



**Texas State Soil and Water Conservation Board
 Clean Water Act Section 319(h) Nonpoint Source Program
 FY 2007 Project 07-11**

NONPOINT SOURCE SUMMARY PAGE for the CWA, Section 319(h) Agricultural/Silvicultural Nonpoint Source Program					
Title of Project:	Lampasas River Watershed Assessment and Protection Project				
Project Goals/Objectives:	1) To foster the development of a Lampasas River Watershed Protection Plan (WPP) by coordinated watershed assessment and analysis, stakeholder and public involvement, and education activities. 2) Compile and maintain a geo-database complete with watershed land use inventory and other assessment data. 3) Develop Load Duration Curves (LDCs) for the Lampasas River Watershed. 4) Conduct spatially explicit modeling (SELECT) to determine the extent of impairment and to support planning efforts. 5) Conduct informational and educational activities with Lampasas River Watershed landowners and other stakeholders. 6) Develop a WPP to address water quality issues and ensure the long-term health of the watershed.				
Project Tasks:	1) Lampasas River WPP Development and Project Administration. 2) Development of LDCs. 3) Watershed Inventory and Geographic Analysis 4) SELECT modeling. 5) Facilitate Implementation of WPP.				
Measures of Success:	<ul style="list-style-type: none"> Inventory, compilation and geographic analysis/modeling of watershed data to be used as an aid in stakeholder decision support – success measured by the accuracy and comprehensiveness of the land use and other data layers compiled, load duration curves developed, and spatially explicit (SELECT) modeling results derived. Documented educational / outreach activities – success measured by public participation as indicated by the attendance rosters at meetings, workshops and demonstration activities. Development of a comprehensive and sustainable WPP for the Lampasas River Watershed – success measured by the approval and acceptance of a WPP to be used for restoring and ensuring the designated uses of the Lampasas River are met. 				
Project Type:	Implementation (); Education (); Watershed Planning (X); Assessment (); Groundwater ()				
Status of Water Body: 2004 Water Quality Inventory and 303(d) List	<u>Segment ID:</u> 1217 Lampasas River above Stillhouse Hollow Lake 1217A Rocky Creek	<u>Parameter:</u> Bacteria Depressed dissolved oxygen	<u>Category:</u> 5c 5b		
Project Location:	Lampasas River Watershed in Bell, Burnet, Coryell, Hamilton, Lampasas, Mills, and Williamson Counties				
Key Project Activities:	Hire Staff (X); Monitoring (); Regulatory Assistance (); Technical Assistance (); Education (X); Implementation (); Demonstration (); Planning (X); Other ()				
NPS Management Program Elements:	Element 1 (STG 1D, STG 2A, STG 2D, STG 3D, STG 3F), Element 2, Element 4, Element 5				
Project Costs:	Federal:	\$498,422	Non-Federal Match:	\$332,281	Total: \$830,703
Project Management:	Texas Agricultural Experiment Station, Texas Cooperative Extension, and Texas State Soil and Water Conservation Board				
Project Period:	36 months – September 2007 through August 2010				

Part I – Applicant Information

Applicant							
Project Lead		Dennis Hoffman, Ph.D.					
Title		Senior Research Scientist					
Organization		Texas Agricultural Experiment Station – Blackland Research and Extension Center					
E-mail Address		dhoffman@brc.tamus.edu					
Street Address		720 E. Blackland Rd.					
City	Temple	County	Bell	State	TX	Zip Code	76502
Telephone Number		(254) 774-6040		Fax Number		(254) 774-6001	

Project Partners	
Names	Roles & Responsibilities
Dennis Hoffman, Ph.D. Principal Investigating Scientist ~ TAES-BREC	Project Administration and WPP facilitation and development
Monty Dozier, Ph.D. ~ TCE	Outreach/Education
Raghavan Srinivasan, Ph.D. Cooperating Investigating Scientist ~ TAMU-SSL	Land Use/Land Cover Inventory, Geographic Analysis (SELECT Modeling), and Database Development

