



**Texas State Soil and Water Conservation Board
 Clean Water Act §319(h) Nonpoint Source Grant Program
 FY 2009 Project Workplan 09-08**

NONPOINT SOURCE SUMMARY PAGE for the CWA §319(h) Agricultural/Silvicultural Nonpoint Source Grant Program						
Title of Project:	Implementing the Pecos River Watershed Protection Plan through Continuous Water Quality Monitoring and Dissolved Oxygen Modeling					
Project Goals:	1) establish and operate a continuous water quality monitoring (CWQM) station on the Pecos River near Girvin to provide critical information on water quality parameters in the middle portion of the Pecos River in Texas so that the impacts of WPP implementation can be accurately monitored, and 2) utilize computer based dissolved oxygen (DO) modeling to identify the sources of DO impairment, estimate load reductions needed and evaluate best management practices (BMPs) ability to achieve load reductions					
Project Tasks:	(1) Project Administration; (2) Quality Assurance; (3) Continuous Water Quality Monitoring; (4) Dissolved Oxygen Modeling					
Measures of Success:	<ul style="list-style-type: none"> • Installation of an operational CWQM station on the Pecos River near Girvin, TX • Data collected and included in TCEQ's surface water quality database • Continued collection of discharge data from USGS flow gage near Girvin, TX • Collected continuous water quality data available on the Internet • Identification of long-term funding sources to maintain operation of CWQM station and USGS gage • Identified sources/causes of DO impairment • Estimate of load reductions needed to restore water quality (DO) • Management measures evaluated to address DO impairment 					
Project Type:	Implementation (); Education (); Planning (); Assessment (X); Groundwater ()					
Status of Water Body: 2008 Texas Water Quality Inventory and 303(d) List	<u>Segment ID:</u> 2310 (Lower Pecos River) 2311 (Upper Pecos River)	<u>Parameter:</u> Fish kills; golden algae Dissolved oxygen	<u>Category:</u> CN 5c			
Project Location (Statewide or Watershed and County)	Pecos River Watershed in Crane, Crockett, Loving, Pecos, Reeves, Terrell and Ward Counties					
Key Project Activities:	Hire Staff (); Surface Water Quality Monitoring (X); Technical Assistance (); Education (); Implementation (); BMP Effectiveness Monitoring (X); Demonstration (); Planning (); Modeling (X); Bacterial Source Tracking (); Other ()					
Texas NPS Management Program Elements:	<ul style="list-style-type: none"> • LTG, Objectives 1 & 3 • STG – 1, Objective D • STG – 2, Objective D • Milestones C and F 					
Project Costs:	Federal:	\$224,826	Non-Federal:	\$152,050	Total:	\$376,876
Project Management:	<ul style="list-style-type: none"> • Texas Water Resources Institute • Texas Institute for Applied Environmental Research 					
Project Period:	October 1, 2009 – July 31, 2014					

Part I – Applicant Information

Applicant							
Project Lead		Dr. Kevin Wagner					
Title		Associate Director					
Organization		Texas AgriLife Research, Texas Water Resources Institute					
E-mail Address		klwagner@ag.tamu.edu					
Street Address		1500 Research Pkwy, Ste 110 2260 TAMU					
City	College Station	County	Brazos	State	TX	Zip Code	77843-2260
Telephone Number		979-845-1851		Fax Number		979-845-0662	

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)	Project coordination, QAPP development, Project reporting
Texas Commission on Environmental Quality (TCEQ)	CWQM station installation, operation and maintenance; data validation and distribution
Texas Institute for Applied Environmental Research at Tarleton State University (TIAER)	Model DO, identify sources contributing to impairment, estimate load reductions needed, and options for effective and efficient BMP implementation

