

**Texas AgriLife Research
Texas Water Resources Institute**

**Watershed Protection Plan Development for Buck Creek
FY 06 CWA 319(h)
TSSWCB Project No. 06-11**

Quarter no. 12 From 10.1.2009 Through 12.31.2009

I. Abstract

Work conducted during this quarter of the project focused on completing the first draft of the Buck Creek WPP and submitting it to TSSWCB for initial review prior to public release. This draft was sent to TSSWCB on 11.19.09. Final data analyses were also conducted for data being included in the Buck Creek WPP. September 30 was used as a cut-off data for data collection to be incorporated into the WPP. Collecting water samples and preparing collected water and fecal samples for BST analysis also continued to bolster the number of samples in the state BST Library from the Panhandle region of Texas. Water samples were collected at sites 5, 10A, 10C and 11 this quarter. A stakeholder meeting was held in Wellington on October 27th and presented the final results of the LDC and SELECT modeling along with the final BST results.

II. Overall Progress and Results by Task

TASK 1: Project Coordination and Administration

Subtask 1.1: Conduct quarterly TTVN meetings as appropriate with project participants to discuss project activities, project schedule, lines of responsibility, communication needs, and other requirements. (Sept. 06 - Aug. 10).

The following actions have been completed during this reporting period:

- a. A conference call was held in lieu of a TTVN this quarter to discuss project progress and the timeline for completing the project.

85% Complete

Subtask 1.2: TWRI will prepare electronic quarterly reports. All progress reports will also be provided to Texas AgriLife Research and Texas AgriLife Extension Service project cooperators and participants, Hall-Childress, Collingsworth, and Donley SWCD directors and will be placed on the project website. (Sept. 06 - Aug. 10).

The following actions have been completed during this reporting period:

- a. Submitted Year 3, Quarter 4 report to TSSWCB on January 15th, 2010.

85% Complete

Subtask 1.3: Representatives from TWRI will attend meetings with the TSSWCB project manager and other meetings, as needed, to review project status, deliverables, etc. (Sept. 06 - Aug. 10).

The following actions have been completed during this reporting period:

- a. TWRI and TSSWCB continue to confer and discuss the project, its workplan and deliverables. Meetings between all project participants have also been held to discuss these subjects.

85% Complete

Subtask 1.4: *TWRI will submit appropriate Reimbursement Forms. (Sept. 06 - Aug. 10).*

The following actions have been completed during this reporting period:

- a. As of August 31, 2009, a total of \$300,885 or about 70% of total project funding has been expended.

70% Complete

Subtask 1.5: *TWRI will attend all stakeholder meetings as described in Task 6. (Sept. 06 - Aug. 10).*

The following actions have been completed during this reporting period:

- a. A stakeholder meeting was held on October 28th in Wellington at the Club Room of the Wellington Auditorium. Approximately 28 people were in attendance.

85% Complete

TASK 2: Quality Assurance Project Plan Development

Subtask 2.1: *TWRI will develop a QAPP that will detail project goals and objectives relating to water quality monitoring activities; identify the data needed to fulfill those objectives; list field and laboratory methods; describe procedures and schedules to be followed; and specify a data management structure and the quality assurance protocols. (Sept. 06 – Feb. 07).*

The following actions have been completed during this reporting period:

- a. No activity to report at this time.

100% Complete

Subtask 2.2: *Provide annual revisions to the QAPP and amendments, as necessary, to the TSSWCB and EPA. (Feb. 07 – Aug. 10).*

The following actions have been completed during this reporting period:

- a. The annual QAPP revision was approved on November 24, 2009.

90% Complete

TASK 3: Sanitary Survey of Buck Creek Watershed

Subtask 3.1: *Texas AgriLife Research will acquire available literature, data, and information germane to describing the contributions, both spatially and temporally, and sources of bacterial loading in Buck Creek. The data analyses will include discussion of temporal (inter-annual, seasonal) and spatial trends in water quality, an evaluation of potential sources, and an identification of data gaps. This task will include an explanation of how BST methods provide useful data to assist in water quality management efforts where bacterial contamination is a concern. (Sept. 06 – Oct. 09).*

The following actions have been completed during this reporting period:

- a. The final BST report and data analysis that will be included in the Buck Creek WPP are completed.
- b. Fecal material continues to be collected as a means to identify other sources contributing *E. coli* to the Buck Creek watershed.