Part II – Project Information

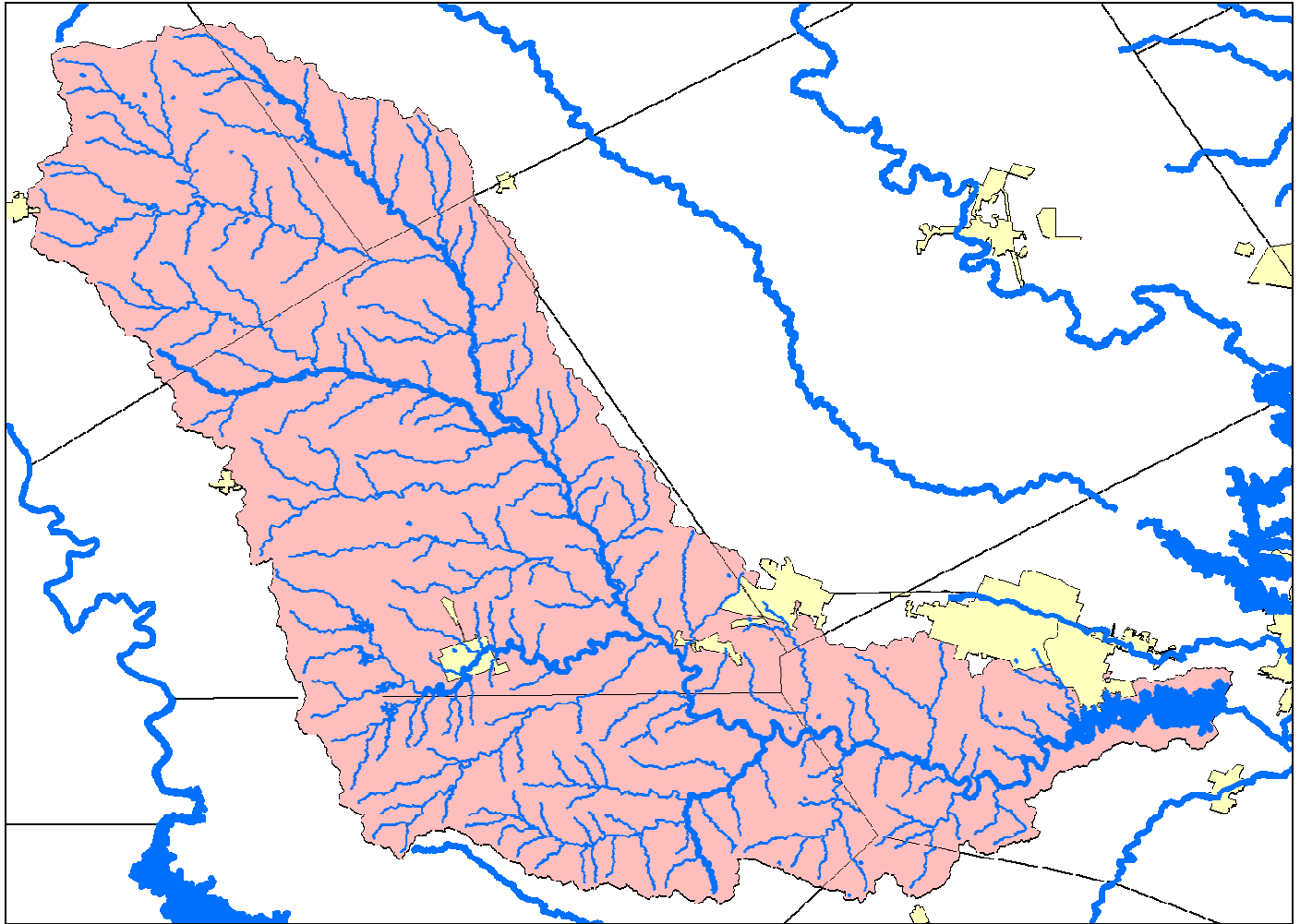
Project Type							
Surface Water	<input checked="" type="checkbox"/>	Groundwater	<input type="checkbox"/>				
Does the project implement recommendations made in a Watershed Protection Plan or TMDL Report or Implementation Plan?				Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
If yes, identify the document. (Approved or Draft)			N/A				
If yes, identify the agency/group that developed and/or approved the document.			N/A		Year Developed	N/A	

