

TEXAS WATER RESOURCES INSTITUTE

Statewide Bacterial Source Tracking Program for FY 2015  
FY 2015 Workplan 15-52

Quarter no.2 From 12/1/14 Through 2/28/15

**I. Abstract**

Work this quarter focused on completing the QAPP, scheduling maintenance service for RiboPrinters, hiring needed staff to complete project tasks, supporting BST analysis for the Arroyo Colorado project, and preparing for upcoming outreach events such as the 2015 Environmental Trade Fair and Conference, 2015 Waste to Worth Conference, and 70<sup>th</sup> Soil and Water Conservation Society International Annual Conference. Following QAPP approval next quarter, work will be initiated to evaluate/develop new PCR markers, evaluate the BST library, characterize naturalized *E. coli* populations in soil, and continue supporting BST efforts in the Arroyo Colorado and other watersheds as directed by TSSWCB.

**II. Overall Progress and Results by Task**

**Task 1 Project Administration**

*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<sup>th</sup> of March, June, September, and December. QPRs shall be distributed to all Project Partners and posted on the project website.*

The following actions have been completed during this reporting period:

- a. The 2<sup>nd</sup> quarterly progress report was submitted on March 16, 2015.

**30% Complete**

*Subtask 1.2 TWRI will perform accounting functions for project funds and will submit appropriate Reimbursement Forms to TSSWCB at least quarterly.*

The following actions have been completed during this reporting period:

- a. To date, \$7,167 of the \$215,842 has been expended.
- b. A 6 month no cost extension has been requested to extend the project to February 28, 2016.

**3% Complete**

*Subtask 1.3 TWRI will host coordination meetings or conference calls with the TSSWCB, UTSPH EP, and AgriLife SCSC at least quarterly 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.*

The following actions have been completed during this reporting period:

- a. Coordination meetings were held on December 18, 2014 and March 5, 2015.

**30% Complete**

*Subtask 1.4 TWRI will work with AgriLife SCSC and UTSPHEP to develop a Final Report that summarizes activities completed, conclusions reached during the project, and the extent to which project goals and measures of success have been achieved.*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**0% Complete**

## **Task 2 Quality Assurance**

*Subtask 2.1 TWRI will work with UTSPH EP, AgriLife SCSC, and IRNR to develop a QAPP for activities in Tasks 3-5 consistent with EPA Requirements for Quality Assurance Project Plans (QA/R-5) (May 2006) and the TSSWCB Environmental Data Quality Management Plan (August 2007).*

The following actions have been completed during this reporting period:

- a. The QAPP for this project is near completion and will be submitted early next quarter for TSSWCB review and approval.

**70% Complete**

*Subtask 2.2 TWRI will submit revisions and necessary amendments to the QAPP as needed.*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**0% Complete**

*Subtask 2.3 AgriLife SCSC and UTSPH EP will maintain and update, at least annually, the 7 statewide BST template-SOPs for collection of fecal samples for BST, isolation of E. coli, archival of E. coli isolates, ERIC-PCR, RP, pre-processing of water samples for Bacteroidales PCR, and Bacteroidales PCR consistent with EPA Guidance for Preparing Standard Operating Procedures (SOPs) (QA/G-6) and the TSSWCB Environmental Data Quality Management Plan so that they include the most recent advances in BST science, methodologies, markers and technologies.*

The following actions have been completed during this reporting period:

- a. AgriLife SCSC and UTSPHEP are in the processing of reviewing DNA extraction method SOPs. Upon completion of side-by-side evaluation of methods, the SOP may be updated.

**30% Complete**

*Subtask 2.4 AgriLife SCSC and UTSPHEP will coordinate to ensure that needed personnel training is kept on par between the groups to ensure congruity statewide.*

The following actions have been completed during this reporting period:

- a. AgriLife SCSC and UTSPHEP routinely converse via email and phone to discuss the congruency of lab methods.

**30% Complete**

### **Task 3 Analytical Laboratory Capacity, Library Exploration and Refinement, and Methods Development**

*Subtask 3.1 UTSPH EP and AgriLife SCSC will maintain BST analytical equipment (e.g., RiboPrinter) and general laboratory equipment. This includes securing maintenance contracts, replacement parts, and expendable supplies and purchase of a new computer for the UTSPH EP RiboPrinter system.*

The following actions have been completed during this reporting period:

- a. DuPont has been contacted about doing preventative maintenance on the UTSPHEP and AgriLife SCSC RiboPrinters. Preventative maintenance visits for both labs are currently being scheduled.

**30% Complete**

*Subtask 3.2 UTSPH EP and AgriLife SCSC will retain (or hire) lab personnel, Graduate Students, and/or Postdoctoral Research Associates to 1) maintain laboratory operating capacities and technical expertise to conduct BST studies across the state, 2) aid in the evaluation, expansion and maintenance of the Texas E. coli BST Library, 3) evaluate library-independent methods and markers, and 4) provide support on TSSWCB projects.*

The following actions have been completed during this reporting period:

- a. UTSPHEP has retained Joy Truesdale and Elizabeth Casarez and hired one graduate student, Cesar Navar, part-time to assist with project activities. AgriLife SCSC has retained Pauline Wanjugi, Postdoctoral Research Associate to assist with project activities.

