



**Texas State Soil and Water Conservation Board
 Clean Water Act §319(h) Nonpoint Source Grant Program
 FY2011 Project Workplan 11-08**

SUMMARY PAGE						
Title of Project	Development of a Watershed Protection Plan for Double Bayou					
Project Goals	To develop a nine element Watershed Protection Plan (WPP) for the Double Bayou watershed by 1) establishing and providing direction for a stakeholder group that will serve as a decision-making body, 2) conducting targeted water quality sampling and analysis, 3) identifying and analyzing spatial and temporal patterns in watershed data; and 4) increasing education among targeted audience.					
Project Tasks	(1) Project Administration; (2) Quality Assurance; (3) Public Participation and Stakeholder Coordination; (4) Surface Water Quality Monitoring; (5) Data Analysis; (6) WPP Development					
Measures of Success	<ul style="list-style-type: none"> • Coordination and engagement of a watershed stakeholder committee • Creation of the Double Bayou Watershed Partnership • Collection and analysis of quality assured data for watershed • Development and approval of Double Bayou WPP approved by stakeholders and satisfies EPA's nine key elements 					
Project Type	Implementation (); Education (); Planning (X); Assessment (X); Groundwater ()					
Status of Waterbody on 2008 Texas Water Quality Inventory and 303(d) List	<u>Segment ID</u>		<u>Parameter</u>		<u>Category</u>	
	2422B		bacteria		5c	
	2422B		depressed dissolved oxygen		5c	
Project Location (Statewide or Watershed and County)	Double Bayou Watershed in Chambers and Liberty 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 ()					
Texas NPS Management Program Elements	<ul style="list-style-type: none"> • Element One – LTGs 1, 2, 5, and 6 • Element One – STGs 1A,1B, 1C, 3A, 3B, and 3D • Elements Two and Five 					
Project Costs	Federal	\$1,023,614	Non-Federal	\$388,149	Total	\$1,411,763
Project Management	• Geotechnology Research Institute (GTRI)/Houston Advanced Research Center (HARC)					
Project Period	April 1, 2012 – March 31, 2015					

Part I – Applicant Information

Applicant							
Project Lead		Dr. Stephanie Glenn					
Title		Research Scientist					
Organization		Geotechnology Research Institute (GTRI)/Houston Advanced Research Center (HARC)					
E-mail Address		sglenn@harc.edu					
Street Address		4800 Research Forest Drive					
City	The Woodlands	County	Montgomery	State	TX	Zip Code	77380
Telephone Number	281-364-6042			Fax Number	281-363-7935		

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.
Geotechnology Research Institute (GTRI)/Houston Advanced Research Center (HARC)	Project administration and coordination; also responsible for developing water quality monitoring plan, approved QAPP and data analysis including development of load duration curves and modeling efforts
Galveston Bay Estuary Program (GBEP)	Provide coordination of activities with related projects, provide state funding source for matching funds
Shead Conservation Solutions	Provide organization and coordination for all stakeholder processes
United States Geological Survey (USGS)	Implement water quality monitoring; assist with data analysis
Houston-Galveston Area Council (H-GAC)	Clean Rivers Program Partner for this watershed

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, or (d) a Comprehensive Conservation and Management Plan developed under CWA §320?				Yes	X	No	
If yes, identify the document.		<i>The Galveston Bay Plan</i> , a Comprehensive Conservation and Management Plan					
If yes, identify the agency/group that developed and/or approved the document.		Galveston Bay Council as facilitated by the TCEQ Galveston Bay Estuary Program		Year Developed	1995		

Watershed Information				
Watershed Name(s)	Hydrologic Unit Code (8 Digit)	Segment ID	305(b) Category	Size (Acres)
Double Bayou	12040202 (portion)	2422B, 2422D	5c (2422B) 3 (2422D)	89,325

Water Quality Impairment
Describe all known causes (pollutants of concern) of water quality impairments or concerns from any of the following sources: 2008 Texas Water Quality Inventory and 303(d) List, draft 2010 Texas Integrated Report, Clean Rivers Program Basin Summary/Highlights Reports or other documented sources.
<p>The 2008 Texas Water Quality Inventory lists Segment 2422B, Double Bayou West Fork as category 5c impaired for depressed dissolved oxygen and bacteria. The 2008 Texas Water Quality Inventory lists Segment 2422B, Double Bayou West Fork as a concern for depressed dissolved oxygen.</p> <p>The draft 2010 Texas Integrated Report lists Segment 2422B, Double Bayou West Fork as category 5c impaired for bacteria and category 5b impaired for depressed dissolved oxygen.</p> <p>The draft 2010 Texas Integrated Report lists Segment 2422B, Double Bayou West Fork and Segment 2422D, Double Bayou East Fork, as category 5a impaired for dioxin in edible tissue and PCBs in edible tissue.</p> <p>The draft 2010 Texas Integrated Report lists Segment 2422B, Double Bayou West Fork and Segment 2422D, Double Bayou East Fork as a concern for depressed dissolved oxygen.</p> <p>The draft 2011 Basin Summary Report by the H-GAC/Clean Rivers Program reported Segment 2422B, Double Bayou West Fork, is non supporting of both the 24-hr average and the 24-hr minimum for dissolved oxygen.</p>

Project Narrative

Problem/Need Statement

The East and West Forks of Double Bayou are located northeast of Galveston Bay in Chambers County, Texas. This area is largely non-urbanized, with the majority of land use characterized by cropland and pasture for cattle. Oil and gas wells are scattered through the area. The area has an extensive network of irrigation canals as well as some channelized waterways that greatly alter the natural drainage pattern. The West Fork of Double Bayou has been listed on the 303(d) list for dissolved oxygen and bacteria impairment. The East Fork of Double Bayou is a very scenic waterway often used for recreational purposes.

