

**Texas Water Resources Institute**

**SWAT Model Simulation of the Arroyo Colorado Watershed  
CWA 319(h)  
TSSWCB Agreement No. 02-021-07-09**

Quarter no. 7 From 01/01/09 Through 02/28/09

**I. Abstract**

The final project invoice was submitted to TSSWCB while work continues on model calibration and validation. AgriLife Research discussed load reduction scenarios with TCEQ and TSSWCB; it was determined to base the run on estimated target acreage of each BMP to be implemented by 2015 and 2020. Upon receipt of information, AgriLife Research will finalize the model and work on the final report. At which time, TWRI will be able to submit the final report to TSSWCB.

**II. Overall Progress and Results by Task**

**TASK 1: Coordinate and Administer Project**

*Subtask 1.1: TWRI will coordinate project efforts with all project partners, as well as ongoing projects in the watershed. These projects include the Arroyo Colorado Ag NPS Assessment, Education of BMPs in the Arroyo Colorado Watershed, and the WQMP Implementation Assistance in the Arroyo Colorado Watershed. TWRI will participate in Arroyo Colorado Watershed Partnership meetings (steering committee and work groups) to report progress and coordinate efforts. TTVN meetings or teleconferences will be held, as appropriate, with project partners 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. TSSWCB, on behalf of the project leaders, presented an update of the project to the Ag Issues Workgroup Meeting on Jan 26, 2009.

**100% Complete**

*Subtask 1.2: TWRI will prepare electronic quarterly reports for submission to the TSSWCB. Progress reports shall document all activities performed within a quarter and shall be submitted by the 15th of January, April, July, and October. All progress reports will be provided to all project partners.*

The following actions have been completed during this reporting period:

- a. Submitted Year 2, Quarter 3 Report (final quarterly report) on April 15, 2009.

**100% Complete**

*Subtask 1.3: TWRI, with support from SSL and TAES, will develop a QAPP for activities in Task 2 consistent with EPA Requirements for Quality Assurance Project Plans (QA/R-5) and the TSSWCB Quality Management Plan.*

**100% Complete**

*Subtask 1.4: TWRI will implement the approved QAPP and provide revisions and necessary amendments to the QAPP.*

The following actions have been completed during this reporting period:

- a. The annual update of the QAPP was approved.

**100% Complete**

*Subtask 1.5: TWRI will attend meetings with the TSSWCB project manager and other meetings, as needed, to review project status, deliverables, and other project matters.*

The following actions have been completed during this reporting period:

- a. TWRI worked extensively with AgriLife Research to ensure proper use of funds and expenditures were charged per the contract deliverables.
- b. TWRI facilitated a meeting between AgriLife Research, TSSWCB and TCEQ to discuss modeling scenarios.

**100% Complete**

*Subtask 1.6: 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. TWRI worked with AgriLife Research to ensure proper expenditure of funds. Through this quarter, all but \$888.95 were expended on the project activities.
- b. A final invoice for the amount of \$54,723.61 was submitted for the period of December 1, 2008 through February 28, 2009. Total funds expended on the project was \$94,108.05

**94% Complete**

*Subtask 1.7: TWRI will develop, host and maintain an internet website for the dissemination of information.*

The following actions have been completed during this reporting period:

- a. The Arroyo Colorado Web site, <http://www.arroyocolorado.org> continues to be updated and once finalized, the final report for this project as well as project outcomes will be posted on the website (with TSSWCB approval).

**100% Complete**

*Subtask 1.8: TWRI, with assistance from SSL and TAES, will develop the final report and technical documentation of the project for submission to TSSWCB, EPA, and project partners.*

The following actions have been completed during this reporting period:

- a. TWRI is awaiting final results of model to finalize the final report. Kannan (AgriLife Research) will provide the information for the final report when it available.

**40% Complete**

**Task 2: Watershed data compilation, analysis, and simulation using SWAT**

*Subtask 2.1: Various data such as land use (current and historical), soil, BMP implementation locations, topography, sub-watershed delineation (matching earlier HSPF sub-watersheds), long-term weather data, crop management practices, stream flow and water quality data (current and historical) on sediment, BOD, and nutrients, for the Arroyo Colorado Watershed will be compiled for the period of 1999-2006 from sources such as USGS, TCEQ, TWDB, TPWD, IBWC, Nueces River Authority (NRA), TAES, TCE, and NRCS.*

The following actions have been completed during this reporting period:

- a. Data assembly complete.

**100 % Complete**

*Subtask 2.2: The SWAT model will be set up and calibrated to measured flow and in-stream measurements of sediment, BOD, and nutrient concentrations for the period of 1999-2003 (with 1999 as warm-up period) using monitoring data available from USGS and IBWC stream gages, as well as data from the TWDB, TCEQ, and NRA. Model parameters related to (sub) watershed/landscape processes will be adjusted to match the measured and simulated flow, sediment, BOD and nutrient loading at key locations in each subwatershed.*

The following actions have been completed during this reporting period:

- a. None to report at this time.

**95% Complete**

*Subtask 2.3: Subsequent to calibration, the model will be validated using measured flow and in-stream measurements of sediment, BOD, and nutrient concentrations for the period of 2004-2006.*

The following actions have been completed during this reporting period:

- a. Two preliminary spreadsheets were submitted outlining stream flow and water temperature results.

**45 % Complete**

*Subtask 2.4: Simulate load reduction scenarios for a suite of management measures specified by the TSSWCB.*

The following actions have been completed during this reporting period:

- a. AgriLife Research met with TCEQ to determine load reduction scenarios to simulate. Initial discussion was to base the future BMP scenario on the implementation of the following on all of the acreage in the Arroyo Watershed.
  - 1) Nutrient management in all cultivated area throughout the watershed
  - 2) Irrigation related BMPs in all cultivated+irrigated area (irrigation land leveling, Irrigation System Surface and Subsurface and

- irrigation water management NRCS practice codes 464,443 and 449)  
3) residue management in all cultivated area
- b. However, upon further investigation, it was determined that while it would be interesting, it would not be ideal to run these scenarios on ALL of the cultivated land in the Arroyo. Therefore, AgriLife Research requested TSSWCB provide an estimate on the target acreage of each BMP to be implemented by 2015 and 2020. AgriLife Research is awaiting a reply from TSSWCB to proceed.

**25% Complete**

*Subtask 2.5: Provide TSSWCB the flow and watershed loadings to the Arroyo Colorado, as determined by SWAT, for input by TCEQ into the EFDC model. SWAT output will include time series of average daily flow (in CMS) and sediment, BOD, NH3-N, NO2+NO3, TN, OP and TP loadings (in metric units of mass) at the Port of Harlingen and for each sub-basin (10-14) downstream of the Port of Harlingen (flow to be reported as flow volume for the sub-basins).*

The following actions have been completed during this reporting period:

- b. None to report at this time.

**10% Complete**

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

- None to report at this time.

**IV. Projected Work**

**Task 1**

- Submit the final report

**Task 2**

- Conduct final model runs to calibrate and validate the model. Submit the final project report