



**Texas State Soil and Water Conservation Board  
 Clean Water Act §319(h) Nonpoint Source Grant Program  
 FY 2016 Workplan 16-13**

SUMMARY PAGE			
Title of Project	Water Quality and Pollutant Loading Assessment in the Angelina River above Sam Rayburn Watershed		
Project Goals	<ul style="list-style-type: none"> <li>Evaluate existing data to describe potential causes and sources of pollution</li> <li>Supplement existing water quality and quantity data through targeted intensive water quality monitoring</li> <li>Develop/maintain a successful public participation program, including a general education campaign and stakeholder group</li> <li>Establish an analytical framework for developing a future watershed-based plan for all or portions of the Angelina River above Sam Rayburn watershed</li> </ul>		
Project Tasks	(1) Project Administration; (2) Quality Assurance; (3) Public Education, Outreach and Involvement; (4) Data Acquisition and Evaluation of Existing Data; (5) Supplemental Monitoring for WPP Development		
Measures of Success	<ul style="list-style-type: none"> <li>Delivery of education programs and public involvement</li> <li>Collection and analysis of existing data</li> <li>Collection and analysis of quality assured data generated for watershed sampling sites</li> <li>Estimated source loadings and needed reductions</li> <li>Stakeholder engagement enhanced and cultivated for future watershed based planning</li> </ul>		
Project Type	Implementation ( ); Education (X); Planning ( ); Assessment (X); Groundwater ( )		
Status of Waterbody on 2014 Texas Integrated Report	<u>Segment ID</u>	<u>Parameter of Impairment or Concern</u>	<u>Category</u>
	Angelina above Sam Rayburn 0611	Acute Toxic Substances (Aluminum)	NS CN 5c
	East Fork Angelina River 611A	Chronic Toxic Substances (Lead)	5b/CN
	Mud Creek 611C	Bacteria (geomean)	
	West Mud Creek 611D	Bacteria (geomean)	CS NS 5b/CN
	Lake Nacogdoches 611Q	Depressed Dissolved Oxygen Acute Toxic Substance (Aluminum)	5b CS
	Lake Striker 611R	Bacteria (geomean)	CS
		Bacteria (geomean) Nitrate Ammonia	CS
		Ammonia	CS
		Ammonia	

Project Location (Statewide or Watershed and County)	Angelina, Cherokee, Nacogdoches, Rusk and Smith counties					
Key Project Activities	Hire Staff ( ); Surface Water Quality Monitoring (X); Technical Assistance ( ); Education (X); Implementation ( ); BMP Effectiveness Monitoring ( ); Demonstration ( ); Planning (X); Modeling (X); Bacterial Source Tracking ( ); Other (X)					
<i>2012 Texas NPS Management Program Reference</i>	<ul style="list-style-type: none"> <li>• Long Term Objectives 1, 2, 6, 7, and 8</li> <li>• Short-Term Objectives             <ul style="list-style-type: none"> <li>– Data Collection and Assessment: A, B, and C</li> <li>– Education: B, D, and G</li> </ul> </li> <li>• Components (Ch 1) 2, 4, and 5</li> <li>• Milestones             <ul style="list-style-type: none"> <li>– Priority Watershed Milestones (Ch 2): Stakeholder Participation and Water Quality Monitoring</li> <li>– NPS Program Milestones (Appendix E): Milestone/Measurement- Watershed Education; Watershed Characterization</li> </ul> </li> </ul>					
Project Costs	Federal	\$660,027	Non-Federal	\$217,864	Total	\$877,891
Project Management	<ul style="list-style-type: none"> <li>• Texas A&amp;M AgriLife Research, Texas Water Resources Institute</li> </ul>					
Project Period	May 1, 2017 – December 31, 2021					

**Part I – Applicant Information**

Applicant							
Project Lead		Lucas Gregory					
Title		Senior Research Scientist and QA Officer					
Organization		Texas A&M AgriLife Research, Texas Water Resources Institute					
E-mail Address		<a href="mailto:LFGregory@ag.tamu.edu">LFGregory@ag.tamu.edu</a>					
Street Address		578 John Kimbrough Blvd. 2260 TAMU					
City	College Station	County	Brazos	State	TX	Zip Code	77843-2260
Telephone Number	979-845-1851			Fax Number	979-845-0062		

Project Partners	
Names	Roles & Responsibilities
Texas State Soil and Water Conservation Board (TSSWCB)	Provide state oversight and management of all project activities and ensure coordination of activities with related projects and TCEQ.
Texas A&M AgriLife Research – Texas Water Resources Institute	Project oversight and administration, coordination and facilitation of stakeholder engagement and involvement, existing watershed and water quality data assessments, pollutant loading assessment, needed load reduction estimations, conduct water quality monitoring, development of final report.
Angelina & Neches River Authority	Conduct water quality monitoring and laboratory analysis; data assimilation and data submission to TCEQ’s Surface Water Quality Monitoring Information System (SWQMIS) database; provide assistance for stakeholder relations and public outreach; preparation of task reports and assistance in preparation of the final report.