Since 2009, GTRI has worked with the USGS and Shead Conservation Solutions with funding from GBEP/TCEQ, through the American Recovery and Reinvestment Act of 2009 (ARRA), to develop a watershed characterization for Double Bayou. The watershed characterization project includes establishing a baseline set of data, identifying data gaps, developing and initiating a Data Monitoring Plan and QAPP, and initial stakeholder work.

The initial baseline data and resulting data gap analysis report provided by GTRI-HARC to the TCEQ GBEP in November 2009 and February 2010 (<http://www.harc.edu/ProgramAreasProjects/LandWaterPeople/WaterResources/WatershedCharacterizationDoubleBayou/tabid/1301/Default.aspx>) showed that the Double Bayou watershed and West Fork of Double Bayou have limited data collection, including flow. Spatial representation of sampling data in the watershed is currently heavily biased towards the estuarine and tidal portions of the area. The northern part of the East Fork of Double Bayou is not represented in any of the existing monitoring data.

Through the watershed characterization process, stakeholders in the Double Bayou watershed were identified, including community leaders, elected officials, landowners, nonprofit organizations, and representatives of relevant local, state, and federal agencies. Stakeholders have been introduced to the watershed, background, and data results, identifying key issues, and soliciting stakeholder input.

Development of the Double Bayou WPP supports the goals and actions outlined in the Water and Sediment Quality (WSQ) Action Plan and the NPS Action Plan of the Galveston Bay Comprehensive Conservation and Management Plan (CCMP). The Galveston Bay Comprehensive CCMP was developed by the Galveston Bay National Estuary Program (now the TCEQ Galveston Bay Estuary Program) and approved by the EPA National Estuary Program in 1995. Specifically, the Double Bayou WPP satisfies the following CCMP actions:

- Action WSQ-1: Reduce Contaminant Concentrations to Meet Standards and Criteria
- Action WSQ-6: Reduce Nutrient and BOD Loadings to Problem Areas
- Action NPS-1: Implement storm water programs for local municipalities
- Action NPS-2: Perform pilot projects to develop NPS Best Management Practices
- Action NPS-3: Identify and correct priority watershed pollutant problems
- Action NPS-10: Develop inventory of agricultural non-point sources
- Action NPS-11: Coordinate and implement existing agricultural NPS control programs

This project will address the current water quality problems of dissolved oxygen and bacteria in the streams, as well as lay the groundwork for implementation of strategies to restore water quality through the development of a WPP for Double Bayou.

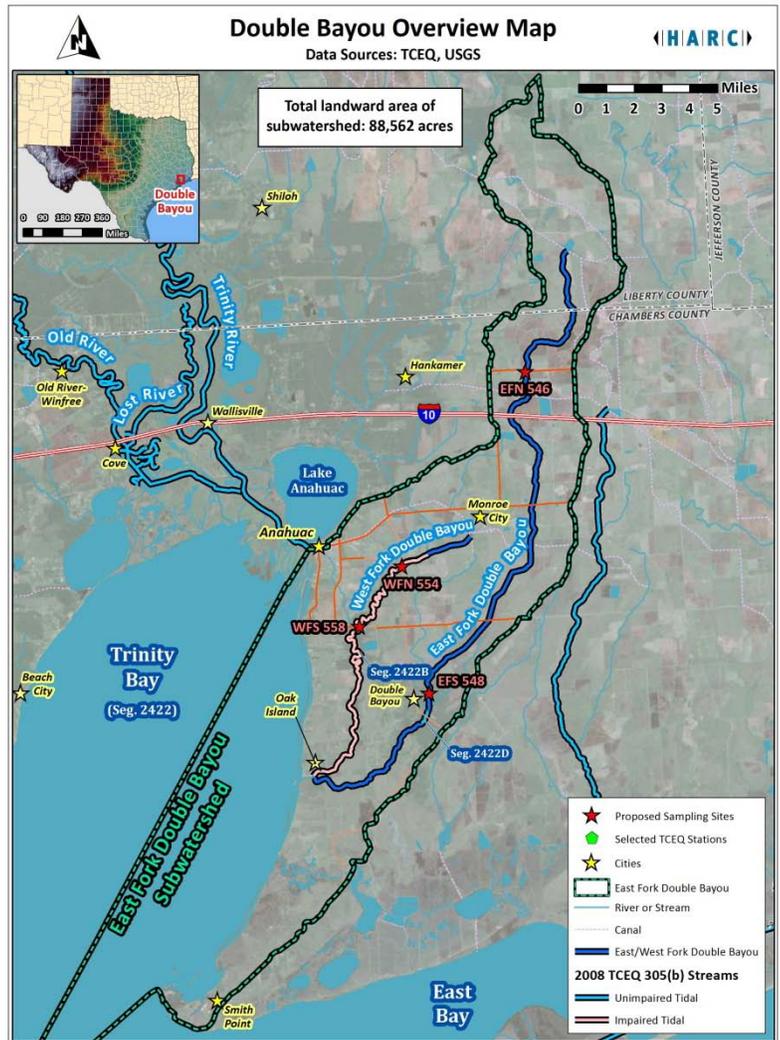
Project Narrative

General Project Description (Include Project Location Map)

The goal of this project is to develop the Double Bayou WPP. The watershed planning process will involve the formation of a watershed stakeholder group, implementation of targeted water monitoring, further data analysis, and development of watershed management measure recommendations.

