

## Work Task C10: Razorback Sucker Growth Studies

FY06 Estimates	FY06 Actual	Cumulative Accomplishment Through FY06	FY07 Approved Estimate	FY08 Proposed Estimate	FY09 Proposed Estimate	FY10 Proposed Estimate
\$125,000	\$63,518	\$63,518	\$125,000	\$125,000	\$125,000	\$125,000

**Contact:** Tom Burke, (702) 293-8310, tburke@lc.usbr.gov

**Start Date:** FY06

**Expected Duration:** FY11

**Long-term Goal:** Seek measures to improve quantity, quality, and cost effectiveness of RASU reared for the Fish Augmentation Program.

**Conservation Measures:** RASU3, RASU4, and RASU6

**Location:** Various locations including hatcheries, rearing ponds, universities, and private research facilities.

**Purpose:** Evaluate factors affecting growth of subadult RASU to maximize total length at release and reduce rearing time in hatchery.

**Connections with Other Work Tasks (past and future):** This work is similar to actions in C11 and shares some activities (concurrent studies at same locations.) Also, a workshop for fish culturists planned for FY07 will be held jointly for RASU (C10) and BONY (C11).

**Project Description:** Provides funding over a 5-year period for investigations into rearing and culture of RASU. The goal is to investigate ways to accelerate growth of RASU through manipulation of physical, chemical, and biological attributes of the rearing environment (e.g., manipulate feed, fish density, water temperature, water hardness, turbidity, lighting, presence/absence of cover). Current hatchery practices rear 250-300 mm TL fish in roughly 3 years. However, numerous observations during recent rearing and culture of RASU show a wide range in growth rates for this species, and it is possible to have 100, 200, and 300 mm TL fish from the same year class on station at the same time. In general, 25% of a RASU year class exhibit accelerated growth, 50% show moderate growth, and 25% demonstrate slow growth.

The species is a rare fish for which only limited life-history data exist, and data that exist are mostly for adults, not young life stages such as those being reared in hatcheries. As more fish are reared, released, and followed, more life-history data are being collected. Much of this information may be important to fish culturists. For example, the fact that young RASU were nocturnal was determined in 1992 by observations of biologists from the Lake Mohave NFWG. Even so, hatchery managers are just now testing night-time feeding regimes. Active culture of RASU is a young science; many of the techniques initially used for rearing this species

originated in the culture of rainbow trout, a species actively cultured for more than 50 years. Only during the past decade was it conclusively determined that a high-protein trout diet results in spinal deformities in fingerling RASU. As a final example, it was not recognized until the 1980s that adult RASU can feed successfully in open water areas on zooplankton. Much of the existing literature up to that time was for riverine population, and assumed that the adult RASU were only bottom feeders. This information may be vital in determining where feed should be introduced within the water column during the culturing process (sinking, floating, or suspension). These types of observations need to be recongnized, then hypotheses developed, and finally tests of the hypotheses designed and conducted.

Literature reviews will be conducted to compile information on rearing these fish. This will include site visits to facilities acitvely culturing RASU to document successes and failures. Also to be included are inquiries to field biologists and technicians to document behavior of fish in the wild (i.e., daily activities such as feeding, resting, and use of cover in wild habitat). And finally, ideas and hypotheses will be formulated into numerous small experiments, testing one variable at a time.

**Previous Activities:** This was a new start in FY06.

**FY06 Accomplishments:** Reclamation contracted with AGFD to begin work on this 5-year effort (actual award of the contract did not occur until late into the fiscal year). The first research objective was to collect background information regarding RASU rearing techniques in both hatcheries and natural rearing areas. A questionnaire was developed and sent out to facilities known to have reared RASU or currently rearing RASU. Testing-apparatus designs were reviewed for installation at Bubbling Ponds SFH.

**FY07 Activities:** Information from the questionnaire is being summarized and on-site visits to all RASU rearing stations are being conducted. Findings are being developed into a descriptive report to be shared among those conducting RASU culture. In cooperation with Reclamation, a workshop with RASU culturists is being facilitated to share information and ideas concerning improved production of species, particularly with regard to improving growth rate of RASU between 350 and 500 mm TL.

Also, polyculture tests are being conducted by the USFWS at Achii Hanyo Native Fish Rearing Facility, where RASU and BONY are being reared in the same ponds. These fish will be harvested in November 2007, and study results will be available in spring 2008. The USFWS is also conducting RASU growth studies at Willow Beach NFH to determine density levels and feeding rates for rearing RASU from 300 mm up to 500 mm TL to accelerate brood stock development in Lake Mohave.

**Proposed FY08 Activities:** Research investigations from a priority list of research needs developed at the fish culture workshop will be designed and conducted.

**Pertinent Reports:** The scope of work is available upon request from the LCR MSCP.