

## Texas Water Resources Institute

### Support Analytical Infrastructure and Further Development of a Statewide Bacterial Source Tracking Library FY 10 State General Revenue Nonpoint Source Grant Program TSSWCB Project No. 10-50

Quarter no. 3 from 3/1/11 through 05/31/11

#### I. Abstract

This quarter a conference planning meeting was held and BST comments solicited from state agencies are being addressed. Isolate collection continues, and quality control issues are being addressed. BST SOP continues to be fine-tuned in response to concerns as they arise.

#### 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. TWRI submitted the 2<sup>nd</sup> Quarter, Year 1 report to TSSWCB on March 11, 2011.

**2% 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. Expenditures thus far have totaled \$91,587 or roughly 21% of total project funding.

**21% Complete**

Subtask 1.3: *TWRI will host coordination meetings, conference calls, or TTVN meetings with the TSSWCB, AgriLife 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 conference planning meeting was held on May 31<sup>st</sup> and addressed comments provided by state agencies. Due to the wide variety of BST knowledge exhibited by the comments it was decided that Courtney will send a BST primer to everyone that RSVPs for the course. This will insure that everybody has a basic knowledge and will be able to follow the content presented at the conference. Committee members will provide Dr. DiGiovanni edits and comments on the draft program by June 10.

### **22% Complete**

*Subtask 1.4: TWRI will develop (Months 1-3), host and maintain (Months 4-24) a website (e.g., <http://bst.tamu.edu>) that will be used as a means 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. This quarter, the website <http://texasbst.tamu.edu> was viewed by 63 unique visitors (12 in March 2011, 9 in April 2011, and 42 in May 2011).

### **55% Complete**

*Subtask 1.5: TWRI will work with AgriLife SCSC and AgriLife EP to prepare Technical Reports as required by project Tasks into published technical reports. These reports will be permanently housed in the TWRI online Reports Database.*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

### **0% Complete**

## **TASK 2: Support and maintain BST analytical infrastructure**

*Subtask 2.1: AgriLife EP and AgriLife SCSC will ensure needed operational and maintenance support for current BST analytical equipment (i.e., RiboPrinter) and general laboratory equipment is executed. This includes securing maintenance contracts, replacement parts and expendable supplies.*

The following actions have been completed during this reporting period:

- a. A pricing agreement for RiboPrinter consumables has been reached with DuPont Qualicon and supplies were ordered.
- b. Repair and maintenance visits for both AgriLife EP and AgriLife SCSC RiboPrinters are to be scheduled to address quality control issues seen in both laboratories to determine whether the problems are with the consumables or the instruments.

### **20% Complete**

Subtask 2.2: *AgriLife EP will hire a Postdoctoral Research Associate/Research Associate that will maintain laboratory operating capacities and technical expertise to conduct BST studies across the state. This FTE is intended to provide support on TSSWCB-funded projects in the Leon River, Lampasas River, and Buck Creek watersheds (projects 10-51, 06-11, 06-07).*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**100% Complete**

Subtask 2.3: *AgriLife SCSC will hire a Postdoctoral Research Associate that will maintain laboratory operating capacities and technical expertise to conduct BST studies across the state. This FTE is intended to provide support on TSSWCB-funded projects in the Little Brazos River tributaries, Big Cypress Creek, and Attoyac Bayou watersheds (projects 09-52, 09-55, 09-10).*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**100% Complete**

### **TASK 3: Quality Assurance**

Subtask 3.1: *AgriLife SCSC and AgriLife EP will maintain and update (at least annually) statewide BST SOPs for ERIC-PCR, RP 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 EP confirmed library isolate selection procedure with AgriLife SCSC due to concern about large number of ERIC pattern clones seen with source isolates.

**25% Complete**

Subtask 3.2: *AgriLife SCSC and AgriLife EP 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. No activity to report this quarter.

