

The Outside Story

Little Loudmouths: How Tiny Animals Make So Much Noise

By Kenrick Vezina

From early spring through late summer, the air trills and croaks and buzzes and chirps with the sounds of nature's little loudmouths. Mornings are full of birdsong; evenings are the domain of frogs and crickets. How do such little animals make so much noise? Let's find out by looking at some of the sound-per-pound champions you can find in our forests.



First up: the frogs. Although basso bullfrogs can produce a very impressive 120 decibels, it's the smallest species in our region that is the most interesting. Spring peepers are about as long as a paperclip, and weigh as much as a nickel. A male peeper can output around 100 decibels from point-blank range. For perspective, OSHA recommends hearing protection for anything over 85 decibels. And peepers rarely sing alone. Hundreds of them gather in shrubby wetlands in spring. On a warm evening in April, your local marsh can easily be as loud – and as full of lovesick longing – as a crowded bar.

Frogs have a similar vocal anatomy to humans, including a larynx (or voice box) with flaps of tissue that vibrate as air passes over them to make sound. The trick to frogs' vocal talents is their expandable throat pouches. These air sacs offer two advantages. First, they're built-in resonating chambers, allowing frogs to amplify their calls. Second, they allow frogs to sing continuously without needing to inhale: air passes from the lungs to the air sac, then back again multiple times in a single breath.

Our next group of vocalists is birds. Among our avifauna, one prominent little loudmouth is the winter wren. Even among the notably diminutive wren family, winter wrens are small. Weighing less than half an ounce, and with a wingspan of a mere 5 to 6 inches, these birds look like mousy brown balls with pert tails and tiny beaks. And yet they can fill an entire bottomland forest with song.

A single male's frenetic song can produce 16 notes per second – and members of the western population can manage 36! At more than 90 decibels in volume, these tiny birds put crowing roosters to shame. While some roosters may crow at 130 decibels, wrens are at least ten times louder, per pound, than those barnyard klaxons.

The magic of birdsong happens deep in a bird's chest. Where its trachea branches off to its lungs, a bird has a specialized sound-making structure called a syrinx. The vibrating membranes of this structure,

coupled with a bird's four internal air sacs and powerful air-moving muscles, allow birds to out-belt even the best human singers.

Of course, forced air isn't the only way to make noise. Our final group of little loudmouths, insects, aren't literal loudmouths, since their sound doesn't come from their mouths – but they claim the current world-record holder for loudest animal relative to its size: *Micronecta scholtzi*, the European lesser water boatman. These aquatic insects – each about as long as a grain of rice – have been measured producing 100 decibels.

Our own northeastern insects can also be plenty loud. Most of the notable calling insects use stridulation to make noise. It's the same mechanism that the water boatman uses, analogous to drawing a bow across a violin's strings. What varies is exactly upon which body parts a given species has evolved stridulating structures. For katydids it's their forewings; for water boatmen it's their genitalia and abdomen.

The dog day cicadas and their relatives are the most impressive noisemakers among our native insects. In late summer, it's not uncommon to hear a cicada's motor whine over the literal motor whine of a neighbor's weed-whacker. These large insects produce a sound reaching 100 decibels or more using unique organs called tymbals. These structures are corrugated with flexible sections and stiffer ribs (think of a bendy straw). When the cicada flexes certain muscles, the ribs bend then "click" back into place. By flexing them extremely quickly in rapid succession, and using their own bodies as resonating chambers, the cicadas create their symbolic end-of-summer buzz.

Whether it's a spring peeper, a winter wren, or a cicada, the reason for all of this noise comes down to reproduction. When you're a small animal in a big world, sound is an excellent tool to advertise your presence and fitness to potential mates and to warn off potential interlopers. Sometimes, it pays to be a little loudmouth.

Kenrick Vezina is a freelance writer, naturalist, and raconteur based in the Greater Boston area.

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PO Box 270, Lyme, New Hampshire 03768
mail@northernwoodlands.org / 603-795-0660
www.northernwoodlands.org

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