

**Draft**  
**Minutes of Meeting**  
**North Bosque River TMDL Refinement Project Advisory Group**  
April 18, 2007  
10:00 am -12:00 pm  
J. J. Pickle Research Campus  
MCC Building

**Stakeholders Present:** Eric Allman (Sierra Club, substituting for Justin Taylor); Ricky Garrett (City of Waco); Pat Kultgen and Lucas Gregory (Texas A&M University System, substituting for Allan Jones); Donna Long (Texas State Soil & Water Conservation Board, substituting for John Foster); Tony Provin (Texas Cooperative Extension); David Villareal (Texas Department of Agriculture, substituting for Richard Eyster).

**Stakeholders Absent:** Norman Bade (Natural Resources Conservation Service); Jay Bragg (Brazos River Authority, replacing John Ellis); Shawneille Cambell (U.S. Environmental Protection Agency); John Cowan (Texas Association of Dairymen and Dairy Farmers of America); Jerry Golden (City of Clifton); Norman Johns (National Wildlife Federation); Mark Kaiser (City of Stephenville); Richard Kiesling (U.S. Geological Survey); Ned Meister (Texas Farm Bureau); Anjna O'Connor (U.S. Army Corp of Engineers); Pat Radloff (Texas Parks and Wildlife Department); Joseph White (Baylor University).

**Support Team Present:** Larry Hauck (TIAER); James Houser (TIAER); George Ward (UT-CRWR)

**Others Present:** Clyde Bohmfalk (TCEQ); Tom Conry (City of Waco); Tim Foster (Mobile Process Technology); Faith Hambleth (TCEQ); Larry Koenig (TCEQ); Lial Tischler (Tischler & Kocurek); Bruce Wiland (Wiland Consulting) .

**Materials Distributed:**

The following was provided at the meeting: meeting agenda and handouts on the presentation.

**Welcome & Introduction**

The seventh meeting of the North Bosque River TMDL Model Refinement Project Advisory Group was held on Wednesday, April 18, 2007 from 10:00 AM until 12:00 PM in Room 3.1004 of the MCC Building, J.J. Pickle Research Center, The University of Texas at Austin. Larry Hauck (TIAER) introduced the meeting and self-introductions were made.

## **Old Business**

The group approved the minutes from the December meeting.

## **Meeting Overview**

Larry Hauck introduced the presentation and outlined what it would cover.

The meeting covered three topics: A summary of the model validation process including a review of material presented at the December meeting; the current state of the model validation process; and further discussion of potential allocation scenarios and the scenario simulation process.

Dr. Hauck quickly reviewed the history and current status of the project.

Jim Houser (TIAER) reviewed and discussed the model validation process. First, the purpose of model calibration and verification (the two processes involved in model validation) was reviewed. Then Dr. Houser reviewed the long-term hydrologic calibration, the time-of-travel calibration, the measured cross-sectional areas, and the calibration of base and surface flow presented at the December meeting. Next information presented at the December meeting about the short-term hydrologic calibration based was reviewed. Dr. Houser presented the most recent calibration summary statistics for all the streamflow monitoring stations in the watershed. A map of the precipitation stations in the North Bosque was also shown to illustrate one possible reason why the model predictions are better in the upper portion of the watershed than in the south. The northern region had better coverage of precipitation stations than the south region.

Dr. Houser then moved to a discussion of the short-term nutrient and sediment calibrations, which included presentation of preliminary results. The addition of the Public Law (PL) – 566 flood retardation reservoirs to the model simulation and the TIAER measured sediment and nutrient removal efficiencies for the “typical” reservoir were reviewed. Results were shown of how the 2001 TCEQ measured data on soil test phosphorus (STP) for dairy waste application fields was used to determine the start date for the short-term nutrient calibration simulation. A question arose concerning the validity of the start date, and TIAER agreed to look into the matter further.

