

**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. 7 From 4.1.2011 Through 6.30.2011

I. Abstract

Work this quarter has focused on completing the model evaluation; QUAL2K has been determined to be an appropriate model. Additional collection of data and running statistical analyses on these data to ensure their validity has also been a major undertaking. The CWQM station still awaits deployment which is now scheduled for the weeks of August 8th or August 15th. Model set up has been initiated and is progressing as data inputs are validated. Completion of the model set up will be dependent upon the sorting and validating of available data.

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 3, Year 2 report to TSSWCB on July 13, 2011.

58% 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 \$54,435 dollars have been spent, or approximately 25% of total project funding.

25% 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 April 26th to discuss project happenings and project progress.

58% 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.

20% 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. No activity to report at this time.

25% 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. No activity to report at this time.

0% 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 complete CWQM Station design and unit construction.
- B. Station deployment is scheduled for the week of August 8th or August 15th.

75% 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. Effective September 1, 2011, TCEQ will be transferring the operation and maintenance of all CWQM sites in the Pecos and Upper Rio Grande over to USGS. USGS will also be responsible for data validation.

20% 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 is currently operational and is not listed as impacted by funding shortfalls.

30% 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:

- B. This gage is currently operational and is not listed as impacted by funding shortfalls.

30% 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. Model evaluations have been completed and QUAL2K has proven to be appropriate for project needs
- B. This task is not 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. Historical data have been collected and are being used to validate and calibrate the model.
- B. A series of statistical analyses are being conducted on the available data in an effort to verify the accuracy of the data, illustrate any overarching trends in the data and highlight any underlying patterns in the data set that may impact modeling outcomes.

80% 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. Initial development of the model has begun. Using GIS, the river has been segmented into 5 km increments.
- B. As historical data are sorted and verified, they will be used to calibrate and validate the model.

20% 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

- bio-fouling on CWQM probes has led to questions of data validity being raised; as such, only data collected in the 1st or 2nd day post site maintenance will be used for modeling purposes

IV. Projected Work for Next Quarter

- CWQM station deployment is scheduled for the week of August 8th or August 15th by TCEQ personnel
- work will continue in the organizing and validating of historical data for use in developing the model
- model development will continue as data inputs are validated