



**Texas State Soil and Water Conservation Board
 Clean Water Act §319(h) Nonpoint Source Grant Program
 FY 2008 Project 08-09**

NONPOINT SOURCE SUMMARY PAGE						
Clean Water Act §319(h) Agricultural and Silvicultural Nonpoint Source Grant Program						
Title of Project	Microwatershed-Based Approach to Monitoring and Assessing Water Quality in the North Bosque River Watershed					
Project Goals	To provide targeted assessment data for the evaluation of continuing agricultural NPS pollution abatement efforts associated with I-Plan activities for two phosphorus TMDLs in the North Bosque River.					
Project Tasks	(1) Project Administration; (2) Quality Assurance; (3) Surface Water Quality Monitoring; and (4) Data Management and Reporting of Data Assessment.					
Measures of Success	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.					
Project Type	Implementation (); Education (); Planning (); Assessment (X); Groundwater ()					
Status of Water Body on 2008 Texas Water Quality Inventory and 303(d) List	<u>Segment ID</u>		<u>Parameter</u>		<u>Category</u>	
	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	<ul style="list-style-type: none"> • Element 1 (Short Term Goals 1B, 1C, 1E, 2D, 3D) • Element 2 • Element 5 					
Project Costs	Federal	\$107,824	Non-Federal	\$100,000	Total	\$207,824
Project Management	Texas Institute for Applied Environmental Research (TIAER)					
Project Period	September 1, 2008 – February 28, 2010					

Part I – Applicant Information

Applicant							
Project Lead		Anne McFarland					
Title		Research Scientist					
Organization		Texas Institute for Applied Environmental Research, Tarleton State University					
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Telephone	(254) 968-9581			Fax	(254) 968-9790		

Project Partners	
Names	Roles & Responsibilities
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 and summarizing monitoring data for the final project report.
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.
Environmental Protection Agency (EPA)	Provide federal oversight and management in cooperation with the TSSWCB of CWA Section 319 funded project.
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 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 adopted TMDL Report 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/Highlights Reports, or other documented sources.
<p>Within the 2008 Texas Water Quality Inventory and 303(d) List, the following impairments or concerns are indicated:</p> <ul style="list-style-type: none"> • Nutrient Enrichment (Algae) – Segments 1226 and 1255 are both categorized as 4a indicating a TMDL has been completed and approved by the U.S. Environmental Protection Agency (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. • Depressed 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 is designed to assess continuing reductions in agricultural nonpoint source (NPS) pollution associated with Implementation Plan (I-Plan) activities for two total maximum daily loads (TMDLs) for the North Bosque River (NBR). 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* and TSSWCB project 04-12 *Assessment of Springtime Contributions of Nutrients and Bacteria to the NBR Watershed* and now this project 08-09. 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.

The manure hauling and composting program is one component of the I-Plan that has shown clear reductions in the amount of in-stream phosphorus based on microwatershed data. While 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, continuing microwatershed monitoring through this project will allow for evaluations to determine if improvements in water quality are still occurring as an impact of manure haul-off and composting.

While it has been several years since the I-Plan was approved, adoption of some strategies prescribed in the I-Plan has been slow. 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 now being overcome, and continued monitoring at these microwatershed sites is, thus, needed to more fully monitor success of implementing CNMPs.

