



**Texas State Soil and Water Conservation Board
 State Nonpoint Source Grant Program
 FY 2016 Workplan 16-51**

SUMMARY PAGE			
Title of Project	Texas Bacterial Source Tracking Program (FY16–FY17)		
Project Goals	<ul style="list-style-type: none"> • Support BST analyses throughout Texas • Further refine Texas <i>E. coli</i> BST Library • Evaluate new library independent markers • Provide outreach regarding BST 		
Project Tasks	(1) Project Administration; (2) Quality Assurance; (3) BST Analyses; (4); Known Source Fecal Sample Collection; (5) BST Library Refinement and Library Independent Marker Development; (6) Outreach		
Measures of Success	<ul style="list-style-type: none"> • BST Analyses for Plum Creek and Big Elm Creek watersheds • Addition of 100 known source fecal samples to BST Library • Evaluation of source-specific, library-independent markers • Outreach through website and delivery of BST informational materials 		
Project Type	Implementation (); Education (); Planning (); Assessment (X); Groundwater ()		
Status of Waterbody on 2012 Texas Integrated Report	<u>Segment ID</u> Plum Creek (1810) Big Elm Creek (1213A)	<u>Parameter of Impairment or Concern</u> Bacteria Bacteria	<u>Category</u> 4b 5c
Project Location (Statewide or Watershed and County)	Statewide, Plum Creek and Big Elm Creek		
Key Project Activities	Hire Staff (X); Surface Water Quality Monitoring (); Technical Assistance (); Education (X); Implementation (); BMP Effectiveness Monitoring (); Demonstration (); Planning (); Modeling (); Bacterial Source Tracking (X); Other ()		
2012 Texas NPS Management Program Reference	<ul style="list-style-type: none"> • Component 1 – LTG Objectives 1, 2, 3, 6 • Component 1 – STG 1C • Components 2, 3, 5 		
Project Costs	\$444,170		
Project Management	<ul style="list-style-type: none"> • Texas Water Resources Institute • The University of Texas Health Science Center at Houston School of Public Health, El Paso Regional Campus • Texas A&M AgriLife Research, Department of Soil and Crop Sciences 		
Project Period	November 1, 2015 – October 31, 2017		

Part I – Applicant Information

Applicant							
Project Lead	Kevin Wagner, Ph.D.						
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Co-Applicant							
Project Lead	George Di Giovanni, Ph.D.						
Title	Professor						
Organization	The University of Texas Health Science Center at Houston School of Public Health, El Paso Regional Campus						
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Co-Applicant							
Project Lead	Terry Gentry, Ph.D.						
Title	Associate Professor						
Organization	Texas A&M AgriLife Research, Department of Soil and Crop Sciences						
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Project Partners	
Names	Roles & Responsibilities
Texas State Soil and Water Conservation Board (TSSWCB)	Provide state oversight and management of all project activities and ensure coordination of activities with related projects and TCEQ.
Texas Water Resources Institute (TWRI)	Project Coordination and Administration, Quality Assurance, Reporting, and Outreach (Tasks 1, 2, and 5).
The University of Texas Health Science Center at Houston School of Public Health, El Paso Regional Campus (UTSPH EP)	Work in conjunction with AgriLife SCSC to perform all work described in Tasks 2-6.
Texas A&M AgriLife Research – Department of Soil and Crop Sciences (AgriLife SCSC)	Work in conjunction with UTSPH EP to perform all work described in Tasks 2-6.

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> ?				Yes	X	No	
If yes, identify the document.		2014 Update to the Plum Creek Watershed Protection Plan					
If yes, identify the agency/group that developed and/or approved the document.			Plum Creek Watershed Partnership		Year Developed	2014	

Watershed Information				
Watershed or Aquifer Name(s)	Hydrologic Unit Code (12 Digit)	Segment ID	Category on 2012 IR	Size (Acres)
Plum Creek	12100203	1810	4b	288,240
Big Elm Creek	1207020403	1213A_01 1213A_02 1213B_02 1213B_01 1213C_01	5c	207,115