## Part II – Project Information

Project Type				
Surface Water	X	Groundwater		
Does the project implement recommendations made in (a) a completed WPP, (b) an adopted TMDL, (c) an approved I-Plan, (d) a Comprehensive Conservation and Management Plan developed under CWA §320, (e) the <i>Texas Coastal NPS Pollution Control Program</i> , or (f) the <i>Texas Groundwater Protection Strategy</i> ?				X
If yes, identify the document.				
If yes, identify the agency/group that developed and/or approved the document.			Year Developed	

Watershed Information				
Watershed or Aquifer Name(s)	Hydrologic Unit Code (12 Digit)	Segment ID	Category on 2012 IR	Size (Acres)
Angelina River Above Sam Rayburn (inclusive of all named tributaries below)	120200040101-0106; 0201-0207; 0301-0305; 0401-0405; 0501-0506; 0601-0604; 0701-0705	0611	5C	1,048,568
East Fork Angelina River	120200040501-0505	0611A	5B	121,454
Mud Creek (inclusive of West Mud Creek)	120200040101-0106; 0201-0207	0611C	5B	357,057
West Mud Creek	120200040104-0105	0611D	5B	59,379

Water Quality Impairment			
Describe all known causes (i.e., pollutants of concern) and sources (e.g., agricultural, silvicultural) of water quality impairments or concerns from any of the following sources: <i>2014 Texas Integrated Report</i> , Clean Rivers Program Basin Summary/Highlights Reports, or other documented sources.			
<b><u>Impairments (2014 Texas Water Quality Inventory and 303(d) List)</u></b>			
Segment 0611: Angelina River Above Sam Rayburn Reservoir: From the aqueduct crossing 1.0 kilometer (0.6 mile) upstream of the confluence of Paper Mill Creek in Angelina/Nacogdoches Country to the confluence of Barnhardt Creek and Mill Creek at FM 225 in Rusk County			
	<b><u>Impairment</u></b>	<b><u>Category</u></b>	<b><u>Year Listed</u></b>
0611 : Angelina River Above Sam Rayburn Reservoir	bacteria	5c	2000
0611A: East Fork Angelina River	bacteria	5b	2002
0611C: Mud Creek	bacteria	5b	2010
0611D: West Mud Creek	bacteria	5b	2010
	<b><u>Concerns (2014 Texas Water Quality Inventory)</u></b>	<b><u>Level of Support</u></b>	
0611: Chronic Toxic Substances in Water (Lead)		CN (Use concern)	
0611C: Depressed Dissolved Oxygen		CS (concern screening levels)	

0611D: Nitrate, Ammonia	CS (concern screening levels)
0611Q: Ammonia	CS (concern screening levels)
0611R: Ammonia	CS (concern screening levels)

**Sources (2014 Texas Water Quality Inventory)**

**Bacteria:** Non-point source, municipal point source discharges, wildlife other than waterfowl, and some unknown sources; **Ammonia:** Non-point source and unknown sources; **Nitrate:** unknown source; **Total Phosphorus:** unknown source; **Depressed Dissolved Oxygen:** Natural Conditions

**2015 Basin Summary Report for the Upper Portion of the Neches River Basin: Angelina-Neches River Authority**

**Point Sources:** For the Upper Angelina River there are 21 permitted dischargers, including the cities of Troup, Tyler, New Summerfield, Whitehorse, Jacksonville, Cushing, Mount Enterprise, Henderson, Arp, and New London. Additional point sources could result from sewage overflows or broken sewage lines. There are several permitted discharges for industry along the watercourse.

**Non-point Source:** Failing or inadequate septic systems might contribute to water impairment. Additionally, livestock and agricultural operations, including cattle and poultry, are likely contributors. Wildlife such as feral hogs and deer are also possible contributors. In some portions of the watershed, urban runoff may also be a significant factor in bacterial impairment. Improper use of fertilizer may explain the presence of elevated levels of ammonia and nitrate in the water body.