Dr. Houser next presented results of the calibration of SWAT to data from the Hunewell Ranch field plots. These plots consisted of three side-by-side small fields of improved pasture receiving commercial fertilizer. Pasture lands receiving commercial fertilizers are the major land-use that is not well represented by the TIAER water quality monitoring stations in the North Bosque River watershed.

Dr Houser next presented some information from a recent article on the uncertainty of measured data. This information led to a general discussion concerning the uncertainty of measured and model predicted data and how these factors will play into the creation of scientifically based measures of model performance and how to best present the data for the nutrient calibration. Pat Kultgen strongly encouraged the use of Monte Carlo simulations to model the effect of uncertain inputs, such as rainfall, on model output;

however, concerns were indicated that the SWAT model computational time is too long to allow a complete Monte Carlo approach to be used. Tony Provin suggested a calibration/verification approach that would withhold data from random periods of time during the calibration period; however, the group expressed concern about the effect such an approach would have on a continuous time simulation in which previous conditions affect current conditions (e.g., soil moisture, soil nutrient build-up, etc.).

Preliminary results for the sediment and nutrient calibration were shown by Dr. Houser for key sites within the North Bosque River watershed. The group discussed and offered suggestions for how the calibration might be improved. An extreme rainfall-runoff event occurred in February of 1997 near the end of the calibration period. TIAER suggested they would look into the quality of the data collected during that extreme period and ascertain the validity of inclusion of that event in the calibration data set.

The last part of Dr. Houser's presentation focused on an overview of BMPs used in the previous TMDL allocation scenarios and on BMPs suggested by the group at the last meeting in December. This presentation initiated further discussion of other potential BMPs that might be appropriate to consider and how the allocation scenarios would be simulated. Some of the ideas presented based on the discussions at the December meeting were:

- Building additional PL-566 reservoirs at strategic sites to reduce downstream transport.
- Liquid manure injection beneath the soil (LMI).
- "Ripping" coastal fields on contour, which means plowing along the contour resulting in less runoff. (It was mentioned that this practice makes harvesting more difficult, and therefore, may not be a technology farmers would be eager to adopt).
- Manure vacuum systems.
- Filter strips.

Dr. Provin offered that diesel costs may negate the cost-effectiveness of LMI. The group concluded that LMI would be an unlikely procedure. A discussion of some new technologies and how they would be modeled ensued. Various techniques for reducing the sediment loading to lagoons were suggested, such as electric coagulation. The issue was also raised about a change in the nature of the manure waste and possible subsequent change in the number of liquid vs. solid manure application fields created by such a change. The concepts of improved land management and reduction in use of commercial fertilizer were also discussed, as it was pointed out that inorganic commercial fertilizers are used on agricultural fields in the watershed. Dr. Provin and Lial Tischler suggested "commercial fertilizer substitution" as a possible BMP where fields currently receiving commercial fertilizer would receive manure instead. Various group members confirmed that the use of vacuum systems is increasing in the watershed with the increase in freestall dairies. The question of how the slurry from vacuum systems would be used was raised. This prompted additional discussions about the state of the manure waste, including discussions about the role of manure slurry in biogas generation and compost,

and how much of the manure waste and nutrients would actually leave the watershed through these processes. The concept of using turf grass production as a way of creating a value-added product that could help move manure nutrients out of the watershed was discussed. Various members of the group have been involved with research in turf grass and a brief discussions of the pros and cons of turf grass as a remediation technology ensued. Dr. Provin pointed out that filter strips may start leaking nutrients over time as the level of nutrients in the strip build-up over time. Both Dr. Houser and Dr. Hauck briefly discussed how these different BMPs might actually be simulated.

Finally, the issue of how the new TMDL will be compared to the original TMDL was raised. Larry Koenig, the TCEQ Project Manager, mentioned that an in-stream target concentration for soluble reactive P helped establish the target reductions of the original TMDL and that such an approach would likely be used again, though different reduction goals could result.

The meeting adjourned at 12:00 PM.