

TEXAS WATER RESOURCES INSTITUTE

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

Quarter no.3 From 3/1/15 Through 5/31/15

I. Abstract

Accomplishments this quarter included approval of the QAPP, preventative maintenance of the RiboPrinters at both labs, replacement of the research associate at the AgriLife SCSC lab, performing sample analyses for the Arroyo Colorado project, and promotion of the use the Texas BST Program at the 2015 Environmental Trade Fair and Conference and 2015 Waste to Worth Conference.

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 3rd quarterly progress report was submitted on June 12, 2015.

50% 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, \$55,929 of the \$215,842 has been expended.
- b. A 6 month no cost extension was awarded to extend the project to February 28, 2016.

26% 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 March 5, 2015.

50% 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. AgriLife SCSC and UTSPHEP are continue reviewing DNA extraction method SOPs. Upon completion of side-by-side evaluation of methods, the SOP may be updated.

50% 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.

50% 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.

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. A graduate student, Cesar Navar, assisted with the project until May 31, 2105. He will potentially be re-hired for the fall 2015 semester. AgriLife SCSC has retained Pauline Wanjugi, Postdoctoral Research Associate to assist with project activities.
- b. Pauline Wanjugi resigned her postdoctoral research associate position at AgriLife SCSC, on April 15, to take a position at EPA. The position was re-advertised and an offer was made to the top applicant (Maitreyee Mukherjee). She is tentatively scheduled to begin on July 6

70% 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. A stratified sampling design was used to map 30 locations for soil sampling in SW12; however, the extensive rains delayed sampling until next quarter.

30% 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 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. 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. AgriLife SCSC attended a webinar offered by Source Molecular.

50% 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. The final field samples for the project were collected in May. ERIC-RP analyses are ongoing.

75% 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 3/1/15 – 5/31/15, there were 43 visits to the website by 33 unique visitors.

50% 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 “Layperson” BST Brochure developed under project 10-50 was updated, printed, and distributed at the 2015 Texas Environmental Trade Fair.
- b. TWRI UTSPHEP, and AgriLife SCSC promote the use of and provided resources on BST at the 2015 Environmental Trade Fair and Conference in Austin.
- c. TWRI participated in the 2015 Waste to Worth Conference and presented on how Texas has used BST to support and improve its watershed planning efforts.
- d. Next quarter, TWRI will participate in the 2015 Universities Council on Water Resources (UCOWR) Conference and 70th Soil and Water Conservation Society International Annual Conference and present on the Texas BST Program.

50% 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.

50% Complete

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

- N/A.

IV. Projected Work for Next Quarter

- UTSPHEP will continue work in support of the Arroyo Colorado WPP.
- SCSC will continue work to evaluate naturalized *E. coli* populations at Riesel and UTSPHEP will begin analysis of archived Houston *E. coli* isolates
- TWRI will participate in the 2015 UCOWR Conference and 70th Soil and Water Conservation Society International Annual Conference and present on the Texas BST Program.