

## CHANGES IN THE FRESHWATER MUSSEL POPULATIONS OF THE POTEAU RIVER SYSTEM, LE FLORE COUNTY, OKLAHOMA

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Comparing shells from a Caddoan midden with those collected at the turn of the century shows similar populations of freshwater mussels to have occurred in the Poteau River system over a period of several thousand years. Examination of the drainage in 1976 revealed reductions in diversity and density within the past 70 years most likely resulting from changes in land use and the impoundment of Wister Lake.

### INTRODUCTION

From the early part of this century, changes in land and stream uses and the addition of impoundments have greatly affected the abundance and distribution of freshwater mussels (1-4). Although little is known of original species compositions in most streams, considerable data are available for the freshwater mussels of the Poteau River system of Le Flore County, Oklahoma. This paper discusses mussel collections from three periods: (a) ca. 3500-1000 B.P., a Caddoan midden; (b) 1910-1912, Isely (5); and (c) 1976.

### METHODS

In 1947 and 1948, 2208 shells and fragments were excavated from the Scott Site, a Caddoan midden along Fourche Maline Creek 3 km north of Summerfield, Oklahoma. Of these, 927 shells with intact umbones were examined. Details of the Scott Site and other sites in the Poteau River drainage are given by Bell (6) and Wyckoff (7). The 1910-1912 data are from Isely (5) with many nomenclatural changes. Isely's collections were from the Poteau River east of Poteau, Oklahoma, and from Caston Creek immediately south of Wister, Oklahoma. In May 1976, mussels were collected from areas along Fourche Maline Creek, Caston Creek, and the Poteau River. Representative specimens from the latter collections have been placed in the Naiad Collection, University of Oklahoma Biological Station, Kingston, Oklahoma. Nomenclature used in this paper follows Burch (8) although other names may apply.

### RESULTS AND DISCUSSION

Sixteen species of freshwater mussels were recovered from the Caddoan midden, all of which presently may be found in the streams and rivers of eastern Oklahoma (9) (Table 1). With the exceptions of *Quadrula nodulata* and *Megaloniaias giganteus*, all were stream species most often inhabiting riffles or swifter waters below riffles (10-12). The two exceptions were pool forms usually restricted to large rivers and river lakes with firm bottoms.

In the Poteau River drainage, Isely (5) surveyed Caston Creek below Wister and the Poteau River east of Poteau. He described Caston Creek as a small, riffly stream with an unusually high diversity of pond and creek species. In the text (p. 77), he stated that 15 species were collected in Caston Creek; however, in his Table 2, only 12 species were listed, 11 of which now are considered valid (Table 1).

At the turn of this century, the Poteau River was a naturally deep and sluggish stream. East of Poteau, Isely (5) found a large and varied population of riverine species with a composition somewhat similar to the midden remains of the Scott Site (Table 1). Thirteen species were present in both with similar relative abundances. As Isely's station was approximately 43 km downstream from the Scott Site, differences in the sizes of the streams and their flow and substrates are reflected in some variation of the species compositions. Species inhabiting riffly streams (10-12) were more abundant in the Scott Site remains (e.g. *Tritogonia verrucosa*, *Eliptio dilatata*, *Trun-*

TABLE 1. Freshwater mussels from various localities in the Poteau River drainage.

Species	Poteau R.		Fourche	Caston	Caston
	1910-1912 <sup>a</sup>	Scott Site	Maline Cr. 1976	Cr. 1910-1912 <sup>a</sup>	Cr. 1976
<i>Amblema costata</i>	65	182	14	rare	0
<i>Fusconaia flava</i>	24	77	3	occasional	1
<i>Quadrula nodulata</i>	0	2	0		0
<i>Quadrula pustulosa</i>	192	279	8	occasional	0
<i>Quadrula quadrula</i>	0	1	0		0
<i>Tritogonia verrucosa</i>	12	139	2	frequent	1
<i>Megalomias giganteus</i>	2	1	1		0
<i>Eliptio dilatata</i>	4	88	0		1
<i>Pleurobema cordatum</i>	33	44	5		0
<i>Anodonta grandis</i>	0	0	0	occasional	0
<i>Lasmigona complanata</i>	2	0	4	occasional	0
<i>Strophitus undulatus</i>	0	0	0	occasional	0
<i>Actinonaias carinata</i>	7	0	0		0
<i>Carunculina parva</i>	occasional	0	0	frequent	0
<i>Ellipsaria lineolata</i>	2	0	0		0
<i>Lampsilis anodontoides</i>	3	27	31	common	0
<i>Lampsilis ovata</i>	common	29	0	frequent	0
<i>Lampsilis radiata</i>	0	13	0		0
<i>Ligumia recta</i>	2	6	0		0
<i>Ligumia subvostrata</i>	0	0	0	common	0
<i>Proptera purpurata</i>	14	3	4		6
<i>Truncilla truncata</i>	4	27	3		0
<i>Obliquaria reflexa</i>	14	9	0		0
Totals	386+	927	75		9

