

## **Watershed Assistance to Improve Water Quality in North Central Texas**

Texas Water Resources Institute  
FY 03 Federal Appropriated Funds  
Project # 03-60768

Quarter no. 11 From 4/7/06 Through 7/7/06

### **Progress in Meeting Project Milestones and Output Commitments**

#### Task, Deliverables, and Schedules

The Texas Water Resources Institute (TWRI) along with the Texas A&M University Spatial Sciences Laboratory (SSL), Blackland Agricultural Research and Extension Center (BAREC) and Texas Cooperative Extension (TCE) have been diligently working to complete project deliverables. Project efforts during the eleventh quarter focused on modeling activities and education. The SSL and BAREC have completed efforts to calibrate and validate the SWAT model for Cedar Creek Reservoir. TCE has assisted in collection of soil samples to assess background nutrient concentrations in various land use types. TCE staff have educated 4,500 youth using the Stream Trailer Demonstration and have completed 90 percent of the Cedar Creek fact sheet and 90 percent of the curriculum for the Stream Trailer.

TWRI continues to update its Web site containing water quality information, specifically related to project efforts, for scientists and the general public, and to provide project oversight and financial management for the project. The Web site was recently redesigned to be more user friendly and to add additional resource material.

In looking forward to the next quarter, with SWAT modeling activities completed for Cedar Creek Reservoir and Watershed, work will continue on developing BMP scenarios to correct sediment and nutrient loadings. Work associated with Eagle Mountain Reservoir modeling activities will continue. Currently, the model has been calibrated and validated for hydrologic processes and the team has calibrated and preliminarily validated the model for water quality parameters.

The economics team has developed an economic model that will quantify the cost effectiveness of different BMP scenarios. TCE specialists will begin identifying and forming stakeholder groups and publishing the Cedar Creek publication.

The status of tasks, milestones and deliverables will be defined using the following terms:

Pending	Work has not started on the deliverable
Initiated	Work has started
Completed	The objectives were achieved and deliverables are finished
Deferred	Work has started, but further action is delayed pending other information, the completion of another objective, staff restraints, etc.
Ongoing	Work will continue throughout the term of the contract

**Task 1      SWAT Modeling**

Date	Status	Deliverables
1/1/04	Completed	1. Complete model calibration and validation for Cedar Creek Reservoir watershed
1/1/05	Completed	2. Model calibration and validation for Eagle Mountain Reservoir watershed
9/1/06	Pending	3. Model calibration and validation for Richland Chambers Reservoir watershed

Comments:

- The Spatial Sciences Lab (SSL), in cooperation with Blackland Agricultural Research and Extension Center, has completed the validation and calibration of the SWAT model for Cedar Creek Watershed. This deliverable is 100 percent complete.
- The research team has identified BMPs which will be beneficial in reducing loadings in stream segments and Cedar Creek Reservoir. SWAT runs have been made to get estimates as to the type of reservoir loadings (point or non point sources) and sources of contamination (stream segments, tributary flow or resuspension of reservoir sediments). These model runs have helped focus BMP selection.
- The research team has begun to run BMP scenarios through the SWAT/QUAL2E/WASP model to look at plausible BMPs to implement and at which locations, as well as the overall reduction these BMPs will have on nutrient and sediment loading into Cedar Creek Reservoir. This deliverable is 75 percent complete.
- SSL has collected water quality data and weather station data for Eagle Mountain Reservoir. Basins and sub-basins have been delineated for the SWAT model and the process is under way to calibrate and validate the model. The SWAT model has been calibrated and validated for hydrologic processes. Furthermore SWAT has been calibrated and preliminarily validated for water quality parameters.

