Work Task C40: Genetic and Demographic Studies to Guide Conservation Management of RASU and BONY in Off-Channel Habitats

FY08 Estimates	FY08 Actual	Cumulative Accomplishment Through FY08	FY09 Approved Estimate	FY10 Proposed Estimate	FY11 Proposed Estimate	FY12 Proposed Estimate
$0	$0	$0	$0	$75,000	$180,000	$180,000

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Start Date: FY10

Expected Duration: FY18

Long-term Goal: Effective fishery management of backwater habitats developed by program.

Conservation Measures: RASU2, RASU6, BONY2, BONY5

Location: Reaches 2, 3, 4, and 5 backwater habitats.

Purpose: Quantify genetic and demographic parameters that are necessary for informed, long-term management of RASU and BONY in off-channel habitats.

Connections to other work tasks (past and future): This work is related to work tasks C25 (Imperial Ponds Native Fish Research) and C31 (RASU Genetic Diversity Assessment).

Project Description: When observed on Lake Mohave and elsewhere, RASU and BONY demonstrate a group spawning behavior whereby a female will spawn with multiple partners many times over a period of a few weeks. These observations led biologists to believe that all possible genetic crosses were being made during the spawn. However, analyses of adult RASU placed into Yuma Cove backwater in 1991 and 1992, along with analyses of the larvae RASU produced each year, showed that not all of the adults contributed genetic material to the next generation. It is possible that individual adults do not spawn every year or that even if they do, they don't always contribute genetic material to the next generation. This information needs to be verified in order to model population structure within these isolated habitats over subsequent generations and to predict at what frequency genetic material needs to be exchanged between habitats to maintain robustness of the overall community of these fishes within the LCR MSCP program area over the 50-year life of the program.

This study will collect demographic and genetic information that will lead to recommendations that help to optimize long-term management of off-channel habitats for these two critically endangered fishes. Genetic data will be captured from larvae, juvenile, and adult RASU and BONY from at least two replicate groups of off-channel habitats. Characterization of

microsatellite and mitochondrial DNA variation will be used to assign the parentage of individual larvae to specific adults.

Genetic tissues will be collected from groups of adult RASU and BONY. These fish will be tagged and released into backwater habitats. Remote sensing will be used to specifically track tagged adults and determine their presence in spawning areas at specific times. This combination of population and genetic information will allow us to determine the actual location of spawning and to evaluate reproductive success of specific individuals. These data can then be compared and contrasted to determine both effective and census population sizes, and to quantify patterns of survivorship.

There are three phases to the study: field observations, lab analyses of genetic materials, and modeling of populations dynamics. The study will require multiple years of data collection and analyses, and final recommendations are anticipated by 2018. Numbers of samples will be fewest during the first two years of the study, but estimated costs are initially high to cover purchase of specialized, analytical equipment.

Previous Activities: N/A

FY08 Accomplishments: N/A

FY09 Activities: Initial study design will be accomplished with funds from G3. Tissues from RASU and BONY being reared and monitored at Imperial Ponds (C25) will be collected under work task C31.

Proposed FY10 Activities: Specific numbers of adults of each species will be selected and stocked into ponds on Imperial Refuge, and samples of any young produced will be collected and analyzed. Samples of young produced in ponds with extant populations will be collected. Additional native fish refuge ponds, and grow out ponds having populations of these fishes, will be assessed for possible inclusion in this study. Annual reports and progress reports will be provided.

Pertinent Reports: N/A