98% Complete

Subtask 3.2: *Texas AgriLife Research will perform an aerial assessment of watershed will be utilized along the main channel of Buck Creek to identify and characterize stream channel locations, vegetation dynamics, current land use, and potential bacteria sources to the creek. The area will be flown twice during the project to assist in determining possible contributions. This information will be supplemented with a review of current DOQQ photography. Information from this subtask will be crucial in the development of implementation strategies in the Watershed Protection Plan. (Sept. 06 – Aug. 09).*

The following actions have been completed during this reporting period:

- a. This task has been completed.

100% Complete

Subtask 3.3: *Texas AgriLife Research will conduct an inventory of existing land use patterns in the Buck Creek watershed utilizing available imagery. (Sept. 06 – Aug. 07).*

The following actions have been completed during this reporting period:

- a. This subtask is complete.

100% Complete

Subtask 3.4: *Texas AgriLife Research will conduct a survey of the watershed to identify the potential sources of fecal matter to Buck Creek. Wildlife and domestic animal sources of observed scat can be identified. Concentrated waterfowl areas and bird rookeries or bat colonies may be identified. The utilization of waterways by wildlife, as well as dogs, cats, and other domestic animals will also be assessed. Human influences are also typically identified, including malfunctioning septic systems and sewer overflows. (Sept. 06 – Aug. 09).*

The following actions have been completed during this reporting period:

- a. This task is now complete.
- b. Work conducted this quarter has included sampling at WWTP lagoons and CAFO lagoons. These were the two remaining sources that needed to be evaluated.
- c. Although this task is complete, fecal sample collection will continue in an attempt to identify other sources of bacterial contribution in the watershed.

100% Complete

TASK 4: Micro-Watershed Monitoring and Sampling

Subtask 4.1: *Texas AgriLife Research will perform routine sampling (grab sampling) at six locations (Sites 3, 5, 6, 10a, 10c, and 11) on Buck Creek. (Feb. 07 – Aug. 09).*

The following actions have been completed during this reporting period:

- a. Flow resumed during December and samples were collected at sites 5, 10A, 10C and 11.

93% Complete

Subtask 4.2: *Texas AgriLife Research will collect a minimum of 8 rain event/high flow grab samples from the Buck Creek sites over the course of the study. (Feb. 07 – Aug. 09).*

The following actions have been completed during this reporting period:

- a. This task is complete.

100% Complete

Subtask 4.3: *Texas AgriLife Research will perform quarterly sampling (grab sampling) at selected tributary sites within the Buck Creek watershed when flow is present. (Feb. 07 – Aug. 09).*

The following actions have been completed during this reporting period:

- a. Sample collected at site 5 during December.

93% Complete

Subtask 4.4: *Texas AgriLife Research will compile and analyze the sampling data. Data will be for informational and assessment purposes due to the limited data previously collected. (Feb. 07 – Jan. 10).*

The following actions have been completed during this reporting period:

- a. Final data analysis was completed and September 30, 2009 was used as an artificial end date for the data that is included in the Buck Creek WPP.
- b. This task is now complete.

100% Complete

Subtask 4.5: *TWRI will transfer monitoring data from activities in Task 4 to TSSWCB for inclusion in the TCEQ surface water quality monitoring database. (Aug. 09 – Aug. 10)*

The following actions have been completed during this reporting period:

- a. Data were transferred from AgriLife Vernon to TWRI.
- b. Data formatting and validation has begun and will be completed next quarter.

10% Complete

TASK 5: Bacterial Source Tracking

Subtask 5.1: Stage 1 BST Assessment. Monthly targeted water grab sampling of creek segments at greatest risk for fecal pollution loading, as identified through the sanitary survey, will be performed for a period of six months (Texas AgriLife Research -Vernon). Approximately 50 E. coli isolates from 50 different water samples will be analyzed using ERIC-PCR and RiboPrinting and compared with known isolates from the previously developed Texas AgriLife Research-El Paso, Texas E. coli source library to determine the need for the development of a local Buck Creek source library for Stage 2 of the BST work (Texas AgriLife Research-El Paso). Bacteroidales PCR will be performed by Texas AgriLife Research-El Paso to determine if creek segments are being impacted by human or animal fecal pollution. Depending on the results of the Stage 1 BST work, the number of water and source isolates and the types (sewage or animal) of source samples listed below for Stage 2 may change. (Feb. 07 – Aug. 07).

