

Work Task C10: Razorback Sucker Rearing Studies

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
\$125,000	\$126,121.64	\$765,880.49	\$125,000	\$125,000	\$125,000	\$0

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Start Date: FY06

Expected Duration: FY15

Long-term Goal: Provide RASU of sufficient quantity and quality for the Fish Augmentation Program, and ensure that these fish are reared in a cost-effective manner.

Conservation Measures: RASU3, RASU4, and RASU6.

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

Purpose: Evaluate factors affecting rearing of subadult RASU to maximize quantity and quality of RASU produced for the LCR MSCP.

Connections with Other Work Tasks (past and future): This work task is a companion study to Bonytail Rearing Studies (C11) and may share some of the same locations, source data, and testing staff during implementation. Also, investigations carried out may be conducted at hatcheries identified in Section B.

Project Description: This work task provides funding for investigating rearing and culture practices of RASU. The goal is to investigate ways to accelerate growth and improve post-stocking survival of RASU through manipulation of physical, chemical, and biological attributes of the rearing environment.

Objectives:

- Evaluate factors affecting growth in aquaculture
- Evaluate polyculture techniques to maximize rearing capabilities
- Identify requirements to rear RASU to 500mm using existing facilities at WBNFH
- Evaluate predator recognition and avoidance training

Previous Activities: Literature reviews, site visits to RASU aquaculture facilities, communication with fisheries professionals, and workshop led to the development of hypotheses for single-variable experimental designs.

Factors that affect RASU growth in captivity have been evaluated and methods to improve growth rates at Bubbling Ponds SFH have been identified. Results showed that growth rates of RASU are 6-9 mm/ month; this is consistent between ponds and all tested densities are temperature independent. Growth may be enhanced by separating fast-growing and slow-growing fish after the first year, substantially reducing fish density, and modifying the water delivery system to eliminate *Ichthyophthirius multifiliis* (Ich) from the hatchery source water.

Polyculture of RASU and BONY was evaluated at Achii Hanyo Rearing Station. The study concluded that polyculture of BONY and RASU is not detrimental to either species provided densities do not exceed carrying capacity. This is no longer being practiced at Achii Hanyo due to difficulties with maintaining pond densities amidst voluntarily spawned BONY.

FY12 Accomplishments: RASU growth studies at Willow Beach NFH concluded that current production rates prohibited achieving fish growth of 500 mm TL within four years. In order to achieve the desired 500 mm TL, annual production would have to be reduced to 1,600 razorback suckers instead of the current production of 7,000 razorback suckers to 300 mm TL and 1,000 to 400 mm TL.

Infrastructure improvements were made to the research building at Bubbling Ponds SFH in preparation for initiating RASU and BONY Predator Recognition experiments in FY13. This included installation and repairs to tanks and water supply. RASU have been obtained from SNARRC, and predators (largemouth bass and flathead catfish) have been captured and quarantined.

FY13 Activities: Predator recognition research will continue. RASU will be exposed to the conspecific alarm substance and a predator with a temporarily incapacitated jaw muscle concurrently. Survival trials of conditioned and unconditioned fish when exposed to actively feeding predators will be evaluated over 24 hours.

RASU and BONY predator recognition experiments will be initiated in FY13. RASU will concurrently be exposed to its conspecific alarm substance and a predator with a temporarily incapacitated jaw muscle. Survival trails of conditioned and unconditioned RASU when exposed to actively feeding predators will be evaluated over 24 hour intervals.

Pond restoration is expected to begin late in FY13. Three ponds will be restructured into six identically sized mesocosms to evaluate survival of BONY and RASU at various levels of predator avoidance training.

Proposed FY14 Activities: Pond reconstruction and installation of remote PIT scanning antennae is going to be completed. Predator recognition studies to investigate whether a subset of conditioned fish increases survival of unconditioned fish will continue. Investigations of long-term survival of trained RASU will also continue. How time between conditioning and stocking influence survival in the presence of actively feeding predators will be evaluated.

Pertinent Reports: Scopes of work and project reports are available upon request. *Effects of Disease Treatments on Growth of Razorback Sucker; Effects of Capture By Trammel Nets On Native Arizona Fishes; and Factors Affecting Growth of Razorback Sucker in Captivity: Literature Review and Knowledge Assessment* are available on the LCR MSCP website.