GOLIAD COUNTY GROUNDWATER CONSERVATION DISTRICT

PROPOSED DESIRED FUTURE CONDITION

DATED January 11, 2016

The Goliad County Groundwater Conservation District (GCGCD) Mission Statement and Desired Future Condition (DFC) are to maintain groundwater availability from the Gulf Coast Aquifer on a sustainable basis. A sustainable groundwater supply is critical for the continued viability of the agricultural economy of the county. Without a viable agricultural economy, the county would suffer major economic distress.

Historic water level data gathered by the Texas Water Development Board (TWDB) and by GCGCD since 2003 shows a steady water level decline since 1980. During the drought of the 1950's and periodic recordings to date, the upper aquifer sands are being depleted and some have completely dried up. GCGCD has prepared an economic impact statement that details the additional costs associated with continued declining water levels and is committed to minimize those additional costs by implementation of use, spacing, depth, and drawdown rules. GCGCD projects that some water level decline will continue and there will be an associated economic impact.

GCGCD has compared empirical pumping and water level data with the Modeled Available Groundwater (MAG) run by Intera titled "2014 DFC Baseline Run-2070 Pumping". GCGCD finds that this modeled data using average recharge cannot be used to provide an accurate DFC. The MAG shows an annual overall pumping rate of 12,185 acre feet which far exceeds the 2014 groundwater pumping of 6,115 acre feet documented by GCGCD. Annual pumping continues to increase and the pumping recorded in 2014, which was a drought year, is considered to be the highest annual groundwater use to date. The associated modeled drawdown of 1.0 foot in the Evangeline aquifer and a rise of 3.3 feet in the Chicot Aquifer is contrary to the drawdown being recorded by GCGCD. GCGCD drawdown data will be presented in detail later.

GCGCD asserts that a primary reason that the TWDB Model data does not support the empirical drawdown data compiled by GCGCD is that the Model uses values for annual rainfall and recharge that are too high. Average annual rainfall for Goliad County continues to drop and there are long range projections that continued lower rainfall can be expected. Too much emphasis has been put on the drought of record with the implication that all of the other years are normal. Since the drought of the 1950's there have been several significant droughts and many mini droughts. In fact most years, even those with above average rainfall, have drought periods.

Annual recharge is affected by two components, rainfall and ground surface geology. In addition to the lower annual rainfall comments above, surface use has changed significantly in the last 60 years, especially in north Goliad County. Much of this area is classified as the recharge area for the Evangeline Aquifer. 60 years ago, 40-45 percent of north Goliad County was tilled for crops. This type of a surface provided for greater rainfall capture and allowed rapid and significant percolation by rainfall into the subsurface. Today there is minimum tillage occurring in north Goliad County. The compacted grass and brush covered soil fundamentally and substantially changed recharge rates. In addition, the introduction of brush and hardwoods significantly increased plant use and transevaporation.

The San Antonio River authority has engaged Texas Tech to develop the brush management Ecological Dynamics Simulation Model (EDYS) for Goliad and adjacent counties. This model is basically complete and the final report is being prepared. GCGCD has been provided a preview of the model. This model may be beneficial to determine the change in recharge and the current recharge.

Referring to the graph of the North Goliad County Wells using TWDB data, note that there was a steady increase in water levels recorded after the drought of the 1950's until about 1980. These graphs were prepared by LBG Guyton for Region L using TWDB data from 1954-2000. During this time, farm land was being converted to range land. As previously noted, after 1980, water levels began a steady decline. That decline occurred without a notable change in rainfall. This data should support the thought that a change in land use has significantly reduced the amount of recharge occurring especially to the Evangeline aquifer in north Goliad County. Referring to the rainfall data attached, note that annual rainfall has declined significantly for the years 2008 through 2014 which along with reduced recharge has resulted in a recorded drop of water level of 8.6 feet in the Evangeline Aquifer in the last 12 years.

Intera has recently completed the model run entitled "Baseline DFC Run with 50% Recharge" for GMA-15. The drawdown generated by this run is significantly more than with average recharge but still is much less than what is recorded by TWDB and GCGCD data.

Included as attachments are graphs of water levels recorded by TWDB starting in 1955 and continuing with graphs of water levels recorded by GCGCD starting in 2003 through spring of 2015. Currently most of the groundwater supply comes from the Evangeline Aquifer in north Goliad County and the Chicot Aquifer in south Goliad County. Please note from the attached water level data that water levels have continued to decline in both of these aquifers since 1980. The GCGCD data covers a more dispersed area and includes a greater number of wells. In addition, all of the GCGCD wells are open cased not pumped and therefore are a true representation of static water levels.

The GCGCD data averages five depths of wells in the Evangeline Aquifer and three depths of wells in the Chicot Aquifer. The averages are from data generated since 2003 through spring of 2015. For the years 2003-2014, rainfall was below average for 8 of these 12 years. The average rainfall for these 12 years was below average.

For the Evangeline Aquifer:

_7_ wells above 100 feet depth, water level dropped _6.32_ feet,

_23_ wells 101 to 199 feet depth, water level dropped _8.46___ feet,

_18_ wells 201 to 300 feet depth, water level dropped _8.62___ feet,

_4_ wells 301 to 400 feet depth, water level dropped 14 feet,

_2_ wells below 401 feet depth, water level dropped _7.44_ feet.

The weighted average of sixty (60) wells in the Evangeline Aquifer is 8.59 feet drawdown.

For the Chicot Aquifer:

_4__ wells above 100 feet depth, water level dropped _5.24__ feet,

_6__ wells 101 to 200 feet depth, water level dropped _2.61__ feet,

_5_ wells 201 to 400 feet depth, water level dropped _6.19_ feet.

The weighted average of fifteen (15) wells in the Chicot Aquifer is _4.50 feet drawdown.

GCGCD has expressed a great interest in working with TWDB in developing the updated model of the Gulf Coast Aquifer for the Central Gulf Coast. In addition to the question of recharge, GCGCD is concerned that the modeled water budget shows a significant inflow of streams to the Evangeline and Chicot Aquifers. The USGS gain-loss studies of the Lower San Antonio River Basin and the Coleto Creek Watershed shows in both studies a surface water gain from the Aquifer. This discrepancy needs extensive further evaluation.

The Baseline DFC Run with 50% Recharge provides drawdown data that is more consistent with the empirical data presented. The GMA-15 Members voted to use average drawdown in establishing the DFC and MAG. GCGCD has noted that average drawdown values used vary in different model runs. GCGCD has included in the District's Management Plan the water budget of GAM Run 12-018 (Version 2) provided by TWDB. GAM Run 12-018 (Version 2) uses recharge values of 9,440 acre feet for the Chicot Aquifer and 7,163 acre feet for the Evangeline Aquifer. GCGCD requests that these recharge values be the maximum values used for Goliad County in modeling the new DFC and MAG.

After a thorough evaluation of all factors including model runs and empirical data compiled by TWDB and GCGCD, GCGCD requests that a greater variance be allowed for the District based on evidence provided to support a higher GAM predictive uncertainty.

The Desired Future Condition of the Gulf Coast Aquifer within Goliad County shall not exceed an average of 10 feet of drawdown of the Gulf Coast Aquifer in the year 2070 relative to the water levels of the aquifer at year 1999.