

2011 GSA Annual Meeting in Minneapolis (9–12 October 2011)

**Paper No. 60-3**

Presentation Time: 2:10 PM-2:25 PM

## DEFINING THE SPRINGSHEDS OF TWO MAJOR SPRINGS IN TEXAS: SAN MARCOS AND BARTON SPRINGS

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San Marcos and Barton springs are two major springs that issue from the Balcones Fault Zone Edwards Aquifer in south central Texas. San Marcos Springs discharges from the San Antonio (SA) segment while Barton Springs discharges from the Barton Springs (BS) segment. However, their springsheds share a common boundary that varies depending on water levels. The purpose of this report is to present the findings of collaborative investigations by the Edwards Aquifer Authority (Authority), Barton Springs Edwards Aquifer Conservation District (BSEACD), and City of Austin Watershed Protection and Development Review Department (COA) to define the springshed boundary between San Marcos Springs and Barton Springs.

The scope of the investigation consisted of tracer tests completed at various locations in the vicinity of San Marcos and Barton springs, which included the Trinity Aquifer as well as the Edwards Aquifer.

Results of the tracer tests revealed discrete groundwater flowpaths and rapid groundwater velocities connecting the Edwards Aquifer recharge zone to San Marcos Springs and Barton Springs. Apparent (injection point-to-detection point) velocities ranged from less than one to 3,600 meters per day (m/d). Dyes were recovered from every injection, and many were recovered from both San Marcos Springs and Barton Springs. This indicates bi-directional flow to both spring major complexes.

Based on the fastest groundwater velocities, San Marcos Springs receives most of its recharge from the southwest along the San Marcos Springs Fault and smaller amounts from west and north of the springs. Groundwater carried dyes to both spring complexes and other recovery points both parallel to and perpendicular to the Balcones Fault Zone, revealing the three-dimensional groundwater flow system in the Edwards Aquifer. The boundary between San Marcos Springs and Barton Springs springsheds is located in the vicinity of the confluence of the Blanco River and Halifax Creek under drought conditions when Onion Creek is dry. The groundwater divide appears to moves north along the creek in the recharge zone during wet conditions when the creek is flowing, and recharge is the dominant hydrologic feature. Consequently, the Blanco River recharges both spring complexes depending on hydrologic conditions.

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Session No. 60  
[Environmental Problems in Karst Terranes/Terrains and Their Solutions: In Honor of James F. Quinlan](#)  
Minneapolis Convention Center, Room M100FG  
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