Texas State Soil and Water Conservation Board
Clean Water Act §319(h) Nonpoint Source Grant Program
FY 2009 Project Workplan 09-07

NONPOINT SOURCE SUMMARY PAGE for the CWA §319(h) Agricultural/Silvicultural Nonpoint Source Grant Program			
Title of Project:	Monitoring Effectiveness of Nonpoint Source Nutrient Management in the North Bosque River Watershed		
Project Goals:	To provide targeted surface water quality data for evaluating the effectiveness of agricultural NPS pollution abatement efforts associated with I-Plan activities for two phosphorus TMDLs in the North Bosque River watershed.		
Project Tasks:	(1) Project Administration; (2) Quality Assurance; (3) Surface Water Quality Monitoring; and (4) Data Management, Analysis, and Reporting		
Measures of Success:	Data collected will allow continuing evaluation of improvements in water quality, associated with NPS pollution abatement activities outlined in the TMDL I-Plan, at targeted microwatershed locations within the headwaters of the North Bosque River watershed.		
Project Type:	Implementation ( ); Education ( ); Planning ( ); Assessment (X); Groundwater ( )		
Status of Water Body: 2008 Texas Water Quality Inventory and 303(d) List	Segment ID:	Parameter:	Category:
	1226 North Bosque River	Excessive Algal Growth	4a
	1226B Green Creek	Depressed dissolved oxygen	5c
	1226E Indian Creek	Bacteria	5c
	1226F Sims Creek	Bacteria	5c
	1226K Little Duffau Creek	Bacteria	5c
	1255 Upper North Bosque River	Excessive Algal Growth	4a
		Bacteria	5c
		Depressed dissolved oxygen	5c
	1255A Goose Branch	Bacteria	5c
	1255B North Fork Upper North Bosque River	Bacteria	5c
	1255C Scarborough Creek	Bacteria	5c
	1255E Unnamed Trib. of Goose Branch	Bacteria	5c
	1255F Unnamed Trib. of Scarborough Creek	Bacteria	5c
	1255G Woodhollow Branch	Bacteria	5c
Project Location (Statewide or Watershed and County)	North Bosque River Watershed within Erath, Hamilton, Bosque, Somervell, McLennan and Coryell Counties		
Key Project Activities:	Hire Staff (X); Surface Water Quality Monitoring (X); Technical Assistance ( ); Education ( ); Implementation ( ); BMP Effectiveness Monitoring ( ); Demonstration ( ); Planning ( ); Modeling ( ); Bacterial Source Tracking ( ); Other ( )		
Texas NPS Management Program Elements:	• Element 1 (Short Term Goals 1B, 1C, 1E, 2D, 3D) • Element 2 • Element 5		
Project Costs:	Federal: $450,412	Non-Federal: $300,175	Total: $750,587
Project Management:	Texas Institute for Applied Environmental Research (TIAER)		
Project Period:	November 2, 2009 – August 31, 2014		

Part I – Applicant Information

Applicant							
Project Lead	Anne McFarland						
Title	Research Scientist						
Organization	Texas Institute for Applied Environmental Research, Tarleton State University						
E-mail Address	mcfarla@tiaer.tarleton.edu						
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City	Stephenville	County	Erath	State	Texas	Zip Code	76402
Telephone Number	(254) 968-9581			Fax Number	(254) 968-9790		

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 Institute for Applied Environmental Research (TIAER)	Responsible for all project activities and tasks including 1) submitting quarterly progress and financial reports, 2) developing data quality objectives and a quality assurance project plan for approval by TSSWCB and EPA, 3) performing routine ambient and storm event monitoring and laboratory analysis, and 4) compiling, analyzing, and summarizing monitoring data for the final project report.
Brazos River Authority (BRA)	Coordinate water quality monitoring activities in the Brazos River Basin, including the North Bosque River watershed, through the Clean Rivers Program.
Texas Commission on Environmental Quality (TCEQ)	Track and report on implementation activities associated with the I-Plan for phosphorus TMDLs in the North Bosque River watershed.

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.	An Implementation Plan for Soluble Reactive Phosphorus in the North Bosque River Watershed for Segments 1226 and 1255						
If yes, identify the agency/group that developed and/or approved the document.	TCEQ (approved December 2002) & TSSWCB (approved January 2003)		Year Developed	2002			

Watershed Information				
Watershed Name(s)	Hydrologic Unit Code (8 Digit)	Segment ID	305 (b) Category	Size (Acres)
North Bosque River	12060204	1226	4a & 5c	695,264
Upper North Bosque River	12060204	1255	4a & 5c	79,616

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.