Through this project, the formation of the Double Bayou Watershed Partnership will be a crucial step in developing and implementing the WPP. The Partnership will serve as the participatory mechanism for interested stakeholders during this process. Stakeholder meetings will discuss initial water quality monitoring results, stakeholder water quality concerns, watershed development and usage, criteria for success and other important measures.

Initial stakeholder work in the watershed characterization process for Double Bayou involved developing a preliminary list of stakeholders and interviewing stakeholders to begin to understand how they perceive water quality problems and potential solutions in the Double Bayou watershed. Based on the input and information gleaned from the interviews and open house in the Watershed Characterization project, Shead Conservation Solutions will refine the stakeholder list, identify roles for various levels of stakeholder involvement, and define an organizational structure to present to participants. Shead Conservation Solutions will develop communication products and invite stakeholders to participate. Shead Conservation Solutions will facilitate meetings of the Double Bayou Watershed Partnership – its steering committee and workgroups – toward the development of a WPP that integrates the results of water quality data and modeling with goals and strategies for water quality improvements. Development of the plan will be coordinated with all the technical assistance activities of GTRI and USGS.



Using the initial water quality results from the watershed characterization process, as well as inputs and concerns from the stakeholder process, a targeted water quality monitoring plan will be developed. The targeted water quality monitoring plan will provide sufficient data for evaluating annual and seasonal trends, spatial patterns, flow analyses and other relationship patterns. The targeted water quality monitoring plan will further define water quality problems noted in the watershed characterization process, assess critical and possible sources, and analyze data trends.

The USGS will conduct water quality data monitoring. Routine ambient monitoring and biased-flow storm event monitoring will be conducted at 4 mainstem sites once per month (routine) and during 8 storm events (biased-flow) for 2 years, collecting field, conventional, flow and bacteria parameter groups. In addition, USGS will conduct effluent monitoring at the Anahuac WWTF outfall once per month for 2 years, collecting the field, conventional and bacteria groups as well as BOD, CBOD and COD. USGS will conduct 24-hour DO monitoring at 2 sites during the index period

collecting field and flow parameter groups. Through TSSWCB project 05-02 *FY05 Statewide NPS Pollution Management Project*, USGS will install and operate one Index Velocity Site Gage at an appropriate tidal location in the Double Bayou watershed; no other USGS gages are currently operating in this watershed. USGS will provide operations and maintenance for this new Index Velocity Site Gage during the project period. The USGS will provide technical support including input for the QAPP and sampling plans, and will be responsible for site selection and data collection at sites on East and West Fork Double Bayou. Site selection will be determined based on the assessment of the initial watershed characterization water quality data results as well as stakeholder inputs and concerns.

Using data collected from the targeted water quality monitoring plan, GTRI will develop assessment methodologies capable of identifying spatial and temporal changes in water quality. GTRI will conduct a statistical analysis of trends and spatial patterns in water quality. Statistical methods for manipulation of both spatial and temporal data to achieve this goal will also be described. Data from the watershed characterization (the historical baseline data set) and the implemented targeted water quality monitoring plan will be used for data analysis. Using flow data captured from the new USGS Index Velocity Site Gage, GTRI will develop load duration curves (LDCs) to reflect flow during the project time period. To aid in understanding pollutant fate and transport mechanisms in the watershed, GTRI will utilize the Spatially Explicit Load Enrichment Calculation Tool (SELECT) to employ a watershed model in order to understand pollutant fate and transport mechanisms. Part of the Double Bayou watershed characterization process will involve analysis of models suitable for Double Bayou watershed. As a tidal watershed, it poses special challenges in developing a model that can adequately capture the tidal segments of the watershed. The recommendations from this analysis will be used to develop the model for the Double Bayou WPP. Data results and analyses will be developed into outreach materials and presented to the stakeholders for discussion.

Tasks, Objectives and Schedules						
Task 1	Project Administration					
Costs	Federal	\$44,046	Non-Federal	\$30,296	Total	\$74,342
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	GTRI will prepare electronic quarterly progress reports (QPRs) for submission to the TSSWCB. QPRs shall document all activities performed within a quarter and shall be submitted by the 15 th of January, April, July and October. QPRs shall be distributed to all Project Partners and posted on the project website.					
	Start Date	Month 1		Completion Date	Month 36	
Subtask 1.2	GTRI 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 36	
Subtask 1.3	GTRI 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. GTRI will develop lists of action items needed following each project coordination meeting and distribute to project personnel.					
	Start Date	Month 1		Completion Date	Month 36	
Subtask 1.4	GTRI will develop (Months 1-3), host and maintain (Months 4-36) a website to serve as a public clearinghouse for all project- and watershed-related information. All presentations, documents and results will be posted to this website. The website will serve as a means to disseminate information to stakeholders and the general public. GTRI will solicit content matter for the website from Project Partners.					
	Start Date	Month 1		Completion Date	Month 36	
Subtask 1.5	GTRI will contract with Shead Conservation Solutions who will serve as the Double Bayou Watershed Coordinator. The Watershed Coordinator will serve as the primary conduit for interaction with landowners, citizens, and entities to facilitate the development of the WPP. The Watershed Coordinator shall successfully complete (or have already completed) the Texas Watershed Planning Short Course. The Watershed Coordinator shall participate in Texas Watershed Coordinator Roundtables and the TSSWCB Southeast and South Central Texas Regional Watershed Coordination Steering Committee meetings.					
	Start Date	Month 1		Completion Date	Month 36	
Deliverables	<ul style="list-style-type: none"> • Quarterly progress reports in electronic format • Reimbursement Forms and necessary documentation in hard copy format • Lists of action items from project coordination meetings • Project website 					

