Work Task C64: Post-Stocking Movement, Distribution, and Habitat Use of Razorback Suckers and Bonytail

FY16 Estimate	FY16 Actual Obligations	Cumulative Accomplishment Through FY16	FY17 Approved Estimate	FY18 Proposed Estimate	FY19 Proposed Estimate	FY20 Proposed Estimate
$700,000	$656,351.17	$1,043,666.57	$750,000	$750,000	$750,000	$750,000

Contact: Jeff Lantow, (702) 293-8557, jlantow@usbr.gov

Start Date: FY15

Expected Duration: FY27

Long-Term Goal: To maintain an effective LCR MSCP Fish Augmentation Program

Conservation Measures: BONY3, BONY 4, BONY5, RASU3, RASU4, and RASU6

Location: Reaches 2–5

Purpose: To provide information on the movement, distribution, and habitat use of stocked razorback suckers (*Xyrauchen texanus*) and bonytail (*Gila elegans*) and to use this information to set up an appropriate monitoring network to suggest potential stocking locations and track post-stocking survival

Connections with Other Work Tasks (Past and Future): This work task represents the merger of three previously funded work tasks: C39 (closed), C45 (closed), and C49 (closed). The intent of this combination was to capture the activities with similar purposes and scope into a consolidated, multi-reach effort for both razorback suckers and bonytail. This work task is related to Work Tasks B2, B3, B4, and B6, all of which provide razorback suckers and bonytail for augmentation stocking and may also build on information gained in Reach 1 through Work Tasks C13 (closed) and C57 (closed). Information collected under this work task will be added to the database used to complete Work Task D8. Information obtained from C8 (closed) and C61 will be used in this study. Funds from Work Task G3 were provided in FY14 to accomplish preliminary work in Reach 2 that will be covered by this work task in FY15.

Project Description: The activities covered under this work task both consolidate and build on the work that has been undertaken and accomplished under closed Work Tasks C39, C45, and C49. The approaches used to identify appropriate stocking locations throughout Reaches 2–5 will be formalized, which will be accomplished through pilot releases of tagged fishes to identify dispersal and movement of individuals or groups. Information on preliminary post-stocking habitat selection and use and survival will be provided and can then be used to (1) establish a more appropriate monitoring network in terms of where to locate remote sensing equipment or other sampling gear with higher probabilities for contacts, (2) indicate locations that may be better suited for stocking fishes, and (3) possibly identify additional aggregations of native fishes.

The networks that are established under this work task will also provide monitoring information on the effectiveness of different stocking treatments (conducted under Work Task C61) as well as longer-term information on survival, habitat use, and movement of native fishes in these reaches. Eventually, these established long-term monitoring networks may be used for system-wide monitoring and would be covered under Work Task D8.

Previous Activities: Detailed accounts of work and accomplishments covered under closed Work Tasks C39, C45, and C49 have been reported under these tasks and in their associated technical reports. They include the tracking and monitoring of stocked razorback suckers and bonytail in specific areas in Reaches 3 and 4. Post-stocking movement and habitat use have been documented, and post-stocking survival estimates have been developed for razorback suckers and/or bonytail in these reaches.

Reach 2 (Lake Mohave): A sonic telemetry study was initiated in FY15 with the stocking of 19 adult razorback suckers into Lake Mohave. Razorback suckers were tracked monthly, and 25 submersible ultrasonic receivers were deployed, allowing for continuous surveillance throughout the year. Fish movements and habitat use were identified through analyses of active and passive contacts. Tracking of this cohort of fish will continue through FY17, coinciding with the expected duration of sonic tag battery life.

Reach 3: Habitat use of razorback suckers was studied in eight backwaters and the lower Colorado River from Park Moabi downstream to the Lake Havasu delta (previously conducted under Work Task C39). During the 5 years of trammel netting and 3 years of remote passive integrated transponder (PIT) scanning, both trammel nets and PIT scanners predominantly contacted recently released fish (< 3 years).

Of the eight backwaters being monitored, razorback sucker catch per unit effort for trammel nets and PIT scanners was on average seven times higher in Park Moabi. Water quality (primarily temperature) and the composition of aquatic vegetation were identified as the greatest distinguishing factor in Park Moabi.

