7 Natural Champions

Meet some of nature's best swimmers, divers, weightlifters, and wrestlers:
They're wild.

By Mary Hoff

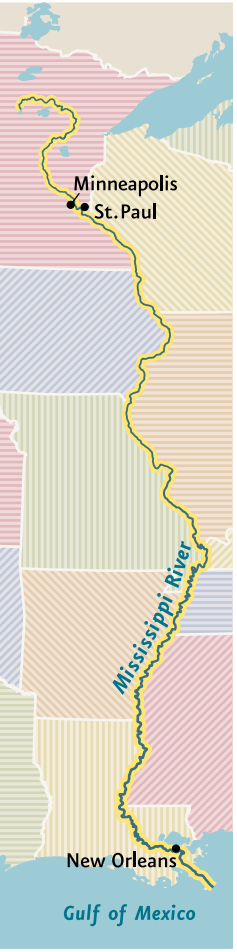
JUMP, RUN, SWIM, DIVE—every four years people from around the world get together at the Summer Olympics to compete for gold medal awards in athletic events. The skills of Olympic athletes are impressive. But what would happen if animals could join in the games too? Let's take a look at seven of Minnesota's top wild competitors.

Look at the wild athletes on the opposite page. Try to name the action each one does best. Clockwise from the top: white-tailed jackrabbit, pavement ant, osprey, golden shiner, bullsnake, American eel, water boatman. Read the story on the following pages to find out how each creature excels.

OPPOSITE PAGE: OSPREY BY STAN TEKIELA. ABOVE, CLOCKWISE FROM TOP: WHITE-TAILED JACKRABBIT BY STAN TEKIELA, PAVEMENT ANTS BY BILL JOHNSON, OSPREY BY JIM BRANDENBURG, GOLDEN SHINER BY KONRAD SCHMIDT, BULLSNAKE BY ALLEN BLAKE SHELDON, AMERICAN EEL BY SEAN LANDSMAN/ ENGBRETSON UNDERWATER PHOTOGRAPHY, WATER BOATMAN BY BILL JOHNSON.

1. Marathon swimmer: American eel

(Anguilla rostrata)



An Olympic marathon swim is 10 kilometers, or 6.2 miles, long. But when an American eel "goes the distance," it swims about 1,800 miles between the Gulf of Mexico and Minnesota rivers.

The story starts when eel eggs hatch in the Sargasso Sea, a massive expanse of floating seaweed in the north Atlantic Ocean. The young fish float along on ocean currents until some reach the outlet of the Mississippi River in the Gulf of Mexico. Most eels that hang out here become males. The eels that swim far upstream are typically females. Some of them swim as far as Minnesota. Here they hang out in the Mississippi, St. Croix, or Minnesota rivers for five to 20 years. Females can be more than 3 feet long (males are only half that size).

When an eel is ready to breed, it starts its marathon swim back to the Sargasso Sea. To prepare for the trip, the eel eats lots of fish, frogs, snails, and other food. It uses the food to make and store oil in its body. The oil gives the eel energy-packed fuel for its long journey. For the trip the eel sends more blood to a balloonlike bag, called a *swim bladder,* within its body. The extra blood helps create gases that fill the swim bladder and keep the eel afloat. Its eyes become more adept at sensing blue light, so it can see well in the ocean.

If you've heard the phrase "slippery as an eel," you already know one of the eel's secrets for swimming so well: The slimy skin with tiny scales makes it easy for water to slide smoothly past its body without creating friction to slow it down.

The ability to wiggle its whole body makes the eel a champion marathon swimmer. With many ribs and well-placed muscles, the eel moves like a snake underwater. Wiggling helps propel it swiftly and efficiently.

Arriving in the Sargasso Sea after two to three months, eels mate and lay eggs, starting the cycle once again.

MAP BY MATT KANIA. AMERICAN EEL BY SEAN LANDSMAN/ENGBRETSON UNDERWATER PHOTOGRAPHY.

BILL JOHNSON

2. Weightlifter: pavement ant

(Tetramorium caespitum)

Imagine carrying a bag of groceries or a backpack that weighs 10 times as much as you do. That's how much pavement ants can lift. Human weightlifting champions spend years building muscles to be able to lift three or four times their weight.