2008 Texas Water Quality Inventory and 303(d) List:

- **Nutrient Enrichment (Algae)** – Segments 1226 and 1255 are both categorized as 4a indicating a TMDL has been completed and approved by USEPA.
- **Bacteria** – Segment 1255 is listed for bacteria for the entire waterbody. The source of the bacteria impairment is considered NPS and the impairment category is 5c, indicating that additional data and information need to be collected before a TMDL is scheduled. Within Segment 1255, six unclassified segments are also listed for bacteria. These unclassified segments are 1255A, 1255B, 1255C, 1255E, 1255F, and 1255G. In addition, three unclassified segments of Segment 1226 are listed for bacteria. These unclassified segments are 1226E, 1226F, and 1226K. All unclassified segments in Segments 1255 and 1226 listed for bacteria have NPS indicated as the source and are categorized as 5c. Segment 1226M Little Green Creek is noted for concern for near non-attainment.
- **Dissolved Oxygen** – Segment 1255 and unclassified segment 1226B are on the List as category 5c. Concerns are noted for Segments 1255H South Fork Upper North Bosque River Reservoir, 1226O Sims Creek Reservoir, and 1226 (portion near Clifton and upstream portion near Hico).
- **Ammonia** – Concerns are noted for Segments 1255 (lower portion), 1255A, 1255C, 1255J Goose Branch Reservoir, and 1226N Indian Creek Reservoir.
- **Chlorophyll-a** – Concerns are noted for Segments 1255, 1255B, 1255D South Fork North Bosque River, 1255J, 1255K Scarborough Creek Reservoir, 1226 (portion near Meridian and upstream portion near Hico), 1226B, 1226N, and 1226O.
- **Nitrate** – Concerns are noted for Segments 1255 (lower portion), 1255A, 1255C, and 1226E.
- **Orthophosphorus** – Concerns are noted for Segments 1255, 1255A, 1255B, 1255C, 1255J, 1255K, 1226 (upstream portion near Hico), 1226E, 1226K, and 1226N.
- **Total Phosphorus** – Concerns are noted for Segments 1255 (lower portion), 1255A, 1255B, 1255C, 1255J, 1255K, 1226K, and 1226N.

Project Narrative

Problem/Need Statement

This project addresses continued monitoring of water quality reductions from agricultural NPS pollution associated with I-Plan activities for two TMDLs for the North Bosque River (NBR) at 13 microwatershed sites. Segments 1226 (North Bosque River) and 1255 (Upper North Bosque River) in the Brazos River Basin were included in the *1998 303(d) List* as impaired under narrative water quality criteria related to nutrients and excessive growth of aquatic vegetation. Through the TMDL, phosphorus was identified as the nutrient most often limiting aquatic plant growth, and dairy operations and municipal wastewater treatment facility (WWTF) effluents were considered the major controllable sources of phosphorus to the river. The TCEQ adopted two TMDLs for phosphorus in the NBR for Segments 1226 and 1255 in February 2001. These TMDLs were approved by the USEPA in December 2001. *An I-Plan for Soluble Reactive Phosphorus in the NBR Watershed for Segments 1226 and 1255* was approved by the TCEQ in December 2002 and by the TSSWCB in January 2003.

As part of the I-Plan, a microwatershed approach to monitoring was included to provide finer geographic resolution for managing implementation activities (identified as "Tributary Monitoring" in the I-Plan). Monitoring at the microwatershed or subwatershed level also allows the impact of agricultural NPS implementation activities to be assessed separately from urban runoff and WWTF contributions. Monitoring at several microwatersheds was initiated in 2001 through TSSWCB projects 01-13 and 01-14 *Technical and Financial Assistance to Dairy Producers and Landowners of the NBR Watershed within the Cross-Timbers and Upper Leon SWCDs*. This monitoring has continued under a series of related projects: TSSWCB project 01-17 (*Extending TMDL Efforts in the NBR Watershed*), TSSWCB project 04-12 (*Assessment of Springtime Contributions of Nutrients and Bacteria to the NBR Watershed*), and TSSWCB project 08-09 (*Microwatershed-Based Approach to Monitoring and Assessing Water Quality in the North Bosque River Watershed*). Data collected from these microwatersheds has been used to help the TSSWCB direct technical and financial assistance to property owners and to better characterize the effects of implemented management activities. This project also complements monitoring along the mainstem of the North Bosque River conducted under a TCEQ CWA §319(h) project.

