

Work Task C10: Razorback Sucker Rearing Studies

FY14 Estimate	FY14 Actual Obligations	Cumulative Expenditures Through FY14	FY15 Approved Estimate	FY16 Proposed Estimate	FY17 Proposed Estimate	FY18 Proposed Estimate
\$125,000	\$133,266.56	\$1,000,660.01	\$0	\$0	\$0	\$0

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Start Date: FY06

Expected Duration: FY14

Long-Term Goal: Provide information from research to inform managers of ways to improve the efficiency and effectiveness of the LCR MSCP Fish Augmentation Program

Conservation Measures: RASU3, RASU4, and RASU6

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

Purpose: To evaluate factors affecting rearing of subadult razorback sucker to maximize quantity and quality of razorback sucker produced for the LCR MSCP

Connections with Other Work Tasks (Past and Future): This work task is a companion study to Work Task 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 Fish Augmentation (Section B).

Because of similarities in goals and scope with Work Task C61, this work task will be merged with Work Task C61 in FY15. The proposed activities and corresponding budget estimates for FY15 will likewise be captured under Work Task C61. This is a logical merger of these work tasks, as information from this type of research will allow the development and testing of conditioned fish as experimental stocking treatments. These treatments will then be used to test whether different types of conditioning will translate to improved survival of stocked fish. Additionally, the sharing of overlapping resources is expected to increase efficiency in implementation and reporting, and it may also reduce overall expenditures.

Project Description: Funding provided for this work task is to be used for investigating the rearing and culture practices of razorback sucker. The goal is to investigate ways to accelerate growth and improve post-stocking survival of razorback sucker 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 razorback sucker to 500 mm using existing facilities at the Willow Beach NFH
- Evaluate predator recognition and avoidance training

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

Factors that affect razorback sucker growth in captivity have been evaluated, and methods to improve growth rates at the Bubbling Ponds Fish Hatchery have been identified. Results showed that growth rates of razorback sucker are 6–9 mm per month; this is consistent among 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 hatchery source water.

A study of the polyculture of razorback sucker and bonytail was conducted at the Achii Hanyo Native Fish Rearing Facility, which concluded that the polyculture was not detrimental to either species provided densities did not exceed carrying capacity. The study is no longer being conducted at the station due to difficulties with maintaining pond densities with voluntarily spawned bonytail.

Razorback sucker growth studies at the Willow Beach NFH concluded that current production rates prohibited achieving fish growth of 500 mm TL within 4 years. In order to achieve the desired 500 mm TL for all fish, annual production would have to be reduced to a total of 1,600 razorback sucker instead of the production rate of 8,000 razorback sucker (7,000 to 300 mm TL and 1,000 razorback sucker to 400 mm TL).

FY14 Accomplishments: A predator conditioning study was completed at the Bubbling Ponds Native Fish Conservation Facility. Razorback sucker were exposed to the alarm pheromone in the presence of a predator fish that had its jaw

paralyzed using botulinum toxin (making it unable to actively feed) to test if razorback sucker could be conditioned to recognize largemouth bass and channel catfish as a danger. Razorback sucker were exposed to the predator and the alarm pheromone for 5 minutes and then transferred to a tank of actively feeding predators. Conditioned fish had a higher percent of survival than unconditioned fish. For the largemouth bass trials, 52% of conditioned razorback sucker survived compared to 14% of unconditioned razorback sucker. During the channel catfish trials, 86% of conditioned razorback sucker survived compared to 63% of unconditioned razorback sucker. When exposed to both the largemouth bass and channel catfish, 35% of the conditioned razorback sucker survived compared to 16% of unconditioned razorback sucker.

Six ponds were improved to complete predator avoidance trials. Remote PIT scanners were developed to optimize the antenna design for the ponds. A total of 1,000 razorback sucker were grown out for predator conditioning trials.

FY15 Activities: This work task was closed in FY14.

Proposed FY16 Activities: This work task was closed in FY14.

Pertinent Reports: Scopes of work and project reports are available upon request. The reports titled *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 Web site.