

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

FY14 Estimate	FY14 Actual Obligations	Cumulative Expenditures Through FY14	FY15 Approved Estimate	FY16 Proposed Estimate	FY17 Proposed Estimate	FY18 Proposed Estimate
\$150,000	\$118,472.41	\$15,602.82	\$425,000	\$200,000	\$200,000	\$200,000

**Contact:** Jim Stolberg, (702) 293-8206, [jstolberg@usbr.gov](mailto:jstolberg@usbr.gov)

**Start Date:** FY14

**Expected Duration:** FY18

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

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

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

**Purpose:** To evaluate the effects alternative stocking methods have on survival of razorback sucker and bonytail 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, C11, C26 (closed), C31, C33 (closed), C39, C46 (closed), D8, and G3. In FY15, Work Tasks C10 and C11 will be incorporated into this task due to similarities in purpose, scope, and out-year implementation. Specific activities will be detailed in this work task, and the proposed FY budgets will reflect the work that is to be undertaken. This is a logical merger of these work tasks, as information from this type of research will allow the development and testing of conditioned fish as experimental stocking treatments. These treatments will then be used to test whether different types of conditioning will translate to improved survival of stocked fish. Additionally, the sharing of overlapping resources is expected to increase efficiency in implementation and reporting, and it may also reduce overall expenditures.

**Project Description:** Extensive monitoring of Colorado River native fish is a commitment under the program, and in accordance with the HCP, 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 sucker 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, fish reared by alternative means may also be evaluated through these efforts. To test the effectiveness of these alternate rearing treatments, stockings would be completed in paired groups and may include fish 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. 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 in FY09–11. Feeding rates, efficiency of food conversion, growth, swimming performance, and physical condition of razorback sucker reared in flowing raceways at the Lake Mead Fish Hatchery were evaluated. The results from multiple iterations of this research showed that razorback sucker 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 fish 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 fish.

In preparation of this work task, 11,930 razorback sucker were repatriated into Lake Mohave during FY13 as 5 paired cohorts released in day and night stocking events. This number was previously reported incorrectly as 13,116 razorback sucker but has been revised to remove an additional stocking of 1,186 razorback sucker that were unrelated to the paired day and night stockings. All efforts associated with these stocking events were captured under Work Task B2. Contact data for these cohorts will be obtained through FY14 and 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.

**FY14 Accomplishments:** Razorback sucker capture and contact data collected through ongoing monitoring efforts were analyzed during FY14 to evaluate the results from FY13 day/night paired releases. Through FY14, approximately 2% of these releases had been captured or contacted through monitoring efforts. This figure represents a similar contact rate as that observed for traditional stockings, and at present, little difference has been observed between the numbers of fish contacted from day or night releases. Lake Mohave

monitoring data collected through Work Task D8 have demonstrated that stocked fish are often not contacted for up to 3 years post release. 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.

During FY14, the Willow Beach NFH repatriated 11,321 razorback sucker into Lake Mohave as 6 paired cohorts released in day and night stocking events. The time of year and locations of stockings were similar to those of FY13; however, cohort sizes were slightly reduced due to the inclusion of an additional stocking replicate. Capture and contact data for these cohorts will be obtained through ongoing monitoring efforts and evaluated under this work task in future years to determine the effectiveness or benefit of this alternative stocking method.

A portion of FY14 funding was also used to upgrade 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 40-foot raceways. It is anticipated that flow-conditioned and static-reared native fish will be stocked in paired cohorts during FY15. Contact data for these cohorts will be analyzed under this work task to evaluate differential survival.

**FY15 Activities:** An additional 14,483 razorback sucker will be repatriated into Lake Mohave as 7 paired cohorts released in day and night stocking events. A portion of contact data for these cohorts will be collected under this work task, and data will be analyzed as they become available.

Paired stockings of flow-conditioned and static-reared razorback sucker will occur in FY15 pending completion of the Lake Mead Fish Hatchery electrical upgrade. Cohort sizes may be small during the initial study year due to availability of suitably sized fish; however, they are expected to increase in future years as additional fish are brought on station.

Work Tasks C10 and C11 have been incorporated into this work task beginning in FY15. The resulting increase in the budget estimate corresponds to the addition of this work. Predator recognition conditioning that was previously carried out in a hatchery setting in FY14 will transition into field research during FY15. These mesocosm-based, post-training survival trials will be completed to determine if the frequency of avoidance training influences bonytail and razorback sucker survival in the presence of predators. Remote PIT scanners will be installed in November 2014 as part of this effort, and depending on weather variables, field trials are expected to begin shortly thereafter or in early spring.

**Proposed FY16 Activities:** Data collected through this and other efforts will continue to be analyzed to assess the effectiveness or benefit of night stockings.

Pre-release flow conditioning of razorback sucker and stocking of flow-conditioned and static-reared cohorts will continue. In addition, it is anticipated that flow conditioning of bonytail will be initiated in FY16. Other alternatives to traditional stockings will be evaluated during the year, and potential opportunities to implement these alternatives will be assessed as fish become available. Additional mesocosm-based, post-training survival trials will also be completed during FY16 in an effort to determine if the time between predator avoidance training and stocking influences bonytail and razorback sucker survival in the presence of predators.

**Pertinent Reports:** N/A