

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

Quarter no. 4 From 10/1/2007 Through 12/31/2007.

I. Abstract

The QAPP revision for the project was approved during the last week of September 2007; therefore, we were able to begin collecting water samples and fecal samples. Work conducted during this quarter mainly consisted of collecting water quality samples and preparing to begin trapping live animals for the positive ID fecal samples. All total, water samples were collected on four different dates and were collected at sites 3, 4, 10a, 10c, and 11. Trapping began in December and has resulted in the capture of several raccoons and opossums. Project personnel held a TTVN meeting on November 16th to discuss project activities and update everyone on progress made since the last meeting. No stakeholder meeting was held during the quarter; so in lieu of the meeting, a newsletter was drafted and sent out in early December to update stakeholders on project activities. As a result of Buck Creek being recently listed as having a concern for nitrates, water samples will now be analyzed for nitrates. These data will be used to aid in determining potential sources and will be useful for developing management strategies to manage nitrate levels in the creek in the future. Delivery of an educational program has been scheduled for January 24th in Wellington, this program is being delivered in place of the quarterly stakeholder meeting.

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.

The following actions have been completed during this reporting period:

- a. A quarterly TTVN meeting was held November 16th. During this meeting we discussed the project progress, lines of responsibility and discussed topics of concern.
- b. Another TTVN meeting will be scheduled and held next quarter.

20% 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.

The following actions have been completed during this reporting period:

- a. Submitted Year 1, Quarter 4 report to TSSWCB on 1-14-08.

20% 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.*

The following actions have been completed during this reporting period:

- c. 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.

20% Complete

Subtask 1.4: *TWRI will submit appropriate Reimbursement Forms.*

The following actions have been completed during this reporting period:

- a. The most recent invoice paid was recorded on 10/31/2007. As of that date, a total of \$61,041.98 or 14.2% of total project funding has been expended.

14.2% Complete

Subtask 1.5: *TWRI will attend all stakeholder meetings as described in Task 6.*

The following actions have been completed during this reporting period:

- a. No stakeholder meetings were held during this quarter.
- b. A newsletter was sent out in early December to maintain lines of communication with watershed stakeholders.

20% 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.*

The following actions have been completed during this reporting period:

- a. The QAPP has been submitted to EPA for their review and was approved the last week of September.

100% Complete

Subtask 2.2: *Provide annual revisions to the QAPP and amendments, as necessary, to the TSSWCB and EPA.*

The following actions have been completed during this reporting period:

- a. An amendment to the QAPP was deemed necessary and has been made.
- b. Signature pages for the QAPP are currently being circulated; this amendment should be approved during the next quarter.

20% 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.*

The following actions have been completed during this reporting period:

- a. Work on this project is underway. The Research Technician is continually in contact with landowners in the watershed and is constantly learning new information regarding potential bacteria sources in the watershed.

12% 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.*

The following actions have been completed during this reporting period:

- a. No activity to report at this time.

0% Complete

Subtask 3.3: *Texas AgriLife Research will conduct an inventory of existing land use patterns in the Buck Creek watershed utilizing available imagery.*

The following actions have been completed during this reporting period:

- a. No activity to report at this time.

0% 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.

The following actions have been completed during this reporting period:

- a. Multiple samples from known animal sources have been collected and identified.
- b. Trapping approved by Texas A&M and Texas Parks and Wildlife has been initiated as a means of collecting a positively identified fecal sample without harming the animal.
- c. Motion activated wildlife cameras continue to be used at multiple locations to identify what species of wildlife or other animals pass by these locations on a somewhat frequent basis and to assess their viability for trapping live animals.

10% 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.

The following actions have been completed during this reporting period:

- a. Sampling began during this quarter upon the approval of the QAPP.
- b. Samples were collected at least once during the quarter at sites 3, 4, 10a, 10c, and 11.

10% 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.

The following actions have been completed during this reporting period:

- a. Samples collected on December 13, 2007 were collected shortly after a rainfall event. Results from these samples are shown in on the last page of this report.

12% 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.

The following actions have been completed during this reporting period:

- a. No activity to report this quarter.

0% 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.

The following actions have been completed during this reporting period:

- a. Samples have been collected along the creek on November 7, December 5, 13, and 19. The complete data set showing measured *E. coli* and nitrate levels at each site on the respective date is attached to the end of this report.

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). Enterococcus faecium human-specific enterococcal surface protein (esp) gene 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.