The following actions have been completed during this reporting period:

- a. This subtask is now considered complete.

100% Complete

Subtask 5.2: Samples of fecal matter and/or domestic sewage will be collected from the major potential sources of fecal matter in the watershed. These sources will include domestic animals, wildlife, and human sources. In all, 100 known source samples from the Buck Creek watershed will be collected and processed for E. coli isolation and archival by Texas AgriLife Research-Vernon. Bacterial cultures of E. coli isolates will be archived for future analyses and dissemination to other laboratories. E. coli isolates will be sent to the Texas AgriLife Research-El Paso laboratory for BST analyses and selection of isolates for inclusion in the source library. It is anticipated that over 300 E. coli colonies from source samples will be screened by ERIC-PCR. Approximately 100 of those isolates will be selected for ribotyping BST analysis and inclusion in the source identification library. All sample collection, processing procedures and documentation will be specified in the QAPP. (Aug. 07 – Jan. 10).

The following actions have been completed during this reporting period:

- a. The last shipment of fecal/domestic sewage isolates were analyzed this quarter and results were included in the presentation to stakeholders on October 28th.
- b. This task is now complete.

100% Complete

Subtask 5.3: Ambient water sampling, analysis and isolation of E. coli will be conducted by Texas AgriLife Research – Vernon. Ambient water samples will be collected from at least 4 sites in the Buck Creek watershed on ten dates over a 1-year period. These dates would likely include

at least five dry weather events and at least three post-rainfall events. Approximately five water samples would be collected on each date from each site; and ten samples from the vicinity of the Clean Rivers Program monitoring site. E. coli in water samples will be enumerated using USEPA Method 1603 by the Texas AgriLife Research-Vernon laboratory. Following enumeration, Texas AgriLife Research-Vernon will isolate E. coli from the samples and archive cultures. Bacterial cultures of E. coli isolates will be archived for future analyses and dissemination to other laboratories. E. coli isolates will be sent to the Texas AgriLife Research-El Paso laboratory for ERIC-PCR and RiboPrinting BST analyses and source identification. The Texas AgriLife Research-El Paso laboratory technician will coordinate sample shipment or collection (when necessary) with Texas AgriLife Research -Vernon. (Aug. 07 – Jan. 10).

The following actions have been completed during this reporting period:

- a. All samples have been analyzed and results were complete during the quarter.
- b. This task is now complete.

100% Complete

Subtask 5.4: ERIC-PCR and RiboPrinting fingerprints of approximately 500 E. coli isolates from ambient water samples will be analyzed and compared to source library isolates using Applied Maths BioNumerics software by Texas AgriLife Research-El Paso. (Aug. 07 – Jan. 10).

The following actions have been completed during this reporting period:

- a. This task is now complete.

100% Complete

Subtask 5.5: Texas AgriLife Research-El Paso will compile and analyze the BST data. Water isolates will be identified to cattle, other livestock, avian and non-avian wildlife, domestic sewage, and pet sources. Results will help identify the sources needed to be addressed by the Watershed Protection Plan. (Aug. 07 – Jan. 10).

The following actions have been completed during this reporting period:

- a. A draft final report has been developed and results have been presented to stakeholders.
- b. The final report should be completed this quarter.

75% Complete

TASK 6: Stakeholder Coordination and Education

Subtask 6.1: The Vernon Research Assistant will receive training on watershed protection plan development and serve as the watershed coordinator for Buck Creek. (Sept. 06 – Aug. 10).

The following actions have been completed during this reporting period:

- a. The Research Assistant has completed the Watershed Protection Planning Workshop on June 2-6, 2008 in Bandera.