Part II – Project Information

Project Type							
Surface Water	X	Groundwater					
Does the project implement recommendations made in a completed Watershed Protection Plan or an adopted TMDL or Implementation Plan?				Yes	X	No	
If yes, identify the document.		A Watershed Protection Plan for the Pecos River in Texas					
If yes, identify the agency/group that developed and/or approved the document.		Landowners and entities in the Pecos River watershed, facilitated by Texas AgriLife Extension Service, Texas AgriLife Research, Texas Water Resources Institute, and TSSWCB			Year Developed	2008	

Watershed Information				
Watershed Name(s)	Hydrologic Unit Code (8 Digit)	Segment ID	305 (b) Category	Size (Acres)
Pecos River	13070001, 13070002, 13070003, 13070004, 13070005, 13070006, 13070007, 13070008, 13070009, 13070010, 13070011	2310, 2311	CN, 5c	9,984,000

Water Quality Impairment			
Describe all known causes (pollutants of concern) of water quality impairments from any of the following sources: 2008 Texas Water Quality Inventory and 303(d) List, Clean Rivers Program Basin Summary, Basin Highlights Reports or Other Documented Sources.			
Segment: Upper Pecos River (2311_05 and 06)	Impairments: Depressed Dissolved Oxygen (5c)	Year 1st Listed 2006	
Segment: Lower Pecos River (2310_01 and 02)	Concerns: harmful golden alga bloom	Concern Level: CN	
Upper Pecos River (2311_01, 02, 03, 04, 05, 06, 07 and 08)	harmful golden alga bloom	CN	
Upper Pecos River (2311_01, 05 and 07)	chlorophyll – a	CS	
Upper Pecos River (2311_04)	bacteria	CN	
Upper Pecos River (2311_06)	depressed DO	CN	

Project Narrative

Problem/Need Statement

The Pecos River is a greatly depleted western river flowing 418 winding miles through hot, dry, semi-arid landscapes in Texas. It is the largest river sub-basin flowing into the Rio Grande River from the United States. The Pecos River itself is also the lifeblood of many communities within its reaches, mainly as an irrigation source, recreational uses, and as recharge for underlying aquifers. As such, its importance historically, biologically and hydrologically to the future of the Rio Grande Basin is critical. The flows of the once great Pecos River have dwindled to a mere trickle due to many causes – some natural and some man-induced. Its upper reaches in Texas now resemble a small creek rather than a river. If the integrity of the entire Rio Grande basin below the Pecos is to be improved and maintained, then it is crucial that both the water quality and quantity of Pecos flows be improved and stabilized within a natural flow regime.

Due to the lowered water quality and stream flows in the upper portion of the river, the aquatic community of the Pecos River has been drastically altered according to reports from biologists and to local users of the river. No longer does the river support as many diverse communities of aquatic plants, invertebrates, microorganisms, fish and amphibians as it describes in the *WPP for the Pecos River in Texas*. The greatly reduced aquatic diversity has been negatively affected by changes in river hydrology, riparian community destruction, oil and gas activities, irrigation demands, long and short-term droughts, damming of the river and the desertification of the upland watershed due to several factors. These factors, both natural and man-made, have allowed introduced plant species, such as saltcedar, to dominate the riparian corridor and other nuisance brush species to become firmly established on upland areas and have likely contributed to water quality declines, such as the DO impairment in the upper reaches of the river (Segments 2311_05 and 2311_06).

According to data from the U.S. Section of the International Boundary and Water Commission (IBWC), the Pecos River contributes 274 million m³ of streamflow to the Rio Grande, which accounts for approximately 11% of the total annual inflow to Amistad International Reservoir. However, it also contributes to the total dissolved solids (salt) loading into the reservoir at an annual rate of 0.54 million tons or 29.5% of the total annual salt load. The concentration of total dissolved solids (TDS) of the Amistad International Reservoir exceeded 1,000 ppm for a month in 1988, and has fluctuated since. It is important to control salt loading from the Pecos to Rio Grande if TDS of the reservoir are to be kept in compliance with the Texas Water Quality Standards. Several key areas where dissolved solids enter the river have been identified and quantified.