Watershed Information				
Watershed Name(s)	Hydrologic Unit Code (8 Digit)	Segment ID	305(b) Category	Size (Acres)
Lampasas River (Lampasas River above Stillhouse Hollow Lake, Rocky Creek, Sulphur Creek, Simms Creek, Stillhouse Hollow Lake)	12070203 (portion)	1217 1217A 1217B 1217C 1216	5c 2 2 2 2	839,800

Project Narrative

Problem/Need Statement

The Lampasas River (segment 1217 in the Brazos River Basin), rises in western Hamilton County 16 miles west of Hamilton and flows southeast for 75 miles, passing through Lampasas, Burnet, and Bell counties. In Bell County the river turns northeast and is dammed five miles southwest of Belton to form Stillhouse Hollow Lake (segment 1216). Below Stillhouse Hollow Lake, the Lampasas River flows to its confluence with Salado Creek and the Leon River to form the Little River.



The Lampasas River is characterized by relatively low water levels most of the time and is situated within a predominantly rural and agricultural landscape. Land use within the watershed is rural, with row crops and grasslands. Major agricultural interests include beef cattle on rangeland, and hay, wheat, oats, sorghum, corn, cotton, peanut, and pecan operations.

During periods of rainfall, bacteria (*E. coli*) originating from birds and mammals, livestock, inadequately treated sewage, and/or failing septic systems may be washed into the Lampasas River and its tributaries and have the potential to contribute to elevated bacteria densities; consequently, impairing recreational use of the waterbody. Bacteria may remain in the streams in levels exceeding established criteria and can be measured well after a rain event has occurred. These organisms are normally found in wastes of warm-blooded animals and are generally not harmful to human health, but may indicate the presence of pathogens that can cause disease.

The Lampasas River above Stillhouse Hollow Lake is listed on the *2004 303(d) List* for elevated bacteria levels. Water quality data also indicates nutrient enrichment in isolated areas within the watershed. The State requires water quality in the Lampasas River be suitable for contact recreation, a healthy aquatic ecosystem, fish consumption and general use.

The data used to assess current bacterial concentrations in the Lampasas River is the result of sampling conducted through the Texas Commission on Environmental Quality (TCEQ) Clean Rivers Program. Fecal coliform samples have been taken at 5 designated sampling sites along the Lampasas River. It has been observed that, in the past five years, two of the five sampling sites indicated a use concern or non-support of contact recreation. While *E. coli* samples were collected, none have been assessed within the five-year period for the *2004 303(d) List*. Although routine sampling indicates the presence of elevated bacteria levels in the Lampasas River, the origin of this source is unclear.

There is a clear need to 1) further assess bacterial contamination to the Lampasas River, as well as the potential for other pollution within the watershed, 2) Update classification of land use distribution and influencing processes related to water quality and overall watershed health, 3) develop LDCs for the Lampasas River to reflect water quality across flow conditions; thus better characterizing pollutant problems, 4) Use spatially explicit modeling to rank and estimate the potential fate and transport of pollutants, and 5) facilitate and encourage public education, involvement, and/or awareness of all water quality issues within the Lampasas River Watershed through a stakeholder driven water quality implementation and management strategy.

These tasks will be accomplished through development of a comprehensive WPP. With this approach, planners stand a better chance of effectively addressing the Lampasas River water quality impairment by first gathering the required information, while reaching out to facilitate and encourage public involvement and awareness of water quality issues within the watershed.

Project Narrative

General Project Description

The purpose of this project is to work in concert with federal, state and local partners to coordinate a stakeholder driven process for the development of a WPP in the Lampasas River Watershed that is consistent with EPA's nine essential elements fundamental to a potentially successful WPP. Project partners include TSSWCB, TCEQ TAES, TCE, Brazos River Authority, Soil and Water Conservation Districts (506, 508, 509, 534, 554), Groundwater Conservation Districts (Clearwater UWCD, Central Texas GCD, Fox Crossing Water District, Saratoga UWCD), U.S. Army Corps of Engineers, Texas Watch, municipal and county governments, Lake Stillhouse Hollow Cleanwater Steering Committee, Inc., and Friends of Sulphur Creek.