**Project Narrative**

**Problem/Need Statement**

The Angelina River above Sam Rayburn Reservoir rises in rural Rusk County and flows 104 miles in a southerly direction. The river sub-basin encompasses portions of Angelina, Cherokee, Nacogdoches, Rusk and Smith counties. Cities within this area include Arp, Cushing, Gallatin, Henderson, Jacksonville, Mount Enterprise, New Chapel Hill, New Summerfield, Reklaw, Troup, Tyler and Whitehouse. The sub-basin includes a total of eighteen named stream segments: two rivers, thirteen creeks, and three lakes. Routine water quality monitoring demonstrated that four waterbodies in this sub-basin do not meet the state’s water quality standard for contact recreation due to elevated *Escherichia coli* concentrations; they are now on the Texas 303 (d) List. In addition to the listed impairments, concerns for depressed dissolved oxygen, elevated nitrate, ammonia, and total phosphorus also exist in these waterbodies. Once listed as impaired, the U.S. Environmental Protection Agency, through the Federal Clean Water Act, requires remedial action to address water quality impairments. However, establishing a clear understanding of the water quality issues and drivers of these problems prior to remedial efforts is important for future success. The state conducted recreational use attainability analyses (RUAAs) on Segments 0611A, C, and D in 2014 and found that the current primary contact recreation standard is appropriate for Segments 0611A and D. Secondary contact recreation 1 is more appropriate for Segment 0611C (<https://www.tceq.texas.gov/waterquality/standards/ruaas/ruaasneches>). If approved by EPA, this change would result in this segment being removed from the 303 (d) List in the future.

According to the Angelina & Neches River Authority (ANRA) Clean Rivers Program (CRP) Coordinator and the FY 2016 Coordinated Monitoring Schedule available online (<https://cms.lcra.org/schedule.aspx?basin=6&FY=2016>), ANRA and TCEQ Regional Office personnel currently monitor 17 stations within this sub-basin. Of these, six are on the Angelina or East Fork of the Angelina River, seven are on tributaries, and four are in lakes. This monitoring approach provides a good spatially representative data set; however, this quarterly monitoring regime proves limited as it does not capture temporal variability in flow and pollutant loading conditions. A more extensive monitoring regime is necessary to better define water quality in these segments and aid efforts to identify potential source impacts to these waterbodies. Aggregating and analyzing existing data regarding potential pollutant loadings is also needed to develop an appropriate restoration strategy.

Evidence suggests multiple potential contributors to the overall pollutant load in these waterbodies; however, a concerted effort to aggregate available information and assess it collectively has not been completed. Diverse land use

in the sub-basin suggests that common point and nonpoint sources of bacteria and nutrients exist in this watershed. However, many potential pollution sources in the sub-basin have yet to be quantified. On-site sewage facilities are one source whose distribution remains largely unknown. If failing, they may contribute significant pollutant loading. Feral animals, livestock, pets and wildlife are also present in the watershed and represent a source of pollutant loading that is not currently well understood.

Gaining an understanding of water quality drivers and transferring it to stakeholders is necessary so that they may select a restoration strategy that is appropriate for this area or smaller watersheds within this larger sub-basin. Stakeholder desire to address local water quality issues is also unclear. Most stakeholders are unaware that water quality impairments exist in these waterbodies and they are not actively engaged in restoration efforts to correct impairments. Therefore, education program delivery to local stakeholders to increase their knowledge and understanding of bacteria impairments and potential mitigation strategies is needed. Programming such as the Texas Watershed Steward or other similar programs can provide the needed education and fill this critical information gap. Additionally, these efforts will empower local stakeholders to better care for their water resources, and will also promote future water quality efforts in these and other nearby watersheds. Providing focused information will set a firm foundation for watershed based planning efforts to restore water quality now and in the future.

## Project Narrative

### General Project Description (Include Project Location Map)

This project will investigate current water quality in the watershed through an integrated assessment of existing watershed and water quality data, collection and additional intensive water quality data analysis and local watershed stakeholder engagement. It will identify and establish a baseline pollutant source understanding and quantify existing pollutant loads and define load reductions needed to achieve applicable water quality standards.

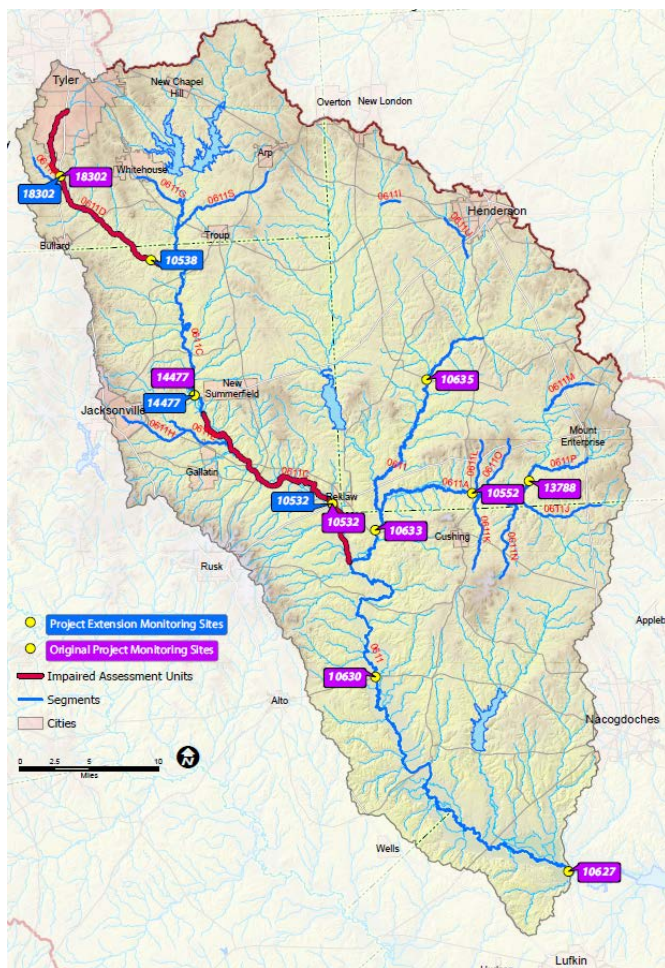
Data aggregation and assessment will begin following approval of the project's acquired data QAPP and will focus on compiling existing watershed data that allows pollutant sources to be identified and their extent of potential influence to be quantified. Data gathered will include previously collected water quality data, streamflow records, wildlife densities and livestock estimates. If available, data regarding the number of septic systems and the extent of wastewater and stormwater infrastructure will be collected. If unavailable, this information will be estimated utilizing approaches similar to other watersheds. Collectively, information will be assessed to provide a general description of watershed pollutant contributors. Geographic information systems (GIS) will be utilized significantly where appropriate to aid in identifying watershed areas where potential causes and sources of pollutant contributors exist. This platform will allow visualization of pollutant loadings in relation to potential source locations across the watershed.

