



January 12, 2012

Eye on the Environment

Eye on the Invertebrates

By Andrea Stephens, Northwest Connections

Ever heard of a **fatmucket**? How about a **giant floater** or a **creek heelsplitter**? Poke around on the Clearwater River and you'll have a better chance of coming across a **western pearlshell** than a wolverine, but you're unlikely to read about them in the news.

Despite their relative anonymity, pearlshells in Montana have garnered some scientific attention recently, enough that Fish, Wildlife and Parks has assigned them a Tier 1 Conservation Status: a Montana creature of greatest conservation need. The western pearlshell, like the others, is a freshwater mussel, and sorely in need of our attention and appreciation.

North America happens to be the global hotspot of freshwater mussel diversity. Most of that richness is centered in the eastern part of the US, particularly the southeast: 290 of North America's 300 species live there. The western US, by comparison, is home to eight native mussels.

Montana can lay claim to three of these eight: fatmuckets and giant floaters are native to the low-elevation, warm, sandy-bottomed rivers of eastern Montana, home now as well to the introduced heelsplitter. There's only ONE in

western Montana and as you might have guessed, it's the western pearlshell mussel.

Didn't know mussels lived in Montana? Well, does the name "Musselshell River" ring a bell? After encountering mussel shells on the banks of this eastern Montana river, Lewis and Clark offered up the name. They didn't mention what type of mussel they saw, but it was most likely the fatmucket.

What do we know about the pearlshell - western Montana's only mussel, and the state's only coldwater trout stream mussel? As with most other invertebrates, the list of what we DON'T know is far longer than the list of what we DO know. But here are a few generally accepted tidbits.

A Forest Service biologist told me pearlshells were considered "starvation food" by the Salish – although I have yet to unearth documented evidence of this. Many shell middens in eastern Washington and Oregon contain pearlshells, so it only stands to reason folks in our neck of the woods ate them as well, although a tribal biologist did confide that they're rather tough and rubbery.

Like their marine counterparts you may have eaten with garlic and butter, freshwater mussels have an elongated shell, that can grow to 3 or 4 inches long. The inside of the shell is coated with a beautiful purplish mother of pearl. Some individual western pearlshells have been aged at 90 and 100 years old, making them one of the longest-lived invertebrates –

heck, one of the longest-lived animals! - on the planet.

Pearlshell mussels have separate sexes. During breeding, males release sperm into the water that females must filter back out of the water through their all-purpose siphon. After fertilization, eggs develop into larvae, known as glochidia. These mini-mussels are expelled in clouds by the female and would end up just washing helplessly downstream were it not for their ability to hitchhike in the most unlikely manner: by attaching to the gills of westslope cutthroat trout!

Most species of mussels can exploit a number of different host fish species during their larval stage. The giant floater, for example, will hitch a ride with dace, catfish, sticklebacks or darters. But Montana's pearlshell is perhaps the most specialized, having evolved specifically with westslope cutthroat. Western pearlshells live all along the west coast, from Alaska and British Columbia south to California and inland as far as Nevada, Wyoming and Utah. Fish hosts on the west coast include all the Pacific salmon, as well as rainbows and cutthroats. Here in Montana, pearlshell larvae will use other introduced salmonids such as rainbow, brook and brown trout, but they are ecologically allied to our native westslope cutthroat.

Of what benefit is it to a mussel to hitch its fortune to a specific, randomly passing fish? An adult mussel is able to move an exceedingly short distance over the course of its long life; fish are their free bus ride to a new neighborhood, aiding dispersal of the species. In fact, many mussel species time the release of glochidia to coincide with the upstream migratory movements of their host.

(On a side note, the dreaded Zebra and quagga mussels, which haven't yet been introduced to Montana's waters - knock on wood - have free-swimming larvae that don't require a host fish to complete their life cycle. As a result, these invasive mussels have a distinct advantage over native mussels where they have been introduced, as nearby as the Dakotas.)

The dark cloud over the story is the fact that North America's freshwater mussels are seriously imperiled: 61 of the 300 species are federally endangered; 8 are threatened. 36 species are believed to have gone extinct altogether. For the western pearlshell, targeting westslope cutthroat means an intimate, and potentially dangerously narrow, interdependence. Precipitous declines in cutthroat populations, and isolation of those populations in headwaters streams, has had dire consequences for the mussels that depend on them.

Increasing sedimentation, dewatering, dredging, channelization, diversions: we tend to think of this laundry list in terms of effects on water quality and fisheries. But these issues are all implicated in population declines of mussels in Montana and across North America. In 2010, Montana's Natural Heritage Program (MTNHP) reported on its recent statewide survey of mussel populations.

While western pearlshell populations are found widely across western Montana, very few of these populations are likely to survive the next 20-30 years as a result of lack of reproduction. Only 15 out of 32 populations surveyed in a population viability study contained young mussels, direct evidence of reproduction. Many of the survey sites turned up no mussels at all, even in places with historic populations. Mussel

beds known to exist in the Blackfoot, Bitterroot and Clark Fork rivers are either extirpated, or the mussels exist in such low densities that persistence of the population is unlikely.

Now for the silver lining; or at least a break in the clouds: want to take a guess where some of the strongest populations of the western pearlshell were found in the state? Here in our own Clearwater River! When you're hunched over in your waders, peering through a glass-bottomed bucket to look for mussels half-embedded in the substrate, "catch-per-unit-effort" (cpue) takes on a new meaning.

In mussel research, cpue is measured as mussels found per hour. MTNHP researchers plodded through plenty of miles of stream finding one or fewer mussels per hour. Yet in a particular stretch of the Clearwater, they found an incredible 480 pearlshells in an hour! Viable populations were also found in Marshall Creek.

It's now time to consider whether these strong Clearwater populations could be used for seed to restore extirpated or weak populations in nearby streams with otherwise good habitat and improving densities of cutthroats. In 2011, Fish, Wildlife and Parks, along with Heritage Program staff, made a fledgling attempt to do just that, hoping to re-establish pearlshell populations in 3 Blackfoot River tributaries.

The project turned out to be unsuccessful, but for procedural reasons, not biological ones. The team members plan to try again in the summer of 2012, armed with experience and hope in turning the tide for this little-known native invertebrate.