Continued monitoring of microwatershed sites in the headwaters of the North Bosque River is needed to evaluate the ongoing effectiveness of agricultural NPS pollution prevention programs. While the I-Plan for the North Bosque River phosphorus TMDL was adopted in early 2003, not all strategies within the I-Plan have yet been adopted. For example, the development and certification of comprehensive nutrient management plans (CNMPs) has had limited progress until fairly recently due to a variety of reasons. Deadline extensions for the issuance of permits by TCEQ for concentrated animal feeding operations (CAFOs) have also delayed the adoption of CNMPs. These delays are being overcome, and continued monitoring at these microwatershed sites is, thus, needed to more fully monitor success of implementing CNMPs. Also, improvements in water quality lag changes in land management due to residual impacts (e.g., fertilizer applied in excess in previous years) and variations in weather patterns that occur seasonally, annually, and over decades. As part of monitoring for success for the North Bosque River TMDL, water quality monitoring was initiated in the spring of 2001 at over a dozen microwatershed sites. While some improvements have been documented in previous project reports (see Millican and McFarland, 2008: *Extending TMDL Efforts in the North Bosque River Watershed: Data Evaluation through 2007),* precipitation and runoff conditions have varied greatly between 2001 and 2007 from pre-TMDL conditions, somewhat confounding the evaluation of water quality changes. Precipitation and runoff patterns are expected to vary greatly from year to year but also may show climatic variations between decades that require long-term monitoring to understand. Assessment of conservation or land management practices often depends on the climatic "baseline" evaluated from short-term projects of only a few years. Rarely do "average" weather conditions occur and if weather conditions happen to be unusually wet or dry during the assessment period, the evaluation of effectiveness will be skewed. Long-term monitoring allows assessment of practices over a range of weather conditions and evaluation of the impact of "rare" events, such as large floods or extended droughts, on overall effectiveness. The findings from long-term monitoring can then be transferred to other watersheds to aid in realistically assessing the conditions and time needed to obtain NPS water quality improvements.

One component of the I-Plan that has shown clear reductions in the amount of in-stream phosphorus based on microwatershed data is the manure hauling and composting program. While financial support for the Composted Manure Incentive Project (CMIP) by TCEQ ended in August 2006 and TSSWCB funding for the Dairy Manure Export Support

(DMES) program ended in February 2007, continuing microwatershed monitoring through this project will help assess the long-term effectiveness of these programs. While the public funding support for these projects has ceased, a goal of CMIP and DMES was to aid in the establishment of a self-sustaining composting industry. Within the watershed, six composting facilities are still active and many amended CAFO permits note the use of composting for manure disposal. While specific tracking of manure haul-off data is not available, indirect measures based on general information from permits and composting facilities should allow linkage of changes in water quality at the microwatershed level to the effectiveness of overall manure management including the use of composting.

Finally, while these TMDLs specifically address soluble reactive phosphorus with regard to excessive algal growth, total phosphorus, nitrogen constituents, total suspended solids and bacteria, will also be monitored. Several tributaries of the NBR are listed as impaired due to elevated bacteria, and many of the implementation practices for phosphorus reduction are anticipated to also decrease bacteria concentrations.

Project Narrative

General Project Description (Include Project Location Map)

This project provides assessment for evaluating reductions in agricultural NPS pollution associated with I-Plan activities. Monitoring will be conducted for 53 months during which TIAER will provide continued assessment activities at 13 microwatershed sites within the NBR watershed (Figure 1 and Table 1). The project will make use of automated sampling systems already in TIAER's possession, so no new equipment will be needed.

