

mussels of the cannon river



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introduction

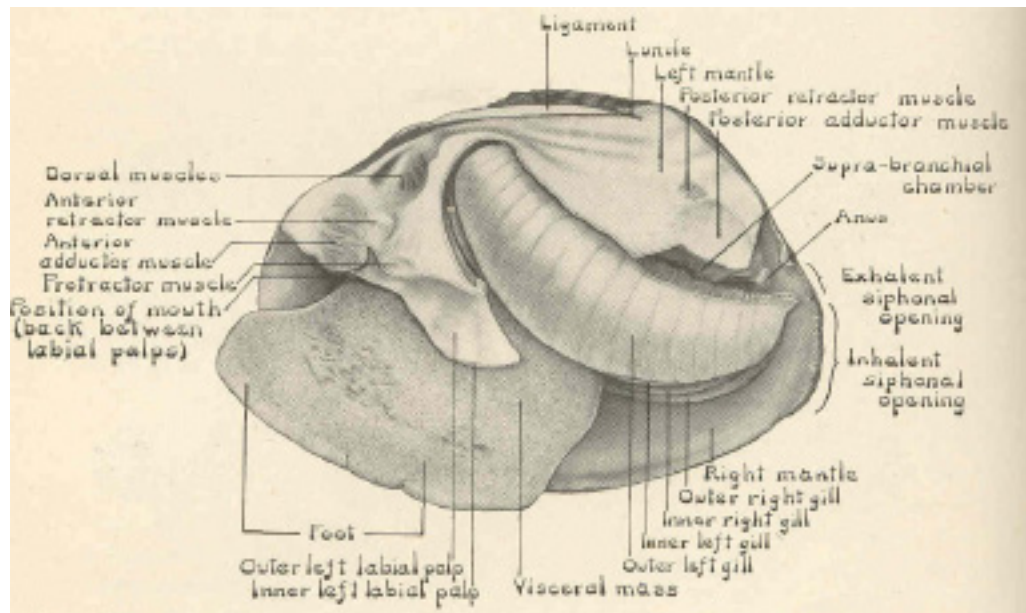
Who is this guide written for?

This guide is for all those who are curious about the mussels that lie below the murky waters of the Cannon.

mussel natural history

Anatomy

Let's face it, most of you don't know a lick about freshwater mussel anatomy. I blame this on the state of the US education system, which prizes skills like reading comprehension and math rather than ensuring that 4th graders be able to identify the anterior abductor and incurrent syphon of a mussel. I included a diagram below to bring you up to speed, and I insist that you don't read further until you have memorized every detail.



Freshwater Mussel Diagram. Features the White Heelsplitter (*Lasmigona complanata*)

Taxonomy

Let's start with some taxonomy! All freshwater mussels belong to the order Unionoida. Unionoida belong to the class Bivalvia (meaning, "two shells") which includes animals such as clams, oysters, scallops, and (of course) mussels. Finally, all bivalves are a part of the Phylum mollusca which includes creatures such as squid, octopi, snails, and my favorite animal: the nudibranch.

Reproduction

Freshwater mussels can be pretty curious creatures when it comes to reproduction. For example, some mussels release larva that attach to the gills of fish. These larva stay on the gills of fish for weeks or even months before falling off as juvenile mussels. To deposit these larva, females employ an ornate fish-shaped lure fashioned out of their mantle. These mantle flaps pulse rhythmically - simulating the motion of fish attracting unwitting predatory fish to "pounce" and scoop up a set of Lampsilis larva. This lure is so intricate and so well "designed" that it can be difficult to imagine how it could be shaped by natural selection. Darwin himself puzzled over organs of "extreme perfection and complication," such as the human eye and acknowledged that it defies common sense to imagine that any such organs were formed through small scale modifications over geologic time.

To the evolutionary biologist Stephen Jay Gould, the lure of the freshwater mussel is the most awe-inspiring adaptation in nature. I find it a bit wanting to call a freshwater mussel awe-inspiring; nevertheless, Gould, in his excellent essay collection **Ever Since Darwin** uses the Lampsilis as a vehicle to explore the issue of perfection in evolution, expanding upon Darwin's conundrum of organs of "extreme perfection and complication."

mussel descriptions

There are 15 mussel species which inhabit the Cannon River. This guide includes species which were found during a 1997 student survey of a section of the Cannon nearby Carleton.

