

## Work Task G3: Adaptive Management Research Projects

FY09 Estimates	FY09 Actual	Cumulative Accomplishment Through FY09	FY10 Approved Estimate	FY11 Proposed Estimate	FY12 Proposed Estimate	FY13 Proposed Estimate
\$230,000	\$388,826.06	\$1,427,875.36	\$300,000	\$300,000	\$380,000	\$380,000

**Contact:** Theresa Olson, (702) 293-8127, [tolson@usbr.gov](mailto:tolson@usbr.gov)

**Start Date:** FY06

**Expected Duration:** FY55

**Long-term Goal:** Effective conservation of native species and their habitats.

**Conservation Measures:** MRM1, MRM2, MRM4, WIFL1, MRM5, BONY5, RASU6, CRCR1, YHCR1, MRM3, FLSU3, LLFR1, LLFR3

**Location:** System-wide

**Purpose:** Develop tools to effectively evaluate conservation actions.

**Connections with Other Work Tasks (past and future):** Research projects initiated under this work task may be continued as Species Research (Section C). Information obtained may be used for Fish Augmentation (Section B), System Monitoring (Section D), Habitat Creation (Section E), Post-Development Monitoring (Section F), or Habitat Maintenance (Section H).

**Project Description:** The Adaptive Management Program is an assurance that the conservation actions presented in the HCP are effectively accomplished. This work task develops and evaluates tools by which the conservation actions can be measured, and provides data to improve the efficacy of techniques to successfully create habitat.

Three principal activities comprise this work task: 1) evaluate species accounts and suggest research to update, expand, and/or refine life history data; 2) review and evaluate conservation actions implemented prior to the LCR MSCP along the Colorado River or implemented by other entities; and 3) assess existing and potential monitoring tools and protocols to improve evaluation capabilities.

This work task enables Reclamation to initiate priority research projects in a timely manner. For example, opportunistic research proposals (e.g., time-sensitive such as spawning or breeding season dependent) can be considered and initiated during the funding year and then be elevated to full research or monitoring status (Section C, D, or F) the following year. Also, experimental techniques can be evaluated through research to

assess their utility, and if found to be useful, they would be incorporated into monitoring activities.

**Previous Activities:** An evaluation of monitoring techniques for assessing relative abundance of RASU in riverine reaches was conducted, providing population estimates for adult RASU spawning in the Colorado River near Needles, California. A telemetry study was initiated in FY07 to determine range and habitat use by repatriated RASU in Reach 3.

Research was begun to experimentally determine lethal salinity limits for RASU eggs and larvae. Results indicate that upper salinity tolerances are between 10,000 and 15,000  $\mu\text{S}/\text{cm}$  for eggs, and 23,000 and 26,000  $\mu\text{S}/\text{cm}$  for larvae. Remote sensing applications for PIT-tagged fish were evaluated. This was continued as C23.

**FY09 Accomplishments:** A study was initiated looking at the hydrology and water management of southwestern willow flycatcher known breeding sites at Topock Marsh. Breeding populations have been declining in Topock Marsh at an alarming rate, and this study will help determine whether the lack of water during the initial part of the breeding season is the reason. Hydrology and standing water were mapped throughout the breeding season in 2009 to get pre-treatment data for comparison with data collected after placing water within the site during FY10 breeding season. Intensive topography and photography were also obtained for the study area. The treatment and monitoring portion of this study will be continued under D2 and D3.

A study was initiated to determine the feasibility of utilizing soil amendments. Amendments tested included compost, manure, hay, wood waste, cotton gin waste, rice hulls, and bio-solids; materials in the form of moist soil amendments were also tested. Initial indications suggest that the bio-solid material, Lassenite Pozzolan, which is primarily amorphous silica, may be a suitable material. Extensive laboratory testing will continue in FY10 under C42 on this substance.

Preliminary assessment of stable isotope analyses as a possible tool for understanding RASU survival in Reach 3 was conducted, resulting in a design for C38. A study design for assessing post-stocking survival of BONY was completed, and the work will begin in FY10 as C39. A study to assess population ecology of RASU and BONY in floodplain lakes and ponds was scoped out. This work also will be initiated in FY10 (see C40). Approval was sought and received from the Lake Havasu Office of the BLM to modify artificial structures placed in Lake Havasu by addition of PIT-tag antennae to facilitate investigations of habitat use by stocked fish. The work is being initiated in FY10 as C41.

