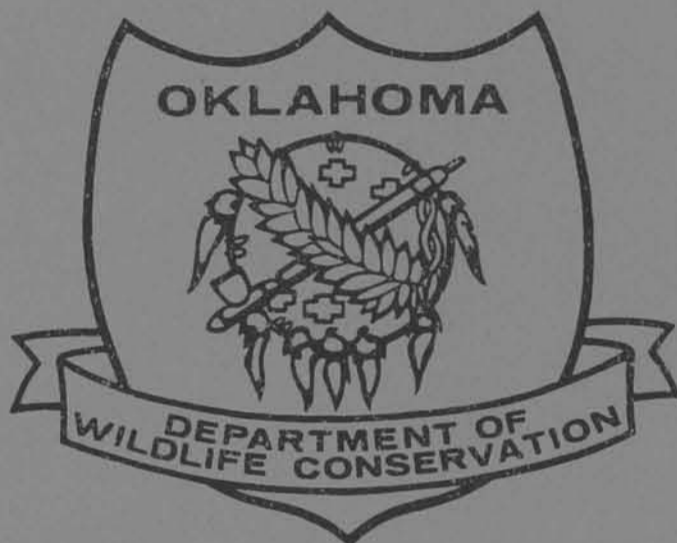


## FINAL REPORT



FEDERAL AID GRANT NO. T-14-P-1

THE FRESHWATER MUSSELS OF OKLAHOMA

OKLAHOMA DEPARTMENT OF WILDLIFE CONSERVATION

OCTOBER 1, 2003 through SEPTEMBER 30, 2005

## FINAL REPORT

STATE: Oklahoma

GRANT NUMBER: T-14-P

GRANT PROGRAM: State Wildlife Grant

GRANT PERIOD: October 1, 2003 – September 30, 2005

### ABSTRACT:

This report summarizes the known species of freshwater mussels existing in Oklahoma. Included in each species account are:

- Current scientific name
- Photo of the species
- Synonymy of names for the species used in Oklahoma in the past
- Description of the species
- General distribution of the species
- Table of shell characters
- Oklahoma distribution map
- List of specimen locations in Oklahoma
- Comments

Also included in the report are sections on:

- Anatomy and physiology of freshwater mussels
- Literature
- Mussel conservation
- Zoogeography

Finally at the end of the report are included:

- Questionable and uncertain species that may occur in Oklahoma
- Exotic species
- Species list for major river systems in Oklahoma
- An expanded list of unionid literature
- Glossary of terms

### OBJECTIVE:

Summarize historical and recent literature and collections with descriptions, distributions and photographs of the native and introduced freshwater mussels of Oklahoma.

### NEED:

Oklahoma is host to approximately 57 species of native Unionid mussels, and several populations with uncertain taxonomic status. Native freshwater mussels are found throughout the state, but species richness declines from east to west across the state. The greatest diversity of mussels occurs in several southeastern rivers such as the

Kiamichi and Little Rivers. Oklahoma's mussels include many widespread species (e.g. *Pyganodon grandis*, *Strophitus undulatus*) but also several regionally endemic species restricted to the Ozark and/or Ouachita Highlands (e.g. *Ptychobranthus occidentalis*, *Lampsilis rafinesqueana*) or the Gulf Coastal Plain (e.g. *Obovaria jacksoniana*). Live specimens of at least one species, the Western Fanshell (*Cyprogenia aberti*), have not been collected in several decades suggesting that this species may be extirpated from Oklahoma. Of the approximately 57 possible species of native freshwater mussels in Oklahoma, 19 of these have Natural Heritage Inventory global ranks of G3, G2 or G1. Additionally, 23 species have been nominated for inclusion on Oklahoma's list of Species of Greatest Conservation Need that was developed as part of the Oklahoma Comprehensive Wildlife Conservation Plan.

Several publications have been written regarding freshwater mussels in Oklahoma. The first of these by Isely (1925) was based on major collections conducted during the early twentieth century and this provided the basis for understanding Oklahoma's freshwater mussel fauna. Valentine and Stansbery (1971) published a report also based on extensive collections but this was largely restricted to the Red River and Lake Texoma region. Finally, a series of three publications by Branley A. Branson (1982, 1983 and 1984) summarized many literature records regarding Oklahoma unionids and provided black and white photographs of the species covered. Judging from records provided by Isely and Valentine and Stansbery, many drainage systems within the state have suffered drastic reductions in populations and species diversity since the early part of the twentieth century. At least one species, and possibly several, have been extirpated from the state and many species have been extirpated from one or more of the drainage systems in which they once occurred. Historically, the major factors that have dealt severe blows to mussel populations and species in Oklahoma were similar to those that have devastated mussels throughout North America. These include pollution (agricultural, industrial and municipal), siltation (agricultural, forestry and construction) and reservoir construction.