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>2012 Texas Integrated Report</i> , Clean Rivers Program Basin Summary/Highlights Reports, or other documented sources.
Parameter(s) of Impairment: <ul style="list-style-type: none"> • 1213A_01 – bacteria • 1810_01 – bacteria • 1810_02 – bacteria • 1810_03 – bacteria Category: <ul style="list-style-type: none"> • 1213A_01 – 5c • 1810_01 – 4b • 1810_02 – 4b • 1810_03 – 4b Parameters(s) of Concern: <ul style="list-style-type: none"> • 1213B_01 – depressed dissolved oxygen, nitrate • 1213C_01 – impaired habitat, orthophosphorus • 1810_01 – depressed dissolved oxygen, nitrate • 1810_02 – impaired habitat, nitrate, orthophosphorus, total phosphorus • 1810_03 – depressed dissolved oxygen, nitrate, total phosphorus

Project Narrative

Problem/Need Statement

Bacteria are the number one cause of water quality impairment in Texas. BST is a valuable tool for identifying human and animal sources of fecal pollution to support development of watershed plans, TMDLs, and other strategies for addressing these impairments. Comprehensive BST has been completed by UTSPH EP and AgriLife SCSC in numerous watersheds throughout Texas with support provided by the TSSWCB. As a result of these joint efforts over the last decade, the Texas *E. coli* BST Library (ver. 5-15) currently contains 1,765 *E. coli* isolates obtained from 1,554 different domestic sewage, wildlife, livestock and pet fecal samples. Despite its expansiveness, continued development and refinement of the library to include additional known source isolates from additional Texas watersheds and different animal hosts is needed to further increase its utility. Looking to the future, library independent BST holds much promise. It is already being used to support BST analyses in Texas. However, to improve its ability to address the needs in Texas, further work is needed to develop and evaluate new markers. Finally, continued outreach and technology transfer is needed to expand awareness and understanding of BST, foster dialogue and collaboration, and bring water resource managers up to speed on advances in BST technologies, methodologies, applications and results.

Project Narrative

General Project Description (Include Project Location Map)

Due to the current and anticipated need for BST studies in Texas, statewide BST analytical infrastructure needs to be maintained appropriately. This not only includes the needed maintenance and repairs of analytical equipment; but also the continued support, training, and retention of skilled personnel. To meet the needs of the State, BST analytical capabilities will be maintained at both UTSPH EP and AgriLife SCSC BST laboratories. Financial support will be used to maintain lab personnel at UTSPH EP and AgriLife SCSC, continue refinement and evaluation of the Texas *E. coli* BST library, continue work on marker development and evaluation, and support targeted BST analyses for the Big Elm Creek and Plum Creek watersheds.

ERIC-PCR, RP and *Bacteroidales* PCR template-SOPs will also be reviewed and updated accordingly to ensure that they are current and up to date with applicable methods, technologies and markers. UTSPH EP and AgriLife SCSC will collaborate to evaluate and refine the Texas *E. coli* BST library. Fingerprint diversity of source-specific *E. coli* isolates will be investigated to help evaluate the strain representativeness of the library. This will allow the project team to identify specific needs for the expansion and refinement of the library. To support library expansion and BST analyses in the Big Elm Creek and Plum Creek watersheds, approximately 100 known source fecal samples from targeted animal sources will be collected by TWRI and analyzed for *E. coli*.

As funding allows, AgriLife SCSC and UTSPH EP will continue work to evaluate and further develop/refine source-specific bacterial PCR markers. Specifically, efforts will be made to evaluate the addition of library-independent markers to the Texas BST toolbox. Further, TWRI, AgriLife SCSC and UTSPH EP will cooperate with other entities nationwide to ensure that the most up-to-date and accurate BST approaches are implemented in Texas.

Finally, delivering educational and informational programming regarding BST continues to be a critical need. To this end, TWRI will continue to host and maintain the BST website (<http://texasbst.tamu.edu/>). The website will be used to disseminate educational materials, project updates, science updates, and other outreach efforts to advance the science and application of BST in Texas and nationally. To provide greater outreach to water resource managers in Texas, the project team will promote the use of and provide resources on BST. As needed to support this, TWRI, UTSPH EP, and AgriLife SCSC will develop additional flyers, one-pagers, tri-folds or other appropriate printed media to 1) discuss the appropriate application of BST in identifying fecal contamination sources and 2) promote the analytical laboratory capability of public BST labs which the State has invested. As appropriate, TWRI will also include information about BST in its publications. Additionally, TWRI, UTSPH EP, and AgriLife SCSC will periodically meet with natural resource agencies to advance the general knowledge and understanding of agency staff on the use of BST in Texas.