Supplemental water quality data will be collected to provide improved temporal scale to the existing CRP monitoring regime and refined spatial scale through monitoring non-CRP sites. Monitoring will not commence until an approved monitoring QAPP is secured. Nine monitoring sites will be selected for additional monitoring. Additional monitoring beyond the nine sites originally monitored will be placed on Mud Creek and West Mud Creek. Four sites located along West Mud and Mud Creeks will be monitored for 19 months to increase data resolution and aid in future planning efforts. Selections will be made by ANRA and TWRI in consultation with other watershed stakeholders such that data is provided at the most critical and useful sites. Planned quarterly CRP monitoring will continue at all sites and supplemental monitoring will be coordinated such that the selected sites will be monitored on a monthly basis for one year. This approach will fill data gaps resulting from the traditional quarterly CRP monitoring regime. Collecting additional water quality and flow data will improve estimates for loading reductions needed to achieve applicable water quality standards.

Data analysis will be conducted to improve knowledge regarding existing instream water quality conditions and hydrological influences on overall pollutant loading. Load duration curves (LDCs) are widely accepted for depicting existing pollutant loading in relation to flow regime and enable current pollutant loads and needed pollutant loading reduction estimates to be made. LDCs will be developed at each sampling station in the watershed with sufficient paired water quality and stream flow data ( $\geq 20$  points) and will demonstrate the general drivers of pollution. Other

water quality data assessments will also be conducted using proven statistical methods to determine the presence of other trends or correlations in water quality and/or watershed characteristics.

Pollutant source identification and loading estimates will be completed through this project. To assess potential pollutant loading in the watershed, source categories will be identified through discussions with local stakeholders and population estimates for each source will be estimated. Commonly used methods to estimate sources will be used including estimating populations and potential pollutant loadings for feral animals, livestock, pets, on-site sewage facilities, wastewater treatment and other wildlife as appropriate. The spatially explicit load enrichment calculation tool (SELECT) will be used to depict potential *E. coli* loads from evaluated sources. Collectively, this approach will produce Element A and a portion of Element B of the EPA's 9 key elements of successful WPPs.



Cultivating local support to improve water quality is a primary goal for this effort. Local knowledge and regard for existing water quality issues is not high and stems from the general lack of engagement. General education delivery will initiate efforts in the watershed to raise awareness about local water quality issues and will provide general education regarding causes, sources, impacts of and potential solutions to water quality impairments. Information will likely come from the Texas Watershed Steward program and may include other general educational programs. More focused engagement will follow with discussions on local water quality impairments, their causes and sources, and options to address noted impairments. Stakeholder engagement in this project will culminate with discussion regarding the most appropriate path forward to address impairments in the sub-basin.

Tasks, Objectives and Schedules						
Task 1	Project Administration					
Costs	Federal	\$ 72,603	Non-Federal	\$ 23,965	Total	\$ 96,568
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 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 1 <sup>st</sup> of January, April, July and October. QPRs shall be distributed to all Project Partners.					
	Start Date	Month 1		Completion Date	Month 56	
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 56	
Subtask 1.3	TWRI will host coordination meetings or conference calls, at least quarterly, with Project Partners to discuss project activities, project schedule, communication needs, deliverables, and other requirements. TWRI will develop lists of action items needed following each project coordination meeting and distribute to project personnel.					
	Start Date	Month 1		Completion Date	Month 56	
Subtask 1.4	TWRI will develop a Final Report that summarizes activities completed and conclusions reached during the project and discuss the extent to which project goals and measures of success have been achieved.					
	Start Date	Month 1		Completion Date	Month 56	
Deliverables	<ul style="list-style-type: none"> <li>• QPRs in electronic format</li> <li>• Reimbursement Forms and necessary documentation in hard copy format</li> <li>• Final Report in electronic and hard copy formats</li> </ul>					

