Meeting Summary
Leon River TMDL Stakeholder Group
First State Bank Meeting Room

October 20, 2005

STAKEHOLDERS PRESENT: Ricard Cortese, David DeJong for John Cowan, Anthony Daniel, Hall Debusk, Richard Eyster, Tom Gerik, Jay Bragg for Kyle Headley, Norman Mullin, Clarence Richardson, Aaron Wendt, and Bob Whitney.

STAKEHOLDERS ABSENT: James Abbott, David Blackburn, Judge Jon Burrows, Robert Fleming, Eddy Lange, Buddy Teague, and Neil Walter.

SUPPORT TEAM PRESENT: Kerry Niemann (TCEQ), James Miertschin (James Miertschin & Associates), Steve Hicks (Hicks & Company).

OTHERS PRESENT: Gary Jimerson (Huma Clean), Frank Volleman (Wildcat Dairy), Lloyd Van Zandt (Dairy), Clarence Richardson (USDA-ARS), Jeff Stewart (Commanche Natl. bank), Gerald Burns (Commanche Natl. Bank), Micheal Martin (TCEQ), Bill Ross (TCEQ), Todd Oneth (TSSWCB), Sid Slocum (TCEQ-DFW), Robert Ozment (TCEQ-Waco), Cliff Moore (TCEQ-Abiliene), Larry Adams (Adams Farm), Joe Moore (Moore Farm), David Villearal(TDA), Kim Lue (NRCS), Cullent Stephens(Farmer), Rodney Stephens (Farmer), Martin Seider (Farmer), Norman Mullin (Enviro AG Engr), Kieth McIlvan (Tx Farm Bureau), Niel Holt (USDA-FSA), David DeJong (TAD), Pat Gunter, Jim Stallings (McMinn ranch), Joe Cordell, Tommy Elliot (Elliot Dairy), Tamilie Aennich (TCE), George Birmingham, Whit Weens (TCE), G. Hockman(dairy), Juanita Andres (ranch), Danon Chumney (dairy), John Koster (dairy), Jake Murphee (Garrett ranch), John McCormick (City of Commanche), Blake Lasater (B&K Dairy), Tony McCleny (Coryell Co. Farm Bureau), Royce Lubke (cattleman), Rick Taylor, James Littlejohn, Stephen Schrask, William Lasater (Lasater Dairy), Monte Carmicheal (cattleman).

WELCOME AND INTRODUCTIONS:
Kerry Niemann opened the meeting at approximately 12:05 p.m.and introduced himself, James Miertschin, and Steve Hicks. He informed stakeholders that James Miertschin would give a presentation on the TMDL modeling results.

PRESENTATION SUMMARY:

Dr. Miertschin provided an outline of the presentation that included a background to the TMDL study, review the historical water quality data, the modeling approach used, allocations for TMDL, and bacterial source tracking results and then implementation.

TMDL Study Background

This TMDL study examines the Segment 1221 of the Lower Leon River. This segment was identified as impaired for bacteria and put on Section 303(d) list of the Clean Water Act. This segment includes the Leon River below Proctor Reservoir to down to headwaters of Lake Belton. There are 41 stream segments statewide on the 303(d) list for bacterial impairment that have TMDL projects ongoing. The TMDL establishes the maximum amount of bacterial loading (allocation) that the segment can withstand and still meet the established water quality criteria. The overall objective of the TMDL is to identify and distribute load allocations to contributing sources. Segment 1221 was identified as impaired based on set criteria for fecal coliform with counts exceeding 200 colonies/100ml (geometric mean) or 400 colonies/100ml (grab sample).

The tasks required in a TMDL study are to identify the problem, collect data, assess data, develop allocations and implementation plan. The draft TMDL report is reviewed and approved by the TCEQ and EPA. This process takes years to complete and we are at the stage of developing the allocations. Stakeholder involvement is important to the TCEQ. The process needs stakeholder input as to assumptions used in the model and input from the local level.

Leon River Project Background

Initial water quality data is from 1996-2001 database fecal coliform and indicated that 2 out every 6 samples were non-compliant with water quality criteria for contact recreation.
The historical database used is from the BRA, TCEQ and others.

