

Work Task C27: Small Mammal Population Studies

FY09 Estimates	FY09 Actual	Cumulative Accomplishment Through FY09	FY10 Approved Estimate	FY11 Proposed Estimate	FY12 Proposed Estimate	FY13 Proposed Estimate
\$65,000	\$110,074.68	\$203,265.36	\$35,000	\$70,000	\$70,000	\$0

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Start Date: FY08

Expected Duration: FY12

Long-term Goal: Species research to determine distribution, genetics, and habitat requirements, and establish monitoring protocols for covered small mammal species.

Conservation Measures: CRCR1, YHCR1

Location: Reaches 3 through 7 from Davis Dam to the Southerly International Boundary with Mexico.

Purpose: Implement distribution, habitat, and genetics studies for system monitoring of LCR MSCP covered small mammal species. These studies are being conducted to determine geographic range limits of the Yuma hispid cotton rat (*Sigmodon hispidus eremicus*) and the Colorado River cotton rat (*Sigmodon arizonae plenus*), and to determine habitat requirements for these species. Data will be used to coordinate surveys of conservation areas and design habitat for covered mammal species.

Connections with Other Work Tasks (past and future): Data collected as part of Small Mammal Colonization (F3) will also be analyzed as part of the effort to determine species distribution of the two cotton rat species found along the LCR. Previous presence/absence surveys on small mammal populations were conducted under D10. This research will aid in developing a long-term population monitoring protocol for small mammals and a habitat model for *Sigmodon* spp. that can be used for restoration efforts (Section E) and adaptive management (Section G).

Project Description: Studies will be designed to determine the habitat usage, population status, genetic differentiation, and distributional range of two covered small mammal species: the Colorado River cotton rat (*Sigmodon arizonae plenus*) and Yuma hispid cotton rat (*Sigmodon hispidus eremicus*). Small mammals will be trapped in various habitat types along the LCR to collect genetic samples. Samples will be sent to a genetics laboratory for DNA analysis. Genetic differentiation data for animals captured along the LCR will also be compared with data from animals of different subspecies located within Arizona, east of the LCR MSCP planning area, to obtain genetic markers. These data will

be used to compare and contrast specific subspecies and determine the distributional range of each species of cotton rat within the LCR watershed.

The genetics work will be completed in FY10. Additional time and funding will be utilized to develop a habitat model and a population demography study to determine habitat usage and establish a protocol for population monitoring at conservation areas. Population monitoring protocol development and habitat model development research has been designed and will begin in FY10 under G3. These studies will then be moved to this work task in FY11.

Previous Activities: *Sigmodon* spp. have been captured at seven localities along the LCR. A study was initiated at the end of FY07 to determine genetic differentiation between covered small mammal species, distributional range for each species, and habitat usage along the LCR. In FY08, additional efforts were made to identify cotton rat populations, including sampling known populations along the LCR. One population of *Sigmodon* was found at the Cibola Nature Trail site on Cibola National Wildlife Refuge, and several small populations were found near Yuma, Arizona. Distribution and population genetic analyses have been conducted for these covered species.

FY09 Accomplishments: Genetic samples have been collected from the seven sites that have confirmed populations of *Sigmodon*. All samples collected for each species have been sequenced and analyzed for the population genetic analysis. The geographic ranges of the two species have been better defined and populations have been identified for the habitat analysis and population demographic study.

Additional funds were provided to gather data and genetic samples of populations in multiple localities in Arizona, to compare with genetic samples taken along the LCR in order to determine connectedness or isolation of populations.

FY10 Activities: The final report for the genetic analysis will be completed and will be posted on the LCR MSCP Web site. Habitat analysis and development of a population monitoring protocol for *Sigmodon* is being designed under G3 and will be completed in FY11.

Proposed FY11 Activities: Permanent sampling grids will be established at known *Sigmodon* localities to develop a habitat model for quantifying restoration efforts, determine habitat usage, and establish a permanent protocol for population monitoring of *Sigmodon* at restoration sites. Population monitoring design and habitat analysis research will continue at several sites along the LCR to determine habitat use for duplication and implementation at restoration sites.

Pertinent Reports: The final report for the population genetic analysis will be posted on the LCR MSCP Web site. A habitat modeling and population monitoring study design is available upon request from the LCR MSCP.