

Work Task C31: Razorback Sucker Genetic Diversity Assessment

FY12 Estimate	FY12 Actual Obligations	Cumulative Expenditures Through FY12	FY13 Approved Estimate	FY14 Proposed Estimate	FY15 Proposed Estimate	FY16 Proposed Estimate
\$125,000	\$124,776.15	\$379,246.55	\$130,000	\$130,000	\$130,000	\$0

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Start Date: FY09

Expected Duration: FY15

Long-term Goal: Maintain genetic quality of RASU utilized in the LCR MSCP.

Conservation Measures: RASU2, RASU3, RASU5, RASU6.

Location: Wayne State University, Detroit, Michigan.

Purpose: To maintain a sound genetic management program for RASU within the LCR MSCP.

Connections with Other Work Tasks (past and future): This work is related to larval RASU collections (B1) and to management of fish habitat restoration sites (for example, E14, E25, F5, and C40). Larval and adult tissue samples are collected at no additional cost from each reach of the program wherever RASU are captured. This includes work accomplished under work task D8, C13, C33, C45, and C49.

Project Description: This work task provides the funding to analyze the genetic structure of RASU communities in reservoirs, river reaches, and off-channel habitats within the LCR and characterize the various RASU stocks relative to the founder population from Lake Mohave. Our fish augmentation program continues to produce large numbers of fish annually and these large pulses of fish have the potential to change the genetic diversity of a population in a short period of time, especially when populations are small. It is important to monitor the genetic structure of the various RASU 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 WSU's genetics research laboratory for analyses. Results will be used to determine the genetic health of these communities, to assess effectiveness of the Fish Augmentation Program, to continue monitoring of the Lake Mohave repatriation effort, provide guidance on management of RASU in Lake Mead, as well as populations developing in newly constructed floodplain 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. DNA was extracted and samples were characterized for mtDNA and microsatellite variation. Analyses of microsatellite data collected over the past 15 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 number of breeders and census size identifies the importance of increasing census population size in Lake Mohave.

FY12 Accomplishments: In Lake Mohave there was a decline in mtDNA variation in 2012 compared to 2011. However, overall patterns of variation were generally consistent with those found in previous years, indicating that levels of genetic variation continue to be maintained by the current management program. As long as adult population size remains low, however, there are concerns over the impact of random effects on this population.

Fine-scale variation in larval production in Lake Mohave was also evaluated. Analysis of microsatellite variation failed to identify significant differences among regions or samples, indicating that samples of larvae collected from a single location during the same week are not genetically different. This indicates that the collection of one sample per week at an individual location is adequate to represent the genetic variation of the adult population.

Analyses of the Lake Mead population indicates that levels of genetic variation remain low. However, as in Lake Mohave, these levels were comparable to previous estimates.

FY13 Activities: Reclamation will continue to assess razorback sucker genetics for the LCR through analyses of RASU fin clips and larvae collected from spawning areas, reservoirs, river reaches, and off-channel habitats within the LCR MSCP area.

Proposed FY14 Activities: Collection of larval RASU, fin clips, and muscle plugs will continue from spawning areas within the LCR MSCP area. DNA will be extracted and samples characterized for mtDNA and microsatellite variation. Due to the small population size, future work will evaluate potential problems related to the effective number of breeders.

Pertinent Reports: *Razorback Sucker Genetic Diversity Assessment: Final Project Report 2011*, and *Razorback Sucker Genetic Diversity Assessment: Interim Report 2012* are completed and will be posted to the LCR MSCP website.