**20% Complete**

Subtask 3.3: *AgriLife SCSC and AgriLife EP will work with AgriLife BAEN, USDA-ARS, USDA-NRCS WRAT, and others to develop strategies for 1) reconciling BST and modeling results (SELECT, SWAT, etc.) and 2) using BST in model development, calibration, and validation.*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**20% Complete**

Subtask 3.4: *AgriLife EP and AgriLife SCSC will work with public and private laboratories across the state which are exploring the use of BST. AgriLife 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 AgriLife EP and AgriLife SCSC (subtask 3.1).*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**10% Complete**

Subtask 3.5: *AgriLife EP and AgriLife SCSC will work with AgriLife BAEN, USDA-ARS, USDA-NRCS WRAT, USGS, TIAER, and selected river authorities to define appropriate ambient water sampling protocols to provide desired statistical confidence with BST findings. The level of sampling adequate for statistical characterization of sources and determination of environmental conditions influencing source contributions (often wet versus dry weather conditions) will be described.*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**0% Complete**

#### **TASK 4: Promotion of BST**

Subtask 4.1: *AgriLife SCSC with assistance from TWRI will develop a publication that describes the extent of BST work conducted to date in Texas. This report should compare and contrast methodologies and results. This publication should build on the discussion in the Task Force Report.*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**0% Complete**

Subtask 4.2: *TWRI will develop flyers, one-pagers, tri-folds or other appropriate printed media that can be used to 1) promote the general use of BST consistent with the Task Force Report, 2) discuss the appropriate application of BST in identifying fecal contamination sources, and 3) promote the analytical lab capability of public BST labs which the state has invested. Printed media should be appropriately developed for each target audience including, but not limited to, 1) state and federal agencies with water quality responsibilities and jurisdictions (TCEQ, TPWD, DSHS, GLO, USEPA (Region 6 and GOMP), USGS, NOAA), 2) political subdivisions of state government (municipal, county), including TML and TAC, that may be involved in watershed planning processes focused on abatement of bacterial contamination, 3) livestock producer organizations such as TFB, TSCRA, ICA, TAD, TCFA, TSGRA, TPPA, TPF, TWA, 4) private and public water quality labs, and 5) the general public. As appropriate, TWRI will include information about BST in general, and this project specifically, in the tx H2O, New Waves e-letter, AgriLife News.*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**0% Complete**

Subtask 4.3: *TWRI, AgriLife EP, and AgriLife SCSC will promote BST by making presentations at conferences, workshops, seminars and other appropriate venues such as WEF/WEAT, TSCRA/TFB/TWA Annual Conventions, ASABE, TCEQ Environmental Trade Fair.*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**0% Complete**

Subtask 4.4: *TWRI, AgriLife EP and AgriLife SCSC will work to inform other researchers/academia who are engaged in BST in Texas (Edrington, Brinkmeyer, Alam) about the methods and approaches recommended by the Task Force and being implemented by the State.*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**0% Complete**

**TASK 5: Texas *E. coli* BST Library expansion, PCR marker development/refinement and *E. coli* isolate selection method evaluation**

Subtask 5.1: *AgriLife EP and AgriLife SCSC will isolate *E. coli* from known source fecal samples. Known source fecal samples should primarily fill gaps identified in other TSSWCB-funded BST projects, as well as, archived known sources identified through subtask 5.5, and gaps identified through subtask 6.3. Approximately three isolates from each fecal sample will be analyzed using ERIC-PCR for inclusion in the Texas *E. coli* BST Library. Based on the ERIC-PCR fingerprint patterns, approximately half of the isolates will be further analyzed using RP for inclusion in the Texas *E. coli* BST Library. AgriLife EP and AgriLife SCSC will equitably split workload.*

The following actions have been completed during this reporting period:

- a. As part of this project, the Leon and Lampasas studies increased the number of sources samples to be collected from 100 to 200. Currently, 75 of the 95 samples so far collected from the Leon and Lampasas studies were positive for *E. coli*. From these, approximately 220 isolates have been archived, and 140 ERIC suspensions have been made. Approximately 60 isolates have been screened by ERIC-PCR and 35 isolates have been selected for the local libraries which will then be screened for inclusion in the Texas *E. coli* BST library.
- b. AgriLife SCSC to collect an additional 70 known-source sample, total of 100 known-source samples, as part of the Attoyac Bayou project to be fingerprinted for local library creation, as well as screening for inclusion in the Texas *E. coli* BST library.