Tasks, Objectives and Schedules				
Task 1	Project Administration			
Costs	\$26,000			
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 15 th of December, March, June and September. QPRs shall be distributed to all Project Partners.			
	Start Date	Month 1	Completion Date	Month 24
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 24
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 24
Subtask 1.4	TWRI will work with AgriLife SCSC and UTSPH EP to develop a Final Report that summarizes activities completed, conclusions reached, and extent to which project goals and measures of success have been achieved.			
	Start Date	Month 18	Completion Date	Month 24
Deliverables	<ul style="list-style-type: none"> • QPRs in electronic format • Reimbursement Forms and necessary documentation in hard copy format • Final Report in electronic and hard copy formats 			

Tasks, Objectives and Schedules				
Task 2	Quality Assurance			
Costs	\$2,000			
Objective	To develop data quality objectives (DQOs) and quality assurance/control (QA/QC) activities to ensure data of known and acceptable quality are generated through this project.			
Subtask 2.1	TWRI will work with UTSPH EP and AgriLife SCSC to develop a QAPP for activities in Tasks 3-5 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 1	Completion Date	Month 3
Subtask 2.2	TWRI, UTSPH EP and AgriLife SCSC will implement the approved QAPP and submit revisions and amendments as needed.			
	Start Date	Month 4	Completion Date	Month 24

Subtask 2.3	AgriLife SCSC and UTSPH EP will maintain and update the 7 statewide BST template-SOPs for collection of fecal samples for BST, isolation of <i>E. coli</i> , archival of <i>E. coli</i> isolates, ERIC-PCR, RP, pre-processing of water samples for <i>Bacteroidales</i> PCR, and <i>Bacteroidales</i> PCR consistent with EPA <i>Guidance for Preparing Standard Operating Procedures (SOPs) (QA/G-6)</i> and the TSSWCB <i>Environmental Data Quality Management Plan</i> so that they include the most recent advances in BST science, methodologies, markers and technologies.			
	Start Date	Month 1	Completion Date	Month 24
Deliverables	<ul style="list-style-type: none"> • QAPP approved by TSSWCB in both electronic and hard copy formats • Approved revisions and amendments to QAPP, as needed • Data of known and acceptable quality as reported through Tasks 3-5 • Updated statewide BST template SOPs 			

Tasks, Objectives and Schedules				
Task 3	BST Analyses			
Costs	\$280,607			
Objective	Support BST analyses for the Big Elm Creek and Plum Creek watersheds.			
Subtask 3.1	UTSPH EP and AgriLife SCSC will maintain BST analytical equipment (e.g., RiboPrinter) and general laboratory equipment to support BST analyses. This includes securing maintenance contracts, replacement parts, and expendable supplies.			
	Start Date	Month 1	Completion Date	Month 24
Subtask 3.2	UTSPH EP and AgriLife SCSC will retain (or hire) lab personnel, students, and/or Postdoctoral Research Associates to maintain laboratory operating capacities and technical expertise to conduct BST studies across the state.			
	Start Date	Month 1	Completion Date	Month 24
Subtask 3.3	UTSPH EP will perform targeted BST analysis to support the watershed planning efforts in the Big Elm Creek watershed. BST analyses will be performed on monthly samples from 1-2 sites (i.e. 12 months x 1-2 sites = 12-24 total samples) in the Big Elm Creek (Segment 1213A) watershed. Sample collection will be conducted by TWRI with funding provided by TCEQ.			
	Start Date	Month 4	Completion Date	Month 24
Subtask 3.4	AgriLife SCSC will perform targeted BST analysis to support watershed protection plan implementation efforts in the Plum Creek watershed. BST analyses will be performed on monthly samples from 5 sites (i.e. 12 months x 5 sites = 60 total samples [sampling plan to be determined following discussions with GBRA and Plum Creek stakeholders]) in the Plum Creek watershed. Samples will be collected by GBRA with funding provided by TSSWCB.			
	Start Date	Month 4	Completion Date	Month 24
Deliverables	<ul style="list-style-type: none"> • BST analyses for Big Elm Creek watershed • BST analyses for Plum Creek watershed 			

