

Draft
Minutes of Meeting
North Bosque River TMDL Refinement Project Working Group
Wednesday, November 14, 2007
10:00 am -12:30 pm
Brazos River Authority
Main Conference Room
4600 Cobbs Drive
Waco, Texas

Stakeholders Present: Eric Allman (Sierra Club, replacing Justin Taylor); Jay Bragg (Brazos River Authority); John Cowan (Texas Association of Dairymen and Dairy Farmers of America); Ricky Garrett (City of Waco); Allan Jones (Texas A&M University System); Donna Long (Texas State Soil and Water Conservation Board, for John Foster)

Stakeholders Absent: Norman Bade (Natural Resources Conservation Service); Shawneille Cambell (U.S. Environmental Protection Agency); Richard Eyster (Texas Department of Agriculture); Jerry Golden (City of Clifton); Norman Johns (National Wildlife Federation); Mark Kaiser (City of Stephenville); Ned Meister (Texas Farm Bureau); Anjna O'Connor (U.S. Army Corp of Engineers); Tony Provin (Texas Cooperative Extension); Pat Radloff (Texas Parks and Wildlife Department); Joseph White (Baylor University).

Support Team Present: Larry Hauck (TIAER); James Houser (TIAER)

Others Present: Clyde Bohmfalk (TCEQ); Tom Conry (City of Waco); Linda Ethridge (former major, City of Waco); Tim Foster (The Roadrunners); Loren Henley (Texas State Soil and Water Conservation Board (TSSWCB)); Larry Koenig (TCEQ); Norm Mullin (Enviro-Ag); Wiley Stem (City of Waco); Jacob Stewart (Office of U.S. Representative Chet Edwards); Lial Tischler (Tischler/Kocurek representing Texas Association of Dairymen); Bruce Wiland (Wiland Consulting); Penny Wimberly (City of Waco).

Materials Distributed:

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

Welcome & Introduction

The public meeting of a North Bosque River TMDL Model Refinement Project Working Group was held on Wednesday, November 14, 2007 from 10:00 AM until 12:30 PM at the Brazos River Authority, Main Conference Room, 4600 Cobbs Drive, Waco, Texas. Larry Hauck (TIAER) opened the meeting and self-introductions were made.

Executive Summary

The meeting covered how many and what kind of TMDL allocation scenarios would be simulated. Jim Houser (TIAER) led the discussion of the TMDL allocation scenarios.

The first two scenarios discussed were designed to reevaluate the simulated conditions that were the basis of the original TMDL adopted in 2002. The two scenarios consisted of the “baseline” or reference condition used for comparison and the “TMDL allocation” scenario. Both scenarios were based on conditions of land use, dairy operations, and municipal wastewater treatment plant (WWTP) discharges in the North Bosque River (NBR) watershed for the year 1998. The “baseline” scenario was designed to replicate existing conditions in 1998 and the “TMDL allocation” scenario included various phosphorus (P) control practices for dairy operations (i.e., P reduction in diet, haul-off of manure from the watershed, and manure application according to Natural Resources Conservation Service (NRCS) guidance) and WWTPs (i.e., P limits on discharges).

Next a general discussion involving attendees and presenters considered additional P control practices and measures besides those included in the original TMDL allocation. The additional practices and measures included enhanced rainfall event design requirements for concentrated animal feeding operation (CAFO) retention control structures, poultry litter haul off, third party application fields, new NRCS guidance for manure application rates, construction of structures like Public Law (PL)-566 reservoirs, inclusion of Microgy biogas facility and its liquid application fields, vegetative buffers, and number of other potential best management practices (BMPs).

Finally there was a general discussion of the “future” TMDL allocation baseline and control-strategy scenarios, which will simulate the new fully permitted animal numbers, including proposed herd expansions, for CAFOs and maximum allowable numbers for animal feeding operations (AFOs).

Most issues were agreed upon and resolved by the working group and arrangements were made about how to manage the few remaining unresolved items. The meeting was adjourned at 12:30 PM.

Detailed Meeting Minutes

Presentation of and Discussions of “Existing Condition” Scenarios:

The first portion of the meeting entailed presentation and explanation by Jim Houser of the scenarios that would be used to reevaluate the original TMDL adopted in 2002. Dr. Houser presented two scenarios consisting of the “baseline” or reference condition used for comparison and the “TMDL allocation” scenario. The “baseline” scenario was designed to replicate existing conditions in 1998 and the “TMDL allocation” scenario included various phosphorus (P) control practices for dairy operations (i.e., P reduction in diet, haul-off of manure from the watershed, and manure application according to Natural Resources Conservation Service (NRCS) guidance) and municipal wastewater treatment plant (WWTP) (i.e., P limits on discharges). Both scenarios were based on conditions of

land use, dairy operations and their waste application fields, and WWTP discharges in the North Bosque River (NBR) watershed for the year 1998. It was explained that for the present application of these scenarios by SWAT certain enhancements to the model were included that were not directly considered in the original TMDL allocations. These enhancements included turkey operations and litter disposal based on Texas State Soil & Water Conservation Board (TSSWCB) information on litter production, grazing of beef cattle on 90 % of range and pasture lands, and direct inclusion of the Public Law (PL)-566 reservoirs in the model. The dairy cow numbers used in the scenarios will be 40,450 as considered previously and for the baseline scenario dairy waste (liquid and solid) application will be at the nitrogen (N) agronomic rate. WWTPs will be simulated using the same discharge rates and nutrient concentrations as used in the original TMDL.

