine load reduction estimations.
North Texas Municipal Water District (NTMWD)	Conduct targeted water quality monitoring. Serve as watershed coordinator, provide assistance for stakeholder relations, and support 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 *Texas Coastal NPS Pollution Control Program*, or (f) the *Texas Groundwater Protection Strategy*?			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 2012 IR	Size (Acres)
Lake Lavon	120301060101 120301060102 120301060103 120301060104 120301060105 120301060201 120301060202 120301060203 120301060204 120301060205 120301060206 120301060207 120301060208 120301060301 120301060302 120301060303 120301060304 120301060305 120301060306 120301060307	0821 0821A 0821B 0821C 0821D	0821C (5c) 0821D (5c)	198,981

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: *2012 Texas Integrated Report*, Clean Rivers Program Basin Summary/Highlights Reports, or other documented sources.

Lake Lavon (Segment 0821) is a 198,981-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 *E. coli* 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.

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.

There are eleven wastewater treatment plants in the watershed. 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, 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

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.

To address this issue, 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.

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. This will enable SELECT to function using ArcGIS now and into the future.

This project will refine and utilize the improved capabilities of the SELECT by supporting 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 will 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.

Lake Lavon was selected due to identification of two major tributaries, Wilson Creek and the East Fork of the Trinity River abv 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 198,981 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 Mellissa, 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.

These characteristics make it an ideal candidate for WPP development. Furthermore, the unique hydrography and hydrology of the East Fork of the Trinity River above Lake Lavon make the Lake Lavon WPP effort ideal for refining and testing the improved capabilities of SELECT described above.

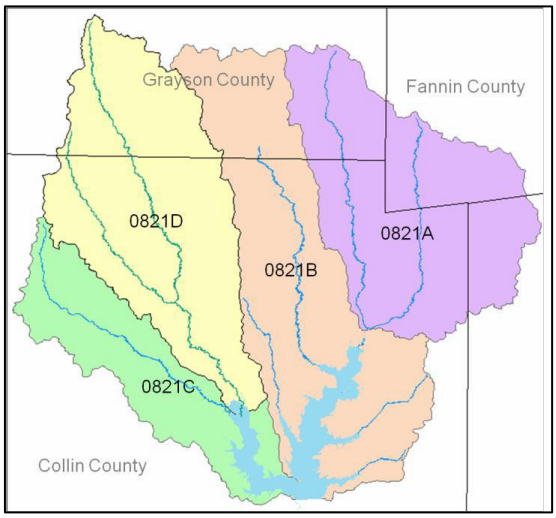
Project Narrative

General Project Description (Include Project Location Map)

This project will provide critical supporting data and information necessary for development of a stakeholder-driven watershed protection plan for Lake Lavon that satisfies EPA's nine elements for acceptance, while also developing new and improved pollutant source analysis tools (i.e. Improved SELECT) that will benefit other watershed planning efforts. Baseline data collection, including land use and land cover, Spatially Explicit Load Enrichment Calculation Tool (SELECT) analysis, flow and load duration curve development, load reduction determinations, and targeted water quality monitoring will be conducted as part of this project and in advance of the plan development process with stakeholders. This will allow all major components of essential data to be preemptively collected, analyzed, and prepared for delivery to stakeholders in an organized and efficient manner that maintain continuity of process.

The NTMWD, in cooperation with Texas A&M AgriLife Extension, will initiate a stakeholder-driven plan development process with support from the Texas State Soil and Water Conservation Board (TSSWCB). 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.

Texas A&M AgriLife Research/BAEN will 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 reprogramed for compatibility with new versions of ArcGIS, which are a necessary component of analysis.



The NTMWD will lead collection of eighteen months of supplemental water quality data through targeted monitoring at selected locations in the watershed. Sites will be selected based on watershed characteristics and input from initial public meetings with key stakeholders. These data 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 conduct land use/land cover analysis with field validation. Texas A&M Research/BAEN will develop LDCs and load reduction estimates. In addition, BAEN will use the improved SELECT analysis to distribute potential loads by source across subwatersheds and evaluate their potential impact on in-stream water quality; this will help determine the most effective and efficient implementation strategy.

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. This will allow for the development of an implementation strategy that identifies the combination of management measures and priority implementation areas that have the greatest potential to improve water quality. 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 an improved version of SELECT and the formation of a Watershed Partnership to support development of a WPP for Lake Lavon. 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 WWPs.

