

## Work Task C65: Evaluation of Immediate Post-Stocking Survival of Razorback Suckers and Bonytail

FY15 Estimate	FY15 Actual Obligations	Cumulative Accomplishment Through FY15	FY16 Approved Estimate	FY17 Proposed Estimate	FY18 Proposed Estimate	FY19 Proposed Estimate
\$60,000	\$20,738.26	\$20,738.26	\$120,000	\$120,000	\$120,000	\$0

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**Start Date:** FY15

**Expected Duration:** FY18

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

**Conservation Measures:** BONY3, BONY4, BONY5, RASU3, RASU4, and RASU6

**Location:** Reaches 2–5

**Purpose:** To identify the most important sources of immediate post-stocking mortality and to inform managers of how to best target and prioritize solutions

**Connections with Other Work Tasks (Past and Future):** This work task is related to Work Tasks B2, B3, B4, C10 (closed), C11 (closed), C46 (closed), and C61. Preliminary planning, acquisition of materials, and study design development will occur in FY14 with funds from Work Task G3.

**Project Description:** Observations from past stocking events have indicated relatively high and immediate post-stocking mortality of razorback suckers and bonytail. This pattern appears more commonly in backwater situations and occurs even in instances where no or low numbers of predatory fishes are present and where water quality parameters should not be a source of mortality. Transport and handling stress and predation by piscivorous birds have been suspected as causes of this low survival. Only anecdotal evidence exists to support the speculation that piscivorous birds are the major cause of this mortality, and although handling and transport stress have been measured for stocked fishes, little evidence exists that connects this stress to actual latent mortality.

This work task builds directly on the knowledge gained from Work Task C46 (closed) and takes the next step from observing stress indicators in stocked fishes to investigating how this translates into actual latent post-stocking mortality. This work may involve holding a subset of stocked fishes in a protected area for observation and recording survival rates after 24, 48, and 72 hours. Longer durations may also be explored if deemed necessary. A subsample of these fishes may also have their blood tested for levels of stress-indicating compounds.

In addition, a bioenergetics model of piscivorous bird predation will be further developed and tested, and observational studies may be employed to help calibrate the model. These studies may include performing counts of confirmed feeding of piscivorous birds on stocked razorback suckers and bonytail. This model is intended to help inform managers of the relative pressure that bird predation may be having on stocked native fishes.

Data collected during this study will be used to assess the effect of stocking treatments relative to stress-related mortality, bird predation, or other factors that may be accounting for immediate post-stocking mortality and will allow managers to better prioritize and target solutions, like those being tested under Work Task C61, or find new ways to improve survival of stocked fishes by identifying what factors are the greatest sources of immediate mortality.

**Previous Activities:** This was a new start in FY15. Previous activities have been conducted under Work Task G3 and included the development of a protocol and study plan to assess latent mortality of stocked fish. The development of a bioenergetics model was initiated in FY14. The purpose of the model was to suggest the potential pressure that available piscivorous birds could exert on stocked fish.

**FY15 Accomplishments:** Latent mortality within the first 72 hours following stocking of razorback suckers in Reach 2 was evaluated. No mortality was observed in the first 72 hours of stocking within the subsample of fish that was held at the stocking location.

Preliminary efforts, initiated under Work Task G3, were made to document bird predation on native fishes using remote passive integrated transponder (PIT) tag scanners as well as scanning beneath known roosts of piscivorous birds. Scanning was initiated in Laughlin Lagoon following a bonytail release in September 2015. Scanners were deployed on the tops of poles out of the water within the stocking area where cormorants were regularly observed. Game cameras were attached to the scanners to document bird usage and to correlate any PIT tag contacts with a particular species of bird. Two PIT tags were detected on multiple scanners within 24 hours post-release, and photo corroboration confirmed that the fish were consumed by a cormorant.

Additional scanning beneath the known roost sites in the lagoon documented 23 stationary tags that are assumed to be from deceased fish. These tags were from fish which had been released throughout the LCR MSCP area, and some were from fishes released as early as 2003.

The energy content (measured in calories) of razorback suckers and bonytail was planned to be collected and assessed in-house; however, specialized equipment was not available on loan or to rent, and the equipment cost for a single experiment could not be justified. This portion of the bioenergetics model development was postponed, and consequently, the FY15 budget expenditures were less than expected. This work will be completed at a facility more suited for the research needs.

**FY16 Activities:** The scanning of known bird roosts immediately following stocking events continues in FY16. Scanning continued to occur in Laughlin Lagoon through December 2015, which encompassed several stocking events and most notably a bonytail release on December 9. Continuous scanning for 10 days following this release resulted in the detection of 24 tags, which was 2.53 percent of the stocked fishes. In total, sporadic scanning from September through December resulted in the detection of 64 tags and confirmed predation by several species (osprey, cormorant, and great blue heron). A study plan will be completed, which will include post-release bird scanning directed at refining the parameters needed for bioenergetics modeling.

Razorback sucker work is being initiated to investigate latent mortality and the relative survival and dispersal of fish stocked using soft release techniques. Fish will be released in paired cohorts, with one of the cohorts being released into a netted off portion of a selected backwater. Telemetered fish will be released with each group, and remote PIT tag scanning will be conducted to look at immediate dispersal. Relative survival will be evaluated after several years of contact data have been collected.

**Proposed FY17 Activities:** Additional bird predation data may be collected in order to continue to refine the bioenergetics model. This work will accompany several native fish stocking events and primarily those scheduled for the Imperial Ponds Conservation Area.

Experimental releases of razorback suckers will continue in order to determine if fishes that are held for 3 days in a netted off section of a selected backwater have greater long-term survival (probability of re-contact) than fishes released without being held. These soft releases should allow the fishes ample recovery time following the handling and hauling associated with fish stocking events. This work will be accomplished using paired releases at three locations within Reach 3.

**Pertinent Reports:** N/A