



## **Quantifying impacts of groundwater withdrawal on avian communities in desert riparian woodlands of the southwestern U.S.**

Project  
#06-290

**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. Groundwater 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 Upper San Pedro River adjacent to Fort Huachuca Military Reservation in Arizona. Military readiness could be jeopardized if limited military 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 birds.

**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 a set of models to allow resource managers on military lands to better predict the effects of future groundwater withdrawal/surface water depletion on riparian bird communities along the Upper San Pedro River and elsewhere in the desert southwest.



A researcher collects data in a riparian woodland along the Upper San Pedro River, southeastern AZ

**Summary of Approach:** From March to October 2006, we surveyed birds, sampled vegetation, and measured surface water at 17 study sights located in riparian woodlands throughout southeastern Arizona, including 4 study sites situated along the Upper San Pedro River near Fort Huachuca Military Reservation. We also sampled avian food resources (i.e., arthropods) and monitored nests of riparian bird species at a subset of these study sites.

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



Black phoebe - a common bird of riparian woodlands

**Accomplishments:** We detected positive associations between the presence and extent of surface water and relative abundance for 4 species of birds: black phoebe, Wilson's warbler, common yellowthroat, and song sparrow. In addition, we found evidence for declines in populations of riparian obligate bird species (including Bell's vireo, yellow warbler, and summer tanager) following groundwater withdrawal and a subsequent tree die-off at one of our 17 study sites.

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