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The Hydromorphic Evolution of the Owl Mountain and Nolan Creek Provinces within the Fort Hood Military Installation, Bell and Coryell Counties, Texas

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ABSTRACT

The Owl Mountain and Nolan Creek provinces are dissected karst plateaus in the eastern section of the Fort Hood Military Installation. The installation contains surficial exposures of carbonate strata from the Lower Cretaceous Trinity and Fredericksburg groups and is underlain by the Edwards and Trinity aquifers. The Owl Mountain and Nolan Creek provinces are characterized by rugged terrain with steep slopes and incised canyons, and are delineated to the north and south by the installation boundary, the Live Fire Impact Range to the west, and Belton Lake to the east. These provinces are utilized by the United States Army for troop maneuvers and training; some parts have been extensively modified by training exercises and road building, more remote areas are set aside as grazing land, endangered species habitat, and recreational areas for military families. As part of the U.S. Army's quest to catalog and manage the natural resources in these training areas, the Fort Hood Natural Resources Management Branch requested baseline geochemical data regarding subaerial springs in the Owl Mountain and Nolan Creek provinces as well as subaqueous contributions from the training areas into Belton Lake. Seven subaerial springs were monitored monthly over a two-year period for physicochemical parameters and ionic concentrations. In order to delineate subaqueous springs discharging into Belton Lake, a multi-parameter sonde was deployed to collect physicochemical data along the shoreline. Spatial analysis was used to interpret the data gathered along the collection route and to delineate potential locations where such springs might exist. These data were used to propose a hydrogeologic model for groundwater migration through varying permeabilities of the interfingering Comanche Peak and Edwards carbonates.