Work Task C41: Role of Artificial Habitat in Survival of RASU and BONY

FY13 Estimate	FY13 Actual Obligations	Cumulative Expenditures Through FY13	FY14 Approved Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate	FY17 Proposed Estimate
$65,000	$57,946.18	$101,566.06	$65,000	$0	$0	$0

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Start Date: FY10

Expected Duration: FY14

Long-term Goal: Maintain effectiveness of the fish augmentation program.

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

Location: Reach 2, Davis Cove.

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

Connections with Other Work Tasks (past and future): This work is related to all work tasks in Section B that provide RASU and BONY for augmentation stocking, specifically B7, C23, and F5. Study results will add to the database used to complete D8. Due to the strong overlap in scope and purpose of this work task with C58, it will be merged into a new work task in FY 15, C63: Evaluation of Habitat features that May Influence Success of RASU and BONY in Backwater Environments. Specific activities and coreresponding 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. Similar structures have recently been placed into coves in Lake Mohave. RASU have been periodically observed by SCUBA divers in and around these structures, along with numerous species of exotic fishes. This study will record the frequency at which these structures are selected by native species.

Davis Cove, a rearing pond along Lake Mohave, was used to monitor and assess a native fish population's response to the deployment of artificial habitat. Davis Cove is a 2.7-acre backwater pond that has supported a native fish community since 2005. There is a resident population of BONY that contribute young of the year fish (YOY) after every spawning season. Based on visual evidence, these YOY numbers decrease significantly by the end of August of each year. 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 also be used to suggest future stocking locations in Reaches 2 and 3. For example, 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 intended to inform management on 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 higher value for a particular type of cover. This information may be used in to enhance created backwaters that may have 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 for impacting post-stocking survival through expansion of study areas. Should the habitat be selected over open water by either native species then the study could be moved to another closed system that also holds non-native fish. At this stage, we can monitor habitat use in the presence of predators. If native fish select these artificial habitats then they have potential as a form of protection/cover after future stocking events.

Previous Activities: PIT-tag antennae have been purchased and are being incorporated into artificial habitats. Beal Lake was stocked with 610 PIT-tagged RASU in February 2010 and the population was tracked throughout the year using remote PIT-tag antenna. The population dropped to approximately 130 individuals by the end of the year with more than 50% of the loss occurring during the first three months post-stocking. The reason for the demise of the stocked fish is unknown, but some possibilities are predation by migratory birds, mortalities associated with stocking and handling, or water quality deficiencies in certain areas of Beal Lake.

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

In FY12 372 PIT tagged RASU (mean TL = 258 mm) were stocked into Davis cove. Brush and pipe, were deployed simultaneously with a single antenna (control) within 3-5 m. Similar to 2011 the control antenna received more contacts than both habitat types. Small traps with PVC and brush were deployed in several locations to capture YOY BONY that did not have PIT tags. These traps proved to be unsuccessful at capturing young of the year BONY. Five sonic tagged RASU 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. RASU were not detected within 5 meters of the habitat designs over the 21 days. At the end of FY12, it was

decided to stock PIT tagged BONY into Davis for the study's future dates since it appeared that RASU did not select either habitat over the control.

FY13 Accomplishments: In December, 2012 and April, 2013, 444 and 301 PIT tagged BONY (Achii Hanyo Native Fish Rearing Facility) were stocked into Davis Cove, respectively. In March of 2013, 52 PIT tagged RASU (Lake Mead Fish Hatchery) were also stocked. On April 1, 2013, one of each habitat and a single antenna (control) were deployed in 2.3-3.4 m of water on the western shoreline in Davis Cove. A total of 12 scanning intervals were completed between April 1 and September 9 of 2013.

Three month sonic telemetry tags were also used to track habitat use by (4) individual BONY in an attempt to corroborate the scanning results. Fish were tracked at multiple times throughout the day and early evening between April 22 and July 26 of 2013. One sonic-tagged fish was detected within 5 m of both habitat types on July 26, 2013 at 5:55 a.m.

The Chapman modification of the Lincoln-Peterson Model was used to determine razorback and BONY 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. Fish contacts per habitat/antenna as well as statistical analysis will be presented in an annual report.

FY14 Activities: Habitat scanning will begin at the start of the fiscal year to serve two purposes: 1) allow for increased paired scanning events, and 2) monitor the razorback and BONY populations during piscivorous bird migration months. Alternate (smaller diameter) pipe habitat will be deployed prior to the scheduled BONY stocking in the spring in an effort to better duplicate anecdotal evidence of BONY occupying pipe with a diameter of less than 10 inches. A smaller size class (100-150 mm) of BONY will be PIT tagged and stocked as well to document any selection. Sonic tagged BONY will be monitored with respect to their use of artificial habitats. Water quality and population estimates will continue to be recorded with each remote sensing equipment deployment.

Proposed FY15 Activities: Closed in FY14.

Pertinent Reports: Report for 2012 activities was posted to the MSCP website. All findings and statistical analysis will be presented in a report titled, *Role of Artificial Habitat in the Survival of Razorback and Bonytail: 2013*, and will be posted to the LCR MSCP website upon completion.