Tasks, Objectives and Schedules						
Task 2	Quality Assurance					
Costs	Federal	\$22,224	Non-Federal	\$12,733	Total	\$34,957
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	GTRI will develop a QAPP for water quality monitoring activities in Task 4 and a QAPP for watershed modeling activities in Task 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.					
	Start Date	Month 1		Completion Date	Month 3	
Subtask 2.2	GTRI will implement the approved QAPPs. GTRI will submit revisions and necessary amendments to the QAPPs as needed.					
	Start Date	Month 4		Completion Date	Month 36	
Deliverables	<ul style="list-style-type: none"> Monitoring QAPP approved by TSSWCB and EPA in both electronic and hard copy formats Modeling QAPP approved by TSSWCB and EPA in both electronic and hard copy formats Approved revisions and amendments to QAPPs, as needed Data of known and acceptable quality as reported through Tasks 4 and 5 					

Tasks, Objectives and Schedules						
Task 3	Public Participation and Stakeholder Coordination					
Costs	Federal	\$225,640	Non-Federal	\$51,560	Total	\$277,200
Objective	To coordinate and facilitate public involvement in a local watershed stakeholder group that will provide local input into the decision-making process for the development of the Double Bayou WPP					
Subtask 3.1	Shead Conservation Solutions will develop a Public Participation Plan (PPP) which details the strategy for engaging the public and stakeholders in the watershed planning process for Double Bayou. The PPP shall, at a minimum, include 1) stakeholder group ground rules, 2) stakeholder group structure (i.e., steering committee, work groups) and membership, 3) stakeholder meetings topic/purpose and tentative schedule, and 4) a targeted outreach plan to increase public participation in the process. The PPP shall be designed to guide the stakeholders through the watershed planning process as described in the EPA <i>Handbook for Developing Watershed Plans to Restore and Protect Our Waters</i> .					
	Start Date	Month 1		Completion Date	Month 3	
Subtask 3.2	Shead Conservation Solutions, with input from Project Partners, will compile (Months 1-3) and maintain (Months 4-36) a database on watershed stakeholders and affected parties for use in engaging the public in the watershed planning process. Special care will be taken to engage a diverse group of stakeholders from throughout the watershed which includes, citizens, agricultural interests, local businesses, local and regional governmental entities and elected officials, state and federal agencies, and environmental and special interest groups.					
	Start Date	Month 1		Completion Date	Month 36	
Subtask 3.3	Shead Conservation Solutions will facilitate public participation and stakeholder involvement in the watershed planning process, specifically project meetings and activities. Shead Conservation Solutions will coordinate meetings, secure meeting locations, prepare and disseminate meeting notices and agendas. Meeting summaries will be prepared and posted to the project website. It is anticipated that at a minimum, quarterly public meetings will be sufficient; however, if more meetings are deemed necessary, they will be scheduled accordingly Meeting frequency may be adjusted throughout the course of the project to accomplish project goals. TSSWCB will review and approve all meeting notices, agendas, and meeting summaries prior to public dissemination.					
	Start Date	Month 1		Completion Date	Month 36	
Subtask 3.4	Shead Conservation Solutions, and other Project Partners as appropriate, will attend and participate in other public meetings as appropriate in order to communicate project goals, activities and accomplishments to affected parties. Such meetings may include, but are not limited to, city councils, county commissioners' courts, Clean Rivers Program Basin Steering Committee and Coordinated Monitoring, local soil and water conservation districts (SWCDs), and other appropriate meetings of critical watershed stakeholder groups.					
	Start Date	Month 1		Completion Date	Month 36	
Subtask 3.5	Shead Conservation Solutions will facilitate communication with stakeholders in order to engage the public and affected entities in the watershed planning process. Shead Conservation Solutions will utilize all appropriate communication mechanisms including direct mail, e-mail, the project website, and mass media (print, radio, television, as funds allow). Shead Conservation Solutions will develop, publish, and distribute 5 semi-annual newsletters (1 in year 1 and 2 in years 2 and 3) that highlight Double Bayou watershed activities; the newsletter shall be distributed as most appropriate to individual landowners and entities in the watershed. Shead Conservation Solutions will develop and disseminate general project informational materials, including, but not limited to, flyers, brochures, letters, factsheets, news releases, and other appropriate promotional publications. In conjunction with GTRI, Shead Conservation Solutions will develop and utilize a listserv (e.g., http://listserv.tamu.edu/) to facilitate direct discussion between stakeholders. Shead Conservation Solutions will solicit content matter for educational materials from Project Partners as appropriate. TSSWCB must approve all project-related content in any educational materials and publications prior to distribution.					
	Start Date	Month 1		Completion Date	Month 36	