This project addresses two critical needs as identified in the Pecos River Watershed Protection Plan (WPP). Water quality monitoring in the watershed is rather limited and needs improvement. The WPP specifically calls for the establishment of 4 new CWQM stations at locations across the watershed; a new CWQM station at Girvin, TX is prioritized as an immediate, short-term need in the WPP. This project will implement one new CWQM station in cooperation with TCEQ which will enhance data collection in the watershed and provide water quality data in conjunction with USGS monitored flow data (USGS gage 08446500). Data from this particular location will be critical to assess the impacts of implementing the Pecos River WPP, particularly invasive species control (saltcedar) in this portion of the watershed through TSSWCB project 08-08, *Implementing Components of the Watershed Protection Plan for the Pecos River in Texas*. Establishing a CWQM station at this site will accomplish two main objectives; 1) it will enable the river's users to have a better understanding of water quality trends in the river, and 2) it will allow pollutant loads to be calculated at Girvin and provide a concrete indication of water quality changes as a result of implementing BMPs from the Pecos River WPP.

The *WPP for the Pecos River in Texas*, as well as the letter received from EPA Region 6 following their consistency review of the WPP, indicate the need for further assessment and the development of recommended management measures to address the DO impairment in the upper portions of the river; specifically assessment units 2311_05 and 2311_06. This project will accomplish this need by employing computer-based DO modeling to assess historic water quality data on the Pecos River and identify the causes and sources of the DO impairments in the river, develop an estimate of load reductions needed to achieve water quality restoration and evaluate the impact of BMPs recommended in the Pecos River WPP.

Project Narrative

General Project Description (Include Project Location Map)

One objective of this project is to facilitate the construction, installation, monitoring and maintenance of a CWQM station on the Pecos River near Girvin, TX. The station will be incorporated into TCEQ's CWQM network and will provide critical data for evaluating management practice implementation activities associated with the Pecos River WPP. This site will continuously monitor DO, temperature, pH and specific conductance using the same type equipment that the other 5 stations in the watershed utilize. TDS will be calculated from the measured specific conductance ($SC \times 0.65 = TDS$).

In cooperation with TSSWCB and TWRI, TCEQ will identify a suitable station site location upstream of the US 67 crossing on the Pecos River near Girvin. TCEQ will design and install the CWQM station to assure compatibility with other CWQM stations in other segments of the Pecos River. This station will also be situated very near USGS gage 08446500, which is located just upstream of the US 67 bridge, to ensure that accurate water borne constituent loads can be calculated.

TCEQ will be responsible for the monthly maintenance and operation of the site for the entire three year period. TCEQ Region 7 personnel from Midland will provide the continuous calibration and maintenance of the system as required to ensure that data are being properly transmitted to TCEQ and posted on their CWQM network website. Additionally, TCEQ will coordinate with USGS to ensure that flow discharge measurement is continued at the USGS gage, data are verified and transmitted to the online database at <http://www.texaswaterdata.org>. TCEQ will ensure that proper quality assurance and quality control (QA/Q) is applied to the collection and dissemination of collect data through the inclusion of this new site in TCEQ's currently existing, EPA-approved, CWQM QAPP (to be updated to include the site a Girvin, TX).

Conducting computer based DO modeling is the second objective of this project and will be conducted by TIAER to identify the sources of pollution that influence DO levels in the Pecos River and have led to the current DO impairment in its upper reaches. Currently available data (streamflow, water quality, water rights withdrawals, and wastewater



