TNRCC Response to Public Comments for Two TMDLs for Phosphorus in the North Bosque River

February 19, 2001

Document Structure

This document has been prepared in response to comments received by the Texas Natural Resource Conservation Commission (TNRCC or Agency) on the two Total Maximum Daily Loads (TMDLs) prepared for phosphorus in the North Bosque River. This Response to Comments document contains two main sections. The first section is a summary which provides the Agency's response to the most common comments received on the two TMDLs. The second section is a synopsis in table format of all comments submitted and the TNRCC's responses to each comment.

Many comments address similar issues from slightly different perspectives. For organizational and consolidation purposes, the Response to Comments has been arranged into seven different categories:

I. Texas TMDL Development Process
II. General water quality issues
III. Technical Issues (problem definition & endpoints; pollutant source analysis; linkage/modeling & margin of safety; loading allocation)
IV. Implementation Issues
V. Permitting Issues
VI. Enforcement issues
VII. Legal Issues

The TNRCC is committed to developing and implementing TMDLs. After a TMDL is approved, the TNRCC will begin preparing an implementation plan. The TNRCC has utilized the best available science to develop these TMDLs and is confident that these TMDLs provide the necessary technical basis for restoring water quality as defined by the narrative standard outlined in the TMDL. Outside of the scope of TMDL development, TNRCC implements a variety of ongoing permitting and enforcement programs that directly benefit the goal of phosphorus reduction in the North Bosque River. The implementation of these programs in the North Bosque River watershed will be modified as necessary based on the implementation plan. Finally, although the development and approval of TMDLs do not constitute rule making, the TNRCC is confident that it has established an open process for obtaining public input and comment on TMDLs.

I. Texas TMDL Development Process

The primary goal of the TNRCC's Total Maximum Daily Load (TMDL) program is to restore and maintain beneficial uses in impaired water bodies. For each impaired water body, the process in Texas requires the preparation of a TMDL. The TMDL is a technical analysis that 1) determines the maximum loadings of a substance causing impairment that a water body can receive and still attain and maintain its water quality standards and (2) allocates this allowable loading

between contributing point and non-point source categories in the watershed. Upon approval by the Commission, the technical analysis must be submitted to EPA for review and approval.

The process in Texas includes the preparation of an implementation plan which is a detailed description and schedule of the (regulatory and voluntary) management measures necessary to achieve the pollutant reductions identified in the TMDL. Implementation plans are developed with consultation and input from stakeholders in the watershed and are subject to review and approval by the Commission. The TMDL or pollutant load allocation and the implementation plan together create a watershed action plan which provides local, regional, and state organizations a comprehensive strategy for restoring and maintaining water quality in an impaired water body.

The TMDL development process has been designed to support the Commission's policy directive that TNRCC staff establish a clear delineation between TMDL allocation and an implementation plan. TMDLs can be completed accurately and expeditiously by first acquiring scientific information to determine how much pollutant reduction is necessary, rather than how pollutant reductions will be achieved. Once TMDLs are completed and approved, TNRCC and stakeholders can focus on selecting specific management options for achieving the pollutant reduction established by the TMDL.

The level of stakeholder involvement throughout the preparation of the implementation plan will be determined on a case-by-case basis. After a draft implementation plan report has been prepared with local stakeholder input, TNRCC will initiate a process for the review and approval of an implementation plan report. TNRCC staff will make the implementation report available for public comment, conduct a hearing, analyze the comments, make the necessary revisions based upon the public input we receive and bring the document to the commission for adoption.

II. General Water Quality Issues

Some comments indicate a concern that there are human health issues associated with phosphorus and/or other nutrients in the North Bosque River or Lake Waco. The types and loads or concentrations of nutrients in the North Bosque River watershed are issues of ecological health, not human health. There is little reason to believe that measured and predicted phosphorus levels would preclude physical contact with surface water in the North Bosque watershed nor contribute to impairment of the contact recreational use.

Many comments concerned the taste and odor of drinking water produced from Lake Waco, and whether that should be a focus of the TMDLs. The substances that cause the taste and odor in Lake Waco are not a threat to public health. Lake Waco has experienced seasonal taste and odor episodes for at least 40 years. While nutrient conditions in the lake may have some indirect influence on taste and odor episodes, there is no demonstrated linkage to assure that reducing nutrient concentrations will reduce or eliminate taste and odor episodes. Other Texas reservoirs with similar and higher nutrient and algae levels do not experience taste and odor problems. Measured and predicted nutrient levels in this reservoir cause it to be ranked in a "mid-range" when compared to other reservoirs in Texas. All reservoirs are subject to nutrient enrichment, but Lake Waco has not shown the advanced water quality effects associated with excessive nutrient enrichment. Even though Lake Waco is not included on the state list of impaired waters, and therefore not specifically addressed in these TMDLs, the recommended reduction in phosphorus

loading to Segments 1226 and 1255 should contribute to a reduction of nutrient enrichment for this reservoir. To the extent that taste and odor episodes are related to nutrient enrichment, this reduction should also reduce the incidence of these episodes.

The North Bosque River (Segments 1226 and 1255) was included in the 1998 Texas CWA § 303(d) List and deemed impaired under narrative water quality standards related to nutrients and aquatic plant growth. Those segments are also listed for contact recreation impairment based on the potential presence of pathogens; however, these TMDLs are not addressing that issue. TNRCC is evaluating the relationships between elevated levels of fecal coliform bacteria and the designated use of contact recreation in this and other streams in Texas. Consistent with guidelines from the Environmental Protection Agency (EPA) and other state programs the TNRCC has changed bacterial indicators of water quality from fecal coliform to *Escherichia coli* (*E. coli*) in fresh water and enterococci in marine water. This change was adopted in July 2000 in revisions to 30 TAC, Chapter 307 (Surface Water Quality Standards) and has been submitted to EPA for review and approval. Although the measurement of fecal coliform bacteria (normally found in the intestines of warm blooded animals and some cold blooded animals) has provided a convenient tool for the screening of water bodies for potential contamination from untreated wastewater, public health studies have not demonstrated a clear, reproducible relationship between fecal coliform levels and transmission of water borne diseases through recreational contact. The TNRCC will continue to monitor both fecal coliform and the more definitive E. coli and enterococci to develop accurate relationships for Texas surface water.

There were also comments about the overall health of the North Bosque River (and other adjacent watersheds) and requests that TNRCC do more to address these types of concerns. The TNRCC concurs that there may be other water quality concerns throughout the North Bosque River watershed (and other watersheds). However, the purpose of these TMDLs is to address phosphorus loading in the two impaired segments. While these TMDLs are focused on addressing water quality problems associated with nutrients, other TMDLs will be necessary to fully address other water quality impairments identified in the North Bosque River watershed.

III. Technical Issues associated with the TMDL report

Problem Definition and Endpoint Identification

The TNRCC has determined that the appropriate target for broad-scale North Bosque River TMDL allocation purposes is narrative in character, like the water quality standard it supports. Numerous comments recommended there should be quantitative goals for the TMDLs, in the form of numeric water quality standards or criteria. There were suggestions that narrative goals are not adequate for establishing the TMDLs or for evaluating the success of implementation. Some of those comments then objected to numbers found in the TMDLs, contending that those numbers constituted numeric criteria or standards for phosphorus that were inappropriately selected by TNRCC. One comment requested numeric criteria for many types of nutrients and related parameters, as well as phosphorus.

Under General Criteria, the Texas Surface Water Quality Standards [30 TAC, Chapter 307.4 (e)] say:

> "Nutrients from permitted discharges or other controllable sources shall not cause excessive growth of aquatic vegetation which impairs an existing, attainable, or designated use. Site-specific nutrient criteria, nutrient permit limitations, and/or separate rules to control nutrients in individual watersheds will be established where appropriate after notice and opportunity for public participation and proper hearing."

Also pertinent are the following statements from the Texas Surface Water Quality Standards [30 TAC, Chapter 307.4 (a)] regarding the applicability of general criteria:

> "(a) Application. The general criteria set forth in this section apply to surface waters in the state and specifically apply to substances attributed to waste discharges or the activities of man. General criteria do not apply to those instances in which surface water, as a result of natural phenomena, exhibit characteristics beyond the limits established by this section. . . . "

Nutrients are natural components of natural systems, and nutrients are needed to maintain ecological health. Natural nutrient levels can be highly variable, influenced by weather and season, local geology and/or vegetation, and other things. The response of aquatic vegetation, including algae, to nutrient loading is also highly variable, influenced and often controlled by factors such as temperature, stream flow, light availability, and seasonal variations in biotic communities. For these basic reasons, establishing simple yet reasonable and appropriate numeric standards for nutrient concentrations is very difficult, and when possible is very site-dependent.

Biological and chemical data collected within the North Bosque watershed, and assessed during the TMDL development process, indicated that soluble phosphorus is the nutrient that would most often limit algal growth. Related studies indicated that annual average soluble phosphorus concentrations less than approximately 50 micrograms per liter (µg/L) would have some limiting effect on algal growth potential. In order to accomplish the technical analysis and run a quantitative model to determine where levels of phosphorus would not cause excessive growth of algae, a numeric target or range of targets was needed as a working assumption. The stakeholder committee selected a "preliminary target" of 30 µg/L at a site near Meridian, which represented approximately 50% of the average concentration at that site. To achieve the 50% reduction in concentration at this point it was estimated that a 50% reduction in loading would be necessary. However, model output was ultimately presented in a probability curve form that did not require a specific concentration target to be identified in order to evaluate model predictions.

The assumption by some commentors that either the 30 µg/L or 50 µg/L soluble concentrations are *de facto* goals of the TMDL document is not correct. Those were working numbers, based on the best available in-stream algal growth response information and for discussion, but neither value is proposed by TNRCC as a numeric standard or criteria for TMDL implementation. Due to the size and variability within the North Bosque River watershed, appropriate nutrient criteria would vary geographically and temporally, and the establishment of single-value standards is not appropriate for this watershed. Model predictions suggest that annual average concentrations of soluble phosphorus at several index sites will often be near those discussion values.

The narrative goal is *to achieve reductions in the total-annual loading measured as passing specific index sites along the North Bosque River, with the reductions averaging approximately 50% across the watershed but varying between approximately 38% and 66% at the individual index sites*. This narrative load reduction target is expected to result in similar reductions in the annual-average concentration of soluble phosphorus at the index sites. The narrative goal is not predicated on the basis of conditions during any particular year, nor for any particular population of humans or dairy cows.

The most feasible parameter for measurement currently appears to be in-stream concentrations of soluble phosphorus. The numeric measures will vary at the different index sites, are likely to reflect longer term values (i.e. annual averages) rather than instantaneous concentrations, and are likely to be assessed against probability curves to account or allow for natural and unpreventable annual variations related to weather conditions. Annual average expression of numeric measures for these TMDLs is more appropriate and more feasible than daily loads or instantaneous limits. This approach is consistent with similar evaluations elsewhere and is more appropriate for the watershed because 1) project analyses utilized annual averages, 2) model calibration and predictions are stronger for annual averages, and 3) algal growth response to nutrient loading in a large watershed, such as this, occurs over longer time periods. The annual average is more feasible because daily loads or instantaneous limits linked to extremely dynamic environmental conditions cannot reasonably be defined or monitored.

The load and concentration reductions that result from the narrative goal of the TMDLs are expected to achieve the narrative water quality standards. If post-implementation assessment of the numeric measures of success indicate that the standard is not being attained, the implementation plan will include provisions for revisiting the analyses and/or developing additional controls or management measures to achieve success.

