

A Bug's Life

To further his understanding of the natural landscape, biologist Stephen Trombulak turns to one of the area's smallest creatures.

BY JOSHUA BROWN

STEPHEN TROMBULAK doesn't look up when a bird, concealed in a nearby thicket of saplings, starts singing an outlandishly long song: five, six, seven, eight seconds of connected trills and chirps. The Albert D. Mead Professor of Biology and Environmental Studies keeps his head down, the brim of his Boston Red Sox hat nearly touching a small Tupperware bowl he has just prized out of a hole in the soil. He peers into the container, one of five pitfall traps he dug into this mossy and fern-covered hummock earlier in the summer. A thin layer of dead insects floats at the bottom of the trap.

"Oh yes, we have a ton of beetles here," he says, pulling a pair of forceps out of his field vest and poking around in the brown ooze at the bottom of the container. "We've got some crickets, some slugs—I hate slugs—and this is one of the beetles I'm looking for, a carabid."

He picks up a spray bottle labeled "70% ethanol," and carefully rinses the contents of the trap into a plastic bag. "One in four named animal species are beetles," he says slowly, still gazing toward the

ground. He labels the bag with a red grease pencil, replaces the container in its hole beneath a fern, covers the top, and pulls a compass out of his pocket to take a bearing for the next set of traps.

Then he looks up with a hint of a smile. "Did you hear that winter wren?"

Those who know Trombulak would not be surprised to find him here, in a soggy stand of spruce and birch on the western slope of the Green Mountains, studying wildlife.

But they might be a little surprised to see him—a *vertebrate* biologist, a teacher who likes to have his students down at Otter Creek at six in the morning to catch birds, a scientist with a reputation for concern about big creatures and big ideas—directing his attention to, well, small and spineless beetles. Today, even his beloved birds wait.

"We need to develop a conservation perspective for all organisms," he says, wending his way through the deep shade of this adolescent forest, "not just the ones that are showy or cute or cuddly." Trombulak's recognition that many of nature's processes are bigger than the range of human perception has helped



make him a leader in the emerging science of landscape ecology. Take the winter wren as an example. Whether an individual winter wren has success hatching young birds in Vermont may be determined by what is happening

NATURE'S PARADOX
Stephen Trombulak has recognized that much of nature's processes are bigger than the range of human perception. And, sometimes, one must look at the smallest things to fully understand this.

to the surrounding thousands of acres or to its wintering grounds hundreds of miles away in the Southern states.

But if the big is hard to perceive, so too is the small. Bird watchers would be sure to notice if winter wrens stopped returning to Vermont, but how many would notice if a hundred species of beetles suddenly blinked out? Perhaps none, and yet the foundation of the wren's diet includes many beetles. "We'll probably

Middlebury scholar in residence Bill McKibben. "He is an amazingly courageous, outspoken—though always rigorously scientific—champion for big wilderness in the East." And it's this passion, coupled with a scientist's inherent inquisitiveness that has led Trombulak to beetles.

"I could not credibly call myself an entomologist. I did one beetle project back in the Pleistocene," he says, his black tank top and tattooed shoul-

Trombulak recently attended in Brazil. "There was a tremendous focus on large-scale processes and big animals," he says, holding up a black speck in his forceps, a beetle the size of a pepper flake. "Out of a thousand presentations maybe 20 were on invertebrates."

The same bias against the small seems to exist close to home, too. "The recovery of Vermont's forests over the last 130 years is told as a success

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ders making him, at age 50, look more like a member of Generation Y than a relict of the ice age. "One of the beauties of Middlebury is that you're encouraged to be broad, to make connections," he says. "Insects are fascinating, so I decided to retrain myself on beetles."

Beetles are nature's common laborers. They're just about everywhere on the planet (except in the oceans and at the poles), and with 350,000 named species, beetles are the most common of all animals. Though their roles in the economy of nature are indispensable—as pollinators, predators, scavengers, dung rollers, and soil makers—you would not know it from a meeting of the Society for Conservation Biology

story. It's true the trees are back, and we've reintroduced some large animals. That's all great," he says. "Yet while we know how the trees are distributed across the landscape, and we have a reasonably good picture of mammals and birds, we don't have a good picture of what is happening to the little creatures." It is estimated that more than 5,000 species of beetles can be found in Vermont, each a cog in an enormously complex mechanism that we might best understand as a healthy forest, clean water, and clear air. And of the 5,000 beetle species, some 450 are in the family Carabidae, the ground beetles.

"Professional biology seems to think natural history and systematics are out of fashion," Trombulak says,

following his compass straight toward a fearsome tangle of tipped-over spruce trees. Yet, as he knows from years of computer mapping and simulations, without this foundation of knowledge about the real organisms on the land, ecological models—and the conservation actions that result from them, like land purchases—can be badly off target.

"If we are going to have reserves—land set aside from extractive uses like logging—that represent the diversity of life," he says, "we need to know how *all* organisms are spread across the landscape." Including beetles.

Several days later, Trombulak has holed up in a lab in McCardell Bicentennial Hall. In the stillness, the sound of a pin—sliding though the hard back of a dead beetle, then a tiny paper label, and into a block of foam—can be heard. Trombulak pencils a note into a logbook and then picks up his next specimen for pinning. "Look," he says quietly, and through the double lenses of a dissection microscope, a shimmering, breathtakingly beautiful, green and black beetle comes into view. "See that beanlike thing off the back leg? That's the enlarged trochanter. It's distinctive to the carabids."

Then he looks across the stone-topped lab table strewn with books like *American Insects Order 24: Coleoptera* and says, with just a hint of exasperation, "Wolves are flashy, but not everything in nature is a big carnivore." 🐾

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