Pecos River Watershed (Blue arrow is pointing at the US 67 Hwy crossing near Girvin, TX)

treatment facility discharges, etc.) will be utilized in this evaluation. The primary goals of the modeling exercise are to 1) identify the sources of pollution causing the DO impairment in Segment 2311 and examine DO dynamics in Segment 2310, 2) develop an estimate of load reductions, for each pollutant, needed to achieve water quality restoration, 3) evaluate BMPs and their ability to reduce pollutant loadings from identified sources affecting DO levels and 4) recommend a suite of BMPs, based on those in the Pecos River WPP, to be implemented throughout the watershed that will effectively lead to the restoration of water quality (DO). Results from this modeling evaluation will be combined into a Technical Report which will be distributed to landowners and entities involved in the development of the Pecos River WPP; based on their recommendations, conclusions from the DO modeling and evaluations of BMPs will incorporated into future revisions of the WPP and used to guide future BMP implementation. TWRI,

with assistance from TIAER, will develop a QAPP for DO modeling activities 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*. Through TSSWCB project 08-08 TWRI will coordinate and facilitate public meetings needed to gain local input into the modeling process and to deliver information on the DO modeling process, findings, management recommendation and what benefits can be expected as a result of this implementation.

TWRI will provide financial administration and oversight to the project. All quarterly progress reports and a final report will be provided to the TSSWCB in a consistent and timely fashion by TWRI personnel. The project will be implemented for three years giving TCEQ and TSSWCB consistent continuous water quality monitoring of the Pecos River at Girvin to determine true and necessary parameters to accurately determine success of the Pecos River WPP. During the project, TWRI will make efforts to identify and secure long-term sources of funding to continue the operation and maintenance of both the CWQM station and USGS gage beyond the life of this project.

Tasks, Objectives and Schedules						
Task 1:	Project Administration and Coordination					
Costs:	Federal:	\$65,421	Non-Federal:	\$49,141	Total:	\$114,562
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, in cooperation with TCEQ and TIAER, 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 and posted to the project website.					
	Start Date:	Month 1		Completion Date:	Month 57	
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 57	
Subtask 1.3:	TWRI will host coordination meetings, conference calls, or TTVN meetings with the TSSWCB Project Manager and all Project Partners at least quarterly to discuss project activities, project schedule, communication needs, deliverables, and other requirements.					
	Start Date:	Month 1		Completion Date:	Month 57	
Subtask 1.4:	Project Partners will cooperate and communicate with landowners and entities that contributed to the development of the Pecos River WPP in order to efficiently and effectively achieve WPP implementation program goals and to summarize activities and achievements made through the program. Specifically, Project Partners will, at least, participate in public meetings as necessary to obtain local input, deliver information on project activities, discuss goals and objectives and guide future project activities. Additionally, Project Partners will attend and participate in other public meetings in the Pecos River watershed, as needed, such as city council meetings, county commissioner's court meetings and SWCD meetings, in order to communicate project goals, activities and accomplishments to affected parties.					
	Start Date:	Month 1		Completion Date:	Month 57	
Deliverables	<ul style="list-style-type: none"> • QPRs in electronic format • Reimbursement Forms and necessary documentation in hard copy format • Brief summaries of public meetings where this project was discussed, including action by Project Partners needed 					

Tasks, Objectives and Schedules						
Task 2:	Quality Assurance					
Costs:	Federal:	\$4,500	Non-Federal:	\$2,500	Total:	\$7,000
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:	TCEQ will bring the collection of data at the new CWQM site (Task 3) under their existing EPA-approved CWQM QAPP (http://www.tceq.state.tx.us/assets/public/compliance/monops/water/wqm/cwqmn_qapp_rev2.pdf).					
	Start Date:	Month 1		Completion Date:	Month 3	
Subtask 2.2:	TWRI, with assistance from TIAER (Subtask 4.1) will develop a QAPP for activities in Task 4 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> .					
	Start Date:	Month 1		Completion Date:	Month 3	
Subtask 2.3:	TWRI will submit revisions and necessary amendments to the QAPP as needed.					
	Start Date:	Month 3		Completion Date:	Month 45	
Deliverables	<ul style="list-style-type: none"> • Verification that the new CWQM site is covered by the TCEQ CWQM QAPP • Data of known and acceptable quality as reported through Task 3 • QAPP for Task 4 approved by TSSWCB and EPA in both electronic and hard copy formats • Approved revisions and amendments to the Task 4 QAPP 					