To develop a WPP for the Lampasas River, current land uses and processes will be identified and assessed in a spatial and temporal context to quantify pollutant origin and fate. Geographic analysis of the watershed will develop a current land use / land cover dataset, derived from the most current USDA National Agriculture Imagery Program (NAIP) aerial photography. Supporting this effort will be the utilization of municipal and census data (among others). Final digitization of land use will be verified by ground-truthing and other verifiable data.

Inventory of potential watershed contributors of bacterial and other NPS pollution will be undertaken. For example, inventory of agricultural use is required to assess the potential for agricultural NPS contamination. As well, inventory of groundwater use, residential/commercial development, municipal wastewater treatment, on-site wastewater treatment (septic systems), wildlife habitat, livestock, and other relevant watershed characteristic data will be compiled and analyzed. A comprehensive geo-database will be developed for analysis, providing for management strategy identification and prioritization.

Watershed assessment focus will then be directed toward development of load duration curves. This will allow watershed planners to allocate bacteria loadings to categories of potential point and nonpoint sources. The load duration curve method has found wide acceptance across the country for bacteria TMDLs.

This assessment will rank the sources of bacteria and estimate the fate and transport of *E. coli*, nutrients (N and P), salinity, and sediment within the watershed. This will be achieved using a spatially explicit Geographic Information System (GIS) methodology. For this approach, the watershed will be divided into subwatersheds and pollutant loads from various sources, i.e. agriculture, urban, and wildlife, will be identified and quantified for each. From this information, total pollutant loading for the watershed can be calculated and contributing components will be ranked based on percentage and estimated production. In addition to the GIS methodology, the hybrid statistical and process-based approach of SPARROW (SPAtially Referenced Regressions On Watershed attributes) will be used to estimate the fate and transport of pollutants within the watershed. The SPARROW approach allows users to rigorously analyze uncertainty in model parameters and predictions.

Concurrent with assessment activities, an informational, educational, and communication program will be implemented to foster partnerships, identify and recruit stakeholders, organize workgroups, and facilitate coordination towards the development of the WPP. The program will enhance partner, stakeholder and public understanding of watershed processes, NPS pollution potential associated with land use, development and utilization of the WPP as a living document and water quality planning tool, and encourage stewardship.

Achievement of project success will be measured through the amount of public participation in the planning process, quality and quantity of Lampasas River watershed assessment data compiled and modeled, number and participation in educational outreach activities, and implementation of a Lampasas River WPP.

Water Quality Impairment

Describe all known causes (pollutants of concern) of water quality impairments from any of the following sources: 2004 Water Quality Inventory and 303(d) List, 2004 Summary of Waterbodies with Water Quality Concerns (Secondary Concerns List) or Other Documented Sources (ex. Clean Rivers Program Basin Summary or Basin Highlights Reports).

<u>Waterbody (Segment)</u>	<u>Standards not met in 2004 (parameter)</u>	<u>2007 CRP BSR</u>
Lampasas River above Stillhouse Hollow Lake	excessive bacteria	increasing trend in nitrate
Rocky Creek	depressed dissolved oxygen	

Project Goals

- To foster the development of a Lampasas River WPP by coordinated watershed assessment and analysis, stakeholder and public involvement, and education activities.
- Compile and maintain a geo-database complete with watershed land use inventory and other assessment data.
- Develop LDCs for the Lampasas River Watershed.
- Conduct spatially explicit modeling (SELECT) to determine the extent of impairment and to support planning efforts.
- Conduct informational and educational activities with Lampasas River Watershed landowners and other stakeholders.
- Develop a WPP to address water quality issues and ensure the long-term health of the watershed.