Tasks, Objectives and Schedules			
Task 4	Known Source Fecal Sample Collection		
Costs	\$16,000		
Objective	To expand the Texas <i>E. coli</i> BST Library and support BST analyses in the Big Elm Creek and Plum Creek watershed through the collection of approximately 100 known source fecal samples.		
Subtask 4.1	TWRI will work with UTSPH EP and AgriLife SCSC to develop a targeted list of needed species for fecal sample collection and plan for their collection and delivery. This list should primarily fill gaps in the Texas <i>E. coli</i> BST Library and provide support for analyses in the Big Elm Creek and Plum Creek watersheds.		
	Start Date	Month 2	Completion Date
Subtask 4.2	TWRI will collect 50 fecal samples from each watershed in accordance with the plan developed in Subtask 3.1 and work closely with UTSPH EP and AgriLife SCSC to coordinate delivery of the samples to the appropriate lab. TWRI will communicate with a select group of organizations, agencies and businesses in each of the 2 targeted watersheds to arrange and resolve any access concerns and gather input to improve geographic targeting of sample collection. Travel plans, scheduling, and routing maps will be prepared prior to deploying the field crew. TWRI will deploy the field crew to collect known source samples from each targeted watershed. TWRI will coordinate closely with UTSPH EP and AgriLife SCSC to ensure sample delivery adheres to established QA/QC procedures. A known source sample data set will be finalized after completion of the field work and submitted to TSSWCB.		
	Start Date	Month 4	Completion Date
Deliverables	<ul style="list-style-type: none"> Proposed list of needed species recommended for fecal sample collection MS Excel summary data sheets cataloguing known source samples collected 		

Tasks, Objectives and Schedules			
Task 5	BST Library Refinement and Library Independent Marker Development		
Costs	\$109,563		
Objective	Evaluate and expand the statewide <i>E. coli</i> BST library through the addition of 100 known source fecal samples collected through Task 3. Develop and refine library-independent markers.		
Subtask 5.1	UTSPH EP and AgriLife SCSC will isolate <i>E. coli</i> from the approximately 100 known source fecal samples collected through Task 3. Approximately three isolates from each fecal sample (for a total of approximately 300 isolates) will be analyzed using ERIC-PCR for inclusion in the Texas <i>E. coli</i> BST Library; based on the ERIC-PCR fingerprint patterns, approximately half of the isolates (150) will be further analyzed using RP for inclusion in the Texas <i>E. coli</i> BST Library. UTSPH EP and AgriLife SCSC will equitably split workload.		
	Start Date	Month 4	Completion Date
Subtask 5.2	UTSPH EP and AgriLife SCSC will collaborate to evaluate the geographical and temporal stability, composition, average rates of correct classification (accuracy), diversity of source specific isolates, and further development and refinement needs of the Texas <i>E. coli</i> BST library, as the library is updated with new known-source isolates.		
	Start Date	Month 4	Completion Date
Subtask 5.3	As funding allows, AgriLife SCSC and UTSPH EP will utilize the best available bacterial indicators to evaluate and further develop/refine source-specific bacterial PCR markers using known source fecal material. AgriLife SCSC and UTSPH EP efforts will focus on evaluating additional library-independent PCR markers for the Texas BST toolbox. UTSPH EP will also archive Big Elm Creek water DNA samples for future library independent work.		
	Start Date	Month 4	Completion Date
Deliverables	<ul style="list-style-type: none"> Highlights of work performed included in QPRs and Final Report 		