Tasks, Objectives and Schedules			
Task 3	Public Participation and Stakeholder Coordination		
Subtask 3.6	Shead Conservation Solutions will coordinate with Texas AgriLife Extension Service to host a Texas Watershed Steward Program workshop focused on Double Bayou through TSSWCB project 11-05, <i>Continued Statewide Delivery of the Texas Watershed Steward Program.</i>		
	Start Date	Month 1	Completion Date
Month 12			
Deliverables	<ul style="list-style-type: none"> • Public Participation Plan • Stakeholder database, updated as needed • Educational and promotional materials, as developed and disseminated • 5 semi-annual Newsletters, as developed and distributed • Meeting notices, materials, agendas, attendance lists, and summaries • List of other meetings attended and dates with brief summary of topics discussed and action needed included in QPRs 		

Tasks, Objectives and Schedules						
Task 4	Surface Water Quality Monitoring					
Costs	Federal	\$360,560	Non-Federal	\$49,440	Total	\$410,000
Objective	To provide sufficient data to characterize current water quality conditions throughout the Double Bayou watershed.					
Subtask 4.1	<p>USGS will conduct routine ambient monitoring at 4 mainstem sites once per month, collecting field, conventional, flow, and bacteria parameter groups. The QAPP, as detailed in Task 2, will precisely identify sites. The sampling period extends over 24 months. The number of samples planned for collection through this subtask is 96. Currently, routine ambient monitoring is conducted once per quarter year at one station by TCEQ (10657; field, conventional, and bacteria parameters only) and at two stations by the Trinity River Authority (18361, 10658; field and conventional parameters only) through the Clean Rivers Program. Sampling through this subtask will complement existing routine ambient monitoring regimes.</p> <p>Field parameters are pH, temperature, conductivity, and dissolved oxygen. Conventional parameters are total suspended solids, turbidity, sulfate, chloride, nitrite+nitrate nitrogen, ammonia nitrogen, total kjeldahl nitrogen, chlorophyll-a, total hardness (ANC), orthophosphorus, and total phosphorus. Bacteria parameters are <i>E. coli</i> and Enterococcus (for both tidal and above tidal sites). Flow parameters are quantitative flow collected by gage, electric, mechanical or Doppler, including severity.</p>					
	Start Date	Month 7		Completion Date	Month 30	
Subtask 4.2	<p>USGS will conduct biased-flow monitoring at 4 mainstem sites during 3 storm events each year, collecting field, conventional, flow, and bacteria parameter groups. Specific parameters are defined in subtask 4.1. The QAPP, as detailed in Task 2, will precisely identify sites. The sampling period extends over 24 months. The number of samples planned for collection through this subtask is 24.</p>					
	Start Date	Month 7		Completion Date	Month 30	
Subtask 4.3	<p>USGS will conduct effluent monitoring at 1 WWTF outfall once per month, collecting field, conventional, flow, bacteria, and effluent parameter groups. Specific parameters are defined in subtask 4.1; effluent parameters are BOD, CBOD, and COD. The QAPP, as detailed in Task 2, will precisely identify sites. The sampling period extends over 24 months. The number of samples planned for collection through this subtask is 24.</p> <p>Coordination between TPDES permittees and the TCEQ Regional Office will be required. Neither GTRI nor USGS nor TSSWCB shall submit WWTF data to TCEQ for use in permit compliance and enforcement; rather, WWTF data will only be used to estimate bacteria loadings from wastewater discharges and to assist TPDES permittees in improving management and operations.</p>					
	Start Date	Month 7		Completion Date	Month 30	
Subtask 4.4	<p>USGS will conduct 24-hour DO monitoring at 2 sites three times during the index period (in 2012 and 2013) collecting field parameter groups. Specific parameters are defined in subtask 4.1. The QAPP, as detailed in Task 2, will precisely identify sites. The number of samples planned for collection through this subtask is 12.</p>					
	Start Date	Month 7		Completion Date	Month 30	
Subtask 4.5	<p>Through TSSWCB project 05-02 <i>FY05 Statewide NPS Pollution Management Project</i>, USGS will install and operate one Index Velocity Site Gage at an appropriate tidal location in the Double Bayou watershed; no other USGS gages are currently operating in this watershed. Through this project, and contingent upon TSSWCB project 05-02, USGS will provide operations and maintenance for this new Index Velocity Site Gage; continuous sampling extends over 36 months. USGS will provide flow data collected from this gage to Project Partners.</p>					
	Start Date	Month 1		Completion Date	Month 36	

Tasks, Objectives and Schedules			
Task 4	Surface Water Quality Monitoring		
Subtask 4.6	<p>USGS will transfer monitoring data from activities in Subtasks 4.1-4.4 through GTRI to TSSWCB for inclusion in the TCEQ SWQMIS at least quarterly. 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 <i>TCEQ Surface Water Quality Monitoring Data Management Reference Guide</i>. USGS will submit Station Location Requests as needed to obtain TCEQ station numbers for new monitoring sites. USGS and GTRI will work with H-GAC to input monitoring regime, as detailed in the QAPP, into the TCEQ Coordinated Monitoring Schedule. Data Correction Request Forms will be submitted to TSSWCB whenever errors are discovered in data already reported. All monitoring data files, data summary reports, and data correction request forms will be provided to all Project Partners. GTRI will post monitoring data to the project website in a timely manner. USGS and GTRI will work with H-GAC to post monitoring data to the H-GAC Water Resources Information Map (WRIM) (http://webgis2.h-gac.com/CRPflex/) in a timely manner.</p>		
	Start Date	Month 4	Completion Date
			Month 36
Subtask 4.7	<p>GTRI will develop and publish a final Assessment Data Report summarizing water quality data collected through this Task. The Report shall, at a minimum, characterize trends and variability in collected water quality monitoring data.</p>		
	Start Date	Month 31	Completion Date
			Month 36
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 • Monitoring data updates posted to the project website • Technical Report characterizing trends and variability in collected water quality monitoring data 		

