Texas A&M AgriLife Research  
Texas Water Resources Institute

Development of a Watershed Protection Plan for Attoyac Bayou  
FY 09 CWA 319(h)  
TSSWCB Project No. 09-10


I. Abstract
Activities this quarter have focused on the continued execution of project tasks. Water sampling was concluded, all data have been processed and remitted for inclusion in SWQMIS. The SELECT model outputs have been refined and are nearing completion and LDCs are in the process of being updated. The RUAA process was finally initiated this quarter and all field work was completed. BST work is nearing completion and will be done next quarter. Stakeholder meetings will resume next quarter.

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 January, April, July and October. QPRs shall be distributed to all project partners. Months 1 thru 36.

The following actions have been completed during this reporting period:

A. TWRI submitted Year 3, Quarter 4 project report for the Development of a Watershed Protection Plan for Attoyac Bayou to TSSWCB on October 11, 2012.

93% Complete

Subtask 1.2: TWRI will perform accounting functions for project funds and will submit appropriate Reimbursement Forms to TSSWCB at least quarterly. Months 1 thru 36.

The following actions have been completed during this reporting period:

A. Expenditures thru October 1, 2012 total $408,293 or about 66% of the total project budget.

68% Complete

Subtask 1.3: TWRI will participate in meetings as appropriate in order to efficiently and effectively achieve project goals, coordinate monitoring efforts and summarize activities and achievements made throughout the course of this project. Months 1 thru 36.

The following actions have been completed during this reporting period:

A. No new activity to report this quarter.

83% Complete
Subtask 1.4: TWRI will work with project personnel from ANRA, BAEN, CES, SAML, SFASU to prepare technical reports as required by project Tasks into published technical reports. These reports will be housed in the TWRI online Reports Database indefinitely. Months 12 thru 36.

The following actions have been completed during this reporting period:

A. Technical report development has begun as appropriate and will continue through the end of the project.

40% Complete

TASK 2: Quality Assurance

Subtask 2.1: TWRI, with assistance from ANRA, BAEN, CES and SFASU will develop a QAPP for activities in Tasks 4, 5, 6, 7 and 8 consistent with EPA Requirements for Quality Assurance Project Plans (QA/R-5) and the TSSWCB Environmental Data Quality Management Plan. Months 1 thru 6.

The following actions have been completed during this reporting period:

A. The QAPP for the Development of a Watershed Protection Plan for Attoyac Bayou was approved by EPA on June 21st.

100% Complete

Subtask 2.2: TWRI will submit revisions and necessary amendments to the QAPP as needed. Months 6 thru 36.

The following actions have been completed during this reporting period:

A. The annual QAPP revision to include RUAA related information and update other portions of the plan was approved by EPA on July 2nd, 2012.

100% Complete

TASK 3: Public Participation and Stakeholder Coordination

Subtask 3.1: CES, with assistance from ANRA, BAEN, Pineywoods RC&D, SAML, SFASU and TWRI, will facilitate public participation and stakeholder involvement in project meetings and activities. A master list of participants and potentially affected parties will be compiled and maintained by CES. Special care will be taken to engage a diverse group of stakeholders from throughout the watershed. Months 1 thru 36.

The following actions have been completed during this reporting period:

A. CES has continued to contact local stakeholders in the watershed and gaining their support and buy-in for the project.

93% Complete

Subtask 3.2: CES, with assistance from TWRI, will coordinate meetings, secure meeting
locations, prepare and disseminate meeting notices and agendas. Meeting summaries will be prepared as appropriate and posted to the project website. It is anticipated that at a minimum, quarterly public meetings will be sufficient; however, if more meetings are deemed necessary, they will be scheduled accordingly. Meeting frequency may be adjusted throughout the course of the project to accomplish project goals. TSSWCB will review and approve all meeting notices, agendas, and meeting summaries prior to public dissemination. Months 1 thru 36.

The following actions have been completed during this reporting period:

A. No activity to report this quarter.  

93% Complete

Subtask 3.3: As needed, other public meetings will be attended by appropriate project personnel, usually the Watershed Coordinator, in order to communicate the goals and objectives of the project, activities and accomplishments to affected parties. These may include, city council, county commissioner’s court, regional water planning, CRP meetings, SWCD meetings, etc. Months 1 thru 36.

The following actions have been completed during this reporting period:

A. No activity to report this quarter.  

92% Complete

Subtask 3.4: TWRI and CES will work to develop and disseminate educational materials to watershed stakeholders. These materials will include flyers, letters, brochures, news releases and others. All documents, educational materials, press releases, etc. will be reviewed and approved by the TSSWCB project manager prior to dissemination. Months 1 thru 36.