Task 2 Economic Analysis

Date	Status	Deliverables
9/1/04	Completed	1. Begin developing input data for economic analysis of alternative BMPs for Cedar Creek Reservoir and Watershed
4/1/05	Initiated	2. Conduct economic analyses of alternative BMPs for Cedar Creek Reservoir Watershed
10/1/05	Initiated	3. Begin developing input data for economic analyses of Eagle Mountain Watershed
4/1/06	Pending	4. Conduct economic analyses of alternative BMPs for Eagle Mountain Reservoir Watershed
4/1/06	Pending	5. Begin developing input data for economic analyses of Richland Chambers Reservoir watershed
11/1/07	Pending	6. Conduct economic analyses of alternative BMPs for Richland Chambers Reservoir Watershed

Comments:

- Input data has been gathered for the economic model used to quantify the cost and benefits of identified BMPs input into the SWAT model to look at reducing nutrient and sediment loadings in Cedar Creek Watershed. Background data on cost and effectiveness of suggested BMPs has been gathered. The model is 100 percent complete. The model is being developed so that additional BMPs can be added in the future.
- BMPs being evaluated include: terraces, contour farming, crop residue management, conversion of cropland to grass or urban, grazing management – rotational grazing, fencing of water supply, fertilizer/nutrient management, pasture planting/range seeding, streambank stabilization, sediment retention structures and improving pasture conditions from fair to good.

**Task 3      Extension Education**

Date	Status	Deliverables
4/1/04	Completed	1. Develop generalized watershed management program bulletin
7/1/04	Completed	2. Conduct two-day watershed management training program for County Extension Agents and other selected resource personnel
10/1/05	Initiated	3. Recruit Cedar Creek stakeholder committee
1/1/05	Initiated	4. Develop Cedar Creek Watershed characteristics fact sheet
1/1/05	Completed	5. Construct demonstration trailer
4/1/05	Completed	6. Hold Cedar Creek public meeting on watershed characteristics and pollution problems
4/1/05	Pending	7. Recruit Eagle Mountain stakeholder committee
4/1/05	Completed	8. Conduct two-day training program on stream erosion for County Extension Agents and other resource personnel
4/1/05	Pending	9. Hold two Cedar Creek stakeholder committee meetings
7/1/05	Deferred	10. Develop Eagle Mountain Watershed characteristics fact sheet
7/1/05	Initiated	11. Conduct two Cedar Creek Extension education meetings on urban storm water quality, agricultural nonpoint source pollution prevention and wastewater
7/1/05	Initiated	12. Develop general fact sheets on:
	Completed	1) Wastewater management options around lakes,
	Pending	2) Urban storm water management, and
		3) Lawn management
10/1/05	Pending	13. Hold Eagle Mountain stakeholder committee meetings
10/1/05	Pending	14. Hold Eagle Mountain public meeting on watershed characteristics and pollution problems
		15. Develop Richland Chambers Watershed characteristics fact sheet
		16. Conduct educational meetings in the Richland chambers Watershed
		17. Hold Richland Chambers stakeholder committee meetings
		18. Hold Richland Chambers public meeting on watershed characteristics and pollution problems

Comments:

- TCE developed a generalized watershed management bulletin entitled “The Watershed Management Approach.” This deliverable is 100 percent complete.
- Extension personnel held a two-day watershed management training on September 16-17, 2004 in Fort Worth. Participants included County Extension

Agents and other Extension personnel, TRWD staff, NRCS and SWCD personnel from counties within Cedar Creek and Eagle Mountain Watersheds.

- Cedar Creek Watershed fact sheet development is in the intermediate stage. This deliverable will be completed once BMP runs have been made through the SWAT model and recommendations have been made on how to reduce loadings into the reservoir. This deliverable is 80 percent complete.
- TCE developed a generalized bulletin on Stormwater Management. This deliverable is 100 percent complete.
- Educational materials for the trailer are under development. The demonstration trailer has been used at more than 70 events with over 5,600 participants.
- TCE personnel developed a generalized, interactive presentation on the North Central Texas Water Quality Project highlighting project goals and objectives. This informative presentation is auto-narrated and can be used by Extension Agents in presentations to individual county groups. This presentation is available through the North Central Texas Water Quality project Web site.
- TCE worked with County Extension Agents in Kaufman, Henderson, Van Zandt and Rockwall counties to gather soil samples as part of a soil sampling campaign aimed to collect data to verify findings of the SWAT model. Over 100 samples were collected.
- Conducted four water quality programs in the Cedar Creek Watershed geared toward agricultural stakeholders on the issues of non-point source pollution.
- Presented the project poster at the United States Water Quality Conference in San Diego, Texas A&M University's Water Week, the Southern Region Water Quality Conference in Lexington, KY, the Nation Water Quality Conference in San Antonio, TX, and the Texas River and Reservoir Mangers Meeting, Austini, TX.
- Stream Trailer curriculum project (additional deliverable) is under development and 90 percent complete.
- TCE worked with TRWD to collect stream bank soil samples used to verify loadings being predicted in the SWAT model.
- Extension personnel held a two-day watershed management training on November 17-18, 2005 in Fort Worth. Participants included County Extension Agents and other Extension personnel, TRWD staff, NRCS and SWCD personnel from counties within Cedar Creek and Eagle Mountain Watersheds, EPA, city personnel and engineering consulting firms.
- Extension personnel are planning a stream restoration training in cooperation with the North Texas Stream Team for September 11-13, 2006 in Dallas, TX.