Tasks, Objectives and Schedules						
Task 3:	CWQM Station Construction, Installation, Operation, Maintenance and Data Transfer					
Costs:	Federal:	\$34,194	Non-Federal:	\$22,272	Total:	\$56,466
Objective:	To procure supplies and equipment, construct CWQM station monitoring unit, complete site selection, install, operate and maintain so the site is consistent with TCEQ's other CWQM sites to provide quality data of acceptable standards					
Subtask 3.1:	TWRI will purchase needed supplies to construct and maintain a deployable CWQM station. TWRI will transfer these supplies to TCEQ.					
	Start Date:	Month 1	Completion Date:	Month 3		
Subtask 3.2:	TCEQ will design, construct, test and deploy a continuous water quality monitoring site at the selected location near Girvin, TX upstream of US 67. This site will continuously monitor DO, temperature, pH and specific conductance using the same type equipment that the other 5 stations in the watershed utilize.					
	Start Date:	Month 1	Completion Date:	Month 4		
Subtask 3.3:	TCEQ will operate and maintain the CWQM station utilizing existing personnel and resources. This will entail monthly site visits by TCEQ Region 7 technical staff to ensure proper functioning of monitoring and reporting equipment. Additionally, TCEQ staff will validate recorded data and ensure that the data is made available through TCEQ webpages, including http://www.texaswaterdata.org .					
	Start Date:	Month 4	Completion Date:	Month 45		
Subtask 3.4:	TCEQ will coordinate with USGS to continue operation and maintenance of discharge monitoring equipment at the USGS gage near Girvin (08446500) to ensure that pollutant load calculations can be developed utilizing the water quality and discharge data collected.					
	Start Date:	Month 4	Completion Date:	Month 45		
Subtask 3.5:	TWRI will work to identify and secure long-term sources of funding to continue the operation and maintenance of both the CWQM site and USGS gage near Girvin. Through this project, funding for the CWQM site is covered through the end of FY2012. Currently, funding for the USGS gage is covered through the end of FY2010					
	Start Date:	Month 1	Completion Date:	Month 45		
Deliverables	<ul style="list-style-type: none"> Monitoring equipment properly installed at the chosen site Equipment relaying information to the TCEQ as required, complimenting existing river data Proper maintenance of discharge and water quality monitoring and reporting equipment Funding source for additional monitoring and discharge measurement secured Data available on Internet at http://www.texaswaterdata.org 					

