Work Task C10: Razorback Sucker Growth Studies

FY08 Estimates	FY08 Actual	Cumulative Accomplishment Through FY08	FY09 Approved Estimate	FY10 Proposed Estimate	FY11 Proposed Estimate	FY12 Proposed Estimate
$125,000	$159,000.24	$328,901.24	$125,000	$125,000	$125,000	$25,000

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Start Date: FY06

Expected Duration: FY12

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 was held in FY07 that focused on culture needs for both 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 accelarate 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 Native Fish Work Group. 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. For 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 the 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 recognized, then hypotheses developed, and finally tests of the hypotheses designed and conducted.

Previous Activities: Literature reviews were conducted to compile information on rearing these fish. These reviews also included site visits to facilities that are actively culturing RASU to document successes and failures. Inquiries were made 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 are being formulated into numerous small experiments, testing one variable at a time.

FY08 Accomplishments: Reclamation is working cooperatively with AGFD to study factors affecting growth of RASU. A report was submitted by AGFD titled *Effects of Disease Treatments on Growth of Razorback Sucker*. Four chemicals commonly used to treat for *Ichthyophthirius multifiliis* were examined to evaluate their effects on growth of RASU. The intent is to incorporate learned information and the best technologies into Bubbling Ponds SFH for facility improvements to accelerate RASU growth and improve survival. Final designs were completed for installation of intensive culture tanks at Bubbling Ponds SFH.

At Willow Beach NFH, a RASU growth study was completed in recirculating raceway units. Preliminary results from these studies will be included in a report in FY09.

RASU and BONY that had been polycultured at Achii Hanyo FRS were harvested in December 2008. A total of 60 RASU grew to an average of 469 mm TL and 2,163 BONY reached 300+ mm TL.

FY09 Activities: USFWS will conduct the second year of polyculture for RASU and BONY in the same ponds at Achii Hanyo FRS and raceways at Willow Beach NFH used during the first year of the study. 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. AGFD will continue to study factors affecting growth of RASU at Bubbling Ponds SFH.

Proposed FY10 Activities: Research investigations on RASU growth will continue to be implemented.

Pertinent Reports: The scopes of work are available upon request.