The following actions have been completed during this reporting period:

B. No activity to report this quarter.  

92% Complete

Subtask 3.5: TWRI will develop, host and maintain a project website that will be used as a clearing house for all project related information. All presentations, documents and results will be posted to this website. It will also serve as a means to disseminate information to stakeholders and the general public. Months 1 thru 36.

The following actions have been completed during this reporting period:

A. TWRI has continued to add content and refine the design/layout of the project website. It is available online at: http://attovac.tamu.edu  

B. During the quarter, the site received 125 individual visits with 54% of those being new visitors.  

95% Complete

TASK 4: Watershed Survey and GIS Information Update

Subtask 4.1: CES will collaborate with other project partners, local agencies and stakeholders to
develop a comprehensive GIS inventory of the Attoyac Bayou watershed. This GIS will include the most recent information available on land use, elevation, soils, stream networks, reservoirs, roads, municipalities and satellite imagery or aerial photography. Locations of SWQM stations, USGS gages, public access points to the waterbodies, floodwater-retarding structures, wetlands, TPDES permittees (including WWTFs, CAFOs and MS4s), and subdivisions should also be included. Locations of possible bacteria sources, identified in Subtask 4.3, should be incorporated. The cumulative impact of TSSWCB-certified WQMPs on the management of agricultural lands as modeled in TSSWCB project 04-06 will also be documented. Months 3 thru 28.

The following actions have been completed during this reporting period:

A. The GIS is now considered complete; however, additional information will be added if needed and as it is found.

100% Complete

Subtask 4.2: CES will work to update existing Land Use/Land Cover for the watershed to a level that is representative of current watershed conditions. Months 6 thru 15.

The following actions have been completed during this reporting period:

A. This task is now complete.

100% Complete

Subtask 4.3: CES will collaborate with other project partners, especially ANRA and SFASU, and local stakeholders to conduct source survey that accurately characterizes the potential sources of contamination in the watershed during varying spatial and temporal monitoring periods. Months 3 thru 24.

The following actions have been completed during this reporting period:

A. Ground truthing was completed this quarter to verify potential sources. This task is now complete.

100% Complete

Subtask 4.4: CES will combine findings from the watershed survey, GIS update and LU/LC update into a task final report. Months 20 thru 28.

The following actions have been completed during this reporting period:

A. The source survey report and LU/LC update descriptions have been drafted into WPP chapters and released to the Watershed Partnership in draft form for review.

90% Complete

TASK 5: Surface Water Quality Monitoring

Subtask 5.1: SFASU, with help from other project partners (ANRA and CES), will conduct sampling site reconnaissance at the prospective sample sites listed in Table 1 (Project Narrative) to determine the suitability of sample collection at these locations. Once site selection has been
finalized; those needing TCEQ station numbers will be submitted for a Station Location request (SLOC request) by SFASU. Months 1 thru 3.

The following actions have been completed during this reporting period:

A. All SLOC request have been finalized and informal Site IDs have been issued.

100% Complete

Subtask 5.2: SFASU will conduct routine, bi-weekly (twice monthly), ambient water quality monitoring at 10 locations throughout the Attoyac Bayou watershed (see Table 1 in the Project Narrative) over the course of 2 years. Sampling will include routine field parameters (Temp, pH, DO, conductivity, flow) and collection of water samples of the volume required by the QAPP. Water samples will be delivered to ANRA within the appropriate holding time for bacteriological and nutrient analysis (these analysis will include ammonia N, nitrate-nitrite N, dissolved Ortho-P, Total P, Total Suspended Solids, and E. coli enumeration utilizing the IDEXX method). 52 sampling events are scheduled for a total of 520 samples. Sampling efforts will be coordinated with ANRA and TCEQ.

Additionally, a subset of water samples (250) will be collected for BST analysis. All 250 samples will be prepared for Bacteroidales analysis (Subtask 8.1) and a 100 sample subset of the 250 total samples collected will be prepared for E. coli analysis (Subtask 8.2). SFASU will deliver these samples to the WET Lab at SFASU for preparation and storage utilizing the USEPA 1603 method. Samples will be transferred to the SAML at TAMU for BST analysis (Task 8). Months 6 thru 30.

