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Water-Nymphs of the Platte

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WATER-NYMPHS OF THE PLATTE

By Patricia W. Freeman and Keith Perkins
Illustrations by Laura Williams

Little known, but hauntingly beautiful and valuable to the environment as well, clams and mussels inhabit many Nebraska lakes and rivers. In the first survey of the entire Platte River, the authors found 11 species.

The ancient Greeks and Romans believed that water-nymphs, deities they called naiads, lived in, gave life to and perpetuated springs, rivers and lakes. Scientists later gave the name "water-nymph" or "naiad" to the freshwater clams called mussels, since like the mythological water-nymphs, they protect the water in which they live. Mussels, as it turns out, are excellent indicators of a body of water's health because they filter and clean the water, so keeping track of how many mussels are present and where they are is important.

We surveyed mollusks (clams and snails) of the Platte River during the summers of 1990 and 1991. With the exception of the Big Bend reach of the river in Dawson, Buffalo and Hall counties, no mussels were found in the river's main channel. But in backwaters, lakes and sandpits along the river, we found 11 species of mussels at 49 different sites from east to west across the state. Among them we found the Asiatic clam, a non-native, pest species, for the first time in the state, placing it several hundred miles west of the present eastern population of eastern Iowa and Missouri.

Normally there is greater diversity of naiad species toward the mouth of a river, but this is not the case in the Platte. We believe there are at least two reasons for this. First, there are fewer backwaters and generally less diversity of habitat in the Platte from the mouth upstream to the Big Bend reach in Hall County. Second, there is more human activity east of Hall County, especially from Columbus and Fremont on to the mouth. Human activities increase the mud, toxins and organic compounds accumulating in the river, and the water has less distance in which to cleanse itself before it reaches the mouth. Other reasons might include a sampling bias since it was difficult to get permission to sample private lakes and sandpits near the river on the eastern section.

The close association between naiads and fish might offer a third explanation for the lack of diversity. Although larval naiads can be free-swimming, most require a three- to six-week parasitic attachment on the gills, skin or fins of a host fish, probably for transport. Some species of naiads will parasitize only specific species of fish (with little harm to the host), but others attach to any number of different host fish. Naiads may not be present in a particular part of a river because a suitable host fish is not present.

Pink heel-splitter (*Potamilus ohioensis*)

Although there is scant information on early surveying of mussels on the Platte, it does appear that Samuel Aughey collected snails on the Platte for a report in 1877 to the U.S. Department of the Interior. He reported no mussels coming from the Platte but did list certain species in “all streams in Nebraska,” “all tributaries of the Missouri in Nebraska,” “all streams in eastern Nebraska” and “all the Nebraska Rivers.” We have no idea of the abundance or rarity of mussels in the Platte then, but we assume at least some of the 11 species we see today were present. All specimens we found are being curated and housed at the University of Nebraska State Museum and will serve as the benchmark study against which future surveys and monitoring of the mollusks of the Platte can be compared.

For comparison, we surveyed a stretch of the Missouri from Child’s Point in Bellevue downstream to Plattsmouth. The Child’s Point site is a historically important Native American site where mollusks were abundant and regularly consumed. No mussels were found in this stretch of the Missouri. The Big Bend reach has greater diversity of habitat with its channels, backwaters and sandpits. West of this area we may be seeing the natural decrease of diversity as we move away from the mouth of the river as well as the western extent of known ranges for many of these animals, which have an eastern continental distribution.

Clams feed by filtering particles such as algae, protozoans and detritus out of the water with their gills. They clean our water and are food for furbearers such as minks, muskrats and raccoons. Surely they are an important part of our biodiversity. Can we afford to lose these hard-shelled water-nymphs from our springs, lakes and rivers because of pollutants or siltation?

Pink heel-splitter, *Potamilus ohioensis* (below and page 14). Less than seven inches across. **Giant floater, *Anodonta grandis grandis*** (above right). Up to seven inches across.