Wiley Stem asked why turkey operations were included this time. It was explained that new information had become available since the last TMDL effort. There were a substantial number of turkeys operations in the NBR watershed, and that their litter was being applied in the southern part of the watershed near the location of the poultry houses. Dr. Houser also pointed out that about 30,000 grazing cattle were being included in the new TMDL.

Lial Tishler recommended that source effects from elements new to this TMDL reevaluation (e.g. turkey, grazing, and PL-566 reservoirs) should be reported for purposes of comparison with the previous TMDL. Larry Koenig also suggested that the loading fraction from each land-use sector should be determined. TIAER indicated that to the degree SWAT output readily allows such evaluations, they would be included.

Bruce Wiland emphasized that 50 percent of solid manure needs to be hauled out, as is planned for the TMDL allocation scenario.

A discussion then ensued on the difference between the P crop requirement rate and the P crop removal rate, which will need to be clarified for the simulations. It was further stated that at the time of the original TMDL, crop removal rates were just beginning to be considered and that the modeling effort at that time only considered the crop requirement rate.

Mr. Stem added that it is not necessarily considered technologically feasible for solid manure to be applied at the P crop removal rate because those rates are often less than the spreaders are designed to apply. Inferred from this was that rather than a yearly application rate at the P crop removal rate, enough manure for more than one year (e.g., two or three years) would be applied the first year and no application for the necessary number of following years to have the application rate average out at the P crop removal rate. If SWAT was operated assuming application at the P crop removal rate, Mr. Stem wondered if the uncertainty of rainfall events and differences of rainfall between years might impact the simulated P losses. The group confirmed the reality of his concern, and it was considered whether the scenario should simulate larger amounts applied less frequently. There is equipment manufactured now that is able to apply manure at the lower rates required by manure application at the crop P removal rate, but few if any

producers in the NBR have such equipment. TIAER will explore the possibility of using SWAT to model periodic larger applications that will still maintain manure application on waste application fields at an annual average crop P removal rate. However, Dr. Houser explained the difficulty of doing this with the current configuration of the model, as well as the fact that the long term nature of the simulations (39 years) would help average out any effects created by short-term precipitation and application variations. Again, it was emphasized that the results of this simulation of the TMDL allocation “existing” conditions scenario would be compared to the results of the original “existing” conditions scenario.

At this point Dr. Tishler cautioned that absolute concentrations and loadings from the SWAT simulation were not the primary focus, but rather the comparison of output from the alternate scenarios as to the percent difference of nutrient loadings and concentrations between scenarios was a more reasonable expectation from the model.

Discussions of Feasibility of Additional BMPs and Control Measures

At this point the discussion moved to a list of potential BMPs, management practices, and control measures that had been mentioned during recent advisory group meetings or were required in the new individual permits. Each of these items was discussed individually.

Dr. Houser explained how the present Texas NRCS Field Office Technical Guide (FOTG) Practice Standard 590 will be simulated by the model. For soil test P (STP) concentrations less than 200 ppm, the model will apply manure at two times the P crop requirement rate based on a “medium” P runoff potential from the Phosphorus Index Worksheet for East Texas. The “medium” PI was calculated by assuming that the STP for waste application fields would be “very high,” that no commercial fertilizer P would be applied and that the average proximity to a stream fell within the 500-900 ft range. In addition, the average slope, NRCS runoff curve number, and annual soil erosion for waste application fields was computed. The above factors contributed to a 19.5, or medium, PI score on the PI Worksheet for East Texas. Above 200 ppm the application rate will be at the P crop removal rate.

Dr. Tischler had a question about how waste application fields would be taken in and out of application by the model. Dr. Houser briefly explained how the dynamic manure management version of SWAT developed by TIAER for this project performs the simulation. In scenarios using this dynamic manure management version, any additional land needed for manure application (as application rates are reduced per NRCS guidelines) will be considered third party fields, and simulated appropriately with the restriction that application ceases once STP exceeds 200 ppm. It was also noted that third party fields serve as an additional BMP, since manure nutrients will replace the commercial inorganic fertilizer that was previously assumed in the model to achieve necessary crop production.

Dr. Houser explained that the model would also consider the new permit requirement that retention control structures (RCSs) be designed for the 25-year, 10-day rainfall event. Mr. Wiland pointed out that the new RCS requirements for confined animal feeding

operations (CAFOs) do not apply to animal feeding operations (AFOs). There is also a difference in requirements between beef and dairy operations.

Mr. Stem asked how RCS sludge buildup would be simulated. Dr. Hauck explained how that issue had been resolved in previous meetings, which was to consider insignificant buildup of sludge due to the use of agitation pumps and other means resulting in all P being applied to fields.