Data indicates that the segment was not supporting at stations FM 1702 below confluence with South Leon and at Hwy 281 outside of Hamilton from 1996 - 2001. These stations reported geometric mean values of 247 colonies /100 ml and 336 colonies/100 ml.

Three reaches in 2000 and 2 reaches in 2002 and two 25 miles reaches were not supporting at Gustin and near Hamilton with this study. We completed one base flow and two stormwater sampling events during this TMDL study. We sampled 5 times over a hydrograph during each storm event. During the first storm event, E.coli values observed reached a maximum 400 colonies/100ml (grab) and a geometric mean of 126 colonies/100 ml. On the main stem 3 stations exceeding geometric means exceeded criteria and 4 stations maximums exceeding grab samples. Second storm event was larger and results lab results indicate lots of values in excess. Base flow sampling indicated with high concentrations in samples but not of the same magnitude as in the stormwater events.

The TCEQ now relies on E.coli for water quality data since it is a more specific bacteria test to pinpoint sources from warm-blooded organisms. Fecal coliform tests have more false positive readings.

Model Development

Applied watershed model Hydrologic Simulation Program-Fortran(HSPF). The program was developed in 1970's and is continuously modified/updated and widely used in US and worldwide. This model can simulate watershed conditions for everyday of the year. The first parameter modeled is the hydrology that is based on precipitation in the watershed. If it doesn't rain then the model doesn't flow. Precipitation input is an integral part of the process. Also simulates receiving water concentrations of constituents, of which in this case are bacteria. Sub-watersheds are simulated in the model with their own stream channels within each watershed. Hamilton station is key station used in this modeling. Sub-watersheds are based on topography, land use categories etc. In the model the reach of the impaired segment is to Hamilton and a little below.

The first step is to calibrate the model with precipitation data. We used precipitation data records for Hamilton and Lake Proctor for several seasons and simulated conditions for four years. Models results of flow were compared to recorded USGS station located at Hwy 84 in Gatesville. In general, there is agreement with runoff occurring in the model when it rains. The runoff modeling is simulated over a period of years to a get more reflective modeling from precipitation input since variations occur. Bottom line is to statistically analyze and this generates a 1% difference between actual and modeled flows. This is considered a very good calibration for hydrology.

The next step is to simulate bacteria concentrations. Several mechanisms in the model for transport, where bacteria are entering directly into the receiving stream, from overland flow on the land surface, and transported into shallow soil zone (interflow) and shallow surface water, and groundwater flow if goes deeper. Non-point source is diffuse in nature and direct sources here are including leaking septic systems, wildlife or livestock animals depositing directly on the stream or leaking sewer lines in municipal areas. Use estimates on loading based on land use, ranching, forests, livestock, waste application fields from dairies, cropland, residential and commercial uses. When runoff occurs the bacteria is simulated to receiving stream and decay rates are applied. Calibrated model inputs are placed into the model for different reaches based on land uses. Two primary non-point source loading for reaches. Base model loading with land use types and number of animals on each reach. Starting point on model based on number of maximum fecal material organisms. Typically use 1/10 of theoretical loading to the receiving stream. There are also Waste Application Field (WAF) assumptions input with WAF1 (dry application) and WAF2 (wet application). When there are lots of cattle and relatively few acres of WAF then the bacteria numbers are large. Therefore, 1/100 of the theoretical loading for WAF was used in the model.

We plot simulated results vs. observed and examine compatibility of observed historical data and then adjust inputs into the model to achieve a more realistic simulation. When comparing the two the database numbers are a grab sample and model results provide a daily mean concentrations. This will cause a little mismatch due to this difference and this is considered in analysis. The historical data is split into two categories based on flow conditions (base flow and runoff) and a 99% confidence interval is established. Simulated concentrations are then compared to these two datasets over time.