Source Identification

Several comments object to municipal wastewater treatment plants (WWTPs) being described as "major controllable sources" of phosphorus along with dairy waste application fields (WAFs). Comments along these lines cite the fact that total WAF loading within the watershed has been approximately five times as much as total WWTP loading, and suggest or imply that reductions in WWTP loading are not needed or appropriate at this time. In the context of the North Bosque River TMDLs, the term "controllable" should be understood to mean – subject to existing regulatory programs and requirements, and having known and effective control actions or management measures that can significantly reduce phosphorus loading to the stream system. Of the sources considered and modeled, only WAFs, WWTPs, and urban stormwater are subject to an existing regulatory program. Urban stormwater is not easily managed to reduce phosphorus loading and the effectiveness of such measures is unknown. The WWTPs are "major" sources because they dominate local conditions during low flow periods and have significant effects within stream channels immediately downstream of the discharge points. This is true even though WWTP loading is of moderate scope in the overall annual watershed total. The WAFs are "major" sources because they have provided loading that is disproportionately large on a per-acre basis, compared to all other sources; because they may have dramatic impacts on small streams or reservoirs within a short distance downstream during small to moderate rainfall events; and because WAFs dominate the overall annual watershed total loading.

Some comments took issue with source identification numbers from Table 3 and Figure 3 of the TMDL document. In particular, the numbers and pie chart indicating that approximately 80% of the gross loading "Above Stephenville" during the mid-90's originated from waste application fields was criticized as unfair and inaccurate, and attributed to "erroneous modeling." The numbers in Table 3 and Figure 3 were calculated directly from the area (i.e. hectares) of each land use within subwatersheds and land-use-specific export coefficients (i.e. kilograms per hectare per year) developed from data collected in the North Bosque River watershed. The export coefficients were derived from data collected in small tributary streams (not in fields, not upstream from BMPs), and did not omit the assimilative effects of WAF BMPs. The data were collected under quality assurance plans approved by USDA and/or TNRCC. The gross loading numbers estimate the total loading that reached streams within a short distance from various land uses, but still some distance upstream from the North Bosque River index sites. The SWAT model did not play any part in developing the Table 3 and Figure 3 values – nor any other gross loading values presented or discussed. The SWAT output represents the "net loading" that is expected to actually pass the index sites, after some additional in-stream assimilation of phosphorus delivered to streams as "gross loading." The TNRCC believes the gross loading estimates in Table 3, and most of the information in Figure 3, were generally accurate, represent conditions that existed when TMDL development began, and provide a valuable perspective on which sources to control. One error in Figure 3 has been identified: numeric values for loading in the bar graphs was presented as kilograms, but actually represented pounds. Correction of that error will reduce the magnitude of numbers on the bar graph axes, when converted to kilograms, but the shape of the bar graphs will not change. The pie charts are not affected, because the proportionate contributions by source are the same regardless of the units of measurement used.

Linkages Between Sources and Receiving Water (Modeling)

The TNRCC believes that the Soil and Water Assessment Tool (SWAT) watershed modeling has been more than adequate for the purpose of establishing the TMDLs, and now will begin developing an implementation plan and initiating implementation. Some modeling comments expressed concern that predictions of the future "may not be accurate" because of various details of model theory, operation, or calibration. Others suggested that the model must portray every individual facility or land unit that is or may be a source of phosphorus, every possible management practice or permit violation, and every foot of stream or water body up to the headwaters, to provide instantaneous water quality limitations for every moment of every day. In general, the modeling comments then request that more modeling be done to resolve all such details and uncertainties before any TMDL can be developed.

The TNRCC believes that the modeling used the best tool available, since the SWAT model was specifically developed to address large-watershed agricultural management issues and is widely used nationally and internationally for such purposes. Other modeling approaches were evaluated, and this approach was considered the most appropriate for this situation. The model development and operation were performed by the creators and sponsors of the SWAT model, who are among the most experienced and knowledgeable SWAT users available. Furthermore, the model operators are located in proximity to the North Bosque River watershed and were thus familiar with the physical watershed characteristics and able to participate in meetings and discussions of the technical work group or stakeholder committee.

Some comments contend that there was no true peer review of the modeling effort, suggesting that term can only be used for the kind of review applied to new scientific hypotheses by other research scientist. The generic SWAT model was appropriately peer reviewed when it was first developed. Peer review for specific TMDL applications is different. TMDLs are regulatory planning exercises, not pure science research to construct or alter basic theories. The “peers” for regulatory planning exercises include affected parties, those involved in developing the plan, and consultants or advisors that participate to assist them — that is a large part of what the stake-holder process is about. Through meetings of the stakeholder committee and technical work group, there were numerous opportunities for the appropriate involved “peers” to comment on and help guide data analyses, model development, and model prediction scenarios. The TNRCC believes that appropriate peer review for the North Bosque River TMDLs did occur.

The model analyses performed to develop the TMDLs involved numerous SWAT simulations, for several purposes. The first major purpose was to calibrate and verify the North Bosque River application of the model. Calibration used inputs that were actually measured, simulated over relatively short monitored periods, and compared model output to stream results that were actually measured during the corresponding period. Various rates or constants used by the model to calculate results were adjusted to match model output to observed data as closely as possible. Some customization of the model algorithms was done to improve its characterization of nutrient fluxes and BMPs. Verification consisted of applying the calibrated model to another portion of the data set to test the calibration settings. Adjustments to the "curve number" values were used to calibrate surface runoff calculations, and adjustments to the "cover factor" of the Universal Soil Loss Equation were used to calibrate sediment yield calculations. The curve number and cover factor adjustments were reasonable, within normal ranges and consistent with similar calibrations for sites throughout the United States, and consistent with theoretical limitations cited by some comments. The TNRCC believes the North Bosque River SWAT model was correctly and adequately calibrated and verified.

The second major purpose of model development was to prepare suitable initial condition scenarios, which were named "Existing" and "Baseline" (or "Future") for discussions and graphics. Long term planning based on predictive modeling, like these TMDLs, require initial condition or baseline model runs from which to estimate the effectiveness of changes. Predictive "forward looking" model simulations used a 38-year period of historical weather imposed on management practices, discharges, land use distributions, etc., that remained constant year-to-year in the model. This provided output that characterizes the range of variation to be expected because of weather. The "Existing" model scenario used management, discharge, and land use conditions like the calibration/verification simulations, but set constant and imposing the 38-yr weather condition variation. This provided a "before" case that is computationally similar to the predictive simulations. Another scenario referred to as "Baseline" (or sometimes "Future") used estimates of urban growth, with full-permitted discharge conditions for WWTPs, and full-permitted dairy cow numbers with concomitant adjustments to WAF acreage. Output from those "Existing" and "Baseline" scenarios predicted conditions expected before any TMDL-imposed management practices or controls take effect. The narrative goal of substantial phosphorus net loading reductions at various index sites is proposed relative to the "Existing" scenario results.

Some of the model cases and details involved in calibrating and verifying the model, and preparing the initial cases for evaluation purposes, were as follows:

1) Calibration and Verification
    a) Use current estimate of cow numbers
    b) Apply all manure on total amount of WAF (9,450 ha) at rate between N and P rate
    c) WAF soil P concentration at 250 ppm (based on field study in mid 90's)
    d) Use average discharge rate and concentrations from WWTP
    e) Run for 10 years, but calculate average for years when observations made
2) Existing
    a) Same as calibration, except run for 1960 through 1998
3) Baseline
    a) Cropland area constant
    b) Urban area increased by population growth (20%)
    c) Permitted cow numbers (67,000) and permitted WWTP flow concentrations
    d) Apply manure at N rate
    e) Soil P at 250 ppm in WAF (6,375 ha)
    f) Simulations for 1960 through 1998
    g) Add 3 new point sources @ 1 mg/l total P and 0.75x10-6 L/d each)

It is not feasible to constantly change the Existing and Baseline model scenario(s) to represent daily changes that occur as the planning effort proceeds, in order to then resimulate all future predictions, as suggested by some comments.

The third major purpose of model simulations was to predict the environmental effect of various management practices or control actions. Many more predictive scenarios were simulated by altering management practices or controls from the Existing/Baseline model scenarios to represent potential TMDL measures, and thus provide predictions of the relative effectiveness of the potential measures. Ultimately, the model scenarios named "TMDL-e" and "TMDL-f" were developed by combining a suite of several management practices and control actions that appeared to effectively reduce phosphorus loads and concentrations at the index sites. Contrary to the allegations of several comments, the selected management practices and control actions were not chosen on the basis of acceptability by the dairy industry, nor by cities. Both groups have indicated in comments that management practices or control actions included in the final model scenarios are not considered acceptable by them.

Some comments contend that there is no margin of safety in the TMDL. In some cases because of inadequate peer review, in others cases because of uncertainty regarding the effect of nutrient levels on algal density or taste and odor. The implicit margin of safety discussed in the TMDL document pertains to model predictions that significant reductions in phosphorus loading are possible by using feasible management practices and control actions. Reductions in phosphorus concentrations are reasonably certain to result from the loading decrease. Significant reductions in phosphorus loading (with correlated reductions in concentrations) are the goal of the TMDLs. The margin of safety discussion is not intended to apply to indirect tertiary or quaternary effects like algal density or taste and odor issues. Algal density is affected by many uncontrollable factors as well as nutrient levels. Nor does the margin of safety pertain to the Lake Waco taste and odor

problem, which is not verifiably linked to or controlled by algae levels or nutrient concentrations in a predictable manner, and is not a target of the TMDLs.

Even though the TNRCC believes that the SWAT watershed modeling has been more than adequate for the purpose of establishing the TMDLs, model refinement is always possible, and TNRCC will support efforts to improve the model analyses as implementation proceeds, in coordination with affected parties and regional interest groups. Adjustments to the implementation plan can be made later if shown to be appropriate by the improved model analyses.

Some comments indicated concern or confusion regarding "time-weighted" versus "flow-weighted" presentation of model output. Presentation and discussion of time-weighted and flow-weighted depictions of model output were attempts to portray different perspectives on a complex issue. Time-weighted concentrations are shown in the TMDL figures that use concentration units. The TMDL figures that use load units represent the same perspective portrayed by previous flow-weighted concentration displays, but using different units. Both perspectives are important and must be incorporated in large scale nutrient management, and both perspectives were considered by TNRCC in developing the TMDL.

Loading Allocations

The use of annual average loads and concentrations in the TMDLs is more appropriate and feasible than daily loads or instantaneous limits. Annual average values are appropriate because 1) project analyses utilized annual averages, 2) model calibration and predictions are stronger for annual averages, and 3) algal response to nutrient loading in a large watershed occurs over longer time periods than a day. Annual average targets are also more feasible because daily loads or instantaneous limits linked to extremely dynamic environmental conditions cannot reasonably be defined or monitored. TMDL targets are not meant to be, and will seldom be useful as, "grab limits" for instantaneous enforcement of permit conditions.

Some comments suggest that the TMDLs are not adequate because the SWAT model does not portray individual sources specifically enough to simulate or assign facility-specific permit limits to every CAFO or WAF, or because the TMDLs do not state specific allocations for each of the specific types of sources. The TNRCC believes that the model analyses have been sufficient in quality and quantity to establish the stated TMDL goals as the basis for implementation planning. The SWAT model was never intended as a tool for setting individual permit limits; if such models are ever needed, perhaps they can be developed later. The TMDLs do establish reductions in pollutant loadings from the point source and nonpoint source categories as required by law. The process and steps for achieving those reductions will be determined in the implementation plan.