The following actions have been completed during this reporting period:

- a. To date, 19 water samples have been analyzed. Of the filters received, they exhibited:
 - 19 filters received-- DNA extracted and purified for *Bacteroidales* testing.
 - 19/19 samples tested positive for the Universal marker
 - 7/19 samples tested positive for Ruminant marker
 - 1/19 samples tested positive for Human marker
 - 3/19 samples tested positive for the Hog marker
 - Horse marker inconclusive at this time

10% 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.

The following actions have been completed during this reporting period:

- a. No activity to report at this time.

0% 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.

The following actions have been completed during this reporting period:

- a. No activity to report at this time.

0% 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.

The following actions have been completed during this reporting period:

- a. No activity to report at this time.

0% 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.

The following actions have been completed during this reporting period:

- a. No activity to report at this time.

0% Complete

TASK 6: Stakeholder Coordination and Education

Subtask 6.1: The Vernon Research Tech II will receive training on watershed protection plan development and serve as the watershed coordinator for Buck Creek.

The following actions have been completed during this reporting period:

- a. The Research Technician has taken an online short course through the EPA's Watershed Academy regarding watershed protection plan development.

15% Complete

Subtask 6.2: The Vernon Research Tech II/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.

The following actions have been completed during this reporting period:

- a. Following the September 11, 2007 stakeholder meeting, nominations for a watershed steering committee were received. Currently, the committee consists of six SWCD board members who are also landowners and three other landowners in the watershed.
- b. The formation of a Technical Advisory Committee is also in the works.

50% 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.

The following actions have been completed during this reporting period:

- a. No stakeholder meeting was held this quarter; however, a newsletter was sent to approximately 90 people in the watershed and across the state. This newsletter provided a brief update to the project and reminded everyone about the workshop scheduled for January 24th in Wellington. This newsletter is posted on the project website: <http://twri.tamu.edu/buckcreek/>
- b. The next meeting will actually be a day long workshop of the Texas Watershed Stewards program given by Texas Cooperative Extension. This meeting will be held in Wellington on January 24th. This workshop will help to emphasize the importance of the watershed management approach and will highlight what roles and functions that a watershed plays.

20% 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.*

The following actions have been completed during this reporting period:

- a. The Texas Watershed Steward program has been scheduled for January 24th in Wellington. This program will highlight the goals and principles of watershed management.

5% Complete

Subtask 6.5: *The Vernon Research Tech II/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.*

The following actions have been completed during this reporting period:

- a. No activity to report at this time.

0% 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.*

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/>

95% 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.*

The following actions have been completed during this reporting period:

- a. No activity to report at this time.

0% 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.*

The following actions have been completed during this reporting period:

- a. No activity to report at this time.

0% Complete

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

- The permit to conduct animal trapping for the project has been approved by Texas A&M and Texas Parks and Wildlife.
- Joy Truesdale, a Ph.D. student, was hired November 1, 2007 as a research assistant, and is being trained in all aspects of this source tracking project.
- The Texas Agricultural Experiment Station and Texas Cooperative Extension underwent name changes that are effective January 1, 2008. The Texas Agricultural Experiment Station is now Texas AgriLife Research and Texas Cooperative Extension is now Texas AgriLife Extension Service.

IV. Projected Work for Next Quarter

The following will be accomplished during the coming quarter:

- A minor QAPP revision to correct wording errors and to update sampling sites should be completed during the upcoming quarter.
- The steering committee and technical advisory group will be established during the next quarter.

Buck Creek Sampling data:

Buck Creek Phase II		October -December 07 Report			
<i>E. coli</i> Data (cfu/100mL)					
Legend:		NSC = no sample collected			
No October data		standard: 126 mean, 394 single sample			
Date:	site 03	site 04	site 10A	site 10C	site 11
11/07/07	No Flow	206	133	64	87
12/05/07	No Flow	No Flow	29	14	4
* 12/13/2007	750	322	99	17	98
12/19/07	19	No Flow	27	8	13

* denotes sample collection following rainfall event

Buck Creek Phase II		October -December 07 Report			
Nitrate Data (mg/L)					
Legend:		NSC = no sample collected			
No October data		screening level: 1.95 mg/L			
Date:	site 03	site 04	site 10A	site 10C	site 11
11/07/07	No Flow	0.05	21.2	18.4	16.9
12/05/07	No Flow	No Flow	21.3	20.8	17.6
* 12/13/2007	NSC	NSC	NSC	NSC	NSC
12/19/07	<0.2	No Flow	22	20.8	20.1

* denotes sample collection following rainfall event