Tasks, Objectives and Schedules						
Task 2	Quality Assurance					
Costs	Federal	\$ 9,900	Non-Federal	\$ 3,268	Total	\$ 13,168
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	TWRI will develop a QAPP for activities in Task 4 and 5 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> . 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 Assemblage and Habitat Data (RG-416)</i> . [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 where applicable.]					
	Start Date	Month 01		Completion Date	Month 04	
Subtask 2.2	TWRI will implement the approved QAPP. TWRI will submit revisions and necessary amendments to the QAPP as needed.					
	Start Date	Month 04		Completion Date	Month 56	
Deliverables	<ul style="list-style-type: none"> <li>• QAPP approved by TSSWCB and EPA in both electronic and hard copy formats</li> <li>• Approved revisions and amendments to QAPP, as needed</li> <li>• Data of known and acceptable quality as reported through Task 4 &amp; 5</li> </ul>					



Tasks, Objectives and Schedules						
Task 3	Public Education and Outreach					
Costs	Federal	\$ 118,805	Non-Federal	\$ 39,216	Total	\$ 158,021
Objective	To increase local awareness of water quality issues, improve knowledge of watersheds and water quality and gain support for restoring local water quality					
Subtask 3.1	<p>TWRI and ANRA will host public education and outreach events through existing statewide programs delivered in or near the project area as instructors are available. At least one event will be held annually and may include but should not be limited to the following programs:</p> <ul style="list-style-type: none"> <li>• Lone Star Healthy Streams;</li> <li>• Texas Well Owner Network;</li> <li>• Texas Watershed Steward;</li> <li>• Texas Riparian and Stream Ecosystem Education</li> </ul>					
	Start Date	Month 1		Completion Date	Month 56	
Subtask 3.2	<p>TWRI with assistance from ANRA will identify and meet with key stakeholders in the watershed to inform them of water quality issues, and solicit their input on water quality restoration goals, objectives, and indicators that will aid water quality restoration.</p>					
	Start Date	Month 1		Completion Date	Month 56	
Subtask 3.3	<p>TWRI with local assistance from ANRA will conduct public outreach to inform the public about upcoming meetings and educational events, locations of educational materials, project status updates, current water quality and how the public/stakeholders can address water quality issues. Activities may include but are not limited to:</p> <ul style="list-style-type: none"> <li>• Communicating via media sources such as newspaper (at least 2 annually);</li> <li>• Public events (project information and presentations at events) (at least 2 in the final year of the project)</li> </ul>					
	Start Date	Month 1		Completion Date	Month 56	
Deliverables	<ul style="list-style-type: none"> <li>• Hosted public education and outreach event agendas, sign-in sheets, and other available documents (one annually)</li> <li>• Stakeholder Group and Public meeting agendas, minutes, sign-in sheets, and other available documentation (at least 2 in the final year of the project)</li> <li>• Public events (project information and presentations) (at least 2 in the final year of the project)</li> </ul>					

Tasks, Objectives and Schedules						
Task 4	Watershed Pollutant Loading and Source Assessment					
Costs	Federal	\$ 165,007	Non-Federal	\$ 54,466	Total	\$ 219,473
Objective	To collect existing data and information to identify causes and sources of water quality impairments, issues in the watershed, conduct analysis to illustrate water quality trends and correlations, estimate existing loads and determine loading reductions needed to meet water quality standards.					
Subtask 4.1	<p>TWRI will gather existing data and information pertaining to water quality impairments and issues in the watershed. Generally, this will consist of existing water quality data, streamflow data, animal and human population data and geospatial data regarding the watershed's physical characteristics, uses and features.</p>					
	Start Date	Month 4		Completion Date	Month 56	
Subtask 4.2	<p>TWRI, with assistance from ANRA will perform GIS analysis throughout the project area and estimate pollutant loadings from sources contributing to water quality impairments and concerns. SELECT will also be used to demonstrate pollutant source loading potential. This will be completed by analyzing existing data and information to the extent possible, and characterizing water quality conditions, watershed conditions, and sources of pollution contributing to water quality impairments and issues.</p>					
	Month 20	Month 6		Completion Date	Month 56	

Subtask 4.3	Using load duration curves, existing and needed instream pollutant loads will be estimated using data acquired in subtask 4.1 and produced through Task 5. Load duration curves will be developed at all stations with at least 20 data points containing both pollutant concentration and stream flow rate.			
	Month 18	Month 6	Completion Date	Month 56
Subtask 4.4	Using existing data that has been analyzed, TWRI with consultation from ANRA will identify additional data needs to further evaluate water quality drivers in the watershed.			
	Month 24	Month 20	Completion Date	Month 56
Deliverables	Written descriptions and assessments of the following for inclusion in the project final report: <ul style="list-style-type: none"> <li>existing data and information gathered</li> <li>analysis conducted on gathered data</li> <li>pollutant load and needed load reduction estimates</li> <li>additional data collection needs for future development of a watershed based plan</li> </ul>			