Proposed Monitoring Locations

Site	Description
20	White Rock Creek at Snider Ln in Lucas, TX
19	Ticky Creek at CR-392 in Collin County
18	Pot Rack Creek at CR-572 in Collin County
17	Arnold Creek at CR-618 in Collin County
16	Upper Indian Creek at CR-622 in Collin County
15	Headwaters Pilot Grove Creek at CR-584 in Collin County
14	Lower Pilot Grove Creek at CR-574 in Collin County
13	Headwaters Sister Grove Creek at CR-475 in Collin County
12	Lower Sister Grove Creek at FM-1377 in Collin County
11	Upper Wilson Creek at Virginia Pkwy in McKinney, TX
10	Lower Wilson Creek at Orr Road in Allen, TX
9	East fork of the Trinity at County Road 177 in Collin County
8	Whites Creek at Hwy 455 in Collin County
7	East fork of the Trinity at County Road 210 in Collin County
6	Honey Creek at County Road 170 in Collin County
5	Slayter Creek at Hwy 75
4	East fork of the Trinity River at Hwy 75
3	Honey Creek at Hwy 75
2	East fork of the Trinity at Hwy 331
1	East fork of the Trinity at FM 546

Tasks, Objectives and Schedules				
Task 1	Project Administration			
Costs	$7,680			
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	Extension, in coordination with project partners, will prepare electronic quarterly progress reports (QPRs) for submission to the TSSWCB. QPRs shall document all activities performed within a quarter and shall be submitted by the 15th of December, March, June and September. QPRs shall be distributed to all Project Partners.			
	Start Date	Month 1	Completion Date	Month 27
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 27
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 27
Subtask 1.4	Extension 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 27
Deliverables	• 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	$10,000			
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	The NTMWD and SSL along with BAEN will develop a QAPPs (2) for activities in Task 3 and 4 consistent with the most recent versions of *EPA Requirements for Quality Assurance Project Plans (QA/R-5)* and the *TSSWCB Environmental Data Quality Management Plan*. All monitoring procedures and methods prescribed in the QAPP shall be consistent with the guidelines detailed in the *TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue (RG-415)* and *Volume 2: Methods for Collecting and Analyzing Biological Assemblage and Habitat Data (RG-416)*. [Consistency with Title 30, Chapter 25 of the Texas Administrative Code, *Environmental Testing Laboratory Accreditation and Certification*, 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	The NTMWD, SSL, and BAEN will implement approved QAPPs, and will submit revisions and necessary amendments as needed.			
	Start Date	Month 2	Completion Date	Month 27
Deliverables	• 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	Develop new and improved pollutant source analysis.			
Costs	$33,000			
Objective	Improve the capabilities and functions of SELECT software and analysis.			
Subtask 3.1	BAEN will develop software that will allow SELECT to incorporate aspects of fate and transport of bacteria into its analysis and prioritize areas of concern based on actual loads.			
	Start Date	Month 1	Completion Date	Month 27
Deliverables	• Improved and updated SELECT software in ArcGIS using python coding.			

Tasks, Objectives and Schedules				
Task 4	Conduct water quality monitoring and data analysis to support development of a watershed protection plan.			
Costs	$154,134			
Objective	Conduct water quality monitoring and data analysis to support development of the Lake Lavon Watershed Protection Plan, including evaluation and prioritization of best management practices to improve water quality.			
Subtask 4.1	The NTMWD will conduct in-stream water quality monitoring at 20 target locations on a monthly basis for 18 months for selected parameters, analyze and report the data, and participate in Partnership meetings to share and interpret results. NTMWD will transfer monitoring data to TCEQ for inclusion in the SWQMIS at lease quarterly.			
	Start Date	Month 2	Completion Date	Month 27
Subtask 4.2	The SSL at TAMU will develop land use/landcover data at the subwatershed level appropriate for SELECT analysis and provide a detailed report of procedures and results for inclusion in the WPP.			
	Start Date	Month 2	Completion Date	Month 18
Subtask 4.3	The BAEN at TAMU will prepare flow and load duration curves, conduct improved SELECT analysis for bacteria, and provide a detailed report of the procedures and results for inclusion in the WPP.			
	Start Date	Month 2	Completion Date	Month 18
Deliverables	• Water quality data • Technical reports detailing water quality, land use/land cover analysis, and modeling results			

Tasks, Objectives and Schedules				
Task 5	Watershed partnership facilitation.			
Costs	$15,634			
Objective	Work with local stakeholders and partner agencies to form a watershed partnership and steering committee to support the development of a watershed protection plan for Lake Lavon.			
Subtask 5.1	NTMWD's watershed manager will serve as watershed coordinator and will be responsible for general oversight and coordination of WPP development.			
	Start Date	Month 1	Completion Date	Month 27
Subtask 5.2	NTMWD, in coordination with Extension, will facilitate development of a watershed partnership and steering committee to provide stakeholder input to support project activities.			
	Start Date	Month 1	Completion Date	Month 27
Subtask 4.3	NTMWD, in coordination with Extension, will facilitate public partnership meetings to support development of a watershed protection plan for Lake Lavon.			
	Start Date	Month 1	Completion Date	Month 27
Deliverables	• Meeting agendas • Meeting attendance lists • News releases and meeting announcements			

Project Goals (Expand from Summary Page)

- Coordinate data collection for development of a watershed protection plan for Lake Lavon.
- Develop new and improved pollutant source analysis to support effective and efficient implementation.