The following actions have been completed during this reporting period:

A. Sampling has been completed and all samples were remitted to the appropriate labs.

B. This task is now complete.

100% Complete

Subtask 5.3: SFASU will utilize automated sampling devices to collect stormflow samples at two locations (Attoyac Bayou @ SH 7 and Big Iron Ore Creek @ FM 354). These samples will be picked up by SFASU and delivered to ANRA for analysis. It is anticipated that a minimum of 10 stormflow events will be sampled from each selected site yielding at least 20 total stormflow samples. These samples will be analyzed for the same parameters as listed in Subtask 5.2. Months 6 thru 30.

The following actions have been completed during this reporting period:

A. Sampling has been completed and all samples were remitted to the appropriate labs.

B. This task is now complete.

100% Complete

Subtask 5.4: SFASU will collect water quality samples quarterly for five quarters from the four identified point source dischargers in the watershed. Sampling will include routine field parameters (Temp, pH, DO, conductivity) nutrient parameters and bacteria parameters.
samples will be delivered to ANRA within the appropriate holding time for bacteriological and nutrient analysis. 20 samples have been budgeted for. Months 6 thru 21.

The following actions have been completed during this reporting period:

A. This task is now complete.

100% Complete

Subtask 5.5: ANRA will maintain a master database for housing all environmental water quality data collected through the project. SFASU will maintain a database of field parameter data collected under the project and transmit this data to ANRA for inclusion into the master database. Data collected and analyzed will be included ANRA’s CRP database and submitted to TSSWCB for transmittal to TCEQ for inclusion in SWQMIS. Data will be formatted consistent with TCEQ DRMG. A Station Location (SLOC) Request for any new monitoring stations will be submitted to TCEQ by SFASU (Subtask 5.1). Months 6 thru 36.

The following actions have been completed during this reporting period:

A. ANRA incorporated all surface water quality data into their database and remitted it for inclusion in SWQMIS.

B. This task is now complete.

100% Complete

Subtask 5.6: ANRA and SFASU will collaborate to develop a technical report summarizing water quality data findings. ANRA will focus on describing the analytical analysis of water samples and streamflow while SFASU will focus on describing field conditions and parameters. This report will be incorporated in the WPP developed for the Attoyac Bayou watershed. Months 24 thru 30.

The following actions have been completed during this reporting period:

A. Work on the report describing water quality monitoring and analysis was initiated this quarter.

20% Complete

TASK 6: LDC and SELECT data analysis

Subtask 6.1: BAEN, with cooperation from other project partners, will develop LDCs on currently available ammonia and bacteria data for each monitoring site on the Attoyac Bayou. LDCs developed will be consistent with EPA’s An Approach for Using Load Duration Curves in the Development of TMDLs, EPA’s Options for Expressing Daily Loads in TMDLs. Months 6 thru 12.

The following actions have been completed during this reporting period:

A. This task is now considered complete.

100% Complete
Subtask 6.2: BAEN, with cooperation from other project partners, will update LDCs developed using historic water quality data with water quality data collected under Task 5. LDCs will be used to estimate needed load reduction for ammonia and bacteria at each site in the waterbody. Months 24 thru 30.

The following actions have been completed during this reporting period:

A. The analysis is completed for half of the stations for both ammonia and bacteria but still needs to be reviewed.

50% Complete

Subtask 6.3: BAEN, with cooperation from other project partners, will conduct watershed modeling using the SELECT approach for the Attoyac Bayou. Information collected in Tasks 4, 5, 7 and 8 will be incorporated with information from LDC analyses to estimate pollutant loadings from sources within the watershed and identify potentially critical loading areas. Months 24 thru 30.

The following actions have been completed during this reporting period:

A. Final SELECT model outputs are completed. A final review will be completed soon.

95% Complete

Subtask 6.4: BAEN will combine results from LDC and SELECT analysis into a technical report that summarizes Task 6 findings. Months 28 thru 32.

The following actions have been completed during this reporting period:

A. Work on this task has begun by describing the methods used. As work is completed, additional information on project specific findings will be incorporated.

40% Complete

TASK 7: Recreational Use Attainability Analysis

Subtask 7.1: Utilizing information from Task 4 (comprehensive GIS inventory and current land use classification) and other relevant information, CES and SFASU will identify sites for RUAA data collection. Proposed sites should be located in areas where the waterbody is accessible to the public and has the highest potential for recreational use (primary contact). Sites shall be identified for the Attoyac Bayou and the Terrapin, Waffelow, Naconiche, Big Iron Ore and West Creeks. Proposed sites shall at least include those from Task 5. The QAPP, as detailed in Task 2, will precisely identify selected sites. SFASU will submit Station Location Requests as needed to obtain TCEQ station numbers for new monitoring sites. Months 16 thru 28.