Tasks, Objectives and Schedules						
Task 4:	Dissolved Oxygen Modeling and Management Practice Evaluation					
Costs:	Federal:	\$120,711	Non-Federal:	\$78,137	Total:	\$198,848
Objective:	To assess the dissolved oxygen (DO) impairment in the Pecos River in Texas by conducting DO modeling that focuses on identifying the different sources of DO impairment and evaluating the ability of various management measures to alleviate the impairment.					
Subtask 4.1:	TIAER will evaluate DO models, such as QUAL2K, capable of simulating low-flow steady-state conditions and diel DO fluctuations from aquatic vegetation photosynthesis and respiration. TIAER will recommend the use of suitable candidate model for the Pecos River. TIAER, TWRI and TSSWCB will select the model to be used. Once the most suitable model is selected, TIAER will assist TWRI in developing a modeling QAPP (Task 2).					
	Start Date:	Month 1		Completion Date:	Month 4	
Subtask 4.2:	TIAER will obtain and evaluate relevant historical data on the Pecos River including, but not limited to, streamflow, water quality, water rights withdrawals, and wastewater treatment facility discharges. TIAER will access databases for pertinent data needed in the next subtask for model development and validation.					
	Start Date:	Month 1		Completion Date:	Month 6	
Subtask 4.3:	TIAER will develop and validate against historical data, a QUAL2K model (or similar model) of the Pecos River Segments 2310 and 2311, with specific emphasis on currently impaired assessment units 2311_05 and 2311_06. The model will represent DO conditions under low flow steady-state conditions and include critical pollutant sources (organic loadings, nutrients, total dissolved solids, etc.), attached and suspended algae, and hydrologic alterations (Red Bluff Reservoir, irrigation withdrawals, etc.), which are all potentially contributing to the current DO impairment in assessment units 2311_05 and 2311_06. TIAER will perform limited sensitivity testing of model input parameters by first increasing and then decreasing each parameter separately to determine its affect on model output.					
	Start Date:	Month 6		Completion Date:	Month 12	
Subtask 4.4	TIAER will apply the validated model for a series of low-flow base conditions in the Pecos River that represents seasonal conditions in the river. TIAER will then impose on the various base conditions selected BMPs for which the model will predict changes in DO concentrations. These BMPs will include, but not necessarily be limited to, options that will decrease organic loadings to the river, decrease salinity content, decrease nutrient loading, increase flow, increase aeration, increase shading and decrease water temperature. Specific BMPs recommended by landowners and entities included in the Pecos River WPP will be included in this analysis.					
	Start Date:	Month 13		Completion Date:	Month 36	
Subtask 4.5:	TIAER, with assistance from TWRI, will develop a Technical Report describing results from Task 4. This report will include descriptions and discussion of model inputs, assumptions and outputs; a detailed discussion of sources of pollution as identified by the model and their influence on DO levels in the river, an estimate of pollutant load reductions needed to achieve water quality restoration and expected load reductions from each BMP or suite of BMPs to address individual pollutant categories. A concluding discussion on alleviating the DO impairment in the Texas portion of the Pecos River will also be included and should recommend a implementation approach for BMPs that will ultimately result the restoration of DO levels. Results from this modeling evaluation will be combined into a Technical Report which will be distributed to landowners and entities involved in the development of the Pecos River WPP; based on their recommendations, conclusions from the DO modeling and evaluations of BMPs will incorporated into future revisions of the WPP and used to guide future BMP implementation.					
	Start Date:	Month 25		Completion Date:	Month 45	

Deliverables	<ul style="list-style-type: none"> • Modeling results that identify sources and cause of the DO impairment and that estimates pollutant loads • Modeling results that estimate load reductions needed, from identified pollutant sources, to achieve water quality restoration • Modeling results that evaluate the effectiveness of recommended BMPs designed to improve water quality • Technical Report detailing the modeling process, results and findings
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Project Goals (Expand from NPS Summary Page)
<ul style="list-style-type: none"> • to establish and operate a CWQM station at Girvin in conjunction with TCEQ to provide critical information on water quality parameters in the middle portion of the Pecos River; to include this station in TCEQ's CWQM Network; to utilize this data to accurately monitor the impacts of WPP implementation; to provide additional data to be included in future water quality assessments. • to conduct computer based DO modeling as a means to identify sources of pollution contributing to the current DO impairment; to estimate pollutant load reductions needed to achieve water quality restoration; to evaluate BMPs recommended in the WPP to adequately address identified pollutant sources so that DO levels are restored

Measures of Success (Expand from NPS Summary Page)
<ol style="list-style-type: none"> 1) Installation, operation and maintenance of a CWQM station on the Pecos River near Girvin, TX upstream of US 67 2) Continuing the operation of the USGS gage at Girvin, validating the data and ensuring its availability via the internet 3) Inclusion of data collected by this CWQM station in the SWQMIS database and used in future water quality evaluations for the Pecos River 4) Data collected for the site available on the Internet at the TCEQ webpage http://www.texaswaterdata.org 5) Funding secured to continue CWQM station operation beyond the culmination of this project 6) Determine the sources/causes of the DO impairment 7) Estimate pollutant load reductions needed to restore water quality (DO) 8) Evaluate BMPs from Pecos River WPP to ascertain their ability to mitigate pollutants and restore water quality (DO)