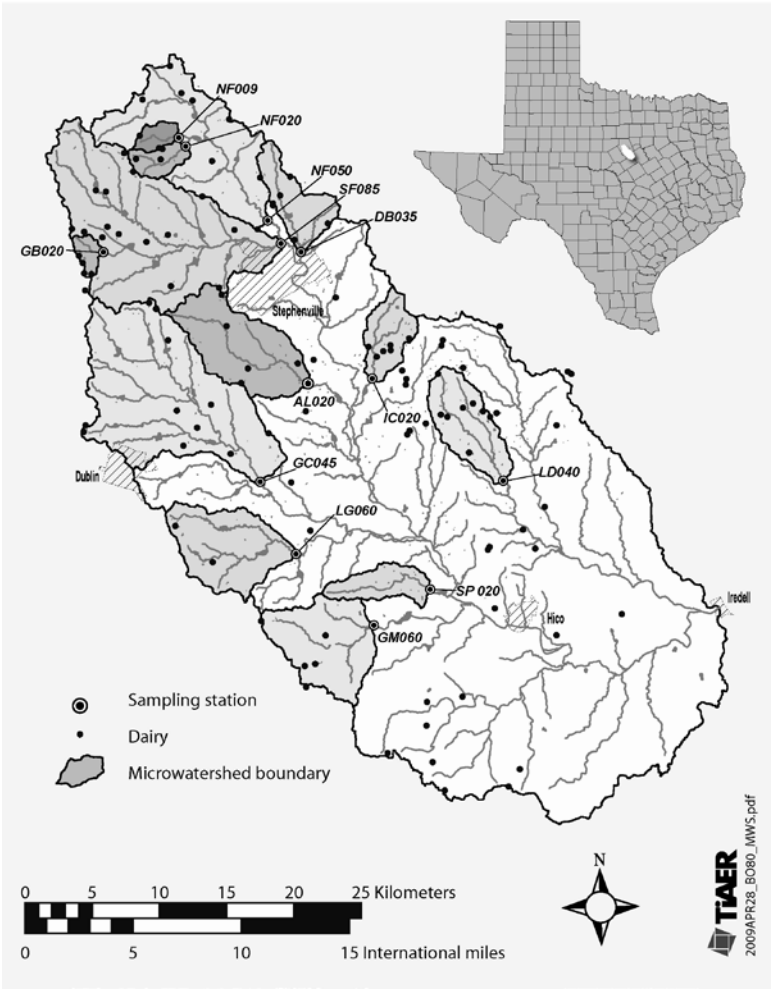

Figure 1. Location of microwatershed sampling sites within the upper portion of the NBR watershed.

These 13 microwatersheds were selected to represent the range of land management practices within the watershed and to provide focused monitoring in the upper portion of the NBR watershed, where most dairy operations are located. Selection of sampling sites also considered the availability of historical monitoring data. Most of these stream sites have been monitored since spring 2001, although some sites have a monitoring history extending back to 1991 (Table 1).

The data collected should allow demonstration of success of I-Plan activities. Smaller stream sites were chosen, because it is anticipated that changes in water quality will occur more quickly in these smaller watersheds than in larger watersheds and that changes observed can be more readily related to changes in land management. Monitoring at these microwatershed sites also helps isolate agricultural activities from urban runoff and WWTF discharges that impact the mainstem of the river.

Table 1. Location and sampling history of monitoring sites.

TIAER Site ID	TCEQ ID	Watershed and General Location	Date of First Grab Sample	Date of First Automatic Storm Sample
AL020	17604	Alarm Creek at FM 914	14-May-01	05-Sep-01
DB035	17603	Dry Branch near FM 8	2-Apr-02	5-Feb-02
GB020	17214	Unnamed tributary to Goose Branch between CR 541 & CR 297	11-May-95	5-May-95
GC045	17609	Green Creek upstream of SH 6	16-Apr-01	26-May-01
GM060	17610	Gilmore Creek at bend of CR 293	5-Feb-01	31-Aug-01
IC020	17235	Indian Creek downstream of US 281	8-Jun-94	18-Oct-93[a]
LD040	17608	Little Duffau Creek at FM 1824	14-May-01	31-Aug-01
LG060	17606	Little Green Creek at FM 914	14-May-01	14-Jul-01
NF009	17223	Unnamed tributary of Scarborough Creek at CR 423	18-Apr-91	16-May-92[b]
NF020	17222	North Fork North Bosque River Scarborough Creek at CR 423	30-Oct-91	19-May-92
NF050	17413	North Fork of North Bosque River at SH 108	4-Apr-91	7-Jun-91[c]
SF085	17602	South Fork of North Bosque River at SH 108	30-Apr-01	26-May-01
SP020	17242	Spring Creek at CR 271	8-Jun-94	20-Oct-93[a]

[a] Storm sampling suspended from March 3, 1998 to May 3, 2001 at IC020 and SP020 and from March 3, 1998 through May 12, 2001 at SC020.
[b] Storm sampling at NF009 was suspended from March 25, 1998 through June 12, 1998.
[c] Storm sampling at NF050 was suspended from February 9, 1997 through May 4, 2001.

TIAER will conduct routine monitoring (grab samples) at 13 sites once every month, collecting field, flow, conventional and bacteria parameter groups. TIAER will avoid duplicative routine monitoring conducted at these sites by other entities including TCEQ and BRA. Routine grab samples will be analyzed for nutrient forms, total suspended solids (TSS), and *E. coli*. In addition, field constituents of dissolved oxygen, pH, specific conductance (conductivity), and water temperature will be recorded at the time grab samples are collected. Historically, these sites are dry or not flowing about 50 percent of the time when visited for routine sampling. These sites flow primarily in response to rainfall-runoff events and have a fairly rapid hydrograph response making it necessary to include automated storm monitoring.

TIAER will conduct biased-flow monitoring (automated sampling) under high flow (storm event influenced) conditions at all 13 sites during about 16 storm events per site per year. TIAER will maintain and operate automated samplers and water-level recorders at all 13 sites, along with stage-discharge relationships for the measurement of flow. Automated samplers will be set to activate sampling upon a selected rise in water level and collect individual samples at sequential time intervals. At each site, individual samples will be retrieved and flow-composited into one sample on about a daily basis that will be analyzed for nutrient forms and TSS.

