

## Work Task C30: Development and Evaluation of Measures to Reduce Transport of Quagga Mussel During Fish Transfer and Stocking Activities

| FY10 Estimates | FY10 Actual | Cumulative Accomplishment Through FY10 | FY11 Approved Estimate | FY12 Proposed Estimate | FY13 Proposed Estimate | FY14 Proposed Estimate |
|----------------|-------------|--|------------------------|------------------------|------------------------|------------------------|
| \$70,000       | \$77,335.50 | \$171,889.89                           | \$150,000              | \$150,000              | \$150,000              | \$0                    |

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**Start Date:** FY09

**Expected Duration:** FY13

**Long-term Goal:** Maintain effectiveness of the fish augmentation program.

**Conservation Measures:** BONY2, BONY3, BONY4, BONY5, RASU2, RASU3, RASU4, RASU5, RASU6, and RASU8.

**Location:** Various state and federal hatcheries and laboratories in Boulder City, Nevada; Willow Beach, Arizona; Cornville, Arizona.

**Purpose:** To develop and test measures to assure non-transmittal of quagga mussel larvae and adult quagga mussels during the fish transport and stocking activities of the LCR MSCP Fish Augmentation Program.

**Connections with Other Work Tasks (past and future):** This work is related to all fish facilities in B2, B3, B4, B5, B6, B7, B10, and B11 as RASU and/or BONY are moved between these sites and the lower Colorado River. Work began as a literature investigation under G3.

**Project Description:** This study will develop and test means to assure that quagga mussel larvae and adult mussels are not being transported throughout the Colorado River system as a result of the Fish Augmentation Program. The original Fish Augmentation Plan called for capture of wild RASU larvae from Lake Mohave, which are provided to Willow Beach NFH (B2), Dexter NFH (B4), and Bubbling Ponds SFH (B5). In addition, RASU larvae and juveniles are transported from Willow Beach NFH to Lake Mead SFH (B6) and to lake-side rearing ponds (B7). BONY are transferred from Dexter NFH to Willow Beach NFH and to Achii Hanyo Rearing Station (B3), and directly to the river system. This is an acceptable pathway because quagga mussels are already present at the Willow Beach and Achii Hanyo facilities; therefore, no quagga-free facility is exposed to quagga infestation as the result of this strategy. Transfers of fish from quagga-infested facilities to non-infested facilities have been halted until such time that assurances can be

made that quagga mussels are not being carried along with these fish. This study will attempt to develop measures to allow such certification.

**Previous Activities:** During January 2007, the exotic quagga mussel was discovered in Lake Mead, and subsequently found in both Lake Mead SFH (B6) and Willow Beach NFH (B2). Larval RASU that were to be transferred to Bubbling Ponds SFH (B5) were not collected (B1) and no RASU of any size or year class were delivered to waters outside the Lower Colorado River corridor. Quagga mussels have not severely impacted the maintenance or operation of the facility. However, quagga mussels continue to have an impact on delivery of fish. Preventing further movement or transfer of quagga mussels is a priority for state and federal agencies. Fish transport protocols for the lower Colorado River corridor have been developed and are under review by cooperating resource agencies. Studies conducted by the USFWS determined that concentrations of potassium chloride (KCl) and formalin, which had been recommended for killing quagga mussel larvae in transport water, were not effective in killing quagga larvae under the water conditions at Willow Beach NFH and the levels of KCl/formalin tested may be toxic to native fish species.

**FY10 Accomplishments:** Cutrine-Ultra (copper), Peraclean (peracetic acid), and Spectrus CT1300 (quaternary ammonium compound) were selected from a list of molluscicides in the Zebra Mussel Chemical Control Guide. These three chemicals were chosen for testing by USFWS at Willow Beach NFH to evaluate their effectiveness at killing quagga mussel life stages. Quagga mussel veligers exhibited resistance to most of the concentrations of all three chemicals tested in the 6-7 hour time frame allotted which simulates the average transportation time for stocking fish into the lower Colorado River. Mortality in 100% of veligers was observed only in the two highest concentrations of peracetic acid, however BONY exposed to one half concentrations died in less than 30 minutes.

**FY11 Activities:** A literature search will be performed to formulate a list of potential chemicals that will be tested for effectiveness on quagga mussel mortality. Investigations will continue in order to find alternative treatment methods and to establish a protocol that is effective at killing quagga mussel larvae without harming native fish.

**Proposed FY12 Activities:** Investigations will continue until a suitable treatment regime can be found. As protocols must be rigorously tested prior to approval, this work task is being extended in both time and funding.

**Pertinent Reports:** The scope of work is available upon request. Annual reports from each year will be posted to the LCR MSCP website.