

Work Task C37: Hydrology Studies for Avian Riparian Obligate Species

FY10 Estimates	FY10 Actual	Cumulative Accomplishment Through FY10	FY11 Approved Estimate	FY12 Proposed Estimate	FY13 Proposed Estimate	FY14 Proposed Estimate
\$150,000	\$266,477.27	\$266,477.27	\$50,000	\$10,000	\$0	\$0

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Start Date: FY10

Expected Duration: FY12

Long-term Goal: Species research.

Conservation Measures: MRM1 (WIFL, YBCU, ELOW, GIFL, GIWO, VEFL, BEVI, YWAR, SUTA).

Location: Southwestern willow flycatcher and yellow-billed cuckoo breeding sites and LCR MSCP habitat creation sites.

Purpose: To measure hydrologic conditions such as soil moisture, depth to ground water, and amount of standing water in the habitat for the southwestern willow flycatcher and the yellow-billed cuckoo in order to manage habitat creation sites.

Connections with Other Work Tasks (past and future): Breeding habitat for willow flycatchers is being determined through studies completed under D2 and breeding habitat for yellow-billed cuckoos is being determined through studies completed under D7. Habitat parameters for other obligate riparian species, such as summer tanagers, yellow warblers, and Bell's vireos that may benefit from these type of studies are being addressed under Work Task D6. This study was initiated under G3 in 2009.

Project Description: Based on information gathered during surveys for southwestern willow flycatchers on the LCR since 1997, it has been noted that within the dense, moist riparian habitats where flycatchers are found, several other LCR MSCP covered species are also commonly encountered. These species include yellow-billed cuckoos, summer tanagers, vermilion flycatchers, yellow warblers, gilded flicker, and Gila woodpecker. Some soil moisture and/or standing water may be an important feature of optimal riparian habitat, but the exact role this water has in habitat use is not known. It may increase vegetation health, which may be related to insect abundance, or it may increase humidity and lower temperatures. It is also not known how long moisture needs to be present or how large an area needs to be kept in this state during the breeding season.

Although much has been determined regarding site conditions needed for breeding southwestern willow flycatchers (flycatchers) and yellow-billed cuckoos (cuckoos), quantification of how much moist soil or standing water within breeding locations, and how to maintain needed hydrological conditions is still undetermined. This study will review hydrological studies that have been completed already within other river systems that have nesting flycatchers and cuckoos. Monitoring will also begin on hydrologic conditions such as ground water, soil moisture and standing water under known breeding flycatcher and cuckoos sites along the Virgin and lower Colorado River systems.

Previous Activities: New start in FY10.

FY10 Accomplishments: Additional funds became available in FY10 which enabled Reclamation to complete this work in advance. In February and March of 2010 sites were selected and random plots were placed in known willow flycatcher and yellow-billed cuckoo habitats at Bill Williams River National Wildlife Refuge, Topock Marsh, Mormon Mesa, and at the Cibola Valley Conservation Area. Piezometers were placed at each site and transects were established to measure each point for various hydrologic characteristics. The following characteristics were measured at each site: depth to water table, soil texture, soil organic layer, soil moisture and temperature, standing water, and indices for evapotranspiration were created.

The percent soil moisture was measured using two different methods over the course of the field season. Soil moisture was recorded deeper in the soil to measure the soil moisture conditions closer to the tree root zone. A second method was used for purposes of analysis only in which soil moisture was determined from overall soil samples. Air temperature and relative humidity were used as proxies to estimate evapotranspiration. Standing water was measured using a variation of the line intercept method. Existing wells were measured once per month to obtain depth to ground water. These wells were located at varying distances from the river.

At SWFL sites in this study, soil moisture was best predicted by soil texture and distance from flowing water, and relative humidity was best predicted by vegetation canopy height. Sites with lower percent sand had higher percent soil moisture, and sites closer to flowing water had generally lower percent soil moisture. Relative humidity was higher in sites with higher canopy height.

At YBCU sites in this study, soil moisture was best predicted by soil texture. Sites with lower percent sand had higher percent soil moisture. Preliminary data show no significant relationships between vegetation characteristics and the other measured environmental variables.

The SWFL sites had lower average air temperatures, higher average relative humidity, and higher percent canopy cover compared with the YBCU sites. There were no significant differences in the height of the canopy or the percent ground cover between SWFL and YBCU sites.

FY11 Activities: The second year of sampling will take place at the same areas sampled in year one. The data collected will be used along with data collected in year one to characterize hydrologic conditions of breeding yellow-billed cuckoo and southwestern willow flycatcher habitat. After the second year of data has been collected, a final report will be drafted.

Proposed FY12 Activities: The final report will be posted to the LCR MSCP website.

Pertinent Reports: The annual report for 2010, *Soil Hydrology Conditions in Occupied Southwestern Willow Flycatcher and Yellow-Billed Cuckoo Habitat*, will be posted on the LCR MSCP website. The study plan is available upon request.