The following actions have been completed during this reporting period:

A. EPA approved the QAPP Revision that includes RUAA information on July 2nd.

B. This task is now complete.

100% Complete

Subtask 7.2: CES and SFASU shall conduct a thorough historical information review of the
recreational uses of the waterbody that occurred on and/or after November 28, 1975. Historical resources that should be examined include, but are not limited to, photographic evidence, local newspapers, museum collections, published reports, historical society records, and long-term landowners/residents. Texas Parks & Wildlife Department and commercial providers of outdoor recreation goods and services should be consulted for historical information. Months 16 thru 28.

The following actions have been completed during this reporting period:

A. Work on this task is continues as historical evidence that supports the use and lack of use of the Attoyac Bayou and its tributaries for primary contact recreation are being compiled.

50% Complete

Subtask 7.3: CES and SFASU will conduct 2 field surveys at each selected RUAA site. Surveys shall be conducted during a normal (average) warm season (air temperature ≥ 70°F) during baseflow conditions. Baseflow conditions are sustained or typical dry, warm-weather flows between rainfall events, excluding unusual antecedent conditions of drought or wet weather. The surveys should be performed during the period people would most likely be using the waterbody for contact recreation, typically March to October (e.g., spring break, summer, holidays or weekends).

To ascertain the suitability of the streams for contact recreation use, field surveys shall document hydrological characteristics of the stream, such as width and depth of channel, flow/discharge, air/stream temperature, bank access, and stream substrate. Information to be collected shall at least satisfy those questions found on the Field Data Sheet from the TCEQ staff draft Recreational Use-Attainability Analyses (UAAs) – Procedures for a Comprehensive Recreational UAA and a Basic UAA Survey.

CES and SFASU shall document and describe antecedent (prior to fieldwork) rainfall conditions (approximately the previous 30 days) at each selected site. Months 16 thru 28.

The following actions have been completed during this reporting period:

A. The first field survey was conducted July 20-22 and the second event was conducted August 24-25.

B. This task is now complete.

100% Complete

Subtask 7.4: CES and SFASU shall collect a digital photographic record of each selected site during the field surveys. Photographs shall include upstream, left and right bank, and downstream views. Any evidence of observed uses or indications of human use shall be photographed. Photographs should clearly depict the entire channel and each transect measured.

To aid in documenting existing uses, CES and SFASU shall install, operate, and maintain motion-capture cameras at selected monitoring locations from Task 5. (only those locations where bi-weekly sampling is conducted). Months 16 thru 28.
The following actions have been completed during this reporting period:

A. Photo documentation of the waterbody and observed evidence of secondary recreation was completed during the July and August field survey events.

B. This task is now complete.

**100% Complete**

Subtask 7.5: *In order to obtain information on existing and historical uses and stream characteristics, CES and SFASU shall conduct interviews of 1) users present during the field surveys, 2) streamside landowners along the field survey transects, 3) local residents, and 4) commercial providers of outdoor recreation goods and services. Surveys shall include at least those questions found on the Interview Form from the TCEQ staff draft Recreational Use-Attainability Analyses (UAAs) – Procedures for a Comprehensive Recreational UAA and a Basic UAA Survey. Months 16 thru 28.*

The following actions have been completed during this reporting period:

A. SFASU staff has conducted numerous surveys and mailed out survey forms in an attempt to obtain as much local feedback as possible on waterbody uses.

**80% Complete**

Subtask 7.6: *CES and SFASU will combine findings from historical review, field surveys, web searches and interviews into a technical report that meets criteria set forth in TCEQ’s Recreational Use-Attainability Analyses (UAAs) – Procedures for a Comprehensive Recreational UAA and a Basic UAA Survey. Results from this report will be included in the Attoyac Bayou WPP. Month 28 thru 32.*

The following actions have been completed during this reporting period:

A. SFASU has continued to draft the RUAA report by drafting background information on the waterbody, describing the RUAA procedure and incorporating findings from the field survey into the report.

