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Tree-Ring Analysis of Netleaf Hackberry: Applications of Dendrochronology in Riparian Conservation

A. L. McCoy[1]; D. M. Meko[2]; J. Wong[3]; B. J. Orr[4]
1. Arid Lands Resource Sciences, University of Arizona, Tucson, AZ, United States.
2. Laboratory of Tree-Ring Research, University of Arizona, Tucson, AZ, United States.
3. Laboratory of Tree-Ring Research, University of Arizona, Tucson, AZ, United States.
4. Office of Arid Lands Studies, University of Arizona, Tucson, AZ, United States.

Current global climate change predictions present uncertainties regarding the variability of river flows in the southwest that could lead to escalating ecosystem stress throughout the region. These predictions reinforce a growing need for a more adaptive approach to management of river systems. Dendrochronology is a proven and effective tool for examining historic influences of climate on ecosystems and offers insights into how ecosystems may respond to changing climate conditions. While dendrochronology is often utilized in forest and upland systems, potential applications in riparian ecosystems have not been fully established. This study investigates the dendrochronological characteristics and monitoring applications of the common riparian tree Netleaf hackberry (Celtis reticulata). The study was completed in the semi-arid Upper Santa Cruz River watershed in southern Arizona. The Upper Santa Cruz River is characterized by a cascading series of shallow sedimentary groundwater basins and a roughly 40-mile riparian forest compromised of signature southwest riparian tree species. Results from the study confirm that hackberry trees do cross-date effectively and growth rates correlate with stream flow and with maximum and minimum temperature patterns. This information can be used to help understand how changing climate patterns may impact growth trends and the overall health of riparian species. Given increasing demands on water resources, understanding the impacts of hydrologic regimes on riparian ecosystems could contribute to management decisions about groundwater and in-stream flows. Furthermore, dendrochronological analysis can provide a new and integrated riparian health assessment tool to management agencies and conservation organizations.

Contact Information

Amy L. McCoy, Tucson, Arizona, USA, 85750-0000, click here to send an email