Bonytail survival, distribution, and habitat use were assessed at two different locations in FY15: the Bill Williams River in fall 2014 and Park Moabi in spring 2015. Information was obtained through the use of sonic telemetry and remote PIT scanning. The Bill Williams River release site continued to result in low recontacts for bonytail; only 1 of 19 telemetered fish was active after 1 month. Remote PIT scanning data from these two locations showed high contact rates within the first weeks post-release followed by rapid decreases in contact rates in subsequent weeks.

Reach 4 and 5: Monthly PIT tag scanning surveys and a single netting survey below Palo Verde Diversion Dam were completed in FY15. Bonytail were only contacted within months of their release, and razorback suckers were most frequently contacted in the A-10 upper backwater. Only a single razorback sucker was contacted in Reach 5 during FY15. It was in a side channel on the California side, about 0.80 river mile downstream from Ferguson Lake.

FY16 Accomplishments: Accomplishments for this work task have been summarized by river reach.

Reach 2 (Lake Mohave): Tracking of sonic-tagged razorback suckers continued in FY16 through monthly monitoring trips. Passive and active tracking allowed for the identification of both large-scale movements and the use of specific habitats at various locations. Based on passive contacts, razorback suckers were observed to routinely transition among lake zones, often traveling more than 30 miles within relatively short periods of time (5 days – 2 months). Active contacts provided information regarding seasonal habitat use, with fish using deeper, mid-channel habitat in late spring and summer and shallow inshore habitat in late fall.

Nineteen bonytail were obtained from the Lake Mead Fish Hatchery (B6), implanted with 9-month sonic tags, and released into Lake Mohave with a cohort of approximately 400 PIT-tagged bonytail based on similar efforts in early FY16. These fish were released at Arrowhead Cove, a site where bonytail were historically captured. Active tracking was conducted intensively for 6 weeks after release to maintain contact with these fish; however, despite these intensive efforts, approximately one-half of these fish became difficult to locate within the first 3 weeks. Contacts with these fish steadily declined through winter, but an increase in activity was observed in late spring and summer. At the conclusion of the 9-month study period (when sonic tag batteries were expected to fail), seven fish were confirmed as mortalities, eight had an unknown status, and four remained active.

An additional 20 sonic-tagged bonytail were released into Lake Mohave in April 2016 in order to continue to monitor fish within the lake. These fish were released with a cohort of 500 PIT-tagged bonytail and stocked in two locations, Arrowhead and Yuma Coves. Monitoring of these fish followed the same general

format as the previous stocking, with short-term intensive tracking followed by monthly tracking trips. Low recontact rates were observed immediately following stockings. Only 8 of 20 fish were contacted via active or passive tracking 1 month after stockings. At the conclusion of this 9-month study period, 8 fish were confirmed as mortalities, 12 had an unknown status, and 3 were not contacted at any time during the study period.

Reach 3: Due to flannelmouth sucker (*Catostomus latipinnis*) and razorback sucker observations in Laughlin Lagoon, bonytail telemetry and PIT scanning was initiated. This release also included radio-tagged fishes to help describe the fate of fishes lost within the study area. Twenty-four bonytail were implanted with telemetry tags (12 sonic tagged and 12 radio tagged). By the end of the 12-week study, 13 of these fish were confirmed mortalities. Two of the radio tags were found out of the water, and two sonic tags were detected beneath a known cormorant (*Phalacrocorax auritus*) roosting site below Davis Dam. The 11 remaining tags were lost within the study area (no indication of emigration), which may also indicate removal from the study area by avian predators.

Actively tracked bonytail were found associated with bulrush habitats 15% of the time. This was the highest association with any habitat type for all actively tracked fish. PIT scanning indicated some level of survival in Laughlin Lagoon based on the detection of 13 bonytail that were stocked 3 months prior to the beginning of this study. Nevertheless, unique PIT tag detections from the first week to the second week dropped 30% at Laughlin Lagoon, compared to a 60% drop observed in Park Moabi and a 90% decline in detections recorded at other release sites based on similar scanning efforts at all locations.

