



## OUR MISSING MUSSELS

By Eric Dinerstein

One of our region's most challenging environmental struggles has been cleaning up the Potomac River. Of course, the river's pollution has been with us for many decades, but it wasn't always so. Back in the days when George Washington would leave the civilization of what is now Georgetown to survey the hinterlands (perhaps Cabin John), the Potomac was free from modern-day pollutants. It was safe to drink from, or to catch fish in, or harvest other food along its shores, as nature-savvy Native Americans had been doing for centuries. The water was pure then, in part, because the watershed was largely undisturbed, without the siltation and organic pollution of so many inhabitants upstream dumping waste into the river. But there was another factor, an underwater sanitation team, purifying the river on a daily basis. Behold the native mussel, small but mighty. Mussels, like other bivalves such as clams and oysters, use their gill structures to filter water passing through them to remove nutrients and silt.

In pre-Colonial times, native mussel populations were so abundant, as gleaned from historical records, that they probably filtered entire sections of the river of nutrients and sediment every few days. Native Americans not only collected native mussels for food, but also used the shells as utensils and for jewelry. Later, in the last two centuries, mussels became the raw material for making pearl buttons. Since the 1950s, native and non-native mussel species have been the preferred substrate for cultured pearls in Japan, and their harvest remains an important industry.

The important economic uses of mussels should not overshadow their contribution to global biodiversity. There are about 900 species of freshwater mussels in the world. The center of the universe is a group of about 300 species, not in the Amazon, Orinoco, or the Ganges, but in the southeastern United States, especially around Mobile Bay and throughout Alabama's rivers and streams. Some have highly charismatic names: the fuzzy pigtoe; purple wartyback; winged spike; fluted elephantear; spectaclecase; rough rabbitsfoot; and orangefoot pimpleback, to name a few. And mussels are favorite food items for a wide range of freshwater predators—feathered, furred, and scaly. They are central players to the integrity of the Potomac ecosystem.

Illustration by Trudy Nicholson



### Freshwater Mussels

Despite the incredible diversity of native freshwater mussels in the United States, they, like other freshwater invertebrates, are among the most endangered creatures on Earth. The most serious threats are pollution and competition from other invasive mussel species. Here in Maryland we have about 17 species of native mussels, like the native yellow lamp mussel, to name but one, but you will find few, if any, of them in our stretch of the Potomac. Instead, non-native species are prevalent. The reasons why non-native species are outcompeting natives are not entirely clear. One possibility is that they become overwhelmed by the same pollutants that they otherwise filter out or are unable to cope with particular pollutants. And it is also not entirely clear if the non-native mussels are any less "filter workhorses" than the native mussels. Research questions abound.

The presence of healthy populations of native species of mussels is a strong biological indicator of the health of the Potomac and other rivers, and conservationists and aquatic biologists regularly survey local waters for their abundance. The results show dramatic declines of the native species and, in many places, replacement by invasives. Now, the dominant species found in surveys are mussels that never evolved in our local waters.

Cleaning up the river with better zoning regulations, restricting development along the river, and keeping pollutants out, is critical for the restoration and future health of our native ecosystems. Being able to drink from the Potomac without fear of infection or disease should be a non-negotiable demand for future generations. So our

native mussels are the equivalent of canaries in the coal mine: where they flourish—when we keep urban growth far from the riverbanks, reduce nutrients from agricultural runoff and other pollutants—that is where our efforts are succeeding.



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The proliferation of non-native mussels, like the crayfish discussed in a previous column, presents a more vexing challenge. The potential of gene editing, to someday remove or greatly reduce the reproductive abilities of non-natives holds out some promise for removal of invasives. Until then, let's give our native yellow lampmussels all the help they can get by fighting for a pollution-free Potomac.