

**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. 10 From 1.1.2012 Through 3.31.2012

I. Abstract

Work this quarter has focused on the continued development of the QUAL2K model to assess instream water quality. Data continued to be collected, model functionality to evaluate the Pecos River was assessed, and model set up was refined. Calibration of the model began this quarter and will be completed next quarter. A project planning meeting was hosted in Temple on March 7th to discuss modeling progress and more specifically, BMP scenarios that will be evaluated. 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 2, Year 3 report to TSSWCB on April 10, 2012.

83% 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 \$104,739,283 dollars have been spent, or approximately 46% of total project funding.

50% 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. A conference call was held March 7th to discuss project happenings and project progress with the entire project team.
- B. A planning meeting was also hosted March 7th to discuss DO modeling specifics, BMP modeling scenarios, content for the upcoming field days and the timeline for completing the project.

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; however, plans have been made to present an overview of DO modeling activities to watershed landowners during the upcoming field days.

40% 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 submitted to TSSWCB for review on 10.12.2011.

50% 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. The transition of CWQM site maintenance, operation and data validation continues with USGS having already assumed this role at sites CAMS 785 and 788 on the Pecos.

83% 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.

83% 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. This gage is currently operational and is not listed as impacted by funding shortfalls.

83% 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. Model of Segment 2311 was developed, including hydraulic input parameters.
- B. Developed and confirmed Excel spreadsheet to modify QUAL2K input to allow elevation to be used as a surrogate for salinity on effects to dissolved oxygen saturation value.

- C. Tested and confirmed QUAL2K functionality to include weirs and dams as a BMP.
- D. Hydraulic input parameters began to be added to the model as well Initiated calibration of model for Segment 2311.
- E. Initial discussions on BMPs conducted through a meeting at TSSWCB offices.

60% 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. No activity to report at this time.

0% 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 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. No activity to report at this time.

0% Complete

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

- The CWQM station at Girvin is now online and operational as is the CWMN Station upstream of Red Bluff Reservoir.

IV. Projected Work for Next Quarter

- work will continue to complete model development next quarter
- model calibration/validation will continue next quarter and preliminary model outputs should be available early next quarter
- preliminary capabilities of the model will be presented at upcoming field days for Pecos River watershed landowner

CAMS 785 Near Girvin