100% Complete

Subtask 6.2: The Vernon Research Assistant/Watershed Coordinator, with assistance from TWRI and Texas AgriLife Extension Service, will assemble a stakeholder group to provide input and assist in the development of a Watershed Protection Plan. The stakeholder group will be made up of landowners, elected officials, agency representatives, industry groups, and others as appropriate. Potential agency representatives and industry groups include soil and water conservation districts, county commissioners and judges, Texas State Soil and Water Conservation Board, Red River Authority, Texas Commission on Environmental Quality, Texas AgriLife Extension Service, Texas AgriLife Research, Texas Water Resources Institute, Texas Parks and Wildlife Department, Natural Resources Conservation Service, Farm Services Agency, Texas Cattle Feeders Association, and Texas Farm Bureau. Participation by all that may be affected will be encouraged throughout the process. (Sept. 06 – Feb. 07).

The following actions have been completed during this reporting period:

- a. The stakeholder group has been assembled and continues to be added to as the project progresses.

97% Complete

Subtask 6.3: The stakeholder group will meet quarterly, or as needed. These meetings will be held within the Buck Creek watershed to solicit input on the development of the watershed plan. In addition, the status of monitoring and assessment efforts will be presented in the context of how a watershed plan will promote recovery or proper functions of the Buck Creek watershed. (Sept. 06 – Aug. 10).

The following actions have been completed during this reporting period:

- a. A stakeholder meeting was held October 28th in Wellington where watershed modeling was discussed. Approximately 28 stakeholders were in attendance.

85% Complete

Subtask 6.4: As appropriate, educational programs will also be provided in conjunction with the stakeholder meetings. Informational programs on topics such as principles of watershed hydrology, primary nonpoint source pollution types, and agricultural BMPs for protecting water quality (i.e. alternative watering, riparian management issues, livestock and wildlife management, grazing management, shade development, feeding strategies, cross fencing, and prescribed burning) will also be provided. (Sept. 06 – Aug. 10).

The following actions have been completed during this reporting period:

- a. No new activity to report at this time.

60% Complete

Subtask 6.5: The Vernon Research Assistant/Watershed Coordinator will also meet semi-annually with each SWCD to discuss the status of the project and obtain any input the SWCDs have to offer regarding the project and watershed protection plan. (Sept. 06 – Aug. 10).

The following actions have been completed during this reporting period:

- a. The Research Assistant/Watershed Coordinator met informally with the SWCDs.

90% Complete

Subtask 6.6: TWRI will develop (Months 1-3), host and maintain (Months 3-36) an internet website for the dissemination of information on educational, monitoring and demonstration activities taking place across the Buck Creek watershed. Website delivery of information will be the most time and cost effective way to disseminate information to interested people or groups. (Sept. 06 – Aug. 10).

The following actions have been completed during this reporting period:

- a. The website has been developed and will be updated at least quarterly with project updates. Any and all information related to the project will be available on the project website. <http://twri.tamu.edu/buckcreek/>

99% Complete

TASK 7: Watershed Protection Plan

Subtask 7.1: Texas AgriLife Research and TWRI will develop a Watershed Protection Plan for Buck Creek based on criteria set forth in the FY04 guidelines. Findings from Tasks 3-5 and stakeholder input obtained from Task 6 will be utilized to develop the plan. (Sept. 06 – Aug. 10).

The following actions have been completed during this reporting period:

- a. The first draft of the Buck Creek WPP was completed and was sent to TSSWCB on November 19th for their initial review.

75% Complete

Subtask 7.2: TSSWCB, Texas AgriLife Extension, RRA, and local SWCDs will assist with composition, editing, and publication of the final watershed protection plan, as needed. (Sept. 06 – Aug. 10).

The following actions have been completed during this reporting period:

- a. Initial feedback has been received from multiple parties on the content and composition of the Buck Creek WPP.

20% Complete

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

- AgriLife Vernon completed NELAC lab manual requirements and proficiency tests.

IV. Projected Work for Next Quarter

The following will be accomplished during the coming quarter:

- a. Work on the draft WPP will continue next quarter.
- b. A stakeholder meeting will be held next quarter to go over the Buck Creek WPP with watershed stakeholders.
- c. Work will continue on the BST and LDC and SELECT Modeling final reports.
- d. Fecal sample collection will continue in an effort to bolster the Buck Creek specific fecal bacteria data set.