Work Task D8: Razorback Sucker and Bonytail Stock Assessment

FY13 Estimate	FY13 Actual Obligations	Cumulative Expenditures Through FY13	FY14 Approved Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate	FY17 Proposed Estimate
$675,000	$718,996.60	$4,113,981.86	$675,000	$850,000	$850,000	$850,000

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Start Date: FY05

Expected Duration: FY55

Long-term Goal: Conduct long-term system monitoring of RASU and BONY

Conservation Measures: RASU6 and BONY5

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

Purpose: Supplement and maintain sufficient knowledge and understanding of RASU and BONY populations within the LCR MSCP planning area to have an effective AMP.

Connections with Other Work Tasks (past and future): Monitoring data for RASU and BONY have been or will be gleaned from work accomplished under C8, C12, C13, C15, F5, and G3.

Project Description: This project collects and organizes RASU and BONY population and distribution data to maintain up-to-date, system-wide, stock assessments for these species. Data acquisition work is accomplished by one of two strategies: 1) gleaning information from ongoing fish monitoring and fish research activities, and 2) direct data collection through field surveys within the LCR MSCP planning area not covered by other work tasks. Additionally, as short-term research activities are completed under separate work tasks, a portion of those activities may transition into or be included as part of ongoing, long-term monitoring projects under work task D8.

Work routinely includes trammel netting and electro-fishing, but visual surveys are also periodically conducted, as well as surveys using specialized equipment and techniques (e.g. SCUBA, underwater photography, and video recordings). Funding described under this work task provides for all costs associated with conducting field surveys including salary, travel, and materials necessary for Reclamation staff to accomplish this work. This work task also provides funding for private sector monitoring contracts, gleaning or capturing data from ongoing research actions and monitoring programs, transfer of these data into record archives, and organizing these data into a cohesive report.

Previous Activities: Reclamation, Arizona, and Nevada have cooperatively conducted fall fish surveys on Lake Mead since 1999. Reclamation has also participated in interagency cooperative native fish roundups on Lake Mohave since 1987, and on Lake Havasu (including the river reach below Davis Dam) since 1999. Additional monitoring of native fish populations outside of these annual events has also been conducted under work task D8 as short-term research activities have transitioned into long-term monitoring projects.

FY13 Accomplishments: Accomplishments for this work task have been summarized by river reach.

Reach 1 (Lake Mead). In cooperation with the AGFD and NDOW, Reclamation conducted annual fall gill net surveys of Lake Mead. Participating agencies were responsible for sampling Boulder Basin, Virgin Basin, Gregg Basin, and the Overton Arm. This lake-wide effort resulted in the capture over 1,900 fish representing 14 different species. Two species of native fish were captured during this effort including 2 RASU and 7 FLSU. One RASU contacted through this effort was a new, wild fish, and the other was a recapture.

Collection of wild-born RASU larvae took place at all major spawning sites (Las Vegas Bay, Echo Bay, and the Muddy River/Virgin River inflow) over the course of the spawning season. This effort yielded 509 larvae from Las Vegas Bay, 40 larvae from Echo Bay, and 191 larvae from the Muddy River/Virgin River inflow area for a lake wide total of 740 larvae. A portion of the captured larvae were retained for genetic analyses with the majority being returned to the lake.

Monitoring of the Lake Mead RASU population also continued. Tracking of sonic-tagged fish continued to gather information on habitat use and movement patterns of RASU, and data obtained from monitoring sonic-tagged fish provided valuable information including the general location of RASU populations, the location of spawning sites, and the movement patterns of RASU within and between spawning areas. Trammel netting surveys conducted during the spawning season resulted in the capture of 60 RASU; with 16 coming from Echo Bay, 4 from Las Vegas Bay, and 40 from the Muddy River/Virgin River inflow area. Of the 60 RASU captured, 25 were recaptured fish. The remaining RASU captured were new wild fish and included 3 from Echo Bay, all 4 from Las Vegas Bay, and 28 from the Muddy River/Virgin River inflow area. Aging information was obtained from 37 RASU during the 2013 study year bringing the total number of RASU aged as part of the long-term monitoring program to 432. Ages of new wild RASU captured from long-term monitoring areas in 2013 ranged from 7 to 17 years old. Additionally, one individual from the CRI area of the lake was aged at 2 years old, making it one of the youngest fish aged to date. The evaluation of fin-ray sections removed from captured fish continues to suggest ongoing and recent recruitment in Lake Mead.