**Task 4 Administration**

Date	Status	Deliverables
1/7/04	Completed	1. Quarterly Progress Report
4/7/04	Completed	
7/7/04	Completed	
10/7/04	Completed	
1/7/05	Completed	
4/7/05	Completed	
7/7/05	Completed	
10/7/05	Completed	
1/7/06	Completed	
4/4/06	Completed	
7/7/06	Completed	
10/7/06		2. Final Report

Comments:

- TWRI continually updates the Web site created specifically for the North Central Texas Water Quality Project. The Web site can be accessed at the following address: <http://nctx-water.tamu.edu>.
- Program material presented at the project sponsored watershed management training has been added to the North Central Texas Water Quality Web site. Also included is a generalized, interactive presentation highlighting project goals and objectives. This informative presentation is auto-narrated and can be used by Extension agents in presentations to individual county groups.
- TWRI Project manager and TCE Extension Assistant traveled to Dallas Texas to meet with local TCE agents to discuss project activities. During that same trip they scouted the area for an urban stream to be used in an upcoming stream restoration workshop within the Cedar Creek Watershed.
- On May 2, 2006, project participants met at the Blackland Agricultural Research and Extension Center in Temple, TX to discuss project deliverables and outcomes to date.
- Project Manager Clint Wolfe attended the Texas River and reservoir Managers Meeting in Austin, TX, May 18-19, 2006.

### Problems or Obstacles Encountered and Remedial Actions Taken

The Spatial Sciences Laboratory and Blackland Agricultural Research and Extension Center have been working closely with Texas Water Resources Institute (TWRI) towards successful completion of project deliverables. Significant progress has been made in modeling Cedar Creek and Eagle Mountain Watersheds. For the Cedar Creek watershed, hydrology calibration and validation is 100 percent complete, and for Eagle Mountain watershed, hydrology calibration and validation is 100 percent complete. Efforts continue to complete water quality validations for Eagle Mountain watershed.

The sediment survey for Cedar Creek Reservoir Watershed is complete and those findings are being used to update SWAT parameters. The goal is to have the most accurate information possible to use in developing a scientifically sound watershed protection plan.

### Work Planned for Next Reporting Period

#### Task 1: SWAT Modeling

Continue running the SWAT/QUAL2E/WASP model using select BMP scenarios and looking at total load reductions within the reservoir. Finalize which BMP strategies are most effective and least costly at reducing nutrient, sediment and pollutant loadings into Cedar Creek Reservoir. Finalize model validation for Eagle Mountain Reservoir.

#### Task 2: Economics

Finalize data collection of BMP cost and effectiveness for the economic model. Begin running different scenarios with SWAT/QUAL2E/WASP output.

#### Task 3: Education

Publish watershed specific bulletin relating to Cedar Creek Watershed. Recruit and interact with the Cedar Creek Watershed stakeholder group. Develop program for the scheduled stream restoration training. Publish Stream trailer Curriculum to accompany demonstration trailer.

#### Task 4: Administration

TWRI will continue working with TRWD, SSL, BAREC and TCE in moving forward with project deliverables and reporting progress on a quarterly basis. Efforts will be made to publicize the project and raise awareness of water quality issues within the study area.