



Quantifying Impacts of Ground Water Withdrawal on Avian Communities in Desert Riparian Woodlands of the Southwestern U.S.

Project
#08-290

Background: Riparian woodlands in the desert southwest are an extremely important resource because they constitute <1% of the desert landscape, yet typically support >50% of the breeding birds. Riparian woodlands also provide shelter and critical food resources for dozens of species of Neotropical migratory birds that alight in these woodlands during their spring and fall migrations across the desert southwest. Ground water withdrawal (and subsequent loss of surface water) to support urban developments in the desert southwest has the potential to degrade or eliminate riparian woodlands throughout the region, including riparian woodlands along the San Pedro River adjacent to Fort Huachuca Military Reservation (FHMR) in Arizona. Military readiness could be jeopardized if limited resources are diverted from the military's mission at Fort Huachuca Military Reservation (and at other military installations in the southwestern U.S.) to deal with the recovery of potentially dozens of declining populations of riparian birds. Funding for this research project was provided by the Department of Defense (DoD) Legacy Resource Management Program.

Objective: The objective of this research project was to assess the value of riparian woodlands to the health and persistence of avian communities in the desert southwest. Specifically, we sought to quantify the extent to which both surface water and the health of riparian vegetation influence the abundance and diversity of riparian birds. Ultimately, our objective was to develop models to allow resource managers on military lands to better predict the effects of future ground water withdrawal and surface water depletion on riparian bird communities along the San Pedro River and elsewhere in the southwestern U.S.



Surface water flowing in Arivaca Creek, AZ

Summary of Approach: From March to October 2006-2008, we surveyed birds, sampled vegetation, and measured surface water at 28 study sights located in riparian woodlands throughout southeastern Arizona, including 4 study sites situated along the San Pedro River near FHMR. We also sampled avian food resources and monitored bird nests at a subset of these study sites.

Benefit: Results from this study provide data that will allow resource managers on military lands to better predict how abundance and diversity of riparian birds will be affected by reductions in ground and surface water levels.



Photo credit: A. Nelson

A Black Phoebe (*Sayornis nigricans*) in a riparian woodland

Accomplishments: We found that the presence and extent of surface water was positively associated with total relative abundance and species richness of riparian birds. We also found that the majority of riparian bird species analyzed were positively associated with surface water, including both breeding (Black Phoebe, Yellow Warbler, Common Yellowthroat, Song Sparrow, Lesser Goldfinch) and migrant (Yellow-rumped Warbler, Wilson's Warbler) species. In addition, some avian food resources (e.g., arboreal and aerial arthropods) were greater at "wet" vs. "dry" study sites. These results provide some of the first quantitative data demonstrating the importance of ground and surface water to riparian birds in the desert southwest.

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