

Work Task C61: Evaluation of Alternative Stocking Methods for Fish Augmentation

FY16 Estimate	FY16 Actual Obligations	Cumulative Expenditures Through FY16	FY17 Approved Estimate	FY18 Proposed Estimate	FY19 Proposed Estimate	FY20 Proposed Estimate
\$200,000	\$175,395.05	\$373,555.34	\$300,000	\$300,000	\$0	\$0

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Start Date: FY14

Expected Duration: FY18

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

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

Location: The lower Colorado River within the LCR MSCP planning area, including reservoirs and connected channels from Lake Mead downstream to Imperial Dam

Purpose: To evaluate the effects that alternative stocking methods have on the survival of razorback suckers (*Xyrauchen texanus*) and bonytail (*Gila elegans*) stocked within the LCR MSCP planning area

Connections with Other Work Tasks (Past and Future): Related work tasks include B2, B3, B4, B5, B6, C10 (closed), C11 (closed), C26 (closed), C31, C33 (closed), C39 (closed), C46 (closed), C63, C64, D8, and G3. In FY15, Work Tasks C10 and C11 were incorporated into this work task due to similarities in purpose, scope, and out-year implementation. Specific activities will be detailed in this work task, and the proposed fiscal year budgets will reflect the work that is to be undertaken. In FY16, documentation of soft release experiments was moved from Work Task C65 to Work Task C61. Because soft release research is essentially a type of stocking treatment and aims to assess long term survival through recontact probabilities, it is more appropriately covered under Work Task C61.

Project Description: Extensive monitoring of Colorado River native fishes is a commitment of the LCR MSCP, and in accordance with the Habitat Conservation Plan, several monitoring and research elements have been included as part of the LCR MSCP Fish Augmentation Program. Two of these research elements will be addressed, including (1) understanding and minimizing adverse

effects of stocking and (2) understanding post-stocking distribution and survival. Alternative stocking methods will be evaluated for razorback suckers and bonytail within the LCR MSCP Fish Augmentation Program boundaries and may include stocking during different seasons, stocking at night, stocking cohorts of various quantities, and stocking at specific locations. These alternative methods will generally be evaluated through multiple iterations of paired stockings, with one group representing the more traditional stocking and one representing the alternative method being investigated.

In addition to these alternative stocking methods, fishes reared by alternative means may also be evaluated through these efforts. These treatments will then be used to test whether different types of conditioning will translate to improved survival of stocked fishes. To test the effectiveness of these alternate rearing treatments, stockings would be completed in paired groups and may include fishes that have been either flow conditioned or trained to recognize predators. Information regarding post-stocking distribution and survival will be obtained through ongoing research and monitoring work tasks (C64 and D8). As information on these stockings becomes available, different combinations of these alternative stocking methods and treatments may also be evaluated.

Previous Activities: Previous research related to this work task was conducted under Work Task C26 (closed) in FY09–11. Feeding rates, efficiency of food conversion, growth, swimming performance, and physical condition of razorback suckers reared in flowing raceways at the Lake Mead Fish Hatchery were evaluated. The results from multiple iterations of this research showed that razorback suckers reared at the highest velocity flows evaluated, 38 and 39 centimeters per second, exhibited the most growth, highest food conversion efficiency, and best swimming performance. Additional rearing of native fishes under flowing conditions will be conducted as part of the current work task, and future monitoring efforts will be used to evaluate how the benefits of this rearing strategy relate to post-stocking survival of native fishes.

A total of 37,723 razorback suckers were repatriated into Lake Mohave during FY13–15 as 18 paired cohorts released in day and night stocking events. All efforts associated with these stocking events were captured under Work Task B2. Approximately 2% of FY13 and 0.4% of FY14 releases had been captured or contacted through monitoring efforts at the end of FY15, with little difference observed between day or night releases. Additional capture and contact data for FY13–15 cohorts will be obtained through future-year monitoring efforts and evaluated under this work task to determine the effectiveness or benefit of night stockings as compared to traditional day stocking events.

A portion of FY14 funding was also obligated to upgrade the electrical capabilities at the Lake Mead Fish Hatchery in preparation of future flow-conditioning efforts. This upgrade will support the operation of submersible

propeller pumps, which will allow for controlled flow in ten 30-foot raceways. Monitoring data from flow-conditioned and static-reared cohorts will be analyzed under this work task to evaluate differential survival.

FY16 Accomplishments:

Razorback sucker capture and contact data collected through ongoing monitoring efforts were analyzed during FY16 to evaluate the results from previous year day/night paired releases. Through FY16, approximately 2.3% of FY13, < 1% of FY14, and 1% of FY15 releases had been captured or contacted through monitoring efforts. These figures represent similar contact rates as those observed for traditional stockings; however, while little difference has been observed between fishes contacted from FY13 and FY15 day or night releases, approximately 62% of contacts from FY14 releases represent fishes stocked at night. Lake Mohave monitoring data collected through Work Task D8 have demonstrated that stocked fishes are often not contacted for up to 3 years post-release. Current data continue to support this observation, as an additional 110 fishes from FY13–15 were contacted for the first time in FY16. For this reason, these cohorts will continue to be tracked in future years, as it may require multiple years of data to evaluate this alternative stocking method.