Tasks, Objectives and Schedules						
Task 5	Modeling and Data Analysis					
Costs	Federal	\$282,194	Non-Federal	\$175,277	Total	\$457,471
Objective	To analyze water quality data using trend and statistical analysis and land use/land cover analysis in conjunction with LDCs, SELECT, and a watershed model to determine needed pollutant load reductions to achieve environmental goals established by stakeholders and to estimate potential loadings from identified pollutant sources.					
Subtask 5.1	GTRI will conduct a statistical trend analysis of all historic and existing water quality data for the watershed. Using water quality data collected through Task 4 and assimilated data collected by other entities during the same period, GTRI will conduct statistical analysis of trends and spatial patterns in water quality in Double Bayou.					
	Start Date	Month 7	Completion Date	Month 32		
Subtask 5.2	GTRI will develop LDCs for the non-tidal portion of the watershed for at least one critical index site per assessment unit to determine load reductions needed to achieve water quality standards. LDCs will be developed using water quality data collected through Task 4 and assimilated data, if any, collected by other entities during the project period. LDCs shall be consistent with 1) EPA's <i>An Approach for Using Load Duration Curves in the Development of TMDLs</i> , 2) EPA's <i>Options for Expressing Daily Loads in TMDLs</i> , and 3) EPA's <i>Development of Duration-Curve Based Methods for Quantifying Variability and Change in Watershed Hydrology and Water Quality</i> .					
	Start Date	Month 7	Completion Date	Month 32		
Subtask 5.3	GTRI will utilize SELECT to model pollutant loadings from across the watershed. Utilizing information from the ARRA-funded watershed characterization, SELECT will be developed for the entire watershed, tidal and non-tidal portions. Modeling will be used to estimate loadings from various sources and to identify critical loading areas within the watersheds.					
	Start Date	Month 7	Completion Date	Month 32		
Subtask 5.4	GTRI will employ a model capable of quantifying pollutant loadings and needed load reductions in the tidal portion of the watershed (suitable model(s) will be determined as part of the ARRA-funded Double Bayou Watershed Characterization project). The model will be able to perform a quantitative analysis of the tidal mixing processes between Double Bayou and the Galveston Bay system. The model will be used to understand the exchange of pollutant loads each tidal cycle and the rate at which tidal mixing removes pollutants from the bayou.					
	Start Date	Month 7	Completion Date	Month 32		
Subtask 5.5	Using the results from Subtasks 5.1 and 5.2, GTRI will develop a technical report that further defines water quality problems, assesses critical and possible source areas, and discusses loading estimates.					
	Start Date	Month 7	Completion Date	Month 32		
Deliverables	<ul style="list-style-type: none"> Technical Report detailing the results of the trend, statistical and SELECT analyses, LDCs development, and watershed model analysis 					

Tasks, Objectives and Schedules						
Task 6	Double Bayou Watershed Protection Plan Development					
Costs	Federal	\$88,950	Non-Federal	\$68,843	Total	\$157,793
Objective	GTRI, USGS and Shead Conservation Solutions will work with stakeholders to develop the Double Bayou Watershed Protection Plan					
Subtask 6.1	GTRI, in collaboration with project partners, will develop a WPP for the Double Bayou watershed that is consistent with and satisfies the expectations of the nine elements fundamental to watershed-based plans as described in EPA's <i>2004 Nonpoint Source Program and Grants Guidelines for States and Territories</i> [68 Fed. Reg. 60653-60674 (October 23, 2003)]. The WPP shall be founded on decisions made by stakeholders through the watershed planning process and incorporate findings from project Technical Reports (Tasks 4-5) and the ARRA-funded watershed characterization. Shead Conservation Solutions will facilitate public review and stakeholder approval of the WPP.					
	Start Date	Month 1		Completion Date	Month 36	
Subtask 6.2	GTRI will develop an "executive summary" style document, based on the WPP, which will serve as a public outreach tool to garner support for the implementation of the WPP and achieve long-term sustainability.					
	Start Date	Month 34		Completion Date	Month 36	
Subtask 6.3	After EPA has completed a satisfactory nine element consistency review of the WPP, GTRI will publish, print, and distribute to stakeholders the WPP and "executive summary" style document.					
	Start Date	Month 34		Completion Date	Month 36	
Deliverables	<ul style="list-style-type: none"> • Draft nine element Watershed Protection Plan to TSSWCB (Month 32) • Final stakeholder-approved nine element Watershed Protection Plan (Month 36) • "Executive Summary" style public outreach document based on WPP 					

Project Goals (Expand from Summary Page)

To develop a nine element Watershed Protection Plan (WPP) for the Double Bayou watershed by :