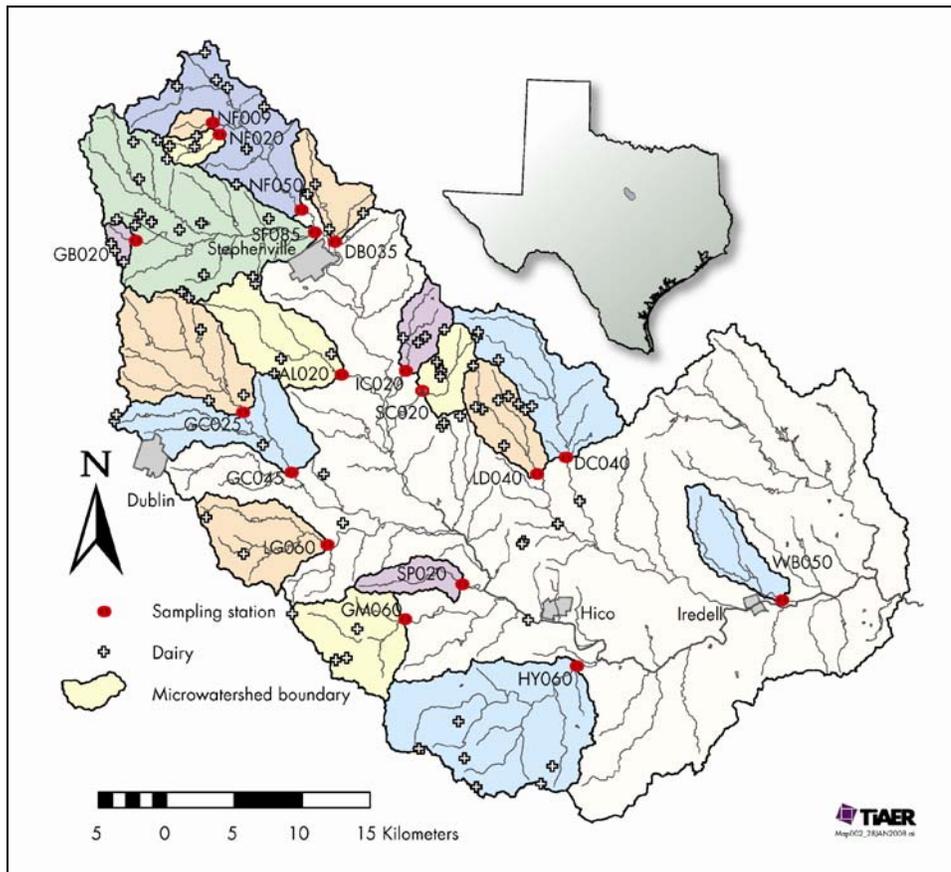
Additionally, in cooperation with the U.S. Army Corps of Engineers (USACE) and the USDA Natural Resources Conservation Service (NRCS), assessment data from the Gilmore Creek subwatershed may be used for evaluating the water quality impact of targeted implementation of conservation practices and planning.

Finally, 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 monitored. It is anticipated that many of the implementation practices for phosphorus reduction will also have an impact on bacteria concentrations. Many of the tributaries in the NBR watershed are listed as impaired due to elevated bacteria. Continued monitoring of bacteria will support the TSSWCB Statewide Bacterial Water Quality Impairment Reduction Initiative and will help in evaluating ancillary improvements in water quality from implementing phosphorus abatement strategies.

Project Narrative

General Project Description (Include Project Location Map)

This project will provide assessment data for use in evaluating reductions in NPS pollution associated with I-Plan activities in the agricultural sector. Monitoring is proposed for 12 months (October 2008 – September 2009). In this project, TIAER will provide continued assessment activities at 18 microwatershed sites within the NBR watershed (Figure 1 and Table 1).



The monitoring effort will make use of numerous automated sampling systems in TIAER’s possession that will be made available to this project. These 18 microwatersheds represent a variety of land uses within the watershed and provide focused monitoring in the upper portion of the NBR watershed, where most dairy operations are located. Most of these stream sites have been monitored since April or May 2001, although some sites have a monitoring history extending back to 1991 (Table 1). Sites on Walker Branch (WB050) and the upper portion of Green Creek (GC025) have been more recently added to the monitoring network.

Data collected when evaluated should allow demonstration of the success of I-Plan activities. Sampling sites were selected that represent a range of land management practices within the watershed. Selection of sampling sites also considered the availability of historical monitoring data. Smaller

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

stream sites were chosen, because it is anticipated that changes in water quality will occur more quickly in these smaller watersheds than in larger watershed areas and that changes observed can be more readily related to changes in land management. Monitoring at these microwatershed sites may also help isolate agricultural activities from urban runoff and WWTF discharges that impact the main stem of the river.

TIAER will conduct routine ambient monitoring (grab samples) at 18 sites once every month, collecting field, flow, conventional and bacteria parameter groups. TIAER will avoid duplicative routine ambient 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, conductivity, and water temperature will be recorded at the time grab samples are collected. Note that, based on a historical review, these sites are generally dry or not flowing about 50 percent of the time when visited for routine sampling.