We divided the 11 species of naiads into two groups based on abundance. Five are considered widespread and abundant, and the remaining six are rarer. In the widespread category are the giant floater (*Anodonta grandis grandis*) and the white heel-splitter (*Lasmigona complanata*), both very tolerant of adverse environmental conditions and substrates. They can be as large as seven inches across. When it inhabits rivers, the giant floater prefers quiet water with a mud or mud-and-gravel substrate. It also will adapt to lake environments and is common in Lake McConaughy.

The white heel-splitter is typically found in rivers with large-river characteristics, namely rivers that are sluggish and turbid with mud or mud-and-gravel bottoms. Almost as large is the pink heel-splitter (Potamilus obiensis), which is expanding its range and increasing in number. It is a known colonizer of river sections that have been dredged. This species prefers shallow water with a good current but thrives in a variety of substrates. All three species have broad continental distributions and are abundant.

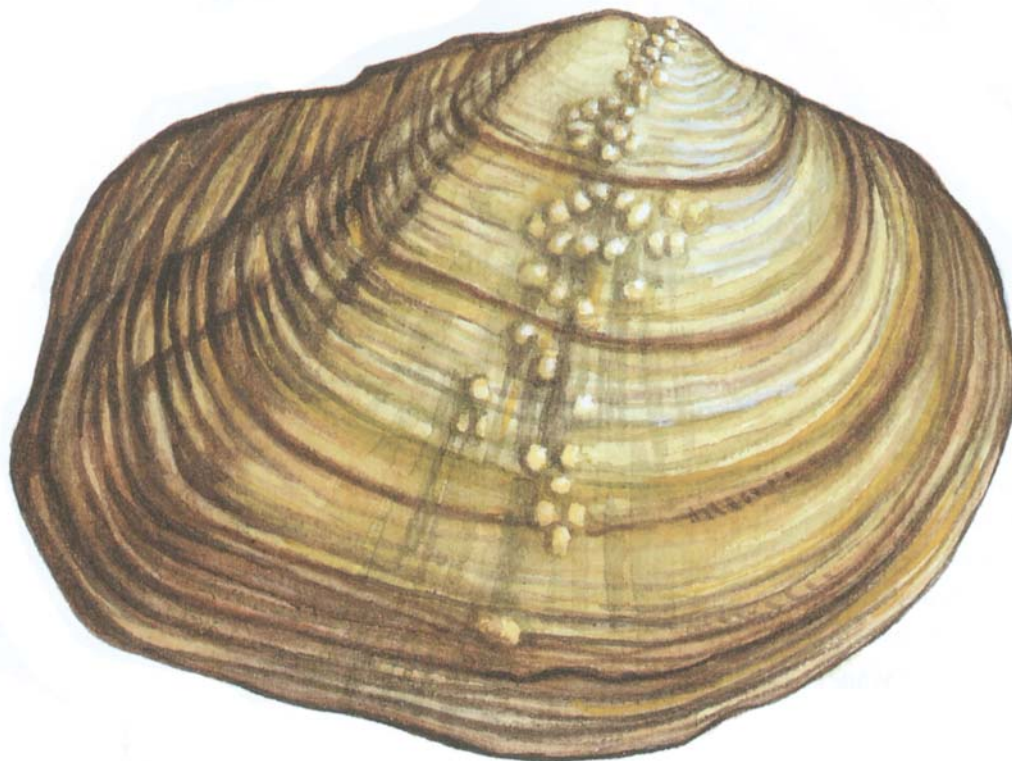


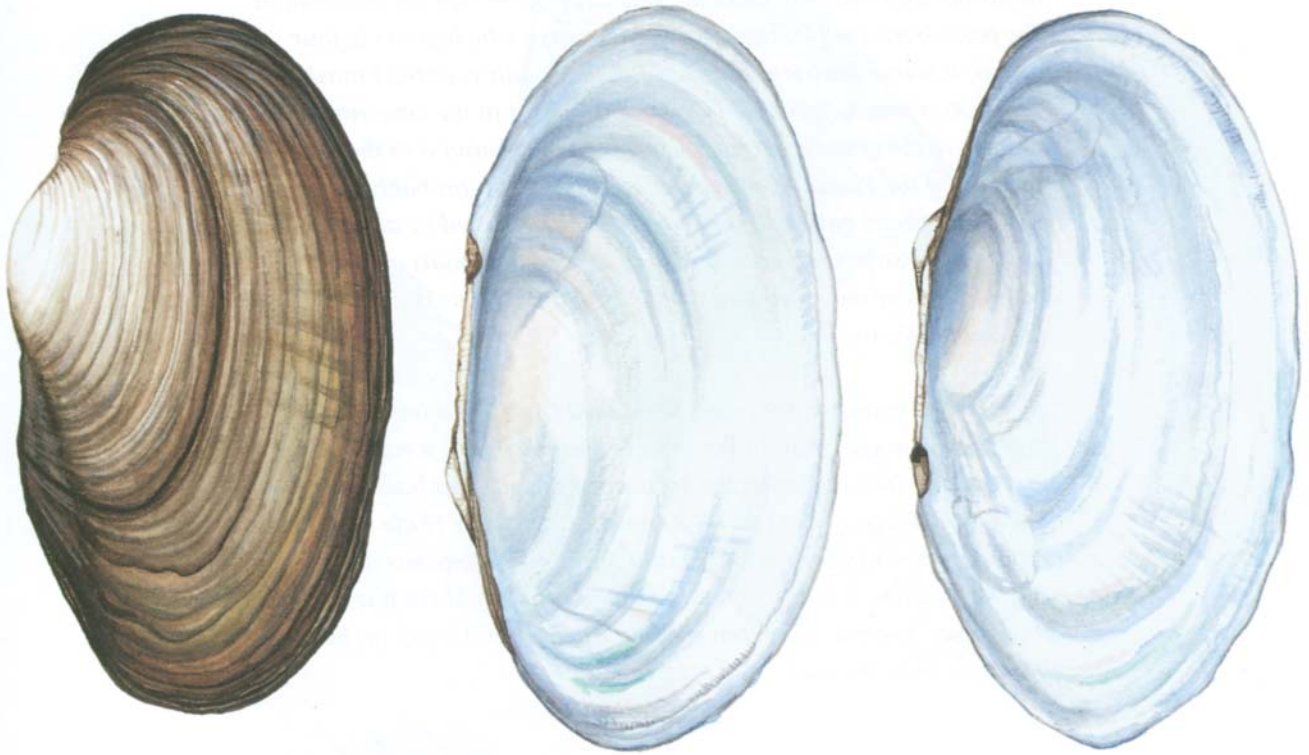
White heel-splitter, *Lasmigona complanata*. Up to seven inches across.

*In contrast, the maple-leaf mussel (*Quadrula quadrula*), the most abundant mussel in the Platte proper, is a species on the western edge of a more eastern continental distribution. It is a thick-shelled mussel and one of potential commercial value for pearls and buttons. It can grow to five inches across. Maple-leaf mussels favor large rivers and rivers with large-river characteristics, but it also can adapt to lakes where conditions are appropriate. It inhabits clear or turbid rivers with substrates ranging from small to medium gravel or rocks with or without mud in between.*



Maple-leaf mussel (*Quadrula quadrula*).
Up to five inches across.





Cylindrical paper shell (*Anodontooides ferrusacianus*). Up to four inches across.

