Work Task C31: Razorback Sucker Genetic Diversity Assessment

FY14 Estimate	FY14 Actual Obligations	Cumulative Accomplishment Through FY14	FY15 Approved Estimate	FY16 Proposed Estimate	FY17 Proposed Estimate	FY18 Proposed Estimate
$130,000	$134,780.01	$576,957.51	$140,000	$160,000	$160,000	$160,000

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Start Date: FY09

Expected Duration: FY18

Long-Term Goal: Maintain genetic quality of razorback sucker utilized in 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 sucker within the LCR MSCP

Connections with Other Work Tasks (Past and Future): This work task is related to larval razorback sucker collections (B1) and to management of fish habitat restoration sites (e.g., E14, F5, and C40). Larval and adult tissue samples are collected from each reach of the LCR MSCP wherever razorback sucker are captured and includes work accomplished under Work Tasks C13, C33 (closed), C45, C49, 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 in order to assess the effectiveness of the LCR MSCP Fish Augmentation Program, continue monitoring 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. DNA was extracted and samples 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 numbers of breeders and size identifies the importance of increasing the population size in Lake Mohave.

FY14 Accomplishments: Within Lake Mohave, 288 fin clips and 743 larval samples were collected and analyzed for levels of molecular variation in FY14. 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.

From Lake Mead, 68 adult fin clips and 55 larvae were collected. Samples have been extracted, sequenced, genotyped, and analyzed using genetic software.

FY15 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. Beginning in FY15, an attempt will be made to collect genetic samples (fin clips) during the tagging process. This expanded initial effort will have benefits in terms of improved data for providing inference and will potentially reduce the need for extensive netting during the spawning season. Protocol development will be initiated in FY15, and additional supplies will be purchased for storing and processing samples. In order to implement these changes, FY15 expenditures may exceed budget projections.

Proposed FY16 Activities: Collection of larval razorback sucker and fin clips will continue from spawning areas 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. 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: The reports titled *Continuing Studies of Razorback Sucker Genetics: 2008; Interim Report: 2010; Razorback Sucker Genetic Diversity Assessment: Final Project Report 2011*; and *Razorback Sucker Genetic Diversity Assessment: Interim Report 2012* are posted on the LCR MSCP Web site. The report titled *Razorback Sucker Genetic Diversity Assessment: Final Report 2013* is completed and will be posted on the Web site as well.