

**Texas AgriLife Research
Texas Water Resources Institute**

**Implementing the Pecos River Watershed Protection Plan through Continuous Water Quality
Monitoring and Dissolved Oxygen Modeling
FY 09 CWA 319(h)
TSSWCB Project No. 09-08**

Quarter no. 13 From 10.1.2012 Through 12.31.2012

I. Abstract

Work this quarter has focused on the finalizing the application of the model. An in-depth review of the QUAL2K was completed to assure its reasonableness. This review revealed a consistent error in meteorological data was discovered. As a result, the bulk of work this quarter focuses on correcting this error and included revalidating and calibrating the model and beginning to re-run modeled BMP scenarios. The CWQM station at Girvin continues to collect and report data to TCEQ's CWQM monitoring network.

II. Overall Progress and Results by Task

TASK 1: Project Administration and Coordination

Subtask 1.1: *TWRI, in cooperation with TCEQ and TIAER, 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 and posted to the project website.*

The following actions have been completed during this reporting period:

- A. TWRI submitted the Quarter 1, Year 4 report to TSSWCB on January 15, 2013.

95% Complete

Subtask 1.2: *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. To date, approximately \$124,946 dollars have been spent, or approximately 56% of total project funding.

60% Complete

Subtask 1.3: *TWRI will host coordination meetings, conference calls, or TTVN meetings with the TSSWCB Project Manager and all Project Partners at least quarterly to discuss project activities, project schedule, communication needs, deliverables, and other requirements.*

The following actions have been completed during this reporting period:

- A. No activity to report this quarter.

83% Complete

Subtask 1.4: *Project Partners will cooperate and communicate with landowners and entities that contributed to the development of the Pecos River WPP in order to efficiently and effectively achieve project goals and to summarize activities and achievements made throughout the course of this project. Specifically, Project Partners will, at least, participate in public meetings as necessary to obtain local input, deliver information on project activities, discuss goals and objectives and guide future project activities. Additionally, Project Partners will attend and participate in other public meetings in the Pecos River watershed, as needed, such as city council meetings, county commissioner's court meetings and SWCD meetings, in order to communicate project goals, activities and accomplishments to affected parties.*

The following actions have been completed during this reporting period:

- A. No activity to report this quarter.

65% Complete

TASK 2: Quality Assurance

Subtask 2.1: *TCEQ will bring the collection of data at the new CWQM site (Task 3) under their existing EPA-approved CWQM QAPP.*

The following actions have been completed during this reporting period:

- A. The CWQM site have been established and brought under existing QAPP(s) and is actively collecting data.

100% Complete

Subtask 2.2: *TWRI, with assistance from TIAER (Subtask 4.1) will develop a QAPP for activities in Task 4 consistent with the most recent versions of EPA Requirements for Quality Assurance Project Plans (QA/R-5) and the TSSWCB Environmental Data Quality Management Plan.*

The following actions have been completed during this reporting period:

- A. The QAPP for the project was approved by EPA for review November 1, 2010.

100% Complete

Subtask 2.3: *TWRI will submit revisions and necessary amendments to the QAPP as needed.*

The following actions have been completed during this reporting period:

- A. The first annual QAPP revision was approved by EPA on June 22, 2012.

100% Complete

TASK 3: CWQM Station Construction, Installation, Operation, Maintenance and Data Transfer

Subtask 3.1: *TWRI will purchase needed supplies to construct and maintain a deployable*

CWQM station. TWRI will transfer these supplies to TCEQ.

The following actions have been completed during this reporting period:

- A. Task complete and parts have been delivered to TCEQ.

100% Complete

Subtask 3.2: TCEQ will design, construct, test and deploy a continuous water quality monitoring site at the selected location near Girvin, TX upstream of US 67. This site will continuously monitor DO, temperature, pH and specific conductance using the same type equipment that the other 5 stations in the watershed utilize.

The following actions have been completed during this reporting period:

- A. TCEQ has completed the installation of the CWQM station near Girvin. This station has been dubbed CAMS 785 and is now operational and reporting data to TCEQ. Station information and data can be viewed online at: http://www.tceq.state.tx.us/cgi-bin/compliance/monops/water_site_photo.pl?cams=785
- B. This task is now complete.

100% Complete

Subtask 3.3: TCEQ will operate and maintain the CWQM station utilizing existing personnel and resources. This will entail monthly site visits by TCEQ Region 7 technical staff to ensure proper functioning of monitoring and reporting equipment. Additionally, TCEQ staff will validate recorded data and ensure that the data is made available through TCEQ webpages, including <http://www.texaswaterdata.org>.

The following actions have been completed during this reporting period:

- A. TCEQ has contracted this work out to USGS.

100% Complete

Subtask 3.4: TCEQ will coordinate with USGS to continue operation and maintenance of discharge monitoring equipment at the USGS gage near Girvin (08446500) to ensure that pollutant load calculations can be developed utilizing the available data.

The following actions have been completed during this reporting period:

- A. This gage continues to operate and produce discharge data.