During spring FY09, an in situ evaluation of the wedge-wire screen system's effectiveness was conducted at Imperial Ponds on Imperial NWR. The purpose was to determine exclusion potential and entrainment rates of this type of system and its applicability to backwater habitat creation under the LCR MSCP. Entrainment sampling was conducted monthly, from mid-April to early July, when larval densities outside the screen were expected to be highest. Preliminary analysis of the samples taken showed

that the eggs and larvae of the smallest size class of nonnative fishes (those with eggs less than 1 mm in diameter) were entrained through the screen in nearly all the samples taken.

Entrained eggs and larvae from several taxonomic groups, primarily *Lepomis* sp., *Clupeidae* sp., and *Cyprinidae* sp., were collected. Larger size classes of nonnative fishes (eggs > 1mm) were collected in the supplementary sampling outside of the screen system, but none of these fish species with larger early life stages, (e.g., predatory fishes including largemouth and smallmouth bass) were collected in the entrainment samples.

These results corroborate the results from a model laboratory analysis of the Beal Lake screen system conducted in 2006 and suggest that these screens (with slot sizes of 0.5 mm) are effective at excluding the eggs and larvae of fishes that have early life stages exceeding 1 mm in diameter, but not those with eggs less than 1 mm in diameter. Initial management implications of these results indicate that the wedge wire screen technology may be used as a part of a program to exclude nonnative fishes from protected backwaters but other management actions may be necessary to achieve 100% exclusion of all nonnative fish species.

**FY10 Activities:** A genetics study will be initiated to determine the population demographics and habitat use of the California leaf-nosed bat. This study will determine the population history of the California leaf-nosed bat along the LCR, determine the distribution of genetic variation in California leaf-nosed bat roost sites, and identify where individuals from different roosts are foraging. This work will be continued in FY11 under C43.

A habitat analysis and development of a population monitoring protocol for *Sigmodon* is being designed and will continue under C27. The purpose of this research is to define the physical structure of the microhabitat utilized by the Colorado River cotton rat at two sites along the LCR where they appear to have relatively high abundance (an indication of high quality habitat). Data from this research can then be utilized in conservation areas for the creation of cotton rat habitat.

Also, a study looking at seasonal movement patterns of Yuma clapper rail will be initiated to determine habitat use during non-breeding times, in order to determine management recommendations for created habitats when breeding is not taking place. This study will continue under C24 in FY11.

Study designs are being finalized for four new investigations to begin in FY11. These include Management of Fish Food Resources in Off-Channel Native Fish Habitats (C44), Ecology and Habitat Use of Stocked RASU in Reach 3 (C45), Physiological Response in BONY and RASU to Transport Stress (C46), and Genetic Monitoring and Management of Recruitment in Bonytail Rearing Ponds (C47).

Other expenditures in FY10 will include additional riparian restoration research on a number of established conservation areas to be supported by G3. Specifically, G3 will be used as initial start-up funding for a groundwater monitoring investigation at three

established LCR MSCP conservation/research areas. This research presents an integrated investigation to: 1) identify areas at risk for groundwater and soil salinization based on existing data, 2) establish a groundwater monitoring system network to determine soil salinity and groundwater conditions in the existing LCR MSCP restoration/conservation areas, 3) develop a salt balance model that can be used to evaluate groundwater elevations and salt accretion/loss in soils and groundwater, and 4) in conjunction with Reclamation, develop strategies for controlling soil and groundwater salinization in these restoration areas, and implement monitoring strategies to help mitigate salinity problems.

Because obligate phreatophytes, such as those in the riparian communities that are being restored by the LCR MSCP, use groundwater and are sensitive to high salinity, improper knowledge and management of available groundwater resources may impact the long-term performance and survival of restored habitats. In addition, information from these investigations may allow for the more efficient use of irrigation water for these managed habitats.

**Proposed FY11 Activities:** Research questions identified during fish augmentation, species research, system-wide monitoring, habitat creation, and post-development monitoring will be evaluated for development into adaptive management research projects under this work task.

**Pertinent Reports:** The final report, *Techniques for Monitoring Razorback Sucker in the Lower Colorado River, Hoover to Parker Dams, 2006-2007* has been posted to the LCR MSCP Web site.