IV. Implementation Issues

The TNRCC believes that the many and conflicting concerns relating to implementation plan elements should be addressed as the implementation plan is developed, and that approval of the TMDL must occur first. Many comments stated that the full implementation plan must or should be available for review and discussion before comments on the draft TMDL can be made. These comments address a policy issue that is not unique or restricted to the North Bosque River TMDLs. There is a presumption that various elements of an implementation plan are embodied in the modeling or analyses. Current TNRCC policy is that implementation plans are developed after

TNRCC approves the TMDL allocation and the goals it establishes. That policy is consistent with existing Federal regulations regarding TMDLs. While the suite of management measures and controls simulated for the TMDL document provides a starting place for development of an implementation plan, and may identify possible management strategies of the eventual plan, the scope and sequence and ultimate form of each management strategy are not yet determined. Development of the implementation plan will be coordinated with concerned parties and ultimately open to public review and comment, similar to the TMDL.

V. Permitting Issues

A number of comments were submitted questioning the appropriateness of TNRCC issuing CAFO permits for expanding or new CAFO facilities until the TMDL and associated implementation plan are completed. The commission has addressed this issue twice in the past through the adoption of an interim policy in November of 1999, which was subsequently modified to address additional concerns about permitting in the North Bosque watershed.

VI. Enforcement Issues

Several comments were received expressing concern over the aggressiveness of the enforcement program in this watershed. Most encouraged a more aggressive program and some indicated that with more aggressive enforcement, the TMDL would not be necessary. The TNRCC enforces all of its rules aggressively and equitably and will continue to do so.

With the adoption of the statewide rule related to concentrated animal feeding operations in April of 1987 the TNRCC and its predecessor agency have attempted to fulfill the obligation of developing and implementing a vigorous and equitable permitting and enforcement program. The Texas State Legislature provided the agency broader enforcement authority in 1985, including authority to issue administrative penalties, during the same period of rapid expansion of the dairy industry in the Bosque River watershed. The adoption of the rule in 1987 related to animal feeding operations and established a permitting process for many of these facilities. The rule also provided the foundation for the agency to initiate enforcement activities which included administrative penalties. After a permit format was developed to reflect requirements in the rule, the agency staff focused on making contact with dairies in the Bosque River watershed which were subject to the permitting requirements for the first time. After providing a reasonable period of time for dairy operations to become familiar with the new regulation and to install necessary facilities and management changes to implement the program, the inspectors from agency offices in Waco, Arlington, and San Angelo added dairy operations to their routine inspection schedules. Violations were documented and notices of violation were sent to the operators. Formal enforcement actions leading to enforcement orders, some with administrative penalties, were issued for facilities that were not responsive to notices of violation.

After several years of inspectors working out of the existing regional offices, the agency created a satellite office in the City of Stephenville in 1996. This office was staffed with four inspectors and administrative staff. Having the inspectors located in the area allowed a more rapid response to complaints and inquiries from citizens and dairy operators in the watershed. The office adopted a policy of responding to any citizen complaint within 2 hours of receipt, even after hours and on weekends. In addition the inspectors initiated a program to inspect each dairy operation in the

Central Texas dairy outreach program area (Erath, Bosque, Hamilton, Johnson, and Comanche Counties) at least once each year. They also conducted follow-up inspections on operations that were issued a notice of violation as a result of the annual comprehensive inspection. Since 1997 the inspectors in this office have completed at least one annual inspection for every known dairy operation in the area.

VII. Legal Issues

The Constitutions and the Texas Administrative Procedures Act
Comments were received concerning the legal status of TMDLs, considering their anticipated consequences. Some expressed the opinion that these TMDLs are too ineffectual to accomplish anything, while others objected that they are so onerous they may destroy an industry. Nevertheless, both sides agreed that they are of sufficient regulatory effect that they must be adopted through formal rulemaking under the Texas Administrative Procedures Act. This objection arises from a fundamental misunderstanding of the result of the approval of a TMDL. A TMDL is a number used as a reference point for management of a specific pollutant in a segment of state water – it does not regulate any activity; it does not require or prohibit doing any act. It does not set commission policy, nor does it implement, prescribe or interpret law or policy. The law requiring the TNRCC to assess and protect state waters, plan water quality programs and implement water quality standards is stated in the Water Code sections described below. The commission's permitting policies are set out in its rules that include both state water quality standards and the commission's permitting parameters and procedures.

These TMDLs, in contrast to law and policy, represent a goal for pollutant reduction in two river segments. They are a planning tool and a permitting guidance, just like the waste load evaluations and waste load allocations that the TNRCC has been incorporating into state water quality plans for about 20 years. The water quality management plan, including these TMDLs, will continue to be used by the TNRCC for program planning and resource allocation purposes. The TMDLs establish the goal for setting permit conditions, but they do not mandate any particular conditions. The legislature and other state agencies may refer to it for their own planning purposes as well.

TAD asserted that these TMDLs violate constitutional and statutory prohibitions against taking of private property and governmental restrictions on private rights without due process. To the contrary, nothing in the TMDLs or in their supporting reports places any restriction on land use or personal action. They are findings consisting of two major parts - a determination of the major classes of sources of phosphorus deposition into the two river segments, and a determination that an average reduction by each of those classes in the amount of 50% of the phosphorus contributed will result in the segments' regaining and maintaining the narrative standard for nutrients. That standard is that there shall not be excessive nutrients in surface water that make the water esthetically unattractive or impair an attainable use.

The TMDL report also includes back-up material indicating that the 50% reduction is feasible. This information is included because EPA requires it as background for their assessment of whether the TMDL accurately predicts attainment of the water quality standard. However, the question answered by the commission and expressed in these TMDLs is not "How will the 50% reduction be achieved?" It is "Will achievement of a 50% reduction implement the water quality

standard?" By approving these TMDLs for submission to EPA and incorporation into the water quality management plan, the commission has determined only that the reduction, if achieved, will implement the standard.

The dairy industry objects that in the report too much of the existing phosphorus loading is attributed to them, and the City of Waco claims that not enough is allocated to that industry. The common theme is that the commission lacked sufficient accurate information to determine that the 50% reduction will implement the water quality standard. The commission is persuaded that the modeling done to assess relative potential for contribution of phosphorus was accomplished using a widely accepted model, calibrated and used in conformity with scientifically appropriate procedures generally accepted in the professional community. The results were not perfect; in our experience modeling never produces a 100% accurate picture of reality.

However, the reason for the use of the model was not to apportion "blame;" nor is the purpose or effect of the TMDL to assign responsibility for cleaning up the river. The model predicted, based on what is known about current permitted and actual land use in the watershed, how much phosphorus those classes of sources can potentially deliver to the streams. In cases like the Bosque, where there are pollutant sources whose actual loading limit is not prescribed by permit, such modeling is necessary in order for the commission to assess the possible loading that can occur. TAD is correct that the model doesn't take into account the location of each dairy and waste application field, the management practices used on each one, or other individual characteristics. The executive director, together with the Texas State Soil and Water Conservation Board, will begin now to create a plan to implement these TMDLs. As part of that process they will assess the impact of mandatory and voluntary measures currently in effect in the watershed.

The City of Waco directs its comments to the perceived inadequacy of the TMDLs to assess the effects of dairy waste application fields on the taste, color and odor of Lake Waco. As pointed out elsewhere, these TMDLs were undertaken to determine what reduction in phosphorus loading to segments 1255 and 1226 will result in those waters' meeting the narrative standard for nutrients. It was not the purpose of this particular project to assess the causes of aesthetic conditions in Lake Waco. If, as Waco asserts, the source of those problems is phosphorus traveling downstream from segments 1255 and 1226, a 50% reduction in that migration - no matter how it is ultimately achieved - will benefit the aesthetic problems in the lake. Those factors are not within the scope of these TMDLs, however, and did not govern the commission's adoption decision.

Authority for Adoption

TAD questioned the legal authority of TNRCC to develop TMDLs.

The State of Texas is required by federal law to develop TMDLs. Section 303(d) of the Federal Clean Water Act (CWA) requires each state to identify water quality limited segments requiring TMDLs and submit a list of those water bodies to the Administrator of the Environmental Protection Agency (EPA). The same section requires that states calculate the total maximum daily load (TMDL) of each pollutant of concern that can be received by each listed segment. States are further required under federal regulation to incorporate TMDLs into their water quality management plans required under §208 of the CWA.

In Texas, state statutory provisions require the commission to establish the level of quality to be maintained in, and control the quality of, water in the state. (Texas Water Code (TWC) §26.011). Texas fulfills its obligations under §303(d) to list impaired segments and create TMDLs through functions assigned by the legislature to TNRCC. The 303(d) list is prepared by TNRCC as part of its monitoring, planning and assessment duties. (TWC §26.0135).

TMDLs themselves are part of the state water quality management plans that TNRCC is charged by statute to prepare. (TWC § 26.036). As the state environmental regulatory body, the commission has primary responsibility for implementation of water quality management functions within the State. (TWC §§26.0136, 26.127). The Executive Director of the TNRCC must prepare and develop, and the commission must approve, a comprehensive plan for control of water quality in the state. (TWC § 26.012). The list of impaired segments and resulting TMDLs are tools in water quality planning.

The commission is also charged with establishing water quality standards (and amending them as needed), as well as ensuring that each watershed in the state is assessed and monitored for compliance with the water quality standards. *(See* TWC §§ 26.0135 and 26.023). The Executive Director is required under TWC § 26.127 to establish water quality sampling and monitoring program for the state, and may enter into contracts or other agreements with other entities for laboratory services for water quality testing.

The commission also has primary jurisdiction over discharges into surface waters of the state. *(See* TWC § 26.001(20), 26.121 and 26.127). As the agency of the State charged with implementing the constitution and laws of this state relating to the conservation of natural resources and the protection of the environment, TWC § 5.012, the commission is authorized to perform any acts necessary and convenient to the exercise of its jurisdiction and powers, (TWC § 5.102).

Summary of Comments Received

Abbreviations and acronyms used:

TMDL	Total Maximum Daily Load	CWA	Clean Water Act
TNRCC	Texas Natural Resource Conservation Commission	mg/L	milligrams per liter
CAFO	Concentrated Animal Feeding Operation	ppm	parts per million; approximately equal to mg/L
AFO	Animal Feeding Operation	µg/L	micrograms per liter
WWTP	Wastewater treatment plant	ppb	parts per billion; approximately equal to µg/L
WAF	Waste application field		
BRA	Brazos River Authority		

Date Rcd.	Source	Summary of Request or Comment	Summary of TNRCC Action or Explanation
II. General Water Quality Issues			
10/23/00	Mayor of Bellmead (verbal)	Residents of Bellmead are concerned about the cost of water treatment associated with taste and odor issues in Lake Waco. The TMDLs should control effects on Lake Waco.	The TMDLs for the North Bosque River will reduce nutrient loading to Lake Waco, which may be beneficial. However, the influence of phosphorus on taste and odor is not direct or reasonably predictable, and no guarantees regarding taste and odor can be made. See Section II of Introduction to TNRCC Response to Comments.
10/23/00	concerned citizen (verbal)	TMDL "pamphlet" does not address tributaries of the North Bosque River, like Duffau Creek in Erath Co., which also have water quality problems. If there is a problem in Lake Waco, it must be worse in those small tributaries, and may affect private water wells.	Implementation strategies are not discussed in the TMDL report. However, as part of the implementation plan, specific management measures will occur in the subwatersheds of the North Bosque aimed at reducing specific sources of phosphorus loading. The mainstem of the North Bosque River cannot improve unless the tributaries do.
10/23/00	concerned citizen (verbal)	In other states, like Massachusetts, children have died because of water wells polluted by dairies, and this needs to be addressed in the North Bosque River area now.	Elevated levels of phosphorus the North Bosque cause no human health risk.

