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Tree rings are key to water supply planning GREG BOWEN Victoria Advocate Friday, April 21, 2006

SEGUIN - A tree-ring study commissioned by the Guadalupe-Blanco River Authority shows there have been worse droughts than the prolonged mid-'50s dry spell known as the "drought of record," or the worst drought in the state's recorded history.

The new information could be crucial to planning for adequate water supplies needed to get Guadalupe River Basin communities like Victoria through future dry spells, the river authority said.

In a press release issued Thursday afternoon, GBRA said the study was conducted by Professor Malcolm K. Cleaveland of the University of Arkansas Department of Geosciences Tree-Ring Laboratory.

Cleaveland examined past droughts in the South Central Texas region using tree-rings to expand knowledge of drought back to 1648, adding more than 50 years to the period examined in previous studies.

The report concludes: "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."

According to GBRA General Manager Bill West, the 1947-1957 "drought of record" is the criteria on which all Texas water resource planning has been based.

"It is basically the gold standard," said West, who explained that the yields of water-supply reservoirs and other resources used for municipal water supplies are based on providing a firm supply through a recurrence of the drought of record.

However, the San Antonio Water System has recently selected a lesser drought than the drought of record as their standard for water planning.

"The SAWS 2005 Water Resource Update is based on the 1982-1984 drought," said Dr. Todd Votteler, GBRA's director of natural resources. "We were shocked to learn that the 1982-1984 drought is not even one of the top 20 short-term drought events, or top 20 long-term drought events, that have occurred in this region since 1648," said Votteler.

He said the "drought of record" actually is the fourth-worst drought over a 10-year-period in the South Central Texas region.

The worst was the 1708 to 1717 drought. No. 2 occurred from 1696 to 1705. The third-worst was 1885 to 1894.

The study also looked at droughts in the Edwards Plateau dating back to 1537. The "drought of record" ranked as second-worst to a drought from 1571 to 1580, Votteler said.

GBRA is concerned that water usage based on a lesser drought standard could increase pumping from the Edwards Aquifer and impact springflows from Comal and San Marcos Springs.

The springs help feed the Guadalupe, Victoria's primary water source.

"GBRA and others are concerned that this could seriously affect the amount of water in the Guadalupe River, with serious impacts on municipal, industrial and agricultural water supplies," Votteler said.

According to Votteler, GBRA commissioned the study in 2005 to update previous tree-ring studies conducted by other organizations, which were based in part on Dr. Cleaveland's prior research.

"Drought is the most complex and least understood of all natural hazards and affects more people globally than any other natural hazard," he said. "By studying the droughts that have occurred in Texas historically we can prepare for future droughts. Unfortunately, the farther back in time we go, the less information we have on droughts."

One way to make up for this lack of observed data is to study things strongly influenced by the climate of the time, or "proxies," he said. "One of the best proxies is tree-rings."

Trees generally grow one tree-ring each year, and its 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 rings are wide.

Some trees can grow to be a few thousand years old, providing a lengthy historical 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 and original timbers found in historic structures. Each ring can be dated exactly and the climate information is relatively easy to extract from properly dated samples.

"We intend to expand on this current research by locating additional trees such as old cypress trees and historical structures with original timbers for Dr. Cleaveland to sample," Votteler said.

* To view the study, go to www.gbra.org, click on the "Edwards Aquifer" tab, then "Information Regarding Edwards Aquifer Management, Regulation and Policy," then "Extended Chronology of Drought in the San Antonio Area."

* Greg Bowen is a reporter for the Advocate. Contact him at 361-580-6519 or gbowen@vicad.com, or comment on this story at www.VictoriaAdvocate.com.