Tasks, Objectives and Schedules						
Task 5	Supplemental Surface Water Quality Monitoring					
Costs	Federal	\$ 293,712	Non-Federal	\$ 96,949	Total	\$ 390,661
Objective	To collect surface water quality and flow data to supplement LDC analysis and better evaluate impairing parameters within the watershed.					
Subtask 5.1	ANRA and TWRI will confer with watershed stakeholders to select 9 monitoring sites in the watershed to perform intensive water quality monitoring. Sites selected will supplement existing CRP monitoring in the watershed and will include monitoring at some CRP sites in off months. This approach will provide an enhance data set at these sites and will be useful for assessment purposes. Once selected, they will be included in the project QAPP as needed prior to initiation of the sampling regime.					
	Start Date	Month 01	Completion Date	Month 04		
Subtask 5.2	Four additional sites will be selected along West Mud Creek and Mud Creek to conduct targeted supplemental monitoring. Sites selected will supplement existing CRP monitoring in the watershed and will include monitoring at some CRP sites in off months. This approach will provide an enhanced data set at selected sites and will be useful for future planning purposes.					
	Start Date	Month 30	Completion Date	Month 34		
Subtask 5.3	ANRA and TWRI will conduct routine, monthly, ambient water quality monitoring consistent with ANRA's current CRP monitoring regime. Sampling will include routine field parameters (water temperature, pH, DO, specific conductance, instantaneous stream flow, days since last significant rainfall, flow severity, present weather, transparency and total water depth). Water samples returned to the lab will be analyzed for conventional parameters, to include Ammonia-N, Nitrate-N, Nitrite-N, Sulfate, Chloride, Total Phosphorus, Total Suspended Solids, and <i>E. coli</i> bacteria. Water samples will be delivered to the ANRA Environmental Laboratory within the appropriate holding time for analysis.					
	Start Date	Month 06	Completion Date	Month 53		
Subtask 5.4	ANRA will transfer completed lab analysis data to TCEQ for inclusion in SWQMIS on a quarterly basis.					
	Start Date	Month 12	Completion Date	Month 55		
Deliverables	<ul style="list-style-type: none"> <li>Site selection completed and sites included in the project QAPP</li> <li>Documentation of sampling events in QPRs</li> <li>SWQMIS data submissions (Data sets, Data Review Checklists)</li> </ul>					

### **Project Goals (Expand from Summary Page)**

In an effort to most efficiently address water quality concerns and impairments and identify potential causes and sources. The specific goals of this project are to:

- identify and gather existing water quality and watershed data relative to potential pollutant loadings
- identify data gaps and identify additional data needs to fully assess the current pollutant loading conditions and sources of bacteria
- collect intensive water quality data at several new sites and existing CRP sites to better describe temporal pollutant loadings in the watershed
- establish current pollutant loads and determine needed pollutant loading reductions to meet applicable water quality standards
- engage local watershed stakeholders in water quality education and empower them to select an appropriate restoration strategy
- produce content that meets the needs of Elements A & B in EPA's 9 Key Elements for Successful Watershed Based Plans

### **Measures of Success (Expand from Summary Page)**

Successful completion of this project will be gauged through the completion of all project tasks and deliverables.

Further, project success can be quantified as:

- Delivery of education programs and public involvement completed and a demonstrated increase in public awareness as documented in delivered program evaluations and the number of meetings held, the number of stakeholders in attendance and evidence of their engagement in restoring local water quality
- Compilation and analysis of existing data completed which clearly documents the current state of water quality, identifies and quantifies potential pollutant sources, estimates pollutant loading in the watershed and defines the needed load reductions to achieve applicable water quality standards
- Collection and analysis of quality assured data generated for watershed sampling sites completed and integrated into SWQMIS as appropriate and utilized to define current pollutant loads and establish needed pollutant loading reductions
- Stakeholder recommendation for an appropriate future path to restoration clearly defined and documented
- Completion of a project final report that clearly describes all project findings, clearly identifies the sources of pollutant loading in the watershed, the extent of this loading and mechanisms that influence instream water quality, needed levels of reduction and the stakeholder recommendation for future restorative action

**2012 Texas NPS Management Program Reference (Expand from Summary Page)**

**Components, Goals, and Objectives**

**Component 1** - Explicit short- and long-term goals, objectives and strategies that protect surface ... water.

**Long-Term Goal** – Protect and restore water quality affected by NPS pollution through assessment,..., and education.

**Objectives**

- 1 – Focus NPS abatement efforts, ...available resources in watersheds identified as impacted by NPS pollution
- 2 – Support the implementation of state, regional and local programs to prevent NPS pollution through assessment... and education.
- 6 – Develop partnerships, relationships... to facilitate collective, cooperative approaches to manage NPS pollution.
- 7 – Increase overall public awareness of NPS issues and prevention activities.
- 8 – Enhance public participation and outreach by providing forums for citizens and industry to contribute their ideas and concerns about the water quality management process.