**50% Complete**

*Subtask 3.3 In order to quantify and characterize the possibility of naturalized E. coli populations occurring in soil and ultimately runoff, AgriLife SCSC, with assistance from TWRI, will install four small enclosures (built from plastic barrels, or similar) in each of 3 designated catchments (un-grazed rangeland, cropland, managed hay pasture) at the USDA-ARS Grassland Research Center in Riesel. Small, mesh-covered windows will be installed in each plastic container to allow for gas exchange. The open end of each enclosure will be buried in the soil to exclude inputs of E. coli from animals or water. One month after installation, four individual soil samples will be collected and composited from inside each enclosure. Four soil samples will also be collected and composited from outside of each enclosure. E. coli will be enumerated for each sample using EPA Method 1603. For each sample containing E. coli, up to 5 E. coli isolates will be isolated, verified, and archived. In FY16, these isolates will be analyzed by ERIC-RP for comparison to the Texas E. coli BST Library. A total of 25 presumptive naturalized E. coli isolates will also be characterized with ERIC-RP through collaborative work with the City of Houston.*

The following actions have been completed during this reporting period:

- a. AgriLife SCSC continues to assess the best approach and need for characterizing naturalized *E. coli* populations in soil.

**25% Complete**

*Subtask 3.4 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 E. coli BST library, as the library is updated with new known-source isolates.*

The following actions have been completed during this reporting period:

- a. Upon approval of the QAPP, work will continue on evaluating the BST library.

**0% Complete**

*Subtask 3.5 Using known source fecal material, AgriLife SCSC and UTSPH EP will utilize the best available bacterial indicators to evaluate and further develop/refine source-specific bacterial PCR markers. Specifically, efforts will be made to evaluate 1) additional wildlife known source fecal samples for human Bacteroidales HF183 marker, 2) additional deer fecal samples from across the state analyzed for the Bacteroidales HF 183 marker, and 3) addition of library-independent qPCR markers to the Texas BST toolbox. These fecal samples will primarily have been collected and archived as part of previous studies including the Arroyo Colorado project. Depending upon the outcome of the Arroyo Colorado sample collection, additional samples may be needed for specific animal groups (i.e., avian wildlife). If additional samples are needed, TWRI will collect and provide these samples to AgriLife SCSC and UTSPH EP, as appropriate.*

The following actions have been completed during this reporting period:

- a. Upon approval of the QAPP, work will continue to evaluate/develop new PCR markers.

**0% Complete**

*Subtask 3.6 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 by attending and participating in BST-related meetings, seminars and workshops, as appropriate, to learn of new and improved BST methods being employed elsewhere.*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**0% Complete**

#### **Task 4 Targeted BST Analysis**

*Subtask 4.1 UTSPH EP will perform targeted BST analysis to support the Arroyo Colorado watershed protection plan development efforts.*

The following actions have been completed during this reporting period:

- a. Joy Truesdale, Elizabeth Casarez and Cesar Navar have been performing sample analyses for the Arroyo Colorado project.

**25% Complete**

*Subtask 4.2 AgriLife SCSC will perform targeted BST analysis to support watershed protection plan development efforts as directed by the TSSWCB.*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**0% Complete**

## **Task 5 Outreach on Bacterial Source Tracking**

*Subtask 5.1 IRNR 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.*

The following actions have been completed during this reporting period:

- a. TWRI continues to host and maintain the Texas BST Library website. Between 12/1/14 – 2/28/15, there were 56 visits to the website by 45 unique visitors.

**30% Complete**

*Subtask 5.2 TWRI, UTSPH EP, and AgriLife SCSC will promote the use of and provide resources on BST by participating in meetings, conferences, workshops, seminars, and other appropriate venues. 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 to advance the general knowledge and understanding of agency staff on BST and to develop action strategies to address issues raised by agency staff regarding the use of BST in Texas.*

The following actions have been completed during this reporting period:

- a. A new promotional flyer was developed for distribution at the 2015 Texas Environmental Trade Fair. Further, the BST Brochures developed under project 10-50 are currently being updated for printing and distribution at the 2015 Texas Environmental Trade Fair.
- b. TWRI UTSPHEP, and AgriLife SCSC will promote the use of and provide resources on BST at the 2015 Environmental Trade Fair and Conference in Austin next quarter.
- c. TWRI will participate in the 2015 Waste to Worth Conference and 70<sup>th</sup> Soil and Water Conservation Society International Annual Conference and present on how Texas has used BST to support and improve its watershed planning efforts.

**30% Complete**

*Subtask 5.3 TWRI, UTSPH EP, and AgriLife SCSC will work with public and private laboratories and other researchers/academia across the state which are exploring the use of BST or engaged in BST in Texas about the methods and approaches recommended by the Task Force and being implemented by the State. UTSPH EP and AgriLife SCSC will work to ensure that methodologies and QA/QC mechanisms adopted by these other laboratories are as congruent as possible with SOPs utilized by UTSPH EP and AgriLife SCSC (subtask 2.1).*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**30% Complete**

**III. Related Issues/Current Problems and Favorable or Unusual Developments**

- N/A.

**IV. Projected Work for Next Quarter**

- TWRI will complete the QAPP and submit it to TSSWCB for approval.
- UTSPHEP will continue work in support of the Arroyo Colorado WPP.
- SCSC will initiate work to evaluate naturalized *E. coli* populations at Riesel.
- TWRI will finalize needed updates to the BST Brochures and print them along with the promotional flyer for the BST program.
- TWRI, SCSC, and UTSPHEP will participate in the 2015 Waste to Worth Conference, 70<sup>th</sup> Soil and Water Conservation Society International Annual Conference, and 2015 Texas Environmental Trade Fair and present on BST use in Texas and distribute promotional items.