Among Minnesota's most common insects, these reddish-black ants live in colonies under sidewalks and rocks and sometimes in our kitchens. Pavement ants are known for their strength. They have bigger heads with bigger muscles, relative to their body size, than many other ants. They eat just about everything—seeds, bits of leftover food, caterpillars, and other ants. When a pavement ant finds a piece of food, it picks it up in its massive jaws. Using its strong neck and leg muscles, the ant carries the food back to its colony.

Here's a little secret: Carrying 10 times your own weight is much easier for tiny creatures like ants than it is for bigger creatures like us. Because an ant is tiny, its muscles do not have very much body weight to support. That means the ant can use a lot of its strength to lift other things. As a creature's size increases, its weight increases far more rapidly than its strength does. Bigger muscles add more weight than strength. We humans have much bigger bodies to support relative to the size of our muscles, so we don't have as much extra strength to lift other things.

BILL JOHNSON

ALLEN BLAKE SHELDON

3. Rower: water boatman

(Corixidae)

When we think of insects moving from one place to another, we usually think of them flying or walking. But water boatmen have a more unusual idea—rowing.

True to its name, this one-third- to one-half-inch-long pond dweller propels itself by using its hind legs to row through the water. Much like an Olympic rower on a racecourse, a tiny water boatman uses its oars to push against the water and speed its way around a pond.

Instead of a boat or racing shell, a water boatman uses its body as a boat. Like a rower with oars, the insect has long, oar-shaped back legs with fine hairs called *setae*. When the water boatman stretches its back legs to the front of its body, the setae flatten out. Then, for the power stroke, the water boatman pulls its legs back and the setae spread out to make a perpendicular blade. The friction between the water and the legs causes the insect's body to surge ahead. At the end of its power stroke, the water boatman moves its "oars" forward and begins again.

STAN TEKIELA

4. Diver: osprey

(Pandion haliaetus)

Soaring 50 feet above a lake on powerful wings, a huge brown and white bird searches the water below. Suddenly it spies a dark movement just below the surface. As its intense yellow eyes focus on its target, it tucks its wings close to its body and plummets headfirst through the air. As it drops, it moves its tail and wings slightly to steer toward its prey. Approaching the water, it opens its claws and stretches its feet downward like landing gear. Splash!

The big bird hits the water with the precision and grace of an Olympic diver. Its legs slice through the water. With its sharp talons, the osprey grabs a fat fish.

Spreading its wings once again and shaking water off its body, the osprey surges skyward, carrying the fish to its mate and chicks in a nest nearby.

An osprey has many adaptations that help make it an exceptional diver. With its streamlined shape, an osprey can easily slice through the air as gravity pulls it downward. Its slit-shaped nose closes as it hits the water. Transparent "third eyelids" protect its eyes. It has a special gland near its tail. This *uropygial gland* produces waterproofing oil. The osprey coats its feathers with this oil to keep them from getting waterlogged.

How well do these adaptations work? Experienced ospreys usually catch fish one out of every four dives. On good days, an osprey catches fish three out of every four dives.

ALLEN BLAKE SHELDON

5. Wrestler: bullsnake

(Pituophis catenifer)

Wrestling takes powerful muscles. A wrestler needs to be flexible and able to wriggle out from an opponent's grip. What kind of Minnesota animal would you choose for an Olympic wrestler? If you said a snake, you've made a good choice.

