

Environmental Flows to Support Riparian Forest Galleries in the Middle Rio Grande/Bravo Basin

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Abstract

Providing environmental flows is challenging in the middle portion of the Rio Grande/Bravo Basin (between Elephant Butte Reservoir in New Mexico and Presidio, Texas) where water demand has continued to increase over time despite limited river water and dropping groundwater levels. Riparian ecosystems in this agriculture-dominated desert environment will likely become more vulnerable as competition over scarce water increases in the face of growing demand and dwindling supply. Little to no water is allocated to riparian ecosystems unless water or water rights are purchased or transferred to sustain those systems. Ongoing debates about providing environmental flows for riparian forest galleries in this water-scarce region have not been backed by quantitative modeling results of potential impacts on surface water and groundwater availability. We quantify water requirements to provide a menu of options for environmental flow allocation to establish cottonwood forest galleries. We apply hydrologic modeling under a projected warm-dry future to determine the frequency of river water availability for providing minimum environmental flows, and to evaluate water budget tradeoffs associated with environmental flow allocations in this region. Results inform water resources management decisions that support riparian habitats.

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