Work Task C39: Post-Stocking Distribution and Survival of Bonytail in Reach 3

FY13 Estimate	FY13 Actual Obligations	Cumulative Expenditures Through FY13	FY14 Approved Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate	FY17 Proposed Estimate
$250,000	$279,418.33	$934,942.09	$250,000	$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.

Location: Reach 3 to include main stem and backwater habitats.

Purpose: To determine the distribution and post-stocking survival of BONY within Reach 3.

Connections with Other Work Tasks (past and future): This work is related to work tasks B2, B3, and B4, all of which provide BONY for augmentation stocking. Study results will add to the database used to complete D8. Due to the overlap in scope and intent of this work task with work tasks C45 (Ecology and Habitat Use of Stocked RASU in Reach 3) and C49 (Investigations of RASU and BONY Movements and Habitat Use Downstream of Parker Dam), these work tasks will be merged into a single work task C64: "Post-Stocking Movement, Distribution, and Habitat use of RASU and BONY" in FY15. This combination of work tasks will allow sharing of overlapping resources is expected to increase efficiency in implementation and reporting and may also reduce overall expenditures. Activities under C64 will be detailed by river reach and the budget estimates will reflect the effort needed to complete this work.

Project Description: This study will follow stocked fish after they are released into Reach 3 of the Colorado River to design and test ways to improve post-stocking survival. Techniques for monitoring will include marking, tagging, netting, electro-fishing, and visual observations. A final report will make recommendations for future BONY augmentation stockings.

Previous Activities: An April, 2010 investigation established that up to 95% of BONY implanted with three-month acoustic transmitters and stocked at Bill Williams River National Wildlife Refuge (BWRNWR), Arizona, were still being actively tracked at the conclusion of that study. Those fish predominantly used the low water clarity habitat found in and near BWRNWR. A transmitter retention study demonstrated BONY implanted with three and six-month acoustic transmitters remained healthy and active.

Based on results from these first two investigations, longer life (six-month) transmitters were utilized during a December 2010 study. Results indicated that only 50% of acoustic tagged BONY were available for contact after three months, which was substantially less than the April 2010 study. By the end of six months, up to 40% of the BONY stocked in December 2010 still remained active. Dispersal and habitat use resembled patterns displayed by BONY stocked during April 2010. Dispersal was primarily confined to habitats in and near BWRNWR; fish spent significantly more time in this area than elsewhere in Lake Havasu. Subsequent analysis of water discharged from Bill Williams River at Alamo Dam, Arizona, indicated a large-scale water release had occurred two weeks prior to the April 2010 study which was the cause for the lower water clarity conditions during that study. Normal discharge was observed prior to and throughout the December 2010 study.

To determine whether dispersal and survival were related to stocking location or habitat availability, separate dual stocking events were implemented during the final year of this project. During the first stocking in November 2011, 15 acoustic tagged BONY (ten implanted with six-month battery life transmitters, and five with 45-day battery life depth-sensing transmitters) were released at the BWRNWR and Cattail Cove, Arizona. Passive and active tracking data indicated depth-tagged BONY released at BWRNWR and Cattail Cove were contacted on average at 78% and 79% of the available water column depth, respectively. Fish depth was greater during day than at night. Turbidity readings were more than five times greater for actively tracked fish released at Cattail Cove than for fish released at BWRNWR.

BONY stocked at BWRNWR utilized habitat found within the refuge and in general, did not disperse as far as those stocked in Cattail Cove. At the end of this study, 21 of 22 sessile tags were recovered using SCUBA and the number of fish available for contact during any given week was back calculated. Mortality of BWRNWR stocked fish was 100 percent. All ten fish tagged with six-month transmitters were dead by 65 days after stocking. Mortality for Cattail Cove stocked fish also was high but the decline less severe; 2 of 10 fish implanted with six month tags were available for contact 180 days after being stocked.

FY13 Accomplishments: A final split stocking was enacted during October 2012 to further explore dispersal, habitat use, and mortality differences between two separate stocking locations: Blankenship Bend (riverine habitat) and BWRNWR. Fifteen acoustic tagged BONY (ten implanted with three-month battery life transmitters, and five with 45-day battery life depth-sensing transmitters) and about 2,000 PIT tagged BONY were released at each location. Remote PIT scanning antennas deployed throughout Blankenship Bend and BWRNWR scanned for 95,435 minutes and contacted 85 unique PIT tagged BONY, all of which contained a stocking history in the Lower Colorado River Native Fishes Database. Contacts occurred exclusively along the rip-rap shore of BWRNWR and in the main river channel and backwaters near Blankenship Bend and in Park Moabi, California. Turbidity readings reflected the clear water conditions near Blankenship Bend relative to BWRNWR, although turbidity in the refuge was lower than previously recorded. Passive and active tracking data indicate depth-tagged BONY released at BWRNWR and Blankenship Bend were contacted on average at 90% and

83% of the available water column depth, respectively. SUR deployments contacted two acoustic tagged fish in a backwater near Blankenship Bend, and a third fish in a backwater at BWRNWR. These contacts occurred exclusively at night. The extent of detectable fish dispersal was 3.2 times greater for BONY stocked at Blankenship Bend (13.7 mi) than BWRNWR (4.3 mi). At the end of the study, 4 of 5 sessile tags were recovered using SCUBA and the number of fish available for contact during any given week was back-calculated. While mortality of BWRNWR stocked fish was lower than the December 2010 and November 2011 studies, it remained relatively high; 6 of 10 fish were still being tracked at the end of the study. Mortality for Blankenship Bend appeared lower; 9 of 10 fish were still available for contact by the end of the study.

The acoustic telemetry study within Lake Havasu was expanded to describe and characterize the inhabitance and dispersal of hatchery-reared BONY using two release points, BWRNWR and Blankenship Bend. Fish were surgically implanted with sonic tags and released into the BWRNWR in April. All acoustic tagged BONY were determined dead within two weeks post-release. As a result, conclusions were unable to be drawn about post-stocking habitat preference within the reservoir. Snorkeler assisted underwater PIT scanning was conducted beneath a known cormorant roost and eleven PIT tags from previous stockings were detected within the substrate.

FY14 Activities: The second part of the acoustic telemetry study within Lake Havasu was initiated. Ten fish were surgically implanted with sonic tags and released in October 2013 at Blankenship Bend. Active tracking has contacted at least half of the original ten BONY and passive tracking has further increased that number. Additional BONY releases are scheduled for the winter and spring; remote PIT scanning and sonic telemetry will be used to estimate survival and describe habitat use.

Proposed FY15 Activities: Closed in FY14**.**

Pertinent Reports: Reports from 2010 to 2011 titled, *Distribution and Post-Stocking Survival of Bonytail in Lake Havasu*, are posted on the LCR MSCP website and the 2013 annual report is completed and waiting to be posted.