

Travelers

Known for their **slow pace**, these nearly invisible creatures live all around Minnesota.

IMAGINE THE GREAT PLAINS in miniature: a piece of land the size of a dinner plate with thousands of grazing animals, most no larger than a candy sprinkle. Each animal has its own portable house. When it comes out to eat, it crawls on only a single foot. These remarkable animals are land snails.

Land snails are mollusks, the second largest phylum of animal life on earth. They belong to a group known as *gastropods*. Gastropods have colonized almost the entire planet, living in places from deep oceans to shallow coastal waters, freshwater lakes, rivers, and springs. On land, they range from arctic tundra to tropical rainforests and from deserts to swamps.

North America is home to more than 1,200 species of land snails. Minnesota harbors about 90 species. They live on prairies, in forests, and near swamps and rocky bluffs and boulders.

Land snails are so poorly known that until 30 years ago only one Minnesota species had a common English name—the cherrystone. While common names have since been proposed for all, they had to be invented from scratch and are usually not very useful. So, like the names we use for dinosaurs, we'll stick with Latin scientific names for land snails in this story.

BILL JOHNSON



An amber snail, *Succinea ovalis*, crawls slowly across a leaf on a track of slippery mucus produced by a special gland on its foot.

Fun fact

The word gastropod comes from the Greek gaster, meaning stomach. Pod comes from the Greek word for foot. A gastropod's foot comes out of its body near the stomach.

Fun fact

Land snails without an outer shell are usually called slugs. A semislug has a shell that is too small for the animal to fully withdraw into.

Fun fact

Most Minnesota land snails are slightly larger than Lincoln's nose on a penny. Over 150 individuals of the smallest species would fit onto a single penny.



What's in the Shell?

A land snail has a shell large enough for the animal to completely withdraw into it. Like all gastropods, a land snail has a head with two or four sensory tentacles. The snail uses its tentacles to smell—the sense it uses the most to learn about its world. Some snails also have eyes on their tentacles. Snails do not have ears of any kind.

The snail has a mouth and a special tongue called a *radula*. The radula is covered with hundreds of sharp barbs, which work like teeth for eating food. The snail gets rid of body wastes through the skin or the end of its digestive system.

Like people, land snails have lungs and breathe air. Because of this, a land snail would drown if it fell into water. It has a heart but no arteries or veins. It pumps its blood through openings between its cells.

To move around, the land snail has one foot. It contracts and expands its foot muscles to make a kind of rippling