- 1) establishing and providing direction for a stakeholder group that will serve as a decision-making body,
 - establish a stakeholder working group that will implement a collaborative stakeholder process to identify potential sources of water quality impairments and further characterize the watershed.
- 2) conduct targeted water quality sampling and analysis,
 - conduct water quality monitoring and data analysis to develop a geodatabase inventory; temporal and spatial patterns will be adapted to target the problem areas, sources and constituents identified, and stakeholder concerns on sources.
- 3) identify and analyze spatial and temporal patterns in watershed data,
 - evaluate annual and seasonal trends, spatial patterns, flow analyses and other relationship patterns in this stage of monitoring.
- 4) increase education among targeted audience,
 - coordinate watershed assessment and analysis and stakeholder input to address water quality issues will aid the stakeholders in understanding how various activities relate to impact the health of their watershed, which will ensure the long-term health of the Double Bayou watershed.

Measures of Success (Expand from Summary Page)

- Coordination and engagement of a watershed stakeholder committee through the creation of the Double Bayou Watershed Partnership
 - GTRI, USGS, Shead Conservation Solutions and the Partnership will work together to coordinate efforts for the development of the Double Bayou WPP that integrates stakeholder results with water quality analysis for a final WPP that satisfies EPA's nine key elements.
- Collection and analysis of quality assured data for watershed assessment
 - Results will be presented to stakeholders and developed into stakeholder outreach material.
- Development of the Double Bayou WPP approved by stakeholders and satisfies EPA's nine key elements
 - GTRI will incorporate the results from the stakeholder coordination, the water quality monitoring and data analysis results into a Double Bayou WPP that satisfies EPA's nine key elements.

2005 Texas Nonpoint Source Management Program Reference (Expand from Summary Page)

Goals and/or Milestone(s)

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

Long-Term Goal – To... restore water quality from NPS pollution through assessment, implementation, and education.

- Objective A – Focus NPS abatement efforts, implementation strategies, and available resources in watersheds identified as impacted by NPS pollution.
- Objective B – Support the implementation of... programs to prevent NPS pollution through assessment, implementation, and education.
- Objective E – Develop partnerships, relationships, memoranda of agreement, and other instruments to facilitate collective, cooperative approaches to manage NPS pollution.
- Objective F – Increase overall public awareness of NPS issues and prevention activities.

Short-Term Goal One – Data Collection and Assessment – Objective A – Identify... waterbodies... from the... 303(d) List... that need additional information to characterize non-attainment of designated uses and [water] quality standards.

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 Plans.

Short-Term Goal One – Data Collection and Assessment – Objective C – Conduct special studies to determine sources of NPS pollution and gain information to target...BMP implementation.

Short-Term Goal Three – Education – Objective A – Enhance existing outreach programs at the state, regional, and local levels to maximize the effectiveness of NPS education.

Short-Term Goal Three – Education – Objective B – Administer programs to educate citizens about water quality and their potential role in causing NPS pollution.

Short-Term Goal Three – Education – Objective D – Conduct outreach through the Clean Rivers Program, ...SWCDs, and others to facilitate broader participation and partnerships [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.

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

Element 5 – The state program identifies... watersheds impaired by NPS... 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.

Part III – Financial Information

Budget Summary			
Federal	\$ 1,023,614	% of total project	66.2%
Non-Federal	\$ 388,149	% of total project (≥ 40%)	33.8%
Total	\$ 1,411,763	Total	100.0%
Category	Federal	Non-Federal	Total
Personnel	\$ 202,516	\$ 62,342	\$ 264,858
Fringe Benefits	\$ 98,654	\$ 30,369	\$ 129,023
Travel	\$ 1,913	\$ 0	\$ 1,913
Equipment	\$ 0	\$ 0	\$ 0
Supplies	\$ 0	\$ 0	\$ 0
Contractual	\$ 586,200	\$ 101,000	\$ 687,200
Construction	\$ 0	\$ 0	\$ 0
Other	\$ 70,755	\$ 18,703	\$ 89,458
Total Direct Costs	\$ 960,038	\$ 212,414	\$ 1,172,452
Indirect Costs (≤ 15%)	\$ 63,576	\$ 16,712	\$ 80,288
Unrecovered IDC		\$ 159,023	\$ 159,023
Total Project Costs	\$ 1,023,614	\$ 388,149	\$ 1,411,763

The TSSWCB CWA §319(h) NPS Grant Program has a match requirement. The cooperating entity will be reimbursed from federal funds and must contribute to the total costs to conduct the project. The match must be from non-federal sources and should be described in the budget justification. Reimbursable indirect costs are limited to no more than 15% of total federal direct costs. The project budget generally covers a three year period.