TIAER will conduct biased-flow monitoring (automated sampling) under high flow (storm event influenced) conditions at 18 sites during about 8 storm events collecting flow and conventional parameter groups. TIAER will maintain and operate automated samplers and water-level recorders at all 18 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 daily and flow-

composited into one sample that will be analyzed for nutrient forms and TSS.

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	5-Sep-01
DB035	17603	Dry Branch near FM 8	2-Apr-02	5-Feb-02
DC040	17607	Duffau Creek at FM 2481	16-Apr-01	7-May-01
GB020	17214	Unnamed tributary to Goose Branch between CR 541 and CR 297	11-May-95	5-May-95
GC025	TBD ^a	Green Creek upstream of FM 847	28-Jan-08	25-Jan-08
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
HY060	17611	Honey Creek at FM 1602	16-Apr-01	4-May-01
IC020	17235	Indian Creek downstream of US 281	8-Jun-94	18-Oct-93 ^b
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 ^c
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 ^d
SC020	17240	Sims Creek upstream of US 281	21-Sep-94	17-Jan-95 ^b
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 ^b
WB050	TBD ^a	Walker Branch at FM 927	28-Jan-08	26-Jan-08

^a TBD = to be determined; paperwork has been submitted to TCEQ but identification numbers have not yet been assigned.

^b 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.

^c Storm sampling at NF009 was suspended from March 25, 1998 through June 12, 1998.

^d Storm sampling at NF050 was suspended from February 9, 1997 through May 4, 2001.

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.

At the end of the project, 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 BMPs implemented at the microwatershed scale and a discussion of interim short-term progress in achieving TMDL water quality goals.

Tasks, Objectives and Schedules						
Task 1:	Project Administration					
Costs:	Federal:	\$7,598	State:	\$5,990	Total:	\$13,588
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 15 th of January, April, July and October. QPRs shall be distributed to all project partners.					
	Start Date:	Month 1		Completion Date:	Month 18	
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 18	
Subtask 1.3	TIAER will participate in North Bosque River TMDL meetings, Clean Rivers Program Steering Committee 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 18	
Deliverables	<ul style="list-style-type: none"> • Quarterly progress reports in electronic format. • Reimbursement Forms and necessary documentation in either electronic or hard copy format. 					

