Texas A&M AgriLife Research
Texas Water Resources Institute

Bacteria Growth, Persistence, and Source Assessment in Rural Texas Landscapes and Streams

FY 13 CWA 319(h)
TSSWCB Project No. 13-56
AgriLife Project No. 06-406957

Quarter no. _____2_____ From ___September 1, 2013_____Through __November 30, 2013_____

I. Abstract

Work this quarter continued to focus on getting the project up and running by ensuring that needed supplies and materials were obtained prior to QAPP approval. The project's QAPP was approved this quarter and second team meeting has been scheduled to discuss current progress and make final plans to begin data collection in earnest. The website update is nearing completion and online updates will be made next quarter.

II. Overall Progress and Results by Task

TASK 1: Project Administration, Public Notification and Engagement

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 will be distributed to all Project Partners.

The following actions have been completed during this reporting period:
A. Submitted Year 1, Quarter 2 report to TSSWCB on 12.9.2013.

24% 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. As of 12/4/2013, a total of $10,143, or about 3% of project funding had been spent.

10% Complete

Subtask 1.3: *TWRI will host coordination meetings or conference calls as needed 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.*

The following actions have been completed during this reporting period:

A. No meeting held this quarter; next meeting scheduled for December 5, 2013.

24% Complete

Subtask 1.4: *TWRI, with assistance from other project partners will develop a final project report.*

The following actions have been completed during this reporting period:

A. No activity to report at this time.

0% Complete

TASK 2: Quality Assurance

Subtask 2.1: *TWRI, with assistance from other project partners, will develop a QAPP for activities in Tasks 3 and 4 consistent with the most recent versions of EPA Requirements for Quality Assurance Project Plans (QA/R-5) and the TSSWCB Environmental Data Quality Management Plan. All monitoring procedures and methods prescribed in the QAPP shall be consistent with the guidelines detailed in the TCEQ Surface Water Quality Monitoring Procedures, Volume 1: Physical and Chemical Monitoring Methods for Water, Sediment, and Tissue (RG-415). [Consistency with Title 30, Chapter 25 of the Texas Administrative Code, Environmental Testing Laboratory Accreditation and Certification, which describes Texas' approach to implementing the National Environmental Laboratory Accreditation Conference (NELAC) standards, shall be required where applicable.]*

The following actions have been completed during this reporting period:

A. The QAPP for the project was approved on November 5, 2013 by TSSWCB.

100% Complete

Subtask 2.2: *TWRI will implement the approved QAPP. 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 at this time.

0% Complete

TASK 3: Simulated Instream *E. coli* Growth and Persistence Assessment

Subtask 3.1: *TWRI and BAEN will establish laboratory-scale flow chambers to simulate stream environments in a controlled setting.*

The following actions have been completed during this reporting period:

A. Flow chambers have been cleaned, tested and prepped for experiments.
B. Task complete.

100% Complete

Subtask 3.2: *TWRI and BAEN will populate flow chambers with known volumes of various types of water from the Carters Creek watershed.*

The following actions have been completed during this reporting period:
A. No activity to report at this time.
B. This task will begin in January.

0% Complete

Subtask 3.3: *TWRI and BAEN will conduct replicated monitoring and analysis over time to simulate instream conditions and assess temporal variations in E. coli growth and persistence in response to water quality changes (DO, DOC, pH, ammonium, nitrate, phosphorus, and turbidity). With the exception of DOC, these parameters will be monitored continuously using automated instrumentation. Water will be monitored by sampling the approximate midpoint of the flowing water column. Ten water samples will be collected from each flow chamber per trial at defined time intervals. Simulations in triplicate; one control and two treatments. Treatment will consist of stream water spiked with prescribed nutrient amendments to evaluate E. coli response.*

The following actions have been completed during this reporting period:
A. No activity to report at this time.

0% Complete

Subtask 3.4: *TWRI and BAEN will evaluate bacterial population dynamics in response to varying levels of nutrients and will simultaneously monitor DO, pH, and turbidity. Using this information, relevant rates of growth and die-off will be calculated and a descriptive summary of findings and results for use in the project final report and other published materials will be produced.*

The following actions have been completed during this reporting period:
A. No activity to report at this time.

