

Work Task C63: Evaluation of Habitat Features that May Influence Success of Razorback Suckers and Bonytail in Backwater Environments

FY16 Estimate	FY16 Actual Obligations	Cumulative Accomplishment Through FY16	FY17 Approved Estimate	FY18 Proposed Estimate	FY19 Proposed Estimate	FY20 Proposed Estimate
\$135,000	\$90,290.50	\$193,042.01	\$150,000	\$150,000	\$0	\$0

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Start Date: FY15

Expected Duration: FY18

Long-Term Goal: To inform future design and management of created backwater habitats

Conservation Measures: BONY3, BONY5, RASU3, RASU5, and RASU6

Location: Reaches 2–5

Purpose: To provide information on how natural and artificial habitat features are used by razorback suckers (*Xyrauchen texanus*) and bonytail (*Gila elegans*) and their relative importance for influencing survival and long-term success

Connections with Other Work Tasks (Past and Future): This work task represents the merger of two previously funded work tasks: C41 (closed) and C58 (closed). This work task is related to all work tasks in Fish Augmentation (Section B) that provide razorback suckers and bonytail for augmentation stocking, specifically Work Tasks B7, C23 (closed), and F5. The results of investigations that occur under this work task may indicate that future stocking treatments will need to be tested (C61) or modified (Section B work tasks).

Project Description: The activities covered under this work task both consolidate and build on the work that has been undertaken and accomplished under Work Tasks C41 (closed) and C58 (closed). The combination of these work tasks represented a logical merger because of their similarities in scope and intent and potential overlap in ongoing experimental investigations.

Habitat features are important to success (growth, survival, and reproduction) of fishes in aquatic environments. In particular, structural features such as submerged woody debris, reefs, rock cavities, and submerged vegetation can provide cover for multiple life stages of fishes. Cover allows fishes to hide and

rest and can be vital to survival by allowing them to avoid predation through both concealment and direct protection. The types of features (both artificially constructed and those that are existing/natural) that may be used by native fishes will be investigated. The use of other forms of cover, such as aquatic vegetation and turbidity, may also be investigated to determine which of these types of features plays a more important role as cover for razorback suckers and bonytail. These features may be important, especially in created backwater environments where they may not be present or may not be in sufficient quantities, to promote the success of these species. By including these features in created backwaters, both immediate and long-term survival and success may improve. This work task was created to:

- Inform managers of habitat structures to include when designing and creating backwaters
- Help improve existing created backwaters by providing options for adding structural elements (both “natural” and artificial) to afford adequate cover
- Potentially assist in improving post-stocking survival by suggesting stocking sites with adequate cover or adding features to stocking locations to provide cover from predatory fish and/or piscivorous birds

Previous Activities: Detailed accounts of work and accomplishments covered under Work Tasks C41 (closed) and C58 (closed) have been reported under these tasks and in their associated technical reports. This work included monitoring the use of artificial habitat features in Davis Cove (on Lake Mohave) by both razorback suckers and bonytail. Investigations have also been ongoing to characterize the existing riprap shoreline at High Levee Pond because of documented frequent use of its cavities by bonytail. Preliminary investigations suggested that bonytail regularly used both artificial (constructed and installed) and more “natural” existing structures (riprap) as cover. No difference has been detected in the use of these features by razorback suckers, and this suggested that this species may use other forms of cover; aquatic vegetation and/or turbidity have been speculated as potential cover used by razorback suckers.

FY15 cavity trials for bonytail at the Lake Mead Fish Hatchery suggested a higher frequency in selection of a structure with the 50-millimeter-diameter cavity (smallest cavity opening offered). The hatchery noted that bonytail took about 30 days to get acclimated to the structure before entering. After acclimating, the hatchery observed the bonytail entering the structure and using it almost exclusively, venturing out rarely except to feed.

Artificial habitat selection trials were conducted at Davis Cove to assess the selection of 4-inch drainage pipe by bonytail. The results from 11 weeks of comparing scanning data from pipe habitat and no artificial habitat (control)

suggest there was no difference in use. The diameter of the pipe used as artificial habitat may have been too small for the bonytail that were stocked into Davis Cove.

Data collection ceased at Davis Cove when dissolved oxygen (DO) crashed to lethal levels in parts of the cove in the fall of FY16. Therefore, data were not available to conduct analyses.

FY16 Accomplishments: Investigations at Davis Cove resumed on October 19, 2015. Three scanning intervals were conducted between October 19 and December 7, 2015, to establish a population estimate for razorback suckers and bonytail that may have survived the low DO levels that were detected on September 4, 2015.

On February 10, 2016, 328 passive integrated transponder (PIT)-tagged bonytail were stocked into Davis Cove. The mean total length and weight of bonytail were 215 millimeters and 89 grams, respectively. Habitat containing PIT tag scanning equipment and PIT tag scanning equipment with no habitat (control) pairings were monitored at four sites within Davis Cove. Scanning intervals lasted between 5 and 7 days and were completed three times between April 7 and May 26, 2016. Over the three scanning intervals, the number of razorback suckers and bonytail contacted was six and eight, respectively. These numbers suggested that the bonytail population had fallen to numbers too low to provide any practical habitat use data. Restocking Davis Cove at that time with PIT-tagged bonytail was not possible due high temperatures, so habitat testing was moved to the Lake Mead Fish Hatchery. This change in location also provided a more controlled setting in terms of water quality and consistent control treatments.

On July 19, 2016, two bundles of drainage pipe, one 3-inch diameter and one 4-inch diameter, were placed in a raceway at the Lake Mead Fish Hatchery that contained about 450 bonytail measuring 300–340 millimeters in total length. Each bundle consisted of 10 pipes measuring 5 feet long and contained no scanning equipment. The bundles were monitored visually over 2 months after deployment. Bonytail were noted to occupy the space under and around the pipe bundles, but only three were seen inside of one of the pipes.

FY17 Activities: Investigations of the selection and use of artificial structures by razorback suckers and bonytail will continue in FY17 at the Lake Mead Fish Hatchery. Cavities with similar 3- and 4-inch-diameter openings will be tested with bonytail. Alternative structures will be tested with razorback suckers. If razorback suckers and bonytail in the hatchery inhabit these structures more than they do open water, then they may select the same structures at future stocking locations such as the Imperial Ponds Conservation Area and Beal Lake. These structures could provide fish cover from piscivorous and avian predation at these sites.

Proposed FY18 Activities: Stocked razorback suckers and bonytail will be acclimated to the habitat while in the hatchery and then released within the same habitat onsite. Razorback sucker and bonytail survival will be monitored.

This work task will be closed in FY18.

Pertinent Reports: All findings and statistical analyses will be presented in the report titled *Evaluation of Habitat Features that may Influence Success of Razorback Sucker and Bonytail in Backwater Environments: 2016*, and it will be posted on the LCR MSCP Web site upon completion.