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10/23/00	concerned citizen, speaking for "business community of the region" (verbal)	The quality of water supplied from Lake Waco is vital to the businesses in the region, and to attracting new businesses. The economic welfare of hundreds of thousands of people is affected by the quality of Lake Waco. All businesses today must contend with more regulation than in the past. Something should be done now to reverse the deterioration of Lake Waco, before it gets worse.	The TMDLs for the North Bosque River will reduce nutrient loading to Lake Waco, which may be beneficial. However, the influence of phosphorus on taste and odor is not direct or reasonably predictable, and no guarantees regarding taste and odor can be made. See Section II of Introduction to TNRCC Response to Comments.
10/23/00	concerned citizen (verbal)	Stated support for statements by mayors of Stephenville and Waco.	TNRCC acknowledges the concern expressed, and notes the expression of concurrence with City of Waco positions, which are addressed elsewhere in this document.
10/23/00 11/20/00	Director of Utilities, City of Temple (verbal) Mayor of Temple (written)	Temple supports other cities in their concern about diminishing water quality in the Bosque and Leon Rivers due to nutrients from dairy waste application fields. Measures to improve the Bosque should also help the Leon R.	See Section II of Introduction to TNRCC Response to Comments.
10/23/00	concerned citizen (verbal)	Expressed general concern about the water and its effect on his generation's future.	TNRCC has similar concerns, and strives to protect water quality for all generations of Texans.
10/23/00	Mayor pro tem of Killeen (verbal)	Killeen's water source, the Leon River and Lake Belton watershed, contains concentrations of dairies similar to the N Bosque. Killeen supports Waco and other cities in efforts to address water quality problems, to help prevent similar problems in the Leon R watershed.	See Section II of Introduction to TNRCC Response to Comments.
10/23/00	concerned citizen, Chair of Waco Chamber of Commerce, speaking for business community (verbal)	The present and future health and economic well-being of our region, and our children's future, are at stake. The Chamber of Commerce urges TNRCC and other governing agencies to assure that current and future laws will be enforced.	See Section II of Introduction to TNRCC Response to Comments.

Date Rcd.	Source	Summary of Request or Comment	Summary of TNRCC Action or Explanation
10/30/00	concerned citizen, Chair of Waco Chamber of Commerce, speaking for business community (letter)	Designated uses of the North Bosque River should be expanded to include fishing and swimming, and those uses should be addressed in the TMDL.	Designated uses for the North Bosque River already include aquatic life use/support, and contact recreation. Measures implemented to address nutrient effects are likely to enhance aquatic life support, and can improve contact recreation support.
10/30/00	concerned citizen, Chair of Waco Chamber of Commerce, speaking for business community (letter)	TNRCC should commit to the businesses, cities, and citizens along the river and Lake Waco that the proposed TMDL will in fact restore water quality to what it was 10 to 20 years ago.	The TMDL will improve water quality, and TNRCC intends that the improvement will support appropriate uses. Reference to some past date provides no measurable basis for evaluating water quality. Taste and odor issues have existed in Lake Waco for more than 20 years, and there can be no guarantee that will change, since nutrients have only indirect effects on taste and odor.
10/23/00	concerned citizen (verbal)	Water quality in L Waco is a concern for the people of McLennan Co, because the water tastes and smells bad. He supports "TNRCC's proposal that will go before the Texas state legislature this January." Although not perfect, that proposal (the TMDL?) is "certainly a step in the right direction."	See Section II of Introduction to TNRCC Response to Comments.
10/23/00	Mayor of Lacy Lakeview (verbal and written)	Taste and odor of Lake Waco water have caused complaints by citizens. City management is concerned about phosphorus from North Bosque River watershed. City managers concur with assessment by Waco mayor, and support those comments and suggestions.	See Section II of Introduction to TNRCC Response to Comments.
12/04/00	Mayor of Woodway (written)	Woodway supports the City of Waco efforts and requests that TNRCC protect water quality in the region.	See Section II of Introduction to TNRCC Response to Comments.

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10/23/00	concerned citizen, Chair of the Texas Parks & Wildlife Fisheries Advisory Board, on behalf of anglers (verbal)	Outdoor water-based recreational opportunities contribute greatly to the quality of life. Fishing has declined in the upper Bosque River, and consumption advisories are "inevitable" if measures are not taken now. Algae causes "ring around the boat" in Lake Waco - where does it come from? Recreational use of Lake Waco could decline if water quality is not protected, with significant economic ramifications. Speaker urges TNRCC to take steps to ensure that water quality in the Bosque River and Lake Waco will not be diminished, and will support recreational opportunities for future generations.	These TMDLs for nutrient impacts will improve water quality in the Bosque River basin. However, it is not possible to predict or guarantee how or whether nutrient controls will affect recreational use or fishing. See Section II of Introduction to TNRCC Response to Comments.
10/23/00	member of Waco City Council (verbal)	Speaker endorsed and supported the comments of the McLennan Co Judge, the Mayors of Waco, Woodway, Lacy Lakeview, and Bellmead, "and others who have spoken on behalf of the objective measurement and the protection of the watershed of Lake Waco."	TNRCC acknowledges the support of the other commentors, and notes the expression of concurrence with City of Waco positions. See Section II of Introduction to TNRCC Response to Comments.
12/15/00	City of Waco (written)	The City of Waco urges the Executive Director to rescind the draft TMDLs and prepare new proposed TMDLs along the lines recommended by the City.	TNRCC believes that it is now more important to move forward on the Bosque River issues than to reconsider the TMDL process. The implementation plan will provide confidence that goals of the CWA will be achieved.
10/23/00	concerned citizen, on behalf of the Water Quality Task Force of the Greater Waco Chamber of Commerce (verbal and written)	The business community of the greater Waco area share the concerns to be expressed by the Brazos River Authority, and requests that TNRCC address those concerns.	TNRCC acknowledges the concern expressed, and notes the expression of concurrence with Brazos River Authority (BRA) positions. The BRA concerns are addressed elsewhere in this document.
10/23/00	concerned citizen, on behalf of M&M Mars (verbal)	M&M Mars located in Waco in part because of the availability of milk and water supplies. They are required to treat their wastes to protect water quality. In order to ensure that existing manufacturing facilities remain viable, and to attract new industries to the area, it is imperative that water quality be maintained, and that any other industry that impacts water resources be environmentally responsible.	TNRCC agrees that water quality is important, and that any source of adverse impacts to water resources should be held responsible.

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10/23/00	concerned citizen, on behalf of the Centex Chapter of the American Water Works Association (verbal)	Without reasonably-priced water, the economic condition of the region will eventually suffer. Cost has increased due to pollution. Centex AWWA supports the positions of the cities, including the need for numerical limits to improve the TMDL.	TNRCC acknowledges the concern expressed, and notes the expression of concurrence with city positions (addressed elsewhere in this document). See Section II of Introduction to TNRCC Response to Comments.
12/15/00	Rangeland Consultants Inc. (written)	Phosphorus is essential to all life forms, and has no known direct toxic effects on humans or animals.	True. TNRCC has never said or contended otherwise, although many verbal comments seem to indicate confusion about this issue. The TMDLs do not presume any toxic or health effects on humans or animals due to phosphorus.
10/23/00	County Judge, McLennan Co. (verbal)	A definite solution to water quality problems, that all can agree upon, is needed. Some compromise may be needed.	The Commission agrees that the water quality problems in the North Bosque watershed must be addressed and solved. These TMDLs are the first of two steps needed to restore water quality in the North Bosque; the second step is development of the implementation plan.
11/28/00	Mayor of Meridian (written)	Meridian agrees that development of a TMDL is absolutely necessary to protect the North Bosque River, and the city wants to assist in a fair and equitable manner.	The TNRCC agrees, and appreciates the City's offer of assistance.
12/15/00	City of Waco (written)	Since Lake Waco is the receiving reservoir for loadings from the listed North Bosque River segments, the TMDL should expressly consider the effect on Lake Waco of targeted reductions of loading to the River, and provide documentation that the proposed actions to reduce nutrient loading will also improve or protect water quality in 'downstream water bodies.'	TMDLs address segments on the 303(d) list. There is no requirement to document effects outside the TMDL watershed. There is no scientifically verified linkage that would assure nutrient reductions would improve taste and odor.
11/09/00	Texas Parks and Wildlife Department (written)	Many types of wildlife depend on the Bosque River. Aquatic life can be stressed by nutrient loading. Fish kills and pollution complaints have increased since 1974 and "are related to growth of the dairy industry... "	These are among the factors that led to development of the TMDLs for the North Bosque River watershed.
10/30/00	concerned citizen (written)	Writer states that Lake Waco water tastes very bad, but that the causes are complex, at least partly natural, and involve multiple sources. Blaming dairies as the sole cause is just local politics.	See Section II of Introduction to TNRCC Response to Comments.

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12/15/00	National Wildlife Federation (written)	NWF respectfully requests that the TNRCC step back and re-evaluate the approach to TMDLs illustrated by this document. TMDLs should provide sufficient information to inspire confidence that goals of the Clean Water Act will be achieved. This document does not pass that basic test.	TNRCC believes that it is now more important to move forward on the Bosque River issues than to reconsider the TMDL process. The implementation plan will provide confidence that goals of the CWA will be achieved.
11/09/00	Texas Parks and Wildlife Department (written)	The scope of the TMDLs is too narrow, and should address nutrient impacts in Lake Waco.	TMDLs address segments on the 303(d) list. Exclusion of Lake Waco from the TMDL was a policy decision. The TNRCC believes that nutrient reductions by these TMDLs may help the Lake Waco situation, and cannot hurt, but nutrients are secondary or tertiary contributors to the problem and there can be no guarantee made regarding taste and odor results.
III. Technical Issues			
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	The problem definition is flawed - To the extent that any exists, the TMDL lacks adequate peer review.	See Section III of Introduction to TNRCC Response to Comments.
10/23/00	Brazos River Authority (verbal)	The N Bosque R TMDLs should advance sound numerical standards.	See Section III of Introduction to TNRCC Response to Comments.
10/23/00	Mayor of Woodway, speaking for the "community of cities" (verbal)	The TMDL standard needs to be numeric and objective, not narrative or subjective.	See Section III of Introduction to TNRCC Response to Comments.
10/23/00	Brazos River Authority (verbal)	Narrative standards in TMDLs are subjective, elusive, and nonquantifiable. Numeric standards would set a scientific benchmark from which to measure success and remove subjectivity. BRA recommends numeric standards for the TMDLs.	See Section III of Introduction to TNRCC Response to Comments.

Date Rcd.	Source	Summary of Request or Comment	Summary of TNRCC Action or Explanation
10/30/00	concerned citizen, Chair of Waco Chamber of Commerce, speaking for business community (letter)	TNRCC should identify a quantifiable measurement for demonstrating compliance with the TMDL and attainment of water quality goals.	See Section III of Introduction to TNRCC Response to Comments.
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	The problem definition is flawed - The model is based on Lake Waco, not the Bosque River; therefore, the endpoint is wrong and there is no margin of safety.	The SWAT model simulated the Bosque River watershed, and does not include Lake Waco. The TMDLs are based on the SWAT watershed model.
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	The problem definition is flawed - The TMDL does not determine the scientifically appropriate maximum daily load, but instead is based on an arbitrarily set load/target and contains assumptions about loading allocations, sources, linkage and implementation plans.	See Section III of Introduction to TNRCC Response to Comments.
10/23/00 11/20/00	Director of Utilities, City of Temple (verbal) Mayor of Temple (written)	Temple strongly recommends a quantitative numerical standard for protecting the rivers, instead of the narrative standard contained in the draft TMDL. “This will allow a clear and precise standard as opposed to one open to various interpretations.”	See Section III of Introduction to TNRCC Response to Comments.
10/23/00	concerned citizen (verbal)	Speaker alluded to the scientific difficulty and uncertainty associated with assigning fixed numeric standards for nutrients, and to recent Congressional action to divert TMDL funds to research to address such issues. He stated that the BRAC and TNRCC “struggled under very adverse circumstances to do the very best job that could be done”. He then stated that the TMDL goal of 50% reduction, “regardless of any increase in numbers, people or cattle,” is numeric and is the best that can be done.	TNRCC acknowledges this statement of support.
12/04/00	Mayor of Woodway (written)	Woodway is concerned about reliance on subjective narrative nutrient standards for the TMDL, and encourages establishment of a numerical standard to insure the TMDL can be sufficiently monitored and enforced.	See Section III of Introduction to TNRCC Response to Comments.