Reaches 4 and 5: In Reach 4, monthly PIT tag scanning surveys were initiated in October 2015. Remote PIT scanners scanned for 9,675.3 hours and resulted in nearly 350 unique razorback sucker contacts and 40 unique bonytail contacts. Native fishes were scanned in nearly every backwater in the area and throughout the main channel. All of the bonytail originated from a single release on September 23, 2015; 29 were detected in October, 12 were detected in November, and then 3 more were detected through January. The majority of razorback suckers recontacted originated from three stocking events from April 2015 through February 2016. There were also 13 fish recontacted that were released prior to 2015, 10 of which were from 2007.

Four scanning trips were completed in Reach 5 for a total of 1,978.8 scanning hours. Zero fish were contacted during the scanning events, and after 2 years of PIT scanning, only a single fish has been contacted on a PIT scanner in Reach 5.

FY17 Activities: The budget estimates reflect the projected costs for FY17 as part of the continuation of work from combined closed Work Tasks C39, C45, and C49 plus the additional work described below for Reaches 2, 4, and 5.

Reach 2 (Lake Mohave): Twenty bonytail will be obtained from the Lake Mead Fish Hatchery, implanted with 9-month sonic tags, and released into Lake Mohave in January. These fish will be stocked with a cohort of approximately 500 fish. An additional 15 razorback suckers will also be obtained from the Lake Mead Fish Hatchery, implanted with 3-year sonic tags, and released with 2 cohorts of 250 fish. Intensive active tracking will be conducted immediately following stocking. Less intensive active tracking and continuous passive tracking will continue throughout FY17.

Sonic-tagged razorback suckers released in FY15 will also continue to be tracked as part of this effort, as this work can be performed concurrently and will help to maximize resources and the use of acquired equipment. Tracking of razorback suckers will be used to evaluate movement patterns, seasonal habitat use or preference, and spawning site fidelity. Contacts with sonic-tagged razorback suckers will also be used to inform sampling locations for ongoing monitoring efforts.

Reach 3: Regular monitoring of razorback suckers, bonytail, and flannelmouth suckers in Reach 3 will be covered under Work Task D8 in FY17.

Reaches 4 and 5: Monthly scanning surveys will continue in Reach 4, and these will include a greater emphasis on locating any potential riverine spawning aggregates. Sonic telemetry of hatchery-released razorback suckers and bonytail will be initiated in December 2016. Scanning locations will be dictated based on the distribution of the telemetered fishes. If available, additional adult razorback suckers will be captured from the river and implanted with sonic tags in order to aid in the detection of spawning aggregates in the river. No scanning will occur in Reach 5 unless the distribution of sonic-tagged fishes suggests that a substantial amount of stocked fishes are dispersing into this reach and forming spawning aggregates.

Proposed FY18 Activities: Proposed activities for this work task have been summarized by river reach. Paired experimental releases of razorback suckers and bonytail exposed to predator avoidance conditioning and non-conditioned fish will be initiated at a location to be determined. Intensive monitoring is expected to commence along with the increased yearly experimental stocking numbers of razorback suckers and bonytail in these reaches. Monitoring efforts under Work Task C64 will be reduced in Reach 3 until the hatcheries rearing capacity is sufficient to allow for the increased experimental stocking rates to commence. Overall increases in expenditures are expected due to the size, complexity, and accessibility issues involved in conducting work in Reaches 4 and 5.

Reach 2: Sonic-tagged razorback sucker monitoring will continue. Continued releases of sonic-tagged bonytail may also occur.

Reach 3: No work is scheduled in this reach in FY18.

Reach 4: Surveys and monitoring efforts will continue in FY18. All data will be used to inform managers of potentially favorable release locations and relative survival in Reach 4.

Reach 5: Surveys will be limited unless the distribution of sonic-tagged fishes from Reach 4 suggests that a substantial amount of stocked fishes are dispersing into this reach and forming spawning aggregates.

Pertinent Reports: A report summarizing the Reach 3 bonytail work from 2013 to 2016 is completed and will be posted on the LCR MSCP Web site.