*Finding the cylindrical paper shell (*Anodontooides ferrusacianus*) was somewhat of a surprise because it was not expected to be as widespread as it is. This species is smaller (up to four inches) and is usually an inhabitant of small water, particularly of clean, headwater streams, small streams or clear, unpolluted lakes. This species is abundant in the Big Bend reach particularly the south channel in Hall County, Bassway Strip in Buffalo County and the Willow Island area.*

*In the rarer category are six species that for one reason or another — substrate, distributional extreme, exotic species — are not as common. The pond horn shell (*Unio merus tetralasmus*), which grows to four inches, is a true prairie species not found broadly over the United States. As a prairie species it is frequently found in the lakes and streams in the eastern part of the state, and we found it in the south channel of the Platte. Although not abundant, it is probably holding its own as a species typical of this area. It has been listed by at least one author in Missouri as endangered. Its preferred habitats are mud-bottom lakes or the quiet water of sloughs and oxbows and the pools of rivers and streams.*

*Another four-incher, the paper pond shell (*Anodonta imbecilis*) is a thin-shelled mussel that thrives in soft substrate where it readily adapts to a pond or lake environment. In rivers it favors quiet backwaters with a substrate ranging from sandy to muddy. Along the Platte it tends to reach greater numbers in lakes but is found in backwaters along the Big Bend reach. If there is a mussel that cranes could eat it would be this species, because of its thin shell. In lakes it can be dug up by the handfuls from the mud.*



Pond horn shell (*Unio merus tetralasmus*). Up to four inches across.



Paper pond shell (*Anodonta imbecilis*).
Up to four inches across.





Asiatic Clam (*Corbicula fluminea*).
One to two inches across.

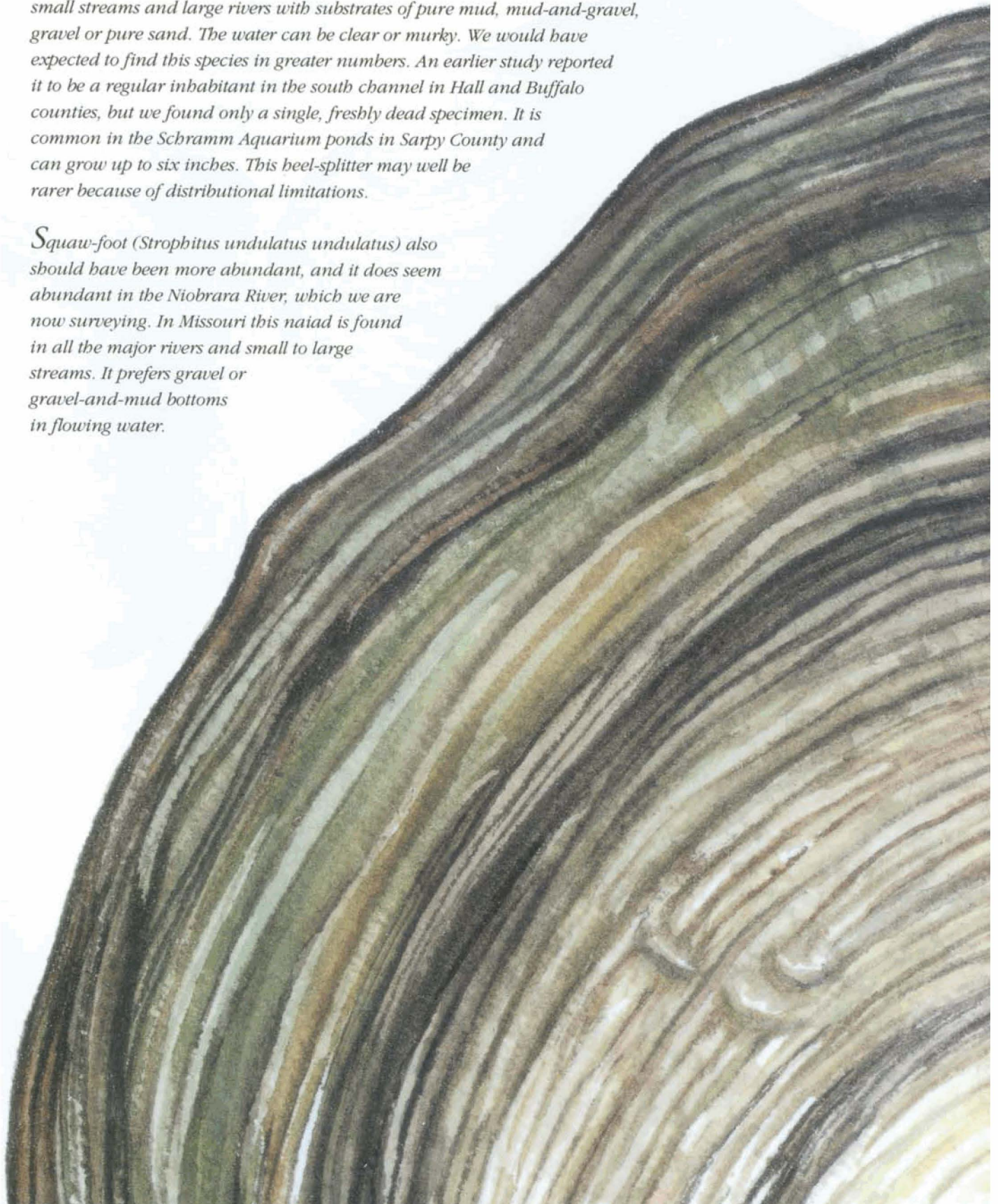
Fragile heel-splitter (*Leptodea fragilis*).
Up to six inches across.

