

Work Task G3: Adaptive Management Research Projects

FY13 Estimates	FY13 Actual Obligations	Cumulative Expenditures Through FY13	FY14 Approved Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate	FY17 Proposed Estimate
\$300,000	\$276,217.73	\$2,147,625.87	\$300,000	\$300,000	\$300,000	\$300,000

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Start Date: FY06

Expected Duration: FY55

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

Conservation Measures: All conservation measures dealing with habitat creation, species research, system monitoring, and fish augmentation.

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.

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: All previous activities were moved to other work tasks after initial year of funding.

FY13 Accomplishments: Genetic research for assessing reproductive success of BONY in backwater habitats was conducted. This included testing and optimizing PCR primers

for assessing reproductive success of bonytail in backwater habitats. Twenty-one microsatellite loci were identified that were sufficiently variable in bonytail to allow identification of individuals and successful identification of full-sib families and their parents. A reduced panel of 18 loci was also tested and allowed full-sib families and their parents to be identified. These molecular tools can now be used to assess relatedness and reproductive success of bonytail produced in off-channel habitats; this portion of the work will be funded through C40 in FY14 and beyond. It is imperative to genetically monitor adults and their progeny to assess parental contributions in an effort to maintain genetic diversity.

FLSU Radio Telemetry Testing and Reach 3 Juvenile RASU Monitoring were supported by funds pre-obligated from G3 in FY13. These research investigations are being conducted in FY14 and the descriptions of these activities are detailed below.

A workshop on Conceptual Ecological Models for RASU, WIFL, and YBCU, and how they can be used to inform management decisions was conducted.

FY14 Activities:

FLSU Radio Telemetry Testing. In past years sonic telemetry has been very successful in documenting habitat use and preference of adult flannelmouth suckers in the Colorado River between Davis Dam and Lake Havasu. More recent attempts to employ this same technology on juvenile and sub adult flannelmouth suckers in this reach have provided mixed results. This may be influenced by the types of habitats that are being used and the potential for those habitats to inhibit sonic telemetry. Radio telemetry is less susceptible to vegetative cover, and could increase detectability of tagged fish. However, radio telemetry has potential draw backs; it is hindered by water depth, and relatively low conductivities. Furthermore, this technology has not been used in this section of river or for this size of flannelmouth sucker.

A low frequency receiver and two 4-gram/6-month tags with trailing antenna suitable for implant in flannelmouth suckers between 300 and 350 mm will be purchased. Field testing of the tags and receiver will be conducted in various different elements of cover and at differing depths. If the technology is deemed adequate, then a subsequent assessment of short-term surgical effects will be conducted on captive flannelmouth suckers. Any beneficial aspects from this work will be incorporated into C53 in future years.

Reach 3 Juvenile RASU Monitoring. Reach 3 has an increasing population of spawning razorback suckers with documented larval fish having been found in the river and backwaters from Needles, CA, downstream through Topock Gorge and into Lake Havasu. While larval presence/absence surveys have been successful despite a minimal effort, virtually no effort has been directed toward looking for juvenile razorback suckers (<300). Current research and monitoring techniques are focused on fish >300mm which have been released by the MSCP, and these techniques are not capable of detecting smaller size classes. Unmarked razorbacks are documented annually through the numerous monitoring and research surveys, and these were all assumed to be hatchery

reared fish that had lost their mark (PIT or wire tag). Similar to Lake Mead, Topock Gorge has an abundance of diverse habitat that may also have the potential to harbor naturally recruited razorbacks.

Appropriately sized survey equipment will be used to look for razorback suckers <250 mm total length. This small size is clearly below the minimum stocking size of the MSCP (300 mm) and would increase the likelihood that they were naturally recruited. Monitoring trips will be conducted between November 2013 and April 2014 to coincide with the reduced flows associated with normal river operations. The decreased flows will force fish to retreat from inundated vegetation and become concentrated in the remaining pools. Larval fish monitoring will be done in conjunction with the surveys, and relative catch rates will be used to direct gear deployment. This work is being conducted in conjunction with C45; results from FY14 will determine whether this work is continued into the future.

Evaluation of Immediate Post-Stocking Survival of RASU and BONY. Preliminary investigations to assess the potential sources and relative magnitude of immediate post-stocking mortality will be initiated in FY14. A protocol will be developed to determine latent mortality associated with transport and handling stress, building on the knowledge gained from C46. This may involve holding a subset of stocked fish in a protected area for observation and recording of survival after 24, 48, and 72-hours. Longer durations may also be explored. A subsample of this fish may also have blood tested for levels of stress-indicating compounds. If budget permits, preliminary trials of this protocol may be conducted in FY14. These data may be important to assess the effect of stocking treatments relative to stress-related mortality that may be accounting for immediate post stocking mortality. In addition, a bio-energetics model of piscivorous bird predation will be developed. The model is a first step in assessing the relative pressure that bird predation is having on survival of stocked fish. G3 funds will be used to initiate this work to be covered under work task C65 in FY15 with steering committee review and approval.

Pilot Releases of Sonic-tagged BONY. A study plan will be developed in FY14 to implement this effort in FY15 under work task C64 (Post-Stocking Movement, Distribution, and Habitat use of RASU and BONY). G3 funds are being used to initiate this work by support planning efforts as well as, acquisitions of instruments, sonic tags and other necessary equipment. Pilot releases of BONY will not occur in Lake Mohave until FY15. Number of tagged individuals, release locations, and long-term tracking will be determined from the study plan and will be dependent on fish availability (sizes and numbers). Data gathered from this effort will inform management for future stocking of BONY in Lake Mohave to meet program commitments. If funding and fish are sufficiently available, groups of RASU may also be released and tracked as part of this effort.

Proposed FY15 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: *Development and characterization of microsatellite PCR primers for bonytail chub for use in assessing relatedness of fishes produced in off-channel habitats* can be found on the LCR MSCP website.