ATTACHMENT 3

MEMORANDUM

From: Project Work Group

To: Edwards Aquifer Recovery Implementation program

Date: September 3, 2010

Re: Report and Recommendation of the Project Work Group Regarding a Rangeland Restoration Project Subgroup

A subgroup of the Project Work Group consisting of Kirby Brown (Lead), Steve Raabe, Jim Bower, Kirk Patterson, Buck Benson, Velma Danielson, and Weir Labatt
Has worked with Texas A&M University researchers over the past five months to develop a study /project to utilize brush management to enhance springflow at San Marcos Springs. Based on this work, the Project Work Group Group recommends approval of this study/project conditioned on obtaining funds from a third-party to fund 75 percent of the project.

BACKGROUND: Private ranches and rangelands comprise the bulk of lands over the Edwards Aquifer. Open space is critical for water infiltration and recharge in the recharge and contributing zones of the Edwards Aquifer. The precipitation that falls on Texas rangelands is the major source of surface flow and aquifer recharge, and the condition and management of these rangelands has major impacts on the water quality and quantity available for recharge and river flows. Healthy rangelands provide clean, high quality drinking water, promote recharge, conserve soil, filter and slow overland flow of water, provide forage for livestock, and provide wildlife habitat (Hays *et al* 1998). Over the last century, encroachment of woody species (particularly Ashe juniper – commonly known as cedar) across much of Texas' Edwards Plateau open rangelands has degraded many of these services, and research demonstrates juniper has negatively affected recharge and streamflow. Studies indicate that rangeland restoration programs reverse this trend through the use of sound long-term management practices to control woody species, and with proper follow-up management practices healthy (water producing) rangelands can be restored. Such restoration may benefit spring dependent species affected by the Edwards Aquifer as well as downstream organisms and communities dependent on reliable stream flows.

Research indicates rangeland restoration and management increases water quantity, as well as quality, for surface water run-off and aquifer recharge. The proper site and geology are critical specific to aquifer recharge, but most central Texas areas within the recharge zone and contributing zone can be enhanced for increased spring, seep and surface water flow. Woody plant invasion can be reversed through appropriate rangeland restoration. Initial costs, however, are generally more than a landowner can justify when considering livestock production alone. Costs are higher for established, mature stands of unwanted brush and lower for younger aged, non-resprouting species. Ashe juniper, the principal target brush species, does not resprout when mechanically controlled. Under certain circumstances, additional water yield results from

rangeland restoration. Recent studies show that within the Edwards Plateau, an additional acre-foot can be gained for every 5-to-8 acres of brush restored to native grassland savannah condition. As demonstrated by several studies, opportunities exist for creating incentive-based programs that lead to additional water yield through rangeland restoration.

Assuming rangeland restoration practices are effective for at least 10 years, the cost to produce an additional acre-foot of water in the Edwards Plateau would be $40 to $180 depending on the method. (Connor *et al* 2008). These surface waters flows are also slowed and cleaned with good range management, releasing higher quality water more slowly over time rather than in a singular muddy rush in a huge flood event, allowing these waters to slowly percolate and be released over time and/or to flow over increased periods of time into aquifer recharge structures, providing extended recharge opportunity. There is still uncertainty as to exactly how much additional water actually enters the aquifer.

PROPOSAL:

The Work Group recommends the following elements for the study:

1. Feasibility of Rangeland Restoration for Increasing Streamflow in the Contributing and Recharge Areas of the Edwards Aquifer—implement a rangeland restoration program in the recharge and contributing zones of key watersheds contributing to Comal and San Marcos springs. Quantify the amount of land within the watershed suitable for rangeland restoration based on the physical features of the land including slope, soils, geology, and brush encroachment. Identify candidate tracts, and contact and enroll landowners in management, monitoring, and follow-up rangeland restoration program.

2. Measure Rangeland Restoration Impact in Recharge/Contributing Area on Comal and San Marcos Springs Watershed—Monitor impact of rangeland restoration in the recharge and contributing areas of the watersheds of the Comal and San Marcos Springs and monitor spring discharge, in essence replicating the monitoring strategies proposed by Conner *et al* (2008) and prepared for Region L. Appropriate designed and implemented monitoring of base flows may provide additional measurable signals on response 5-10 years after initiation.

3. Quantify Rangeland Restoration Impact on Comal and San Marcos Springs - Monitor and attempt to validate impact of rangeland restoration in specific locations identified as most likely to directly impact base flow exiting Comal and San Marcos springs. Utilize USGS data for identification of predominant major recharge locations and attempt to quantify new water exiting the springs as identified by measurements using stable isotope identification based on source mapping while comparing that to base flow monitoring at springs.

Estimates of the Cost to Implement Rangeland Restoration Programs in Hays and Comal Counties

Monitoring Component (10 year period to capture variations in climate conditions)
Stable Isotope Monitoring $100,000 - $200,000/year

- improved understanding of the sources of water fluxes through the hydrologic system at multiple scales

Small Catchment Monitoring $100,000 - $200,000/year

- Springflow monitoring
- Evapotranspiration Micrometeorological Towers
- Soil and Water transpiration

Implementation of Rangeland Restoration Program (~57,000 total acres in area bisected by RR12)—vegetation management and administering program

- 25% participation(60% cost share)~$200/acre average
- 50% participation (90%+ cost share) ~$350/acre average ($250-$500/acre range)
- Assuming 10,000 acres suitable and enrolled ~$3,500,000

TOTAL COST: Up to $7.5 million over 10 years depending on the amount of participation

Stable Isotope Monitoring - up to $2.0 million over 10 years

Small Catchment Monitoring - up to $2.0 million over 10 years

Vegetation management - 10,000 acres (50% landowner participation, 90%+cost share) - $3.5 million over 10 years

USDA EQIP or AWEP programs in 2012 Farm Bill are a possible source of cost-sharing of 75% of the cost-of the vegetation management. Higher participation levels (50%) would occur with additional partner funded match beyond the 75% to obtain a 90% cost share level. Assuming a 75 percent cost-share, the federal EQIP or AWEP share would be $2,625,000, on 10,000 ac at average of $350/ac. The recommended approval is contingent on obtaining the cost share from USDA or another third-party.