Using Relict Vegetation Communities as a Proxy for Transmissivity in the Comanche Peak Formation, Owl and Bear Creek Watersheds, Bell County, Texas

Melinda Faulkner

Department of Geology, Stephen F. Austin State University, P.O. Box 13011, SFA Station, Nacogdoches, Texas 75962

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ABSTRACT

The Owl and Bear Creek watersheds provide surface and subsurface flow into Belton Lake near the confluence of the Leon River on the northeastern peninsula of the Fort Hood Military Installation in Bell County, Texas. The landscape and its topography are largely controlled by the erosional behavior of the Lower Cretaceous limestones and marls of the Fredericksburg Group. The resistant Edwards caps the plateaus and is heavily karsted, providing avenues for meteoric recharge and discharge through intermittent and ephemeral springs. The lower permeability of the Comanche Peak forces ascending fluids to flow laterally and spring out; incising slot canyons into steep sided scarps.

Bigtooth maple, *Acer grandidentatum*, is a small deciduous hardwood tree indigenous to North America. It exists as a continuous population in the intermountain regions of the western United States, with smaller disjunct populations found throughout the Southwest. Previous transect vegetation surveys conducted in the watershed identified nine discrete areas of *A. grandidentatum* habitat confined to mesic slot canyons in the Owl and Bear Creek watersheds. These data were used to create a vegetation model in ERDAS by isolating the spectral intensity of *A. grandidentatum* to determine where additional maple populations may be found. Vegetation mapping conducted in January 2016 located an additional 129 hectares of maple habitat, developed on open slopes where the Comanche Peak and Edwards are interbedded. These interfingered formations have likely created a semi-confined aquifer system where deeper seated fluids migrate upwards through low permeability strata along preferential flow paths and communicate with meteoric waters near the ground surface, maintaining the moisture regime vital to the continued existence of mesic vegetation communities in incised canyons and open slopes.

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