TIAER will develop a Quality Assurance Project Plan (QAPP) for monitoring activities to ensure data of known and acceptable quality are generated and used in this project. The QAPP will be consistent with *EPA Requirements for Quality Assurance Project Plans (QA/R-5)*, the *TSSWCB Environmental Data Quality Management Plan*, and various TCEQ guidelines for monitoring procedures and methods. TIAER will transfer monitoring data to TSSWCB for inclusion in the TCEQ Surface Water Quality Monitoring Information System (SWQMIS).

TIAER will participate in North Bosque River TMDL meetings, Clean Rivers Program Steering Committee meetings, and other meetings as appropriate in order to coordinate monitoring efforts and summarize activities and achievements made through this project. TIAER will provide summaries of project results and activities, as needed, to BRA for inclusion in Clean Rivers Program Basin Highlights/Summary Reports, and to TCEQ for inclusion in TMDL implementation tracking reports.

TIAER will develop an Assessment Data Report summarizing water quality data collected at microwatershed sites during the project. The Report shall, at a minimum, provide an assessment of water quality with respect to effectiveness of TMDL implementation practices at the microwatershed scale and a discussion of progress toward achieving TMDL water quality goals.

Tasks, Objectives and Schedules						
Task 1:	Project Administration					
Costs:	Federal:	$26,566	Non-Federal:	$15,477	Total:	$42,043
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:	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 15th of January, April, July and October. QPRs shall be distributed to all project partners.					
	Start Date:	Month 1		Completion Date:	Month 58	
Subtask 1.2:	TIAER 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 58	
Subtask 1.3:	TIAER will participate in meetings, such as NBR TMDL meetings, Clean Rivers Program Steering Committee and Coordinated Monitoring meetings, and other meetings as appropriate, in order to efficiently and effectively achieve project goals, coordinate monitoring efforts and summarize activities and achievements made throughout the course of this project.					
	Start Date:	Month 1		Completion Date:	Month 58	
Deliverables	• Quarterly progress reports in electronic format • Reimbursement Forms and necessary documentation in hard copy format					

Tasks, Objectives and Schedules						
Task 2:	Quality Assurance					
Costs:	Federal:	$7,434	Non-Federal:	$4,186	Total:	$11,620
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:	TIAER will develop a QAPP for activities in Task 3 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.* 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 standards, shall be required. 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).*					
	Start Date:	Month 0		Completion Date:	Month 1	
Subtask 2.2:	TIAER will submit revisions and necessary amendments to the QAPP as needed.					
	Start Date:	Month 1		Completion Date:	Month 58	
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 4.					

Tasks, Objectives and Schedules						
Task 3:	Surface Water Quality Monitoring					
Costs:	Federal:	$387,488	Non-Federal:	$267,064	Total:	$654,552
Objective:	To collect water quality data (routine ambient and storm event) to support assessment and adaptive management of TMDL implementation activities in the North Bosque River watershed.					
Subtask 3.1:	TIAER will conduct routine ambient monitoring (grab samples) at 13 sites (Figure 1 and Table 1) once every month, collecting field, flow, conventional and bacteria parameter groups. The sampling period will be for 53 months. The total number of samples budgeted for collection through this subtask is 372 assuming sites will be flowing only about 50% of the time when routine monitoring is scheduled with 10% field splits as part of QA/QC. TIAER will avoid duplicative routine ambient monitoring conducted at these sites by other entities including TCEQ and BRA. Routine grab samples will be analyzed in TIAER's NELAP-accredited lab for nutrient forms (total phosphorus, dissolved orthophosphate phosphorus [also referred to as soluble reactive phosphorus], total Kjeldahl nitrogen, dissolved ammonia, and dissolved nitrite plus nitrate), total suspended solids (TSS), and *E. coli*. In addition, field constituents of dissolved oxygen, pH, conductivity, and water temperature will be recorded at the time grab samples are collected.					
	Start Date:	Month 5	Completion Date:	Month 57		
Subtask 3.2:	TIAER will conduct biased-flow monitoring (automated sampling) under high flow (storm event influenced) conditions at 13 sites (Figure 1 and Table 1) during about 16 storm events per year per site. Of note based on long-term monitoring 32 events on average occur per year at each site. The sampling period extends over 53 months. Total number of storm samples budgeted for collection through this subtask is 930 which represents about half the storm samples expected on average. TIAER will maintain and operate automated samplers and water-level recorders at all 13 sites. Automated samplers will be set to activate sampling upon a selected rise in water level and collect individual samples at sequential time intervals. At each site, individual samples will be retrieved daily and flow-composited into one sample that will be analyzed in TIAER's NELAP-accredited lab for nutrient forms (total phosphorus, dissolved orthophosphate phosphorus, total Kjeldahl nitrogen, dissolved ammonia, and dissolved nitrite plus nitrate) and TSS. Due to the unpredictable nature of wet-weather monitoring, TIAER is not able to guarantee a set number of wet-weather samples from each station. Based on historical monitoring efforts, budgeted sampling will only allow for about half of all storm events under average rainfall conditions to be monitored. Efforts will be made to sample storm events that are representative of conditions during the monitoring period to meet project objectives.					
	Start Date:	Month 5	Completion Date:	Month 57		
Subtask 3.3:	Stage-discharge relationships will be maintained and updated, as necessary, for all 13 sites. This will include taking flow measurements and re-surveying stream cross-sections, if apparent changes have occurred.					
	Start Date:	Month 1	Completion Date:	Month 57		
Deliverables	• Routine ambient and biased-flow (storm event) data of known and acceptable quality as reported through Task 4.					