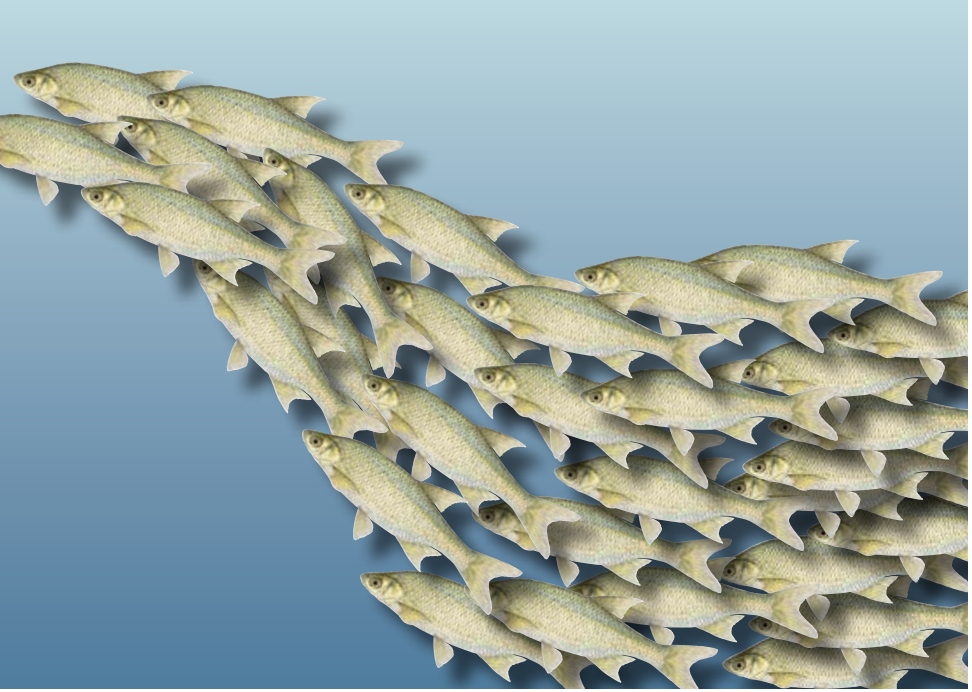
Long and strong, bullsnakes are perfectly built for a wrestling match. These reptiles with black and brown splotches can grow to be 5 feet long or longer.

Also known as a gophersnake, the bullsnake captures and kills gophers, mice, and other prey by wrapping its muscular body around the animal and squeezing it until it dies.

In spring, when getting ready to mate, male bullsnakes wrestle with other male bullsnakes. Two males twist and tangle together like giant spaghetti noodles. Each one tries to prove that it is more powerful than the other. Eventually, one gives up and lets go. The stronger one gets to mate with a female bullsnake.

As far as scientists know, female bullsnakes don't wrestle with each other. But a female snake and a male snake wrestle a little as they tangle together to line up their mating body parts.

What makes a bullsnake such a good wrestler? Like other constrictors, a bullsnake has many sets of vertebrae and ribs, which make it very flexible. It has strong, relatively short muscles, which help it grip and squeeze. A bullsnake doesn't have the arms and legs that a human wrestler uses to take down and pin an opponent. But a bullsnake's opponent doesn't have arms and legs either, so it's a fair match.



JOSEPH TOMELLERI

6. Synchronized swimmer: golden shiner

(Notemigonus crysoleucas)

If you've ever seen dozens of minnows dart through shallow water together, you might have seen golden shiners—champion synchronized swimmers. Commonly found in lakes and slow-moving streams, they travel in groups, called *schools*. Together, they search for microscopic plants and animals to eat or flee bigger fish that want to eat them.

If a shiner were swimming alone when a big fish spotted it, the shiner would most likely get eaten. Traveling in schools helps shiners survive by reducing the chances that any one fish will get eaten when a predator shows up.

Amazingly, no single shiner is in charge of deciding where to go. Fish schooling, like birds flocking, is an example of *emergent behavior*. Their action "emerges" when many individuals respond at the same time to the same cues. In the case of golden shiners, scientists have found two "rules" that keep them in line: Stick close to each other, and stay in shady places. Following these unwritten rules, the little fish flow together like a team of synchronized swimmers.

BILL MARCHEL

STAN TEKIELA

7. Sprinter and long jumper: white-tailed jackrabbit

(Lepus townsendii)

The fastest known human sprinter, Usain Bolt, was clocked running nearly 28 miles per hour during a 2009 race. If he'd raced against white-tailed jackrabbits, he would have been eating their dust. With lots of leg muscle, these rapid rabbit relatives (they're actually hares) can reach speeds of more than 40 miles per hour when chased. Jackrabbits flee owls, coyotes, and other predators across their native grassland habitat in western and southern Minnesota.

How can a jackrabbit run so fast? A big part of the secret is how its hind legs are constructed. Huge hip muscles allow for fast, powerful strides. Long leg tendons "tie" muscles to bones. The tendons act like rubber bands stretched tight, launching the hare through the air with every leap. A jackrabbit also has an extra-big heart and large lungs, which feed muscles oxygen to run strong.

The jackrabbit could try out for the long jump too. With those awesome legs, some hares have been recorded jumping 10 feet in a single bound. Even though the jackrabbit would take three jumps to keep up with the best human long jumpers, who can leap nearly 30 feet, it would surely get a prize for its size.

Teachers resources

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