Measures of Success (Expand from Summary Page)

- Collection of necessary data and information for development of a watershed protection plan.
- Formation of a Watershed Partnership to support development of a WPP for Lake Lavon
- Development and application of an improved version of SELECT.

***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 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.

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	$7,650
Fringe Benefits	$2,188
Travel	$1,695
Equipment	$
Supplies	$
Contractual	$195,126
Construction	$
Other	$8,077
Total Direct Costs	$214,736
Indirect Costs (≤ 15%)	$5,712
Total Project Costs	$220,448

Budget Justification		
Category	Total Amount	Justification
Personnel	$ 7,650	Project director (1.2 months over 1-2.25 years = $7,650)
Fringe Benefits	$ 2,188	Fringe benefits are calculated at a rate of 17.8% of salary to cover FICA, UCI, WCI, and retirement. An additional $695/month (prorated by % FTE) is calculated for group medical insurance. Estimates are in accordance with TAMUS Office of Budget & Accounting procedures established for FY2016.
Travel	$ 1,695	Travel to watershed for stakeholder meetings (up to 3 trips x mileage @ State Rate for trips ranging from 500-600 miles roundtrip = $1,000); Travel to conference for Extension ($695)
Equipment	$ 0	
Supplies	$ 0	
Contractual*	$ 195,126	Water quality monitoring and analysis by NTMWD (77,134); Texas A&M AgriLife Research ($117,992)
Construction	$ 0	
Other	$ 8,077	Equipment or facility rental and user fees for Extension ($1,550); SCSC Graduate student tuition and fees ($6,527)**
Indirect	$ 5,712	Calculated at 15% of Modified Total Direct Cost plus 15% of the first $25,000 of the subcontractual (NTMWD) funds.

** Tuition costs are exempt from IDC.

***NTMWD Contractual Budget Justification**		
Category	Total Amount	Justification
Personnel	$ 26,396	Environmental Program Manager (15 hours per year, yr 1 = $1,214) Environmental Analyst (24 hours per year, yr 1 = $1,583) Environmental Supervisor (15 hours per year, yr 1 = $838) 2-3 Field Staff (576 hours per year, yr 1 = $22,761)
Fringe Benefits	$ 12,593	Fringe benefits are calculated at a rate of 40%-50% of salary to cover FICA, UCI, WCI , retirement and healthcare. Estimates are in accordance with NTMWD Office of Finance & Accounting procedures established for FY2016.
Travel	$ 1,725	Collection of water quality data (12 trips x mileage @ State Rate for trips ranging from 75-100 miles = $1,380); Attend watershed planning meetings (3 trips x mileage @ State Rate for trips ranging from 75-100 miles = $345)
Equipment	$ 20,000	Flow meter ($10,000); Data sondes ($10,000)
Supplies	$ 4,023	Calibration/sterilization chemicals ($200); Sampling supplies ($1,694); Safety gear ($700); GPS unit ($479); Horizontal water sampler w/cord (2 samplers x $475 ea. = $950);
Contractual*	$ 0	N/A
Construction	$ 0	N/A
Other	$ 12,397	Lab analysis ($30 per sample x 360 samples = $10,800); Equipment maintenance, repair, & inspection ($1,150); Data storage ($219); Quality assurance and safety costs ($228)
Indirect	$ 0	N/A

***Texas A&M AgriLife Research Contractual Budget Justification**		
Category	Total Amount	Justification
Personnel	$ 69,136	Project co-director (0.17 FTE 1-2.25 years = $29,681) Assistant Professor (0.1 FTE 1-2.25 years = $19,055) Graduate Research Assistant (0.5 FTE 1-2.25 years = $20,400)
Fringe Benefits	$ 11,190	Fringe benefits are calculated at a rate of 17.8% of salary to cover FICA, UCI, WCI, and retirement. An additional $695/month (prorated by % FTE) is calculated for group medical insurance. Estimates are in accordance with TAMUS Office of Budget & Accounting procedures established for FY2016.
Travel	$ 1,519	Travel to watershed for land use land cover reconnaissance and attend project meetings (SSL $1,519)
Equipment	$ 0	
Supplies	$4,046	Computer and software for BAEN ($2,000); Computer and software forSSL $2046);
Contractual*		
Construction	$ 0	
Other	$ 17,425	QAPP development ($3,500); Professional software development costs for BAEN ($6,000); Equipment for SSL ($952Conference fees ($1,500); BAEN Graduate student tuition and fees ($5,473)**
Indirect	$ 14,676	Calculated at 15% of Modified Total Direct Cost

** Tuition costs are exempt from IDC.

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