**25% Complete**

Subtask 5.2: *AgriLife EP and AgriLife SCSC will quantify species-specific bacteria production (*E. coli* and *Enterococcus*) in feces and measure the variability of this production. While bacteria content of feces has been reported in literature for some species and has been summarized in some reports used in Texas bacteria projects, often this information has been limited to fecal coliform. Known source fecal samples from subtask 5.1 should be used.*

The following actions have been completed during this reporting period:

- b. No activity to report this quarter.

**0% Complete**

Subtask 5.3: *Utilizing known source fecal material, AgriLife SCSC and AgriLife EP will utilize the best available bacterial indicators to further develop and refine species-specific bacteria markers for Bacteroidales PCR. Specifically, efforts will be made on markers to 1) differentiate between ruminants (primarily cattle and deer), 2) identify poultry, and 3) differentiate between domestic swine and feral hogs.*

The following actions have been completed during this reporting period:

- b. No activity to report this quarter.

**0% Complete**

Subtask 5.4: *AgriLife SCSC and AgriLife EP will coordinate to conduct comparison studies to evaluate differences in E. coli isolate selection using isolation methods EPA 1603, EPA 1604 and the IDEXX methods. Six water samples will be processed using the EPA 1603 and 1604 methods and the IDEXX method. Ten E. coli isolates per sample per enumeration/isolation (total of 180 isolates) will be analyzed using the ERIC-RP. The suitability of utilizing E. coli isolates processed using methods other than EPA 1603 in BST will be determined.*

The following actions have been completed during this reporting period:

- b. No activity to report this quarter.

**0% Complete**

Subtask 5.5: *AgriLife EP and AgriLife SCSC will work to quantify the extent (quantity) and nature (method) of known source library samples that have been collected by out-of-state labs (Harwood @ University of South Florida, Source Molecular Corp., IEH Laboratories & Consulting Group, Ellender @ University of Southern Mississippi) and other in-state labs (Brinkmeyer @ TAMU-Galveston) for Texas BST projects. To the extent practical and appropriate, AgriLife EP and AgriLife SCSC will work to incorporate known source library samples from these 3<sup>rd</sup> party labs into the Texas E. coli BST Library. AgriLife EP and AgriLife SCSC and will work with AgriLife BAEN to incorporate known source fecal samples collected through TSSWCB project 07-06 into the Texas E. coli BST Library.*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**10% Complete**

Subtask 5.6: *TWRI, AgriLife EP and AgriLife SCSC will collaborate to 1) expand and update on the list of BST-related R&D activities identified by the Task Force, and 2) prioritize the updated list of BST-related R&D activities.*

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

**0% Complete**

**TASK 6: BST workshop and state of the science conference delivery and development**

Subtask 6.1: *AgriLife SCSC and AgriLife 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 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**

Subtask 6.2: *TWRI, AgriLife SCSC and AgriLife EP will cooperate to establish a Conference Planning Team that serves as the advisory committee for planning a statewide BST workshop (subtask 6.4) and agency specific meetings. Planning activities will include setting meeting agendas, providing information for the development of meeting materials and identifying invited speakers for the statewide BST workshop.*

The following actions have been completed during this reporting period:

- a. A BST Conference Planning meeting was on May 31, 201. Minutes in Appendix I
- b. Courtney has added a conference information section to the project website.

**30% Complete**

Subtask 6.3: *TWRI will work to coordinate BST meetings with targeted agencies (TCEQ, TDA, TPWD, GLO, DSHS, USEPA, and selected river authorities). The intent of these meetings is further the understanding of agency staff on BST and to develop action strategies to address issues raised by agency staff regarding the validity of BST in general, and methods and the Texas E. coli BST Library particularly.*

The following actions have been completed during this reporting period:

- c. No activity to report this quarter.

