

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

FY15 Estimate	FY15 Actual Obligations	Cumulative Accomplishment Through FY15	FY16 Approved Estimate	FY17 Proposed Estimate	FY18 Proposed Estimate	FY19 Proposed Estimate
\$125,000	\$102,751.51	\$102,751.51	\$135,000	\$150,000	\$150,000	\$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 and bonytail 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 and C58. 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 fish. Cover allows fish to hide and rest

and can be vital to survival by allowing fish 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 includes 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 Accomplishments: Cavity selection trials were completed at the Lake Mead Fish Hatchery. These investigations were conducted to help refine the types of artificial cover that may be used by bonytail by providing different-sized openings in constructed artificial habitat structures. Bonytail of similar size classes were provided with cover that had three different entrance sizes and monitored to see which cavities were selected in greater frequency. Data will be analyzed in FY16.

On March 20, 2015, 400 passive integrated transponder (PIT)-tagged bonytail were stocked into Davis Cove. Mean total length and weight of bonytail were 176 millimeters and 59 grams, respectively. Artificial habitat with integrated PIT

tag scanning antennas and control antenna pairings used were the same as those described in FY15 Work Task C41 (closed). These were deployed in four sites within Davis Cove to increase replication of the study. A total of 11 scanning weeks/intervals were completed between April 6 and September 14, 2015. A total of 17 successful pairings between a habitat and its associated control antenna were completed despite several issues with the deployed scanning units. Of these 17 pairings, bonytail selected habitat over the control 15 percent of the time.

Water quality parameter profiles were taken near the center of Davis Cove once at the beginning of each scanning interval. On September 4, 2015, multiple year classes of razorback suckers and bonytail were seen along the western shoreline of Davis Cove in less than 1 foot of water. These fish were exhibiting signs of oxygen-seeking behavior, which was a response to a drop in dissolved oxygen caused by an unknown reason. A water quality profile on September 4 revealed that dissolved oxygen in Davis Cove was below 0.11 milligrams per liter throughout the water column. It is possible that any habitat associations recorded just prior to or immediately following this observed event could have been confounded by this water quality change due to obvious changes in behavior. These pairings, therefore, may be removed from the analysis.

FY16 Activities: Dissolved oxygen in Davis Cove returned to normally observed levels on October 19. Water quality will be more closely monitored in FY16 to account for potential confounding factors in this study with respect to normal behavior. PIT tag scanning with smaller submersible units was performed in October, November, and December 2015 with the intent to track the fishes that survived the low dissolved oxygen levels in Davis Cove.

Investigations of the selection and use of artificial structures in Davis Cove will continue, with an emphasis on habitat use by bonytail. These investigations will be similar to previous years, with the intention of providing a comparable dataset for analyses and to incorporate any refinements from previous years' lessons learned.

Cavity selection trials will continue at the Lake Mead Fish Hatchery. The proposed budget estimate for FY16 includes the purchase of additional scanners and the construction of additional habitat structures for testing and deployment.

Proposed FY17 Activities: Depending on the results and analyses of FY16 habitat selection trials at Davis Cove, the artificial habitat selection study may be expanded to include tests in environments occupied by non-native predatory fish species. Investigations will expand to identify other types of cover habitats that may benefit razorback suckers, including vertical structures and turbidity, if deemed practical. Budget estimates for FY17 reflect this study expansion.

Pertinent Reports: All findings and statistical analyses will be presented in a report titled *Evaluation of Habitat Features that may Influence Success of Razorback Sucker and Bonytail in Backwater Environments: 2015*, and it will be posted on the LCR MSCP Web site upon completion.