<sup>a</sup> The 1910-1912 collections are modified from Isely (5), who in many instances gave only frequency of occurrence.

*cilla truncata*, and to some extent the *Lampsilis* spp.). Conversely, the large river forms (10-12) from Isely's Poteau River station were rare or absent in the midden material (e.g. *Lasmigona complanata*, *Actinonaias carinata*, and *Proptera purpurata*).

Several conclusions can be reached. The shells deposited in the midden quite probably were collected in the immediate vicinity of the Scott Site from the riffle areas of Fourche Maline Creek. Similar observations have been made for other archaeological sites of approximately the same age (13-14). The number of species and their abundance in the Poteau River drainage had remained relatively constant for several thousand years, although many fluctuations may have occurred. Many of the species recorded from the Scott Site and for both of Isely's collections are characteristic of waters which, today, have remained clean with low to moderate siltation rates. In particular, *Pleurobema*, *Fusconaia*, *Eliptio*, *Strophitus*, and *Ellipsaria* are susceptible to stream disturbances (4), indicating that the Poteau River system had been free of pollutants at least through the early twentieth century.

No freshwater mussels were collected in 1976 at Isely's (5) station east of Poteau

nor in the lower Poteau River; however, populations, if small, could be overlooked. In Caston Creek, only two species were re-collected. Six of the nine specimens were *Proptera purpurata*, a species somewhat resistant to organic pollutants and siltation and one not recorded by Isely (5).

The only recognizable population of freshwater mussels along Fourche Maline Creek was at a riffle approximately 100 m from the Scott site (Table 1). Seventy-five specimens representing 10 species were collected. All represented forms which are tolerant of a wide variety of stream conditions and which can withstand at least moderate pollution (2-4, 10-12). Seven of the midden's 16 species were not collected including the formerly abundant *Eliptio dilatata*. One additional species was found, *Lasmigona complanata*, which prefers quiet waters over a soft bottom.

Other localities along Fourche Maline Creek produced only occasional specimens of *Proptera purpurata*. Wyckoff (per. com.) has walked much of the Fourche Maline drainage and has found no other mussel beds. He observed that other Caddoan middens in the drainage contain few freshwater mussels compared with the Scott Site. It would seem reasonable then to assume that

the riffle areas of Fourche Maline Creek near the Scott Site have been capable of supporting mussel populations for a long period of time and that most other areas of this stream have not.

The demise of the mussel populations of the Poteau River system may be attributed partly to changes in agricultural practices and to the impoundment of Wister Lake. Detrimental effects of increased siltation rates and farming chemicals have been well documented (4). Wister Lake was completed in 1949, inundating portions of the Poteau River, Fourche Maline Creek, and other small streams in the area. The conservation pool level (143.7 m above M.S.L.) does not reach Fourche Maline Creek at the Scott Site (146.3 m above M.S.L.); however, the flood pool (153.2 m above M.S.L.) reaches more than 3 km upstream (Tulsa District, U.S. Army Corps of Engineers, per. comm.). On several occasions, the riffle at the Scott Site has been flooded, so that there was little to no current. Those species of freshwater mussels requiring constant flowing water would be greatly affected. As has been noted in Kentucky and Tennessee (1, 3), mainstream impoundments can drastically affect mussel populations not only within their reaches but also for some distance downstream. Although he made no collections, Bell (6) observed that the mussel populations of Fourche Maline Creek in 1947 and 1948 seemed to have the same species composition as the shells he recovered from the Scott Site. Consequently, much of the changes in the mussel populations could be attributed to the creation of Wister Lake.

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