

FINAL PERFORMANCE REPORT



Federal Aid Grant No. F20AP00057 (E-75-R-3)

Propagation and Augmentation of the Ouachita Rock Pocketbook

Oklahoma Department of Wildlife Conservation

January 1, 2020 through December 31, 2021

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State: Oklahoma

Grant Number: F20AP00057 (E-75-R-3)

Grant Program: Cooperative Endangered Species Conservation Fund, Traditional Conservation Grants Program

Grant Title: Propagation and Augmentation of the Ouachita Rock Pocketbook

Grant Period: January 1, 2020 – December 31, 2021

Principal Investigator: Chris Barnhart, Missouri State University, Springfield, MO

Project Leader: Curtis Tackett, ODWC, Tulsa, OK

Executive Summary

COVID-19 restrictions and social distancing measures prevented significant progress on grant activities during 2020. The lack of field work led to limited mussel collection and limited larval production during 2020. The USFWS granted a one year extension for the project through December 31, 2021 but because of unforeseen circumstances with the principal investigator at MSU, the project did not make any progress during the 2021 extension period. The principal investigator at MSU was faced with unprecedented personal circumstances which forced him to retire and discontinue the project. The ODWC did not have the capability to perform these grant objectives in-house therefore the project was not completed.

Objectives:

To augment existing Ouachita Rock Pocketbook populations in the Little River of Oklahoma and Arkansas with juveniles reared from glochidia collected from the Little River.

Summary of Progress:

PROJECT BACKGROUND

The Ouachita Rock Pocketbook (*Arkansia wheeleri*) is known from only three river systems in southeastern Oklahoma and southwestern Arkansas - the Little River (AR and OK), the Kiamichi River (OK) and the Ouachita River (AR). The population in the Ouachita River is very small and only one live *A. wheeleri* has been collected in recent surveys. The Kiamichi River population is larger, but with an estimated population size of less than 1,800 individuals. There is, however, no evidence for recent reproduction or recruitment into the Kiamichi River population. In the Little River, three small and apparently disjunct populations occur. One population occurs in Oklahoma between the US 70 bridge and the confluence of the Mountain Fork River. The other two populations occur in Arkansas. One occurs within a 4.5 mile reach of the river immediately east of the Oklahoma/Arkansas state line; and the other population occurs in the lower Little River below Millwood Reservoir but upstream from the river's confluence with the Red River.

The only population for which gravid females and juveniles have been found in recent years is the population that occurs below Millwood Reservoir.

Several factors appear to have played a role in the decline of the Ouachita Rock Pocketbook including the modification of river flows and in-stream habitat as a result of reservoir construction and management, and the loss of suitable in-stream habitat as a result of siltation and channel modification. Additionally, reservoir construction has nearly eliminated the potential for genetic exchange between the remaining populations, and the small population size and scattered dispersion of individuals within these populations has likely reduced their breeding success and reproduction. The remnant populations currently face additional threats including a proposed electric power plant and a proposed inter-state sale and transfer of water out of the region and into north-central Texas.

Given the species' small population size, declining population trends and the uncertainty surrounding potential new threats, it is important to examine means to enhance or augment these populations. This project sought to conduct a propagation and augmentation / reintroduction project for the Ouachita Rock Pocketbook in the Little River. Within the past decade, several ecological studies have been completed on the Ouachita Rock Pocketbook, which have addressed gaps in our knowledge of its reproductive biology. These studies have identified several suitable fish hosts for the mussel's glochidia and have determined that this is a winter breeding/brooding species. During this same time period, Dr. Chris Barnhart and others have developed an efficient propagation facility for mussels and raising them to a larger size that is more suitable for reintroduction (thus reducing mortality from fish and other predators).

This project sought to propagate and rear juvenile Ouachita Rock Pocketbook mussels from glochidia collected from wild-caught gravid females. The propagation of closely related mussel species may provide further insight into the successful rearing of *A. wheeleri*; therefore, attempts would be made to propagate similar species that will act as surrogates for the Ouachita Rock Pocketbook. The Rock Pocketbook (*Arcidens confragosa*) is a very closely related species to *A. wheeleri* and may be selected in this effort if *Arcidens* proves to be unavailable.

METHODS

- 1) Upon receiving gravid *A. wheeleri* females, MSU staff would house the animals in the propagation facility at Missouri State University in Springfield, Missouri, where glochidia will be harvested, reared on host fish and maintained through transformation into free-living juveniles. Following the harvest of glochidia, females would be returned and released at their original site of collection.
- 2) Recently transformed juvenile Ouachita Rock Pocketbooks would be cultured in the mussel propagation lab over the winter/early spring period until they reached a size of approximately 3-5mm in shell length.
- 3) During the spring, 2-3 mm juvenile mussels would be transferred to floating upweller systems at the Kansas City Zoo to be held for one to two years until they reached an approximate size of

2 cm in shell length. At this size the mussels would be laser-engraved as a permanent identification mark.

4) At a shell length of approximately 2 cm, juvenile mussels would be released by ODWC and USFWS at locations where known populations of Ouachita Rock Pocketbooks occurred.

RESULTS

COVID-19 restrictions and social distancing measures prevented significant progress on grant activities during 2020. The lack of field work led to limited mussel collection and limited larval production during 2020. The USFWS granted a one year extension for the project through December 31, 2021 but because of unforeseen circumstances with the principal investigator at MSU, the project did not make any progress during the 2021 extension period. The principal investigator at MSU was faced with unprecedented personal circumstances which forced him to retire and discontinue the project. The ODWC did not have the capability to perform these grant objectives in-house therefore the project was not completed.

Discussion

The ODWC still values this propagation and population augmentation approach as vital to reestablishing *A. wheeleri* populations in Oklahoma. At recent multi-state meetings we have learned that there is an interest with Arkansas Game and Fish Commission to move forward with some potential propagation of the species using brood stock from the Little River population below Millwood Reservoir and similar interest exists with staff at the USFWS Neosho National Fish Hatchery. We will likely seek these potential avenues for future propagation and population augmentation for our OK populations and look forward to working with ARGFC and the Neosho National Fish Hatchery to pursue these efforts.

CONCLUSIONS/MANAGEMENT RECOMMENDATIONS

We will seek future opportunities for propagation and population augmentation efforts with the ARGFC and the Neosho National Fish Hatchery.

The Kiamichi River population has an estimated population size of less than 1,800 individuals but we need an updated assessment of that population to update the population estimate and determine if reproduction and recruitment is occurring. We believe both the Kiamichi and Little Rivers still remain good candidates for reintroduction and population augmentation.

Significant Deviations:

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Equipment Purchased (Cumulative):

No equipment exceeding \$5,000 in cost was purchased during this grant.

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