

**TRANSIENT GROUNDWATER RIPARIAN CONDITIONS AND SENSITIVITY TO CHANGES IN  
HYDROLOGY, GEOMORPHOLOGY AND VEGETATION****Deborah Hathaway and Nabil Shafike\***

**ABSTRACT:** Shallow riparian groundwater elevations, and their fluctuations in response to environmental and operational factors, are being characterized along the Rio Grande in reaches undergoing evaluation for habitat restoration projects. In this evaluation, a series of fine-mesh, 3-dimensional groundwater flow models are developed and applied. These models will support: the quantification of water supply needs for habitat restoration projects; assessments of the reliability of flows at specific locations; and, identification of locations for habitat restoration projects where shallow groundwater conditions are favorable for project sustainability and maintenance. Time-variant river boundary conditions are being specified using wetted area and depth profiles generated by an existing surface water model (FLO-2D) for a wide range of flow conditions. Regional groundwater conditions, comprising boundary conditions to the riparian groundwater zone, are identified from regional groundwater models. Where data are available, the models are being calibrated to paired river-groundwater level data.

The models will be used to test hypotheses concerning the relationship of shallow riparian groundwater conditions to variations in (a) regional groundwater conditions, (b) flood magnitude and duration, (c) vegetation type and coverage and (d) alternate channel conditions. The relationships characterized in this study will support the identification of flow requirements to establish and maintain groundwater conditions consistent with habitat goals for the Southwest Willow Flycatcher and the Rio Grande Silvery Minnow under varying hydrologic, geomorphic and vegetative regimes.

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