Recharge Enhancement and Automated Monitoring of a Karst Aquifer in Central Texas

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The majority of recharge to the Barton Springs segment of the Edwards Aquifer is through recharge features such as caves, sinkholes, and solutionally enlarged fractures that are located in the beds of creeks that cross the recharge zone. Because this is a karst aquifer with conduits carrying large volumes of recharged water to various parts of the aquifer and to the springs, only a limited amount of filtration and settling occurs. Since this water comes from rainfall runoff and creek flow, it contains varying amount of sediment, bacteria, and other contaminants.

To improve the quality and increase the quantity of water entering the aquifer, a Best Management Practices (BMP) structure was constructed over a cave entrance in Onion Creek that directs a considerable amount of water into the aquifer. This structure was built with an air-pressure activated valve so that the valve could be maintained in the closed position during periods of storm-water flow and which could then be opened when the quality of water improves as the storm pulse recedes. Because of the remote location of the cave, it is not possible to have the valve in the appropriate position at all times. A system for automated monitoring of water quality in the creek is currently being designed. Under predetermined conditions, the system will activate the valve to either close to prevent sediment and contaminant laden storm water from entering the aquifer or to open to allow better quality water to enter the aquifer.