Model calibration base runoff comparisons for three stations. At Hwy 281 the median is 113 for baseline at 281 historical data and 900 for runoff events. Model simulates a median 73 baseflow within range, and 681 for the runoff within the range. If it meets visual and statistical test then a good calibration. Model shows good baseline and runoff correlations that fall within the 99% confidence interval. Plotted four years for model comparison.

Question: You are basing your information on rainfall amounts on three or four locations but rainfall can vary within the watershed. Your values can change if your rainfall data is more accurate?
Answer: That's true because it will vary within the watershed and that's why we do the hydrologic calibration first. It's a limitation in the modeling. If we get agreement on the flow then we can come close to actual amounts but you don't know how much it rains everywhere.

With the simulated daily data generated we can compare the geometric mean every 90 days in the watershed. Our target is 200 colonies/100ml and we model for 190 colonies/100ml, which includes a 5% margin of safety. Since we are exceeding this bacterial concentration then this indicates that we have to have controls on the watershed to get the numbers down below the target level. Using the model, loading reductions are made in the land use categories at 10% reductions are sequentially for each category until the model indicates that the geometric mean comes below the target.

Question: How does Reach 70 compare to other reaches like Reach 50.
Answer: There is less forestland and rangeland contribution for 70 and more WFA for 50. Fewer acres are contributing in rangeland and forest in 50.

Question: What is the difference between point source and direct source?
Answer: The point sources shown here are the municipal sewer plants and those are required to chlorinate and loads are small. The direct sources are representative of animals within the watershed that are directly depositing in the stream.

Question: How can you have representative data in the Reach 60 (Leslie Creek) when 95% of the time the creek is not running?
Answer: If the creek isn't running that can be simulated in the model. But every time I have been there it has been running. I don't know off hand if the model ever indicates that the creek is ever dry. If there is no rainfall it would indicate that it was dry.

We have calibration and geometric mean daily values so allocation generations are the next step. Assumptions we made for input into the model and we ask for input into the assumptions of the model used based on the data available. We need local input from the stakeholders and other local residents. If you know of anything in the watershed that is not reflected correctly in the model then please let us know. This is based on the best data available.

Question: You did take into account the releases from Lake Proctor. Did you know that if they stopped then the river would go dry? They may also have to quit the releases due to the cost of water. We have dried it up many times ourselves.

Answer. The model shows hourly releases for the four years of this study. I'm not sure if the historical data beyond that, but it would be interesting. The focus was on the four years.

Question: You have the 0% reductions in the city sewer plants and we often have spills from accidents and other events to take into account releases and our county has a lot of these. Could that be accounted for in the model?
Answer: It is not incorporated into the model at this time. If we had more data we could incorporate it but it is not typically incorporated due to lack of data and the uncertainty of the source. We also use this as projecting best management practices, not used typically for spills.

Question: How many sewer plants are from Lake Proctor downstream.
Answer: There are six including Hamilton, Comanche, and Devlin. We did sample the effluent of the sewer plants during this study and did not see any problems.

Question: There are still situations where accidents happen and there is still raw sewage going into the system.
Answer: We delete the outliers that are high. The data needs include the volume and bacteria loads then we could include it in there like that and make assumptions as to account for this.

Question: Do you have more copies of the presentation?
Answer: We have a project specific webpage at the TCEQ that has the meeting minutes, and presentations. You are encouraged to review the webpage and communicate concerns with your vested stakeholder. The stakeholder is responsible to bring points of concern to this meeting. The website will have the full presentation.

Question: How come as farmers and ranchers from the Lake down, this the first time that I'm hearing about this study? Why didn't you send something out to announce this?
Answer: We follow the guidelines as presented in House Bill 2912 to communicate activities planned in the study. We do media releases for the program and for every meeting we are going to have. It is the primary responsibility of your stakeholder to provide you with the information you need. This is the third meeting we have had and it is the stakeholders responsibility as well to communicate activities to their group.
We need to look at the stakeholder list and revise the list for those attending the meetings.

Question: Are there any other watersheds affected?
Answer: We have a 303(d) list of waters that don't meet water quality criteria. We now have a categorical ranking process but then we didn't rank them by category in 2000 at the beginning of the study. We now rank by category and look at other variables to determine the need for the study.

