

TEXAS WATER RESOURCES INSTITUTE

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

Quarter no. 4 From 6/1/15 Through 8/31/15

I. Abstract

Accomplishments this quarter included updating drafts of the SOPs; hiring and training of Maitreyee Mukherjee, the new research associate at the AgriLife SCSC lab; completing analyses for the Arroyo Colorado WPP; and presenting on the Texas BST Program at the 2015 Universities Council on Water Resources (UCOWR) Conference, 70th Soil and Water Conservation Society International Annual Conference, and EPA Region 6.

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 15th 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 4th quarterly progress report was submitted on September 15, 2015.

65% 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, \$120,738 of the \$215,842 has been expended.

56% 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. A coordination meeting was held on August 17, 2015 to discuss the meeting with EPA.

65% 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 was approved on May 1, 2015.

100% 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. Updated drafts of the SOPs were prepared in June and submitted to TSSWCB as part of the FY 13-14 Project Final Report.

65% 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. UTSPHEP hosted Maitreyee Mukherjee (new AgriLife SCSC postdoc) on August 3-5 for training on BST procedures. AgriLife SCSC and UTSPHEP continue to routinely converse via email and phone to discuss the congruency of lab methods.

75% 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.

The following actions have been completed during this reporting period:

- a. DuPont has completed RiboPrinter preventative maintenance visits for both labs.
- b. A -80° C freezer at UTSPHEP has broken down and a repair visit is pending. All samples were moved to another freezer for temporary storage.

80% 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 to assist with project activities.
- b. AgriLife SCSC hired Maitreyee Mukherjee as a postdoctoral research associate in July 2015.

80% 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. The last several soil sampling events at Riesel have failed to yield any detectable E. coli. AgriLife SCSC continues to assess the best approach and need for characterizing naturalized E. coli populations in soil.

40% 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. No activity to report this quarter.

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 on the outcome of the Arroyo Colorado sample collection, additional samples may be needed for specific animal groups (i.e., avian wildlife). If more samples are needed, TWRI will collect and provide samples to AgriLife SCSC and UTSPH EP, as needed.

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

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.

75% 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. The final field samples for the project were collected in May and all analyses are complete.

100% 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 6/1/15 – 8/31/15, there were 53 visits to the website by 30 unique visitors.

65% 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. TWRI presented on the Texas BST Program at the 2015 Universities Council on Water Resources (UCOWR) Conference on June 18, 2015 and 70th Soil and Water Conservation Society International Annual Conference on July 28, 2015.
- b. TWRI, UTSPH-EP, and AgriLife SCSC presented the BST Program to EPA on August 25, 2015.

65% 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.

65% Complete

III. Projected Work for Next Quarter

- UTSPH EP will continue work the analysis of library independent BST marker data.
- SCSC will continue work to evaluate naturalized *E. coli* populations at Riesel and UTSPH EP will begin analysis of archived Houston *E. coli* isolates