Lampsilis siliquoidea

This mussel features the wonderful common name of “fatmucket.” It is perhaps the most widely distributed mussel in North America. It ranges from around 2 to 5 inches in length. The shell ranges from a light yellow to a muddy brown, and like the black sandshell often features greenish rays extending along its exterior. This species is also sexually dimorphic with females sporting shells that are more short and stout. Fortunately (depending on your opinion of the fatmucket), this mussel is listed as a species of least concern by the IUCN (International Union for Conservation of Nature).



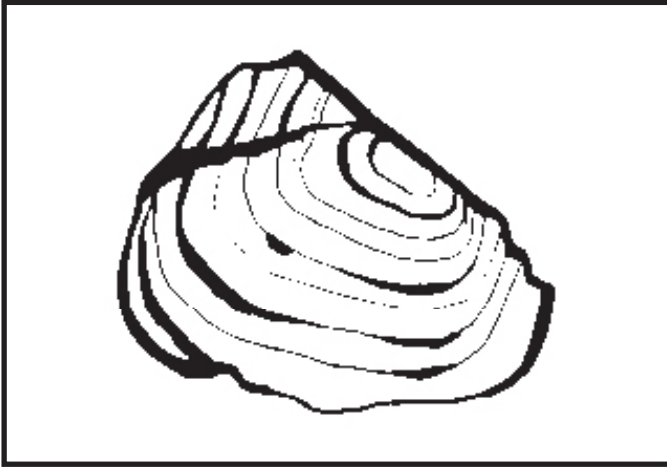
Lampsilis cardium

The “plain pocketbook” is a cute little mussel. It’s shell is yellow to tan in color and often quite thick relative to its size. You’ll also find greenish rays striping the shells of some specimens. Like many other freshwater mussel species, females feature stouter, more compact shells than males. The populations of these species have been deemed to be quite healthy by the IUCN - and is accordingly listed as species of least concern.



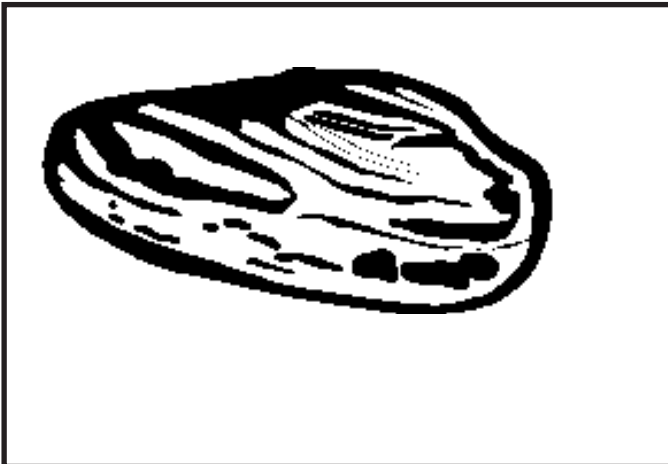
Potamilus alatus

This mussel, the “Pink Heelsplitter,” was by far the most abundant in the Cannon as reported by the 1997 student survey. This might be the most striking mussel in the Cannon, which is about as impressive as being the most striking mussel in the Cannon. Jokes aside, it has an elongate and somewhat rectangular shell up to 8 inches in length that ranges from brown to green in color. You might be surprised to hear that this species is not sexually dimorphic. The “pink” in its name refers to its inner shell.



Ligumia recta

Commonly known as the black sandshell, this bivalve features a long, smooth, black shell, often with greenish rays. It's sexually dimorphic (the two sexes of the same species exhibit a variety of different characteristics, beyond the obvious differences in sexual organs), with males more pointed towards the posterior of the shell and females more rounded. It's listed as a species of "special concern" by the Minnesota DNR, which means that, while neither endangered nor threatened, it is fairly uncommon and has specific habitat requirements.



Lasmigona complanata

Congratulations! You've made it to the last mussel of this field guide. You officially... have a lot of time on your hands! This mussel - the white heelsplitter - is distinguished by its very thin shell. Like the pink heelsplitter, it can get quite large: up to 8 inches. It sports a greenish-brown shell and is not sexually dimorphic. It's also a species of least concern.