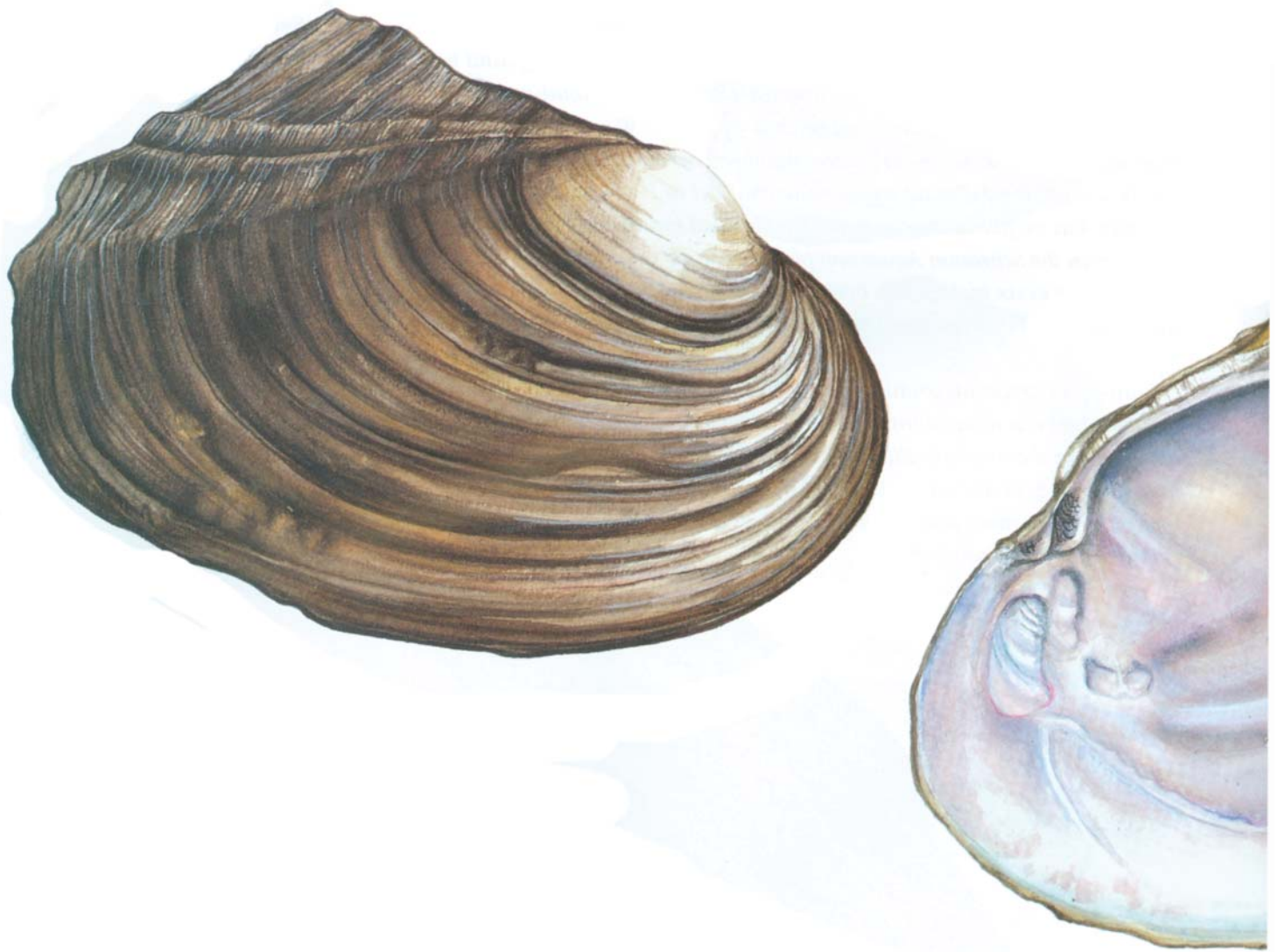
*A tough-shelled, small mussel, the Asiatic clam (*Corbicula fluminea*) was found for the first time in the state in lakes in Lancaster County and in Cozad Canal in Dawson County. This one- to two-inch naiad is an introduced pest species known to clog pipes and irrigation canals, and it grows abundantly in thermal plumes associated with power plants. The Asiatic clam is easily transported in minnow buckets in the free-swimming larval stage and does not need to rely on a host fish. Its flesh is used by humans for food and fish bait. It thrives in a wide variety of habitats, but seems to prefer a substrate of small to medium-size, stable gravel in swift water. It also does well in lakes. The Nebraska specimens are the westernmost of the eastern population, whose closest members are in eastern Iowa and central Missouri. Nebraska winters are probably too cold for this species, but its presence should be monitored.*