Tasks, Objectives and Schedules			
Task 6	Outreach		
Costs	\$10,000		
Objective	Provide continued outreach regarding BST and its application through improving the statewide knowledge base regarding current BST practices, scientific advances, improvements in the application of BST, and incorporating information from other areas of the nation into the BST approaches utilized in Texas.		
Subtask 6.1	TWRI will host and maintain the http://texasbst.tamu.edu website to disseminate educational materials, project updates, science updates, notify readers about educational opportunities, and other outreach efforts to advance the science and application of BST in Texas and nationally.		
	Start Date	Month 1	Completion Date
Subtask 6.2	TWRI, UTSPH EP, and AgriLife SCSC will promote the use of and provide resources on BST. TWRI, UTSPH EP, and AgriLife SCSC will distribute educational brochures developed. As needed, TWRI, UTSPH EP, and AgriLife SCSC will develop additional flyers, one-pagers, tri-folds or other appropriate printed media, that can be used to 1) discuss the appropriate application of BST in identifying fecal contamination sources and 2) promote the analytical laboratory capability of public BST labs which the State has invested. As appropriate, TWRI will include information about BST in general, and this project specifically, in the txH2O magazine and Conservation Matters e-mail newsletter. Finally, TWRI, UTSPH EP, and AgriLife SCSC will periodically meet with natural resource agencies, public and private laboratories, and other researchers/academia to advance the general knowledge and understanding of BST and appropriate methodologies and SOPs for use of BST in Texas.		
	Start Date	Month 1	Completion Date
Month 24			
Deliverables	<ul style="list-style-type: none"> Summaries of outreach efforts included in QPRs and Final Report 		

Project Goals (Expand from Summary Page)
Support BST analyses across the State through (1) continued personnel support and operation and maintenance of analytical infrastructure at public BST laboratories; (2) continued development, updating and implementation of statewide BST template-SOPs for ERIC-PCR, RiboPrinting, and <i>Bacteroidales</i> PCR along with coordination amongst other entities conducting BST in the state to standardize methodologies employed; (3) delivery of information and materials that give an overview of BST activities in Texas to date and describe the use, capabilities and applicability of BST and the services provided by the State-supported analytical labs to local, state and national stakeholder audiences; (4) continued development of the Texas <i>E. coli</i> BST Library; (5) further development of suitable source-specific bacteria markers for library independent BST; and (6) targeted BST.

Measures of Success (Expand from Summary Page)

- Updated BST template-SOPs for ERIC-PCR, RiboPrinting, and *Bacteroidales* PCR ensuring that template-SOPs include current methods, technologies and approaches.
- Maintain needed level of training of AgriLife SCSC and UTSPH EP personnel.
- Continued operation and maintenance of BST analytical equipment and support of personnel needs to sustain operating capability and expand the utilization of BST applications statewide.
- Targeted BST supporting watershed planning and implementation efforts in the Big Elm Creek and Plum Creek watersheds
- Expansion of the Texas *E. coli* BST Library through the analysis of approximately 100 known source fecal samples collected by TWRI
- Development/evaluation of new source-specific bacterial markers for library-independent BST
- Continued outreach through a BST state of the science website (<http://texasbst.tamu.edu/>) that serves as a repository for collected/produced BST information and source of BST related materials, updates, meeting announcements for educational opportunities
- Continued outreach through delivery of BST informational materials describing the state of the science, applicability, usefulness, and analytical capabilities of State-supported BST laboratories to water resource professionals across the state and nation

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.

LTG 1 – Objective 1 – Focus ... available resources in watersheds and aquifers identified as impacted by NPS pollution

LTG 1 – Objective 2 – Support the implementation of state, regional, and local programs to prevent NPS pollution through assessment...

LTG 1 – Objective 3 – Support the implementation of state, regional, and local programs to reduce NPS pollution, such as the implementation of strategies defined in TMDL I-Plans, [and] WPPs...

LTG 1 – Objective 6 – Develop partnerships ... to facilitate collective, cooperative approaches to manage NPS pollution.

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.

Component 2 – Working partnerships and linkages to appropriate State, interstate, Tribal, 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 – ...Progressively address these identified waters by conducting more detailed watershed assessments...

