

# INITIALLY PROPOSED DESIRED FUTURE CONDITIONS (DFCs)- LOST PINES GROUNDWATER CONSERVATION DISTRICT

June 24, 2009

## Introduction

GMA 12 has decided to specify a single value of allowable drawdown throughout each district within GMA 12 as the DFC. Managed Available Groundwater (MAG) will then be determined by the TWDB or by the GMA, with confirmation by the TWDB. The MAG provides the basis for issuing permits within each district. The DFC, established by the GMA, however, is the basis for managing groundwater within each district. DFCs have to be physically possible, individually and collectively, if different DFCs are stated for different geographic areas overlying an aquifer or subdivision of an aquifer.

While DFCs must be a set of conditions of the aquifers within the GMA that the districts believe are desirable, there has to be some basis for setting or arriving at those DFCs, especially one that will stand up through the petition process. Simply to say that no amount of drawdown is acceptable is unacceptable, because it is impossible to produce groundwater without inducing drawdowns. Given enough time and pumpage, drawdowns related to pumpage from the confined portions of the aquifer can become rather widespread. While it is viewed by some as "reverse engineering" the DFCs must protect the existing users and yet consider the future demands for groundwater within the district; where will the water come from to meet growing demands if it doesn't come from within the district. Good conservation will mitigate the amount of demands, but demands are bound to grow as the population within the district grows. The district has no control over growth. Approximately 90% of the LPGCD is served by rural water supply corporations, which are legally obligated to meet the demands within their CCNs.

## Considerations LPGCD Took Into Account

The LPGCD has used the 2007 State Water Plan demand estimates as a basis for projecting demands for groundwater within Bastrop and Lee counties and as a basis for setting the initial DFCs for consideration by GMA-12. These estimates of future demands are largely related to entities that already withdraw groundwater from within the district; out of district transfers or speculative demands included in the 2007 State Water Plan demand estimates compose a relatively small amount of the estimated pumpage. No amount of demand was allocated for potential water marketers beyond that in the state's demand estimates. No currently existing or pending non-exempt well permits in LPGCD were specifically used to determine LPGCD's DFC numbers, although an analysis of the relationship between non-exempt and exempt pumpage within the district as compared to the 2007 State Water Plan numbers is in progress.

The Colorado River alluvium is not modeled separately in the currently available GAM; no springs are modeled, nor can they be with the currently available GAM. Most of the upland springs are related to the hard pans that occur in the sandy soils and on which there is perched groundwater; the perched water is not simulated in the GAM. The model does simulate discharge to major surface water courses, but does a poor job; the amounts and timing are not considered reliable or accurate. Nevertheless, these amounts and particular changes in the amounts are being evaluated to discern trends.

## Process Taken Within LPGCD

As stated, LPGCD has used the 2007 State Water Plan estimates as a basis for anticipated water demands in the district through 2060. The State Water Plan demand estimates do not distinguish between surface and groundwater usage; however, the distinction is relatively simple for the LPGCD and only estimated demands for groundwater were incorporated into the Queen City/Sparta GAM model. ArcGIS was used to extract the drawdowns following a method suggested by Shirley Wade at TWDB. Based on the location of the centroid of each model grid cell, the model cells were assigned to a GCD and to a county. All cells were included in the methodology to determine average drawdown including zero cells and negative cells except as follows:

- There were 2 cells in Bastrop County in Layer 8 (Hooper) (out of 1455 cells total) that apparently went dry (values of the drawdowns were on the order of -99500). The large negative drawdowns were not included in the averaging of drawdowns by county and within the district as a whole. Similarly, large negative drawdowns occurred in layers 1 (Sparta, 2 cells) and 7 (Simsboro, 3 cells) in Bastrop County were excluded. The number of these cells is so small that the impact is not significant.
- There were 5 cells that appeared to be part of Lee County in Layers 7 and 8 (Simsboro and Hooper) that were attributed by the TWDB to Post Oak Savannah GCD. The discrepancy may be an artifact of the GCD cell assignments used by TWDB for the ArcGIS analysis. For the purpose of determining drawdowns and to be consistent with the TWDB, these cells were assigned to POSGCD.
- Zero cells reported in Layer 7 (Simsboro) for Bastrop County were not included in the average drawdown calculation. Inspection showed that there were no zero drawdowns in Bastrop County. The zero values that appeared in the model output corresponded to cell locations that were inactive. Except as described above, however, negative values, were included in the averaging.

After LPGCD had run the GAM with the GMA12D\_3b pumping file and used ArcGIS to determine the modeled drawdowns in 2060, LPGCD's DFC committee met to review the model outputs and to discuss any possible modifications to the direct model drawdown outputs. In most cases, the modeled county-wide average drawdown in 2060 was simply rounded to the next whole number and that rounded number is LPGCD's proposed DFC. One exception to this methodology is Layer 7 (Simsboro) in Lee County. As there is already significant demand both in the LPGCD and neighboring districts for groundwater from the confined part of the Simsboro, LPGCD wanted to take a more conservative stance with this aquifer. As LPGCD and the surrounding districts monitor water levels and learn about how the Simsboro aquifer, especially in the confined portion, responds to pumping, LPGCD anticipates that its recommended DFCs are likely to change somewhat over time with the objective of achieving sustainability in perpetuity as stated in the district's Management Plan.

## Recommendations of LPGCD DFCs

The numbers LPGCD is presenting for DFCs are county-wide and district-wide average drawdowns in feet in 2060 for each aquifer unit. Drawdowns are calculated as compared to 2000 measured water levels.

Geologic Unit/Aquifer Unit	County	Calculated District-wide LPGCD DFC in 2060 (Average drawdown in ft)	Recommended DFC in 2060 (County-wide Average drawdown in ft)
Sparta	Bastrop	10	10
	Lee	-	10
Queen City	Bastrop	13	10
	Lee	-	15
Carrizo	Bastrop	47	30
	Lee	-	60
Calvert Bluff	Bastrop	99	65
	Lee	-	135
Simsboro	Bastrop	212	135
	Lee	-	300
Hooper	Bastrop	129	90
	Lee	-	180

Within its district, LPGCD proposes the 2060 drawdown numbers be adopted as initial DFCs by GMA-12, and then LPGCD plans to further divide the recommended DFCs by county; LPGCD feels that this will better handle the major difference in geologic units in the two counties (*i.e.*, Lee County has a much thicker confined part of the Carrizo-Willcox aquifer than Bastrop County). Additionally, DFCs will be further divided in Bastrop and Lee counties to reflect different numbers for the outcrop (the water table part of the aquifer) and the confined portion of each aquifer. These subdivisions of the proposed DFCs will be reflected in LPGCD's Management Plan. It is also likely that LPGCD will create a ramp up schedule so that it can reach the final 2060 number at a set rate and not all up front at one time and to better allow the district to achieve its Management Plan goal of sustainability in perpetuity.

LPGCD is assembling a system of monitoring wells that will be used to assess conformance with whatever DFCs are established. The district has already conceptualized how this will be done, with each monitoring well representing a specified area. As more monitoring wells are brought into LPGCD's monitoring system, the area represented by each monitoring well will be changed to refine the area it represents. The currently available GAM is calibrated to water levels in each of the aquifers; therefore, DFCs must reflect allowable changes in those water levels. We must play to the strengths of the model, not its weaknesses. The bottom line for LPGCD is that if by monitoring the water levels it feels that the aquifer is responding differently than the GAM predicted, the district has the opportunity to revisit the DFC numbers every 5 years. LPGCD is confident that with more valuable water level data monitoring, it will be able to protect its valuable groundwater resource.