Barton Springs
Edwards Aquifer
CONSERVATION DISTRICT

Technical Memo 2017-1221
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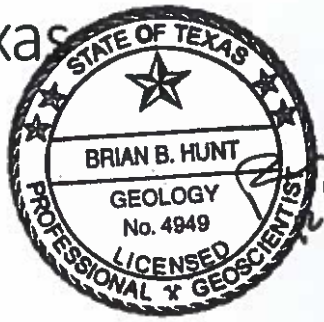
Refining the northern Saline Edwards Aquifer Desired Future Condition, Northern Subdivision of GMA-10, Hays and Travis Counties, Texas

BSEACD Aquifer Science



Because of new information the BSEACD staff and Board discussed a refinement of the DFC expression for the Saline Edwards in the northern subdivision of GMA-10. This memo documents the background, method, and results of a simplified approach to estimating a restated MAG.

New information from USGS modeling results (Brakefield et al., 2015) confirm what District staff and others have concluded from other hydrologic data and studies—that the saline- freshwater-interface is relatively stable. In other words, there is little potential for the movement of brackish water into the freshwater zone. Conversely, the risk of movement of freshwater into the saline zone is also assumed to be low. The USGS study simulated the drought of record and high rates of pumping.

The BSEACD regards the saline zone as alternative water supply that poses little threat to the freshwater Edwards—and in fact can lessen demands placed upon it. Given that the BSEACD has rules in place (management zones and buffers) that address potential pumping projects along the interface of the saline zone, BSEACD staff think it is prudent to restate the DFC for this area to take into account the new information and also develop a DFC that is not overly conservative.

The BSEACD staff suggest that the DFC should simply be an expression of drawdown and remove any reference to the boundary. The spreadsheet is an attempt to estimate how the TWDB would likely calculate the MAG, which is similar to the TWDB approach to calculate a MAG for the Trinity in GMA-10 (Thorkildsen and Backhouse, 2011). In that approach the area is multiplied by the storage coefficient and then by the drawdown expression. Since there are basically no known inflows into the saline zone (e.g. a closed system), that would not be part of the calculation.

Tables 1 and 2 provide an estimate of the MAG based upon a range of drawdown and assumed storage coefficients. A DFC expression of 75 ft of drawdown results in a MAG for the BSEACD of 3,800 to 4,600 ac-ft depending on the storage coefficient used. For the PCGCD same DFC expression would result in a MAG of about 800 to 1,000 ac-ft.

A revised DFC expression coupled with the existing District Management Zone rules and buffers can satisfy the mutual objectives of preserving the interface and enabling development of the saline Edwards Aquifer as an alternative supply to the Fresh Edwards.

Table 1. BSEACD Results

Scenario	DFC drawdown (ft)	Storage coefficient	Areal extent (acres), BSEACD	Estimated MAG (ac-ft)
1	5	7.0E-04	72,363	253
2	50	7.0E-04	72,363	2,533
3	75	7.0E-04	72,363	3,799
4	100	7.0E-04	72,363	5,065

Storage coefficient from TWDB AA10-35

Table 2. Plum Creek GCD

Scenario	DFC drawdown (ft)	Storage coefficient	Areal extent (acres), PCGCD	Estimated MAG (ac-ft)
1	5	7.0E-04	15,478	54
2	50	7.0E-04	15,478	542
3	75	7.0E-04	15,478	813
4	100	7.0E-04	15,478	1,083

References

Bradley, R. G., 2011, GTA Aquifer Assessment 10-35 MAG, Groundwater Management Area 10, Northern saline Edwards Aquifer, Texas Water Development Board, 13 p.

Brakefield, L.K., White, J.T., Houston, N.A., and Thomas, J.V., 2015, Updated numerical model with uncertainty assessment of 1950–56 drought conditions on brackish-water movement within the Edwards aquifer, San Antonio, Texas: U.S. Geological Survey Scientific Investigations Report 2015–5081, 54 p., http://dx.doi.org/10.3133/sir20155081.

Thorkildsen, D. and S. Backhouse, 2011, GTA Aquifer Assessment 10-29 MAG, Groundwater Management Area 10, Trinity Aquifer, Modeled Available Groundwater estimates. Texas Water Development Board. 11 p.