Tasks, Objectives and Schedules						
Task 2:	Quality Assurance					
Costs:	Federal:	\$1,343	State:	\$750	Total:	\$2,093
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 <i>EPA Requirements for Quality Assurance Project Plans (QA/R-5)</i> and the <i>TSSWCB Environmental Data Quality Management Plan</i> .					
	<p>Consistency with Title 30, Chapter 25 of the Texas Administrative Code, <i>Environmental Testing Laboratory Accreditation and Certification</i>, which describes Texas' approach to implementing the National Environmental Laboratory Accreditation Conference (NELAC) standards, shall be required.</p> <p>All monitoring procedures and methods prescribed in the QAPP shall be consistent with the guidelines detailed in the <i>TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue (RG-415)</i> and <i>Volume 2: Methods for Collecting and Analyzing Biological Community and Habitat Data (RG-416)</i>.</p>					
Subtask 2.2:	TIAER will submit revisions and necessary amendments to the QAPP as needed.					
	Start Date:	Month 5		Completion Date:	Month 6	
Deliverables	<ul style="list-style-type: none"> • QAPP approved by TSSWCB in both electronic and hard copy formats for the first 6 months of monitoring • Approved revision to the QAPP approved by TSSWCB and EPA for the second 6 months of monitoring • Approved amendments to the 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:	\$88,761	State:	\$87,320	Total:	\$176,081
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:	<p>TIAER will conduct routine ambient monitoring (grab samples) at 18 sites (Figure 1) once every month, collecting field, flow, conventional and bacteria parameter groups. The sampling period extends 12 months. Total number of sample events scheduled for collection through this subtask is 216, plus 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.</p> <p>Routine grab samples will be analyzed for nutrient forms (total phosphorus, dissolved orthophosphate phosphorus, total Kjeldahl nitrogen, dissolved ammonia, and dissolved nitrite plus nitrate), total suspended solids (TSS), and <i>E. coli</i>. In addition, field constituents of dissolved oxygen, pH, conductivity, and water temperature will be recorded at the time grab samples are collected.</p>					
	Start Date:	Month 2		Completion Date:	Month 13	
Subtask 3.2:	<p>TIAER will conduct biased-flow monitoring (automated sampling) under high flow (storm event influenced) conditions at 18 sites (Figure 1) during about 16 storm events collecting flow and conventional parameter groups. The sampling period extends over 6 months. Total number of sample events budgeted for collection through this subtask is 300.</p> <p>TIAER will maintain and operate automated samplers and water-level recorders at all 18 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 for nutrient forms (total phosphorus, dissolved orthophosphate phosphorus, total Kjeldahl nitrogen, dissolved ammonia, and dissolved nitrite plus nitrate) and total suspended solids (TSS).</p> <p>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.</p>					
	Start Date:	Month 2		Completion Date:	Month 13	
Subtask 3.3:	<p>Stage-discharge relationships will be maintained and updated, as necessary, for all 18 sites. This will include taking flow measurements and re-surveying stream cross-sections, if apparent changes have occurred.</p>					
	Start Date:	Month 2		Completion Date:	Month 13	
Deliverables	<ul style="list-style-type: none"> 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:	\$10,122	State:	\$5,940	Total:	\$16,062
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 <i>TCEQ Surface Water Quality Monitoring Data Management Reference Guide</i> . TIAER will submit Station Location Requests as needed to obtain TCEQ station numbers for new monitoring sites. Data Correction Request Forms will be submitted to TSSWCB whenever errors are discovered in data already reported.					
	Start Date:	Month 2	Completion Date:	Month 18		
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 18		
Subtask 4.3:	Towards the end of the project, 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 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 8	Completion Date:	Month 18		
Deliverables	<ul style="list-style-type: none"> • Station Location Request Forms (as needed) in electronic format • Monitoring data files and Data Summary in electronic format • Data Correction Request Forms (as needed) in electronic format • Project summaries (as needed) for inclusion in BRA and TCEQ publications • Technical Report characterizing trends and variability in collected water quality monitoring data 					

Project Goals (Expand from NPS Summary Page)

To provide targeted assessment data that can be used in evaluating 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 cooperation with a USACE and NRCS project to allow for evaluation of conservation practices within the Gilmore Creek subwatershed.
- 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:

- Data collected, when evaluated, demonstrate effect of I-Plan activities.
- 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.

2005 Texas Nonpoint Source Management Program Reference (Expand from NPS Summary Page)
<p>Element 1 – Explicit short- and long-term goals, objectives and strategies that protect surface and groundwater.</p>
<p>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 <i>TSSWCB Environmental Data Quality Management Plan</i>.</p>
<p>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.</p>
<p>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 can be used in the evaluation of pre- and post-TMDL conditions to assess water quality improvement in targeted microwatersheds.</p>
<p>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 may be associated with on-going pollution abatement activities.</p>
<p>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.</p>
<p>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.</p>
<p>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 may be associated with on-going pollution abatement activities.</p>

Part III – Financial Information

Budget Summary

Federal 319(h)	\$ 107,824	% of total project	52%	
Non-Federal Match	\$ 100,000	% of total project	48%	
Total Project Cost	\$ 207,824	Total project %	100%	
Category				
	Federal 319(h)	Non-Federal Match	Total Project Cost	
Personnel	\$ 65,881	\$ 62,150	\$ 128,031	
Fringe Benefits	\$ 16,786	\$ 16,228	\$ 33,014	
Subtotal Personnel & Fringe	\$ 82,667	\$ 78,378	\$ 161,045	
Travel	\$ 912	\$ 821	\$ 1,733	
Equipment	\$ 0	\$ 0	\$ 0	
Supplies	\$ 11,430	\$ 10,688	\$ 22,118	
Contractual	\$ 0	\$ 0	\$ 0	
Construction	\$ 0	\$ 0	\$ 0	
Other	\$ 3,013	\$ 1,022	\$ 4,035	
Subtotal	\$ 15,355	\$ 12,531	\$ 27,886	
Total Direct Costs	\$ 98,022	\$ 90,909	\$ 188,931	
Indirect Costs (≤ 15%)	\$ 9,802	\$ 9,091	\$ 18,893	
Total Project Costs	\$ 107,824	\$ 100,000	\$ 207,824	