Tasks, Objectives and Schedules						
Task 4:	Data Management and Reporting of Data Assessment					
Costs:	Federal:	$28,924	Non-Federal:	$13,448	Total:	$42,372
Objective:	To manage and transfer monitoring data for inclusion in the TCEQ SWQMIS and to develop a final report summarizing the results and activities of the project and assessing improvements in water quality.					
Subtask 4.1:	TIAER will review and transfer monitoring data from activities in Task 3 to TSSWCB for inclusion in the TCEQ SWQMIS at least quarterly after the first quarter. Data will be transferred in the correct format using the TCEQ file structure, along with a completed Data Summary, as described in the most recent version of the *TCEQ Surface Water Quality Monitoring Data Management Reference Guide*. TIAER will submit Station Location Requests as needed to obtain TCEQ station numbers for new monitoring sites. TIAER will input monitoring regime, as detailed in the QAPP, into the TCEQ CMS. Data Correction Request Forms will be submitted to TSSWCB whenever errors are discovered in data already reported.					
	Start Date:	Month 5		Completion Date:		Month 58
Subtask 4.2:	TIAER will provide summaries of project results and activities, as needed, 1) to BRA for inclusion in Clean Rivers Program Basin Highlights/Summary Reports, and 2) to TCEQ for inclusion in TMDL implementation tracking reports.					
	Start Date:	Month 1		Completion Date:		Month 58
Subtask 4.3:	TIAER will develop a final Assessment Data Report summarizing water quality data collected at microwatershed sites during the project. The Report shall, at a minimum, provide an assessment of water quality with respect to effectiveness of BMPs implemented at the microwatershed scale and a discussion of interim short-term progress in achieving TMDL water quality goals. A draft of this report will be submitted to the TSSWCB for review prior to finalizing the report.					
	Start Date:	Month 47		Completion Date:		Month 58
Deliverables	• Station Location Request Forms (as needed) in electronic format • Monitoring data files and Data Summary Form in electronic format • Data Correction Request Forms (as needed) in electronic format • Project summaries (as needed) for inclusion in BRA and TCEQ publications • Final Technical Report characterizing trends and variability in collected water quality monitoring data					

Project Goals (Expand from NPS Summary Page)

To provide targeted surface water quality data that can be used in evaluating the effectiveness of agricultural NPS pollution abatement efforts associated with I-Plan activities for *Two TMDLs for Phosphorus in the North Bosque River (Segments 1226 and 1255).* While these TMDLs specifically address soluble reactive phosphorus with regard to excessive algal growth, other nutrient constituents and related water quality parameters, such as total suspended solids and bacteria, will be assessed, so evaluation can be conducted to determine whether reductions focusing on phosphorus also result in reductions of other NPS loadings. Specific goals include:

- Providing assessment data to allow for the continuing evaluation of the impact of manure haul-off and composting. Previous monitoring efforts show significant decreases in soluble phosphorus in microwatersheds with the largest relative participation in the composting haul-off program with regard to overall cow numbers and land area. TCEQ support for the Composted Manure Incentive Project (CMIP) ended in August 2006 and TSSWCB funding for the Dairy Manure Export Support (DMES) program ended in February 2007; the data collected should allow evaluations to see if improvements are still occurring.
- Providing assessment data to allow for the continuing evaluation of the impact of Comprehensive Nutrient Management Plans (CNMPs) within the watershed. Only recently have a significant number of CNMPs been certified by TSSWCB. With the development, approval, and implementation of CNMPs within the watershed, water quality should be improving and the monitoring data collected should allow assessment of these improvements.
- Providing assessment data in support of the TSSWCB Statewide Bacterial Water Quality Impairment Reduction Initiative. As part of the TMDLs for the North Bosque River, it is anticipated that many of the implementation practices for phosphorus reduction will also have an impact on bacteria concentrations. Continued monitoring of bacteria will help in evaluating improvements in water quality for this NPS concern.