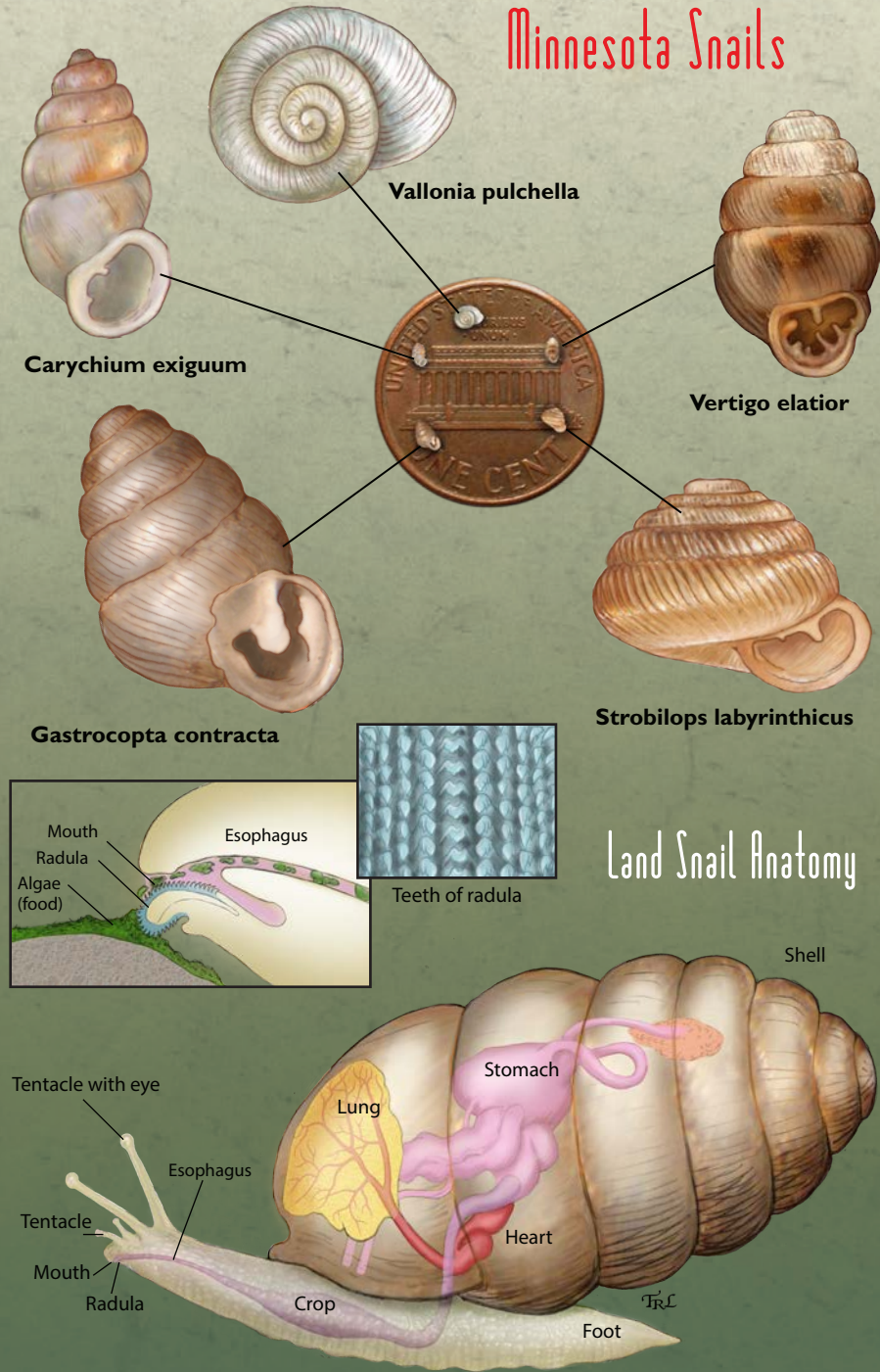
motion that pushes its body forward. Its foot has a special gland that produces slimy mucus. The mucus makes a slippery track on the ground, leaves, or other surface for smoother traveling. A land snail can survive in dry conditions, but it is active only when it has enough water to produce mucus.

Tiny and Tinier

Minnesota's land snails range in size from the 2-inch *Neohelix alleni* to the 1/16-inch *Punctum minutissimum*. While you are most likely to see larger snails when exploring outdoors, they turn out to be far less common than little ones are.

If you counted all the snails in the state, these tiny ones would make up more than 85 percent of them. In some habitats, such as white cedar swamps and limestone cliffs, it is possible to find more than 5,000 snails within a single square yard—a space about as big as an armchair.

Minnesota Snails



Shell

Foot

Slime does more than just help this amber snail get around. It makes it hard for mice or birds to get a grip on it. Small parasites may get stuck in the slime. The flamed tigersnail, *Anguispira alternata* (far right), is one of the most common large snails found in Minnesota.



BILL JOHNSON



BILL FRANK

A Place That's Just Right

Minnesota land snails live in a variety of places, from swamps to dry prairies and rock outcrops. Most live on the ground, especially among moist layers of leaves under trees and shrubs. They also like the humus (decomposed plant and animal matter) that collects between rocks and on small ledges of cliffs. Many snails live in dead plant leaves and stems on the ground on prairies and land near ponds and other wetlands. These dead plants serve as food and shelter from sun and wind.

When exposed to full sun and dry air, most land snails quickly die, even inside their shells. If leaf litter, humus, or other organic matter is removed, snail habitat vanishes. For this reason, fire is one of the most serious threats to land snails today. Researchers have studied snails on land often burned by fire and on land never burned. When fire destroys snail habitat, about 90 percent of individual snails and one-third of snail species disappear.

What Do Snails Eat?

Most Minnesota land snails are *detritivores*, meaning they get food from dead and decaying plant matter such as fallen leaves and rotting wood. Using the sharp, tiny teeth on its tongue, a snail scrapes fungi off the plant matter. Many snail species also happily eat algae and lichens growing on rocks, tree bark, and leaves.

About a dozen of Minnesota's land snail species are *herbivores*, which eat living plants. Among their favored foods are nettle leaves, which contain lots of nutrients.