0% Complete

TASK 4: *E. coli* Source Assessment of Varying LU/LC Types

Subtask 4.1: *IRNR will establish camera trap arrays on each LU/LC type and operate them for two week intervals in summer and winter to document species presence and establish species indices.*

The following actions have been completed during this reporting period:
A. No activity to report at this time.

0% Complete

Subtask 4.2: *Using survey data collected in Subtask 4.1, TWRI/BAEN will develop estimated fecal loading rates from known source fecal samples collected from identified species (Subtask 4.3) contributing E. coli in each LU/LC type. Estimated fecal production rates for each species will be utilized in this estimation.*

The following actions have been completed during this reporting period:

A. No activity to report at this time.

0% Complete

Subtask 4.3: *IRNR/USDA-ARS as appropriate will collect identified sources of fecal material at each selected location and transfer samples to SAML where E. coli colonies will be isolated from these known sources. Identified E. coli will be DNA fingerprinted and included in the Texas E. coli BST Library. 50 known source samples is the target number of sources to collect; 2 E. coli isolates will be analyzed by ERIC-RP per known source sample. Additionally, an E. coli density per gram of feces will be determined for each processed sample.*

The following actions have been completed during this reporting period:

A. No activity to report at this time.

0% Complete

Subtask 4.4: *USDA-ARS will collect 20 surface water runoff samples from each of 3 designated catchments (un-grazed rangeland, cropland, managed hay pasture) at the USDA-ARS Grassland Research Center in Riesel. 60 runoff samples will be remitted to SAML for E. coli BST analysis. Five E. coli isolate will be analyzed by ERIC-RP per sample.*

The following actions have been completed during this reporting period:

A. No activity to report at this time.

0% Complete

Subtask 4.5: *USDA-ARS will collect 25 soil samples from each of 3 designated catchments (un-grazed rangeland, cropland, managed hay pasture) at the USDA-ARS Grassland Research Center in Riesel. 75 soil samples will be remitted to SAML for E. coli enumeration and BST analysis. Four E. coli isolate will be analyzed by ERIC-RP per sample.*

The following actions have been completed during this reporting period:

A. No activity to report at this time.

0% Complete

Subtask 4.6: *Using soil and water samples received, SAML will process samples using EPA Method 1603. E. coli colonies will be isolated from each sample processed and subjected to BST analysis.*

The following actions have been completed during this reporting period:

A. No activity to report at this time.

0% Complete

Subtask 4.7: *SAML will compare E. coli isolates extracted from soil and water samples collected at these sites to E. coli strains isolated and typed in Subtask 4.3 and other included in the Texas E. coli BST Library using the ERIC-RP methodology.*

The following actions have been completed during this reporting period:

A. No activity to report at this time.

0% Complete

Subtask 4.8: *SAML will develop descriptive write up of BST technical approach and its results for inclusion in the project final report.*

The following actions have been completed during this reporting period:

A. No activity to report at this time.

0% Complete

Task 5: Education and Outreach

Subtask 5.1: *Project personnel will deliver project findings as appropriate at regional, state and national meetings to convey project findings to interested audiences and expand the utilization of project results.*

The following actions have been completed during this reporting period:

A. No activity to report at this time.

0% Complete

Subtask 5.2: *TWRI will maintain a program website to house information, findings and progress as well as serve as an avenue to expand education and outreach to larger audiences.*

The following actions have been completed during this reporting period:

A. Website content review and update is nearing completion.
B. Online content will be updated next month.

10% Complete

III. Projected Work for Next Quarter

1. Complete needed supplies and materials procurement in preparation for data collection and analysis commencement.
2. Complete update to the 'Bacteria Fate and Transport' website to reflect work planned under this project.
3. Begin *E. coli* source survey work at Riesel to document potential sources of *E. coli* on research plots and collect known source fecal samples.
4. Begin flow chamber experiments to determine *E. coli* response to nutrient amendments.
5. Collect runoff samples from plots in Riesel when rainfall runoff occurs.
6. Schedule first of two soil sampling events in Riesel.