

Work Task D8: Razorback Sucker and Bonytail Stock Assessment

FY16 Estimate	F16 Actual Obligations	Cumulative Expenditures Through FY16	FY17 Approved Estimate	FY18 Proposed Estimate	FY19 Proposed Estimate	FY20 Proposed Estimate
\$925,000	\$943,608.61	\$6,498,562.96	\$925,000	\$925,000	\$925,000	\$925,000

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Start Date: FY05

Expected Duration: FY55

Long-Term Goal: Conduct long-term system monitoring of razorback suckers (*Xyrauchen texanus*) and bonytail (*Gila elegans*)

Conservation Measures: BONY5 and RASU6

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

Purpose: To supplement and maintain sufficient knowledge and understanding of razorback sucker and bonytail populations within the LCR MSCP planning area in order to have an effective Adaptive Management Program

Connections with Other Work Tasks (Past and Future): Monitoring data for razorback suckers and bonytail have been or will be gleaned from work accomplished under Work Tasks C8 (closed), C12 (closed), C13 (closed), C15 (closed), F5, and G3.

Project Description: Under this work task, razorback sucker and bonytail population and distribution data will be collected and organized 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 under 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 this work task.

Work routinely includes trammel netting and electrofishing, but visual surveys are also periodically conducted as well as surveys using specialized equipment and

techniques (e.g., scuba divers, underwater photography, and video recordings). Funding described under this work task provides for all costs associated with conducting field surveys, including salaries, travel, and materials necessary to accomplish this work. Funding for monitoring agreements, gleaning, or capturing data from ongoing research actions and monitoring programs; transfer of the data into record archives; and organizing the data into a cohesive report is also provided under this work task.

Previous Activities: In cooperation with the Arizona Game and Fish Department and Nevada Department of Wildlife, fall fish surveys on Lake Mead have been conducted since 1999. The Bureau of 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. This participation has continued under the LCR MSCP, beginning in 2005, when the program was implemented. Additional monitoring of native fish populations outside of these annual events has also been conducted under this work task as short-term research activities have transitioned into long-term monitoring projects.

FY16 Accomplishments: Accomplishments for this work task have been summarized by river reach.

Reach 1 (Lake Mead): In cooperation with the Arizona Game and Fish Department and Nevada Department of Wildlife, annual fall gill net surveys of Lake Mead were conducted. Participating agencies were responsible for sampling Boulder Basin, Virgin Basin, Temple Basin, Gregg Basin, and the Overton Arm. The LCR MSCP captured 325 fish representing 10 different species from the Virgin and Temple Basins. No native fish species were contacted.

Wild-born razorback sucker larvae collection 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. A total of 1,167 larvae were captured, with 367 larvae from Las Vegas Bay, 737 larvae from Echo Bay, and 63 larvae from the Muddy River/Virgin River inflow area. An additional 14 larvae were also collected in the Colorado River inflow area during subsequent sampling. The majority of larvae collected through this effort was returned to the lake following each sampling period, as razorback sucker larval abundance was primarily used only as a means of identifying spawning locations during the FY16 field season. A small subset of these larvae were taken to the Lake Mead Fish Hatchery for grow-out and future genetic analyses. These fish will be returned to the lake as juveniles in FY17.

Monitoring of the Lake Mead adult razorback sucker population also continued in FY16. Ten sonic-tagged fish were contacted throughout the year using active (manual tracking) and passive (stationary submersible ultrasonic receivers) telemetry. Monitoring sonic-tagged fish provided the general location of

razorback sucker populations, the location of spawning sites, habitat association data within the long-term monitoring study area, and lake-wide and seasonal movement patterns within and among spawning areas. Trammel netting conducted during the spawning season resulted in the capture of 74 razorback suckers: 4 from Las Vegas Bay, 35 from Echo Bay, 28 from the Muddy River/Virgin River inflow, and 7 from the Colorado River inflow area. Of the 74 razorback suckers captured, 39 were recaptured fish. The remaining razorback suckers captured were untagged and presumed to be wild-spawned fish. The capture of 74 razorback suckers during the FY16 field season was an increase from the 18 captured during the previous year. The increase in the number of razorback suckers captured was due, in part, to the increased sampling effort in FY16, which was conducted to generate a population estimate. The FY16 razorback sucker population in Lake Mead was estimated at 418 individuals (95% confidence interval [CI] from 327 to 559). Aging information was also obtained from 31 razorback suckers during the 2016 study year, bringing the total number of razorback suckers aged as part of the long-term monitoring program to 509. The ages of wild razorback suckers captured from long-term monitoring areas in 2016 ranged from 5 to 14 years old.

Reach 2 (Lake Mohave): A total of 7,898 razorback suckers were successfully repatriated into Lake Mohave in FY16. A total of 913 bonytail were also released in Lake Mohave, 39 of which were sonic tagged as part of ongoing research being carried out under Work Task C64.

Annual razorback sucker roundups were conducted in December and March. During these efforts, 118 razorback suckers were captured using trammel nets. Additionally, electrofishing was conducted in the river section of Lake Mohave above the Willow Beach National Fish Hatchery in June, July, and August (11 razorback suckers captured). The use of remote sensing, which was expanded in 2011 to include the lotic portion of Lake Mohave upstream of the Willow Beach National Fish Hatchery, was also continued. Continued improvements in remote passive integrated transponder (PIT) tag antenna design have allowed for sampling in the high flow conditions of that reach, thereby contacting a large number of razorback suckers that had been previously undetected through other sampling methods.