Minnesota has one snail *carnivore*,

which eats other animals. *Haplotrema concavum* lives in southeastern Minnesota forests, where it hunts for other snails and worms. An ambush predator, this snail waits patiently until its prey comes near and then suddenly lunges out from its shell to grab and eat it.

Who Eats Snails?

You might find piles of broken shells where mice and other small mammals have been dining on larger snails. A variety of birds also eat land snails. Smaller snails often avoid these threats, but some beetles can rip open a tiny shell, remove the snail, and eat it.



The earth-colored shell of this *Neohelix alleni* snail helps it blend into its surroundings and hide in plain sight from birds and other predators.

JEFF NEKOLA

Baby Snails

Most land snails are *hermaphrodites*, which means they have both male and female body parts. Such a snail does not need a mate because it can fertilize its own eggs with its own sperm. Depending on its species, the snail lays one to 100 eggs.

A baby snail develops within the egg. Scientists don't know how long many snail species take to develop. When it's

ready to hatch, the baby snail uses its barb-covered tongue to eat its way out of its eggshell.

When the new snail emerges, it already has a small shell, called a *proto-conch*. Some newly hatched snails may take many years to become adults. Others mature in just three weeks.

Depending on the species, adult snails may live from weeks to decades.

The most likely way that a snail will die is from disease and old age.

Cross-Country Travel

While most snails will move only a few yards under their own power within their lifetime, some travel long distances with the help of animals, water, and wind. Migrating birds can carry a small land snail thousands of miles while the snail holds on with its sticky mucus. If you run your hand through damp grass leaves, you might find a few small snails sticking to you and coming along for a ride.

A Long, Slow Nap

When the weather is dry or cold, a land snail will fully retract into its shell and go to sleep. To do this kind of hibernating, or *estivating*, a snail pumps as much water as possible out of its body and then seals the opening of its shell with a cellophane-like covering called an *epiphragm*. It might also glue itself to a leaf, rock, or other object to protect itself from the outside world. When the outdoors becomes warm and wet, the snail comes out of its shell. Some land snails have woken up after estivating for 70 years or more.

Five Minnesota Land Snails

Hendersonia occulta (cherrystone)

In Minnesota the ¼-inch cherrystone snail lives only in cool, humid rock outcrops in the woods of southeastern counties. This species is known from ice-age fossils found in areas 100 to 1,000 miles south of Minnesota. Today its range reaches from Minnesota and Missouri east to Pennsylvania and Tennessee.



Gastrocopta rogersensis

This land snail is about the size of a grass seed. In Minnesota it is found only in dry, rocky prairies along the Mississippi River in the far southeastern counties. The range of this microsnailed snail runs from Minnesota south to Oklahoma and east to Ohio.



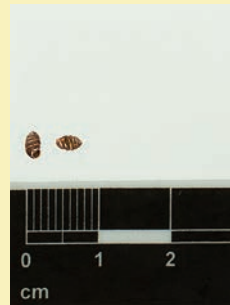
Planogyra asteriscus

Very rare in Minnesota, this microsnailed snail has been found in only four northern white-cedar forests along the Lake Superior shore in Cook County. Its range runs from Minnesota east to New England states and the eastern provinces of Canada.



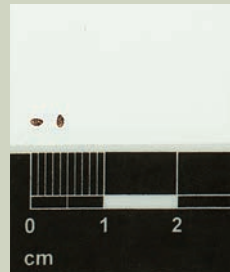
Pupilla hudsonianum

This microsnailed snail has been found on two northwestern lakeshores in Minnesota. The species was discovered and named in 2015 from the population found at Lake Bemidji State Park. It is a common ice-age fossil in Iowa and Illinois. Its range reaches west to the Rocky Mountain foothills in Alberta, Canada, north to Hudson Bay, and east to Newfoundland.



Vertigo nylanderi

This microsnailed snail was reported from one place in northern Minnesota in 1955. For more than 40 years, nobody found the species alive again. Then, in the 1990s, researchers discovered it at three dozen conifer swamps in northwestern Minnesota. Its range extends from Minnesota and central Manitoba to Maine.



COURTESY OF WILL PHELPS

How to Find Snails

The best way to observe land snails is by searching piles of leaf litter. Put a shallow sieve, or strainer, of fine mesh inside a slightly larger sieve of extra fine mesh. Add handfuls of leaves, then shake and tap the sieves to get the smaller particles to pass through. Examine both large and small pieces. If needed, use



a magnifying lens to find and examine the tiny snails. ✓

TEACHERS RESOURCES

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