Tasks, Objectives and Schedules						
Task 1:	Lampasas River WPP Development and Project Administration					
Costs:	Federal:	\$267,605	State:	\$178,403	Total:	\$446,008
Objective:	To develop an informational, educational, and communication program that will foster partnerships, identify and recruit stakeholders, organize workgroups, and facilitate coordination towards the development of the WPP. The program will enhance partner, stakeholder and public understanding of the WPP, encourage their participation, and help them achieve a better understanding of land use activities and their impact on water quality.					
Subtask 1.1:	Conduct quarterly meetings, or as appropriate, with project participants, and other interested parties to discuss project schedule, lines of responsibility, communication needs, and other requirements.					
	Start Date:	Month 1	Completion Date:	Month 36		
Subtask 1.2:	Identify and recruit key stakeholders through public education and outreach. Organize stakeholder group. Prepare and distribute semi-annual newsletter to stakeholders. Develop and host watershed website.					
	Start Date:	Month 1	Completion Date:	Month 36		
Subtask 1.3:	Organize workgroups based on stakeholder recommendations.					
	Start Date:	Month 1	Completion Date:	Month 36		
Subtask 1.4:	Conduct stakeholder meetings as appropriate (stakeholder/community driven), and conduct workgroup meetings according to project demands.					
	Start Date:	Month 1	Completion Date:	Month 36		
Subtask 1.5:	Prepare stakeholder and workgroup educational programs as requested.					
	Start Date:	Month 1	Completion Date:	Month 36		
Subtask 1.6:	Develop Lampasas River WPP					
	Start Date:	Month 1	Completion Date:	Month 18		
Deliverables	<ul style="list-style-type: none"> • Quarterly Reports • Copies of agendas, attendance, and minutes from all meetings and educational activities • List of Stakeholders and work group membership • News releases and meeting announcements • Semi-annual stakeholder newsletters • Website • Lampasas River WPP 					

Tasks, Objectives and Schedules						
Task 2:	Development of load duration curves for the Lampasas River Watershed					
Costs:	Federal:	\$9,701	State:	\$6,468	Total:	\$16,169
Objective:	Develop pollutant source and loading information in the form of LDCs to identify potential point source and/or NPS relationship. LDCs will be used to guide stakeholder decision making.					
Subtask 2.1:	Develop flow duration curves using historical stream-flow data.					
	Start Date:	Month 3	Completion Date:	Month 6		
Subtask 2.2:	Develop LDCs to characterize pollutant loadings in the Lampasas River Watershed for all parameters of concern. Determine if and under what conditions bacteria levels exceed water quality standards.					
	Start Date:	Month 3	Completion Date:	Month 6		
Subtask 2.3:	Calculate the load reductions necessary to meet water quality standards.					
	Start Date:	Month 3	Completion Date:	Month 6		
Deliverables	<ul style="list-style-type: none"> • LDCs for the Lampasas River watershed • Report detailing what the LDCs reveal, for incorporation into the WPP 					

Tasks, Objectives and Schedules						
Task 3:	Watershed inventory and geographic analysis of land use influencing <i>E. coli</i> migration and other NPS pollution within the Lampasas River Watershed.					
Costs:	Federal:	\$38,806	State:	\$25,870	Total:	\$64,676
Objective:	To assess the current land use practices and sources of contribution to <i>E. coli</i> and other NPS contamination within the Lampasas River Watershed. Data compiled from existing surveys, inventory, land use classification, and sub-watershed delineation will be used to develop pollutant source and loading information. This information will be used to facilitate stakeholder driven watershed management decisions. Current geographic data layers (land use, drainage areas, etc.) will be updated and/or developed, and be critical as inputs to modeling.					
Subtask 3.1:	In order to develop and implement DQOs and QA/QC activities necessary to ensure environmental data of known and acceptable quality is generated through this project, a QAPP for Tasks 2-4 will be developed that is consistent with <i>EPA Requirements for Quality Assurance Project Plans (QA/R-5)</i> and the <i>Environmental Data Quality Management Plan for the TSSWCB</i> .					
	Start Date:	Month 1		Completion Date:	Month 2	
Subtask 3.2:	Classify current land use for the watershed using existing land use/land cover data utilizing most current imagery available.					
	Start Date:	Month 2		Completion Date:	Month 4	
Subtask 3.3:	Verify classification of land use through ground-truthing of sub-sampled land units, and collection of available data.					
	Start Date:	Month 2		Completion Date:	Month 4	
Subtask 3.4:	Delineate the Lampasas River Watershed into catchments using highest resolution digital elevation model available.					
	Start Date:	Month 3		Completion Date:	Month 4	
Subtask 3.5:	Compile all of feature class, raster, and tabular data into a comprehensive geo-database reflecting existing watershed conditions.					
	Start Date:	Month 3		Completion Date:	Month 10	
Deliverables	<ul style="list-style-type: none"> • Approved QAPP • Current land use classification for Lampasas River Watershed • Delineation of watershed into catchments to facilitate spatial analysis • Completed (up to date) geo-database for the Lampasas River Watershed 					