Using mark-recapture data from the period spanning 2011-2013, the combined lake-wide RASU population was estimated at 597 individuals in 2013. This estimate includes mark-

recapture data from all areas of the lake including Echo Bay, Las Vegas Bay, the Muddy River/Virgin River inflow area, and the CRI. When looking at different parts of the lake separately, the combined Echo Bay and Muddy River/Virgin River population is estimated at 705 individuals, and the combined long-term monitoring population (excluding the CRI) is estimated at 632 individuals. While these estimates are slightly larger than the combined lake-wide estimate, they also represent much wider confidence bounds. The lake-wide estimate has been essentially the same for the last two years (estimated at 596 individuals in 2012), and with much narrower confidence bounds; this may represent a more reliable estimate of the RASU population in Lake Mead.

Reach 2 (Lake Mohave). Reclamation successfully repatriated 15,369 RASU into Lake Mohave in calendar year 2013. This is an increase from the number of RASU stocked in 2012 (12,793) and above the targeted 6,000.

Following the completion of Work Task C12, monitoring of Reach 2 is now accomplished through a contract which resulted in an increase in funding during FY13. Annual RASU (May and November) roundups were conducted using trammel nets (36 net nights, 66 RASU contacted) and electro-fishing was resumed above Willow Beach in June, July and August (6,909 seconds, 69 RASU contacted). The use of remote sensing, which was expanded in 2011 to include the lotic portion of Lake Mohave upstream of Willow Beach, was also continued. Continued improvements in remote PIT tag antennae design have allowed for sampling in the high flow conditions of that reach, thereby contacting a significant number of RASU that had been previously undetected through other sampling methodology.

In 2013, a total of 475,334 remote sensing PIT tag contacts were recorded lake-wide. In the River section above Willow Beach, 3,842 hours of scan time resulted in 12,900 contacts representing 1,686 RASU. Throughout the rest of Lake Mohave, an effort of 7,451.4 hours of scan time resulted in 462,434 contacts representing 1,635 RASU. As a consequence of increased lake-wide scanning, more RASU were contacted using this method than in past years. A total of 3,321 individual RASU were contacted in 11,293.4 hours of scan time in 2013, compared to 2,788 individual RASU contacted in 8,393 hours of scan time in 2012.

Based on 2012 and 2013 remote PIT scanning, the 134.2-kHz tagged Lake Mohave repatriate population was estimated at 3,588 individuals (95% CI from 3,259-3,950). Subpopulation estimates based on zone specific scanning in 2012 and 2013 were also calculated. The population in the Basin Zone (River Miles [RM] 13-29) was estimated at 1,598 (95% CI from 1,390-1,836), in the Liberty Zone (RM 30-42) at 55 (95% CI from 17-100; one recapture), and in the River Zone (RM 43-63) at 2,188 (95% CI from 1,908 to 2,509). The River estimate was nearly identical to the estimate of 2,174 from regression analysis completed in 2012. Wild fish were also contacted in Basin and River zones, but no estimate was calculated because only one recapture (in River) was recorded from all three zones.

Reach 3 (Lake Havasu). A total of 6,726 RASU and 6,318 BONY were released into Reach 3 during calendar year 2013, all fish were released with a PIT tag.

Capture/contact data was acquired through work task C33, C39, C45, C53, F5, ongoing multi-agency native fish roundups, and from other annual surveys conducted by LCR MSCP partners. A fall netting survey was conducted through Topock Gorge capturing a total of 40 RASU and 13 BONY, and the annual spring roundup captured 21 RASU and 11 BONY. Captures of BONY from annual surveys is comparable to past years, however a portion of these fish are now being contacted in the river above Lake Havasu. This is a result of recent releases in the area associated with the Distribution and Survival of BONY in Reach 3 (C39). Capture numbers have declined during annual surveys as our effort has shifted to acquire more contacts via remote PIT scanning. Large numbers of RASU continue to be contacted in the riverine portions near Needles and select backwaters throughout Topock Gorge. The remainder of the non-native fish community did not show any significant changes.

