

Physical Geography and Climate

The North Bosque Watershed is typical of the Grand Prairie Region of Texas with medium-sized hills carved into the limestone plateau in the upper basin. Rolling, gentler topography continues into the lower basin as the river approaches the Blackland Prairie Region to the East. Soils range from shallow, stony clay loams, especially in areas with moderate to steep slopes, to deep, cracking clays in valley bottoms. The geology of the area is typically limestone beds of varying thickness often separated by calcareous marl (calcium-rich clay) layers. Geologic formations are thought to be the product of shallow, inland seas that covered much of Texas during the Cretaceous Period. Hilltops are generally capped by the erosion-resistant Edwards and Comanche Peak Limestones. The Walnut Clay, which is common in the broad, flat plains of the valley bottoms, is a less resistant layer, often over 150 feet in thickness. Another geologic formation often observed in the area is the Glen Rose Limestone, which may also be a caprock for flat-topped hills or may form steep bluffs that rise along rivers and streams.

The watershed climate may be characterized as a subtropical, subhumid area with hot summers and dry winters. Average annual precipitation is approximately 30 inches, and average gross lake surface evaporation is nearly 70 inches. Rainfall generally follows a bimodal pattern with peaks in the spring and fall. Average wind speed is about 13 miles per hour and the prevailing direction is from the southeast.

Hydrologically, the river is described as having intermittent flow, especially in the upper basin, with a tendency toward flash-flooding during rainfall events. Baseflow is usually minimal and diminishes quickly due to a combination of relatively impermeable soils and the limestone geology of the area. Limited baseflow contribution to the channel cannot sustain low flows during extended periods of little or no rainfall. Consequently, the river may become dry during the summer months when additional water is removed from the shallow aquifer by plants through evapotranspiration.