Budget Justification (Federal)		
Category	Total	Justification
Personnel & Fringe	\$ 82,667	See narrative below.
Travel	\$ 912	Travel to and from sampling sites for sample retrieval and general maintenance.
Equipment	\$ 0	
Supplies	\$ 11,430	Necessary field and laboratory supplies associated with monitoring, analysis, maintenance, and repairs.
Contractual	\$ 0	
Construction	\$ 0	
Other	\$ 3,013	Other represents costs associated with vehicle maintenance, laboratory waste disposal, phone service to automated samplers, and miscellaneous charges such as postage, freight, and insurance.
Indirect	\$ 9,802	Indirect charged 10% of total direct costs.
Budget Justification (Non-Federal)		
Category	Total	Justification
Personnel & Fringe	\$ 78,378	See narrative below.
Travel	\$ 821	Travel to and from sampling sites for sample retrieval and general maintenance.
Equipment	\$ 0	
Supplies	\$ 10,688	Necessary field and laboratory supplies associated with monitoring, analysis, maintenance, and repairs.
Contractual	\$ 0	
Construction	\$ 0	
Other	\$ 1,022	Other represents costs associated with vehicle maintenance, laboratory waste disposal, phone service to automated samplers, and miscellaneous charges such as postage, freight, and insurance.
Indirect	\$ 9,091	Indirect charged 10% of total direct costs.
SOURCE	TSSWCB will provide \$100,000 in non-federal funds sourced from state appropriations (FY2009 General Revenue) through a TMDL Program Grant to TIAER.	

Personnel & Fringe Benefits – Budget Justification (Non-Federal):

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, Deputy Director 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 and Mr. Larry Kennedy. Ms. Nancy Easterling, TIAER’s Quality Assurance Officer, 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 and programming by Mr. Jim Rogers. Mr. Don Gosdin will assist with any needed graphics for the final report along with Mr. Todd Adams, who will assist with any needed GIS work.

TIAER’s field operations staff will conduct the assessment monitoring and development of stage-discharge relationships. All samples will be analyzed in TIAER’s analytical laboratory under task 3. Mr. Tim Jones is the supervisor of field operations and will oversee field efforts for routine and storm monitoring. The field staff under Mr. Jones includes three full-time employees (Jeff Stroebel, Abel Martinez, and Tod Sandlin) and generally one student worker. As needed, other TIAER staff members who are trained in field techniques (Jimmy Millican, David Pendergrass, and Todd Adams) will assist with routine and storm monitoring. The TIAER analytical laboratory is staffed by a lab manager (Mark Murphy), three chemists (James Hunter, Dovie Reynolds, and Donna Cole), and a research technician (Vickie Hunt). The analytical

laboratory also generally employs two to four student workers. Dianne Swanson fulfills the role as TIAER's Laboratory Quality Assurance Officer.

Name	Title	Estimated % Time on Project*
Field Operations		
Tim Jones	Sr Research Associate	9%
Jeff Stroebel	Research Associate	12%
Abel Martinez	Sr Research Assistant	14%
Tod Sandlin	Research Assistant	14%
David Pendergrass	Sr. Research Associate	3%
Student Worker	Student Worker	16%
Analytical Laboratory		
Mark Murphy	Laboratory Manager	11%
James Hunter	Sr Research Assistant	11%
Dovie Reynolds	Research Assistant	11%
Vickie Hunt	Technician	11%
Cole, Donna	Research Assistant (part time)	6%
Student Worker	Student Worker	10%
Data Management, Assessment & Reporting**		
Larry Hauck	Assistant Director	<1%
Anne McFarland	Research Scientist	16%
Jim Rogers	Sr Programmer/Analyst	17%
Jimmy Millican	Sr Research Associate	6%
Todd Adams	Research Associate	5%
Larry Kennedy	Database Manager I	2%
Nancy Easterling	Research Associate	11%
Don Gosdin	Computer Graphics Specialist	<1%
Dianne Swanson	Information Specialist	5%
Student Worker	Student Worker	4%

* Percent time during any given month or quarter will vary depending on tasks to be completed and weather conditions for assessment activities. Project duration planned for 18 months.