The next step in this process is to develop a load allocation. This includes point source, non-point source and WAF's. The goal is to get mean below 190 that includes the 5% Margin of Safety (MOS). Simulated concentrations with management practices on the watershed indicates that the geometric means would now be below the 190 mark. This is four years of daily mean bacterial concentrations and with controls in the watershed it is below the 190 mark. The question now becomes what controls to use and how much control?

The allocation for point sources does not show any reduction due to small loading in the watershed. The level of control for forestland and cropland model states a 30% load reduction. Rangeland is a 40% load reduction, and 30% load reduction for WAF.
Residential/commercial/industrial are a small factor and no reductions are required.

The allocation indicates a 60% reduction on direct sources. We need input from the stakeholders based on assumptions and conclusions derived from the model.

Bacterial Source Tracking

The bacterial source tracking is a genetic test of individual E.coli to determine source by comparing to known sources to the samples collected. Used to calibrate the model and to derive better management practices. The library includes over 2000 RNA samples from animals and/or humans. Includes wildlife, human, livestock etc. The test extracts one organism from the plated colony and compared to those one in the water samples. The samples were taken from stations FM 1702 and Hwy 281 sample stations during baseflow conditions.

Two methods are used including Ribotyping and ERIC. The two columns indicate a TCEQ library and Combined library. Last summer we pulled 200 samples last summer and compared them to the library. The process uses a statistical biology approach. The results indicate 18% related to domestic sewage, 7% domestic pets, 43% wildlife, 24 % livestock, 4.5% zoo animals and 2.5% unidentified. Results are tentative and some samples are pending in the library. Additional unknowns may be identified later and results may change, but very little. This may have more of an impact with loading factors.
Of the 24% Livestock, there was 14% cattle and 10.5% other.

Question: Ever been at the bridge at CR 260? That is where everything comes through. It doesn't smell right there.
Answer: No, now had you been to an earlier meeting we might have known that.

Question: Would hogs show up as other? Do you have anything for feral hogs for they are up and down the river? I don't know of any other hog producers around in the watershed.
Answer: Yes they would be included in the other category, however it may be shown here as sheep or something else beside a hog. We had trouble getting a fecal sample from a feral hog.

Question: I find it interesting that 1 out of every 5 samples is from human and yet we don't have any reductions for the point sources. Somewhere there is a lot of people getting into the streams. Why focus on something when humans are 20% there.

Answer: A lot of this mentioned here will be addressed in the implementation phase since we see this percentage present. We will have to determine the sources whether it is a leaking septic tank or permitted WWTP or etc. That's where we need local expertise in the watershed and input from all of you here. These issues can be brought to the table and follow the direction that are presented here during the implementation phase. This is a tool being the results of this

modeling. All information is useful and can explain some irregularities and can be used to calibrate the model more accurately.

Question: Looks like we need more sampling from runoff events.
Answer: Yes it is a limiting factor. If we had more data we can look at that. I can pull the data points and check to see if any of the flows are higher and check for any differences.

Question: I am looking down the line at implementation. Half comes from wildlife so how do you regulate that? It looks like the livestock industry is one who is going to be regulated.
Answer: These are things we are going to resolve in implementation and select management practices based on the watershed. We need additional input from the stakeholders.

Conclude modeling and allocation process and then implementation. This process will last for years.

Comment: We need stakeholder collaboration and alliances to resolve some of these issues. It is a watershed management approach that requires everyone working together. The stakeholders represent agencies and entities that need to coordinate to come up with the solution. We are here to work with you to resolve the problem and reach a consensus on implementation. You have input into the process. This is your watershed.

Question: Have any of the samples been taken during runoff events? The birds use the trees and are directly over the river.
Answer: I would have to look but most are going to be from baseflow.

Question: Is implementation going to include the whole watershed?
Answer: Yes, it would include the entire watershed.
The stakeholder list was reviewed and modifications were made to the list.

The meeting adjourned at approximately 2:14 PM. The next meeting may be scheduled in February 2006 or sooner.