**Short-term Goals**

**Goal One – Data Collection and Assessment:** Coordinate with appropriate federal, state, regional and local entities, and stakeholder groups to target water quality assessment activities in high priority, NPS-impacted watersheds...and areas where additional information is needed.

- Objective A – Identify surface water bodies...from the IR... that need additional information to characterize non-attainment of designated uses and water quality standards.
- Objective B – Ensure that monitoring procedures meet quality assurance requirements and are in compliance with EPA-approved TSSWCB Quality Management Plans.
- Objective C – Conduct special studies to determine sources of NPS pollution and gain information to target TMDL and BMP implementation.
- Objective D – Develop ... WPPs to maintain and restore water quality in water bodies identified as impacted by NPS pollution.

**Goal Three – Education:** Conduct education... activities to help increase awareness of NPS pollution and prevent activities which contribute to the degradation of water bodies... by NPS pollution.

- Objective A – Enhance existing outreach programs at the ... regional and local level to maximize the effectiveness of NPS education.
- Objective B – Administer programs to educate citizens about water quality and their potential role in causing NPS pollution.
- Objective D – Conduct outreach through CRP, AgriLife Extension, SWCDs and others to enable stakeholders and the public to participate in decision-making and provide a more complete understanding of water quality issues and how they relate to each citizen.

**Objective G** – Implement public outreach and education to maintain and restore water quality in water bodies impacted by NPS pollution.

**Component 2** – Working partnerships and linkages with appropriate state, ... regional, and local entities, private sector groups and Federal agencies.

**Component 3** – Balanced approach that emphasizes both statewide NPS programs and on-the-ground management of individual watersheds.

**Component 5** –Identify waters and their watersheds impaired by NPS pollution... Progressively address these identified waters by conducting more detailed watershed assessments and developing watershed plans...

**Estimated Load Reductions Expected (Only applicable to Implementation Project Type)**

N/A. Loading reductions are not anticipated to result from this project; however, needed loading reductions will be calculated for use in future watershed-based plan development.

**EPA State Categorical Program Grants – Workplan Essential Elements  
 FY 2011-2015 EPA Strategic Plan Reference**

Strategic Plan Goal – Goal 2 Protecting America’s Waters

Strategic Plan Objective – Objective 2.2 Protect and Restore Watersheds and Aquatic Ecosystems

**Part III – Financial Information**

**Budget Summary**

Federal	\$	660,027	% of total project	75.2%
Non-Federal	\$	217,864	% of total project	24.8%
Total	\$	877,891	Total	100%
<b>Category</b>		<b>Federal</b>	<b>Non-Federal</b>	<b>Total</b>
Personnel	\$	144,650	\$ 18,277	\$ 162,927
Fringe Benefits	\$	35,044	\$ 4,128	\$ 39,172
Travel	\$	6,034	\$ 0	\$ 6,034
Equipment	\$	22,310	\$ 0	\$ 22,310
Supplies	\$	897	\$ 0	\$ 897
Contractual	\$	352,899	\$ 139,678	\$ 492,577
Construction	\$	0	\$ 0	\$ 0
Other	\$	12,102	\$ 0	\$ 12,102
<b>Total Direct Costs</b>	\$	<b>573,936</b>	\$ <b>162,083</b>	\$ <b>736,019</b>
<b>Indirect Costs (≤ 15%)</b>	\$	<b>86,091</b>	\$ <b>22,991</b>	\$ <b>109,082</b>
			\$ <b>32,790</b>	\$ <b>32,790</b>
<b>Total Project Costs</b>	\$	<b>660,027</b>	\$ <b>217,864</b>	\$ <b>877,891</b>