While there has been a history of research regarding freshwater mussels in Oklahoma, this information has never been compiled into a single, comprehensive reference document. Additionally, there are mussel collections, particularly during the past 20 years, which have not been published and need to be documented in the literature. Finally, there has been little effort to compare historic and recent mussel distributions to examine geographic range and/or population changes over time.

Recently, two biological factors have been introduced that may further devastate native mussels. First, the Asiatic clam (*Corbicula fluminea*) invaded the state in the early 1970's. This small bivalve can spread easily because of its planktonic, non-parasitic larvae and reaches tremendous populations in a variety of habitats. It is feared that the Asiatic clam may out-compete native species for food filtered from the water column. There have been some serious economic problems with the Asiatic clam clogging water intakes and circulating systems in municipal and industrial water systems.

A second more recent invader is the zebra mussel (*Dreissena polymorpha*), a native of eastern Europe and western Asia. It was introduced into the Great Lakes about 1986 and was discovered in the McClellan-Kerr Arkansas River Navigation System at Kerr Lake and Webber Falls in January of 1993. This species also has non-parasitic, planktonic larvae but possibly more important, large numbers can colonize any hard substrate by attaching with a byssal thread. This habit can be fatal for native mussels if exposed parts of the shell are colonized. Some populations of unionids in the Great Lakes region have been totally annihilated since 1988.

Because of the precarious position of native mussels in Oklahoma, and the relatively large proportion of species which have been identified as species of greatest conservation need in Oklahoma, there is a need for a document which summarizes the current status and distribution of each native and exotic species in the state to serve as a baseline for understanding future changes in the fauna due to the factors mentioned above. This is especially needed for the preparation of the Oklahoma Comprehensive Wildlife Conservation Plan. In addition to its use as a conservation planning reference, this document would be a useful identification manual for the increasing number of biologists being drawn into studies involving mussels and managing the aquatic systems that harbor native unionids. Hard copies or CD versions could be provided to biologists and agencies across the state.

#### APPROACH:

1. Existing literature and existing unpublished data will be compiled to write status accounts for each species of freshwater mussel (native and exotic) known to occur in Oklahoma.
2. Where questionable data exist, museum collections and voucher specimens will be analyzed to determine the accuracy of species identifications and site locations. Travel to several museums will be necessary to clarify some taxonomic questions that exists concerning several populations of Oklahoma mussels and to gather further information regarding the distributions of some species within the state.
3. Professional quality photographs and/or illustrations will be obtained by employing the services of individuals with the necessary talents.
4. A manuscript will be produced complete with descriptions, state and total distributions and photographs of all species of freshwater unionid mussels known to exist in the state of Oklahoma.

#### RESULTS AND DISCUSSION:

The document consisting of 200+ pages had been produced with all objectives met.

#### SIGNIFICANT DEVIATIONS:

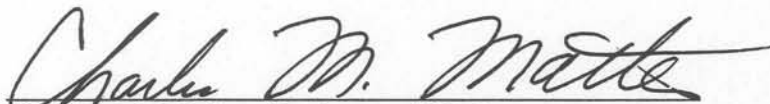
There were no significant deviations from the original objectives of the project. The document turned out to be about twice as long as originally projected and several

sections of additional information was included (Conservation, Zoogeography, Oklahoma Rivers species lists, Anatomy and Physiology, additional literature and a glossary of terms).

**COSTS:**

Total Project Cost	=	\$52,887
Federal Share (75%)	=	\$39,665
State Share (25%)	=	\$13,221

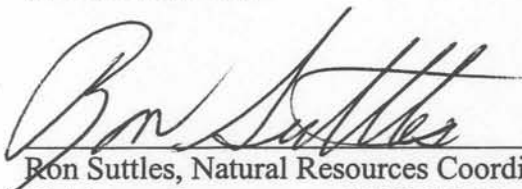
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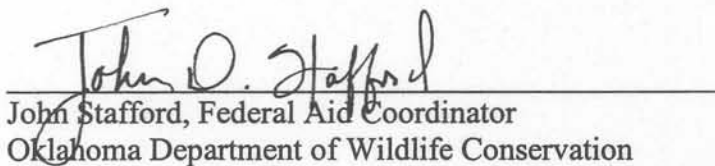
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