Hydrologic alteration of the environmental system in urban communities is a complex and interactive multiplication of anthropogenic activities, hydro-systems that connect locality to regions, and global environmental changes at a larger scale. Often, the impact of climate change is overshadowed by dramatic changes in the local environment driven by urban development and is hard to quantify at the local watershed scale. Estimation of stream health involves the analysis of changes in aquatic species, riparian vegetation, micro-invertebrates, and channel degradation due to hydrologic changes occurring from anthropogenic activities.

The Upper White Rock Creek (UWRC) watershed is located in North-Central Texas, covering a portion of Collin County and Dallas County. The watershed has a drainage area of 169 km$^2$ and is a part of the Trinity River Basin. It is located north of the downtown Dallas metropolitan area, which is being affected by the urbanization and development of the Dallas suburbs of Richardson, Addison, Plano, and Frisco. In this particular section of Dallas, urban development occurred rapidly during the 1980s through 1990s. In UWRC, urban lands increased from 41% in 1980 to 91% in 2001.

In a study that will appear in the May–June 2013 issue of the *Journal of Environmental Quality*, researchers quantified stream health changes arising from urbanization and climate change using a combination of the widely accepted Indicators of Hydrologic Alteration (IHA) and Dundee Hydrologic Regime Assessment Method (DHRAM) on a rapidly urbanized watershed in the Dallas–Fort Worth metropolitan area of Texas. For analyses of the impact of urbanization on stream health, historical flow data of 47 years (1962–2008) collected at two streamflow gauges in White Rock Creek were split into two parts representing pre-urbanization and post-urbanization periods. The influence of climate change was assessed by dividing the precipitation data into three groups of scenarios representing dry, intermediate, and wet conditions. Hydrologic indicators were then evaluated for all three of the climate scenarios to estimate the stream health changes brought on by climate change.

The researchers found from a pre- and post-urbanization analysis of a gauged stream that understanding the impact of climate variability based on historical gauge data may not be achievable because of the uncertainty associated with historical land development. Alternatively, computer models for watershed assessment (e.g., the Soil and Water Assessment Tool, or SWAT) can be useful to rule out the uncertainties contributed by land development in assessing the impact of climate variability on stream health. The stream health index was scored higher at Keller Springs Rd. (high risk) than at Greenville Ave. mainly due to the relatively rapid development rate (urban land cover increased from 2% to >90%) in the drainage area (40% to >90%). The total flow record analyzed at Greenville Ave. consisted of approximately 40 years. The average annual precipitation was 884 mm during 1950–1980 and 1,027 mm for 1981–2007, which is a 16% increase during the post-alteration period. This suggests that climatic variability in this area may play a role in the analysis of stream health, and thus, the stream class for the watershed outlet at Greenville Ave. may include the impacts of both urbanization and climatic changes.

On the impact of climate variability, the results suggest that dry weather poses a greater risk to stream health than wet weather mainly due to the increased intermittency of no-flow days. These data signify the importance of environmental flows—the minimum flow a channel requires to maintain stream habitats.
