

Work Task G3: Adaptive Management Research Projects

FY07 Estimates	FY07 Actual	Cumulative Accomplishment Through FY07	FY08 Approved Estimate	FY09 Proposed Estimate	FY10 Proposed Estimate	FY11 Proposed Estimate
\$275,000	\$343,216	\$624,544	\$230,000	\$230,000	\$230,000	\$230,000

Contact: John Swett, (702) 293-8574, jswett@lc.usbr.gov

Start Date: FY06

Expected Duration: FY55

Long-term Goal: Species research.

Conservation Measures: MRM1, MRM2, MRM4, WIFL1, AMM1, MRM5, BONY5, RASU6, CRCR1, YHCR1, MRM3, FLSU3, LLFR1, and LLFR3.

Location: System-wide.

Purpose: Evaluate existing knowledge for each LCR MSCP covered species to determine research needs, develop a research program to complete appropriate conservation measures, and provide data for the habitat creation and maintenance program. As data gaps are identified for each covered species and their habitats, a research activity will be developed to provide information for the Adaptive Management Program. This work task enables Reclamation to implement priority research projects in a timely manner.

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: To achieve successful habitat creation and an effective Fish Augmentation Program over a long period of time, an Adaptive Management Program must be implemented. Data gaps will be identified during C3 and species research priorities will be defined. These research opportunities will be developed into projects/studies and be implemented by Reclamation staff or via contracts, grants, and agreements. Miscellaneous research projects that relate to LCR MSCP covered species and habitats may also be executed in this work task. New knowledge accumulated during the adaptive management process will be used in planning habitat creation projects for covered species, fish augmentation strategies, and system monitoring programs.

Previous Activities: More than 31,000 RASU were stocked into Lake Havasu and the Colorado River below Davis Dam as part of the Lake Havasu Fish Improvement Project initiated in 1993. The USGS and Reclamation have been studying this community since 1999. As a result of these

studies a population of spawning RASU was discovered near Needles, California. Results of this work are included in a report covering a 3-year period from 2003 to 2005, which is posted on the LCR MSCP Web site.

Research needs were identified in the Fish Augmentation Program (Section B) to evaluate monitoring techniques for assessing relative abundance of RASU, especially in riverine reaches. Techniques evaluated included video and still photography from helicopters, visual counts by drift boats, and using night-time electrofishing. These techniques were tested at the spawning group of RASU near Needles.

FY07 Accomplishments: An evaluation of monitoring techniques for assessing relative abundance of RASU was continued at the spawning group near Needles. Aerial photography and videography was highly influenced by wind, which distorts visibility; however, aerial still photography showed promise. Spawning RASU proved far more accessible to night electrofishing than to standard trammel netting. More fish were contacted per staff hour, resulting in better population size estimates. Population estimates derived by boat surface counts (1,133 fish) fell within the population confidence limits resulting from the electrofishing (1,196 fish). A standardized sampling protocol for float counts and electro-fishing was developed and tested.

A RASU telemetry study was initiated in reach 3 during FY07 to determine range and habitat use for these fish. Fifteen adult male RASU were collected from three distinct spawning groups in the river near Needles, California, and Laughlin, Nevada. They were then surgically implanted with a 36-month sonic tag. These fish were tracked every 2 weeks during the spawning season and monthly for the remainder of the year. Habitat data were collected for each fish contacted during tracking. This information will determine the effectiveness of our current monitoring efforts and provide guidance to improve future monitoring.

Research was conducted to experimentally determine lethal salinity limits for RASU eggs and larvae. Adult RASU were captured from Lake Mohave via trammel nets and electrofishing and were manually spawned on-site during March. Fertilized eggs were transported to the USBR Fisheries Laboratory in Boulder City, Nevada, for experimental trials. Laboratory research for FY07 was conducted from March 14 to May 24, 2007. Salinity levels chosen for experimentation indicated that upper salinity tolerances are between 10,000-15,000 $\mu\text{S}/\text{cm}$ and 23,000-26,000 $\mu\text{S}/\text{cm}$ for eggs and larvae respectively. Additional research will be completed in FY08.

FY08 Activities: An external science review of the strategy for implementing the conservation measures for avian species will be initiated. Current and proposed activities will be evaluated and recommendations for increasing overall program efficiency will be made.

New avian research projects have been proposed in FY08 under this workplan. To effectively and efficiently create marsh habitat for covered bird species, created habitats must be designed to provided necessary requirements for CLRA, LEBI, and BLRA. A study will be initiated to develop a conceptual design to provide these habitat requirements. FY09 work will be continued under Work Task C28.

Through work accomplished under Work Task D2, nest predation was determined to be the leading cause of nest failure for SWFL and other open nest passerines. However, little is known about nest predation along the LCR. In FY08, a study will be initiated to determine causes of nest predation and to recommend management actions that may reduce these stresses. FY09 work will be conducted under Work Task C28.

A final report for the development and evaluation of monitoring techniques of RASU in riverine habitats is being completed. It will include a final evaluation of aerial photography and videography, as well as refinement of standardized protocols for float counts and electro-fishing surveys. These data will be compared to data from standard mark/recapture protocols using electrofishing for accuracy, cost, and overall impact and the least favorable survey methods will be discontinued.

The RASU telemetry efforts initiated in FY07 will be continued. An additional five fish will be sonic tagged and released in the lower end of Lake Havasu, and their movements will be followed, which could possibly lead to the discovery of new spawning aggregations. Initial tags had a 36-month tag life and monitoring will continue through 2009.

This is the first year for the evaluation of RASU ageing techniques. Previous work by a contractor has indicated that accurate ageing can be accomplished by analyzing sections of the second and third fin ray. We will determine if this technique is viable for fish inhabiting tailwater areas. FY08 work will include literature review of ageing techniques, and field demonstrations of the fin ray sectioning method (C29).

Salinity research will also continue with modifications suggested by FY07 data. Lethal ranges identified in FY07 will be further scrutinized in an effort to produce a more precise measure of salinity tolerance. Again, attention will be focused on RASU eggs and larvae, and research will be conducted beginning in March. A new research work task will be developed to continue this work with larger-sized RASU and BONY in future years (C32).

Initial research will be conducted to characterize zooplankton communities in off-channel floodplain habitats that have native fishes (C34).

Proposed FY09 Activities: The avian program review will be completed and results will be published in refereed outlets. Based on the outcome of the remote sensing work for RASU monitoring from FY07, a final monitoring protocol will be developed, further tested, and refined. A final report will be written in FY08 presenting the outcome of these tests in terms of estimating population trends, cost, and overall impact to the resource.

RASU telemetry work will be developed as a new research work task for FY09. Evaluation of RASU ageing techniques will increase this year and will include collection of fin rays from the Needles spawning group. These samples will be analyzed and compared with any known ages of the fish which were sampled. If results are positive and the technique appears useful, a new research work task will be developed to expand application of this technique to characterize year-class strength of known spawning groups throughout the LCR MSCP area.

Pertinent Reports: A draft final report, *Development of Remote Sensing Techniques to Monitor Relative Abundance of Razorback Sucker Found Between Hoover and Parker Dams*, is under review and will be posted to the LCR MSCP Web site.