2005 Texas Nonpoint Source Management Program Reference (Expand from NPS Summary Page)
Goals and/or Milestone(s)
Long-Term Goal Objective 1: To focus NPS implementation strategies and available resources in watershed identified as impacted by NPS pollution in the latest state approved <i>Texas Water Quality Inventory and 303(d) List</i> .
Long-Term Goal Objective 3: Support the implementation of state, regional, and local programs...such as the implementation of strategies defined in...WPPs.
Short-Term Goal 1, Objective D: Conduct monitoring to determine effectiveness of...WPPs and BMPs.
Short-Term Goal 2, Objective D: Implement...WPPs developed to restore and maintain water quality in waterbodies identified as impacted by NPS pollution in the latest state-approved <i>Texas Water Quality Inventory and 303(d) List</i> .
Milestones C: Complete water quality monitoring. Analyze data, assess loadings, and determine the origin and distribution of pollutants.
Milestone F: Implement voluntary and regulatory actions in the watershed and adjust the BMP implementation based on follow-up verification monitoring of effectiveness.

Part III – Financial Information

Budget Summary			
Federal	\$ 224,826	% of total project	60%
Non-Federal	\$ 152,050	% of total project	40%
Total	\$ 376,876	Total	100%
Category	Federal	Non-Federal	Total
Personnel	\$ 46,049	\$ 54,434	\$ 100,483
Fringe Benefits	\$ 12,461	\$ 12,164	\$ 24,625
Travel	\$ 7,825	\$ 0	\$ 7,825
Equipment	\$ 0	\$ 0	\$ 0
Supplies	\$ 23,313	\$ 0	\$ 23,313
Contractual	\$ 102,211	\$ 68,137	\$ 170,348
Construction	\$ 0	\$ 0	\$ 0
Other	\$ 2,507	\$ 0	\$ 2,507
Total Direct Costs	\$ 194,366	\$ 134,735	\$ 329,101
Indirect Costs (≤15%)	\$ 30,460	\$ 17,315	\$ 47,775
Unrecovered Indirect Costs	\$ 0	\$ 0	\$ 0
Total Project Costs	\$ 224,826	\$ 152,050	\$ 376,876

The TSSWCB CWA §319(h) Nonpoint Source Grant Program has a 60/40% match requirement. The cooperating entity will be reimbursed 60% from federal funds and must contribute a minimum of 40% of the total costs to conduct the project. The 40% match must be from non-federal sources and should be described in the budget justification. Reimbursable indirect costs are limited to 15% of total federal direct costs. The project budget generally covers a three year period.

Budget Justification (Federal)		
Category	Total Amount	Justification
Personnel	\$ 46,049	TWRI Project Manager (Gregory 2 mo in yr 1; 1 mo/yr in yrs 2 & 3; 3 mo in yr 4) Program Specialist (Bryant .75 mo/yr)
Fringe Benefits	\$ 12,461	Salary * 17.6% + \$471/mo for insurance
Travel	\$ 7,825	TWRI PM: 3 trps during station installation and public meetings (3 days ea. @ \$800 ea.): \$2,400 TWRI Watershed Coordinator Travel: 5, 3 day trips @ \$700 ea: \$3,500 - lodging ~ \$182 : - vehicle rental ~ \$144 : - per diem ~\$138 - rental fuel ~ \$236 Program Specialist 3,500 miles @ \$.55/mi: \$1,925
Equipment	\$ 0	N/A