FY16 was the first of three study years in which the survival of razorback suckers stocked into Lake Mohave was compared using cohorts of different quantities. Approximately 7,000 razorback suckers were stocked at 4 locations over a 3-week period, with each location receiving a different-sized cohort of fish (250, 500, or 1,000) each week. The total number of razorback suckers stocked at each location was the same; however, cohort stockings were staggered so that no more than two locations received the same number of fish during any one week. Capture and contact data for these cohorts were collected under this and other work tasks throughout the year. Through the end of FY16, < 1% of stocked fish had been captured or contacted. These cohorts will continue to be tracked in future years, and capture and contact data will continue to be analyzed as they become available through monitoring efforts.

Predator avoidance trials also continued at the six mesocosm ponds at the Valle Vista Golf Course in Kingman, Arizona. A chemical liner was applied to the two holding ponds to prevent water loss. Conditioning frequency research trials began with bonytail and largemouth bass (*Micropterus salmoides*). Data from one pond could not be used because of potential bias that was caused by young-of-the-year largemouth bass that were spawned in the pond. Preliminary data acquired from the studies conducted at other ponds suggested a higher survival rate for the fishes conditioned to avoid predators.

Soft release treatments for razorback suckers were initiated in three backwaters within Topock Gorge of Reach 3. These treatments consisted of fishes being released in paired cohorts of 400 to 600 fish. One cohort was released into a netted off portion of a selected backwater and held for 72 hours, and the other

cohort was released directly into the backwater and allowed to disperse without restrictions. Telemetered fish were released with each group, and remote passive integrated transponder tag scanning was conducted to look at immediate dispersal. Relative survival will be evaluated after several years of contact data have been collected.

FY17 Activities: Due to the razorback sucker losses experienced at Willow Beach National Fish Hatchery as a result of the parasite Ich (*Ichthyophthirius multifiliis*) outbreak in in early FY17, and the resulting lack of available fish to be stocked, comparative survival of razorback suckers stocked in cohorts of different quantities in Lake Mohave was postponed. These treatments will be evaluated in future years as fish become available.

Paired stockings of flow-conditioned and static-reared razorback suckers/bonytail will occur in FY17. Fish will be reared at the Lake Mead Fish Hatchery and released in Reach 2 or 3. The cohort sizes may be small during this initial study year due to the unavailability of suitably sized fish; however, they are expected to increase in future years as additional fish are brought on station. Capture and contact data for these cohorts will be collected through ongoing monitoring.

The last conditioning frequency research trials were completed at the six mesocosm ponds at the Valle Vista Golf Course in Kingman, Arizona, in early FY17. The mixed predator trials began but were also compromised when one dead largemouth bass was discovered in each of the five test ponds. It was suspected that someone was illegally stocking bass and fishing in these ponds during nighttime hours. Mixed predator trials will resume in spring 2017. Additional signs will be posted around the ponds, and a community outreach program will be conducted to raise awareness regarding this research in hopes of preventing fishing and stocking activities in the ponds during the trials periods.

Soft release treatments of razorback suckers will continue in order to assess the effect on long-term survival (probability of recontact) of fishes that are held for 3 days in a netted off section of a selected backwater compared to fishes released without being held. These soft releases should allow the fish recovery and acclimation time following the stresses of handling and hauling. This work will be accomplished using paired releases at three locations within Reach 3.

Proposed FY18 Activities: The potential benefits of alternative stocking methods will continue to be analyzed using capture and contact data from fishes stocked during previous years. Paired stockings of flow-conditioned and static-reared native fishes will also continue.

The predator avoidance study at the Valle Vista Golf Course will recommence in late FY17 and run through FY18, and it will focus on additional mesocosm-based post-conditioning survival trials with razorback suckers exposed to a number of different predators. Other alternatives to traditional stocking will be evaluated

during the year, and potential opportunities to implement these alternatives will be assessed as fish become available. Soft release treatments of razorback suckers will continue through FY18.

Longer-term monitoring of these treatments will be assessed through data derived from passive integrated transponder scanning recontacts. This recontact information will be acquired through the research and monitoring efforts conducted under Work Tasks C64 and D8 after FY18. Comparisons of relative recontact rates of treatment versus controlled fish in paired releases will suggest the effectiveness of each treatment with respect to its ability to improve post-stocking survival of both razorback suckers and bonytail.

This work task will be closed in FY18.

Pertinent Reports: The report titled *Razorback Sucker and Bonytail Chub Predator Recognition* is posted on the LCR MSCP Web site.