In FY16, 230,666 remote-sensing PIT tag contacts were recorded in the main sampling areas. In the river section of Lake Mohave above the Willow Beach National Fish Hatchery, 7,370 hours of scan time resulted in 10,862 total contacts representing 1,544 unique PIT tags. In the basin section of Lake Mohave, an effort of 29,574 hours of scan time resulted in 219,796 contacts representing 1,859 unique PIT tags. After duplicate PIT tags contacted in both lake sections were removed from analyses, 3,128 unique fish were contacted in 36,944 hours of scan time during FY16. This is slightly higher than the 3,059 PIT tags contacted in 23,008 hours of scan time in 2015 and a 17% increase in unique contacts made in 2014 (2,777 PIT tags contacted in 8,844 hours of scan time).

The razorback sucker population in Lake Mohave was estimated from two data sources in FY16: (1) trammel net capture data obtained during the annual, multi-agency March roundup and (2) remote PIT scanning data collected during the sample year. Based on trammel net data from the FY16 field season, the repatriate population estimate for the basin section of Lake Mohave was 1,707 (95% CI from 603 to 3,897). This estimate represented less than 1% of the total number of repatriates released into Reach 2 as of March 1, 2015. Based on 2015–16 remote PIT scanning, the Lake Mohave repatriate population was estimated at 3,656 individuals (95% CI from 3,418 to 3,912) lake-wide. Subpopulation estimates using zone-specific scanning were also calculated and estimated the basin (River Miles 13–29) population at 1,947 (95% CI from 1,761 to 2,151) and the river (River Mile 43–63) population at 2,158 (95% CI from 1,960 to 2,377).

Reach 3 (Lake Havasu): A total of 6,105 razorback suckers and 1,522 bonytail were released into Reach 3 during FY16; all fish were released with a PIT tag.

Capture/contact data were acquired through Work Tasks C53, C64, F5, ongoing multi-agency native fish roundups, and from other annual surveys conducted by LCR MSCP partners. A fall and spring netting survey was conducted throughout Topock Gorge and lower Lake Havasu. Bonytail contacts are still rare and typically only occur for the first several weeks to months post-release.

In an effort to identify new aggregations of razorback suckers, multiple electrofishing surveys were conducted this year from Davis Dam through Topock Gorge. The majority of razorback suckers were captured at previously known spawning sites in Laughlin, Nevada, and Needles, California. However, fish were captured and documented in other locations at higher numbers than in the past. New spawning aggregates were found near known spawning sites in Laughlin and Needles and indicated an overall expansion of the previously known spawning sites. The two most prominent new sites were near the California/Nevada border and below the Needles Bridge. The Reach 3 population estimate has doubled in the past decade, and it is anticipated that the fish will continue to redistribute into new areas. Based on the species composition and relative numbers of captures, the non-native fish community in these locations did not appear to be substantially different than in previous years.

All survey methods conducted in Reach 3 in FY16 resulted in 3,027 unique razorback sucker, 292 bonytail, and 62 flannelmouth sucker (*Catostomus latipinnis*) contacts (16 scans and 46 captures). Reach 3 had a razorback sucker population estimate of 4,923 (95% CI from 4,652 to 5,209), which was a slight increase in the estimate from FY15 of 4,795. Bonytail contacts using PIT scanning are still rare in this reach and typically only occur for the first several months post-release.

Reaches 4 and 5 (Parker Dam to Imperial Dam): A total of 6,005 razorback suckers and 1,289 bonytail were stocked into Reaches 4 and 5 during FY16; all fishes were released with a PIT tag.

In Reach 4, monthly PIT tag scanning surveys were initiated in October 2015. Remote PIT scanners scanned for a collective 9,675.3 hours and resulted in nearly 350 unique razorback sucker contacts and 40 unique bonytail contacts. Native fishes were scanned in nearly every backwater in the area and throughout the main channel. All of the bonytail originated from a single release on September 23, 2015. Twenty-nine were detected in October, 12 in November, and then 3 more through January. The majority of razorback suckers originated from three stocking events from April 2015 through February 2016. There were 13 fish detected from stocking events prior to 2015; 10 of the 13 were released in 2007.

Four scanning trips were completed in Reach 5 and collectively scanned for 1,978.8 hours. No fishes were contacted during any of the scanning events, and after 2 years of scanning, only a single fish has been contacted in Reach 5.

FY17 Activities: Monitoring data will be collected for Reaches 1–5. Information will be gleaned from ongoing fish research activities as well as through fish monitoring field work. Field work will include trammel netting, electrofishing, remote sensing of PIT-tagged fishes, and active and passive tracking of sonic-tagged fishes.

Monitoring efforts, including the expanded use of scanners and electrofishing, will be increased for Reaches 4 and 5 below Palo Verde Diversion Dam. These results will be used to inform future stocking locations and additional directed research under Work Tasks C64 and C65.

Proposed FY18 Activities: Monitoring efforts will continue in all river reaches as previously outlined, and participation in multi-agency field surveys will continue. As research-based work tasks are completed in Reaches 1–5, gaps in native fish community sampling data are expected. Efforts under Work Task D8 will fill a portion of these gaps by maintaining the appropriate level of system-wide monitoring of native fishes in the lower Colorado River for the life of the program. An evaluation of the razorback sucker and bonytail sampling design will be initiated after receiving the results of the genetic review (G4).

Pertinent Reports: The reports titled *Razorback Sucker Studies on Lake Mead, Nevada and Arizona 2015–2016 Final Annual Report; Demographics and Monitoring of Repatriated Razorback Sucker in Lake Mohave 2016—Annual Report; Comparative Survival of Repatriated Razorback Sucker in Lower Colorado River Reach 3 – 2014 Annual Report; Comparative Survival of Repatriated Razorback Sucker in Lower Colorado River Reach 3 – 2015 Annual Report; and Movements of Sonic Tagged Razorback Suckers Between Davis and Parker Dams (Lake Havasu) Final Report* will be posted on the LCR MSCP Web site following review.