Remote PIT scanning has continued to improve RASU contact rates. Scanning conducted through our System monitoring (D8), RASU Comparative Survival (C33), and Ecology and Habitat Use in Reach 3 (C45) produced a total of 2,092 razorback contacts in 2013. This is more than twice the amount from 2012 (1,006 contacts). The current RASU population estimate for Reach 3 is 4,524 (4027 to 5081, 95% confidence interval). This population estimate has maintained an upward trend and has more than tripled since the beginning of the MSCP.

Reach 4 and 5 (Parker Dam to Imperial Dam). Under the Fish Augmentation Program, 5,577 RASU and 0 BONY were stocked into Reach 4 during the 2013 calendar year. These fish were released above and below Headgate Rock Dam as part of Investigations of RASU and BONY Movements and Habitat Use Downstream of Parker Dam (C49). Under work task C49, an agreement with the USFWS was finalized which includes an MOU with the Colorado River Indian Tribe (CRIT) for stocking and monitoring native fish on CRIT lands. A total of 701 RASU were stocked into the LCR between Parker Dam and Headgate Rock Dam, and 4,876 RASU were stocked into the LCR between Headgate Rock Dam and Palo Verde Diversion Dam on the Colorado River Indian Tribe (CRIT) lands. In the fall of 2012, 8,468 BONY were also stocked in support of this effort with 5,960 being released between Parker and Head Gate Rock Dams, and 2,508 being released on CRIT lands. These stockings represent the first time that the LCR MSCP has released native fish on CRIT lands for research and monitoring purposes.

In Reach 4 a total of six RASU were contacted in Palo Verde Oxbow Lake from previous year's stockings. The numbers contacted are too low to generate a population estimate for this reach. In Reach 5 remote PIT scanners were used to monitor population size and habitat association of BONY and RASU at Imperial Wildlife Refuge. Adult BONY population estimates ranged from 53 (March 2012) to 11 (August 2012). Adult RASU population estimates ranged from 131 (January 2012) to 103 (August 2012). No larval

BONY or RASU were encountered, but juvenile RASU were captured and the population of new recruits was estimated at 130 fish.

FY14 Activities: Monitoring data will be collected for Reaches 1 through 5. Information will be gleaned from ongoing fish research activities as well as through fish monitoring field work. Field work will include trammel netting, electro-fishing, remote sensing of PIT-tagged fish, and active and passive tracking of sonic-tagged fish.

Proposed FY15 Activities: Monitoring efforts will continue in all river reaches as previously outlined, and LCR MSCP staff will continue to participate in multi-agency field surveys. It is also anticipated that native fish monitoring in Reach 3 will be expanded under this work task beginning in FY15. As research-based work tasks occurring in Reach 3 are completed, gaps in native fish community sampling data are expected. The proposed expansion of monitoring work within Reach 3 and other Reaches will allow for continued collection of these data, compensating for the potential sampling gaps resulting from the closure of multiple research work tasks and will take advantage of these closures by redistributing a portion of the funding towards monitoring. The proposed funding increase for FY15-17 represents an overall less intensive sampling effort that will be accomplished primarily through the deployment of remote PIT tag sensing units and includes the costs associated with their long-term maintenance. Additionally, system-wide surveys will be expanded in Reach 5.

Pertinent Reports: The *Razorback Sucker Studies on Lake Mead, Nevada and Arizona 2012-2013 Final Annual Report,* the *2013 Lake Mohave Razorback Sucker Monitoring Annual Report*, and the *Movements of Sonic Tagged Razorback Suckers Between Davis and Parker Dams (Lake Havasu) Final Report* will be posted to the LCR MSCP website following review.