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12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	The problem definition is flawed - No impairment caused by phosphorus has been identified. The TMDL "will only 'potentially' solve a purely aesthetic appearance of algae blooms in the Bosque River during the six or seven times a year in which the river flows."	See Section III of Introduction to TNRCC Response to Comments.
12/15/00	City of Waco (written)	The soluble phosphorus criterion of 30 ppb selected by the BRAC is more justifiable than a 50 ppb target that resulted from simulations of BMPs acceptable to the dairy industry.	See Section III of Introduction to TNRCC Response to Comments.
10/23/00	President, Texas Association of Dairymen (verbal)	Based on previous meetings with or involving TNRCC, TAD had the understanding that the TMDLs would be based on percentage reductions in loading rather than instream concentrations of phosphorus. However, the published draft TMDLs appear to set an instream target of 30 parts per million (Note: transcript says million, but he may have said billion). TAD requests that TNRCC clarify that the TMDLs require percent reductions in loading rather than setting a target level for instream concentrations.	See Section III of Introduction to TNRCC Response to Comments.
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	The SWAT model "sets a stream concentration of 30 ppb below Meridian" as the TMDL target, despite any statements contained in the TMDL document. That is not a reasonable or attainable target.	See Section III of Introduction to TNRCC Response to Comments.
12/15/00	Rangeland Consultants Inc. (written)	Scientific literature, and data from natural pristine streams, indicate that background concentrations of phosphorus vary widely (i.e. 0 to 1480 ppb), and often approximate 30 ppb as a long term average. Therefore, 30 ppb seems to be an arbitrary value for an instream target, and was not derived from scientific peer-reviewed research.	It is true that natural nutrient concentrations often vary widely in space and time, and that natural waters often have sufficient nutrients to support algal blooms. However, goals for the North Bosque River TMDLs were developed from watershed-specific data and analyses; and, the TMDL goals do not include any fixed concentration target, of 30 ppb or any other, as is presumed by this comment.

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12/15/00	National Wildlife Federation (written)	Numeric criteria are needed for several nutrient species and response parameters as well as phosphorus in order to assess attainment of water quality standards. Based on the draft Yr2000 303(d) List, additional parameters should be addressed by the TMDLs.	TMDLs for other parameters listed on the 303(d) List will be initiated by TNRCC. See Section III of Introduction to TNRCC Response to Comments.
11/09/00	Texas Parks and Wildlife Department (written)	The original preliminary concentration target range of 15 to 50 µg/L soluble phosphorus is reasonable for the North Bosque River system.	That preliminary target range was the general (but not unanimous) consensus of technical and public participants in the data analyses.
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	Jurisdictional issue - The TMDLs exceed Commission jurisdiction because a TMDL is inappropriate for phosphorus in this case. –First, EPA's list published under 33 U.S.C. §1314(a)(2) does not set forth a numeric criteria for phosphorus. TNRCC's standards for phosphorus are also narrative, and by definition are not suitable for calculation. –Second, science does not show that phosphorus is suitable for calculation. –Third, TNRCC has made unsupported assumptions that dairies and other industries have produced nutrients that have caused excessive growth of aquatic vegetation which impairs an existing, attainable, or designated use.	1) A great deal of science, from this project and others, shows that phosphorus loading and concentrations can be calculated. 2) Water quality data from the North Bosque River watershed has identified existing or potential impairments within the watershed, and also quantified the contributions of various sources. 3) See Section III of Introduction to TNRCC Response to Comments.
12/15/00	Brazos River Authority (written)	The TMDLs are not quantitative enough. Definitive numeric standards are needed to measure success of the TMDLs.	See Section III of Introduction to TNRCC Response to Comments.
12/15/00	City of Waco (written)	Figures 4-8 of the draft TMDL indicate that the North Bosque R will not achieve the 30 ppb BRAC target anywhere, and will not achieve the 50 ppb TNRCC target at the majority of river sites.	The figures use model output to illustrate the magnitude of change anticipated from one feasible set of management practices. The TMDL targets are not likely to be single values at any site, nor identical between sites.
12/15/00	City of Waco (written)	The TNRCC should set numerical criteria for phosphorus concentrations in the North Bosque River segments, instead of using the narrative nature of the standard to justify an indefinite endpoint.	See Section III of Introduction to TNRCC Response to Comments.

Date Rcd.	Source	Summary of Request or Comment	Summary of TNRCC Action or Explanation
11/28/00	Mayor of Meridian (written)	Meridian believes that a numeric standard is necessary, not just a percentage reduction. The 50% reduction goal puts an undue burden on WWTPs. In setting a percentage reduction, TNRCC also needs to verify if that is percentage of present or percentage of future production.	The percent reduction target is not related to production of anything, but to the amount of loading observed at points in the North Bosque River. The reduction is calculated relative to current river transport. See Section III of Introduction to Response to Comments.
10/23/00	Mayor of Waco (verbal)	Annual average values are not adequate as targets. "Daily" limits that will affect or limit effects of individual storm events are needed.	See Section III of Introduction to TNRCC Response to Comments.
12/15/00	National Wildlife Federation (written)	TMDLs must ensure compliance with water quality standards during all years, at all times during all years, including during critical conditions. These TMDLs do not even assess seasonal compliance.	This comment does not consider the ecological realities of nutrient issues. Attempting to address such concerns in great detail would only prevent any real progress while more analyses are done.
10/23/00	Mayor of Waco (verbal)	Numeric standards should be established for the TMDL, not subjective, vague narrative criteria. Numeric standards would be more protective, more clear, and easier to implement.	Application of numeric criteria for assessing TMDL success will be considered during development of the implementation plan. See Section III of Introduction to TNRCC Response to Comments.
10/25/00	concerned citizen (written)	North Bosque River has become more polluted due to dairy growth. Pollution has reduced fish populations in the river. No nutrient should be put in the river.	The TMDLs are attempting to address these general concerns.
11/28/00	Mayor of Meridian (written)	City WWTPs should not be considered a major controllable source. WWTPs contribute only 10% of the loading. Load reductions should be assigned to the primary contributor, CAFOs, which contribute five times as much loading as WWTPs.	There are three regulated sources in the watershed: CAFOs, WWTPs, and urban runoff. The TMDLs recognize the relative contributions by sources, and allocates reductions proportionately.
11/20/00	Mayor of Clifton (written)	Rural sources provide approximately 80% of phosphorus loading in the North Bosque River watershed, while urban sources (WWTPs and urban runoff) provide approximately 20%. WWTPs should not be labeled or considered "major sources" in comparison to dairy waste application fields. Other rural sources like cropland or pastures are controllable if regulatory agency decides they are.	The TMDLs recognize the relatively small contribution by urban sources, and allocates reductions proportionately.

Date Rcd.	Source	Summary of Request or Comment	Summary of TNRCC Action or Explanation
12/15/00	National Wildlife Federation (written)	Discharges from CAFO lagoons do not appear to be included or characterized as point sources.	Discharges from CAFO lagoons were not specifically modeled. Discharges under extreme weather conditions authorized by permits are too rare and unpredictable for large scale modeling. Discharges under normal conditions are permit violations, most appropriately dealt with via enforcement programs.
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	Other Legal Authority - The TMDLs may not have used quality assured data as required by Texas Water Code.	Data from TNRCC, TIAER, or the Brazos River Authority were collected under quality assurance plans.
12/15/00	City of Waco (written)	By a wide margin, the single most significant source of phosphorus in the watershed is runoff from WAFs, and it is difficult to understand why the TMDL would conclude that a 50% reduction in both point and nonpoint sources is necessary.	See Section III of Introduction to TNRCC Response to Comments.
12/15/00	City of Waco (written)	TIAER studies indicate that the export coefficients for phosphorus associated with dairy WAFs are much larger than for any other source in the watershed.	True, and that is reflected in the TMDL document information regarding sources of phosphorus loading.
12/15/00	City of Waco (written)	The loading from WAFs are two to five times greater than the loading percentages contributed by the wastewater treatment plants.	That is how the TMDL information portrays the situation.
12/15/00	Rangeland Consultants Inc. (written)	Experimental application of municipal biosolids has increased rainfall infiltration and decreased surface runoff from application areas. A rhetorical question then seems to imply that there may be little if any surface runoff from WAFs in the Bosque watershed, due to extensive application of similar biosolids.	Certainly biosolids can improve soil characteristics when correctly and carefully applied. Experimental applications are often more carefully managed than operational waste management applications. Surface runoff from Bosque WAFs does occur; in addition, phosphorus can be exported via subsurface flow.

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12/15/00	National Wildlife Federation (written)	The TMDLs contain no appropriate margin of safety. NWF does not accept the margin of safety claimed in the document.	The TNRCC believes that the discussion of margin of safety in the TMDL document is pertinent to the model prediction that significant reductions in net phosphorus loading can be achieved through management measures and control actions known to be effective. See Section III of Introduction to TNRCC Response to Comments.
12/15/00	National Wildlife Federation (written)	Phosphorus concentrations predicted by model simulations "...often would exceed the point of limiting algal growth," which is not sufficient to demonstrate compliance with water quality standards.	As pointed out by other commentors, pristine natural waters often exceed nutrient concentrations that would limit algal growth. Water quality standards do not prohibit the growth of algae, but indicate that it should not be excessive due to human sources.
10/23/00	concerned citizen, on behalf of the Water Quality Task Force of the Greater Waco Chamber of Commerce (verbal and written)	Water is one of the most important resources in the region or state. We are already behind the curve in protecting water quality, and this TMDL will be the basis for future protection of the water resource. It is essential that the TMDL be technically sound.	The TNRCC believes that the TMDL is technically sound. It is based on large amounts of watershed-specific data, extensive analyses, and numerous model simulations.
12/15/00	City of Waco (written)	The referenced modeling does not achieve the targeted loading and instream concentration reductions for the 'future' even when permits are frozen at mid-90s herd sizes and WAF acreage. What the TNRCC modeled as 'future' in this draft TMDL bears no resemblance to the future that is actually being allowed to develop on the North Bosque River. Therefore, the model results can be interpreted, at best, to indicate that conditions in the river will remain close to existing impaired conditions as development in the watershed continues.	The TNRCC does not agree with this interpretation. The model prediction figures indicate that post-TMDL concentrations "will equal or exceed" existing (as predicted by the model) concentrations at two of five sites and on rare occasion. Furthermore, the "equal or exceed" condition is only predicted to occur when the concentrations are within the acceptable target range developed from watershed analyses, at sites that are generally not exceeding the target range today. Review of the numeric model output also indicates that, on the average, there will be significant reductions in phosphorus concentrations from current levels to those predicted at full-growth permitted levels.

