

Work Task C10: Razorback Sucker Growth Studies

FY05 Estimate	FY05 Actual	Cumulative Accomplishment Through FY05	FY06 Approved Estimate	FY07 Proposed Estimate	FY08 Proposed Estimate	FY09 Proposed Estimate
\$0	\$0	\$ 0	\$125,000	\$125,000	\$125,000	\$125,000

Contact: Tom Burke, (702) 293-8711

Start Date: FY06 **Expected Duration:** FY11

Long-Term Goal: Continuously seek measures to improve quantity, quality and cost-effectiveness of fish 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 razorback sucker (RASU) in order 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 Work Task 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 five-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/or biological attributes of the rearing environment (e.g., manipulate feed, fish density, water temperature, water hardness, turbidity, lighting, presence/absence of cover, etc.). Current hatchery practices rear 250-300 mm fish in roughly three 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 fish from the same year class on station at the same time. In general, 25 percent of a RASU year class exhibit accelerated growth, 50 percent show moderate rate of growth, and 25 percent demonstrate slow growth.

The species is a rare fish for which only limited life-history data exist, and that which does exist is 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 over 50 years. It was

only during the past decade that it was 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. Should diet formulations sink, float, or remain in suspension? These types of observations need to be recognized, 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 actively culturing RASU to document successes and failures. Also to be included are inquiries to field biologists and technicians to document nuances of the fishes in the wild (e.g., the existing knowledge and observations of daily activities within natural habitat like feeding, resting, use of cover, etc). And finally, ideas and hypotheses will be formulated into numerous small experiments, testing one variable at a time.

FY05 Activities: This is a new start in FY06.

FY06-10 Activities: During FY06, Reclamation is contracting with the Research Branch at Arizona Game and Fish Department to begin work on this five-year effort. The research objectives are to accomplish the following tasks:

1. Collect background information regarding RASU rearing techniques in both hatcheries and natural rearing areas. (FY06 and FY07)
2. Summarize this information in a descriptive report to be shared among those conducting RASU culture. (FY07)
3. In cooperation with Reclamation, facilitate a workshop with RASU culturists in order to share information and ideas concerning improved production of species, particularly with regard to improving growth rate. (FY07)
4. Design and construct a research facility at Bubbling Ponds SFH appropriate for testing new ideas developed at the workshop. (FY07)
5. Conduct the research, and report results to Reclamation and to RASU culturists. (FY08 – FY11)

Pertinent Reports: Scope of Work for this multi-year cooperative study will be available following award of agreement.