Tasks, Objectives and Schedules						
Task 4:	Utilize <u>S</u> patially <u>E</u> xplicit <u>L</u> oad <u>E</u> nrichment <u>C</u> alculation <u>T</u> ool (SELECT) for analysis of the Lampasas River Watershed					
Costs:	Federal:	\$48,507	State:	\$32,338	Total:	\$80,845
Objective:	To assess the current land use practices and sources of contribution to <i>E. coli</i> and other NPS pollution within the Lampasas River Watershed. To further develop the inventory of bacterial contributors, and estimate their potential affect on water quality through spatial analysis.					
Subtask 4.1:	Compile and estimate the contribution of potential sources of <i>E. coli</i> and other parameters within the watershed					
	Start Date:	Month 8		Completion Date:	Month 12	
Subtask 4.2:	Allocate numbers of each potential source category, in a spatial context according to land use classification using GIS.					
	Start Date:	Month 8		Completion Date:	Month 12	
Subtask 4.3:	Identify potential pollutant sources across the landscape based on proximity to hydrology, land use, and other factors using SELECT analysis.					
	Start Date:	Month 10		Completion Date:	Month 12	
Subtask 4.4:	Utilize the hybrid statistical and process-based approach of SPARROW (<u>S</u> patially <u>R</u> eferenced <u>R</u> egressions on <u>W</u> atershed <u>A</u> tributes) to quantify uncertainty in SELECT parameters.					
	Start Date:	Month 10		Completion Date:	Month 12	
Deliverables	<ul style="list-style-type: none"> Report detailing results of geo-spatial analysis (SELECT modeling) results and uncertainty analysis (SELECT) for incorporation in a WPP 					

Tasks, Objectives and Schedules						
Task 5:	Facilitate implementation of the Lampasas River WPP					
Costs:	Federal:	\$133,803	State:	\$89,202	Total:	\$223,005
Objective:	To move toward self-perpetuating implementation of WPP strategies based on targets identified by spatial assessment / watershed analysis, and evolving WPP with changes in land use.					
Subtask 5.1:	Work with stakeholders and workgroups to prioritize implementation activities based on consensus and continual watershed assessment and awareness.					
	Start Date:	Month 18		Completion Date:	Month 36	
Subtask 5.2:	Assist stakeholders in identification and acquisition of resources necessary to proceed with watershed implementation and protection strategies, and in anticipation of future watershed needs.					
	Start Date:	Month 18		Completion Date:	Month 36	
Subtask 5.3:	Identify metrics or other indicators which will be used to evaluate successful implementation or improvement of watershed health over time.					
	Start Date:	Month 18		Completion Date:	Month 36	
Deliverables	<ul style="list-style-type: none"> A living Lampasas River WPP incorporating water quality data, watershed assessment findings, triggers, implementation options/alternatives and activities, and methods of tracking and evaluating WPP success. 					

Measures of Success

- Inventory, compilation and geographic analysis/modeling of watershed data to be used as an aid in stakeholder decision support – success measured by the accuracy and comprehensiveness of the land use and other data layers compiled, load duration curves developed, and spatially explicit (SELECT) modeling results derived.
- Documented educational / outreach activities – success measured by public participation as indicated by the attendance rosters at meetings, workshops and demonstration activities.
- Development of a comprehensive and sustainable WPP for the Lampasas River Watershed – success measured by the approval and acceptance of a WPP to be used for restoring and ensuring the designated uses of the Lampasas River are met.

