

September 2, 2015

To: Groundwater Management Area 8 Representatives
From: William F. Mullican III, P.G.,
Subject: Consideration of the impacts of proposed DFCs on subsidence

Texas Water Code §36.108 (d) (5) requires that groundwater conservation districts, during the joint-planning process, consider the impacts of proposed desired future conditions on subsidence. Subsidence is the geologic term used to describe the sinking of the land surface with respect to sea level. Subsidence may occur as a result of natural causes or from man-induced or anthropogenic causes. Subsidence, especially in low lying coastal areas, may cause significant damage due to flooding and also structural damage to roads and buildings. For example, subsidence in the Houston/Galveston area has been caused by removal of oil and gas minerals as well as groundwater from the confined Gulf Coast Aquifer. Subsidence may also result from the removal of other minerals in the subsurface such as salt and sulfur.

When subsidence is the result of the removal of fluids, this is because the fluids are pressurized or confined. Therefore, when naturally occurring, the pressurized fluids act to hold up the loosely consolidated sedimentary particles in the subsurface (clays, silts, and sands). Due to the inelastic nature of the sediments, in particular clays in areas where subsidence occurs, subsidence where it occurs is permanent. Flooding resulting from subsidence in the Harris/Galveston area has resulted in major losses to land and property over the past 50 plus years.

Mace and others (1994¹) reported on the observed and potential effects of water-level declines in the Woodbine, Paluxy, and Trinity aquifers on subsidence and water quality. Based on an analysis of water-level declines and the elastic and hydraulic properties of confining units for the subject aquifers, Mace and others (1994) concluded that either because of the structural stability of the geologic

¹ Mace, R. E., Dutton, A. R., and Nance, H. S., 1994, Water-level declines in the Woodbine, Paluxy, and Trinity aquifers of North-Central Texas: Transactions of the Gulf Coast Association of Geological Sciences, Vol. XLIV, pp. 413-420.

units in the region or due to a consolidation time-lag, no subsidence has been observed in the North-Central Texas area (coincident with GMA 8). This conclusion was supported by the absence of any measured subsidence by the U.S. Geological Survey in the region from 1957-1991.

Based on the geologic and hydrogeologic characteristics in the region of GMA 8, the proposed desired future conditions will not have any impacts on subsidence.

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