**0% Complete**

Subtask 6.4: *TWRI will coordinate the planning of a statewide BST workshop to be held in Austin in summer/winter 2011/2012. The purpose of this workshop will be to 1) highlight the extent of BST work that has been and is being conducted in the state, 2) discuss the scientific advances and improvements in the application of BST, and 3) identify research needs to further the science of BST. TWRI will handle all meeting logistics, speaker invitations, meeting materials preparation and advertising/promotion of the meeting.*

The following actions have been completed during this reporting period:

- a. See subtask 6.2

**15% Complete****III. Related Issues/Current Problems and Favorable or Unusual Developments**

- a. RiboPrinter quality control issues (consumables and instrumentation) need to be addressed before more isolates can be analyzed.

**IV. Projected Work for Next Quarter**

- a. Collection of samples will continue and be expanded
- b. Conference agenda planning will continue
- c. Quality control concerns will continue to be addressed



**BST Conference Planning Meeting – Summary Notes**  
*(Conference Call)*  
*May 31, 2011 – 10 a.m.*

**Conference Call Participants:**

- Elizabeth Casarez
- George Di Giovanni
- Terry Gentry
- Jody Harwood
- Joanna Mott
- Courtney Smith
- Brian Van Delist
- Loren Warrick
- Aaron Wendt

**I. Agency Comments**

- a. Agency comments were addressed
- b. Question to whether comments were a “laundry list” of compiled questions or really need to answer basic questions
- c. Need to assess TCEQ’s specific needs; want to make sure staff is up to speed as well as has a good understanding of BST
- d. Dr. Di Giovanni will contact agencies (those who submitted comments, i.e. TCEQ, TDA, EPA) to assess their needs and top three issues/pressing issues

**II. BST Primer**

- a. Aforementioned comments ranged from most basic BST issues to advanced – a BST Primer (prior to the conference) was discussed as a possibility for those participants starting from square one
- b. Planning Committee mentioned various documents that could be listed on the Conference website in a “Resource” section
  - i. TMDL Task Force Report
  - ii. Review articles
  - iii. Using Microbial Source Tracking to Support TMDL Development
- c. Documents will also be emailed to each participant once RSVP is received (Courtney will handle)

**III. Draft Program**

- a. What pressing topics need to be covered? Need to cover science & efforts within the state.
- b. Ensure that agency comments are covered in the conference program and info is not too technical or theoretical. We will include bulleted topics to be covered in each presentation, as well as an annotated program that shows links to issues/comments raised by agency feedback.
- c. Common themes from agency comments:
  - i. Accuracy issues
  - ii. Library-dependent; library independent - both approaches to Source Tracking
  - iii. Cost (what amount \$\$ is needed to achieve basic study?)
  - iv. Current infrastructure in place through TSSWCB
  - v. Case studies (in-state and out-of-state)
- d. Program to combine a mix of presentation leading to discussion
  - i. Include 10-minute Q&As after presentations
  - ii. Important for moderators to keep each session/presentation on track
- e. Other speakers to consider/include:
  - i. Robin Brinkmeyer – Texas A&M Galveston (<http://ocean.tamu.edu/profile/RBrinkmeyer>)
  - ii. Maria Alvarez – El Paso Community College
  - iii. Chris Herrington/Mary Jo Kirisits – (Austin BST work), City of Austin and UT Austin

- f. **Panel Discussion:** would like to prepare a list of discussion points beforehand to get discussion started; end with current state of statewide efforts
- g. **Poster Session:** there will not be a call for abstracts; however give students the opportunity to present posters (anticipate no more than 12 posters)
  - i. TWRI will establish poster dimensions and guidelines depending on available display space

#### IV. Next Steps

- a. Conference planning committee will review draft program and send comments to Dr. Di Giovanni by **Friday, June 10. Please provide comments with regards to suggested speakers and topics.**
  - i. Dr. Di Giovanni will follow up with those unable to participate on the Conference Call
    - 1. Karthi
    - 2. Srin
    - 3. Jorge Santo Domingo
- b. Budget will be reviewed by TWRI to determine if a small registration fee is needed (\$20)
  - i. Open online RSVP system by September 2011 (need to confirm speakers, reg. fee, supplemental documents, etc.)