<b>Budget Justification (Federal)</b>		
Category	Total Amount	Justification <small>*(annual salary, amount of time on project, cost to project)</small>
Personnel	\$ 144,650	TWRI Sr. Research Scientist: \$86,771 @ 1 month: \$7,548 TWRI QA Officer: \$75,000 @ 2 months: \$13,063 TWRI TBD Program Manager: \$76,778 @ 2 months: \$12,983 TWRI Program Manager: \$59,064 @ 2 months: \$9,988 TWRI TBD Research Assistant: \$40,000 @ 6.04 months: \$21,057 TWRI Research Assistant: \$41,275 @ 4.8 months: \$17,261 TWRI Graduate Student: \$50,000 @ 12 months: \$50,750 Undergraduate Student Labor: \$15/hr, 20 hrs/wk, 20 wks/yr: \$12,000 *named positions are budgeted with a 3% annual pay increase in all years; TBD positions and graduate students are budgeted with a 3% pay increase in years after year 1 *(Salary estimates are based on average monthly percent effort for the entire contract. Actual percent effort may vary more or less than estimated between months; but in the aggregate, will not exceed total effort estimates for the entire project.)
Fringe Benefits	\$ 35,044	FTE Fringe = Salary * 17.5% + \$745/mo. Graduate Student Fringe = Salary * 10.7% + \$386/mo. Undergraduates Student Fringe = Salary * 10.7% *(Fringe benefits estimates are based on salary estimates listed. Actual fringe benefits will vary between months coinciding with percent effort variations; but in the aggregate, will not exceed the overall estimated total.)
Travel	\$ 6,034	TWRI travel to sub-basin: <ul style="list-style-type: none"> <li>32 trips for monitoring, stakeholder meetings, project meetings, etc.:                est. at 11,144 mi total @ \$0.50/mi.</li> </ul> TWRI Travel to Dallas: 1 trip for the EPA Coordination meeting: lodging (\$126) and per diem for 1 person, 2 days (\$128) plus state vehicle mileage: est. 400 mi @ \$0.50/mi (\$200) and Concur travel system fee (\$8)
Equipment	\$ 22,310	FlowTronic Phoenix flow meter (1 ea. @ \$13,000) SonTek Flow Tracker 2 Display Unit (1 @ \$4,870) SonTek Flow Tracker 2 Probe Assembly (1 @ \$4,400) Shipping Fees (2 @ \$20)
Supplies	\$ 897	Meeting Supplies (toner, paper, pens, etc. for producing meeting materials)
Contractual*	\$ 352,899	Angelina & Neches River Authority
Construction	\$ 0	N/A
Other	\$ 12,102	TWRI Computers: \$2,155 TWRI Computer and Tablet peripherals: \$860 TWRI Monitoring Equipment Usage Fees: 14 days @ \$300/day: \$4,200 Cellular Communications Fees: \$300 TWRI Communications Services: \$2,925 Vehicle Mileage charged to Other instead of Travel: \$387 Misc. FlowTronic Mounting Components: \$960 Deep cycle battery for FloTronic flow meter: \$125 SonTek Flow Tracker 2 wading rod clamp (1 @ \$190)
Indirect	\$ 86,091	15% of Total Direct Costs



Other	\$ 34,872	ANRA Monitoring and Sample Analysis - Ammonia, Nitrate, Nitrite, Total P, Chloride, Sulfate, <i>E. coli</i> enumeration, total suspended solids, total dissolved solids: 84 @ \$233 ea. = \$19,572 - Ammonia, Nitrate, Nitrite, Total P, Chloride, Sulfate, <i>E. coli</i> enumeration, total suspended solids: 68 @ \$200 ea. = \$13,600 ANRA Field Measurements: Flow, pH, DO, Temp, Conductivity: 68 @ \$25 ea.: \$1,700
Indirect	\$ 24,647	10% of Personnel and Fringe

<b>Contractual Budget Justification (Non-Federal): Angelina &amp; Neches River Authority</b>		
Category	Total Amount	Justification
Personnel	\$ 47,700	Environmental Division Manager: \$65,250 @ 1.2 months: \$6,525 Information Systems Manager: \$60,250 @ 1.2 months: \$6,025 Quality Assurance Officer: \$45,000 @ 2.4 months: \$9,000 Environmental Field Technician: \$35,250 @ 6 months: \$17,625 General Manager: \$85,250 @ 1.2 months: \$8,525
Fringe Benefits	\$ 13,356	Fringe = 28% of salaries
Travel	\$ 0	N/A
Equipment	\$ 0	N/A
Supplies	\$ 0	N/A
Contractual*	\$ 0	N/A
Construction	\$ 0	N/A
Other	\$ 72,517	ANRA CRP Monitoring: 14 stations quarterly for 2 years - Laboratory Analysis: 112 samples @ \$245 ea. = \$27,440 - Field Parameters: 112 @ \$25 ea. = \$2,800 - Flow Measurements: 100 @ \$25 ea. = \$2,500 (not performed on reservoirs) - Field Filtration: 112 @ \$15 ea. = \$1,680 - Sampling Supplies: 112 @ \$5 ea. = \$560  ANRA CRP Labor - Environmental Division Manager: \$65,000 annually @ 5% FTE - Information Systems Coordinator: \$55,000 annually @ 10% FTE - CRP Field Technician: \$35,000 annually @ 10% FTE - Fringe: 28% of CRP Labor Costs: \$6,860 - CRP Indirect: 10% of CRP Labor and Fringe: \$2,450  ANRA CRP Monitoring Travel - 8 monitoring trips: 855 mi ea. @ \$0.545/mi = \$3,727
Indirect	\$ 6,105	10% of Personnel and Fringe