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12/15/00	City of Waco (written)	Even the "existing" model scenario was based on cow numbers and WAF acreage not representative of the increases allowed by TNRCC since the mid-90s.	All long-term model analyses or planning require an initial reference time, and cannot be constantly revised to include "today's" data. Simulations used the most current and reliable data available when the model scenarios were developed.
12/15/00	City of Waco (written)	It is likely that the model greatly underpredicts phosphorus loads in the watershed during high flow events.	See Section III of Introduction to Response to Comments.
12/15/00	City of Waco (written)	There is no justification for the claim that the modeling results are 'environmentally conservative.'	One reason is that WWTP discharges are over-estimated by using anticipated permit limits in-stead of realistically probable flows or loading – which is required by federal TMDL guidance.
12/15/00	Rangeland Consultants Inc. (written)	"Significant" stormflow events occur a small percentage of the time in the North Bosque River. Nonpoint source loading only affects the river during those short rare periods.	Long distance transport of runoff loading may only occur during such "significant" events, but the TMDL must also protect the tributary streams and PL566 reservoirs that do receive loading from even minor rainfall runoff events.
12/15/00	City of Waco (written)	There appears to be no justification for the claim that thorough analysis and peer review contributed to minimization of the uncertainty in the conclusions.	There is little uncertainty that instream loading and concentrations can be significantly reduced via a feasible implementation plan, which is the stated goal of the TMDLs. There is more uncer-tainty about how algae mass or growth rates will respond to those reductions, but that is always the case, and those are not TMDL targets.
12/15/00	Rangeland Consultants Inc. (written)	The linkage between land-based management of phosphorus sources and phosphorus impact areas is typically not simple and direct. Removing 50% of biosolids from the North Bosque watershed is not likely to reduce phosphorus loading by 50%.	TNRCC agrees that these linkages are not simple and direct. This is one reason that complex mod-els are used to assess such linkages.
12/15/00	Rangeland Consultants Inc. (written)	The SWAT model of the North Bosque watershed does not have adequate spatial resolution to provide detailed management plans for each specific land use or individual site.	True, but such resolution is not needed at this time. More detailed modeling may be developed, if needed, to support the implementation plan.

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12/15/00	Michael Sullivan and Associates, Inc., submitted on behalf of the Texas Association of Dairymen (written)	The SWAT model is unsuitable for TMDLs due to its use of the Curve Number method, the Universal Soil Loss Equation, and simplified instream phosphorus decay kinetics. A model review report (Ward and Benaman 1999) is cited as supporting this contention.	The Ward & Benaman report does NOT indict the SWAT model on these issues. The model was calibrated, in part, by adjusting the curve numbers and USLE cover factor. Those adjustments were not improper "stretching" of the model, but represent appropriate calibration of empirical equations. The phosphorus decay kinetics used in SWAT were not as simple as described by the commentors, and while not the most complex possible, did improve simulation of assimilation in the stream channels.
12/15/00	Michael Sullivan and Associates, Inc., submitted on behalf of the Texas Association of Dairymen (written)	Calibration and verification of the SWAT model were inadequate.	TNRCC believes that the SWAT model was adequately and correctly calibrated and verified by skilled users with first-hand knowledge of the Bosque River watershed, with adequate review by the Technical Work Group. See Section III of Introduction to Response to Comments.
12/15/00	Michael Sullivan and Associates, Inc., submitted on behalf of the Texas Association of Dairymen (written)	The SWAT model does not specifically simulate 40 PL566 reservoirs, which may trap initial loading from storm events and thus ameliorate dairy and WAF impacts to a greater extent than the model predicted.	The scale of the modeling effort made it infeasible to simulate the watershed at that level of detail. However, the presence, effect, and water quality in those PL566 reservoirs was addressed by parallel studies and modeling efforts, and has been considered by TNRCC staff.
12/15/00	Michael Sullivan and Associates, Inc., submitted on behalf of the Texas Association of Dairymen (written)	The North Bosque River can be affected by stormwater loading only 6 to 17 days per year, so nonpoint source controls are not needed.	TNRCC is required to identify and quantify all sources - point and nonpoint - of pollutant loading contributing to an impairment as part of a TMDL Available data clearly indicates both point and nonpoint source pollution contribute to impairment in the North Bosque River. To restore water quality, management measures will be targeted throughout the watershed at specific, controllable sources of phosphorus loading.

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12/15/00	Michael Sullivan and Associates, Inc., submitted on behalf of the Texas Association of Dairymen (written)	The nonpoint source loading only affects Lake Waco.	TNRCC is required to identify and quantify all sources - point and nonpoint - of pollutant loading contributing to an impairment as part of a TMDL Available data clearly indicates both point and nonpoint source pollution contribute to impairment in the North Bosque River. To restore water quality, management measures will be targeted throughout the watershed at specific, controllable sources of phosphorus loading.
12/15/00	Michael Sullivan and Associates, Inc., submitted on behalf of the Texas Association of Dairymen (written)	Imposing additional management practices on dairies will not result in reducing nuisance algae blooms in the Bosque River.	Imposing additional nutrient management practices on dairies may not reduce algae blooms, since the linkage between BMPs and stream condition is seldom simple or direct (ref Rangeland Consultants, Inc.), and indirect effects on algae mass are notoriously difficult to predict. That is a reason to structure a flexible implementation plan to allow for additional phases as needed to achieve the TMDL targets.
12/04/00	Mayor of Woodway (written)	Woodway urges TNRCC "to consider appropriate peer review."	TNRCC has sought appropriate peer review throughout the TMDL development process, and has extended the comment period to allow several parties to perform additional review.
12/15/00	City of Waco (written)	Even though TNRCC is continuing to authorize expansion of the dairy herd size and WAF acreage, the "future" modeling scenario assumed that CAFO permits would be frozen at mid-90s numbers, herd size, and WAF acreage.	All long-term model analyses or planning require an initial reference time, and cannot be constantly revised to include "today's" data. Simulations used the most current and reliable data available when the model scenarios were developed.
12/15/00	City of Waco (written)	SWAT calibration was poor for high flow periods, when WAF loading would be largest; therefore, loads attributable to WAFs may be much larger that simulated with the model.	See Section III of Introduction to Response to Comments.
10/23/00	President, Texas Association of Dairymen (verbal)	TAD requests that TNRCC "do everything possible to ensure that the data and watershed models upon which the TMDLs rely are accurate." If not accurate, the analyses could have an unwarranted effect on the dairy industry.	See Section III of Introduction to Response to Comments.

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10/23/00	Brazos River Authority (verbal)	The watershed model requires additional review. BRA staff have reservations about details of how waste application fields were simulated and the amount of storm water data used in calibration of the model.	See Section III of Introduction to Response to Comments.
10/23/00	Brazos River Authority (verbal)	TNRCC staff should continue to allow for in-depth scientific peer review of the TMDL model itself. BRA recommends "the TNRCC should give reconsideration to this TMDL process."	TNRCC believes that these issues have been addressed using the best available science and tools. Stopping progress towards TMDL adoption and implementation in order to reconsider matters that have already been subject to extensive analyses, peer review, and coordination would only slow the improvement of water quality. TNRCC believes that the better course is to implement these TMDLs as expeditiously as possible, and provide for adjustment or correction as needed if progress towards water quality goals is not sufficient. See Section III of Introduction to Response to Comments.
12/15/00	City of Waco (written)	Despite evidence that soil phosphorus concentrations at many dairy WAFs far exceed 200 ppm, no effort apparently was made to model the contributions from these many overloaded fields.	See Section III of Introduction to Response to Comments.
12/15/00	City of Waco (written)	Although information was presented that phosphorus export coefficients are higher for WAFs receiving liquid wastes than for solid wastes, there is no indication that SWAT simulated application of liquid wastes.	SWAT did not explicitly simulate application of liquid manure, but did increase the quantity of dry manure applied by a commensurate amount.
12/15/00	City of Waco (written)	SWAT modeling ignored subsurface and surface return flows from WAFs under baseflow conditions, resulting in their effects apparently erroneously being attributed to the municipal wastewater treatment plants.	Simulations of subsurface flows using a more detailed model of smaller areas predicted that subsurface export would be a small percentage of the overall phosphorus export budget. Regardless of how seepage from WAFs was depicted in the model, there was no such erroneous attribution regarding WWTPs.

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12/15/00	City of Waco (written)	The draft TMDL presents no information regarding how the SWAT model was calibrated or verified, and no details on the simulation of WAFs within the SWAT model.	Information of this type was discussed at technical work group meetings, which were open to all interested parties. Papers describing the North Bosque model development will soon be published in technical journals.
10/23/00	Mayor of Stephenville (verbal at hearing; hard copy received 11/27/00)	If the goal is to return the Bosque River to acceptable water quality, then the scientific data does not support the imposition of a TMDL of 1 mg/L on WWTPs.	See Section III and IV of Introduction to Response to Comments.
12/15/00	City of Waco (written)	The model should be run to determine the assimilative capacity of the North Bosque River such that instream targets are met; it should not focus on which specific BMPs may or may not be acceptable.	The model was used to predict the effects of various BMPs. Selection of BMPs for the implementation plan will be based on their effectiveness.
10/23/00	Brazos River Authority (verbal)	The TMDL figures for phosphorus concentration indicate that future concentrations with the TMDL in place "will equal or exceed the soluble phosphorus levels now existing without a TMDL in place." This is inconsistent with the goal of the TMDLs.	The model prediction figures indicate that post-TMDL concentrations "will equal or exceed" existing (as predicted by the model) concentrations at two of five sites and on rare occasion. Furthermore, the "equal or exceed" condition is only predicted to occur when the concentrations are within the acceptable target range developed from watershed analyses, at sites that are generally not exceeding the target range today. Review of the numeric model output also indicates that, on the average, there will be significant reductions in phosphorus concentrations from current levels to those predicted at full-growth permitted levels.
10/23/00	Brazos River Authority (verbal)	BRA endorses a watershed approach for addressing pollutant effects as capable of providing sound science-based regulation.	TNRCC agrees, and is using a watershed approach for this and all other TMDL projects.
12/15/00	City of Waco (written)	The TMDL does not establish allowable pollutant loadings distributed among source categories as required by law.	See Section III of Introduction to Response to Comments.

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12/04/00	Mayor of Woodway (written)	The proposed use of average annual values to determine improvements is less preferable than a daily average or grab sample value. The latter method would identify potential problems immediately so that solutions could be initiated more timely.	See Section III of Introduction to Response to Comments.
10/23/00	Mayor of Bellmead (verbal)	The TMDL should control maximum daily load, instead of or as well as average daily load, similar to wastewater treatment plant permits. This is necessary to control the effects of individual storm events. Recovery of the lake from a large storm event that has significant ecological impact may take years.	See Section III of Introduction to Response to Comments.
10/23/00	Mayor of Woodway, speaking for the "community of cities" (verbal)	Both the TMDL and CAFO permits should specify maximum limits on a daily basis for each individual facility. Maximum limits should not be based on annual averages.	See Section III of Introduction to Response to Comments.
IV. Implementation Issues			
12/15/00	Brazos River Authority (written)	The 50% reduction target stated in the TMDLs will not and can not be attained due to anticipated growth in the North Bosque River watershed.	This comment seems to be based on several presumptions concerning the nature of the implementation plan, which is yet to be defined.
10/23/00	concerned citizen (verbal)	CAFOs and dairies must take responsibility for their waste management and their own ecological management. His generation and city are "tired of paying for a mess that is being made 100 miles northwest of us."	All permittees and regulated entities will be held responsible for their waste management. See Section IV of Introduction to Response to Comments.
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	The problem definition is flawed - The TMDL document does not contain a plan to assess the results of the TMDL.	See Section IV of Introduction to Response to Comments.
10/23/00 11/20/00	Director of Utilities, City of Temple (verbal) Mayor of Temple (written)	Temple supports "voluntary compliance by the dairy industry which results in substantive and measurable results."	The TNRCC acknowledges the support, and will address voluntary compliance during development of the implementation plan.