Note about Scientific Names

Why use all of these long, byzantine latin names when we have perfectly fun, descriptive names like the “fatmucket” and the “plain pocketbook?” It comes down to standardization; one man’s “fatmucket” is another man’s “grass mucket.”

What’s also nice about what scientists like to call “binomial nomenclature” is that it highlights evolutionary relationships between organisms. For instance, *Lampsilis siliquoidea* and *Lampsilis powellii* belong to the same genus (along with all other *Lampsili*) and therefore likely share a fairly recent common ancestor.

natural and human history of the cannon

From 100,000 to about 10,000 years ago the Cannon and the greater Northfield area was what geologists like to call “glaciated,” or what us well-adjusted folks like to call “covered in ice.”

Major changes to the Cannon River ecosystem didn't occur until European settlers in the 19th Century built mills near the Cannon River and dams to power them. This damming increased sediment loads in the rivers which was damaging to mussel populations. Perhaps more importantly, it prevented many fish from traveling as far along the river as they had in the past, thus disrupting the connectivity of mussel populations.

At the turn of the 20th century, The market for both “pearl buttons” made of freshwater mussels and the pearls themselves exploded and the mussels began to be harvested at an unprecedented rate. The industry for pearl buttons was largest along the Mississippi and Illinois rivers and continued until the advent of plastic buttons in the 1940s.

Ecological role of the mussel

According to the Minnesota DNR, Mussels are considered to be “ecosystem engineers,” because they make the aquatic environment more habitable for the entire aquatic ecosystem. As filter feeders, mussels clean the water by removing plankton, bacteria, fungi and detritus, and even unwanted toxins from the water column - using this organic material for energy and to build tissue - pretty neat, right? What's really exciting is that bivalves such as oysters and mussels, despite their relatively small size, can make a

really big dent into water quality when present in significant numbers. In fact, individual mussels filter an estimated of 20-30 gallons of water a day. Finally, we can see anecdotal evidence for the positive effect of mussels on the Cannon river ecosystem if we look at two poems about the Cannon before and after the boom of the “pearl button” industry.

A Scene on the Cannon (Daisy Addison, 1883)

Down through the peaceful valley
The winding Cannon flowed;
And on every dancing wavelet
A sparkling sun-beam rode.
And merrily danced the river,
In the moon-beams silver light;
As it bore the lovers homeward,
Through the folding gloom of night.
Flow onward Cannon River, Flow onward toward the sea!
And carefully guard the secret, So carelessly trusted thee.

Seen from the Bridge (Unknown, 1913)

We stood on the bridge at Third Street
And gazed at the river below.
Whose waters were stagnate and filthy
And wondered why this should be so.
The slime-covered rocks and old timbers
And the decomposed vegetable mass
And garbage dumped in there this summer,
Is a menace to the people who pass.

References

All of the data referenced on the occurrence of mussels in the Cannon comes from a 1997 survey performed by students Zach Jones, Larry Richmond and Professor Gary Wagenbach. All information about the survey is available on the Carleton Arboretum website at www.carleton.edu/campus/arb. Mussel diagram taken from the University of Washington Freshwater and Marine Image Bank.

“How Mussel Farming Could Help to Clean Fouled Waters.” Yale E360. https://e360.yale.edu/features/how_mussel_farming_could_help_to_clean_fouled_waters.

If you're interested in learning a bit more about efforts conservationists are making to improve water quality with mussels and other related techniques, then I highly recommend reading the Yale 360 Article.

Sietman, Bernard E. Field Guide to the Freshwater Mussels of Minnesota. St. Paul, MN: Minnesota Dept. of Natural Resources, 2003.

The best available field guide on freshwater mussels of Minnesota.

Gould, Stephen Jay. Ever since Darwin: Reflections in Natural History. New York: Norton, 1979.

An excellent collection of natural history essays, including the article described in the “reproduction” section of the field guide about *Lampsilis*.

Suave, Jeff. “The Cannon River’s Storied Past.” Southernminn.com, June 6, 2012.

This story expands on some of the themes discussed in the Natural and Human History of the Cannon section and includes both poem included in the field guide

Acknowledgments

Special thanks to my sister helping with the illustrations and layout of the guide!

Thanks to Gary Wagenbach for leading a tour of the Cannon which inspired me to write this guide!