Supplies	\$ 23,313	3 - Greenspan CS4-1200: \$3,760 ea. 3 - IMPULSE GSS: \$220 ea. 3 - Copper shroud for CS-304: \$205 ea. 2 - Sonde Calibration cables: \$110 ea. 3 - Conductivity calibration loops: \$25 ea. 1 - SDI-12 Connector cable: \$20 ea. 3 - Underwater Sonde Cables: \$390 ea. 10 - Diffusion Rods for CS4-1200: \$80 ea. 1 - SDI-12 Calibration Box: \$600 ea. 1 - Sutron 8080 w/ TCEQ Program: \$2,000 ea. 1 - Wireless IP modem: \$192 ea. 3 - 2ft by 2 ft Solar Panels: \$550 ea. 3 - Solar Panel Controllers: \$110 ea. 4 - Storage batteries for Solar Array: \$200 ea. 2 - 12V, 125psi air compressor: \$500 ea. 4 - 125ft, 0.75 in air hoses: \$50 ea. Conduit for probe deployment: \$100 Re-Ployment rail for probe retrieval: \$101 TWRI PM Misc. Supplies: \$1,500
Contractual	\$ 102,211	TIAER Sub-Contract for DO Modeling
Construction	\$ 0	N/A
Other	\$ 2,507	TWRI Vehicle Mileage: 4,517 miles @ \$0.555/mi
Indirect (≤15%)	\$ 30,460	26% of Modified Total Federal Direct Costs
Budget Justification (Non-Federal)		
Category	Total Amount	Justification
Personnel	\$ 54,434	Program Specialist (Bryant .729 mo/yr) TWRI Director @ 1.1 mo/yr
Fringe Benefits	\$ 12,164	Salary * 17.6% + \$471/mo for insurance
Travel	\$ 0	N/A
Equipment	\$ 0	N/A
Supplies	\$ 0	N/A
Contractual	\$ 68,137	TIAER Sub-Contract for DO Modeling
Construction	\$ 0	N/A
Other	\$ 0	N/A
Indirect	\$ 17,315	26% of Modified Total Non-Federal Direct Costs
Unrecovered Indirect Costs	\$ 0	N/A
Contractual Budget Justification (Federal) – TIAER		
Category	Total Amount	Justification
Personnel	\$ 67,950	TIAER QAO (Nancy Easterling; 1.6% in yr 1; 0.8% in yrs 2 & 3) Lead Scientist (Larry Hauck; 6.7% in yr 1; 4.3% in yr 2, 1.955% in yr 3) Res. Scientist (Anne McFarland; 20.5% in yr 1; 8.4% in yr 2; 6.9% in yr 3) Sr. Res. Assoc. (Jimmy Millican; 33.7% in yr 1) Sr. Programmer/Analyst (Jim Rogers; 7.7% in yr 1; 1.9% in yr 2)
Fringe Benefits	\$ 17,367	Salary * 25.6046%
Travel	\$ 3,517	Rental Vehicle, Fuel, Lodging and Per Diem for 2 staff; 3 trips @ 3 days per trip
Equipment	\$ 0	N/A
Supplies	\$ 45	Miscellaneous Office Supplies
Contractual	\$ 0	N/A

Construction	\$ 0	N/A
Other	\$ 0	N/A
Indirect	\$ 13,332	15% of Total Federal Direct Costs
Contractual Budget Justification (Non-Federal) – TIAER		
Category	Total Amount	Justification
Personnel	\$ 22,208	Lead Scientist (Larry Hauck; 2.4% in yr 2, .0745% in yr 3) Res. Scientist (Anne McFarland; 13.2% in yr 1; 5.1% in yr 2; 4.2% in yr 3)
Fringe Benefits	\$ 5,688	Salary * 25.6046%
Travel	\$ 1,250	Lodging and Per Diem for 1 additional staff; 4 trips @ 3 days per trip
Equipment	\$ 0	N/A
Supplies	\$ 30	Miscellaneous Office Supplies
Contractual	\$ 0	N/A
Construction	\$ 0	N/A
Other	\$ 0	N/A
Indirect	\$ 4,377	15% of Total Non-Federal Direct Costs
Unrecovered Indirect Costs	\$ 34,584	58% of Salaries