Measures of Success (Expand from NPS Summary Page)

Collection of assessment data that will allow continuing evaluation of improvements in water quality, associated with NPS pollution abatement activities outlined in the TMDL I-Plan, at targeted microwatershed locations within the headwaters of the North Bosque River watershed. Specific measures of success include:

- Routine data collected are of known and acceptable quality and are representative of ambient water quality conditions across the microwatersheds monitored.
- Biased-flow data collected are of known and acceptable quality and are representative of storm event influenced water quality conditions across the microwatersheds monitored.
- Percentage of routine and storm events successfully monitored with complete and accurate data that satisfies DQOs.
- Provide and report evaluations using collected data to demonstrate effectiveness of I-Plan activities.

2005 Texas Nonpoint Source Management Program Reference (Expand from NPS Summary Page)
Goals and/or Milestone(s)
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 B – Ensure that monitoring procedures meet quality assurance requirements and are in compliance with EPA-approved…TSSWCB Quality Management Plan. This project generates water quality data under the auspices of the USEPA-approved *TSSWCB Environmental Data Quality Management Plan*.
Short-Term Goal One – Data Collection and Assessment – Objective C – Conduct special studies to…gain information to target TMDL activities and BMP implementation. This project will coordinate monitoring activities with on-going monitoring and modeling projects within the watershed to evaluate improvements in water quality with implementation of management practices.
Short-Term Goal One – Data Collection and Assessment – Objective E – Conduct monitoring to determine effectiveness of TMDL I-Plans…and BMP implementation. This project will provide data that will be used in the evaluation of pre- and post-TMDL conditions to assess water quality improvement in targeted microwatersheds.
Short-Term Goal Two – Implementation – Objective D – Implement state-approved TMDL I-Plans…developed to restore and maintain water quality in water bodies identified as impacted by NPS pollution. This project implements monitoring activities described in the TMDL I-Plan that are designed to assess water quality improvements that are associated with on-going pollution abatement activities.
Short-Term Goal Three – Education – Objective D – Conduct outreach through the Clean Rivers Program…to facilitate broader participation and partnerships…[and] enable stakeholders and the public to…[gain] a more complete understanding of water quality issues and how they relate to each citizen. This project will provide information that can be used in educational and outreach materials including Clean Rivers Program publications and TMDL implementation tracking reports.
Element 2 – Working partnerships and linkages to appropriate state, interstate, tribal, regional, and local entities, private sector groups, and federal agencies. This project is committed to cooperation with other agencies and programs in the sharing of data and information.
Element 5 – The state program identifies waters and their watersheds impaired by NPS pollution…. Further, the state establishes a process to progressively address these identified waters by conducting more detailed watershed assessments and developing watershed implementation plans, and then by implementing the plans. This project implements monitoring activities described in the TMDL I-Plan that are designed to assess water quality improvements that are associated with on-going pollution abatement activities.

Part III – Financial Information

Budget Summary			
Federal	$ 450,412	% of total project	60%
Non-Federal	$ 300,175	% of total project	40%
Total	$ 750,587	Total	100%

Category	Federal	Non-Federal	Total
Personnel	$ 241,649	$ 62,795	$ 304,444
Fringe Benefits	$ 62,778	$ 16,278	$ 79,056
Travel	$ 6,320	$ 4,214	$ 10,534
Equipment	$ 0	$ 0	$ 0
Supplies	$ 8,657	$ 5,770	$ 14,427
Contractual	$ 0	$ 0	$ 0
Construction	$ 0	$ 0	$ 0
Other	$ 97,630	$ 67,919	$ 165,549
Total Direct Costs	$ 417,034	$ 156,976	$ 574,010
Indirect Costs (≤15%)	$ 33,378	$ 143,199	$ 176,577
Total Project Costs	$ 450,412	$ 300,175	$ 750,587

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 covers a 58-month period.