2005 Texas Nonpoint Source Management Program Document Reference

Goals &/or Milestone(s)

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

Short-Term Goal One – Data Collection and Assessment – Objective D – Develop...WPPs to maintain and restore water quality in waterbodies identified as impacted by NPS pollution.

Short-Term Goal Two – Implementation – Objective A – Work with regional and local entities to determine priority areas and develop and implement strategies to address NPS pollution in those areas.

Short-Term Goal Two – Implementation – Objective D – Implement...WPPs developed to restore and maintain water quality in water bodies identified as impacted by NPS pollution.

Short-Term Goal Three – Education – Objective D – Conduct outreach...to facilitate broader participation and partnerships and enable stakeholders...to participate in decision-making and provide a more complete understanding of water quality issues and how they relate to each citizen.

Short-Term Goal Three – Education – Objective F – Implement public outreach and education to maintain and restore water quality in waterbodies impacted by NPS pollution.

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

NPS Management Program – Element 4 – Abatement of water quality impairments from NPS pollution and prevention of significant threats to water quality from present and future NPS activities.

NPS Management Program – Element 5 – ...Identify waters and their watersheds impaired by NPS pollution and... address these identified waters by conducting more detailed watershed assessments and developing...and implementing WPPs.

Part III – Financial Information

Budget Summary			
Federal 319(h)	\$498,422	% of total project	60%
Non-Federal Match	\$332,281	% of total project (at least 40%)	40%
Total Cost	\$830,703	Total project %	100%
Category	Federal	Non-Federal Match	Total
Personnel	\$300,711	\$145,626	\$446,337
Fringe Benefits	\$ 84,199	\$ 56,632	\$140,831
Subtotal Personnel & Fringe	\$384,910	\$202,258	\$587,168
Travel	\$ 10,000	\$ -	\$ 10,000
Equipment	\$ -	\$ -	\$ -
Supplies	\$ 23,500	\$ -	\$ 23,500
Contractual	\$ -	\$ -	\$ -
Construction	\$ -	\$ -	\$ -
Other	\$ 15,000	\$ -	\$ 15,000
Subtotal	\$ 48,500	\$ -	\$ 48,500
Total Direct Costs	\$433,410	\$202,258	\$635,668
Indirect Costs (15%)	\$ 65,012	\$ -	\$ 65,012
Unrecovered IDC	\$ -	\$130,023	\$130,023
Total Project Costs	\$498,422	\$332,281	\$830,703

Budget Justification (Federal)		
Category	Total Amount	Justification
Personnel & Fringe Benefits	\$384,910	TAMU-SSL – Sr. Researcher @ 100% TAMU-SSL – Research Assistant @ 50% TAES-BREC – Associate (Watershed Coordinator) @ 100% TCE – Associate @ 25%
Travel	\$ 10,000	For TCE Associate (\$2,500 / yr) + \$70/month (other necessary travel)
Equipment	\$ -	N/A
Supplies	\$ 23,500	\$650/month – general office supplies (paper, computer repair, hardware, software, and software licensing, etc.)
Contractual	\$ -	N/A
Construction	\$ -	N/A
Other	\$ 15,000	Printing, advertising media, facility fees, etc.
Indirect (15%)	\$ 65,012	Current negotiated rate

Budget Justification (Non-Federal)		
Category	Total Amount	Justification
Personnel & Fringe Benefits	\$202,258	TAES-BREC – Sr. Research Associate @ 100% TCE – Associate @ 5% TAMU-SSL – Associate and Admin Assistant @ 10%
Travel	\$ -	N/A
Equipment	\$ -	N/A
Supplies	\$ -	N/A
Contractual	\$ -	N/A
Construction	\$ -	N/A
Other	\$ -	N/A
Unrecovered IDC	\$130,023	TAES will contribute the standard difference in indirect cost rate as a cost shared contribution. The current negotiated rate is 45.5% of modified total direct costs.