**65% Complete**

**TASK 8: Bacterial Source Tracking**

Subtask 8.1: *SAML will conduct library-independent BST on 250 water samples utilizing the Bacteroidales PCR genetic test for human, ruminant, horse, and swine markers. The number of samples collected from each location may be adjusted depending on the size of each watershed in the study area and the complexity of sources as identified in the source survey (Task 4). Budgeted number of samples is 20 from each of Terrapin, Waffelow, Naconiche, Little Iron Ore and West Creeks for a total of 100 samples from the tributaries; 125 samples will be collected and analyzed from the Attoyac Bayou (25 from each sampling site); 21 stormflow samples as collected by automated equipment; 4 samples collected from WWTFs; in total, 250 samples will be analyzed utilizing Bacteroidales PCR. Specific genetic markers for various animal sources are continually being developed by the scientific community and as new markers are identified, they should be included in this analysis as the budget allows. Water samples for this subtask shall be a subset of those collected by SFASU under Task 5. Month 6 thru 30.*
The following actions have been completed during this reporting period:

A. DNA fingerprinting and genetic screening concluded this quarter.

B. This task is now complete.

100% Complete

Subtask 8.2: SAML will conduct limited library-dependent BST and analyze E. coli isolates from 100 water samples (1 isolate per water sample) from across the study area utilizing the ERIC-PCR and RiboPrinting combination method. Isolates will be obtained from water samples collected at: each sampling site (8 samples from each, total of 80 samples), automated stormflow samples (8 samples from each, total of 16 samples) and 1 from each of the 4 WWTFs; yielding a total of 100 samples. This will serve to 1) confirm that the sources of E. coli and Bacteroidales are comparable and 2) assess the spatial and temporal adequacy of the Texas Known Source Library. Month 6 thru 30.

The following actions have been completed during this reporting period:

A. DNA fingerprinting and genetic screening concluded this quarter.

B. Water sample IDs will are all that remains to be done on this task.

98% Complete

Subtask 8.3: SAML will add up to 30 known source fecal samples (1-2 isolates per fecal sample) to the Texas Known Source Library. Fecal samples will be added to the BST library utilizing the ERIC-PCR and RiboPrinting combination method. Samples for this subtask shall be collected by CES or SFASU under Task 5. Month 6 thru 30.

The following actions have been completed during this reporting period:

A. This task is complete.

100% Complete

Subtask 8.4: SAML will assist CES in designing a watershed source survey (also known as a sanitary survey) (Task 4) that better characterizes possible sources of bacteria loadings in the study area. Results from the source survey will be used by SAML to make appropriate adjustments to the BST sampling design and assess the adequacy of the Texas Known Source Library. Month 1 thru 15.

The following actions have been completed during this reporting period:

A. This task is complete.

100% Complete

Subtask 8.5: BAEN will conduct watershed modeling for the study area (Task 6). SAML will work with BAEN to 1) integrate BST results into the model, to the extent possible, and 2) address and reconcile discrepancies between BST and modeling results. Month 7 thru 21.

The following actions have been completed during this reporting period:

A. A meeting between BAEN and SAML was held to discuss BST results into the model
and progress was made on the best approach to utilize.

B. Additional coordination is needed.

50% Complete

Subtask 8.6: CES and SFASU, as appropriate, will collect known source fecal samples from fresh road kill (less than 48 hrs old), known live sources, and other opportunistic sample sources (game taken by hunting or donated by stakeholders) in or very near the watershed. Samples will be delivered to the WET Lab at SFA for processing before being sent to the SAML at Texas A&M University in College Station. Month 6 thru 30.

The following actions have been completed during this reporting period:

A. This task is now complete although additional samples will be added as they are available.

100% Complete

TASK 9: Watershed Protection Plan Development

Subtask 9.1: CES will develop a WPP for the Attoyac Bayou watershed based on criteria set forth in the USEPA FY2004 NPS Program and Grants Guidelines for States and Territories. Findings from Tasks 4-8 and stakeholder input obtained from Task 3 will be utilized to develop the plan. Month 1 thru 36.

The following actions have been completed during this reporting period:

A. No new activity to report this quarter.

45% Complete

Subtask 9.2: TWRI, TSSWCB, ANRA, BAEN, Pineywoods RC&D, SAML, SFASU, and local SWCDs will assist with composition, editing, and publication of the final WPP, as needed. Month 1 thru 36.

The following actions have been completed during this reporting period:

A. No new activity to report this quarter.

10% Complete

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

IV. Projected Work for Next Quarter

Task 1. Work will continue in planning for coordination meetings amongst project personnel.
Task 2. None
Task 3. A project team planning meeting will be held in early next quarter to discuss the topics of the next meeting. Next meeting will be planned and held. Stakeholders will continue to be engaged by the Watershed Coordinator.
Task 4. Continue efforts to complete the task final report.
Task 5. None.
Task 6. Work will continue to produce final SELECT model outputs.
Task 7. Continue surveys and report.
Task 8. Conclude water IDs and report.
Task 9. Work will continue on drafting portions of the WPP.