

Tree-Rings and Timbers from Historic Buildings Shed Light on Past Central Texas

Droughts

A tree-ring study commissioned by the Guadalupe-Blanco River Authority (GBRA) indicates that “there may have been periods when drought was more protracted and the impact might have been considerably worse” than the decade long 1947-1957 drought, known as the Drought of Record. The study was conducted by Professor Malcolm Cleaveland of the University of Arkansas Department of Geosciences Tree-Ring Laboratory (TRL). Tree-rings and original timbers from historic buildings were examined, expanding our knowledge of past droughts back to 1537 in the Edwards Plateau Region and 1648 in the South Central Texas Region.

This is significant because the 1947-1957 Drought of Record (some experts use 1950-1957) is the basis for all Texas water supply planning. This study confirms that the Drought of Record is an appropriate minimum standard for water planning. Similar droughts appear to occur every 80 to 100 years on average. Available supplies of water from reservoirs and other resources used for municipal water supplies are based on providing a reliable supply, should we experience a drought similar to the Drought of Record. Other western states use their respective droughts of record for their planning as well.

Drought is one of the most complex and least understood of all natural hazards, and affects more people globally than any other natural hazards. By studying historic

droughts we can prepare for future droughts. Unfortunately, the farther back in time we look the less drought information we have.

One way to make up for the lack of recorded information is to study things strongly influenced by the climate of the time, or 'proxies.' Tree-rings are one of the best proxies. Trees generally grow one tree-ring each year, and the ring's width provides a record of each year's climate. In a dry year, a narrow tree-ring is produced, while in a wet year the ring is wide.

Some trees can grow to be a few thousand years old, providing a lengthy record of the climate that occurred locally during the life of the tree. Tree-ring chronologies are based on small core samples extracted non-destructively from living trees and cross-sections cut from dead logs. Tree-rings can also be retrieved from original timbers found in historic structures. Each ring can be dated exactly and the climate information is relatively easy to extract.

The study indicates droughts in 1707-1717 and 1885-1894 exceeded the Drought of Record in South Central Texas and a 1571-1580 drought exceeded the Drought of Record for the Edwards Plateau. Cleaveland concludes that "It would appear unwise for civil authorities to assume that the 1950s drought represents the worst case scenario to be used for planning purposes in water resources management in the South Central and Edwards Plateau climate divisions of Texas." This raises a question whether future droughts worse than drought of record may loom somewhere over the horizon.

Extended Chronology of Drought in the San Antonio Area, is available on the GBRA website at www.gbra.org. Plans are underway to conduct an expanded study in the region and the researchers are already searching for original timbers from buildings constructed prior to 1800 and old cypress trees for nondestructive sampling.