Budget Justification (Federal)		
Category	Total Amount	Justification
Personnel	\$ 202,516	<ul style="list-style-type: none"> • Program Manager/Research Scientist @ 30% avg yrs1-3 • Research Scientist @ 13% avg yrs1-3 • Senior Web Applications Developer @3% avg yrs1-3 • GIS Developer and Spatial Analyst @15% avg yrs1-3 • Research Assistant @ 29% avg yrs1-3
Fringe Benefits	\$ 98,654	Fringe rate at 48.5% Yr 1, 48.75% Yrs 2 and 3
Travel	\$ 1,913	10 trips from The Woodlands, TX to Anahuac, TX – 80 miles at \$0.51/mile, \$81.60 a trip round-trip, and 5 trips from the Woodlands, TX to Dallas, TX (estimate of location for watershed roundtable, etc meetings) – 215 miles at \$0.51/mile, \$219.30 a round trip.
Equipment	\$ 0	N/A
Supplies	\$ 0	N/A
Contractual	\$ 586,200	<ul style="list-style-type: none"> • USGS Water Resources \$360,560 • Shead Conservation Solutions \$225,640
Construction	\$ 0	N/A
Other	\$ 70,755	<ul style="list-style-type: none"> • GTRI's Allocated Direct Costs (ADC) cover rent, utilities, phone, office supplies, etc. (estimated at 30% of Personnel) • Printing WPPs in year 3 (\$10,000)
Indirect	\$ 63,576	15% of Modified Total Direct Federal (Total minus Contractual >\$25,000 and minus Equipment)

Budget Justification (Non-Federal)		
Category	Total Amount	Justification
Personnel	\$ 62,342	<ul style="list-style-type: none"> • Program Manager/Research Scientist @ 12% avg yrs1-3 • Research Scientist @ 5% avg yrs1-3 • Senior Web Applications Developer @ 1% avg yrs1-3 • GIS Developer and Spatial Analyst @ 5% avg yrs1-3 • Research Assistant @ 11% avg yrs1-3
Fringe Benefits	\$ 30,369	Fringe rate at 48.5% Yr 1, 48.75% Yrs 2 and 3
Travel	\$ 0	N/A
Equipment	\$ 0	N/A
Supplies	\$ 0	N/A
Contractual	\$ 101,000	<ul style="list-style-type: none"> • USGS Water Resource \$49,440 • Shead Conservation Solutions \$51,560
Construction	\$ 0	N/A
Other	\$ 18,703	GTRI's ADC cover rent, utilities, phone, office supplies, etc. (estimated at 30% of Personnel)
Indirect	\$ 16,712	15% of Modified Total Direct
Unrecovered IDC	\$ 159,023	29.71% of Modified Total Direct Federal and Non-Federal (Total minus Contractual >\$25,000 and minus Equipment) (\$125,922 from Federal; \$33,101 from Non-Federal)

Contractual Budget Justification (Federal) – Shead Conservation Solutions		
Category	Total Amount	Justification
Personnel	\$ 169,697	1 person @ 36.5% for completing the subtasks under Public Participation and Stakeholder Coordination task
Fringe Benefits	\$ 33,430	Fringe rate at 19.7%
Travel	\$ 2,200	Mileage for 10 trips to Dallas, TX (estimate of location for watershed roundtable, etc meetings)
Equipment	\$ 0	N/A
Supplies	\$ 0	N/A
Contractual	\$ 0	N/A
Construction	\$ 0	N/A
Other	\$ 0	N/A
Indirect	\$ 20,313	10% of Salaries and Fringe

Contractual Budget Justification (Non-Federal) – Shead Conservation Solutions		
Category	Total Amount	Justification
Personnel	\$ 27,766	1 person @ 6 % for completing the subtasks under Public Participation and Stakeholder Coordination task
Fringe Benefits	\$ 5,470	Fringe rate at 19.7%
Travel	\$ 3,300	Mileage for 28 trips to Chambers County
Equipment	\$ 0	N/A
Supplies	\$ 200	Facilitation supplies
Contractual	\$ 10,500	Graphic designer technical
Construction	\$ 0	N/A
Other	\$ 1,000	Printing of promotional publications
Indirect	\$ 3,324	10% of Salaries and Fringe

Contractual Budget Justification (Federal) – United States Geological Survey		
Category	Total Amount	Justification
Personnel	\$ 156,537	USGS personnel salary for project mangement and administration, monitoring, sample collection, data management, and gage operation and maintenance
Fringe Benefits	\$ 0	N/A
Travel	\$ 3,750	Vehicle fuel, maintenance, and incidental costs
Equipment	\$ 10,000	Water quality monitor probes and index velocity gage equipment maintenance
Supplies	\$ 4,000	Misc. supplies for monitoring, operation, and maintenance (standards, sample bottles, etc.)
Contractual	\$ 65,000	Lab costs for sample analysis at NELAC laboratory (includes USGS National Water Quality Laboratory)
Construction	\$ 0	N/A
Other	\$ 74,243	Facility costs including rent, power, telecommunications, broadband, and other infrastructure related charges
Indirect	\$ 47,030	Non-standard USGS Indirect Rate 15%

Contractual Budget Justification (Non-Federal) – United States Geological Survey		
Category	Total Amount	Justification
Personnel	\$ 16,611	USGS personnel salary for project mangement and administration, monitoring, sample collection, data management, and gage operation and maintenance
Fringe Benefits	\$ 0	N/A
Travel	\$ 480	Vehicle fuel, maintenance, and incidental costs
Equipment	\$ 1,440	Water quality monitor probes and index velocity gage equipment maintenance
Supplies	\$ 480	Misc. supplies for monitoring, operation, and maintenance (standards, sample bottles, etc.)
Contractual	\$ 13,800	Lab costs for sample analysis at NELAC laboratory (includes USGS National Water Quality Laboratory)
Construction	\$ 0	N/A
Other	\$ 10,180	Facility costs including rent, power, telecommunications, broadband, and other infrastructure related charges
Indirect	\$ 6,449	Non-standard USGS Indirect Rate 15%