

## Work Task C27: Small Mammal Population Studies

FY16 Estimate	FY16 Actual Obligations	Cumulative Expenditures Through FY16	FY17 Approved Estimate	FY18 Proposed Estimate	FY19 Proposed Estimate	FY20 Proposed Estimate
\$40,000	\$801.21	\$451,966.09	\$0	\$0	\$0	\$0

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**Start Date:** FY08

**Expected Duration:** Closed in FY16

**Long-Term Goal:** Identify distribution, genetics, and habitat requirements as well as establish monitoring protocols for covered small mammal species

**Conservation Measures:** CRCR1, DPMO1, MRM1, MRM2, and YHCR1

**Location:** Reaches 3, 4, 6, and 7

**Purpose:** The purpose of this work task is to investigate distribution, genetic variability, and habitat requirements of LCR MSCP covered and evaluation small mammal species. These studies are being conducted to clarify the geographic range of the Yuma hispid cotton rat (*Sigmodon hispidus eremicus*) and the Colorado River cotton rat (*Sigmodon arizonae plenus*) along the lower Colorado River (LCR), identify ways to differentiate subspecies of the desert pocket mouse (*Chaetodipus penicillatus sobrinus*), and to describe habitat characteristics of these species.

**Connections with Other Work Tasks (Past and Future):** Data collected as part of Work Task F3 will be analyzed as part of the effort to determine the distribution of the two cotton rat species found along the LCR. Previous presence/absence surveys on small mammal populations were conducted under Work Task D10. This research will inform improvements to the monitoring protocol for small mammals.

**Project Description:** Studies will be designed to identify the distributional range, genetic differentiation, and habitat use of the covered and evaluation small mammal species. Small mammals will be trapped in various habitat types along the LCR to collect genetic samples; the samples will then be sent to a genetics laboratory for deoxyribonucleic acid (DNA) analyses. Genetic differentiation data for animals captured along the LCR will also be compared with data from animals of different subspecies located within Arizona to obtain genetic markers. These data will be used to clarify the distributional range of each species of cotton

rat and identify genetic markers that can differentiate subspecies of the desert pocket mouse within the LCR watershed. Habitat use and population demographics will be estimated with mark-recapture analyses. A population demography study will be implemented to identify habitat at Colorado River cotton rat and Yuma hispid cotton rat capture locations and establish a protocol for monitoring their presence at conservation areas.

**Previous Activities:** Cotton rats (*Sigmodon* sp.) were captured at seven localities along the LCR, including sites near Yuma, Arizona; the Imperial National Wildlife Refuge; the Cibola National Wildlife Refuge; the Palo Verde Ecological Reserve; and the Havasu National Wildlife Refuge. A study was initiated at the end of FY07 to determine the distributional range for the Colorado River cotton rat and Yuma hispid cotton rat, the genetic differentiation between the covered cotton rat species, and their habitat use along the LCR (D10 and F3). In FY08, the study was moved under Work Task C27 in which additional efforts were made to identify cotton rat populations, including sampling known populations along the LCR. Distribution and population genetic analyses have been conducted for these covered cotton rat species.

Population and habitat monitoring began in FY10. From FY11 to FY13, field work for a combined mark-recapture and habitat study was conducted using trapping grids that had different population densities of Colorado River cotton rats at Pintail Slough, the Cibola National Wildlife Refuge Unit #1 Conservation Area Nature Trail, and the Palo Verde Ecological Reserve. Data suggest that cotton rats need dense herbaceous vegetation at least 0.5 meter in height, as it provides an important cover for their activities and protects them from predators. Areas with this habitat structure often had better trapping success as well. These results and methods were reviewed, and protocol improvements were identified for vegetation measurements and data analyses.

Genetic samples of both species of cotton rats and the desert pocket mouse were sequenced using Next-Gen to identify genetic markers that can be used to differentiate the cotton rat species and the subspecies of the desert pocket mouse.

**FY16 Accomplishments:** The habitat and demography study was completed and the results published. Monitoring protocol recommendations were drafted, which included options for future post-development and system-wide monitoring of the covered small mammal species. A report summarizing the genetic analysis conducted on the small mammals was drafted, and an inventory was completed for all genetic samples acquired by the LCR MSCP.

FY16 obligations were under budget, as field work was completed ahead of schedule in FY15.

**FY17 Activities:** This work task was closed in FY16.

**Proposed FY18 Activities:** This work task was closed in FY16.

**Pertinent Reports:** The *Habitat and Population Demographics of the Colorado River Cotton Rat (Sigmodon arizonae plenus) Along the Lower Colorado River, 2009–2013 Final Report* is posted on the LCR MSCP Web site. The monitoring protocol and genetic reports will also be posted upon completion.