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11/29/00	Two Rivers Sierra Club (written)	Healthy rivers are a birth-right of all Texans. The health of the North Bosque River is important to the quality of life and economic welfare of the region. No industry or group has a right to compromise quality of life or economic health by polluting public resources. The Club urges TNRCC to take actions of sufficient strength and scope to insure that the North Bosque River will become a healthy and thriving river as soon as possible.	See Section IV of Introduction to Response to Comments.
10/23/00	Mayor of Waco (verbal)	The load allocation must be equitable, and reductions should be proportionate to sources. The sources causing pollution must be held accountable and made to stop.	TNRCC believes that the TMDLs and implementation plan will be equitable, will require reductions proportionate to source, and that sources will be held accountable. See Section IV of Introduction to Response to Comments.
12/15/00	Brazos River Authority (written)	The TNRCC may wish to explore the possibility of forming an "executive committee" composed of watershed-based stakeholders to oversee implementation of the TMDLs.	As the implementation plan is developed, this possibility will be explored. The Brazos River Authority is likely to be included, among other stakeholders, if such a committee is formed, and may be considered for monitoring or other duties also.
10/23/00	Mayor of Waco (verbal)	TNRCC must assure that voluntary measures will be adequately implemented with genuine accountability. Third-party measurement or verification of voluntary measures/compliance is needed.	See Section IV of Introduction to Response to Comments.
10/30/00	concerned citizen, Chair of Waco Chamber of Commerce, speaking for business community (letter)	Voluntary measures under the TMDL should be measured for accountability, and enforced if offenders do not comply with the standard.	See Section IV of Introduction to Response to Comments.
12/15/00	National Wildlife Federation (written)	The TMDLs must provide load allocations specific enough to determine if individual permits can be authorized, now and in the future. These TMDLs do not.	See Section IV of Introduction to Response to Comments.

Date Rcd.	Source	Summary of Request or Comment	Summary of TNRCC Action or Explanation
10/23/00 11/20/00	Director of Utilities, City of Temple (verbal) Mayor of Temple (written)	Temple endorses the plan for regional manure composting facilities outlined by TNRCC.	The TNRCC acknowledges the endorsement.
11/29/00	Two Rivers Sierra Club (written)	There are multiple sources of pollution in the watershed, and all should be reasonably and appropriately monitored and regulated. However, CAFOs are clearly the principle source in the watershed, and should be required to take whatever steps are necessary to reduce pollution, including limiting herd density, hauling away wastes, participating in manure recycling programs, funding wetland projects, etc.	The TNRCC intends that sources of pollution take appropriate responsibility for, and actions to control, their pollution. See Section IV of Introduction to Response to Comments.
11/29/00	Two Rivers Sierra Club (written)	Any reasonable implementation plan should have specific goals within a reasonable time frame, with monitoring, public access to data, and periodic assessments of TMDL effectiveness. Whatever the specifics of the implementation plan are, TNRCC should allow adequate time for public comment.	See Section IV of Introduction to Response to Comments.
10/23/00	concerned citizen, on behalf of the Water Quality Task Force of the Greater Waco Chamber of Commerce (verbal and written)	It is essential that the TMDL and any regulations or rules based on it be developed and put into effect as rapidly as possible.	The TNRCC intends to implement the TMDL as soon as possible. See Section IV of Introduction to Response to Comments.
10/23/00	President, Texas Association of Dairymen (verbal)	TAD supports development of the incentive program for manure composting. The dairy industry looks forward to helping successfully implement that program on a voluntary basis.	TNRCC acknowledges this statement of support for the composting program, and welcomes the support of the dairy industry in implementing that program for the benefit of water quality.
10/23/00	President, Texas Association of Dairymen (verbal)	The dairy farmers of the North Bosque River watersheds are ready and able to implement economically viable measures to improve water quality. However, they support doing so only if the measures are based on both sound science and sound economics.	TNRCC intends that the TMDLs and implementation plan are based on sound science and will consider the most cost-effective solutions.

Date Rcd.	Source	Summary of Request or Comment	Summary of TNRCC Action or Explanation
10/30/00	concerned citizen (written)	Writer suggests that TNRCC should discourage the practice of water flushing of livestock waste to holding lagoons, and should consider phasing out lagoons and sprayfields as in North Carolina	See Section IV of Introduction to Response to Comments.
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	The TMDL is premature - It fails to consider new regulatory measures, manure composting, and other BMPs and fails to use current data.	All long-term model analyses or planning require an initial reference time, and cannot be constantly revised to include "today's" data. The implementation plan will consider new regulatory measures, composting, and other BMPs.
11/09/00	Texas Parks and Wildlife Department (written)	The TMDLs cannot be evaluated without information concerning management measures that will achieve the allocation.	See Section IV of Introduction to Response to Comments.
11/20/00	Mayor of Clifton (written)	Freezing or capping city WWTP loading at current levels is inappropriate, as it would reward existing poor performers and sets up a situation where future growth in cities could not be accommodated.	Management measures and control actions needed from municipal wastewater treatment plants necessary to achieve water quality standards will be developed as part of the implementation plan. Such measures and actions are not limited to freezing or capping phosphorus loading at current levels. Alternatives to achieve the overall reduction of phosphorus loading will be evaluated with the assistance of stakeholders. The achievement of sufficient reduction to allow future growth may ultimately depend on more efficient or new technology. See Section IV of Introduction to Response to Comments.
11/09/00	Texas Parks and Wildlife Department (written)	TMDL allocations and implementation plans should not be separated. This is a significant departure from TNRCC Guidance. This strategy may create problems if, for example, elements of the TMDL need to be changed based on practical issues encountered during the implementation process.	The TNRCC Guidance document describes itself as subject to change as policies or procedures evolve. Some adjustments to address "practical issues encountered during the implementation process" may be made through adaptive management. See Section IV of Introduction to Response to Comments.

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11/09/00	Texas Parks and Wildlife Department (written)	There is uncertainty regarding model predictions. A thorough monitoring plan must be part of the implementation plan to assure success.	A monitoring plan and evaluation criteria will be included in the implementation plan. See Section IV of Introduction to Response to Comments.
10/23/00	concerned citizen (verbal)	At his property on the N Bosque R, his family has been concerned about water quality for several years, and have noticed a "sharp decline" in game fish in the river. Also, contact recreation use of the river has been curtailed in recent years because of pollution. Information from TNRCC indicates that CAFOs are responsible for the pollution. The cause of that pollution must be stopped, and the N Bosque R returned to its former condition.	TNRCC expects that implementation of the TMDL will significantly reduce nutrient-related pollution in the North Bosque River.
11/20/00	Mayor of Clifton (written)	The writer requests an opportunity to comment on implementation rules at the appropriate time.	See Section IV of Introduction to Response to Comments.
10/23/00	Mayor of Stephenville (verbal at hearing; hard copy received 11/27/00)	A 1 mg/L phosphorus limit for the Stephenville WWTP would be a severe economic burden on the city ($90,000 per year for a city of 15,000 residents) but would not solve the North Bosque River problems. This management measure should NOT be required. Make 1 mg/L the goal, not the requirement, otherwise there may be compliance problems and sanctions on the City WWTP. If such a limit must be imposed, please condition it to allow for operational variability of WWTPs.	The implementation plan is not yet defined, but may require a 1 mg/L phosphorus limit for Stephenville. Permit limits normally do allow for operational variability within reasonable bounds.
V. Permitting Issues			
10/23/00	concerned citizen (verbal)	Speaker expressed general dismay that additional dairy cattle are authorized by existing permits in the N Bosque R watershed.	TNRCC intends to regulate pollution, not production units. The goal of the TMDLs is to reduce pollution regardless of the number of dairy cattle present. See Section V of Introduction to TNRCC Response to Comments.
12/15/00	National Wildlife Federation (written)	New or expanded permits that cause or contribute to impairments are prohibited by federal law until a TMDL has been developed.	The TNRCC is considering options for addressing pre-TMDL permit increases. See Section V of Introduction to TNRCC Response to Comments.

Date Rcd.	Source	Summary of Request or Comment	Summary of TNRCC Action or Explanation
11/20/00	Mayor of Clifton (written)	Permits to expand dairy herd size have been issued by TNRCC during the same period when urban WWTP expansion has been limited due to the TMDL project. This was done with the knowledge that there are insufficient safeguards to prohibit excess phosphorus runoff, and is contrary to the purpose of the TMDL. There is little evidence that TNRCC has implemented Section 26.027(a) of the Texas Water Code in a manner that is responsible to the environment. The issuance of permits to increase the number of dairy cattle in the watershed should be immediately discontinued, unless such authorizations require that all manure generated by the increase be hauled out of the watershed.	The TNRCC is considering options for addressing pre-TMDL permit increases. See Section V of Introduction to TNRCC Response to Comments.
10/23/00 11/20/00	Director of Utilities, City of Temple (verbal) Mayor of Temple (written)	The size of dairy herds in Erath, Comanche, and Hamilton Counties must be controlled, including an upper limit on the total number. TMDL reductions will mean nothing if herd increases counteract them.	The TNRCC is considering options for addressing pre-TMDL permit increases. See Section V of Introduction to TNRCC Response to Comments.
11/28/00	Mayor of Meridian (written)	Meridian is concerned that TNRCC has continued to permit expanded CAFO herds, with knowledge that there are insufficient safeguards to prohibit excess phosphorus runoff. This shows disregard for the TMDL goal of improving water quality. Meridian asks that CAFO regulations in the Texas Water Code be enforced, and that issuance of permits that increase the overall dairy herd in the watershed be immediately discontinued unless such authorizations require that all manure generated by the increase be hauled out of the watershed.	The TNRCC is considering options for addressing pre-TMDL permit increases. See Section V of Introduction to TNRCC Response to Comments.
10/30/00	concerned citizen, Chair of Waco Chamber of Commerce, speaking for business community (letter)	TNRCC should immediately freeze dairy permit issuance, and urge the current dairy owners to limit their herd size.	The TNRCC is considering options for addressing pre-TMDL permit increases. See Section V of Introduction to TNRCC Response to Comments.

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10/23/00	Mayor of Waco (verbal)	The number of dairy cows allowed in the watershed should be capped or limited. If TNRCC continues to issue permits, the benchmark changes in the model. Residents of Waco pay costs for water treatment because of the cows, and we have taste and odor problems directly related to the number of cows in the watershed. No increases should be authorized before the TMDL implementation plan is completed.	TNRCC is considering options for addressing pre-TMDL permit increases. See Section V of Introduction to TNRCC Response to Comments.
VI. Enforcement Issues			
10/23/00	Mayor of Woodway, speaking for the "community of cities" (verbal)	There is no inventory or data on the existing waste application fields. Existing standards should be enforced to eliminate problems.	See Section VI of Introduction to TNRCC Response to Comments.
10/23/00	Mayor of Waco (verbal)	The lack of information or data concerning soil concentrations of phosphorus in waste application fields "signals" that TNRCC is "not going to deal with the waste application fields in an implementation plan."	More data concerning soil concentrations in WAFs is being collected. TNRCC will address WAFs in the implementation plan.
10/23/00	Mayor of Woodway, speaking for the "community of cities" (verbal)	CAFOs are not a natural land use, but are industrial facilities. CAFOs must be regulated like all other types of industrial facilities that produce pollution. CAFOs must be held accountable for cleaning up the pollution they create. The cities that comprise the community of cities in McLennan County unanimously support the position of the City of Waco in this matter.	CAFOs are and will continue to be regulated like industrial facilities.
10/23/00	concerned citizen, on behalf of the Water Quality Task Force of the Greater Waco Chamber of Commerce (verbal and written)	It is essential that the adopted rules and regulations be fairly and uniformly, but vigorously, applied and enforced across the board.	The TNRCC intends to implement the TMDL as soon as possible.

