

## Work Task C31: Razorback Sucker Genetic Diversity Assessment

FY15 Estimate	FY15 Actual Obligations	Cumulative Accomplishment Through FY15	FY16 Approved Estimate	FY17 Proposed Estimate	FY18 Proposed Estimate	FY19 Proposed Estimate
\$140,000	\$141,928.74	\$650,031.33	\$160,000	\$160,000	\$160,000	\$0

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**Start Date:** FY09

**Expected Duration:** FY18

**Long-Term Goal:** Maintain the genetic quality of razorback suckers utilized under the LCR MSCP

**Conservation Measures:** RASU2, RASU3, RASU5, and RASU6

**Location:** Wayne State University, Detroit, Michigan

**Purpose:** To maintain a sound genetic management program for razorback suckers utilized under the LCR MSCP

**Connections with Other Work Tasks (Past and Future):** This work task is related to larval razorback sucker collections (B1) and management of fish habitat restoration sites (e.g., C40, E14, and F5). Larval and adult tissue samples are collected from each reach of the LCR MSCP planning area wherever razorback suckers are captured, and this includes work accomplished under Work Tasks C13, C33 (closed), C45 (closed), C49 (closed), C64, and D8.

**Project Description:** The genetic structure of razorback sucker communities in reservoirs, river reaches, and off-channel habitats within the LCR will be monitored, and the various razorback sucker stocks relative to the founder population from Lake Mohave will be characterized. Under the LCR MSCP Fish Augmentation Program, production of large numbers of fish annually will continue; these large pulses of fish have the potential to change the genetic diversity of a population in a short period of time. It is important to monitor the genetic structure of the various razorback sucker communities over many years in order to detect changes in the genetic diversity as these populations mature.

Larval fish and adult fin clips will be collected and preserved from each stock during numerous annual surveys and the continuing Lake Mohave larvae collections. These samples will be delivered to a genetics research laboratory

for analyses. The results will be used to determine the genetic health of these communities, assess the effectiveness of the LCR MSCP Fish Augmentation Program, assess the effectiveness of the Lake Mohave repatriation effort, and provide guidance on management of razorback sucker populations developing in newly constructed flood plain habitats within the LCR MSCP area.

**Previous Activities:** Samples of larvae and adult fin clips were obtained on an annual basis from multiple time periods and from various spawning areas, reservoirs, river reaches, and off-channel habitats within the LCR MSCP area. Deoxyribonucleic acid (DNA) was extracted, and samples characterized for mitochondrial deoxyribonucleic acid (mtDNA) and microsatellite variation. Analyses of microsatellite data collected over the past 19 years are consistent with those from mtDNA, indicating that the razorback sucker conservation strategy employed in Lake Mohave is maintaining genetic diversity in the nuclear genome as well. Interpretation of the data in the context of effective numbers of breeders and size identifies the importance of increasing the population size in Lake Mohave.

**FY15 Accomplishments:** Within Lake Mohave, 173 fin clips and 404 larval samples were collected from the main basin and analyzed for levels of molecular variation. The findings were consistent with previous years and indicated that, in Lake Mohave, levels of molecular variation (as measured by mtDNA and microsatellites) continue to be maintained by the current management program. An additional 20 fin clips and 117 larvae were obtained from above the Willow Beach National Fish Hatchery, and these individuals are not significantly different from those in the main basin.

The efficacy of fin clipping all razorback suckers for genetic samples during tagging was explored in FY15. Currently available off-the-shelf systems did not contain preservatives compatible with long-term storage for genetic samples; therefore, this process was not implemented in FY15. Additional discussions and strategies are being explored to evaluate the cost-benefit of this effort. Long-term benefits may be important in terms of genetic information and reduced handling of adult razorbacks in the field.

From Lake Mead, 29 adult fin clips and 91 larvae were collected. Samples have been extracted, sequenced, genotyped, and analyzed using genetic software.

From Reach 3, 148 adult fin clips and 338 larvae were collected. Samples have been extracted, sequenced, genotyped, and analyzed using genetic software.

**FY16 Activities:** Razorback sucker genetics will continue to be assessed for the LCR through analyses of razorback sucker fin clips and larvae collected from spawning areas, reservoirs, river reaches, and off-channel habitats within the LCR MSCP area.

Reach 3 razorback sucker augmentation will include fish from the Lake Mohave gene pool. Due to this shift, genetic monitoring efforts of larvae and adults for Reach 3 will increase to provide contrast with razorback sucker genetics of Lake Mohave. These additional samples will provide a genetic baseline for this population from which changes can be monitored as more Lake Mohave fish are stocked into this reach.

**Proposed FY17 Activities:** Collection of larval razorback suckers and fin clips from spawning areas within the LCR MSCP area will continue. DNA will be extracted and samples characterized for mtDNA and microsatellite variation. Due to the small population sizes, future work will continue in order to evaluate potential problems related to the effective number of breeders.

**Pertinent Reports:** Annual reports for 2013–15 titled *Razorback Sucker Genetic Diversity Assessment* have been completed and will be posted on the LCR MSCP Web site upon completion.