100% Complete

Subtask 3.5: TWRI will work to identify and secure long-term sources of funding to continue the operation and maintenance of both the CWQM site and USGS gage near Girvin. Through this project, funding for the CWQM site is covered through the end of FY2012. Currently, funding for the USGS gage is covered through the end of FY2010

The following actions have been completed during this reporting period:

- A. TWRI has assisted TCEQ in developing a proposal to secure funds to continue site operation.

100% Complete

TASK 4: Dissolved Oxygen Modeling and Management Practice Evaluation

Subtask 4.1: *TIAER will evaluate DO models, such as QUAL2K, capable of simulating low-flow steady-state conditions and diel DO fluctuations from aquatic vegetation photosynthesis and respiration. TIAER will recommend the use of suitable candidate model for the Pecos River. TIAER, TWRI and TSSWCB will select the model to be used. Once the most suitable model is selected, TIAER will assist TWRI in developing a modeling QAPP (Task 2).*

The following actions have been completed during this reporting period:

- A. This task is now complete.

100% Complete

Subtask 4.2: *TIAER will obtain and evaluate relevant historical data on the Pecos River including, but not limited to, streamflow, water quality, water rights withdrawals, and wastewater treatment facility discharges. TIAER will access databases for pertinent data needed in the next subtask for model development and validation.*

The following actions have been completed during this reporting period:

- A. This subtask is now complete.

100% Complete

Subtask 4.3: *TIAER will develop and validate against historical data, a QUAL2K model (or similar model) of the Pecos River Segments 2310 and 2311, with specific emphasis on currently impaired assessment units 2311_05 and 2311_06. The model will represent DO conditions under low flow steady-state conditions and include critical pollutant sources (organic loadings, nutrients, total dissolved solids, etc.), attached and suspended algae, and hydrologic alterations (Red Bluff Reservoir, irrigation withdrawals, etc.), which are all potentially contributing to the current DO impairment in assessment units 2311_05 and 2311_06. TIAER will perform limited sensitivity testing of model input parameters by first increasing and then decreasing each parameter separately to determine its affect on model output.*

The following actions have been completed during this reporting period:

- A. In the process of carefully reviewing the modeling, a consistent error was found in the model input regarding the meteorological data. All calibration and verification cases were rerun and results reviewed (Calibration: May 2008, June 2008, July 2008, August 2008, January 2009, and December 2009; Verification: June 2006, September 2006, December 2006, March 2007, July 2008, December 2008, and November 2009). Overall correcting the error made very little difference in results, though generally there was a slight improvement in the comparison of measured and predicted dissolved oxygen values as a result of making this correction.

100% Complete

Subtask 4.4: *TIAER will apply the validated model for a series of low-flow base conditions in the*

Pecos River that represents seasonal conditions in the river. TIAER will then impose on the various base conditions selected BMPs for which the model will predict changes in DO concentrations. These BMPs will include, but not necessarily be limited to, options that will decrease organic loadings to the river, decrease salinity content, decrease nutrient loading, increase flow, increase aeration, increase shading and decrease water temperature. Specific BMPs recommended by landowners and entities included in the Pecos River WPP will be included in this analysis.

The following actions have been completed during this reporting period:

- A. Finalized coordination with TWRI Project Manager and TSSWCB staff on the suite of BMPs to be considered. QUAL2K was run to evaluate several different BMPs ranging from the Malaga Bend project, specified minimum river flows, decreases in biomass of bottom algae, decrease in nutrient flux from sediments, decrease in nutrients in releases from Red Bluff Reservoir, adding riffle areas, and combinations of some of these individual BMPs. BMP runs were made and reviewed by TWRI and TSSWCB, some additional runs were made, and the results were considered as preliminarily complete.
- B. After discovery of the error in QUAL2K input (see Subtask 4.3 for more details), efforts began to rerun all the BMP scenarios. This effort is continuing into early January 2013.

80% Complete

Subtask 4.5: TIAER, with assistance from TWRI, will develop a Technical Report describing results from Task 4. This report will include descriptions and discussion of model inputs, assumptions and outputs; a detailed discussion of sources of pollution as identified by the model and their influence on DO levels in the river, an estimate of pollutant load reductions needed to achieve water quality restoration and expected load reductions from each BMP or suite of BMPs to address individual pollutant categories. A concluding discussion on alleviating the DO impairment in the Texas portion of the Pecos River will also be included and should recommend a implementation approach for BMPs that will ultimately result the restoration of DO levels. Results from this modeling evaluation will be combined into a Technical Report which will be distributed to landowners and entities involved in the development of the Pecos River WPP; based on their recommendations, conclusions from the DO modeling and evaluations of BMPs will be incorporated into future revisions of the WPP and used to guide future BMP implementation.

The following actions have been completed during this reporting period:

- A. Limited efforts occurred during this quarter on finalizing the report. After all corrected model runs are made, efforts will focus on completing the draft report.

40% Complete

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

Reviewing the modeling revealed a consistent error in the model input regarding the meteorological data. All calibration and verification cases were rerun and results reviewed

IV. Projected Work for Next Quarter

- Complete BMP scenario reruns.
- Focus on final report development.

CAMS 785 Near Girvin