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10/23/00 (verbal) 10/30/00 (written)	concerned citizen	As a consulting engineer, speaker feels that TNRCC does a good job regulating municipal wastewater treatment plants via the permit and enforcement programs. However, he believes that existing TNRCC CAFO regulations (cites Chapter 321, Subchapter B, Paragraph 39) are not being adequately enforced. As a result, the N Bosque R segments have become impaired. He requests immediate enforcement of the existing regulations, and hopes that enforcement will be the highest priority of the TMDL.	See Section VI of Introduction to TNRCC Response to Comments.
10/23/00	concerned citizen (verbal)	Based on 40 years of personal observation, speaker indicated that water quality and fish population in the North Bosque River below Valley Mills have declined over the past 10 years, spoke of odors and "white phosphate foam" in summer, and attributed the decline to dairy-related loading. He requests that TNRCC do something about the situation, and do it soon.	Development of the TMDLs and implementation plan for the North Bosque River watershed is a significant effort to address the situation described. TNRCC is proceeding as expeditiously as possible with development and implementation of these TMDLs.
10/23/00	concerned citizen (verbal)	Speaker requests that TNRCC enforce the existing laws. TMDLs will have no effect unless enforced. If existing laws had been enforced, "then surely we wouldn't be here today."	The TNRCC agrees enforcement is important, and is committed to continued enforcement of all its rules. See Section VI of Introduction to TNRCC Response to Comments.
10/23/00	concerned citizen (verbal)	Speaker contended that he cannot take his child fishing in the North Bosque River north of Hico "because it might kill him. Can you believe that? That happened under the watch of the TNRCC."	It is not clear what type of threat to his child the speaker perceives. Phosphorus concentrations in the North Bosque River do not pose any direct threat to human health. Common sense precautions against physical and bacterial hazards in a natural environment have and always will be needed.
10/23/00 11/20/00	Director of Utilities, City of Temple (verbal) Mayor of Temple (written)	Temple encourages "enforcement of current TMDL limits by TNRCC."	The TNRCC agrees enforcement is important, and is committed to continued enforcement of all its rules. See Section VI of Introduction to TNRCC Response to Comments.

Date Rcd.	Source	Summary of Request or Comment	Summary of TNRCC Action or Explanation
10/23/00	Mayor of Bellmead (verbal)	Better enforcement of rules is needed.	The TNRCC agrees enforcement is important, and is committed to continued enforcement of all its rules. See Section VI of Introduction to TNRCC Response to Comments.
VII. Legal Issues			
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	The TMDL is premature - The EPA has not finalized its guidance document and the TNRCC has no statutory or regulatory guidelines on how TMDLs in Texas are to be developed.	All states are required by § 303(d) of the 1972 Clean Water Act (CWA) to develop TMDLs for water bodies that are impaired. Furthermore, under state law, TNRCC has the authority to develop TMDLs as part of WQMPs. See Section VII of Introduction to TNRCC Response to Comments.
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	Jurisdictional issue - Procedures for developing TMDLs have been unconstitutionally delegated to the TNRCC with no standards.	The legislative directive to TNRCC is sufficiently specific in stating the duties of the TNRCC with respect to water quality. Under state law, TNRCC has the authority to develop TMDLs as part of WQMPs. See Section VII of Introduction to TNRCC Response to Comments.
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	Jurisdictional issue - TNRCC's attempted additional regulation of agricultural non-point sources through TMDLs exceeds the Commission's jurisdiction.	The TMDL does not regulate anyone nor prescribe activities. The TMDL sets a load allocation as required by the Texas Water Code (TWC). The TMDL will be implemented by the TNRCC and the Texas State Soil and Water Conservation Board (TSSWCB) in accordance with duties delegated to those agencies by the legislature.
12/15/00	City of Waco (written)	Runoff from WAFs is regulated by CAFO permits, and any runoff of excessively applied nutrients constitutes a discharge from a point source.	This is an inaccurate statement of the law. It is not particularly relevant because the TMDL takes into account both point sources and nonpoint sources of pollution.

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12/15/00	National Wildlife Federation (written)	The lack of an implementation plan to support the TMDL prevents meaningful assessment of the allocation, and fails to comply with federal public comment requirements.	The TMDL process involves development of two documents: 1) a TMDL which determines the allowable loading and allocates reductions to point and nonpoint categories source, and 2) an implementation plan that describes management measures and control actions needed to achieve the pollutant reductions. While federal law does not require an implementation plan, TNRCC has decided implementation plans are appropriate and will develop them after load allocations have been determined. The process and form of these TMDLs are consistent with federal laws and regulations. See Section VII of Introduction to TNRCC Response to Comments.
12/15/00	National Wildlife Federation (written)	The document oversimplifies the issue of controlling pollution from waste application fields, which must be controlled or allocated as point sources.	This is an inaccurate statement of the law. The comment is not particularly relevant because the TMDL takes into account both point sources and nonpoint sources of pollution. Under state and federal law, runoff from agricultural fields is not regulated as a point source.
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	Jurisdictional issue - The Clean Water Act and Texas law exempt land application from the purview of the TNRCC.	Texas is required under § 303(d) of the CWA to develop TMDLs for water bodies that are impaired. TNRCC and TSSWCB are the state agencies primarily responsible for ensuring that TMDL projects are initiated and implemented.
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	Jurisdictional issue - There are no State legislative guidelines or regulatory guidelines on development of TMDLs.	Under state law, TNRCC has the responsibility to do TMDLs as part of WQMPs, among other legislative mandates. See Section VII of Introduction to TNRCC Response to Comments.

Date Rcd.	Source	Summary of Request or Comment	Summary of TNRCC Action or Explanation
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	Jurisdictional issue - The TMDL violates Article II, § 1 and Article III, §1, Texas Constitution in that the TNRCC's duties were unconstitutionally delegated to TIAER and other entities. --First, there is no legislative grant of authority to the TNRCC that authorizes it to punt the development of TMDLs to third parties. --Second, there are no contracts in place between the TNRCC and TIAER or Blackland for the development of the TMDLs. –Third, there is no reasonable control by the TNRCC over the TMDLs or the TNRCC's involvement or review of the data, since all supporting data for the TMDLs was held by TIAER or Blackland and not the TNRCC. –Fourth, there are no TNRCC rules on the development of a TMDL which gives no real protection against an arbitrary action of a third party. –Fifth, the TNRCC guidance document on TMDLs was not prepared by the TNRCC, but by TIAER and Blackland which raises concerns that there have been no controls and no legal standards in developing the TMDLs which may prejudice the rights of TAD and DFA.	TNRCC follows the public participation requirements of 40 CFR § 130.7(a) as well as applicable state law, TWC §§ 26.036 and 26.037. In fact, the federal regulations at 40 CFR § 130.7(b)(5)(iii) encourage solicitation of water quality data from agencies and academic institutions among other entities. TNRCC seeks meaningful public participation in the decision making process for the development of TMDLs. In response to the first point, the TMDL sets a load allocation as required by the TWC. Furthermore, the TMDL will be implemented by the TNRCC and the TSSWCB in accordance with duties delegated by the legislature. In response to the second point, there need not be contracts in place for TNRCC to consult with TIAER, Blackburn or any other research body in the development of the TMDLs. In response to points three and five, TNRCC reviews all data and calculations for quality assurance, quality control and compliance with applicable state laws and agency rules before using that information in developing the TMDLs. TNRCC cooperated with TIAER and Texas A&M in developing the guidance document *Developing Total Maximum Daily Load Projects in Texas: A Guide for Lead Organizations*. In response to point four, all states are required by § 303(d) of the CWA to develop TMDLs for water bodies that are impaired. Furthermore, under state law, TNRCC has the authority to develop TMDLs as part of WQMPs. See Section VII of Introduction to TNRCC Response to Comments.

Date Rcd.	Source	Summary of Request or Comment	Summary of TNRCC Action or Explanation
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	Other Legal Authority - The TMDLs violate Article 1 § 3 of the Texas Constitution, and the 5th and 14th amendments of the U.S. Constitution because it unequally imposes restrictions upon the dairy producers and not all other persons. –First, no city within the TMDL area is required by Phase 1 or II of the EPA's stormwater regulations to comply with EPA requirements to obtain a permit, even though the EPA could arguably require those entities on a case-by-case basis to comply. –Second, there are no proposed reductions planned for nonpoint contributors in row crops or rangeland.	The TMDL does not regulate anyone nor prescribe activities. The TMDL sets a load allocation as required by the TWC. Future permitting, including stormwater permitting actions, will be undertaken by the state agencies given the legislative directive to do so. The second point refers to issues that will be addressed during the development of the implementation plan.
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	Other Legal Authority - The TMDL proposal violates the Texas Real Private Property Preservation Act, Chapter 2007, Texas Government Code. –First, TNRCC's TMDL efforts are not reasonably taken to fulfill its obligations under the Clean Water Act. –Second, TNRCC has neither alleged or shown that health and safety is currently threatened by the phosphorus levels in the North Bosque. –Third, TNRCC did not perform a takings impact statement. –Fourth, these TMDLs have not been published as rulemaking and proper public notice has not been provided.	The TMDL does not constitute a taking because there has not been a governmental action "that restricts or limits the owner's right to the property." See Section VII of Introduction to TNRCC Response to Comments.
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	Other Legal Authority - The TMDL proposal violates the Texas Administrative Procedure Act and other rule-making procedures. –First, the proposed TMDL is an agency rule. –Second, there is no notice of the results of an analysis of the economic effect upon small businesses. –Third, it does not contain a local employment impact assessment. --Fourth, it does not include a certification that the proposed rule has been reviewed by legal counsel and found to be within the state agency's authority to adopt. –Fifth, the TMDL proposal does not include a draft impact analysis describing the effects of the rule on small businesses as required under TEX. GOV'T CODE ANN. § 2006.002.	These TMDLs are not subject to the rulemaking requirements of the Texas Administrative Procedures Act (APA). The APA defines "rule" as a "...state agency statement of general applicability" that implements, interprets, or prescribes law or policy" or "describes the procedure or practice requirements of a state agency." Tex. Gov't Code § 2001.003(6). These TMDLs do not implement, interpret or prescribe law or policy. They are planning tools for two of the 238 303(d) listed water segments in the state.

Date Rcd.	Source	Summary of Request or Comment	Summary of TNRCC Action or Explanation
12/15/00	Texas Association of Dairymen and Dairy Farmers of America (written)	Other Legal Authority - The TMDLs violate Article 1 § 17 of the Texas Constitution, and the 5th and 14th amendments of the U.S. Constitution by being vague and unenforceable. –First, the TMDLs are not clear as to what the limits or desired effect will be of the TMDLs. –Second, there is a substantial risk of miscalculation by the affected parties in that no party can identify in the TMDL a definite numerical target, but yet will be forced into some kind of compliance with an implementation plan. –Third, the proposed TMDLs will also harm the dairies' constitutional rights insofar as the TMDLs subject dairies and others to limitations of 30 ppb per liter SRP or some other parameter not yet identified by TNRCC. –Fourth, the TMDLs also assume and imply certain BMPs and other regulatory requirements which are not set forth in the text of the TMDLs, and are also vague.	The TMDLs clearly state a reduction of approximately 50% phosphorus loading is necessary in the North Bosque River. BMPs and other regulatory requirements will be assessed during development of the implementation plan.
1/16/01	Texas Association of Dairymen and Dairy Farmers of America (written)	Quoted from McFarland/Feagley letter from March 1, 1999: "However, there is no conclusive scientific evidence to confirm that the off-site land application of these materials is contributing significantly to water quality impairments in Texas. It is our belief that the majority of the off-site application is at or below the agronomic rate for nitrogen. Many of these fields receive animal manure applications only periodically (not yearly), and thus do not represent a major concern." We think that the fact that third-party application fields are not regulated, certainly the permitted fields which are regulated and subject to testing threshold limits and NUPs would be even less likely to impair water quality (*referencing the above passage.*)	The letter doesn't address the subject matter of these TMDLs. It says its authors believe there was no conclusive evidence that offsite waste application is causing water quality impairment statewide, because the practice is used only sporadically. These TMDLs are based on watershed-specific data and represent wasteload allocation to onsite waste application fields.