Budget Justification (Federal)

Category	Total Amount	Justification
Personnel	$ 241,649	Federal portion represents about 79% of total category costs.
Fringe Benefits	$ 62,778	Equals about 26% of federal salaries.
Travel	$ 6,320	Travel to and from sampling sites for sample retrieval and general maintenance and attendance at meetings for monitoring coordination. TIAER provides vehicles but costs include gas and maintenance. Federal portion represents 60% of total category costs.
Equipment	$ 0	N/A
Supplies	$ 8,657	Necessary field and laboratory supplies associated with monitoring, analysis, maintenance, and repairs. Federal portion represents 60% of total category costs.
Contractual	$ 0	N/A
Construction	$ 0	N/A
Other	$ 97,630	Other represents primarily costs associated with lab analyses for samples ($83,250) with a smaller portion allocated for items, such as vehicle maintenance, phone service to automated samplers, software support, and miscellaneous charges for postage and shipping ($14,380). Federal portion represents 60% of total category costs.
Indirect	$ 33,378	Indirect charged 10% of total direct costs minus Laboratory Cost Center costs.

Budget Justification (Non-Federal)		
Category	Total Amount	Justification
Personnel	$ 62,795	Non-federal portion represents about 21% of total category costs.
Fringe Benefits	$ 16,278	Equals about 26% of non-federal salaries.
Travel	$ 4,214	Travel to and from sampling sites for sample retrieval and general maintenance and attendance at meetings for monitoring coordination. TIAER provides vehicles but costs include gas and maintenance. Non-federal portion represents 40% of total category costs.
Equipment	$ 0	N/A
Supplies	$ 5,770	Necessary field and laboratory supplies associated with monitoring, analysis, maintenance, and repairs. Non-federal portion represents 40% of total category costs.
Contractual	$ 0	N/A
Construction	$ 0	N/A
Other	$ 67,919	Other represents primarily costs associated with lab analyses for samples ($58,332) with a smaller portion allocated for items, such as vehicle maintenance, phone service to automated samplers, software support, and miscellaneous charges for postage and shipping ($9,587). Non-federal portion represents 40% of total category costs.
Indirect	$ 143,199	Total indirect calculated as 58% of personnel (Tarleton State University's indirect rate). Non-federal match for indirect calculated as the difference between total and federal indirect.

Budget Justification:

Other –
Starting in FY2010, TIAER's chemistry laboratory will be operated as a service center and will bill the project for each sample for the analytes analyzed. A detailed listing of costs per analyte is available upon request. The TIAER analytical laboratory is staffed by a lab manager (Mark Murphy), two chemists, and a research technician. The analytical laboratory also generally employs two to four student workers.

Personnel & Fringe Benefits –
Estimated personnel allocations are outlined in the table below and are described as follows. As the project leader Dr. Anne McFarland will provide project administration, coordination, and technical oversight as outlined in Task 1. Dr. Larry Hauck, Lead Research Scientist at TIAER, will provide guidance to Dr. McFarland, as needed, for project oversight and will review the final report prior to submittal to the TSSWCB. Data storage and database management under Task 3 will be conducted by Mr. Jim Rogers. Ms. Nancy Easterling, TIAER's Quality Assurance Officer, and Mr. Mark Murphy, the TIAER lab manager, will be assisting Dr. McFarland in data review under Task 3, QAPP development under Task 2, and data submittals under task 4. Dr. McFarland will be the primary author of the final project report under Task 4 with assistance in data analysis provided by Mr. Jimmy Millican and Mr. Todd Adams with programming by Mr. Jim Rogers.

TIAER's field operations staff will conduct the assessment monitoring and development of stage-discharge relationships. All samples will be analyzed in TIAER's NELAP accredited analytical laboratory under task 3. Mr. Jeff Stroebel is the supervisor of field operations and will oversee field efforts for routine and storm monitoring. The field staff includes two full-time employees (Abel Martinez and David Blankenship) and generally one student worker. As needed, other TIAER staff members who are trained in field techniques (Jimmy Millican, David Pendergrass, Tim Jones, and Todd Adams) will assist with routine and storm monitoring. Vickie Hunt will also assist with bottle and equipment preparation for field sampling.

Name	Title	Estimated % Time on Project*
Field Operations		
Tim Jones	Sr Research Associate	2%
Jeff Stroebel	Research Associate	14%
Abel Martinez	Sr Research Assistant	13%
David Blankenship	Research Assistant	13%
David Pendergrass	Asst. Research Scientist	5%
Vickie Hunt	Technician	5%
Student Worker	Student Worker	10%
Data Management, Assessment & Reporting**		
Larry Hauck	Lead Scientist	<1%
Anne McFarland	Sr. Research Scientist	15%
Jim Rogers	Sr Programmer/Analyst	25%
Jimmy Millican	Asst. Research Scientist	8%
Todd Adams	Research Associate	8%
Nancy Easterling	Research Associate	10%
Mark Murphy	Laboratory Manager	<1%
Student Worker	Student Worker	6%

* Percent time during any given month or quarter will vary depending on tasks to be completed and weather conditions for assessment activities.