The native fragile heel-splitter (Leptodea fragilis) is another naiad on the western edge of a more eastern continental distribution. It can be found in small streams and large rivers with substrates of pure mud, mud-and-gravel, gravel or pure sand. The water can be clear or murky. We would have expected to find this species in greater numbers. An earlier study reported it to be a regular inhabitant in the south channel in Hall and Buffalo counties, but we found only a single, freshly dead specimen. It is common in the Schramm Aquarium ponds in Sarpy County and can grow up to six inches. This heel-splitter may well be rarer because of distributional limitations.

Squaw-foot (Strophitus undulatus undulatus) also should have been more abundant, and it does seem abundant in the Niobrara River, which we are now surveying. In Missouri this naiad is found in all the major rivers and small to large streams. It prefers gravel or gravel-and-mud bottoms in flowing water.

Squaw-foot (Strophitus undulatus undulatus). Up to six inches across.





Purple heel-splitter (*Potamilus alatus*).
Up to seven inches across.

*We also expected to find the large (up to seven inches), beautiful purple heel-splitter (*Potamilus alatus*) in greater numbers than we did. Purple heel-splitter is normally found in medium to large rivers and, although seldom abundant, it is very widespread. Purple heel-splitter prefers almost any substrate in slow to swiftly moving water and will adapt to lake or river-lake conditions. Continentally, its distribution is north, south and east of Nebraska. Our only record is from Schramm Aquarium ponds in Sarpy County, actually an artificial situation. Why this species was not found in the Platte should be investigated.*



Patricia W. Freeman, curator of zoology at the University of Nebraska State Museum, and Keith Perkins, associate professor at Sioux Falls College in Sioux Falls, South Dakota, wish to thank the U.S. Fish and Wildlife Service and U.S. Senator Bob Kerrey in particular for their support of biodiversity in the state. Laura Williams, formerly technical artist at the state museum, is now enrolled in the graduate program in medical illustration at the Johns Hopkins University Medical School in Baltimore, Maryland.

