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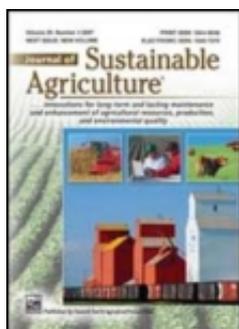
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# Hydrologic, Riparian, and Agroecosystem Functions of Traditional *Acequia* Irrigation Systems

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### **ABSTRACT**

Traditional cultures in arid landscapes of the southwestern United States and northern Mexico developed irrigation systems to irrigate floodplain valleys along streams and rivers. Many of these traditional irrigation systems, referred to as *acequias*, continue to be used today. Population growth in the region

is creating pressures to convert agricultural land and irrigation water to urban and other uses. Unique hydrologic features of the *acequia* systems suggest that, beyond providing crop irrigation, they may provide additional valuable hydrologic, riparian, and agroecosystem functions worth maintaining. We investigated in detail the seepage and the groundwater response to seepage from a traditional *acequia* irrigation ditch along the Rio Grande in north-central New Mexico. We found that 16% of ditch flow seeps into the ditch bed and banks. Groundwater levels near the ditch and midway between the ditch and the river rise 1 m or more within three to four weeks following the start of the irrigation season. The elevated groundwater table produced by ditch and field seepage is sustained until late summer when groundwater levels again drop. The seepage that provides this annual groundwater recharge also sustains riparian vegetation along the main ditch and side ditches. In light of our hydrologic analysis, we considered seepage-supported riparian areas and their ecological functions including aquatic habitat, terrestrial habitat, and water quality effects. *Acequia* hydrology plays an important role in contributing to an ecologically healthy, agriculturally productive, and community-sustaining floodplain agroecosystem.

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## KEYWORDS

- Acequia ,
- agroecosystem,
- ecosystem services,
- hydrology,
- irrigation,
- multifunctional agriculture,
- riparian,
- seepage

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