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	
Category	Costs
Personnel	\$ 122,997
Fringe Benefits	\$ 40,936
Travel	\$ 7,857
Equipment	\$ 0
Supplies	\$ 29,525
Contractual	\$ 189,507
Construction	\$ 0
Other	\$ 16,870
Total Direct Costs	\$ 407,692
Indirect Costs (≤15%)	\$ 36,478
Total Project Costs	\$ 444,170

Budget Justification		
Category	Total Amount	Justification
Personnel	\$ 122,997	<ul style="list-style-type: none"> • TWRI PI (Wagner) \$84,747 @ 8.33% yrs 1-2 plus 3% increase in yr 2 (\$14,760) • SCSC Co-PI (Gentry) \$108,442 @ 8.33% yrs 1-2 plus 3% increase in yr 2 (\$18,887) • TWRI Program Manager (TBD) \$75,528 @ 8.33% yr 1-2 plus 3% increase in yr 2 (\$12,771) • TWRI Research Asst (TBD) \$45,000 @ 10% yrs 1-2 plus 3% increase in yr 2 (\$9,135) • SCSC Post Doc (TBD) \$42,000 @ 83.33% in yr 1 and 75% in yr 2 plus a 3% increase in yr 2 (\$67,444)
Fringe Benefits	\$ 40,936	Fringe for Full Time Employees Calculated as: (Salary * 17.8% + \$695/mo)
Travel	\$ 7,857	<ul style="list-style-type: none"> • TWRI travel to Temple area for project meetings and fecal collection for Big Elm Creek (\$1,600), Lockhart area for fecal collection for Plum Creek (\$1,728) • TWRI mileage for other project-related travel (\$779) • SCSC travel to state meetings and Riesel (\$1,750) and national meetings (\$2,000)
Equipment	\$ 0	N/A
Supplies	\$ 29,525	<ul style="list-style-type: none"> • SCSC ERIC-RP supplies (300 * \$53 = \$15,900) • SCSC Marker Eval/Development Supplies (\$6,000) • SCSC Miscellaneous project supplies (\$1,800) • Fecal isolations: (50 * \$25 = \$1,250) • Fecal ERICs: (150 * \$8 = \$1,200) • Fecal RP: (75 * \$45 = \$3,375)
Contractual*	\$ 189,507	UTSPH EP
Construction	\$ 0	N/A
Other	\$ 16,870	<ul style="list-style-type: none"> • TWRI Communications Services (\$3,000) • Phone allowance (\$200) • TWRI RiboPrinter Service (\$7,500) • SCSC Conference Registrations (\$1,400) • SCSC general maintenance on equipment (\$2,750) • SCSC NELAP Lab accreditation fees (\$2,020)
Indirect	\$ 36,478	15% of federal MTDC (\$243,185)

Contractual Budget Justification – UTSPH EP		
Category	Total Amount	Justification
Personnel	\$ 111,690	<ul style="list-style-type: none"> El Paso: Di Giovanni, PI @ 0.1 FTE yrs 1-2 plus 3% increase in year 2 (\$28,008) El Paso: Truesdale @ 1.0 FTE in yr 1 & 0.654 FTE in yr 2 (\$63,266) El Paso: Casarez @ 0.2 FTE in yrs 1-2 (\$18,496) El Paso: Student Worker \$10/hr * 192 hrs in yr 2 (\$1,920)
Fringe Benefits	\$ 36,825	<ul style="list-style-type: none"> El Paso: Di Giovanni @ 24% of personnel (\$7,282) El Paso: Truesdale @ 40% (+ longevity) of personnel (\$27,706) El Paso: Casarez @ 9% (\$1,664) El Paso: Student Worker @ 9% (\$173)
Travel	\$ 0	N/A
Equipment	\$ 0	N/A
Supplies	\$ 14,695	<ul style="list-style-type: none"> Fecal sample <i>E. coli</i> isolations: 50 @ \$25 ea. = \$1,250 <i>E. coli</i> isolation from water samples (2 sites x 12 months = 24 x 5 isolates/sample = 120 isolates @ \$8 ea.) = \$960 ERIC-RP supplies (\$8*270 isolates ERIC, \$45*195 isolates RP) = \$10,935 Library independent BST marker supplies = \$1,550
Contractual*	\$ 0	N/A
Construction	\$ 0	N/A
Other	\$ 1,579	<ul style="list-style-type: none"> Refrigerator and general maintenance (Biological Safety Cabinets, freezers and refrigerators) = \$1,579
Indirect	\$ 24,718	15% of Modified Total Direct Costs