#1393

Title: **Energy, Water, and Carbon Dioxide Exchange of a Riparian Mesquite Stand**

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Rapid population growth in semi-arid regions of the southwestern United States is increasing the demand for groundwater as a source of drinking water. However, vulnerable riparian corridors are often linked to these aquifers, as in the case of the San Pedro River in southeastern Arizona. In such basins, effective management of water resources requires accurate measurements of water fluxes, including the evapotranspiration from the vegetation in the riparian corridor. The riparian vegetation along the San Pedro River typically consists of a narrow strip of phreatophytes, such as cottonwood (*Populus fremontii*) and willow (*Salix goodingii*), and a wider forest of mesquite (*Prosopis velutina*) which populates the lower river terrace. This paper describes a study in which energy, water, and carbon dioxide fluxes were measured over an open-canopy mesquite forest with an understory of sacaton bunchgrass (*Sporobolus wrightii*) and several annual species. Measurements were routinely made throughout the growing season in 2001 at a height of 14 m using eddy covariance techniques, and are used to provide an estimate of the seasonal water use of this riparian mesquite stand.

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