# Work Task C41: Role of Artificial Habitat in Survival of Razorback Sucker and Bonytail

| FY14 Estimate | FY14 Actual Obligations | Cumulative Expenditures Through FY14 | FY15 Approved Estimate | FY16 Proposed Estimate | FY17 Proposed Estimate | FY18 Proposed Estimate |
|---|---|---|---|---|---|---|
| $65,000 | $59,605.33 | $186,171.39 | $0 | $0 | $0 | $0 |

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**Start Date:** FY10

**Expected Duration:** FY14

**Long-Term Goal:** Maintain effectiveness of the LCR MSCP Fish Augmentation Program

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

**Location:** Reach 2, Davis Cove

**Purpose:** To assess the use and role of artificial reefs and structures as cover by native fishes released under the LCR MSCP

**Connections with Other Work Tasks (Past and Future):** This work task is related to all work tasks in Fish Augmentation (Section B) that provide razorback sucker and bonytail for augmentation stocking, specifically Work Tasks B7, C23 (closed), and F5. The study results will be added to the database and used to complete Work Task D8. Due to the strong overlap in scope and purpose of this work task with Work Task C58, it will be merged into a new work task in FY15: Work Task C63. Specific activities and corresponding budget estimates for subsequent fiscal years will be detailed in this new work task.

**Project Description:** Approximately 800 acres of artificial fish habitat have been constructed and deployed in Lake Havasu over the past 15 years. Prior to FY10, similar structures were placed into coves in Lake Mohave. Razorback sucker have been periodically observed by scuba divers in and around these structures along with numerous species of exotic fishes. The frequency at which these structures are selected by native species will be recorded

Davis Cove, a 2.7-acre backwater rearing pond along Lake Mohave, was used to monitor and assess razorback sucker and bonytail responses to the deployment of artificial habitat. Davis Cove has supported razorback sucker and bonytail communities since 2005. Previously stocked bonytail contribute young-of-the-year fish after every spawning season. The backwater is dominated by rock

and sand shorelines with little emergent vegetation, and it is devoid of large submerged habitats. During this study, a variety of constructed habitat types will be placed into Davis Cove to attempt to determine which types of structures are selected by native species. The information may be used to guide current habitat projects in Reaches 2 and 3 as well as facilitate the design and development of LCR MSCP backwater habitats. It may also be used to suggest future stocking locations in Reaches 2 and 3 (e.g., if certain types of structures are known to be used as cover by native fishes, fish could be released in the vicinity of these structures to potentially increase post-stocking survival).

This study is conducted to inform managers of the selection and use of created structure as habitat. The first part of the study will attempt to determine if artificial habitats are used by native species and what the frequency of use is relative to other available artificial habitats, natural habitats, and areas with no cover. If use of these structures is confirmed, the frequency of use should indicate the relative importance of these features as habitat for cover and may also suggest a higher value for a particular type of cover. This information may be used to enhance created backwaters that may have a need for additional habitat features to provide cover for native fish. The next part of the study will attempt to determine the effectiveness of these features at impacting post-stocking survival through expansion of study areas. If constructed habitats are consistently selected and used by either native species, an attempt to assess the benefit of these habitats as protection and concealment from predators can be made. The impact that these structures have on survival of native fishes could also be suggested by deploying these habitats in other locations that have resident populations of non-native fishes.

**Previous Activities:** In FY11, 380 PIT-tagged razorback sucker (mean TL = 218 mm) were stocked into Davis Cove. Brush habitat was deployed within 3–5 m of a single antenna (control) at three different locations in the cove for 5 weeks. Polyvinyl chloride (PVC) pipe was deployed in the same locations near control antennas for 7 weeks. Open water (control antennas) received more contacts than either habitat. When habitats were removed from Davis Cove in October 2011, young-of-the-year bonytail were discovered to be residing inside the pipe that comprised the frame of the habitat.

In FY12, 372 PIT-tagged razorback sucker (mean TL = 258 mm) were stocked into Davis Cove. Brush and PVC pipe were deployed simultaneously with a single antenna (control) within 3–5 m. Similar to 2011, the open water (control antenna) received more contacts than both habitat types. Five sonic-tagged razorback sucker were released in Davis Cove and tracked over the battery life of their tags, 21 days. Fish movements were followed at early morning, mid-day, and early evening time intervals. Razorback sucker were not detected within 5 m of the habitat designs over the 21 days. At the end of FY12, it was decided to

stock PIT-tagged bonytail into Davis Cove for the future dates of the study since it appeared that razorback sucker did not select either habitat variety over the control.

In FY13, 745 PIT-tagged bonytail (from the Achii Hanyo Native Fish Rearing Facility) were stocked into Davis Cove. In March 2013, 52 PIT-tagged razorback sucker (from the Lake Mead Fish Hatchery) were also stocked. On April 1, 2013, brush habitat, pipe habitat, and a single antenna (control) were deployed along the western shoreline in Davis Cove, similar to FY12. Pipe habitat received more contacts than brush habitat but still fewer than the control antenna.

**FY14 Accomplishments:** On February 18, 2014, 450 PIT-tagged bonytail (from the Achii Hanyo Native Fish Rearing Facility) were stocked into Davis Cove. Mean TL and weight of 25 bonytail sampled were 137 mm and 20.6 grams, respectively. On May 14, 2014, 299 PIT-tagged bonytail (from the Achii Hanyo Native Fish Rearing Facility and Wahweap National Fish Hatchery) were stocked into Davis Cove. Mean TL and weight of 22 bonytail sampled were 121 mm and 17.9 grams, respectively. Mean lengths at stocking were lower than previous years due to a shortage of > 250-mm bonytail at the SNARRC. Perforated drainage pipe (4-inch diameter; 5-foot length) was used as habitat for FY14. On March 3, 2014, the brush and 10-inch diameter pipe habitats from FY13 were removed, and two drainage pipe habitats were deployed in separate locations. One habitat was deployed within 3–5 m of a single antenna (control) on the eastern shoreline of Davis Cove. A second habitat and control antenna were deployed in a similar manner at the north central shoreline. On June 25, 2014, a third pipe habitat and associated antenna were deployed on the southwest shoreline. The single habitat type (4-inch pipe) was deployed in different areas of Davis Cove to increase replication of the study. A total of 11 scanning intervals were completed between March 3 and September 29, 2014. Razorback sucker (stocked prior to 2014) and/or bonytail were contacted at each habitat and control antenna site during each of the scanning intervals, with few technical issues.

The Chapman modification of the Lincoln-Peterson Model was used to develop razorback sucker and bonytail population estimates throughout the course of the study. Deployed habitat and supplemental remote sensors were used to record all PIT tag numbers used for the population estimates.

No sonic telemetry with bonytail was used this year due to a lack of appropriately sized fish available at the SNARRC.

Over two stocking events (June 26 and July 2, 2014), 132 bonytail reared from 3 other Lake Mohave backwater ponds were delivered to Davis Cove. Fish from these stockings were contacted throughout the remainder of the study year. Data analyses has been initiated; preliminary data indicated that contact frequencies were higher for artificial habitats compared to open water control sites for 12 out of 24 pairings. This work task is being continued in FY15 under Work Task C63.

**FY15 Activities:** This work task was closed in FY14.

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

**Pertinent Reports:** All findings and statistical analyses will be presented in a report titled *Role of Artificial Habitat in the Survival of Razorback and Bonytail: 2014* and will be posted on the LCR MSCP Web site upon completion.