Dr. Hauck informed attendees that according to James Grimm of the Texas Poultry Federation, close to 100 % of turkey litter is being removed from the watershed as compared to almost nothing prior to the year 2000. The haul-out amount still needs to be confirmed from local interests of the turkey operations.

To address a question on WWTPs, it was stated that WWTP discharge data will be based on their Discharge Monitoring Reports (DMR).

To present how consideration of additional reservoirs for P reduction could be addressed, Dr. Houser showed on a map of the NBR watershed three locations for evaluating new reservoirs that would be similar to PL-566 reservoirs. He explained that the three reservoirs were at the outlet of subbasins within the existing SWAT delineation of the watershed and that these three subbasins contained relatively high densities of dairy operations. He also indicated that these three reservoirs would be evaluated using the same removal efficiencies developed for the existing reservoirs.

The Microgy biogas plant and how it might be simulated in the TMDL allocation scenarios was discussed next. John Cowan said that the facility was expecting to process manure from as much as 10,000 cows per year. It was proposed that the Microgy plant be simulated based on the amount of liquid waste and its nutrient characteristics as reported in their pending permit application with TCEQ. Also, the waste application fields specified in their permit would be considered in the model. Finally, it was noted that a relatively small portion of these application fields are located outside of the NBR watershed.

The next BMP discussed was lagoon (or RCS) clean out. The simulation currently effectively applies all solids, including associated P, from lagoons onto fields in the NBR watershed. Mr. Mullin indicated that removal of those solids from the watershed is a viable BMP.

Several other BMPs for potential implementation on waste application fields were discussed, but based on the expertise of the dairy industry representatives, especially Messrs. Cowan and Mullin, these were dismissed as being too costly, not proven technologies, or difficult to implement on the dominate cropping system of permanent pasture. The dismissed BMPs included chemical amendment application to fields to bind the P in the soil, constructing terraces, contour plowing, contour ripping, and limestone berms. Mr. Mullin also indicated that some of these BMPs are not very applicable because more and more application fields are permanent pasture.

Messrs. Cowan and Mullin both pointed out that large (100 ft or more) vegetative buffers on fields adjacent to streams have been incorporated into all the new permits. It was also pointed out that this effectively reduces the permitted area for manure application. Dr. Houser and Dr. Hauck explained the current deficiencies in the SWAT filter and/or buffer strip modeling component. Dr. Allan Jones made the suggestion to run some APEX simulations to provide an estimate of removal efficiencies that can be hardwired into SWAT. APEX is a multi-field model that includes features that allow mechanistic simulation of buffer and filter strips. (TIAER was pursuing this option of APEX applications at the time these minutes were created.)

At the end of these discussions, Dr. Jones expressed hope that some of the newer technologies which are being developed to remove P from liquid and solid manure waste streams be considered, even if not directly within this TMDL reevaluation process. It was mentioned that such technologies might be more feasible at such operations as Microgy where the P would be more concentrated and hence potentially more amenable to treatment processes not cost-effective with more diluted waste streams.

Changing Characteristic of Dairies

A changing characteristic of dairy operations in the NBR watershed is that more dairies are using freestalls and less are remaining as solely open-lot operations. Mr. Mullin estimated that about 25% of the freestall operations are using vacuum truck systems to collect manure slurry directly from the lanes. This slurry changes the basic characteristics of the manure, though the effects are on the N content rather than the P content as P is a conservative substance not subject to losses such as volatilization. Mr. Mullin pointed out that most of this slurry is spread on third party fields and is primarily superficially applied to permanent pasture. It was estimated that there are about 10,000 acres of third party fields currently in the watershed. It was decided that ultimately this change in the N characteristics in the slurry were not that different from solid manure and, therefore, would not significantly affect the application of P in the watershed over the long-term 39 year period of the TMDL allocation simulation. Dr. Houser recommended modifying the model to specifically simulate this modified manure was not necessary. No exceptions were noted to his recommendation.

Freestall operations do alter the amount of the manure that is in the liquid and solid portions. For open lots, the model assumes that roughly 25 % of the manure is liquid and 75 % solid. Based on estimates from Mr. Mullin, for a freestall operating with lane flushing, this ratio changes to 85 % liquid and 15 % solid and for a freestall using vacuum collection systems the ratio is 15 % liquid and 85 % solid.

“Future” Scenarios

The last slide of the presentation outlined the “future” scenario and emphasized that it would be simulated with fully permitted cow (beef and dairy) numbers and WWTP discharges. The full permitted numbers will include any requested expansions in herd size included in current permit applications. The exact number of fully permitted cows was still uncertain, and Mr. Wiland agreed to work with TIAER and TCEQ to finalize the correct number. Mr. Koenig also reminded attendees that "full permitted" and "actual

head" numbers are in constant flux, so realistically for modeling purposes we need an agreed-upon estimate for these numbers.

Meeting closing:

Dr. Hauck closed the meeting and Dr. Houser suggested that responding to the minutes of the meeting would be a good way to have a final input on the decisions made at the meeting.

The meeting adjourned at 12:30 PM.